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List of Abbreviations

bcf	:	billion cubic feet
bbl/d	:	barrels per day
bcm	:	billion Cubic metres
BFP	:	Basic Fuel Price
BMI	:	Business Monitoring International
BP	:	British Petroleum
CDM	:	Capricorn District Municipality
CEF	:	Central Energy Fund
CNG	:	Compressed Natural Gas
CPI	:	Consumer Price Index
CTL	:	Coal to Liquid
DoE	:	Department of Energy
GDP	:	Gross Domestic Products
GECF	:	Gas Exporting Countries Forum
GNT	:	Great North Transport
GTL	:	Gas to Liquid
JV	:	Joint Venture
LIMDEV	:	Limpopo Development Agency
LRDT	:	Limpopo Department of Roads and Transport
MDM	:	Mopani District Municipality
MT	:	Million Tonnes
NDoT	:	National Department of Transport
NERSA	:	National Energy Regulator of South Africa
NHTS	:	National Household Travel Survey
OPEC	:	Oil Producing and Exporting Countries
PPI	:	Producer Price Index
PRASA	:	Passenger Rail of South Africa
R	:	South African Rand
SAPIA	:	South African Petroleum Industry Association
TRP	:	Taxi Recapitalisation Programme

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US$:   United States of America Dollar

EXECUTIVE SUMMARY

This report examines the impact of rising fuel costs and interest rates on the South African and Limpopo economy (focusing more particularly on Capricorn District Municipality and Mopani District Municipality) in particular. It focuses on the macroeconomic effects, direct effects on the transport sector and impacts on households. The report concludes with a discussion of possible policy responses to issues raised in the analysis of impacts. This report was prepared by a joint venture between Catshile Consultants and Lifhasi Investments who were appointed by Limpopo Provincial Department of Roads and Transport in February 2010.

Increases in both the costs of fuel and interest rates have always created widespread concerns about its impact on economic growth, transport sector and on poor people. In 2008South Africans experienced substantial high prices for both diesel and petrol. This was as a result of the higher prices of crude oil whereby in the middle of 2008 oil prices struck an all time record of US$144/barrel. During this period the price of petrol was R10.57 whereas the price of diesel was R11.43.

Also during this period interest rates were very high, with the repo rates at 12.00% and prime lending rates at 15.80%. This increases coupled with the fuel prices meant that there was a big shift in the vehicle operating costs of public passenger transport which in certain instances led to the increases in fares.

The scope of work covered the whole area of jurisdiction of the Capricorn and Mopani District Municipalities. The relevant local municipalities covered in this study follow hereunder:

Capricorn District

- Aganang Municipality
- Blouberg Municipality
- Lepelle-Nkumpi Municipality
- Molemole Municipality
- Polokwane Municipality

Mopani District

- Greater Giyani Municipality
- Greater Letaba Municipality
- Greater Tzaneen Municipality
- Ba-Phalaborwa Municipality
- Maruleng Municipality

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Our approach in conducting the study was a combination of a variety of methodologies. Large part of the study was dedicated to desktop research and we also held focus group sessions with transport forums across the two district municipalities. The focus group sessions were based on discussions around the impact of rising fuel prices and interest rates on taxis and bus operators as well as on commuters or passengers. The main aim of the focus groups was to obtain greater insight into how fuel prices and interest rates are impacting on public passenger transport, and the results of the discussions are included in the sections where they are deemed to be relevant. Other approaches which were used in conducting the study are as follows:

- Introductory meetings;
- Email based interviews;
- Telephonic based interviews;
- One on One interviews;

The information and data contained in this report was sourced from a range of sources both locally and internationally and it was only intended for the main purposes of preparing this report. This report comprises of ten sections and they are summaries follow hereunder.

Section 1 : Introduction and background

This section gives the background of the project and also highlights the terms of reference or scope of work. A brief analysis of the study area which is Limpopo Province, Mopani and Capricorn District Municipalities is also given with a summary of the main characteristics.

Section 2 : Policy, legislative and institutional framework

This section makes an analysis of the policy, legislative and institutional framework which is related to the transport sector as well as energy sector. A summary discussion of the following is made

- White Paper on National Transport;
- Moving South Africa;
- White Paper on Energy Policy;
- Limpopo White Paper on Provincial Transport Policy;
- Position Paper on the Deregulation of Petrol;
- Petroleum Pipeline Levies Act No 28 of 2004;
- Petroleum Products Act 120 of 1977;
- National Land Transport Act No 05 of 2009;
- Central Energy Fund(CEF); and
- National Energy Regulator of South Africa.

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The implications of the respective policy and legislation on Limpopo Department of Roads and Transport in terms of public passenger transport are that,

- Public transport operators should be provided with financial support;
- Public transport should be accessible and more affordable in Limpopo;
- Consultation should be made with all transport stakeholders during planning and decision making processes within the province;
- Capacity building of stakeholders;
- Provincial government should offer support to local government in the implementation of transport related matters.

In terms of the implications of policy and legislation on fuel related issues, the following was concluded,

- The fact that petrol is regulated means that Sasol cannot sell its products at a cheaper price;
- Pipeline levies will always bear a huge impact on the price of fuel as each and every increase in the tariffs translates to a shift in the price of fuel; and
- In the promotion of energy efficiency the LRDT should embark public awareness campaigns targeting public transport operators in Capricorn and Mopani.

An analysis of the Central Energy Fund revealed has a major role in the price of fuel. This is because it has the responsibility of calculating the price of fuel.

Section 3 :	Economic and socio-economic profile

A summary of the economic and socio-economic profile of the two districts is provided in below. This information is important as it will serve as guide for the department when it considers the nature of support it wishes to provide on public passenger transport.

	Mopani	Capricorn	Limpopo
Demographics	1 068 567	1 234 165	5 238 286
Employment	169 667	185 898	1 090 000
Unemployment	241 631	124 902	1 337 361
GDP(R1000)	39 651 180	36 649 337	158 201 047
Fuel contribution to GDP(R1000)	78 354	220 834	678 013
Annual Expenditure by transport sector(R1000)	74 631	89 306	359 727

An analysis of the household income within the two districts revealed the following

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- About 64.3% of households in Mopani have a monthly income of less than R1000;
- In Capricorn 61% of households have a monthly income of less than R1000.

Section 4 :   Status Quo Profile of Public Passenger Transport

This section provides analysis the of public passenger transport in Capricorn and Mopani District Municipalities. The findings are summarised as follows

	Mopani District	Capricorn District	Limpopo
No of buses	167	224	3500
No of taxis	953	2701	13000
% of taxi users (work)	61.4	62	61.50
% of bus users (work)	38.6	38	38.50
No of taxi associations	21	30	104
No of subsidized buses	24	196	900
Av taxi fare(c/km)	0.35	0.43	NA
Av bus fare(c/km)	0.32	0.27	NA

Currently there is no passenger rail service within the whole of Limpopo but the government has already commissioned feasibility studies on rail passenger service. Capricorn district has one international airport which is called Polokwane International Airport, whereas in Mopani there are two regional airports which is the Eastgate Airport (Hoedspruit) and Phalaborwa Airport. Both these airports service the domestic flights to Johannesburg.

Both bus and taxi operators were consulted for purposes of obtaining their inputs on the challenges they are facing. The major challenges as per the inputs of the operators are as follows:

- Lack of support by government; and
- High operational costs.

Commuters are represented by Capricorn Commuter Association and Mopani Commuter Association. They indicated that the fares for both taxis and buses are very high and this is having a major impact on their household budgets. They would also like to be informed in time before fares are increased as this will also afford them the opportunity to readjust their monthly budgets.

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Section 5:   Analysis of Vehicle Operating Cost Per Mode

The summary of the findings are as follows:

- The running costs per year for a bus travelling on average 32 256km per annum is R5.32/km.
- The running costs per year for a mini bus travelling on average 62 496km per annum is R2.11/km.

Section 6   :   An analysis of the world's energy sector

This section makes an analysis of the fuel on an international perspective by looking at sources of the world's energy. The major primary suppliers of energy in the world are oil, coal and gas.

Oil provides at least 34.40% of primary energy in the world. It is mostly and commonly used as a fuel for transport, but it also has other uses in various sectors. The major oil producing country in 2009 was Russia whereas the major consumer was the United States. The major oil exporting countries are located in the Middle East and they are represented by the Organisation of Oil Producing and Exporting Countries (OPEC). These countries also hold the largest oil reserves with about 79% of the world reserves. Oil is mainly traded as Brent Crude in the International Petroleum Exchange and as West Texas Intermediate in the New York Mercantile Exchange.

The main driver of oil prices in the past and presently are ,
- Supply and Demand;
- US Dollar Rate;
- Political Events;
- Threats to Oil Transport; and
- Economic Events.

Coal follows oil as one the major suppliers of world energy as it contributes about 20.50%. Coal is mainly used for generating electricity and it is also converted into liquid fuels such as diesel. The major coal producing and consuming country is China whereas the major exporting country is Australia. Coal reserves are available in over 70 countries. The major company in the coal to liquid fuels sector is Sasol which is a South African company.

Gas contributes a small percentage to the world's primary energy supply. Gas can also be converted into liquid petroleum fuels. The major gas producing country is the Russia and the country with the highest consumption of gas is the USA. The major gas reserves are located in the Middle East where about 40% of the world's reserves are found. The major gas producing countries are represented by the Gas Exporting Countries Forum. Petro SA which is a South African company is the world's leader in the conversion of gas to synthetic fuels.

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The security of oil and gas security has always been a major concern for the major consuming and importing countries. This is because the world's major oil and gas resources are located in politically unstable countries where in some instances infrastructure is attacked. Even the economic policies of major producers will have an impact on the security of supply of oil and gas.

The table below is a summary of the production, consumption, reserves and main sources of the world oil, coal and natural gas at the end of 2009.

	Production	Consumption	Reserves	Major Producer	Major Consumers
Oil	3820.5mt	3882.mt	181.7mt	Russia	USA
Coal	3408.6mt	3278.30mt	826 001mt	China	China
Gas	2987bcm	2940.40bcm	6621.2tcf	Russia	USA

Below is a summary of the projected world consumption of coal, oil and natural gas for the years 2010-2020.

	2010	2015	2020	Major Consumers
Oil	4612mt	4514mt	4897mt	USA
Coal	3636mt	4512mt	5599mt	China
Gas	2794mt	3154mt	3561mt	USA

Section 7 : An analysis of the South African energy sector

An analysis of the South African fuel industry reveals that the country relies on crude oil, coal and gas for its primary energy sources of fuel and also that the country is a major consumer of coal and oil.

South Africa has small oil reserves and this makes it one of the major importers of oil. It sources its oil from the Middle East, Russia and other African countries. South Africa has a crude oil refining capacity of 692 000 bbl/d. This is produced from its crude oil refineries and two synthetic fuel refineries. The refineries in South Africa are Sapref, Enref, Chevref, Natref, Sasol and Petro SA. In Limpopo there are no known crude oil reserves and none of the refineries are located within the province.

Coal contributes about 65.9% of the primary energy supply in South Africa. This is because coal is mainly used for electricity generation by Eskom and for synthetic fuels by Sasol. South Africa is a major producer and exporter of coal. In 2009 South Africa was ranked sixth in the world in terms of coal production and seventh for exports. The country has an

abundant coal reserves which are found in Limpopo and Mpumalanga Provinces. In Limpopo the reserves are located in the following coal fields,

- Waterberg;
- Soutpansberg;
- Limpopo; and
- Springbok.

The Waterberg area is estimated to hold about 50% (15 487mt) of South Africa coal reserves. This area is also rich in coal bed methane which is a natural gas that can be converted into liquid fuels.

Natural gas contributes about 2.8% of South Africa energy needs. The country is not a major producer of gas and also has minimal gas reserves. It depends on imported gas from Mozambique and Namibia to meet its national demand. Gas in South Africa is also used for synthetic fuels by both Petro SA and Sasol.

Petroleum products are distributed by rail, pipeline and road tankers. Currently there are about 4600 fuel stations and 200 depots in South Africa. In Limpopo there are about six depots and their location is as follows:

- Bela-Bela(Waterberg District);
- Mokopane (Waterberg District);
- Thabazimbi (Waterberg District);
- Polokwane (Capricorn District);
- Hoedspruit (Mopani District);and
- Makhado (Vhembe District).

Below is a summary of the production, consumption, reserves and main sources of South Africa's oil, coal and natural gas at the end of 2009.

	Production	Consumption	Reserves	Main Sources
Oil	**504 900bbl/d**	**199 100bbl/d**	**15mb**	**Saudi Arabia**
Coal	**140.9mt**	**99.4mt**	**30408mt**	**Own**
Gas	**3.35bcm**	**6.45bcm**	**27.16bcm**	**Mozambique**

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Section 8: Analysis of impact of fuel costs on the macro economy

An analysis of fuel pricing in South Africa reveals that fuel prices in South Africa are regulated by the government and. Petrol prices are regulated at retail level whereas diesel prices are regulated at wholesale prices. The responsibility of calculating the fuel price has been delegated to the Central Energy Fund. Fuel prices are subject to changes every month on the first Wednesday of the month. In calculating the price of two elements are considered to be the basic fuel price and domestic elements.

The BFP reflects the realistic cost of importing a litre of product from international refineries with products of a similar quality compared to local specifications and it comprises of the following elements, namely

- International Market Spot Prices;
- Freight Costs;
- Insurance Costs;
- Ocean Loss Allowance;
- Wharfage;
- Coastal Storage;
- Stock Financing Costs;

The domestic elements are as follows:

- Transport Costs;
- Delivery Costs;
- Wholesale Margin;
- Retail Margin;
- Equalisation Fund Levy;
- Fuel Tax;
- Customs and Excise Levy;
- Road Accident Fund; and
- Slate Levy.

The drivers of fuel prices in South Africa are the international crude oil prices, the rand/US dollar exchange rate, geographic location as well as state taxes and levies. The macro economic impacts are summarised below based on the analysis of the year 2008.

National Economy

- CPI increased by 4.4 percentage points;
- GDP growth declined by 0.75 percentage point;
- Current account deficit grew by 12%;
- Unemployment rate decreased by 1.3 percentage point;

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Provincial Economy

- GDP growth declined by 1.4 percentage point;
- Rate of change of the CPI was at the highest during the month of June at 1.6%;
- Trade balance improved by a whopping 49%;and
- Unemployment rate increased by 0.4 percentage point.

Capricorn Economy

- GDP growth declined by 3.0 percentage points;
- Trade balance decreased by 68%; and
- Unemployment in decrease by 1 percentage point;

Mopani Economy

- GDP growth declined by 3.5 percentage points;
- Trade balance improved 34.6%.
- Unemployment rate decreased by 1 percentage point.

Rising fuel prices have an impact on public transport operators as fuel is one of the major contributors of the operational costs of public transport. Using the VOC which was calculated on Section 5, we assess the impact of a 48c increase in the price of petrol and a 48.50c increase on the price of diesel. The findings are as follows:

- The operating costs for a minibus taxi will change from R271 067.54 to R275 481.54 which is an additional R6 414/year in fuel costs.
- The operating costs for a bus will change from R1 117 380.69 to R1 123 794.69 which is an additional R4 414/year in fuel costs.

Potential solutions which can be implemented by the South African government to minimize the effects of fuel prices are as follows:

- Conservation;
- Strategic Reserves;
- Shift to Alternative Fuels.

Policy options for public passenger transport to contain effects of higher fuel prices can include the following,

- Shift to Non Petroleum Fuel; and
- Reductions in Vehicle Fuel Intensity.

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Section 9 :	Analysis and impact of interest rates on the macro economy

Interest rates are determined by the South African Reserve Bank through the Monetary Policy Committee which meet six times a year and on Wednesdays. They meet to take decisions on whether to increase the repo rate or not. Their decision is affected by a number of factors such as,

- Low saving ratio in South Africa;
- High inflation; and
- The price of crude oil.

The impact of interest rates on the macro-economy as well as the sectoral impact are summarised in the table below.

	HIGHER INTERSEST RATES SCENARIO	LOWER INTEREST RATES SCENARIO
Value of rand	The value of the rand appreciates when compared to other currencies.	The value of the rand depreciates.
Balance of Payments	It becomes expensive to exports goods from SA due to the higher rand and this will results in a reduction in exports.	More goods leave the country as it will be more cheaper to export and this will also improve the Balance of Payments;
Unemployment	Firms slow down on investment and this result in the non-creation of new jobs;	More jobs are created as firms expand as it will also be cheaper for them to borrow for purposes of expansion;
GDP	The fall in consumption will result in a shrinking GDP as consumers and firms will be spending less.	Growth in GDP as consumers and firms increase their spending.
Household	Increament on the cost of borrowing; Less spending; Reduced confidence.	This will result in more money on the hands of consumers and increased spending;
Government	Government debt interest payments increase.	Increase in governement spending;

Using the calculations for vehicle operating costs we analyse the effects of interest rates on public passenger transport after an increase in prime lending rates of 3.5 percentage points. The change in the vehicle monthly instalments will be as follows

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- Bus: R454 618+3.5% =R470 529.63, and this represent an extra R15 911.63/a in vehicle repayments;
- Minibus taxi: R49 228 +3.50% =R50 950.98. This represents an increase of R1722.35 per annum in vehicle repayments.

Section 10 :   Recommendations

A number of proposed interventions or recommendations which could be considered for implementation to minimise the impact of fuel costs and interest rates on public passenger transport. Some of the recommendations are of long term in nature whilst others are short term. These interventions are as follows:

- Public transport subsidies should be introduced to both minibus-taxi and bus service;
- Investigate the introduction of alternative fuel using public transport such as Compressed Natural Gas (CNG), Liquefied Petroleum Gas (LPG), Biodiesel, Hybrid, Hydrogen and Ethanol;
- Make a study of the internationally acclaimed Safe and Fuel Efficient Driving (SAFED) programme;
- Public Private Partnerships;
- Improvement of road conditions;
- Regular maintenance of vehicles;
- Buying fuel in bulk; and
- Separate lanes.

Section 11 :   Stakeholder participation and consultation

Stakeholder participation and consultation processes were undertaken in the implementation of this study. Stakeholders in this regard relates to CDM and MDM officials, Transport Forums, Bus and Taxi Operators and Commuter Associations. The consultation processes took the following form,

- Introductory meetings;
- Focus group meetings.

The consultation took place during the following months of the year 2010

- April;
- May;
- June; and
- August.

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SECTION 1: INTRODUCTION AND BACKGROUND

1.1 PURPOSE OF STUDY

The purpose of the study is to conduct a macro economic impact analysis of fuel costs on the economy covering Mopani and Capricorn districts within the jurisdiction of the Limpopo Province, conduct an economic impact analysis of fuel costs on public passenger transport (all modes of passenger transport in Mopani and Capricorn). This is to be followed by the findings on how people are trying to cope with these increases and then recommendations on the appropriate solutions to the problems identified.

The scope of the study had to cover the following areas,

➢ As part of introduction to look at the international oil industry (in-depth analysis) and where South Africa (SA) and Limpopo Province in particular sources its fuel inputs (coal and oil supply):
- Geopolitical issues,
- Supply constraints (not just crude oil but also coal, and liquid petroleum gas),
- Drivers of crude oil costs,
➢ Evaluate each mode of transport's fuel costs,
➢ Conduct a thorough economic reasoning; identify and illustrate the main fuel cost drivers,
➢ Conduct a macro economic impact analysis of fuel costs on the economy covering:
- The Producer Price Index (PPI),
- The Consumer price indices (CPI and CPIX),
- South Africa's Gross Domestic Product (GDP) and contribution by Limpopo Province in particular,
- Imports and exports and the overall balance of payments,
- Employment,
➢ Conduct an economic impact analysis of increased fuel costs and interest rates on the poor and also on transport with regards to:
- Passenger transport only,
➢ Look for interventions that would reduce the impact of fuel costs on the transport sector and transport planning, and public passenger transport users,
➢ Determine the extent on which the transport operators affected by the rising price of petrol and interest rate have exited the industry due to bank repossessions etc and the best alternative solutions for the Limpopo Province,
➢ Document the findings (summary and discussion of results), and
➢ Outline the recommendations.

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1.2 STUDY AREA

1.2.1 Limpopo Province

Limpopo Province is South Africa's northern most provinces and it is well situated logistically within the N1 highway connecting South Africa's economic heartland of Gauteng to the Southern African Development Community (SADC) to the north, sharing borders with Botswana to the west, Zimbabwe to the north and Mozambique to the east, making it the ideal entrance to Southern Africa. With a total area of 125 755 square kilometres, Limpopo is the fifth-largest (and fifth-smallest) of the country's nine provinces, taking up 10.3% of South Africa's land.

The province has a total of 25 local municipalities and five district council municipalities which are Vhembe, Mopani, Capricorn, Waterberg and Sekhukhune. The population increased from 4 995 534 in2001 to 5 238 286 in 2007. The number of households in the province is 1 215 935. The population distribution within the province is as follows Mopani 1 068 568, Vhembe 1 240 035, Capricorn 1 243 167, Waterberg 596 092 and Greater Sekhukhune 1 090 424. The population density is 41.78 people per square km. Only about 1 565 833 of the population is economically active.

Map 1-1Map of Limpopo Province
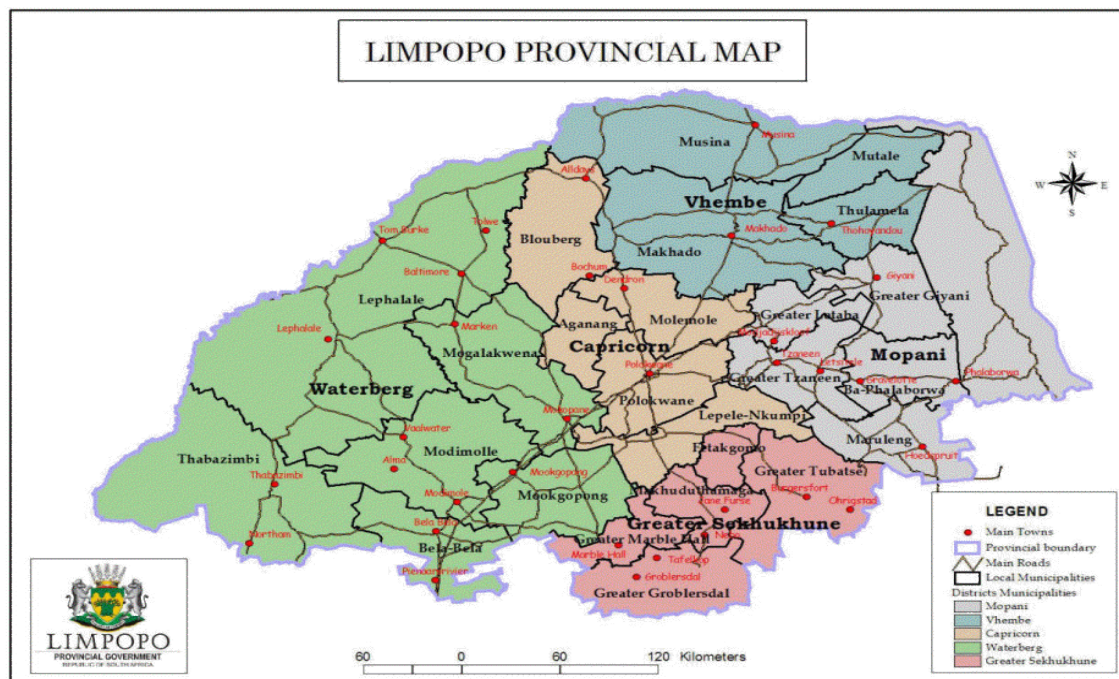
Source: Limpopo Provincial Government Website (www.limpopo.gov.za)

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1.2.2 Capricorn District Municipality

It is situated in the centre of Limpopo Province and it shares its borders with Mopani to the east, Sekhukhune to the South, Vhembe to the north and Waterberg to the west. Polokwane, which is the capital city of Limpopo, lies in the heart of the Capricorn region. It is made up of five local municipalities namely,

- Aganang;
- Blouberg;
- Lepelle-Nkumpi;
- Molemole; and
- Polokwane.

Map 1-2 Capricorn District Municipality

Source: Demarcation Board

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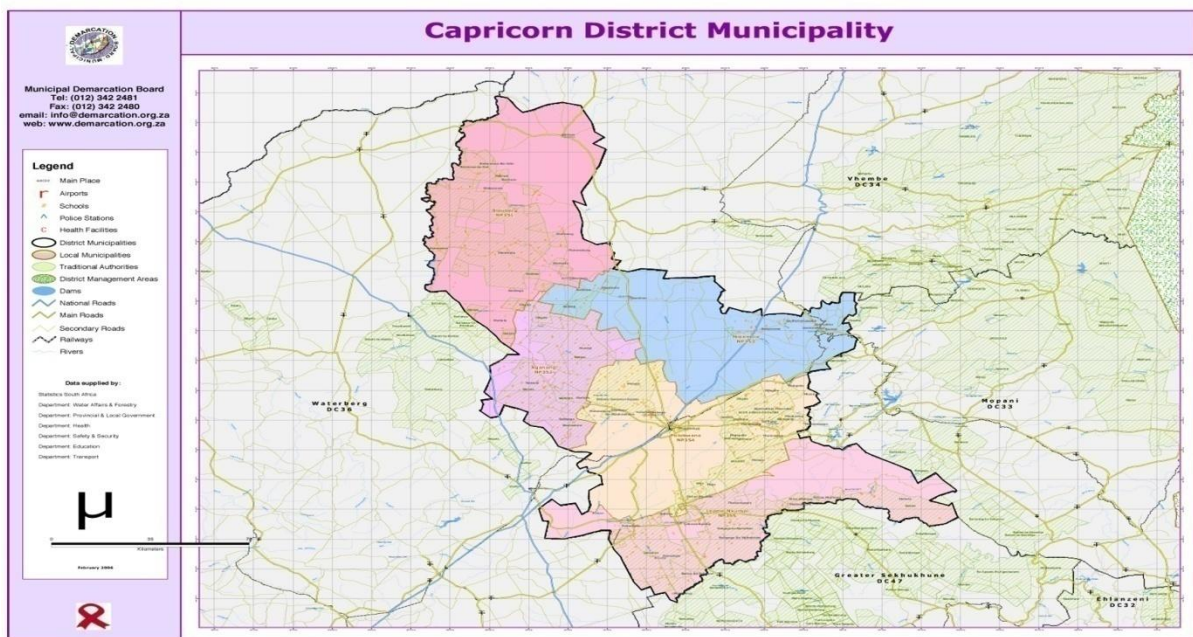
1.2.3   Mopani District Municipality

The Mopani District Municipality (MDM) is situated in the north-eastern part of Limpopo Province. It is bordered in the east by Mozambique, in the north, by Zimbabwe and Vhembe District Municipality, in the south, by Mpumalanga province through Ehlanzeni District Municipality and, to the west, by Capricorn District Municipality and, in the south-west, by Sekhukhune District Municipality. The Mopani District comprises of five local municipalities which are,

- Greater Giyani;
- Ba-Phalaborwa;
- Maruleng;
- Greater Letaba; and
- Greater Tzaneen.

Map 1-3 Mopani District
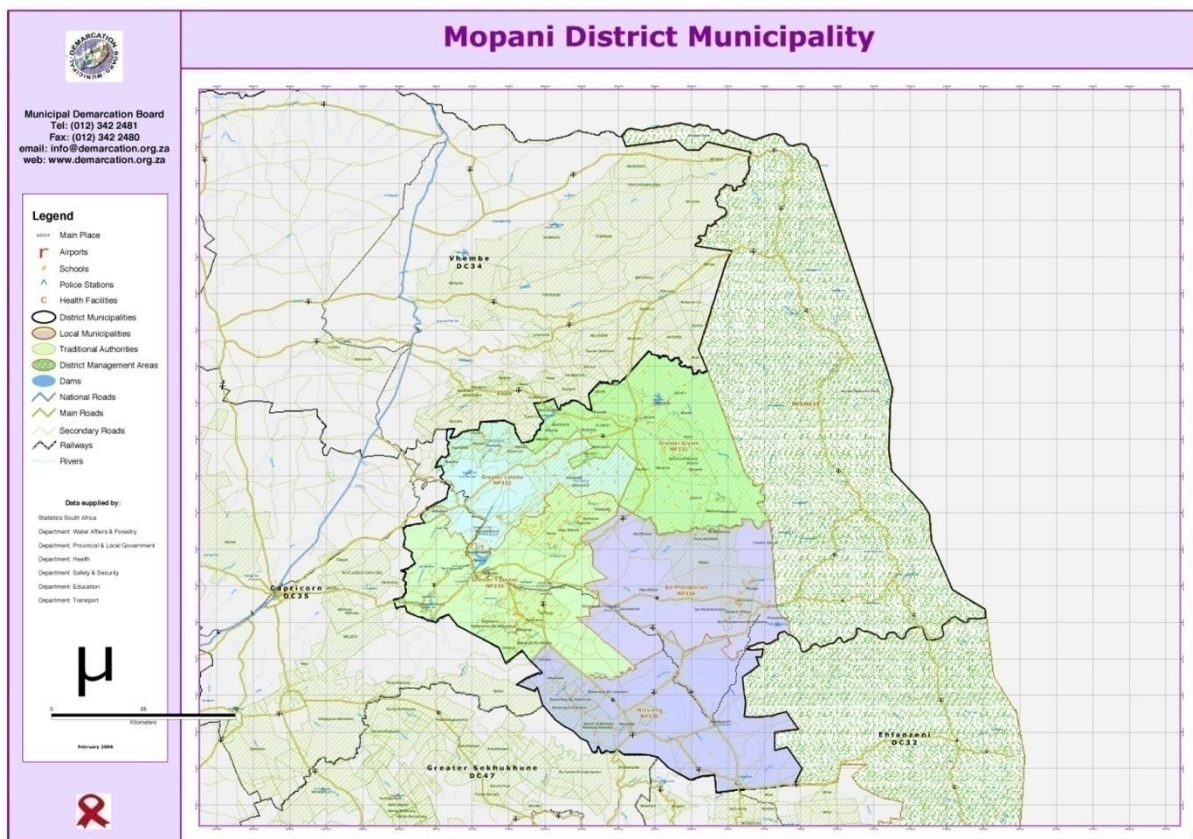
Source: Demarcation Board

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SECTION 2: POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

The purpose of this section is to set the context for the study by providing an analysis of the current key and applicable policies and strategies and highlighting how they can affect public passenger transport, the price of fuel and any recommendations or interventions which are to be proposed at the end of this study. The section will again focus on the relevant national institutions which are role players in the fuel industry.

The following aspects are provided for in this section,

- National, Provincial and Local Government Policies and Strategies
- Legislation
- Institutional Framework

2.1 POLICY FRAMEWORK

This subsection outlines the National Legal framework in which public transport planning takes place as well as the relevant policies on fuel supply. The purpose of this section is to provide a broad overview of the national, provincial and local government policy. This section will provide an analysis of the following national policies and strategies

- White Paper on National Transport;
- Moving South Africa;
- White Paper on Energy Policy;
- Limpopo White Paper on Provincial Transport Policy; and
- Position Paper on the Deregulation of Petrol.

2.1.1 WHITE PAPER ON NATIONAL TRANSPORT OF 1998

Transport plays a significant role in the social and economic development of any country, and this sector has been identified as one of the five main priority areas for socio-economic development by the South African government. The effectiveness of the role played by transport is to a large extent dictated by the soundness of transport policy and the strategies utilised in implementing the policy.

This paper defines the broader goal of transport as the smooth and efficient interaction that allows society and the economy to assume their preferred form. This statement implies that policies in the transport sector must be outward looking, shaped by the needs of society in general, of the users or customers of transport, and of the economy that transport has to support.

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This policy framework is applicable to all modes of transportation in South Africa such as the following

- Land passenger transport;
- Land freight transport;
- Civil aviation; and
- Maritime transport.

The objectives which the government aims to achieve through this policy are described as follows

- Support the goals for meeting basic needs, growing the economy, developing human resources, and democratising decision making;
- Enable customers requiring transport for people or goods to access the transport system in ways which best satisfy their chosen criteria;
- Improve the safety, security, reliability, quality, and speed of transporting goods and people ;
- Improve South Africa's competitiveness and that of its transport infrastructure and operations through greater effectiveness and efficiency to better meet the needs of different customer groups, both locally and globally;
- Invest in infrastructure or transport systems in ways which satisfy social, economic, or strategic investment criteria;
- Achieve the above objectives in a manner which is economically and environmentally sustainable, and minimises negative side effects.

The role of government is defined as that of ensuring that it

- Focus on policy and strategy formulation which are its prime role, and substantive regulation which is its responsibility, with a reduced direct involvement in operations and in the provision of infrastructure and services, to allow for a more competitive environment.
- Put emphasise on strategic planning and bring together key players in broader national strategies which could not be achieved by any single player.
- Retain the regulatory role to ensure unbiased regulation of safety and quality in general, to control market access for transport operators where this is necessary, and to prohibit excessive tariffs in the case of monopolies.

Regulation is described as basically a form of intervention by government, and the intention is to regulate only where it is essential. Government must apply different forms of regulation to ensure that its vision and objectives are realised. The form of regulation differs according to circumstances:

- **Regulation of specific services provided under contract**: This is the highest form of regulation, in which the authority specifies in detail the service to be provided, and can

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impose a variety of sanctions if this is not met. This category includes commuter rail services, and tendered public transport services by bus or taxi.

- **Regulation of the operations of competing operators**: The role of Government will be that of ensuring level playing fields, and regulation for safety, leaving the operator as much freedom as possible to provide customer service as demanded in a competitive environment. In the case of road-based public passenger transport, Government proposes a form of regulated competition, which requires that operators function in a competitive environment, but in a manner which complies with the objectives of Government.
- **Regulation by contract**: This is not an abdication of responsibility by Government, but involves establishing a formal contract with an operator to abide by an agreed set of rules. Instead of investigating and proving individual contraventions, regulation and enforcement by Government involves establishing whether the contract has been adhered to.

The policy on land passenger transport is also provided for in the white paper. Land passenger transport refers to all forms of all forms of public and private passenger movement on land, including the travel modes rail, bus, minibus-taxi, metered taxi, light delivery vehicles, private motor cars, motor cycles and bicycles as well as pedestrian movement. But for the purpose of our study we will concentrate on the applicability of this policy to public passenger transport with a specific emphasis on buses and minibus-taxis.

This policy insists that the underlying objectives are to support the public passenger transport sector through funding of infrastructure and operations. Another role it seeks to play is that of ensuring that the transport system is customer based.

The mission of the Department of Transport (DoT) in respect of land passenger transport is to provide leadership in the promotion of a safe, reliable, effective, efficient, co-ordinated, integrated, and environmentally friendly land passenger transport system in South Africa's urban and rural areas, and the Southern African region, managed in an accountable manner to ensure that people experience improving levels of mobility and accessibility.

Some of the major strategic objectives of the policy on land passenger transport are to

- Ensure the sustainable and dedicated funding for passenger transport infrastructure, operations, and law enforcement;
- Reduce travel distances and times for commuting to a limit of about 40 km or one hour in each direction by correcting spatial imbalances;
- Promote the use of public transport over private car travel, with the goal of achieving a ratio of 80:20 between public transport and private car usage;
- Promote rural development that will improve access to opportunities by ensuring that rural workers are housed in close proximity to their work locations and services, thereby reducing the need to travel;

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- Ensure that passenger transport services address user needs, including those of commuters, pensioners, the aged, scholars, the disabled, tourists, and long distance passengers;
- Ensure that public transport is affordable, with commuters spending less than about 10 percent of disposable income on transport.

IMPLICATIONS

- ➢ *Government must provide financial support to public passenger transport operators;*
- ➢ *Government must make public passenger transport accessible to all the commuters in Limpopo; and*
- ➢ *Government must implement measures to make public passenger transport more affordable to all its users.*

2.1.2 MOVING SOUTH AFRICA(MSA)

Moving South Africa (MSA) (South Africa, Department of Transport 1998) was a project of the DoT, completed in September1998, which aimed to develop a long-term transport strategy for South Africa. The MSA's Action Agenda provides a 20-year strategic framework that includes various strategies for the respective transport aspects such as urban passenger transport, rural passenger transport, tourist and long-distance passenger, special need passengers and freight transport. The agenda also focuses on transport issues such as limited financial resources, decline in public transport quality of service, land use problems affecting travel patterns, and various other issues.

Background

It articulated the vision for public transport thus,

- Mainstream urban public transport operations will meet the needs of currently marginalised users, including the Stranded and Survival customer segments, scholars, users with disabilities, prioritised tourist customers and transferring long distance passengers.
- Over time, as active measures to restrain private car use become effective, viable public transport alternatives will be targeted at the Selective customer segment that are willing to use improved public transport. This will necessitate more, better and different types of public transport services.
- In order to meet these goals, the public transport system will attract sufficient customers per vehicle per day to ensure that fares are affordable, operations are sustainable, and the system as a whole is able to generate adequate funds for the upgrading of both infrastructure and vehicles.

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- To achieve this vision, public transport provision must be planned and regulated at the local level, with local control over stable funding sources for operations and infrastructure, detailed research into local customer needs and close co-operation with local land use planning and other relevant local functions.

Strategy

Moving South Africa set out what it termed an 'implementation strategy', although this remained quite abstract. An important theme was the need to create appropriate institutional structures and decision rules to drive implementation. The following figure summarises the elements of the implementation strategy. It separates the areas that are the focus of government, namely, setting a vision and developing a strategy (pre-step and first three steps) from areas that are relevant primarily to ensuring appropriate choices at the level of the firm, or operator (steps four and five).

Pre-Step: Determine National Objectives

This includes enabling government to understand and make crucial high level choices. It involves making key trade-offs and signalling those trade-offs to the relevant role players.

A. Step One: Establish the Vision for Transport

There are many different stakeholders in the public transport sector. If they are to work together effectively they all need to share a common vision of what they seek to achieve. However, this process is often filled with obstacles. There is a lack of system level decision making, so individual departments tend to maximize according to a narrow set of constraints which do not take into account system effects. Institutions are often weak, decision rights are often misaligned, and there is a tendency to default to false agreement which is easily broken because of an absence of an effective co-operative governance framework.

In establishing the vision there is a need to establish a clear strategy that makes choices and establishes constraints; develop a workable framework for co-operative governance, consulting appropriately with other stakeholders; agreeing the strategy; and determining which signals to send.

B. Step Two: Set the Playing Field

The second step 'requires assembling customised institutional structures which ensure that all the relevant players are participating in implementation in a way that reflects the strategic orientation and choices'.

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C. Step Three: Define the 'Rules of the Game'

Having invested decision rights in a cooperatively governed structure, it is necessary to provide decision rules for the local governing bodies and the actors within the transport platform in order that they can become properly aligned. This includes actions such as investing behind customer segments (e.g. building dedicated bus lanes which support a number of customer segments); internalising externalities (in a manner that enhances the sustainability of the system in relation it's to larger societal impact, and ensures that users bear the full costs of their actions); isolate the 'exceptions'; develop sustainable operators (by ensuring, for instance, through the tendering process, that they are reinvesting to adequate levels); make the system economics transparent (by removing distortions in costing, pricing, and capacity planning) and support with regulations.

D. Step Four: Enable Firm Level Choices

The fourth step becomes easier once the previous steps are properly taken. However it is still crucial to help build capacity for firms to take advantage of the opportunities available within the context of the strategy. This includes initiatives such as training and demonstration projects.

E. Step Five: Target National and Customer Objectives

The performance requirements articulated as a component of the strategy create the basis for a comprehensive set of target outcomes. Measurement of performance is crucial. This includes establishing targets based on customer and national objectives; measuring performance against targets; linking funding to performance against targets such that projects do not receive renewals in the same form if they are not meeting their goals; checking to ensure the system choices are producing the desired results.

IMPLICATIONS

➢ *Public passenger transport should be sustainable both to the operators and users in Limpopo;*
➢ *Consult with all transport stakeholders in Limpopo during planning and decision making processes;*
➢ *Build the capacity of the stakeholders.*

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2.1.3 WHITE PAPER ON ENERGY POLICY OF SOUTH AFRICA

This paper provides that the energy sector in South Africa should be viewed from two sides which are supply and demand. The demand side is generally analysed in terms of the energy requirements of households, industry, commerce, mining, transport and agriculture. Supply sub-sectors include the coal, electricity, nuclear, liquid fuels, gas and renewable industries.

The objectives of this policy are as follows

- Increasing access to affordable energy services;
- Improving energy governance;
- Stimulating economic development;
- Managing energy-related environmental and health impacts;
- Securing supply through diversity.

The white paper has identified the transport sector as one of the demand sectors and as such it recognises that South Africa requires equitable access to affordable public transport and therefore fuel diversity within the sector should be increased. Land policies which were introduced prior to 1994 resulted in the poor being located furthest from work and this has placed a burden on the poor and led to the inefficient use of transport energy.

IMPLICATIONS

➢ *All measures should be taken to make energy or fuel for public passenger transport usage affordable and accessible which in turn will translate to lower transport fares.*

2.1.4 LIMPOPO WHITE PAPER ON PROVINCIAL TRANSPORT POLICY

The provincial white paper on transport was developed in 1996. The major objective of this white paper is to:

- Monitor the needs in the province, identify issues and set priorities for transport within the framework of social and economic reconstruction and development objectives for the province;
- Establish an institutional framework within which transport can be directed optimally;
- Ensure a dependable, accountable, informative and transparent financial and administration system;

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- Direct the management of transport through the optimum application of human and other resources towards the planning, public participation, implementation, co-ordination and the monitoring of the transport system;
- Regulate and control the transport system to ensure that its full potential can be achieved;
- Ensure that sufficient, timely and effective traffic control and safety is maintained.

IMPLICATIONS

➢ **The LRDT must ensure that public passenger transport meet the needs of the commuters in Capricorn and Mopani District Municipalities.**

2.1.5 POSITION PAPER ON DEREGULATION OF THE PETROLEUM INDUSTRY

This paper was presented by the Petroleum, Gas and Policy Directorate within the DME at Oil Summit in 2008. It argues against the deregulation of the industry. It provides that minimal government intervention promotes healthy competition and investment in the industry. According to this paper the present scenario is that the South Africa petroleum industry is still exercising the so-called managed liberization, where government intervenes in order to increase efficiency and protect consumers from exorbitant fuel prices.

In this context certain petroleum products are partially controlled, others controlled and others completely competitive. Jet fuel, diesel, and liquefied gas(LPG) are some of the products which are partially controlled in that the Basic Fuel Price(BFP) is set by government but the retail price remains the discretion of sellers. This is in contrast to petrol which is fully controlled.

The paper highlights the dangers or threats of deregulation as follows

- Deregulation of the petroleum industry will pose a serious threat to the new refinery, especially the new Coal to Liquid Plant (CTL) under consideration;
- The possibility of not having a refinery in the inland should be considered because of concerns that it would be uncompetitive in a deregulated environment which promote competitive prices;
- Deregulation will subject BEE companies to a highly competitive environment which will unfairly eliminate these companies from the market;
- Deregulation of the sector will have an impact on employment in a country faced with high unemployment levels. Given the challenges of job creation and unemployment is prudent to introduce a policy that may exacerbate the unemployment problems;

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- It is also suggested that, although, deregulation did have the effect of reducing retail petrol prices against an international yardstick, but that after a few years the improving trend quickly gets reversed;
- As South Africa is not naturally endowed with crude oil but coal which can be used to produce oil, deregulation may render coal to liquids projects uneconomic. Such a scenario will expose South Africa to more crude imports and subsequent imported inflation which have negative long-term impact on the economic growth of the country.

IMPLICATIONS

➢ *Deregulation should not be considered as an option of decreasing the fuel prices as it will make the market more vulnerable and promotes more imports of crude oil which will have a detrimental effect on economy of South Africa.*

2.1.6 NATIONAL ENERGY EFFICIENCY STRATEGY OF SOUTH AFRICA

This strategy takes its mandate from the White Paper on Energy Policy. It links energy sector development with the national socio-economic plans. It also provides clear guidelines for implementation of efficient practises within our economy, including the setting of governance structures for activity development, promotion and coordination. The energy efficiency strategy allows for the immediate implementation of low cost-cost and no-cost interventions, as well as those higher cost measures with short payback periods. This strategy acknowledges that there exists significant potential for energy efficiency improvement across all sectors of our national economy.

Its vision is to contribute towards affordable energy for all and this will be achieved by encouraging sustainable energy development and energy use through efficient practices. At least eight goals are provided for this in this strategy. The most relevant goal to this study is the one which provides for an increase in energy security and this is aimed at increasing national resilience against oil price fluctuations by reducing the country's dependence upon imported crude oil supplies.

This strategy covers all energy using sectors and will be implemented and it is implemented through sectoral implementation plans. Our analysis of this strategy will be focusing on the transport sector. The transport sector has a target to reduce the demand of energy by 9% in 2015. In terms of the strategy the major objectives of the transport sector are described as follows

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- Increase public knowledge and awareness on efficiency issues;
- Build the user base for public transport through provision of quality public transport services;
- Put in place a regime of monitoring mechanisms, penalties and rewards. Conduct research to articulate the value of energy efficiency to local transport managers and customers and use results to develop target based performance objectives for local authorities to meet in terms of public transport provision.

Some of the approaches of the transport sector in the implementation of the strategy are as follows

- Include fuel efficiency promotion in ongoing fiscal reform;
- Conduct and support fleet audits stressing regular vehicle maintenance;
- Regulations, standards and codes of practice which will stimulate the supply of energy efficient vehicle technologies;
- Public information programmes that would sensitise the motoring public to the benefits of efficiency measures;

IMPLICATIONS

➢ *Public awareness campaigns on energy efficiency should be held regularly aimed at public transport operators in Capricorn and Mopani Districts;*
➢ *Public passenger transport operators should be shown the benefits of regular maintenance of their fleet; and*
➢ *The use of energy efficient vehicle technologies should be stimulated in both Capricorn and Mopani Districts.*

2.2 LEGISLATIVE FRAMEWORK

The purpose of this subsection is to provide legislative context in for the setting of fuel prices and its distribution. An analysis of legislation relating to petrol will also be made for purposes of providing guidance to any policy which may be adopted through the recommendations of this study. The following legislation are analysed in this subsection

- Mineral and Petroleum Resources Development Act Of 2002
- Petroleum Pipelines Levies Act No 28 Of 2004
- Petroleum Products Act 120 Of 1977
- National Land Transport Act No 05 of 2009

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2.2.1 MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT OF 2002

The main purpose of the Act is to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources. It is aimed at promoting the participation of historically disadvantaged individuals who were discriminated against in the past and presently in the petroleum industry.

It also provides for the transformation of the petroleum industry by assisting, providing and facilitating the

- Ownership of exploration or production operations;
- Participation in or control of such operations;
- Development of management, scientific, engineering or other skills of historically disadvantaged persons.

2.2.2 PETROLEUM PIPELINES LEVIES ACT NO 28 OF 2004

The main purpose of this legislation is to provide for the imposition of levies by the relevant regulating authority. Under this Act levies are imposed for the purposes of meeting the general administrative and other related costs of the regulating authority. Levies to be imposed must be based on the amount of petroleum, measured in litres, delivered by importers, refiners and producers to inlet flanges of petroleum pipelines.

Before imposing, varying levies or determined interest the regulating authority must publish such proposed levies. This is done in order to bring the proposed levies, variation or determination to the attention of stakeholders in the petroleum pipelines industry and it should be accompanied by a statement explaining the reasons for the proposed imposition as well as an invitation for representations to be made to the Authority within a specified and reasonable time. The relevant Ministry of Energy should be consulted before any levy is imposed to seek his or her approval or disapproval. Such approval or disapproval is made with concurrence of the Minister of Finance. The imposition of these levies plays a major role in the price of petrol especially as it is included in the retail price of petrol.

IMPLICATIONS

➢ *Pipeline levies will always have a major impact on the price of fuel, and this is because each and every tariff increase translates to a change on the price of fuel. This has a major impact on the inland region as pipelines are the carriers of fuel from the coastal depots.*

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2.2.3   PETROLEUM PRODUCTS ACT 120 OF 1977

The Petroleum Products Act was promulgated in 1977 but has since then undergone a number amendments. Its main purpose is to

- Provide measures in the saving of petroleum products and an economy in the cost of the distribution thereof, and for the maintenance and control of a price thereof;
- Provide for the licensing of persons involved in the manufacturing and sale of certain petroleum products;
- Promote the transformation of the South African petroleum and liquid fuels industry;
- Provide for the promulgation of regulations relating to such licences.

This Act provides for that the maximum or minimum price of which any petroleum product may be sold, should be prescribed. Prices for all petroleum products should published for publicised. It prohibits persons from conducting business in the petroleum industry without the necessary licences such as

- Manufacturing licence;
- Wholesale licence; and
- Retail licence.

> ### *IMPLICATIONS*
>
> ➢ *The fact that petrol is regulated means Sasol cannot sell its products at a price different from the regulated retail price and this means that South Africa is not able to sources cheaper fuel from local companies.*

2.2.4   NATIONAL LAND TRANSPORT ACT NO 05 OF 2009

The NLTA is the main legislation on public transport, but also deals with the roles of spheres of government and planning. The National Land Transport Act 5 of 2009 (NLTA) was brought into operation on 8 December 2009 (some sections on 31 August 2009). It repealed the National Land Transport Transition Act 22 of 2000 (NLTTA).

Institutional Arrangements

Section 11 of the NLTA provides for new functions of the spheres of government. Municipalities are now responsible for planning, contracting for public transport services

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and implementation. Provinces remain responsible for existing bus contracts, but the function can be assigned to municipalities.

Contracting for public transport services

Provinces and planning authorities must take steps as soon as possible after the date of commencement of this Act to integrate services subject to contracts in their areas, as well as appropriate uncontracted services, into the larger public transport system in terms of relevant integrated transport plans. The act provides for the following types of contracts

i)   Negotiated contracts

In terms of the Act negotiated contracts with operators in with a view to

➢ Integrate services forming part of integrated public transport networks in terms of their integrated transport plans;
➢ Promote the economic empowerment of small business or of persons previously disadvantaged by unfair discrimination;
➢ Facilitate the restructuring of a parastatal or municipal transport operator to discourage monopolies.

The negotiated contracts must where appropriate include operators in the area subject to interim contracts, subsidised service contracts, commercial service contracts, existing negotiated contracts and operators of unscheduled services and non-contracted services. A negotiated contract must not exceed 12 years.

ii)   Subsidised service contracts

Only a contracting authority may enter into a subsidised service contract with an operator, and only if the services to be operated in terms thereof, have been put out to public tendering and awarded by the entering into of a contract in accordance with prescribed procedures in accordance with other applicable national or provincial laws. Subsidised contracts must be valid for a period of seven years.

iii)   Commercial service contracts

A contracting authority may enter into a commercial service contract with an operator by placing a notice in the Provincial Gazette and in a newspaper generally circulating in the area where the services are to be operated, inviting tenders from operators for the operation of that service. The validity period of a commercial service contract must not exceed seven years.

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Important Definitions

i)   **Midi bus** means a motor vehicle designed or modified solely or principally for conveying more than 16 but not more than 35 persons, including the driver, and for the purposes of the National Road Traffic Act is a type of sub-category of bus;

ii) **Minibus** means a motor vehicle designed or modified solely or principally for conveying more than nine but not more than 16 seated persons, including the driver;

iii) **Minibus Taxi-Type Service** means an unscheduled public transport service operated on a specific route or routes, or where applicable, within a particular area, by means of a motor car, minibus or midibus;

iv) **Subsidised** in relation to services, means a situation where passengers are provided with financial assistance to be able to afford services that they could not otherwise afford or where services are subsidised for other reasons, for example to encourage public transport usage, relieve traffic congestion, or to support land use and transport integration;

v)   **Subsidised Service Contract** means an agreement between a contracting authority and an operator to operate a service provided for in an integrated transport plan and in terms of which the operator receives direct or indirect financial support in terms of a tendered contract.

IMPLICATIONS

➢ *Funding for public passenger transport should be made available through a number of interventions;*

➢ *Both taxi operators and bus operators in Capricorn and Mopani Districts should be considered for public passenger transport contracts; and*

➢ *Provincial government should offer support to local government in the implementation of transport related matters.*

2.3   INSTITUTIONAL FRAMEWORK

The purpose of this subsection is to make an analysis of the various institutions which are responsible for determining the price of domestic fuel costs in South Africa. Therefore analysis will focus on the following institutions

▪ Central Energy Fund (CEF);
▪ National Energy Regulator of South Africa(NERSA);

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2.3.1   CENTRAL ENERGY FUND (CEF)

The Central Energy Fund is a major role player in South Africa's liquid fuels industry. Its mandate is to engage in acquiring, exploring, generating, manufacturing, marketing and distributing any energy form, especially oil and gas. The CEF is a private company but it is governed by the Central Energy Fund Act. It has also been mandated to calculate the price of petrol by the Department of Energy. It also engages in research relating to the energy sector.

In terms of the CEF Act, the main purpose of the CEF is to give effect to the objectives of the Central Energy Fund, which are to:

- Finance and promote the acquisition of coal, the exploitation of coal deposits, the manufacture of liquid fuel, oil and other products from coal, the marketing of the said products and any matter connected with the said acquisition, exploitation, manufacture and marketing;
- The acquisition, generation, manufacture, marketing or distribution of any other forms of energy and research connected therewith;
- Any other objects for which the fund may be applied, and which has been designated or approved by the said Minister with the concurrence of the Minister of Finance.

The CEF's diversified portfolio of activities is housed in the following active subsidiaries:

- The Strategic Fuel Fund Association, which was established to procure and store crude oil and manage strategic crude oil stocks for South Africa.SFF holds strategic stocks of about 10.5-million barrels of crude oil. It manages the storage facilities in the Western Cape at Milnerton, outside Cape Town, and at Saldanha Bay. It also owns sizeable coal deposits near Johannesburg;
- PetroSA, which owns and operates the gas-to-liquids plant at Mossel Bay. PetroSA is also involved in oil and gas exploration and production, and its offshore production platform supplies gas and condensates by gas pipeline to its onshore plant for conversion into a range of environmentally friendly transportation fuels and associated products for the domestic and international markets; and
- The Petroleum Agency South Africa, which promotes and markets exploration in South African Territory (both offshore and onshore for oil and gas), negotiates and monitors concessions and licences on behalf of government, and is the custodian of geological and geophysical data.

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2.3.2   NATIONAL ENERGY REGULATOR OF SOUTH AFRICA(NERSA)

With its head office in Pretoria, NERSA was established in 2004. It was brought into being in terms of Section 3 of the National Regulator Act 40 of 2004 as a regulating authority. One of the mandates of the regulator that is relevant to this study is to regulate petroleum pipelines industries. Entities responsible for distribution of energy cannot increase their regulated rates or alter their conditions of service until it approves the new tariffs. To obtain approval, an entity must demonstrate that such a change is merited. It then files an application with NERSA to support its cause that an increase is justified or necessary. It is required that there must be an independent body to represent the side of the consumers during the tariff determination, especially the voiceless consumers.

The other responsibilities of NERSA are described as follows, namely

- Issuing of licenses for the construction and operation of petroleum pipeline facilities;
- Gathering information on all petroleum pipelines activities throughout the country to assist with planning and to ensure orderly infrastructure distribution as well as development and security of supply;
- Producing annual reviews on the status of the petroleum pipelines industry;
- Collaborating with the Department of Minerals and Energy and contributing towards the integrated Energy Plan for the energy sector;
- Monitoring the developments in terms of possible new energy sources;
- Identifying instruments and tools to facilitate investment in the petroleum pipelines industry;
- Facilitating the promotion of the interests of HDSA's in the petroleum pipelines industry;

- Setting tariffs for petroleum pipelines;
- Approving tariffs for storage facilities and loading facilities;
- Ensuring compliance of licensees as stated in the licence conditions;
- Promoting equitable access to petroleum pipelines, loading facilities and storage facilities; and
- Ensuring the safe, efficient, economic and environmentally responsible transport, loading and storage of petroleum.

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SECTION 3: ECONOMIC ANDSOCIO-ECONOMICPROFILE

This section provides a socio-economic and economic evaluation of the two districts municipalities (Capricorn and Mopani). It is important and necessary to understand the trends that are occurring in the larger context. The social and economic trends will have an impact on the recommendations which will be made. A better understand of these changes and trends will help in improving public passenger transport in the two districts.

The following aspects are analysed in this section:

- Socio Economic Profile
  - Demographic Trends
  - Population
- Economic Profile
  - Employment
  - Unemployment

3.1 SOCIO ECONOMIC PROFILE

In order to assess the potential for development of the public passenger transport sector within the two districts, the background demographics and social trends must be analysed. This sub-section outlines these trends and provides an analysis of their significance for the development of the transport sector within Mopani and Capricorn district.

3.1.1 Demographics

The figure below shows that the population of Mopani is approximately 1 068 567 people whereas the population of Capricorn is approximately 1 243 165. A breakdown of the population statistics indicates that in Mopani males comprise 496948 of the population compared to women who make up 571619 of the population. In Capricorn males constitute 572517 of the population whereas females makes up about 670450 the entire population.

Figure 3-1Distribution of population per District Municipality

Source: Statistics South Africa

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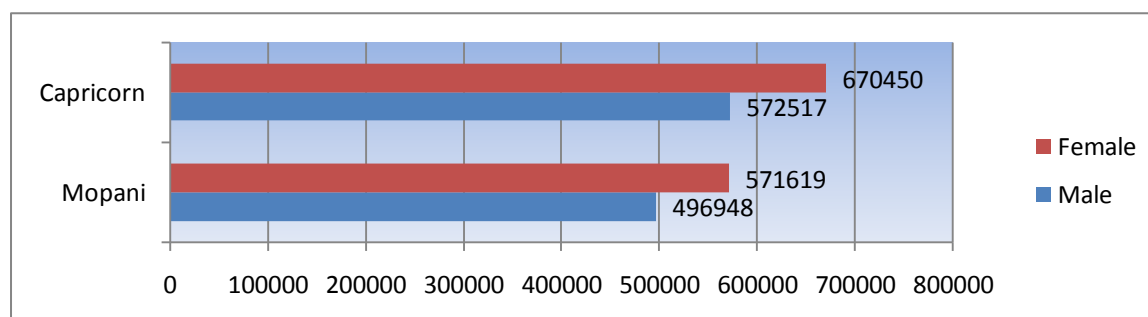
The figure below is depictingthe population breakdown within the local municipalities in CDM. Polokwane population has a population of 561 772 people, LepelleNkumpi population is approximately 241414 people, Blouberg population is approximately 194119 people, Aganangpopulation is approximately 145454 people and Molemole population is made up of 100408 people.

Figure 3-2 Distribution of population per Local Municipality
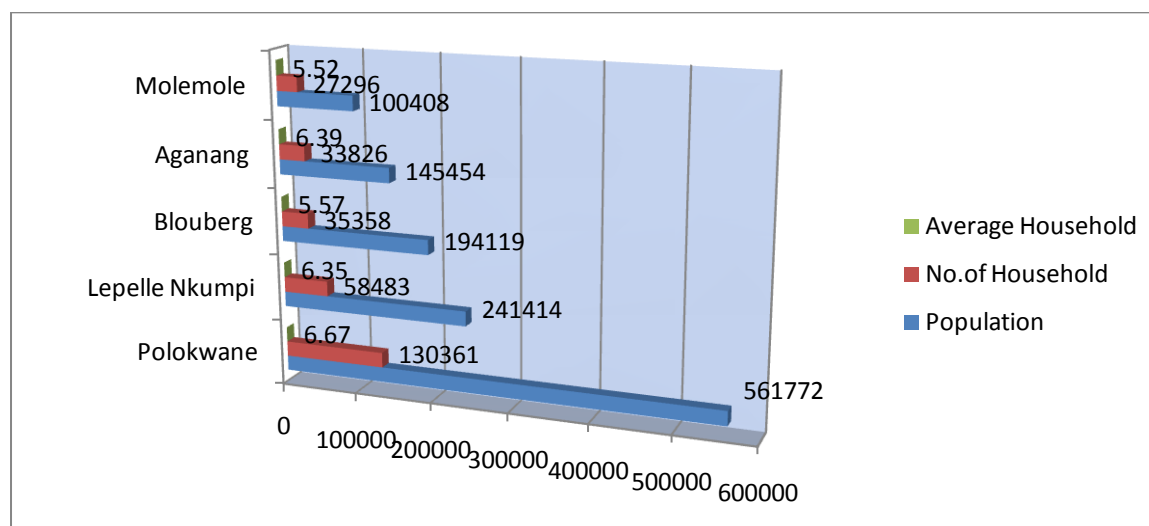
Source: Statistics South Africa

In the figure below a breakdown of the population distribution per local municipality in MDM is depicted. Greater Tzaneen has the largest population in Mopani with approximately 349 081 people. It is followed by Greater Letaba (247739), Greater Giyani (247657), Ba-Phalaborwa (127308) and Maruleng (95667).

Figure 3-3 Distribution of population per Local Municipality in Mopani

Source: Statistics South Africa

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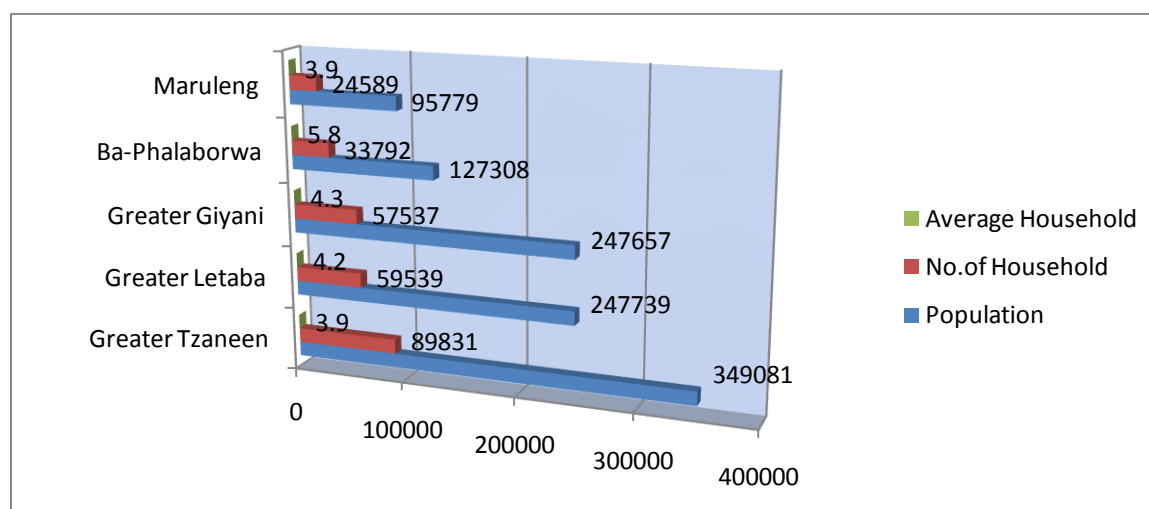
3.2 ECONOMIC PROFILE

Having provided an indication of the socio-economic profile, the purpose of this sub-section is to provide a broad economic analysis of the two districts. The terms utilised in this analysis are described briefly hereunder:

- Employment measures the proportion of the economically active population that are currently employed;
- Unemployment measures the proportion of the economically active population that is actively seeking work;
- Gross Domestic Product of a region is a measure of the income generated in that region. The GDP of a region is defined as the market value of all final goods and services produced within a country in a given period of time.

3.2.1 Employment Trends

The figure below depicts the number of employed and unemployed people. As in the rest of Limpopo Province unemployment remains a major challenge. Only 169 667 in MDM are employed and in CDM the number of people employed is 185 898.

Figure 3-4 Employment Indicators per District Municipality

Source: Statistics South Africa

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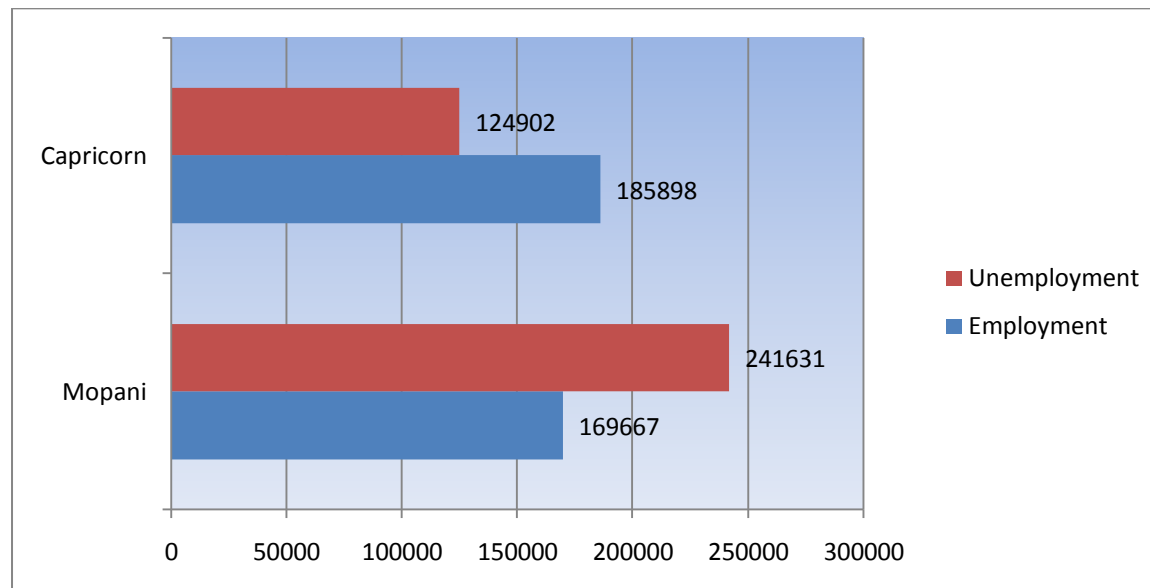
3.2.2 Household Income

The figure below depicts that about 64.3% of households in Mopani have a monthly income of less than R1000 while in Capricorn at least 61% of the households have a monthly income of less than a thousand rand.

Figure 3-5 Household income
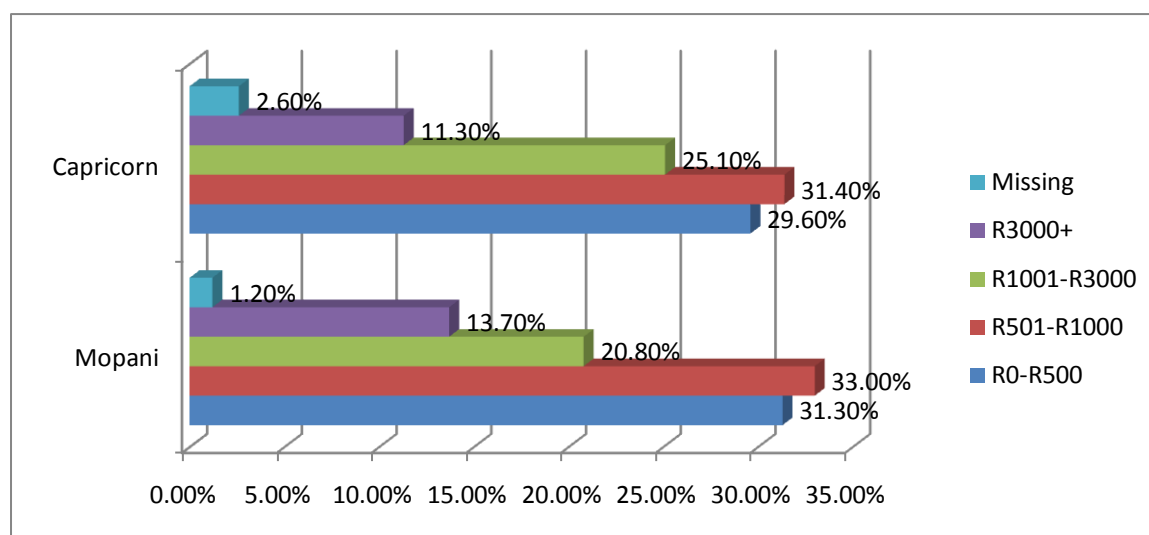
Source: NHTS

3.2.3 Sectoral Trends

The figure below is depicting the GDP of Limpopo, MDM and CDM for the period 2007-2008. The provincial GDP was R134 989 506 in 2007 and R158 201047 in 2008. The GDP of MDM in 2007 was R33 182 070 and in 2008 it stood at R39 651 180. CDM GDP was R32 566 709 in 2007 and R36 649 337 in 2008.

Figure 3-6 Gross Domestic Products per District Municipality (Current Prices, R1000)

Source: Global Insight (March 2010)

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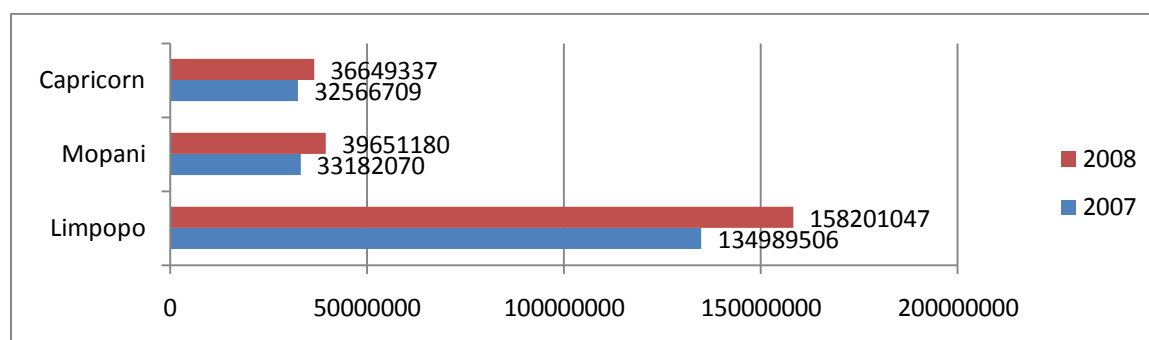
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The following figure depicts the contribution of fuel to the GDP's of Limpopo, MDM and CDM in 2007 and 2008.

Figure 3-7 Fuel Contribution to GDP per District Municipality (Current prices, R1000)
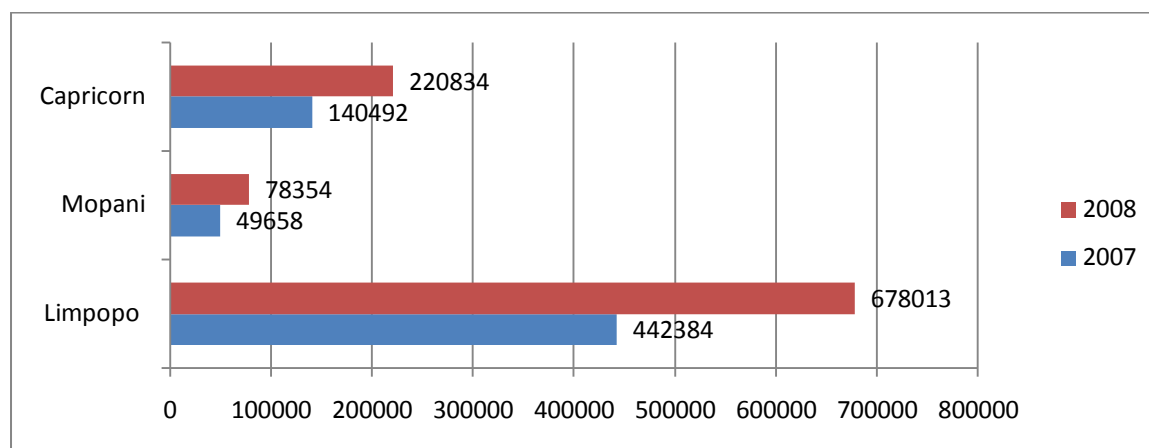
Source: Global Insight (March 2010)

In the figure below the annual expenditure by the transport sector in 2008 is depicted. The focus is on private transport, public transport (day-day) as well as public transport (travel).

Figure 3-8 Annual Expenditure by transport sector in 2008 (Current prices, R1000)
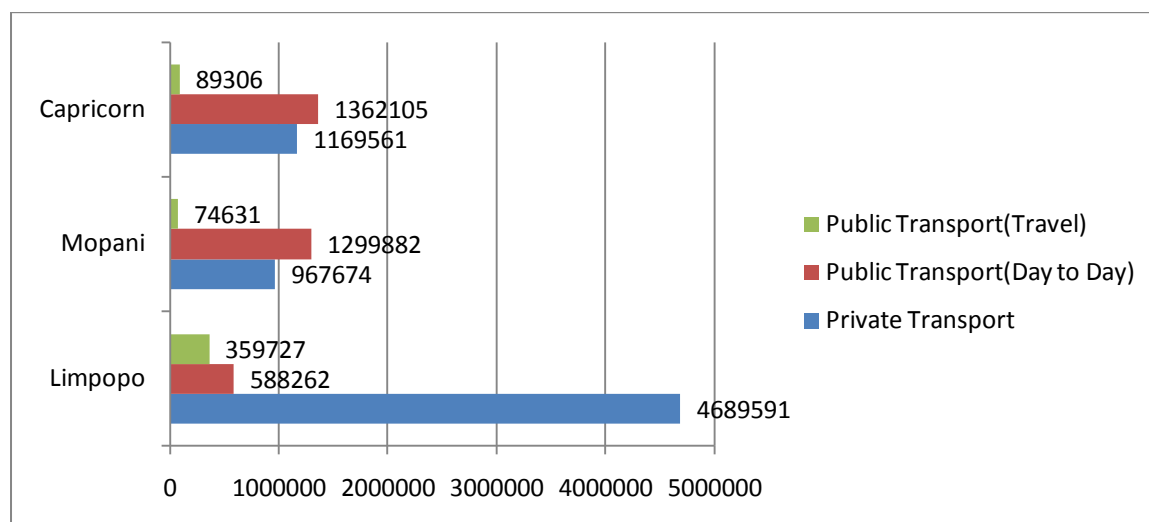
Source: Global Insight(March 2010)

3.3 S UMMARY AND CONCLUNSION

Mopani District Municipality has a total population of 1 068 567 and Capricorn District Municipality population is 1 243 165. In both district municipalities women constitute the majority of the population. The employment rate in Mopani is 169 667 and in Capricorn at least 185 898 people are employed. The unemployment rate in Mopani is 241 631 and in Capricorn at least 124 902 people are unemployed.

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In Mopani 64.3% of the households have a monthly income of less than R1000 and 61% of the households in Capricorn have a monthly income of less than R1000. In 2008 Mopani GDP was R39 651 180. In the same period Capricorn GDP was R36 649 337.

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SECTION 4: STATUS QOU ANALYIS OF PUBLIC PASSENGER TRANSPORT

The section will be analysing and profiling public passenger transport sector in Mopani District Municipality and Capricorn District Municipality. The following aspects are discussed and analysed in this section

- Institutional Arrangements
- Trends in Public Passenger Transport
- Public Transport Subsidy
- Bus Service Sector
- Minibus Taxi Service Sector
- Public Transport Fares
- Challenges Faced by Operators and Recommendations
- Rail Passenger Service
- Air Passenger Service
- Commuters Associations
- Analysis of Vehicle Operating Costs Per Mode

4.1 INTRODUCTION

A large proportion of the population relies on land public passenger transport as their primary means of getting around. Public passenger transport in Mopani and Capricorn districts just like in any other parts of South Africa is generally characterized by high operating costs as well as higher fares. Most of the commuters within these areas come from poor background due to low levels of income and unemployment. The major modes of public passenger transport are minibus-taxis and buses. Currently there is no commuter rail transport service in both CDM and MDM. Public passenger transport is mostly used for the following reasons

- Education;
- Work;
- Holiday;
- Leisure; and
- Shopping.

4.2 INSTITUTIONAL ARRANGEMENTS

Focus of this subsection will be to look at the role expected to be played by the three spheres of government in public passenger transport. We will also look at the various roles played by the other stakeholders such as taxi councils and transport forums.

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4.2.1 National Government

The NDoT is responsible for public passenger transport nationally in South Africa. It sets broad public transport policies and provides the budget for subsidised land public passenger transport and channels these through provinces.

4.2.2 Provincial Government

The public transport sector comes under the authority of the LRDT at a provincial level. The LRDT is responsible for the formulation of the sector policies and for the oversight of that policy implementation, the objectives being to ensure enhanced performance of the sector, and also to provide an optimal contribution to national social economic development. The department is also responsible for providing assistance to local government unable to deliver on the transport legislative mandate, especially in the largely rural municipalities. It is also responsible for contracting and paying subsidised to bus operators.

4.2.3 Local Government

Local governments, through the statutory integrated transport plans, and in consultation with communities, are supposed to identify short to long term transport interventions and budget for these accordingly. Each local government must establish a transport forum which is representative of all the stakeholders such as taxi operators, bus operators, commuters etc. The key roles which are expected to be fulfilled by the transport forum is to

- Ensure continuous communication and promote sound working relations amongst all the relevant role players (especially public transport operators and transport users) and the various levels of government;
- Eliminate all forms of violence in the transport industry by promoting unity and integration;
- Eliminate unfair, unsafe and predatory business practices that may lead to conflict in the transport industry;
- Co-ordinate the provision of transport facilities and the orderly use thereof;
- Facilitate the planning, implementation and monitoring of an effective and coordinated public transport system;
- Advise the appropriate Department within the Government on transport matters and to ensure that good working relations continue between the public transport operators, transport users, businesses and government authorities;
- Identify and prioritise public transport infrastructure needs and requirements;
- Making recommendations with regards to permit applications;
- Mediating conflicts within the transport industry and investigating grievances regarding the transport industry;
- Facilitating human resource development and capacity building in the transport industry; and
- Assisting authorities to implement the relevant public passenger transport legislation and regulations.

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4.2.4 Taxi Councils

Each district has a taxi council which is affiliated to the South African National Taxi Council. The representative councils within the study area are Mopani Taxi Council and Capricorn Taxi Council. Membership of the taxi councils is open to all taxi operators and associations. These councils play a number of roles some of which are regulatory in nature. Their major roles could be summarised as follows

- Creating a more robust effective regulatory regime with respect to all aspects of the mini bus taxi industry;
- Developing and establishing minimum membership admission requirements;
- Disciplining of members;
- Participating in the development of policy regarding control of service provision, safety standards, suitability of vehicles, standards of maintenance and qualification of operations and staff; and
- Participating in the committees of the licensing authorities which issues permits with respect to routes.

4.3 TRENDS INPUBLIC PASSENGER TRANSPORT

This subsection makes analysis of the results of the National Household Travel Survey (NHTS) in order to determine the major trends of public passenger transport in the two districts. The NHTS was commissioned by the NDoT and it was undertaken by Statistics South Africa in 2003 covering all the nine provinces in South Africa and its main purpose was as follows

- To understand the transport needs of household and travellers;
- To ascertain the cost of transport and assess whether households can afford to pay for the mobility which is essential to their survival;
- To assess attitude towards transport services and facilities.

As such this subsection is based upon the results and findings of the NHTS and it will be used to describe public passenger transport trends in MDM and CDM.

4.3.1 Major modes of transport

This part will be looking at highlighting the major modes of transport for work related trips and educational trips. In the figure below minibus-taxis are depicted as the major mode of transport for work related trips, transporting about 61.4% of commuters in Mopani and 62% of the commuters in Capricorn. Buses carry around 38.6% of the commuters in MDM and 38% in CDM. The fact that the taxi service is the most dominant can be attributed to the fact that it is more accessible and also because of the route and network flexibility.

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Figure 4-9Main mode of public transport to work
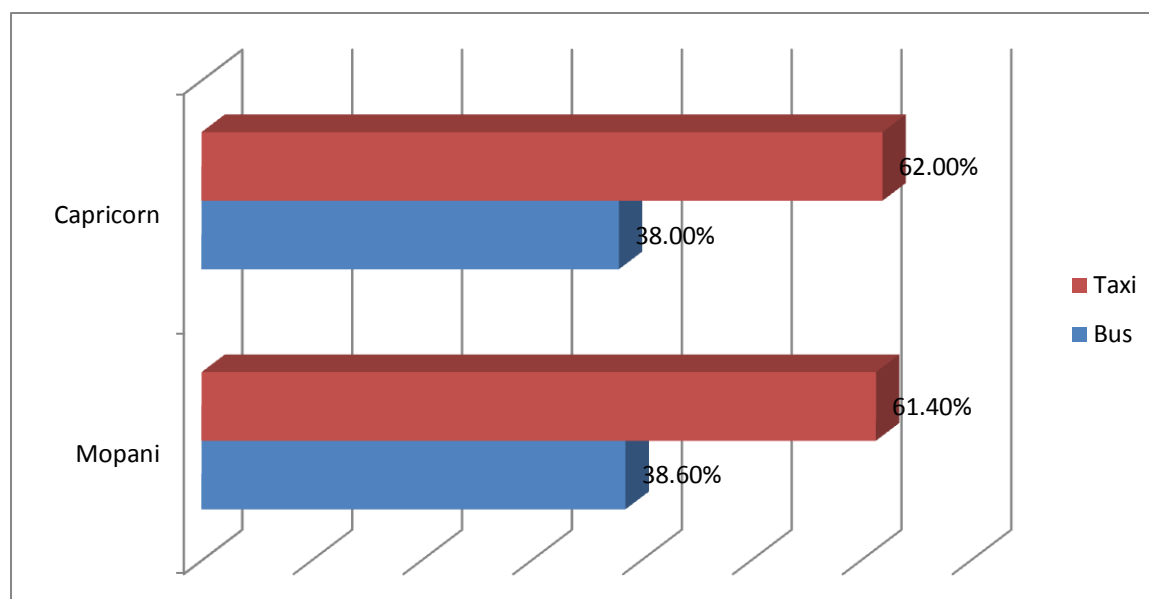
Source: NHTS

The figure below depicts that most educational trips are undertaken by walking (90.60%), followed by taxis (3.5%), car (3.3%), bus (1.90%) and other (0.70%) in MDM. In CDM most educational trips are undertaken by walking (92.50%), followed by taxis (4.0%), car (2.00%), other(1.10%) and the bus (0.40%).

Figure 4-10 Travel modes to education

Source: NHTS

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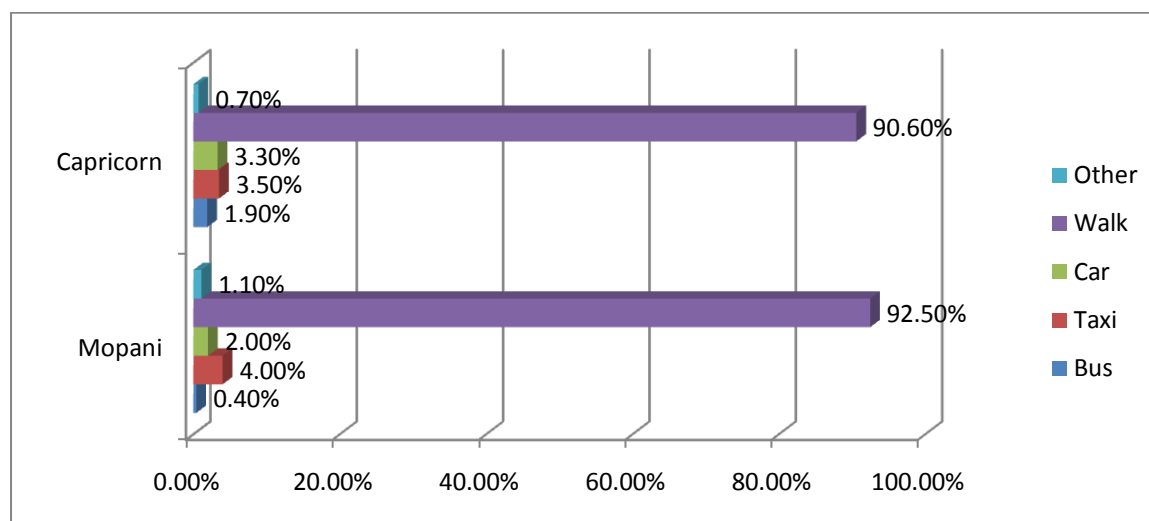
4.2.2 Monthly income spent on public passenger transport

The affordability of transport is a major concern in South Africa. In terms of the national policy on transport, transport costs should be capped at 10% of household income. In the two figures (figure 4-11 and figure 4-12) below an analysis is made on the actual spending of households on buses and taxis within the Mopani and Capricorn. In Capricorn 35.10% of the households are spending between R1-201+ on buses while in Mopani at least 38.70% of the households are spending the same.

Figure 4-11Monthly household expenditure on buses
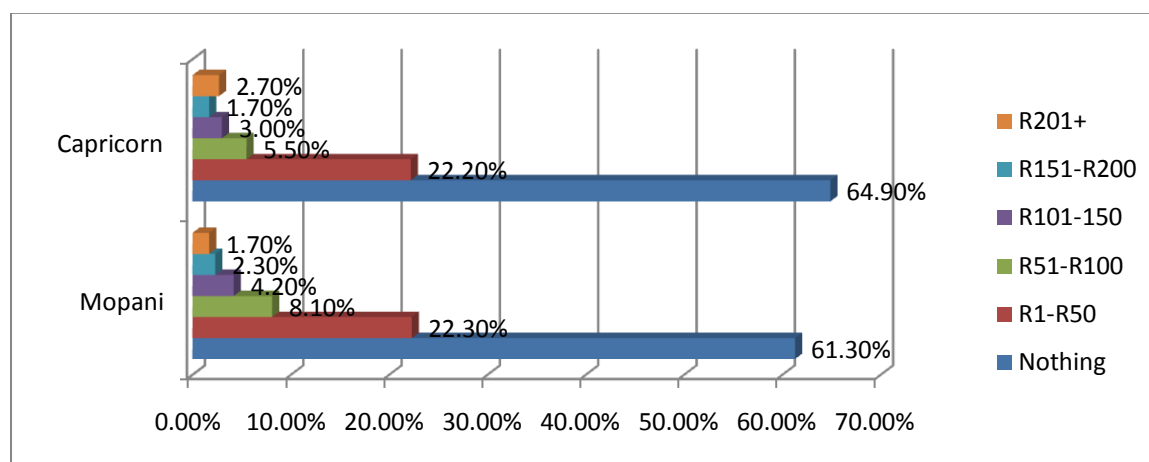
Source: NHTS

In Capricorn 87% of the households are spending between R1-201+ on taxi trips per month whereas in Mopani at least 79.6% of the households are spending the same on taxi trips on a monthly basis.

Figure 4-12 Monthly household expenditure on taxis

Source: NHTS

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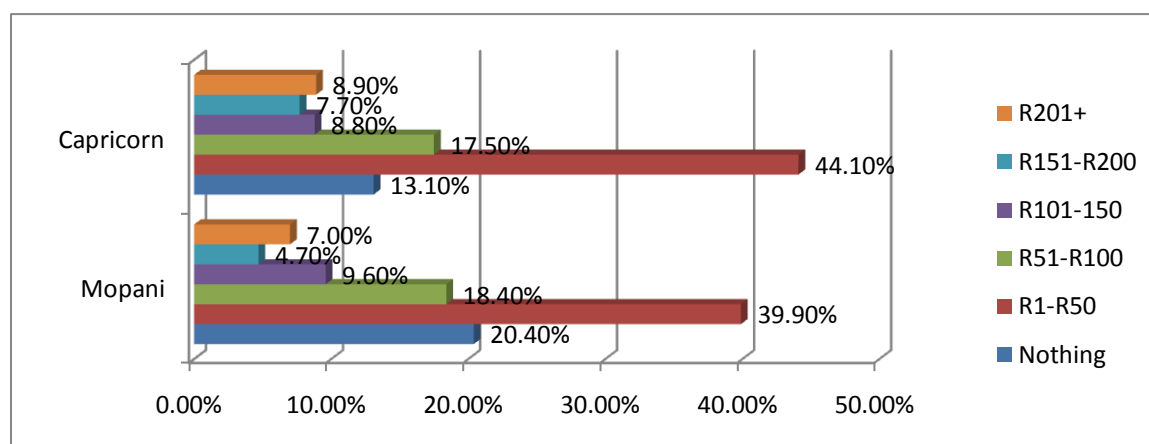
Figure 4-13 Monthly household expenditure on public transport
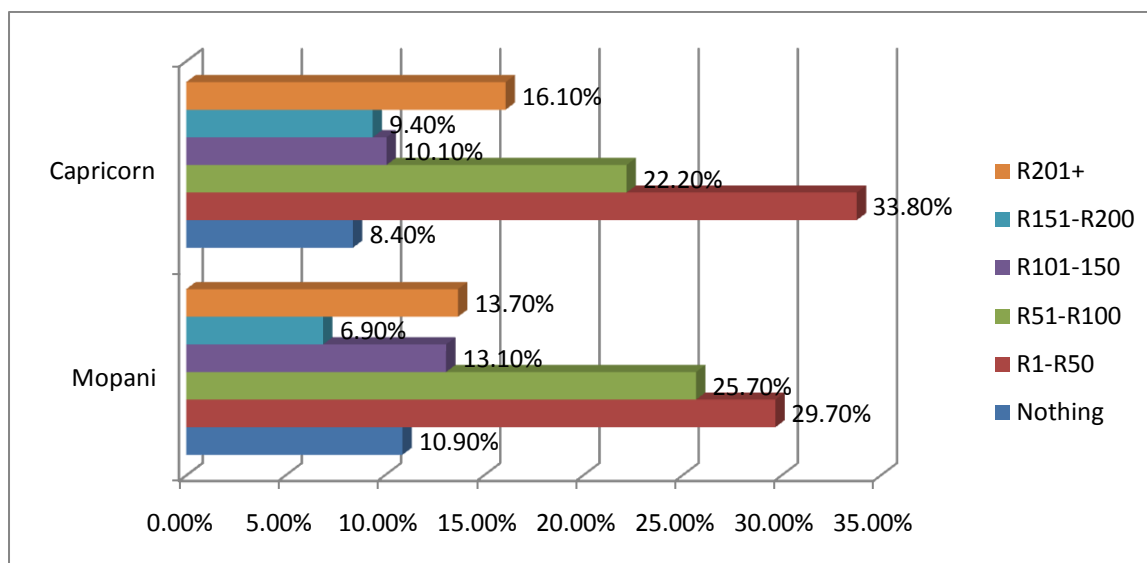
Source: NHTS

The figure below depicts that 35.5% of the households are spending more than 10% of their income on public transport in both Mopani and Capricorn districts. At least 54.9% households in Capricorn are spending between 1-10% of their income on transport and in Mopani it is about 52.7% of the households.

Figure4-14 Percentage of household income spent on public transport

Source: NHTS

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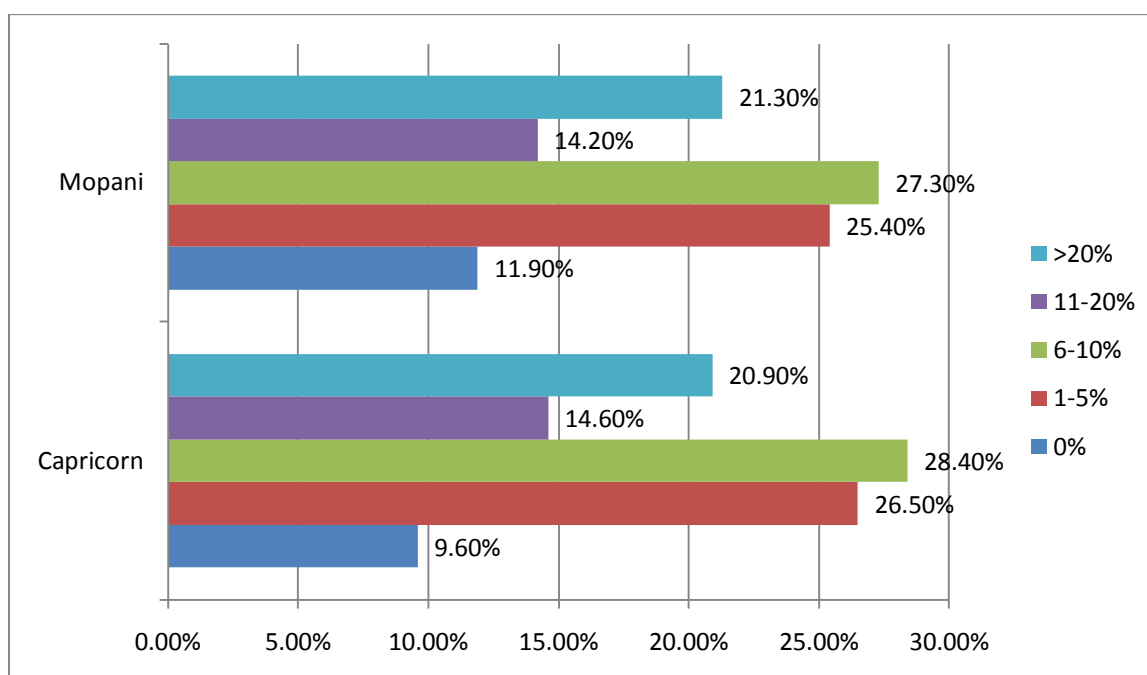
The table (4-1) below indicates the spending patterns of on the two major modes of transport in Mopani and Capricorn districts. At least 63.4% of workers who use public transport in Mopani and 53.2% in Capricorn are spending between R101-R200 per month on it.

Table 4-1 Monthly public transport for work trips

		% of public transport trips			
		R 0-R100	R101-200	R201-300	R301+
District	**Mopani**	17.4	63.4	9.9	9.3
	Capricorn	2.4	53.2	23.4	21.0
Public Transport Mode	**Bus**	33.4	41.7	14.6	10.3
	Taxi	13.9	54.6	17.2	14.3

Source: NHTS

4.4 PUBLIC PASSENGER TRANSPORT SUBSIDY

The term subsidy implies that the user of a service is paying less than the cost of the service, with the balance 'subsidised' or paid for by others, and mostly by government. Such a subsidy may come from government at any level or sphere. In the South African context the funding originates either from the national fiscus (money from tax payers)or from municipalities (money from property rates and other sources of municipal revenue).

Public passenger transport subsidies are limited to the following:

➢ **Transfers for infrastructure**

▪ Public transport infrastructure and systems grant;
▪ Rail infrastructure and systems.

➢ **Transfers for operating costs**

▪ Public transport operations grant (bus subsidies);
▪ Rail operations grant;
▪ Taxi recapitalisation.

In Limpopo there are only two subsidies available, the first one is the public transport operating grant which is paid to the LDRT so that it could be transferred to qualifying bus operators. The second subsidy is the taxi recapitalisation programme which is currently being paid to taxi owners within the province.

▪ Based on a recent assessment of the bus service, fares are approximately 50% subsidised.
▪ Taxi fares are largely unsubsidised but it could be argued that the taxi recapitalisation programme represents a subsidy but that this is likely to be less than 10%.

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The figure below is depicting the amount in rand which has been previously spent on subsidies for selected bus operators by the Provincial Department of Roads and Transport in Limpopo between financial years of 2001/02-2007/08.

Figure 4-15 Bus Subsidy Expenditure
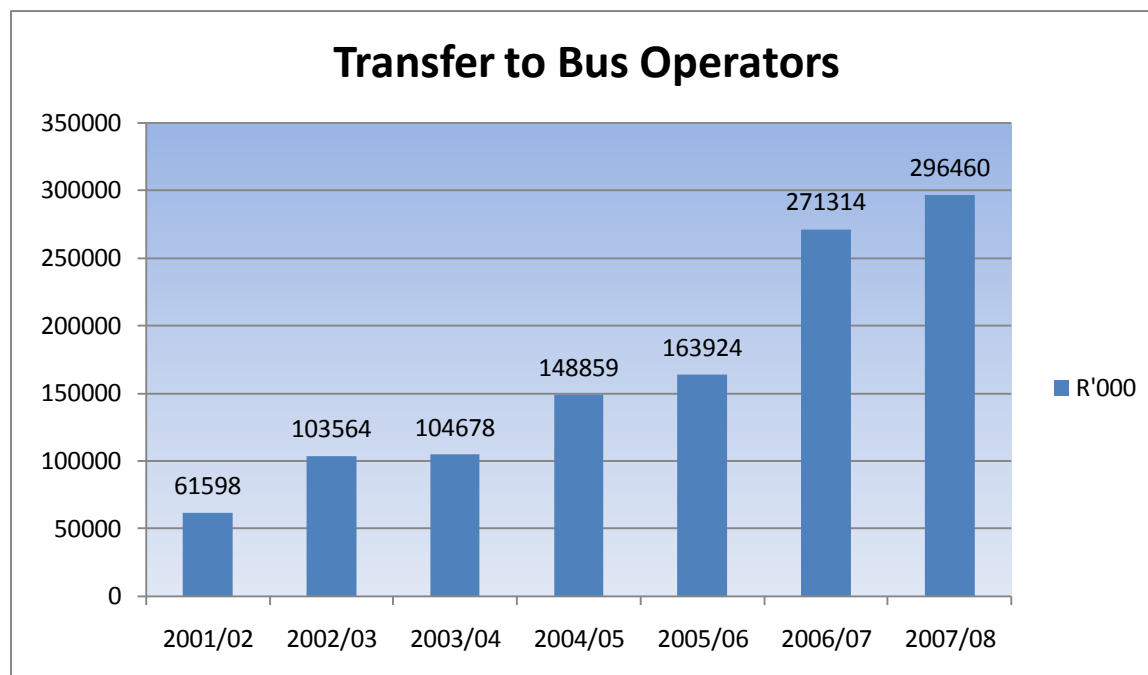
Source: LRDT Expenditure Review 2008

Currently in the province there are about 19 bus companies with approximately 900 buses who are contracted to the department of roads and transport to provide subsidised public service to passengers. There are 180 subsidised bus routes in CDM and 196 subsidised buses in operation. Subsidised buses serve mainly peak hour commuters and offer limited off-peak services to learners, students and the elderly.

According to the department of roads and transport only GNT is operating under a negotiated tender in both MDM and CDM. The LRDT applies an approach of ticket based and also the kilometre based system for payment of subsidies to operators. The following is a list of bus operators that are currently the recipient of subsidies in both CDM and MDM

▪ GNT, Bahwaduba Bus Service;

▪ KopanoBus Service;

▪ Madodi Bus Service;

▪ Risaba Bus Service; and

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- Mathole Bus Service.

Figure 4-16 and 4-17 below are depicting the actual transfers to bus operators in the financial years 2007/08 and 2008/09. The majority of the transfers were made to GNT with about R85 546 000 (82%) of the allocations in 2007/08 and R71 883 000 (64%) in 2008/09. The rest of the allocations in 2007/08 were distributed as follows Bahwaduba R12 760 000(11%), Kopano R11 409 000 (10%), Mathole R4 557 000 (4%), Risaba R3 423 000 (3%).

Figure 4-16 Annual Subsidies to Bus Operators(2007/08)
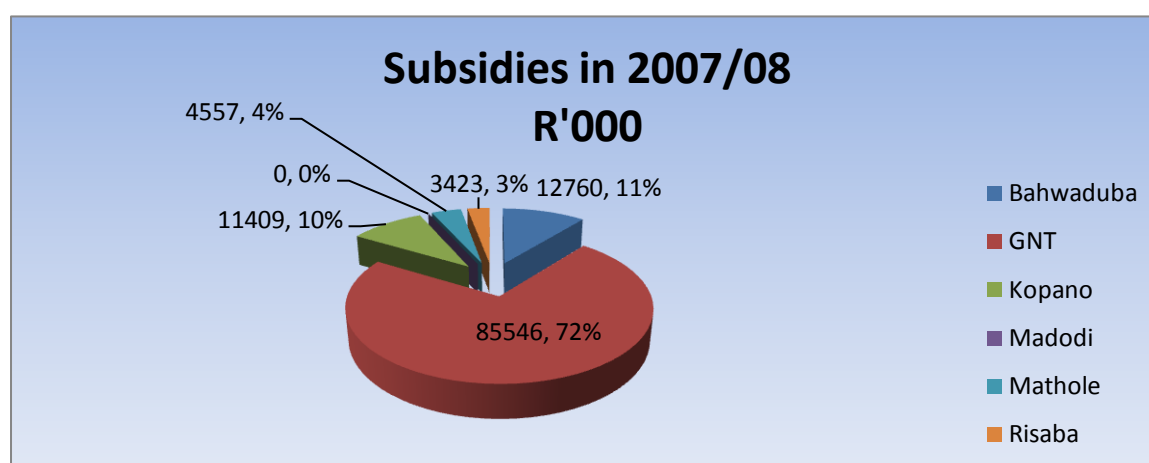
Source: LDRT Annual Report 2007/08

Figure 4-17shows that the allocations for 2008/09 were distributed as follows KopanoR16 790 000 (15%), Madodi R11 140 000 (10%), Mathole R6 780 000 (6%), Risaba R5 202 000 (5%).

Figure 4-17 Annual Subsidies to Bus Operators

Source: LDRT Annual Report 2008/09

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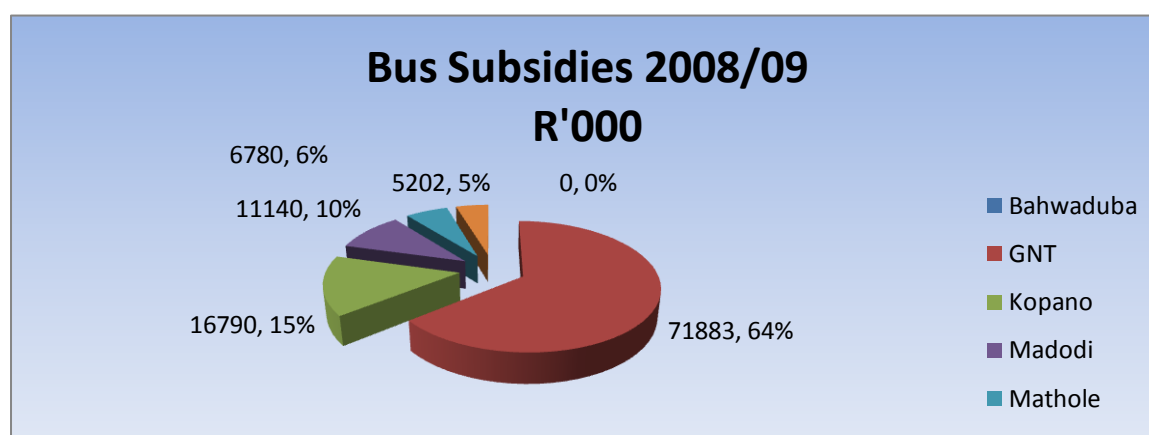
4.5 BUS SERVICE SECTOR

This sector is the second largest transport mode in the two districts following behind the taxi sector. It transports about 1 992 050 passenger in Mopani annually. In Capricorn district almost 7 131 960 are transported by buses annually. The dominant travel pattern of bus passengers is mostly from home to work in the morning and a return trip in the evening. There are some very longroutes (from 40km to 100km) and journeytimes which are in excess of two hours.The bus facilities in both Mopani and Capricorn are inadequate and of poor infrastructure. The major characteristics of this sector are depicted in the table below.

Table 4-2 Major characteristics of the Bus Service Sector

	MDM	CDM	Limpopo
No of buses	237	256	NA
No of Operators	4	18	NA
Major Operator	GNT	GNT	GNT
No of subsidized routes	127	443	NA
No of subsidized operators	128	196	900

4.6. MINIBUS TAXI SERVICE SECTOR

Minibus taxi-type service means an unscheduled public transport service operated on a specific route or routes, or where applicable, within a particular area, by means of a motor car, minibus or midi bus. This sector is the most popular mode of transport for the majority of MDM and CDM commuters. It remains relatively unregulated and taxi fares are not subsidised by the government. Taxis are thus relatively expensive and in many cases are not profitable if replacement of the vehicle is factored into the cost structure. The government have set certain standards for taxi operators, such as the standard of the vehicles to be used for business operations such that only SABS compliant minibuses have been approved to ferry passengers. Some of the compliant minibuses which have been approved by the SABS are as follows

- Toyota Quantum;
- Foton View;
- Chana;
- CAM Inyathi; and
- Polarsum Ingwe.

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More support for taxis is in the pipeline as per the recommendations of the National Taxi Task Team which were approved by the cabinet as the blueprint for transformation of the taxi industry. The recommendations which were made are as follows

- Economic empowerment of the industry;
- Formalisation through registration of Associations;
- Conversion of permits into operating licences;
- Democratisation of the taxi industry.

Major characteristics of the sector are highlighted in the table below.

Table 4-3 Major characteristics of taxi service

	MDM	CDM	Limpopo
No. of taxis	953	2701	13 000
Taxi associations	21	30	104
Taxi facilities(formal)	15	29	NA
Taxi facilities(informal)	53	78	NA
No of routes	74	285	NA
% of users(work trips)	61.4	62	61.50

4.7 PUBLIC PASSENGER TRANSPORT FARES

The fare structure is subject to review every five years in the case of taxi operators in MDM, though more frequent review is possible if warranted by rising fuel prices. Fares were last set in 2005 and have not been reviewed since then and as such operators have had to absorb the 65% rise in the retail price of fuel between January 2006 and July 2008.

Individual taxi associations decide on the fare structure to be charged per route, outside consultation with, or interference by the authorities. Commuters are charged fixed amounts for travelling on particular routes. These routes in the taxi industry are generally known, without being published. Minibus-taxi passengers are charged a fixed cash fare for a route, irrespective of the distance travelled on that specific route. It is an uncommon practice to set fares according to the perception of the customer's willingness to pay.

According to Mr.Mthombeni who is the Chairperson of Mopani Taxi Council in his area commuters are not consulted when taxi fares are decided. Commuters are only informed about the changes in fares through notices which are placed around taxi ranks and inside taxis at least twenty days before the increase. He also said that the taxi council does not play any role when fares are set as this is the prerogative of the individual taxi associations.

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A number of factors are considered when increasing the fares some of which are as follows

- Fuel costs;
- Distance;
- Tyres, spares;
- Other petroleum products;
- Current vehicle prices; and
- Competition by buses.

The newspaper clip below in table 4-4 depicts some of the factors which are taken into consideration when fares are set by the Seshego Polokwane Taxi Association. In the article below it is evident that the association do consult with its passengers when they decide to increase their fares.

Table 4-4 Factors Considered by SeshegoPolokwane Taxi Association

Commuters from Seshego to Polokwane will have to dig deeper in their pockets to meet the new taxi fare which will increase from R6 to R7 from Monday, 10 May. Spokesperson of the SeshegoPolokwane Taxi Association, Mr TakalaniNemahunguni said the increase of the taxi fare was prompted by the escalation of the petrol price. "We decided to increase the price by R1. Last year it was R7 and we had to reduce it to R6 to accommodate the commuters because most of them were badly affected by the economic recession. We spoke with our commuters and they responded positively about the new price. We believe in the Batho Pele principle. Our commuters are our first priority. I can assure you that the price has got nothing to do with World Cup. The taxi industry is not a profit making but a service rendering business," Nemahunguni said.

Source: Polokwane Observer (2010)

In the case of bus fares they are much cheaper when compared to taxi fares and this can be attributed to the fact that some of the bus operators receive subsidies from the DoT. Again it should also be understood that fares for subsidised bus operations are more or less regulated by government. Subsidised buses are only allowed to increase their tariffs once a year and increases should not exceed 10% of the previous year fare. Mostly fares are increased during between February and March of each year. Subsidised operators consult with their passengers through the commuter associations before they increase their fares.

As for the non subsidised buses they are forced by circumstance beyond their control to cap their fares on par with subsidised operations in order to attract and retain passengers as they are in direct competition with subsidised operators. When operators are setting or reviewing bus fares they consider a number of factors such as diesel prices, tyre costs, maintenance etc.

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The table below is depicting public transport fares on Tzaneen route. Tzaneen was chosen as it is the major source employment area in the district. The average taxi fare is 0.35c/km whilst the average bus fare is 0.32c/km. Buses appear to be inexpensive because they are subsidised which is not the case with taxis. The small gap in the fares could be attributed to factors such as competition between bus and taxi service.

ROUTE		DISTANCE(km)	TAXI		BUS	
Trip From	Trip To		Fare	Fare/km	Fare	Fare/km
Tzaneen	Burgersdorp	25km	R8.50	0.34c	R8.50	0.34c
Tzaneen	Lenyenye	22km	R8.00	0.36c	R7.50	0.34c
Tzaneen	Kgapane	31km	R9.00	0.29c	R8.50	0.27c
Tzaneen	Letsetele	30km	R9.50	0.32c	R9.00	0.30c
Tzaneen	Nkowankowa	17km	R7.00	0.41c	R6.50	0.38c
Tzaneen	Giyani	110km	R40.00	0.36c	R35.00	0.32c
Tzaneen	Phalaborwa	110km	R40.00	0.36c	R35.00	0.32c
Tzaneen	Polokwane	104km	R35.00	0.34c	R28.00	0.27c
Tzaneen	Marivane	25km	R8.00	0.32c	R6.50	0.26c

Table 4-5 Public Transport Fares in Tzaneen

Table 4-9 below depicts the bus and taxi fares which is payable within the route of Polokwane and its major surrounding areas. The reason we chose to sample the fares within this route is because Polokwane is the major employment city and the major economic hub within CDM. The average taxi fare/km is 0.43c compared to that of bus fare which is at least 0.27c. It is evident that the short distances are the ones which are more expensive as the average fare/km for Seshego is 0.70c for a taxi and 0.60 for a bus.

Table 4-6 Public Transport Fares in Polokwane

ROUTE		DISTANCE(km)	TAXI		BUS	
Trip From	Trip To		Fare	Fare/km	Fare	Fare/km
Polokwane	Bochum	90km	R35.00	0.39c	R16.50	0.18c
Polokwane	Botlokwa	50km	R20.00	0.40c	R10.50	0.21c
Polokwane	Moletjie	45km	R15.00	0.33c	R8.40	0.18c
Polokwane	Seshego	10km	R7.00	0.70c	R6.00	0.60c
Polokwane	Mankweng	34km	R12.00	0.35c	R6.70	0.29c
Polokwane	Lebowakgomo	56km	R20.00	0.53c	R10.00	0.36c
Polokwane	Mashashane	44km	R14.00	0.32c	R6.50	0.15c
Polokwane	Matlala	75km	R30.00	0.40c	R14.50	0.19c

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4.8 CHALLENGES FACED BY OPERATORS AND RECOMMENDATIONS

In this subsection we are going to highlight the challenges faced by the operators within the two sectors, and this is based on the interactions that we had with them through telephonic and one on one interviews as well as focus groups meeting. They also raised a number of interventions which they require the LRDT to consider for implementation.

<u>Taxi Operators</u>

Their major challenges are as follows

- **Expenses and maintenance of taxis:** It is expensive to run a taxi business as their main cost of running went to petrol of which they are spending between R2000 and R2500/week. The other major costs which are incurred are costs for changing tyres and servicing of their vehicles;
- **Business Performance:** They are failing to make any profit because the routes they operate under are not sustainable and profitable because they share them with buses. As such most of them are failing to honour their monthly vehicle repayments;
- **Poor Infrastructure:** The gravel roads within the rural areas are in poor conditions and this is having an impact on the lifespan of the majority of their vehicles;
- **Lack of Financial Support:** The majority of the operators indicated that lack of government subsidy is really impacting negatively on their businesses. It was also unfair to grant subsidies to bus services whereas they are operating more or less on the same routes with the taxis;
- **Piracy:** In Mopani taxi operators are losing a lot of business to pirating taxis and the local authorities are not taking any actions against the perpetrators;
- **Lack of Support by local government:** Local municipalities do not consider the taxi sector when sourcing out transport service;
- **Higher Interest Rates:** Banks and other financial institutions are charging higher interest rates and many of them are battling to make repayments on their vehicles with interest rates ranging from 20-28%. Many of them are paying monthly instalments of between R8000-R13000 depending on the vehicle make or model. In the last two months at least 18 vehicles were repossessed within the Mopani area;
- **Theft:** Because of the predominant use of cash fares within the sector, a lot of money is lost due to theft by taxi drivers.

Taxi operators were also afforded the opportunity to make inputs on the recommendations on the changes which they would like to see in the sector

- **Subsidies:** Government should introduce taxi subsidies;

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- **Interest Rates/Instalments**: Government should intervene to ensure that banks charge reasonable instalments;
- **Insurance**: Government should look at engaging with the insurance industry on their behalf as they believe that this sector does not serve them well;
- **Government Tenders**: The sector should also be considered for government and municipalities' tenders such as the scholar transport scheme;
- **Taxi Cooperatives**: The department should revisit the taxi cooperatives matter and revitalise them;
- **Road Infrastructure**: Road infrastructure particularly in rural areas is in poor conditions and government must improve these conditions;
- **Electronic Payment System**: Smart card payment systems should be introduced as it can be the only way to reduce theft by taxi drivers; and
- **Consultation**: There should be transparent and sufficient consultation between government and the sector.

Bus Operators

Their major challenges are as follows

- **Expenses and maintenance of buses:** The prices of operational inputs like tyres, tubes, fuel and lubricants have risen so rapidly over the years and some operators are have had difficulties in coping. The prices of some of these inputs have risen above 100% within a period of ten years;
- **Subsidies insufficient:** Those who are receiving subsidies indicated these subsidies are not sufficient to cover all of their operational expenses.

During the focus group meetings the bus operators gave an indication that that they would like the government to implement the following

- Set minimum operating standards for small bus and taxi operators qualifying them to enter the subsidized commuter transport market;
- The department should allocate 40% of present subsidized commuter contracts to small bus and taxi operators;
- The department should assist with maintenance and admin infrastructure for small bus operators on a lease basis; infrastructure financing is linked to the contract.

4.9 RAIL PASSENGER SERVICE

In Capricorn and Mopani as in other parts of Limpopo Province there is no rail passenger transport. The only existing rail service is freight service. There was a feasibility study which was undertaken by PRASA to look at the development of passenger rail service in Limpopo. Another investigation was also conducted with the aim of looking at possibilities of

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introducing passenger rail in Polokwane and Seshego. (Source: Progress report for the Limpopo Provincial Government Economic Sector Cluster)

4.10 AIR PASSENGER SERVICE

Air passenger service in Capricorn is currently limited to Polokwane where there is one major airport, Polokwane International Airport. This airport is located just outside Polokwane adjacent to the N1 and it handles around five thousand aircraft a year, and just under forty thousand passengers. Although it does handle international flights, these are generally cargo aircraft transporting goods and industrial materials. The airport's commercial passenger flights are domestic only, serving the route between Polokwane and Johannesburg. These flights are operated by South African Airways in conjunction with Airlink.

In Mopani there are two regional airports, Eastgate and Phalaborwa airports. The Eastgate airport is located in Hoedspruit and it is situated within an air force base. Phalaborwa airport is located in is located in Ba-Phalaborwa municipality. Eastgate Airport services daily scheduled flights from Johannesburg and connecting flights from Cape Town, operated by SAA's regional and domestic carriers, South African Express Airways.

4.11 COMMUTERS

In undertaking this study we also consulted commuters in the two study areas. The commuters within the two districts are represented by Mopani Commuter Association and Capricorn Commuter Association respectively. In their submissions they raised the following concerns

- The existing bus and taxi fares are very strenuous on those who travel on a daily basis and this impacting on their monthly household budgets;
- Higher fares also contributes to low living standards as well as poverty;
- Public transport operators should look at making increases on a three year cycle rather than annually;
- Operators should inform commuters of the impending increases at least three months earlier as this will enable passengers to readjust their monthly budgets.

The figure below depicts the findings of the National Household Travel Survey (NHTS) on the most important transport problems experienced by passengers in relation to public transport. The major problems according to the findings are

- Public transport ifs too far
- Too expensive
- Not safe

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Figure4-18Most important transport problems experienced
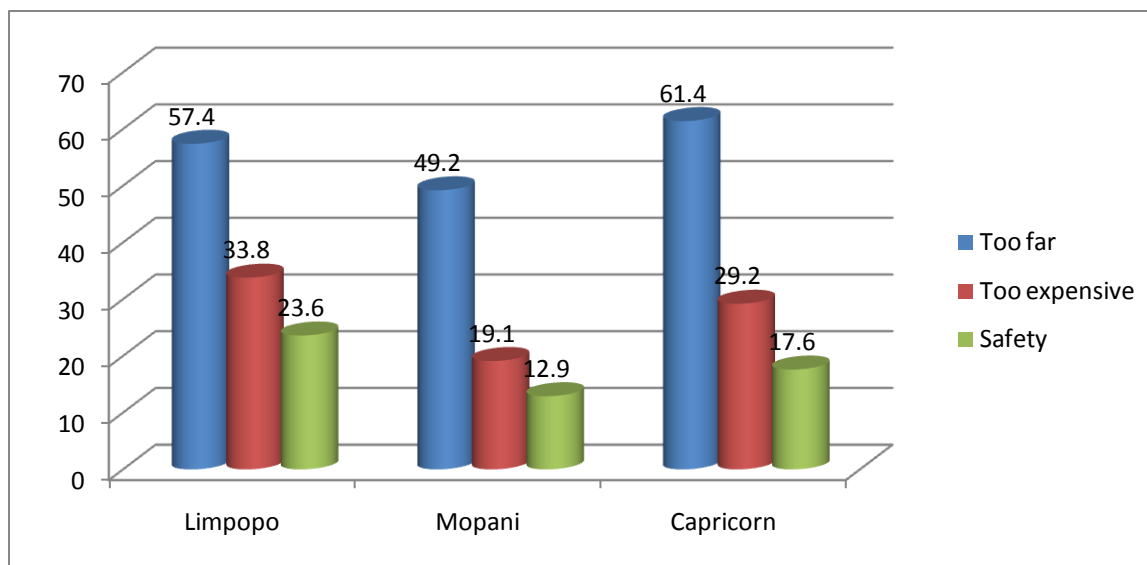
Source: NHTS

4.12 SUMMARY AND CONCLUSION

Following the analysis of public passenger transport in the two districts the following can be concluded

- Commuters/Passengers are reliant only on two major modes of public transport, which is the bus and taxi service;

- The majority of passengers use taxi service for work trips and from the analysis of characteristics of public transport;

- It is evident that some passengers are spending more than they can afford on public transport and this is taking a strain on the household budget of those who relies on public transport for mobility;

- Even though the bus service sector is currently receiving subsidies, this do not apply to all the bus operators within the area;

- As for the taxi operations they do not receive any other subsidy except for the Taxi Recapitalization Scheme which also has certain requirements that must be met; and

- Both of these sectors are facing a number of challenges which are making their businesses not to be profitable and making them survivalist business especially taxi service. These challenges range from the escalating costs of fuel, higher interest rates and others.

Considering the fact that the majority of people in CDM and MDM are reliant on these two sectors for transport, it is important that the department takes certain measures that will improve the sustainability of the two sectors and also make it more affordable to passengers. This will lead to public transport sector becoming more accessible especially in

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rural areas. The department should also prioritise the introduction of passenger rail service within the province.

SECTION 5: ANALYSIS AND EVALUATION OF VEHICLE OPERATINGCOSTS (VOC) AND FUEL CONSUMPTIONPER MODE

This section is going to make an analysis of the vehicle operating costs and fuel consumption of the two major modes of land public passenger transport in both CDM and MDM. The purpose is to try and ascertain the estimated vehicle operating costs of buses and taxis.

5.1 BUS SPECIFICATIONS

The bus analysis has the following specifications:

- Seating capacity of 65 passengers;
- Engine capacity of 4249cc;
- Diesel Engine;
- Fuel consumption of 47l/100km;
- Weighing 8,5tons;
- Travelling 32256 km/year.
- The diesel price is 703.45c/l.

5.2 MINIBUS TAXI SPECIFICATIONS

The minibus taxi analysis has the following specifications:

- Seating capacity of 13 passengers;
- Engine capacity of 2237cc;
- Petrol Engine;
- Fuel consumption of 13.81l/km;
- Travelling 62496km/year.
- The petrol price is 810.00c/l

5.3 CALCULATING THE OPERATING COSTS AND FUEL CONSUMPTION OF BUSES AND MINI BUS TAXIS

Table 5-7 Calculating the operating costs of buses and mini bus taxis

COST GROUP	UNIT	COSTING PARAMETER	COSTS	
			BUS	**TAXI**
FIXED COSTS(A) (A)=B+C	R/YEAR	Admin costs	16 500	2 535
		Monthly Vehicle Instalments(B)	454 618	49 228
		Depreciation@20% (C)	331 536	35 900
TOTAL	**R/YEAR**		**802654**	**87663**
OPERATING COSTS(D) (D)=E+F+G+H	R/YEAR	Vehicle License Fee(E)	6 072	456
		Association Membership Fee(F)	-	1 440
		Insurance(G)	82 884	14400
		Salaries(H)	54 000	34992
TOTAL	**R/YEAR**		**142 956**	**51 288**
RUNNING COSTS(I) (I)=(J+M+N)/100	R/km		5,323	2,114
	c/km	Fuel Costs(J)=(KxL)/100	288.5	111.9
	c/l	Fuel Price(K)	703.45	810.00
	l/100km	Fuel Consumption/100km(L)	41.0	13.81
	c/km	Tyre Costs(c/km)(M)	57.77	49.72
	c/km	Service and Repairs(c/km)(N)	186	49.77
	Km/year	Kilometres per year(O)	32256	62496
TOTAL VEHICLE COST(P) P=A+D+(IxO)	**R/YEAR**		**1 117 380.69**	**271 067.54**

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5.4 SUMMARY AND CONCLUNSION

The summary of the findings are as follows:

- The running costs per year for a bus travelling on average 32 256km per annum is R5.32/km.
- The running costs per year for a mini bus travelling on average 62 496km per annum is R2.11/km.

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SECTION 6: AN ANALYSIS OF THE WORLD'S ENERGY SECTOR

The purpose of this section is to provide an in-depth analysis of the fuel industry on an international perspective. This section will focus on the main sources of the world petroleum products. It will also look at the major role players within the fuel industry globally as well as events which have influenced the costs of fuel in the past three decades to the present. A review of the fuel reserves in the world will also be made. The following aspects are provided for in this section

- Oil Sector
- Coal Sector
- Gas Sector
- Security of Supply

6.1 INTRODUCTION

The world sources its energy needs from oil, gas and coal. These fossil fuels are important to the world for a variety of reasons. Their use ranges from household use to industrial use. Oil, Coal and Gas are also converted to petroleum products for use in the transportation of people and goods and this one of their major uses in the modern world. In 2006 the total world primary energy supply was as follows

Figure 6-19 Primary Energy Supply in the World
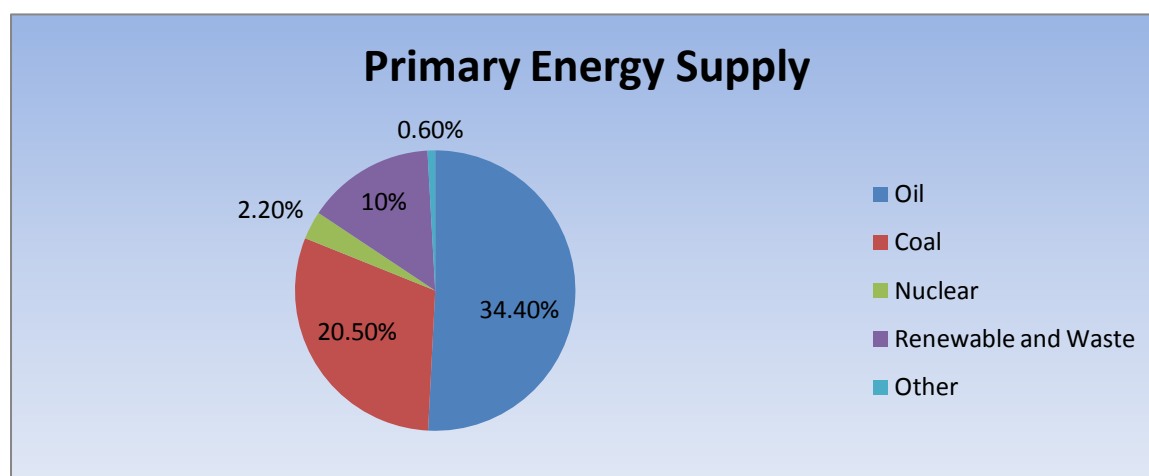
Source: IHS Global Insight 2010

6.2 OIL SECTOR

Oil is arguably the most sought after commodity in the world and it has a major influence on the world economies. It has many uses around the world, such as electricity generation, for heating and cooking purposes and as a key raw input in the manufacture of many items. However, its most important use is its role as a liquid fuel for most forms of transportation

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of goods and persons. All industries are, to a lesser or larger degree, reliant on oil or its derived petroleum products.

Oil accounts for a large percentage of the world's energy consumption, ranging from a low of 32% for Europe and Asia, up to a high of 53% for the Middle East. Other geographic regions' consumption patterns are as follows: South and Central America (44%), Africa (41%), and North America (40%). The world at large consumes 30 billion barrels (4.8 km³) of oil per year, and the top oil consumers largely consist of developed nations.

Until now, the growth in oil consumption has been met by an equivalent increase in production, despite recent price tensions (in 2004/2005, again in 2007 and above all during the first half of 2008). These tensions decreased for a while as a result of the economic crisis which started in during later parts of 2008.

To appreciate the importance of crude oil, we need to understand that:

- The majority of transport is fuelled by oil products, depending on the country;
- Almost all petrochemicals and lubrication is done with oil products;
- The majority of all goods in the shops get there using oil;
- Some of our food involves oil for fertilisers, agrochemicals, tilling, cultivation and transport;
- Oil is our most important energy source accounting to nearly 40% of all primary energy used by humans.

6.2.1 Oil Producing Countries

The figure below depicts the top ten oil producing countries. As expected five of the top producing countries are located in the Middle East and these countries are Iran, Saudi Arabia, Iraqi, Kuwait and United Arab Emirates. In Africa the major oil producing country in 2009 was Nigeria. The world's leading oil producing country the Russian Federation who in 2008 had a production rate of 9888bbl/d and 10032bbl/d in 2009. It is interesting to note that production in the majority of the OPEC countries also increased in 2009. The major oil producing countries in order of production rate in 2009 were Russia, Saudi Arabia, United States of America, Iran, China, Canada, United Arab Emirates, Kuwait, Iraqi and Nigeria.

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Figure 6-20 Top Oil Producing Countries
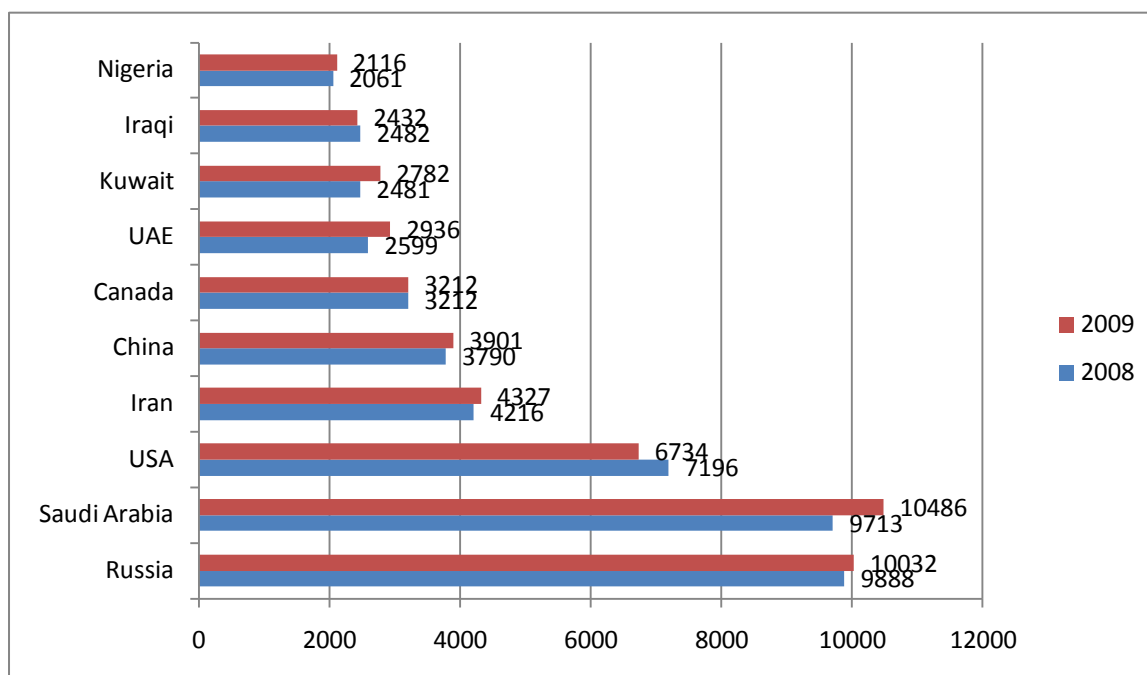
Source: BP Statiscal Review of World Energy2010

6.2.2 Oil Consuming Countries

The main consuming countries are, unsurprisingly, the developed countries of North America, Europe and Asia. The major oil consuming country in the world is the United States even though it has less than 5% of total world population; it consumes at least 20% of the oil produced each year. In Asia, there is an explosion of consumption as Chinese consumption has almost tripled in 15 years and is not showing signs of slowing down. Consumption of the whole Asia-Pacific zone has overtaken that of the North American zone. With an average 78% increase in 16 years, Asia has become the new oil giant.

 Figure 5-20 below depicts the major oil consuming countries in the world in 2008 and 2009. As in 2008 the USA is still the major consumer of oil in the world with a consumption rate of 18686bbl/d. This is down by 4.9% from 2008 but still represent about 21.7% of world's consumption. China and India have both shown increase in their consumption with a growth rate of 6.7% and 3.7% respectively. The major consuming country from OPEC member countries is Saudi Arabia with a consumption rate of 2614bbl/d in 2009 compared to 2390bbl/d in 2008. In 2009 the world consumed 3820.50mt of crude oil.

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Figure 6-21 Major Oil Consuming Countries
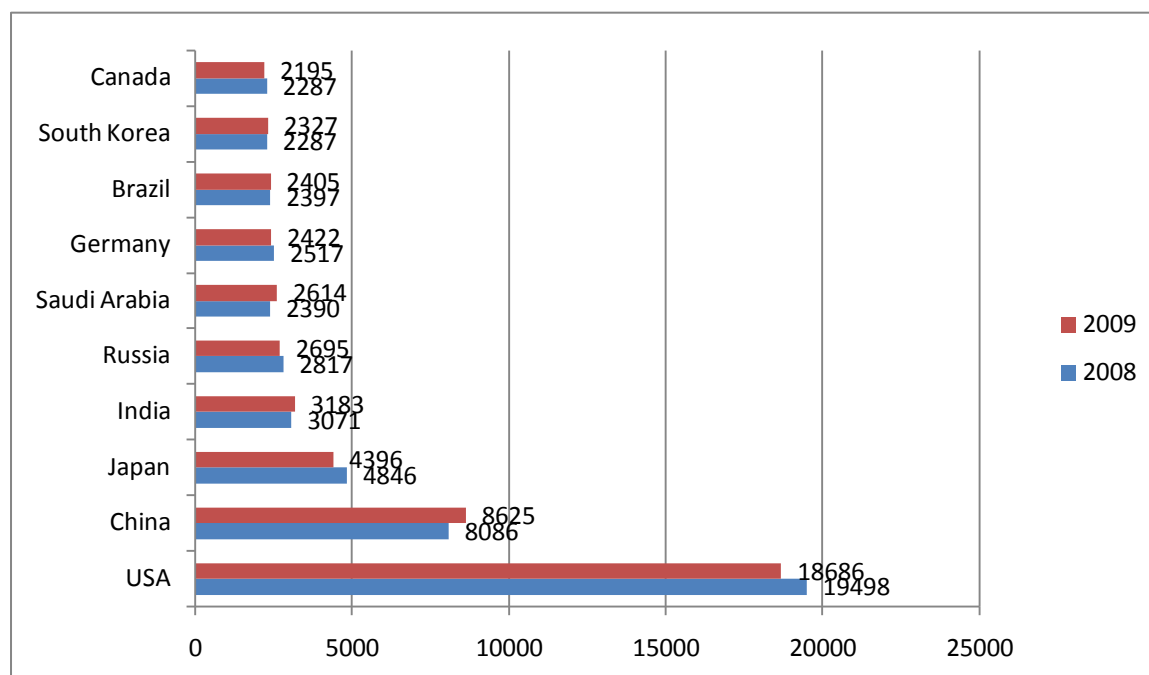
Source: BP Statiscal Review of World Energy 2010

The table below is depicting the projected oil consumption for the period 2010-2020.

Table 6-8 Projected oil consumption

	2010	2015	2020	Major Producer	Major Consumers
Gas	**4612mt**	**4514mt**	**4897mt**	**Russia**	**USA**

Source: BP Statiscal Review of World Energy

6.2.3 Oil Exporting Countries

The majority of the top oil exporting countries is members of OPEC. About eight of the top ten exporting countries are members of OPEC. The only Non OPEC members in the top ten are Russia and Norway. Four of the major oil exporting countries is located in the Middle East which demonstrates the importance of the region in the oil sector. The figure below shows that in 2008 Saudi Arabia exported 8406 billion barrels a day, Russia 6874 bbl/d, United Arab Emirates 2511bbl/d, Iran 2433bbl/d, Kuwait 2390bbl/d, Norway 2246bbl/d, Angola 1948bbl/d, Venezuela 1888bbl/d, Algeria 1883bbl/d and Nigeria 1769bbl/d.

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Figure 6-22 Top Oil Exporting Countries
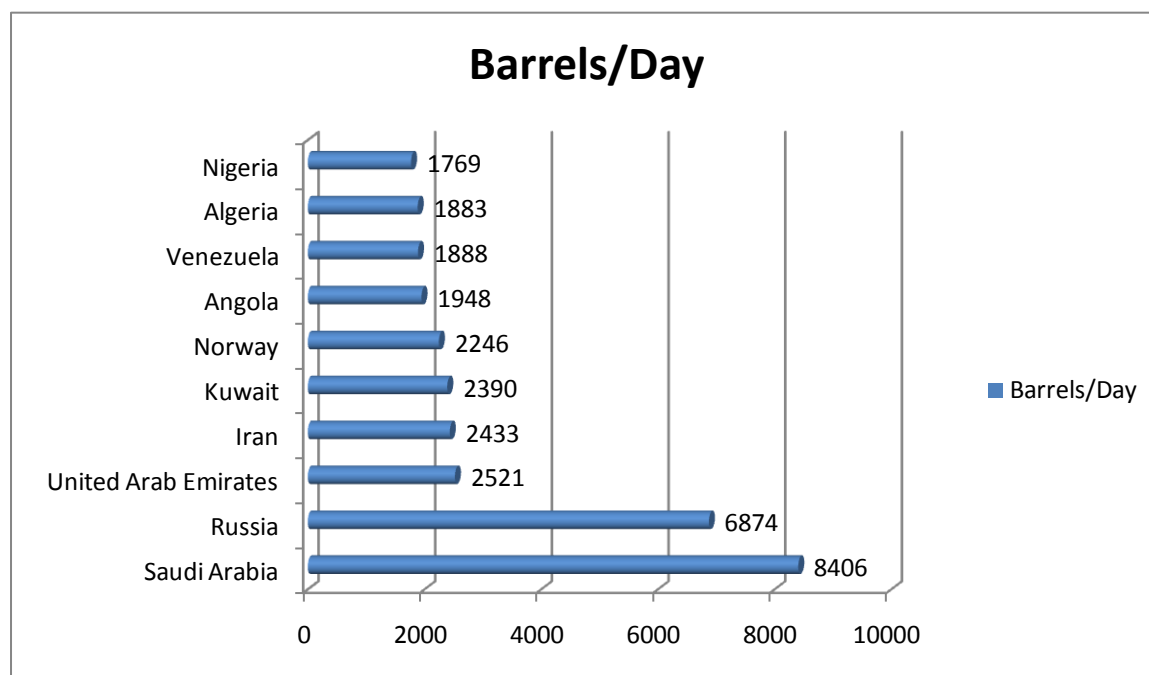
Source: BP Statiscal Review 2010

6.2.4 History of Crude Oil Prices

The year 2008 saw unprecedented increase in the price of oil from around US$90 per barrel in January 2008 to almost US$144.00 per barrel in early July 2008 and this was mostly attributed largely to global demand outstripping supply mainly as a result of astronomical surge in the consumption of oil in emerging economies (China and India) and other developing economies which are growing at a sizzling pace. From the figure below the 12 month average prices of Brent crude oil between the years 1997-2009 are analysed. The average prices for these years is as follows: 1997(US$19.19), 1998(US$12.70), 1999(US$17.90), 2000(US$:28.40), 2001(US$:24.50), 2002(US$24.70), 2003(US$28.80), 2004(US$38.20), 2005(US$54.40), 2006(US$65.10), 2007(US$72.50), 2008(US$97.00), 2009(US$61.50).

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Figure 6-23Average crude oil prices (1997-2009)
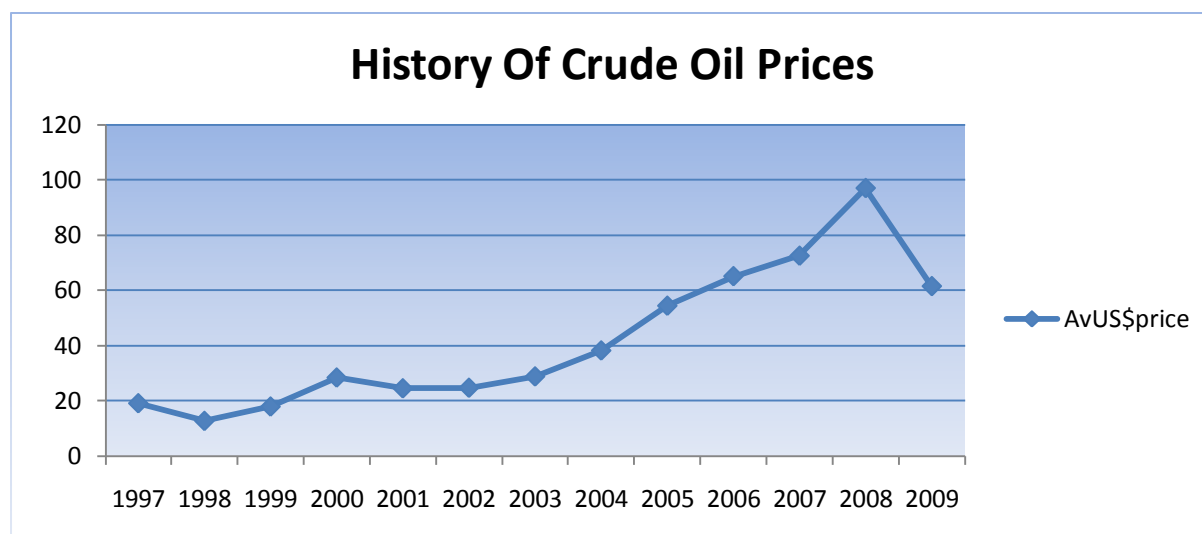
Source: SAPIA (Own calculations)

6.2.5 Oil Reserves

At the end of 2009 the world's total proven oil reserves were 1333.1tmb and as shown in the figure below the majority of the major oil reserves are located in the Middle East countries. The region accounts for two thirds of world oil reserves. Thus, the logical conclusion is that the Middle East, already a strategic zone for oil production, is going to become more and more so as the years go by.

Figure 6-24 World Oil Reserves
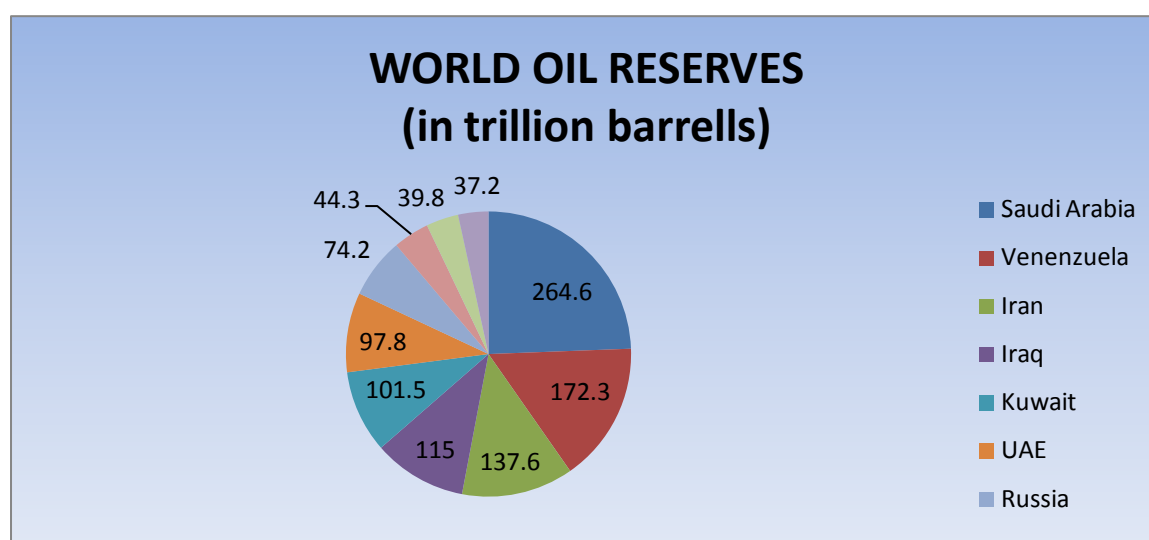
Source: BP Energy Statiscal Review 2010

The distribution of the reserves is as follows Saudi Arabia 264tbl, Venezuela 172.3tbl, Iran 137tbl, Iraq 115tbl, Kuwait 101.5tbl, UAE 97.8tbl, Russia 74.2tbl and Libya 44tbl. Seven of these countries are members of OPEC.

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6.2.6 Oil Producing and Exporting Countries (OPEC)

The Oil Producing and Exporting Countries organization was founded by oil exporting countries. The present membership of the organization currently stands at 12 member countries and it is open to any country with a substantial net export of crude oil petroleum. The current members are Saudi Arabia, Venezuela, Iran, Iraq, Kuwait, United Arab Emirates, Libya, Nigeria, Qatar, Algeria, Angola and Ecuador. Its main objectives is

- To coordinate and unify petroleum policies among member countries, in order to secure a steady income to the producing countries;
- For an efficient, economic and regular supply of petroleum to consuming nations; and
- For a fair return on capital to those investing in the petroleum industry. OPEC member countries produce about 46% of the world's crude oil and 18% of its natural gas.

OPEC's crude oil exports represent about 60 per cent of the crude oil traded internationally. Therefore, OPEC can have a strong influence on the oil market, especially if it decides to reduce or increase its level of production. Current estimates indicate that more than three quarters of the world's proven oil reserves are located in OPEC member countries, with the bulk of these reserves in the Middle East, amounting to 72% of the OPEC total. OPEC member countries have made significant additions to their oil reserves in recent years, for example, by adopting best practices in the industry. The figure below shows that OPEC countries have 79% of the world's crude oil reserves compared to 21% of NON OPEC countries.

Figure 6-25 OPEC Crude Oil Reserves
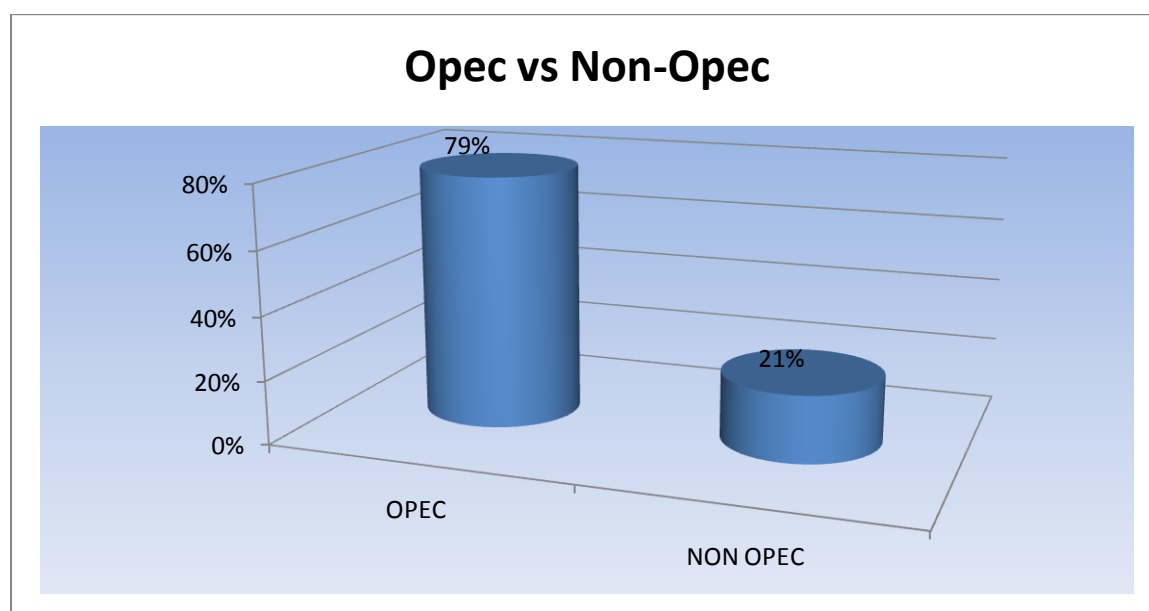
Source: OPEC Annual Statistical Bulletin 2008

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6.2.7 Oil Exchanges

Oil is mainly traded at three exchanges which are the New York Mercantile Exchange (NYMEX), International Petroleum Exchange in London (IPE) and the Singapore International Monetary Exchange (SIMEX).The current reference, or pricing markers, is

- West Texas Intermediate;
- Dubai/Oman; and
- Brent Crude Oil.

The IPE, based in London, is one of the world's largest energy futures and options exchanges and its flagship commodity, Brent Crude is a world benchmark for oil prices. The NYMEX is the world's largest physical commodity futures exchange and it is located in New York. The type of crude oil which is used as a benchmark in oil pricing is the West Texas Intermediate which is also known as Texas Light Sweet. It is also the underlying commodity of the exchange's oil futures contracts.

6.2.8 Drivers of Oil Prices

Globally there have been a number of interruptions in the supply of oil, since the early and late 70's up to today. These interruptions were mostly political in nature whilst others related to economics and certain factors such as climate and they had led to the increase in oil prices. Oil is very critical for economic power hence there is a strong likelihood of further regional military conflicts over energy resources, especially in the Middle East and Caspian region, but also in other significant oil producing regions such as West Africa and Latin America. The conflict in the Delta region of Nigeria also poses a major concern as rebels continue on attacking oil wells and pipelines leading to instability on production.

Besides the abovementioned political factors a series of events have occurred which led to the rise in crude oil prices such as the 2001 economic recession which reduced world demand and led to OPEC cutting production. Other factors like Russian entry into the world market in a big way from year 2000 onwards, hurricane season of year 2004 in the US, hurricane Katrina and Rita in the year 2005 and therising demand, which the controlled supply could not meet as well as the Asian financial crisis.

6.2.8.1 Supply and Demand

In any market situation, supply and demand imbalances can affect prices in both the short and long term. The marketplace forces of supply and demand determine the price of fuel. If demand grows or if a disruption in supply occurs, there will be upward pressure on prices. By the same token, if demand falls or there is an oversupply of product in the market, there will be downward pressure on prices. Like agricultural products, such as wheat and corn, and precious metals, such as silver and gold, crude oil is traded on the world market.

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Recently, crude oil prices have risen dramatically, driven by rising global demand. China's growth has been faster than expected with implications for oil demand. For example, in January 2008, China's oil purchases were up 16 per cent on one year previously. China's rate of GDP growth has averaged 10% per annum since 1990. Human population growth has also increased the demand for oil. Since 1990 there has been an increase of the world population. The oil quotas which are used from time to time by OPEC also have an impact the price of crude oil as it restricts the supply oil.

6.2.8.2 US Dollar Rate

The world markets price oil in United States dollar and over the last few years this currency has seen its value depreciate. This means that for given oil price in the dollar oil has become cheaper in terms of other currencies. Hence a falling dollar increases the demand for oil from investors across the globe boosting the price of oil. Over recent years a negative relationship has built up between the dollar exchange rate and the price of oil.

This means that in cases where the dollar has depreciated on average the price of oil has also risen. Traders are now using this relationship to hedge against a depreciating dollar (i.e. when the dollar falls they increase their demand for oil contracts, which puts upward pressure on the price of oil). It is one of the many reasons which have prompted some of the major oil producing countries to suggest that the price of oil be tied to a basket of currencies instead of just to the dollar.

6.2.8.3 Political Events

Several major events have shown that crude oil prices is vulnerable to various occurrences as it was observed during the following Iraq/Iran war; Yom Kippur war; Iranian revolution; Gulf war; Asian Financial crisis; Gulf War; September 11 2001; Gulf War II; Insurgency in Iraq takes a toll on Iraqi oil production (2003 to 2006); Iranian Nuclear debacle.

Figure 6-26 Movement of Crude Oil Prices Due to Occurrences in the World

Source: WRTG.COM

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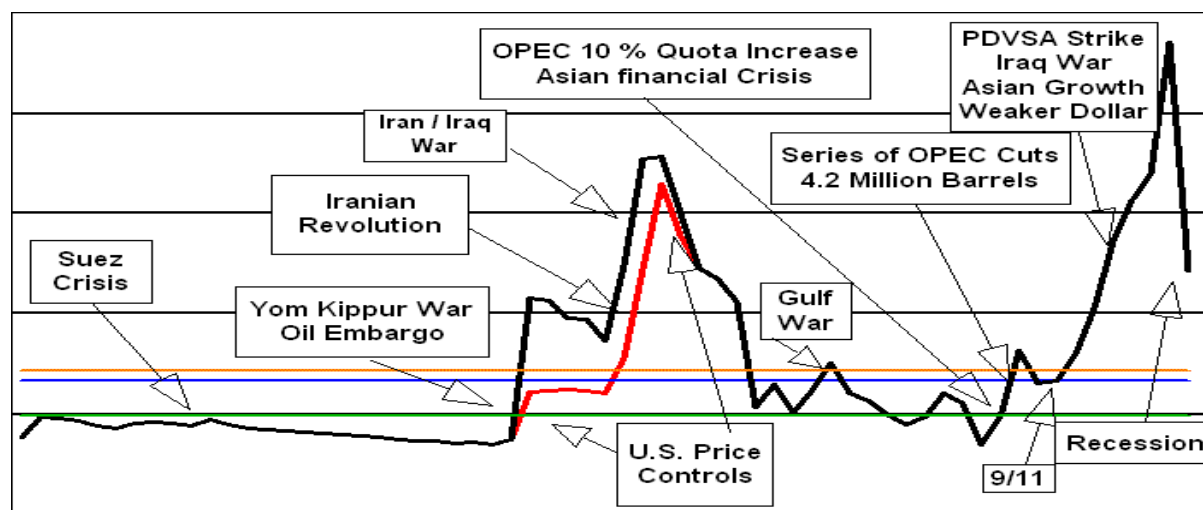
The figure above indicates the movement of oil prices due to events in the world and some of these events are discussed in the subsections below.

Yom Kippur War

The Yom Kippur war resulted in the oil embargo on the United States and Netherlands due to their support for the Israeli government. As such several Arab countries then decreased its production (5million barrels per day) and oil prices quadrupled from US$3.00pb to US$12.00.

Iranian Revolution

During the Iranian revolution at least 2 to 2.5 million barrels per day were removed from the market and this led to an increase in crude oil up to US$35/barrel between November 1978 and June 1979 which was due to the industrial action.

Iraq/Iran War

The invasion by Iraq of Iran in 1980 led to the price of oil doubling from US$14.00 to US$35.00 in 1981.

Gulf War I & II

The Gulf War II in Iraq had a major effect on the supply of oil as this led to the cut off of oil supply from Iraq. Immediately this raised the supply shortage and led to the increase in price. OPEC countries, initially maintained the supply, but later cut production to micro manage supply to the demand. By the third quarter of 2005, price of Oil had jumped to US$45 a barrel which later became US$50 a barrel.

World Trade Centre Attacks

Although the bombing of the World Trade Centre in New York (which is also known as the 9/11 attacks) can be classified as one of the major events which affected crude oil prices, its effect of the crude oil prices was not that extensive. As a matter of fact demand for oil dropped immediately after the 9/11 attack, resulting in OPEC production cut. It also made crude prices to drop by a small fraction.

Iranian Nuclear Debacle

When the tension over the Iranian nuclear ambitions began to build up, the price of crude oil was US$60 a barrel. This situation might not lead to an all out war as Gulf War I & II, but a strike to cripple Iran's nuclear facilities is a possibility. In the first quarter of 2006 oil price was US$70 a barrel price and within a short it moved on to US$75 a barrel. The Iranian issue has created a huge tension in the area and the United States of America have given the

notice that they will not allow Iran to get the nuclear bomb technology, hence tension will increase further.

6.2.8.4 Threats to Oil Transport

Getting oil from the well to the refinery and from there to the service station requires a complex transportation and shortage system. Millions of barrels of oil are transported every day in tankers, pipelines and trucks. This transportation system has always been the Achilles heel of the oil industry but it has become more since the emergence of terrorism. Tankers and pipelines are very vulnerable targets to attack. The threats to oil transportation have in the past directly affected the oil price due to maritime insurers raising premiums to cover tankers passing through risky areas.

6.3   COAL SECTOR

For a number of years, coal has represented more than a third of the world's primary energy consumption. The main consuming countries are China, United States, India and South Africa. In many cases, the major consuming countries possess significant reserves. For most countries, the figures for production and consumption are relatively close (except in the case of Australia, a major exporter). The same comment is true at the level of the continents. Certain countries are marginal net exporters of coal, others marginal importers. Compared to oil, gas or uranium, coal is much less a commodity for international commerce. Coal is mostly used for the following purposes

- Generation of Electricity;
- Household energy;
- Coal to Liquids Fuels; and
- Soft drinks industry.

6.3.1   Coal Producing Countries

The figure below shows the world major coal producing countries. In 2009 the world produced 3408.6mt of coal which was up by 2.4% from 2008 where production was 3336.9mt. China was the world leading producer of coal with about 1552.9mt which was an increase of 9.2% from the previous year and its share of the world's production is 45.6%. The rest of the major coal producing countries are as follows USA 539mt, Australia 228mt, India 211.5mt, Indonesia 155.3mt, South Africa 140.9mt and Russia 140.7mt.

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Figure 6-27 Major coal producing countries
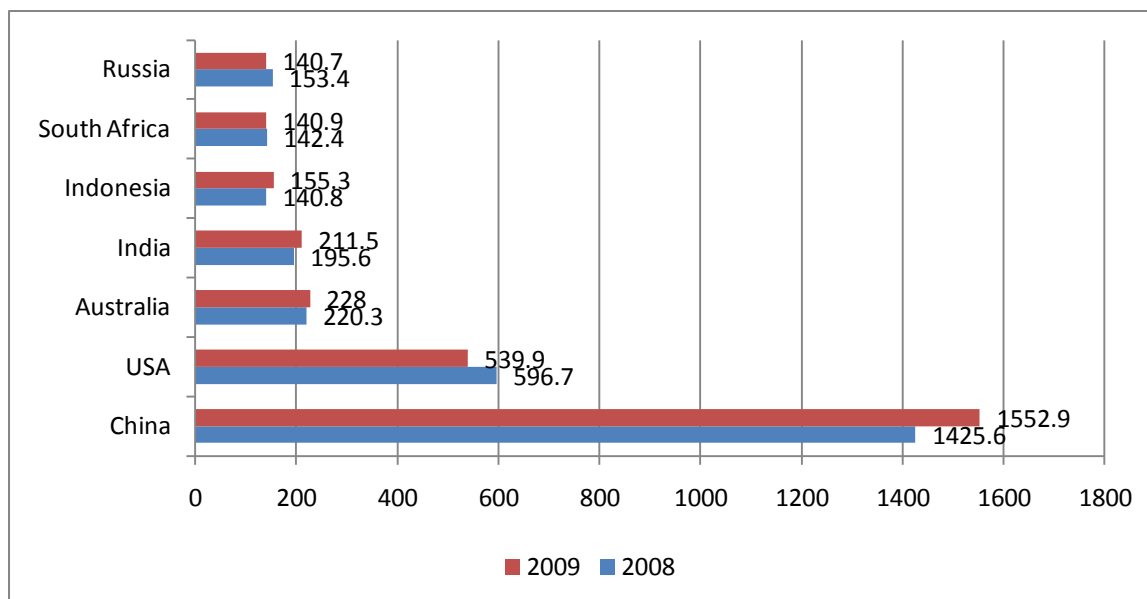
Source: BP Statiscal Review of World Energy 2010

6.3.2 Coal Exporting Countries

The figure below depicts the top coal exporting countries in the world. In 2008 Australia exported 25.6% of the world's coal needs whilst South Africa coal exports stood at 6.3%. The other major coal exporting countries are Indonesia, Russia, USA, Colombia, China and Canada.

Figure 6-28 Major Coal Exporting Countries

Source: BP Statiscal Review of World Energy 2010

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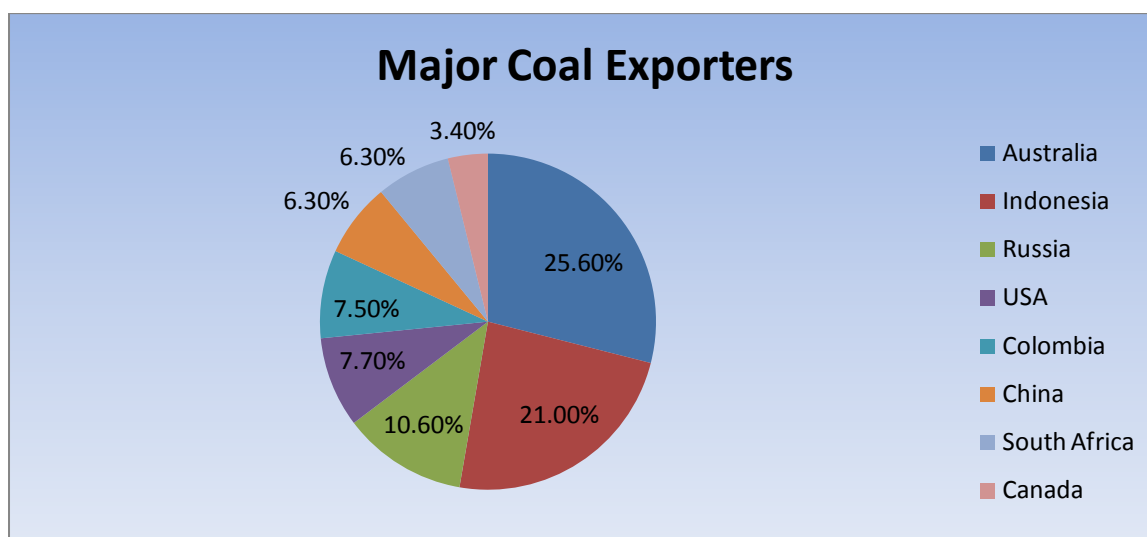
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6.3.3 Coal Consuming Countries

The figure below is depicting the world's top six coal consuming countries for the period 2008-2009. The world consumed 3286.40mt in 2008, in 2009 consumption dropped to 3278.30mt. China consumption was up by 9.6% in 2009. Its total consumption for 2009 is 1537.4mt which is equivalent to 46.9% of the world's consumption.

Figure 6-29 Major coal consuming countries
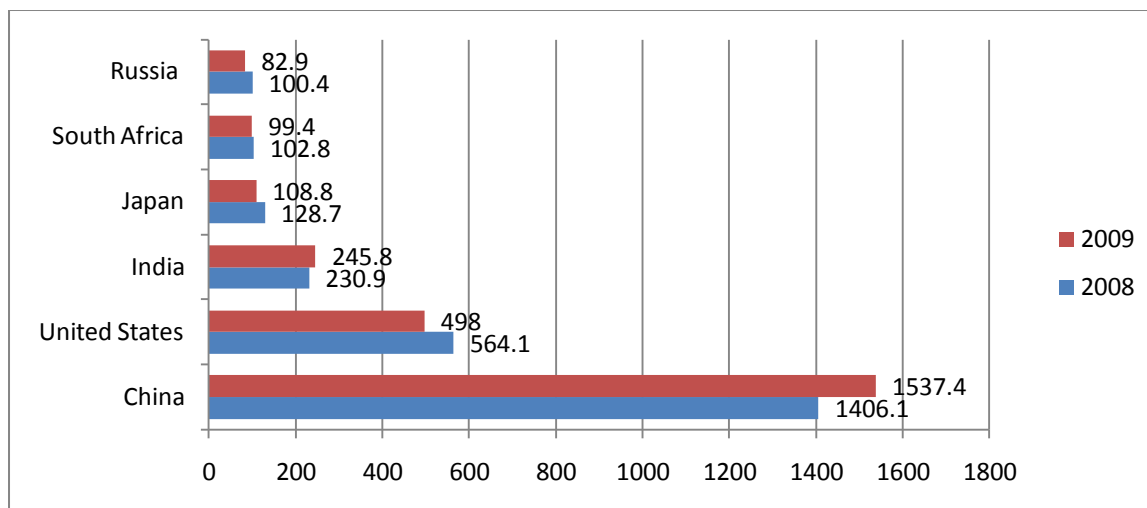
Source: BP Statiscal Review of World Energy 2010

The table below is depicting the projected coal consumption for the period 2010-2020.

Table 6- 9 Projected coal consumption

	2010	2015	2020	Major Producer	Major Consumers
Coal	3636mt	4512mt	5599mt	Russia	USA

6.3.4 Coal Reserves

Coal reserves are available in almost every country worldwide, with recoverable reserves in around 70 countries. At current production levels, proven coal reserves are estimated to last 122 years. The figure below shows the world's top ten proven coal reserves. The world's total coal reserves at the end of 2008 was 826001mt and this reserves are spread as located in the following countries United States 238308mt, Russia 157010mt, China 114500mt, Australia 76200mt, India 58600mt, Ukraine 33873mt, Kazakhstan 31300mt and South Africa 30408mt.

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Figure 6-30 World Coal Reserves
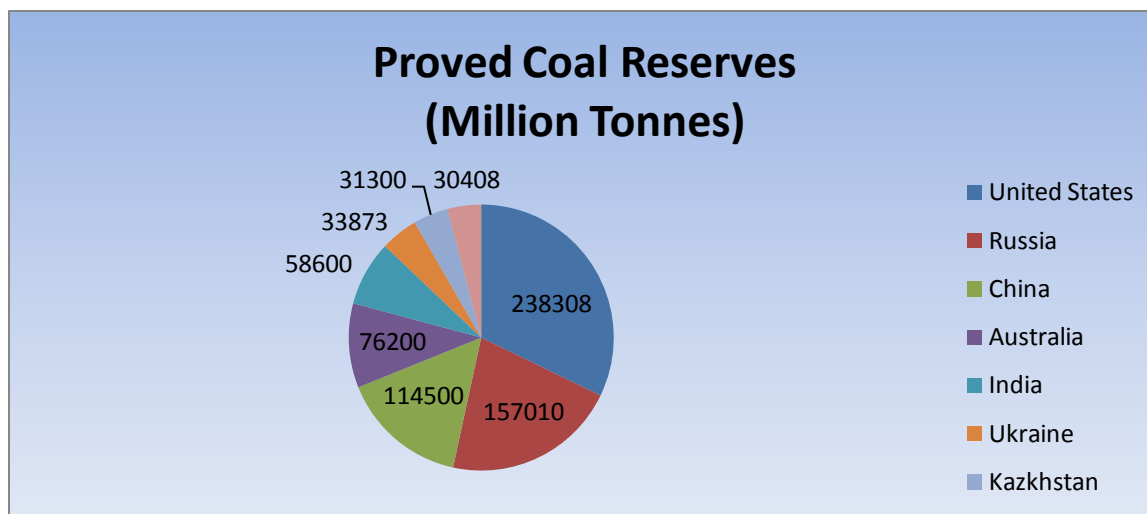
Source: BP Statiscal Review 2010

6.3.5   Coal to Liquid(CTL)

The leading country in the coal to liquid market is South Africa who has been producing coal derived fuels since 1955 and today around 30% of the country's gasoline and diesel needs are produced from indigenous coal. The major and leading CTL fuels producer in the whole world is Sasol which is located in Secunda, South Africa. This company has produced over 1.5 billion barrels of synthetic fuel and chemical products since it commenced its coal to liquids operation, and its products are currently sold in over 90 countries around the world.

6.4   NATURAL GAS SECTOR

Gas has grown from a marginal fuel consumed in regionally disconnected markets to a fuel that is transported across great distances for consumption in many different economic sectors. Increasingly, natural gas is the fuel of choice for consumers seeking its relatively low environmental impact, especially for electric power generation.

As a result, world gas consumption is projected to more than double over the next three decades, rising from 23% to 28% of world total primary energy demand by 2030 and surpassing coal as the world's number two energy source and potentially overtaking oil's share in many large industrialized economies. About three-quarters of the world's proven gas reserves are located in the former Soviet Union and the Middle East far from the areas where demand for gas is expected to rise most rapidly. Indeed, construction of transportation infrastructure is currently the major barrier to increased world natural gas consumption.

As is the case for oil, the major consumer countries for gas are also the developed countries and often developing countries having significant production of their own, together with a large population (Iran, Egypt and Uzbekistan). Consumption of gas is increasing steadily every year, more rapidly even than oil, since it progressed by 41 % in the 15 years from

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1990. As is the case for oil, the Middle East has major gas reserves (42% of world reserves). But its production remains relatively limited (31% of world production). In fact, the major consuming countries of North America and Europe are drawing on their own reserves, partly because the distribution of gas is proportionally more expensive than that of oil. It is therefore less attractive to bring gas from distant locations.

6.4.1 Gas Producing Countries

Three nations generate over 40% of the world's estimated natural gas supplies. Those countries are Russia, the United States and Canada. In 2009 the world's total gas production was 2987 billion cubic metres which is down by 2.1% when compared to 3060.8 billion cubic metres for 2008. The figure below is showing the top five gas producers for 2009. Russia produced 527 bcm, United States 593.4 bcm, Canada 162.4 bcm, Iran 131.2 bcm and Norway 103.2 bcm.

Figure 5-31 Major Gas Producing Countries
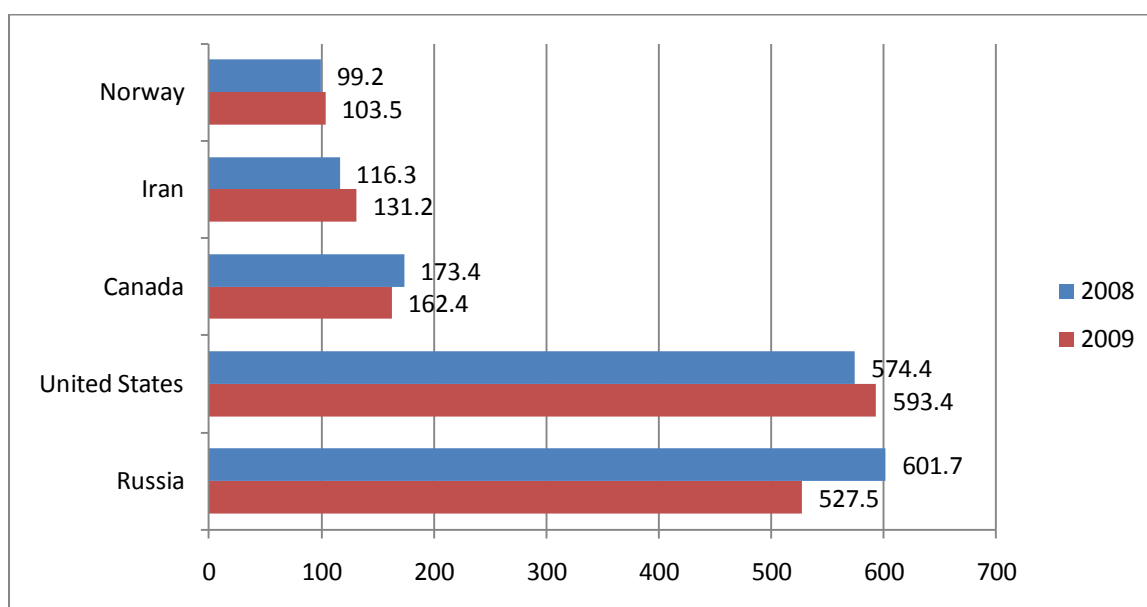
Source: BP Statiscal Review 2010

6.4.2 Gas Consuming Countries

The world total gas consumption fell by 2.1% in 2009 as consumption was stood at 2940.40bcm compared to 3010.80bcm for 2008. The U.S., Russia, Iran, Japan and China account for more than 40% of the world's total natural gas consumption. The figure below indicates the top five gas consuming countries which are US 646.6bcm, Russia 389.7bcm, Iran 131.7bcm, Japan 87.4bcm and China 88.7bcm. Consumption in some of the countries declined in 2009 whereas China increased its consumption by 9.4%.

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Figure 6-32Major Gas Consuming Countries
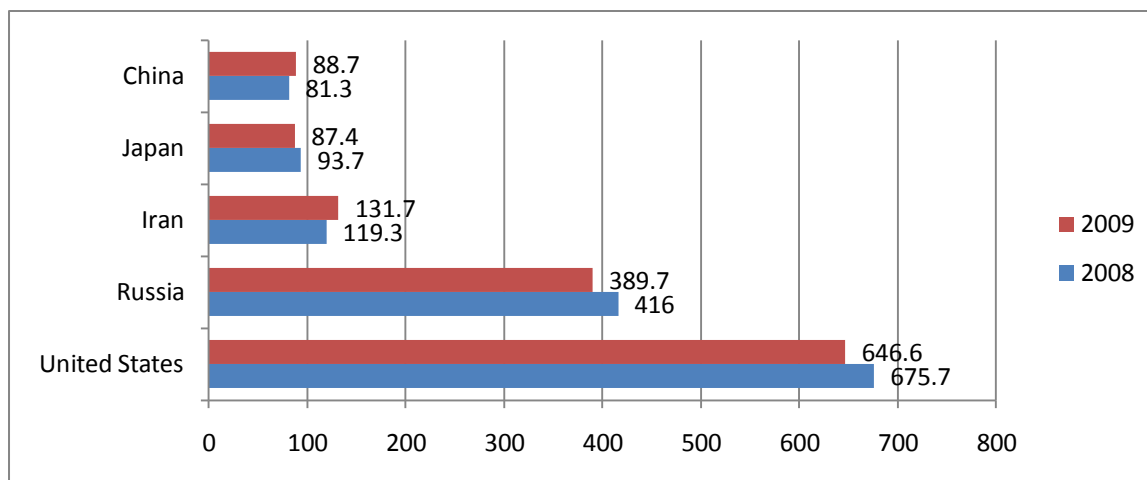
Source: BP Statiscal Review

Table 6-10 Projected Gas Consumption

	2010	2015	2020	Major Producer	Major Consumers
Gas	**2794mt**	**3154mt**	**3561mt**	**Russia**	**USA**

6.4.3   Gas Reserves

The proven world reserves amounted to about 6621.2 trillion cubic feet at the end of 2009. The figure below is showing the distribution of available reserves by region in the world. The Middle East has 40.6% of natural gas reserves followed by Europe and Eurasia with 33.7%, Asia Pacific 8.7%, Africa 7.9%, North America 4.9% and South and Central America 4.7%. As it can be seen from the table below Russia has about 1567.1 trillion cubic feet which is about 23.7% of the world reserves. This is followed by Iran with 1045.7 trillion cubic feet which is about 15.8% of the world reserves.

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Figure 5-33World Gas Reserves
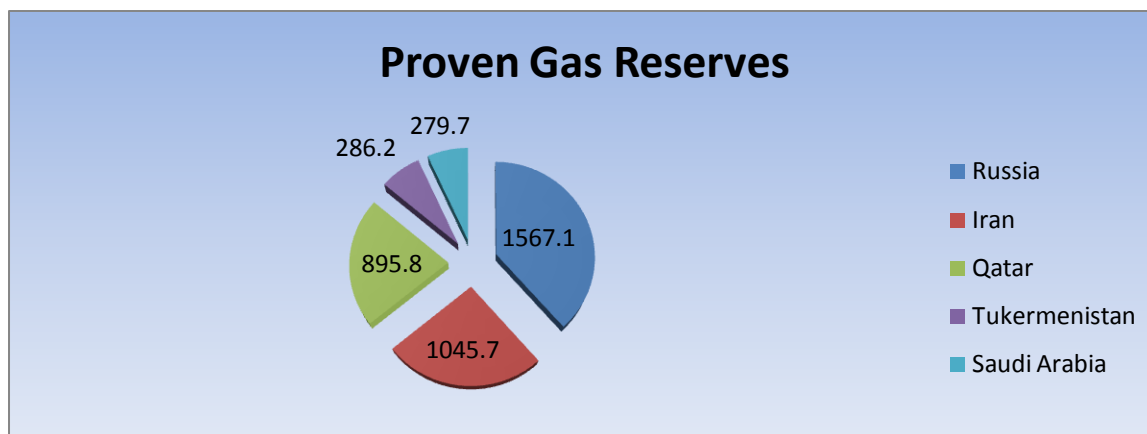
Source: BP Statiscal Review

6.4.4   Gas to Liquid Fuel Producers

The leading companies in the commercialization of synthetic fuel (gas to liquid fuel) are as follows

- Sasol's Oryx gas to liquids plant in RasLaffan Industrial City, Qatar is running at 29,000 bbl/d capacity, near its anticipated 34,000 bb/d nameplate capacity;

- Royal Dutch Shell 14,700 bbl/d gas to liquids plant in Bintulu, Malaysia;

- The Mossgas gas to liquids plant in South Africa produces 45,000 bbl/d; and

- Other companies that have developed gas to liquids processes (at the pilot plant or commercial stage) include ExxonMobil, Statoil Hydro, Rentech, and Syntroleum.

6.4.5 Gas Exporting Countries Forum (GECF)

The GECF is an intergovernmental organization of some of the world's leading natural gas producers. GECF members together control over 70% of the world's natural gas reserves, 38% of the pipeline trade and 85% of the liquefied natural gas (LNG) production. The three largest reserve-holders in the GECF are Russia, Iran and Qatar and these three countries alone hold about 57% of global gas reserves.

The members of this organisation are Algeria, Bolivia, Egypt, Equatorial Guinea, Iran, Libya, Nigeria, Qatar, Russia, Trinidad and Tobago, and Venezuela. Kazakhstan and Norway are observers. Other countries like Brunei, Indonesia, Malaysia, the Netherlands, the United Arab Emirates, and Yemen have participated at different meetings. The full membership will be granted by the approval of at least three quarters of all members.

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6.5   SECURITY OF SUPPLY

Geopolitical issues dominate oil and gas security of supply discussions. The location of the world's oil and gas resources and their availability to consumers is a major concern, and import dependency is a considerable part of this. Countries and governments may feel an elevated level of risk if over dependent on one particular fuel source or on imports from one particular region, particularly if the region is an unstable one where risks may change frequently. While greater freedom of trade, connectivity of markets and interdependence of fuels should go a long way to alleviate potential difficulties, these are not fully in place.

In the oil sector, production is still dominated by the Organization of Petroleum Exporting Countries, which has accounted for almost half of the growth in world oil production since 1995 and its production is at its highest level ever. OPEC accounts for more than 40% of total world production, covers almost over 70% of global proven reserves, and its exports provide over 50% of the world's internationally traded oil.

Many of the OPEC countries have a history of political instability, and most are concentrated in the currently unstable Middle East. Attacks on energy infrastructure in OPEC nations due to ongoing conflicts are a cause for increasing concern, most recently in Iraq and Nigeria. Distribution infrastructure and oil supply routes are also potentially at risk chokepoints are particular worries, where congestion may slow supplies, or which may be at risk as conflict targets. Pipelines, refineries and other energy infrastructure have all recently been the focus of conflict-driven attacks.

Security of supply is not merely the physical security of infrastructure. For example, political concerns in Venezuela resulting from the re-nationalisation of the oil industry have led to investor withdrawal. Industrial issues may also affect supplies as it happened during the winter 2006 when Gazprom, the Russian gas monopoly, turned off its supplies to Ukraine.

Compared with oil consuming countries, many of the countries who use coal for their energy needs rely on domestic supplies of coal, such as China, the USA, India, Australia and South Africa. The major coal producing and exporting countries are stable politically. Its security of supply of is also not vulnerable as coal

- Reserves are very large and will be available for the foreseeable future without raising geopolitical or safety issues;
- Is readily available from a wide variety of sources in a well-supplied worldwide market;
- Can be easily stored and stocks can be drawn on in emergencies;
- Does not need high pressure pipelines or dedicated supply routes; and
- Supply routes do not need to be protected at enormous expense and making them less vulnerable to attacks.

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6.6 SUMMARY AND CONCLUNSION

From the analysis of the fossil fuel sectors it is clear that the world is heavily dependent on oil for its fuel needs as it provides 34.40% of the world energy needs. The major oil producing countries are in 2009 was Russia and the major consuming country is the United States of America. The major oil exporting country is Saudi Arabia. At the end of 2009 the world total proven oil reserves were 1333.1 trillion million barrels. The major role player in the oil industry is OPEC which was established for the main purposes of coordinating and unifying petroleum policies among member countries. Oil is mainly traded at three exchanges which are the NYMEX, IPE and SIMEX. The major oil drivers in the world are supply and demand, US dollar rate, political events and threats to oil transport.

Coal contributes at least 20.50% of the primary energy supply in the world. The major coal producing and consuming country is China while Australia is the major coal exporting country in the world. Major coal reserves are located in the United States. At least three countries are responsible accounts for about 40% of world's natural gas supplies. The major gas consuming country is the United States with Russia as the major gas producing country. At the end of 2009 the world gas reserves stood at 6621.2 trillion cubic feet.

One thing that should be borne in mind is that oil availability will decrease in the future, because of the dwindling oil reserves as well as due to conflicts in conflict prone Middle East and Africa where the major reserves are located. So it is important for oil importing countries to invest in renewable energy as a way of substituting the dependence on oil.

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SECTION 7: ANALYSIS OF THE SOUTH AFRICANENERGY SECTOR

In this section an analysis of the fuel industry in South Africa will be made. Focus will be on the major sources of fuel in the country. The consumption and production trends will also be highlighted. The following aspects will be discussed in this section

- Oil Sector
- Coal Sector
- Natural Gas Sector
- Security of Supply
- Petrol and Diesel Consumption in South Africa
- Fuel Sales in Limpopo

7.1 INTRODUCTION

South Africa like any other developing world is heavily dependent on fossil fuels for its energy needs. As such the sources of South Africa energy needs are

- Crude Oil
- Coal
- Natural Gas

South Africa is a significant coal consumer and exporter but at the same time making it one of the largest importer of oil and some natural gas. This is because it has an abundance of coal reserves with small deposits of oil and natural gas. South Africa has the second largest oil refinery system in Africa and imports the majority of its crude oil from members of the Organization of Petroleum Exporting Countries (OPEC),namely Saudi Arabia, Iran, Nigeria and Angola. The figure below depicts the primary energy supply in South Africa. Coal is the major supplier of energy, contributing 65.9% to the primary energy supply in South Africa.

Figure 7-34 Primary Energy Supply in SA

Source: Energy Digest Statistics 2009(DoE)

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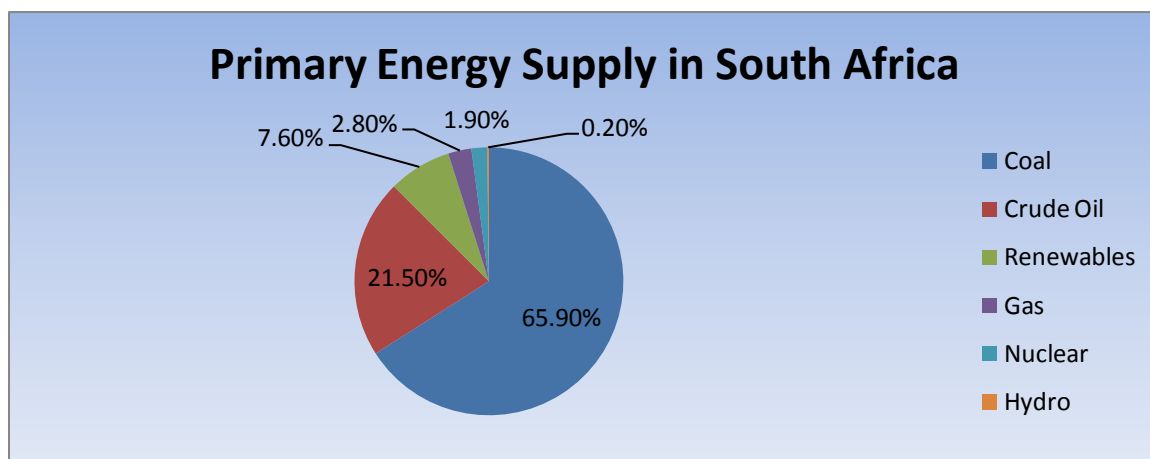
7.2 OIL SECTOR

South Africa has limited oil reserves and it relies heavily on imports to meets its ever growing demand. Crude oil meets about 67 percent of fuel demands of South Africa. According to the Business Monitor International (2010) it is forecasted that South Africa will account for 14.00% of African regional oil demand by 2014, with negligible domestic crude production but a growing synthetic oil capability. We use barrels to measure crude oil, and one barrel is equivalent to 159litres.

7.2.1 Sources

In the past South African has been sourcing its crude oil requirements mainly from OPEC counties but as indicated below Russia has now become one of the suppliers. According to the Global Trade Atlas (2010), the majority of South African oil imports are from Saudi Arabia and Iran followed by Nigeria and Angola. The country is promoting further exploration and development in the petroleum sector but will continue to rely on oil imports in the near-term. From the figure below it is quite clear that South Africa main source of crude oil for 2009 was Saudi Arabia(29%), followed by Iran(23%), Nigeria(16%), Angola(15%), Russia(3%) and other countries(14%).Fields in South Africa which are in production and under development comprised the Oribi, Oryx and Sable oil fields.

Figure 7-35 SA Crude Oil Imports
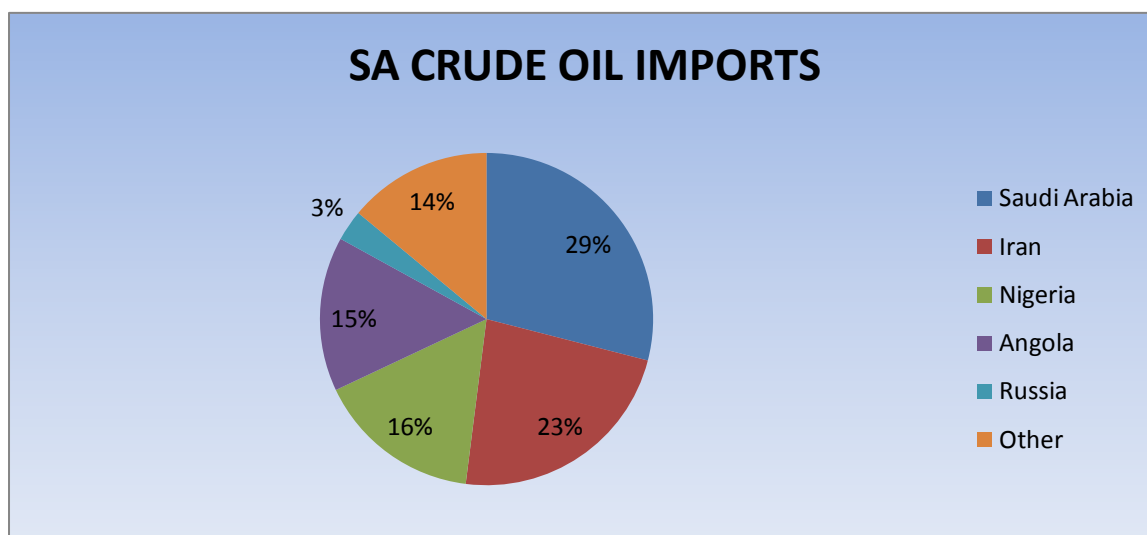
Source: EIA 2010

7.2.2 Oil Consumption and Production

The figure below looks at oil consumption and production by South Africa between the years 2008 and 2009. The consumption is measured against production and it is evident this rise in consumption is not being met by local productions hence the heavy reliant on imported oil. South Africa consumed 575000 bbl/d of oil in 2008 of which 67 percent

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(380000bbl/d) of the demand was met by imported oil. In 2009 South Africa imported 319000bbl/d of crude oil and oil products whereas it also exported 128000bbl/d of crude oil and oil products.

Figure 7-36 SA Oil Consumption and Production
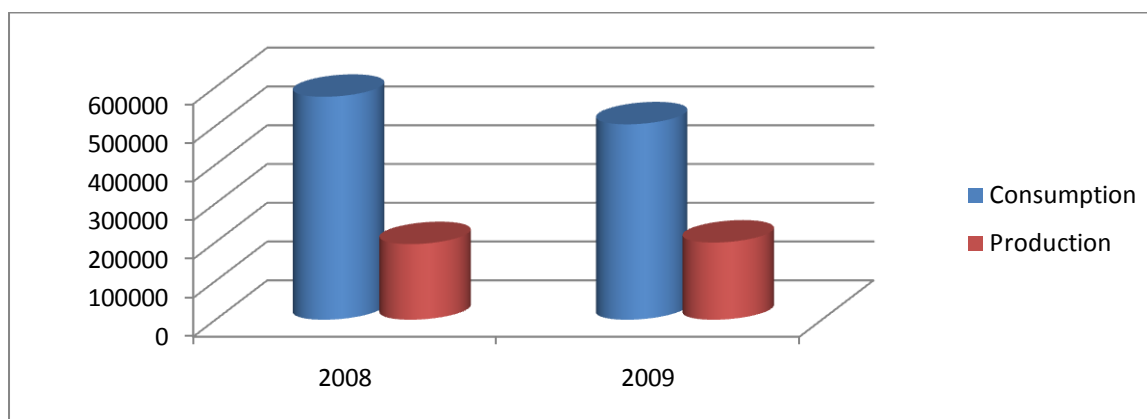
7.2.3 Oil Reserves

According to Oil and Gas Journal (O&GJ), South Africa had proven oil reserves of 15 million barrels in January of 2010. All of the proven reserves are located offshore southern South Africa in the Bredasdorp basin and off the west coast of the country near the border with Namibia.

7.2.4 Crude Oil in Limpopo Province

There are no known reserves of crude oil in Limpopo Province.

7.3 COAL SECTOR

South Africa is overwhelmingly dependent on coal for its energy needs. This fossil fuel provides nearly three quarters of total primary energy. Currently, about 65.90% of South Africa's primary energy needs are provided by coal. Due to the relative lack of suitable alternatives, this situation is unlikely to change over the next coming years. In South Africa around 30% of the country's gasoline and diesel needs are produced from indigenous coal. Coal in South Africa is used for the following purposes

▪ For electricity generation;
▪ For petrochemical industries (Sasol);
▪ For general industry;
▪ For the metallurgical or steel industry; and
▪ Some of it is purchased by merchants and sold locally or exported.

In 2009 South Africa exported at least 67mt of coal comprising of steam (66mt) and coking coal.

7.3.1 Sources

South Africa has abundant supplies of coal located in three of its provinces, which are the Limpopo, Mpumalanga and KwaZulu–Natal. These coal provinces are themselves divided into distinct coalfields in which most of the commercially mineable resources are contained.

About 46.5% of South Africa coal mining is conducted underground and about 53.5% is produced by opencast methods. The coal-mining industry is highly concentrated, with five companies, namely Anglo Coal, BHP Billiton, Sasol Mining, Exxaro Coal, Kumba Coal and Xstrata Coal accounting for 90% of the saleable coal production. The eight largest mines account for 61% of the output.

7.3.2 Coal Production and Consumption

Production and consumption of coal in South Africa have declined in the last two years reasonably steadily over the last decade, at average annual rates of 0.7% and 3.0%, respectively (see Figure 7-37). Consumption in 2009 is estimated by the BP Statiscal Review of World Energy at 99.4mt. Production for 2009 was 140.9mt which represent about 4.1% of the world's total production. The largest share of this, about 64%, was burned by Eskom in its power stations, with Sasol consuming another 24% and industry and small consumers accounting for the remainder. Growth in coal use especially by Eskom and Sasol is expected to continue or even accelerate over the next few years.

Figure 7-37SA Coal Consumption and Production
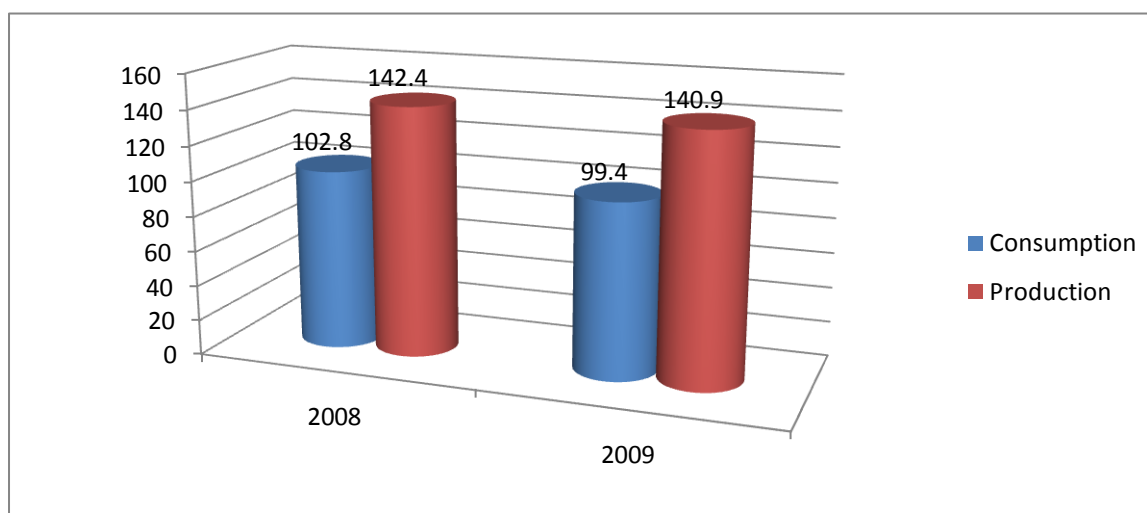
Source: BP Statiscal Review of World Energy 2010

7.3.3 Coal Reserves

Currently the Witbank coalfield is by far the most important source of South Africa's mined coal at present. However, the future of South Africa's coal industry depends on the development of the Waterberg deposits, which extend into Botswana. At the end of 2009

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South Africa reserves totalled 30408mt which is about 3.7% of world's total reserves. Major coal reserves are located in the following areas

- Highveld coalfields(Mpumalanga Province);
- Witbank coalfields(Mpumalanga Province); and
- Waterberg (Limpopo Province).

7.3.4 Coal to Liquid Fuel

The leading coal to liquids fuel producer in South Africa is Sasol which produces synthetic fuels from low-grade coal and a small amount from natural gas. It operates the world's only coal-based synthetic fuels facility, and produces 36% of liquid fuels consumed in South Africa. Sasol produces automotive fuels for consumers, premium fuels and lubricants for industry, as well as jet fuel, fuel alcohol and illuminating kerosene. It also converts natural gas to more environmentally friendly fuels and chemicals.

7.3.5 Coal in Limpopo Province

The province has abundant coal reserves and a number of mining activities is taking place. At the end of 2007 Limpopo coal mines contributed 4% of coal mining in South Africa. The major coal reserves are located in the following areas

- Waterberg(in the Lephalale area);

- Soutpansberg (along the northern part of Soutpansberg mountains);

- Limpopo (along the southern bank of the Limpopo river, west of Musina);and

- Springbok fields.

The Waterberg is estimated to have at least 15 487mt of recoverable coal reserves, which is about 50% of South Africa coal reserves. Already studies are being conducted to establish a coal to liquid gas refinery in the Waterberg region and it is going to be operated by Sasol. There are two major coal mines in Limpopo, the Grootegeluk coal mine in Waterberg and Tshikondeni mine in Vhembe. The Grootegeluk exports about 1.1 million tons of coal annually.Tshikondeni mine produces coking coal which is used in the production of steel.

7.4 NATURAL GAS SECTOR

7.4.1 Introduction

South Africa produces small amounts of natural gas, which it uses in synthetic fuel production. It is one of the major consumers of natural gas in the Southern Africa region. The country's share of demand in 2009 was an estimated at 4.7%, with 6.19% predicted for 2014.

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Limited natural gas reserves exist around the South African coast. PetroSA exploits the reserves off the coast of Mossel Bay, where the gas is converted at the Mossgas plant into liquid fuels. Although gas usage has increased in recent years, the importance of gas in the South African energy economy is still small compared to other countries. Industry remains the largest customer.

South Africa gas fields in production and under development comprise the F-A and F-A Satellite and E-M and E-M Satellite gas fields respectively.

7.4.2 Reserves

South Africa had 27,160,000 cubic metres of proven natural gas reserves at the end of 2009. Currently the major reserves are found off the coast of Mossel Bay.Natural gas from Mozambique is imported through a 535 mile transport pipeline, which Sasol, the South African government, and the government of Mozambique own through a joint venture. The pipeline has peak capacity of 524 mmcf/d of natural gas and was part of a U.S. $1.2-billion natural gas project started in 2004. It is designed to eventually be able to transport double its current capacity.

7.4.3 Production and Consumption of Natural Gas

The figure below is showing the amount of gas produced and consumed in South Africa for the period 2008-2009. In 2008, South Africa produced 3.2 bcm, and consumed 6.2 billion cubic metres and to meet the huge gap, the remaining gas is imported from neighbouring countries such as Mozambique and Namibia. According to BMI (2010), gas production could reach 7.0bcmby 2012/2013, up from an estimated 3.25bcm in 2009. Consumption is expected to also rise from an estimated 6.45bcm to 12.0bcm. This mean that South Africa will require imports of natural gas of 5.0bcm to meet its consumption needs.

Figure 7-38 SA Gas Production and Consumption
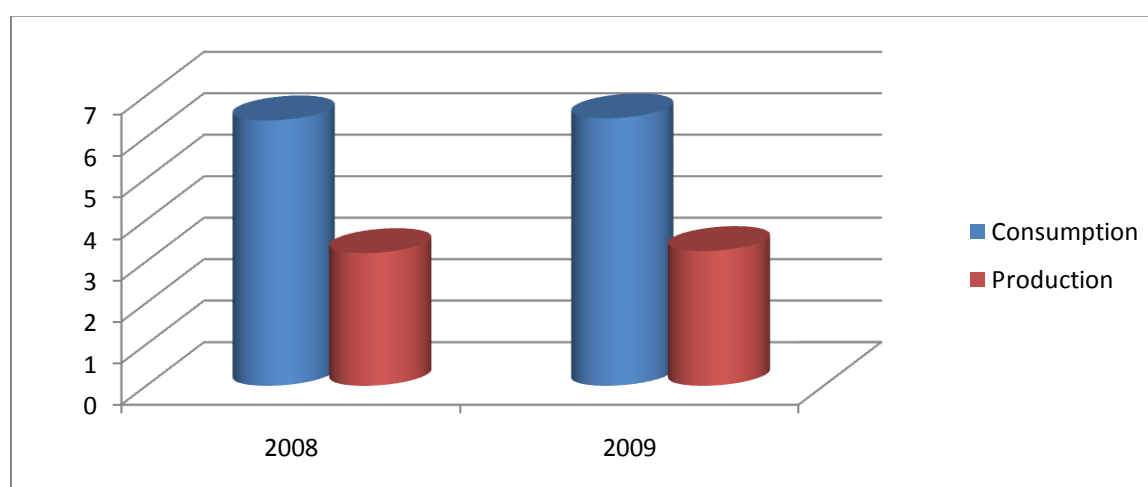
Source: Sullivan and Frost 2010

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7.4.4 Gas to Liquids Fuel

South Africa leading Gas to Liquid fuels manufacturer is PetroSA which has a refinery in Mossel Bay. The refinery has a 36000 crude oil equivalent capacity of 45000bbl/d. The principal process is the conversion of natural gas produced offshore to synthetic liquid fuels such as diesel. The Gas to Liquids (GTL) refinery at Mossel Bay began operations in 2004 and is one of the largest in the world. The GTL plant has for the past 13 years been producing ultra-clean diesel and naphtha products servicing up to 15 percent of the South African transport fuels market. The South African government would like to locate additional natural gas reserves and has provided investment money for exploration in fields in Mossel Bay. Any recoverable natural gas reserves would be developed with the intent of extending the lifespan of the Mossel Bay gas-to-liquids plant.

7.4.5 Natural Gas in Limpopo Province

The fact that Limpopo province holds vast reserves of coal also makes it a major source of coal bed methane, which is a natural gas trapped inside coal. A study which was undertaken in 2006 by Anglo-Coal has established that the eastern part of Waterberg basin, holds up to one trillion cubic feet of recoverable methane gas. This area is located within Waterberg District Municipality.

7.5 SECURITY OF SUPPLY

7.5.1 Introduction

The last time South Africa faced a major shortage of fuel supply was in the holiday season of December 2005. These shortages were attributed to the refineries' failure to make contingency plans for the disruption caused by the switch to unleaded fuels. This led to the ministry of minerals and energy to appoint an investigation team headed by Advocate M.T.K Moerane SC. The investigation team was given the mandate to investigate the 2005 shortages and then make recommendations.

Some of the recommendations made by the investigating team were that focus should be shifted to ensure security of supply by

- Government needs to review its policy with regard to strategic stocks;
- Oil companies and synthetic fuel plants should be obliged to hold prudent commercial levels of refined product stock; and
- The policy on commercial stock in relation to the delineation of responsibilities between Industry and the DME should be reviewed. A qualitative assessment of the risks of supply interruption and South Africa's ability to cope is recommended.

7.5.2   Demand of Petroleum Products

There has been a strong growth in the liquid fuels demand in South Africa over the last few years. This growth has been more confined to the inland region and this has resulted in our

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country becoming a net importer of refined products. The map below indicates the demand for petroleum products in South Africa. For the purpose of this study we will be focusing on the demand for petroleum products in the inland region. The estimated inland market demand is 16.3 billion litres per annum. The production capacity is estimated at 6.9 billion litres per annum with a production shortfall of 6.4 billion litres per annum. The pipeline capacity to the inland market and this shortfall will be bridged by road and rail.

Map 7-4 Demand for Petroleum Products in South Africa
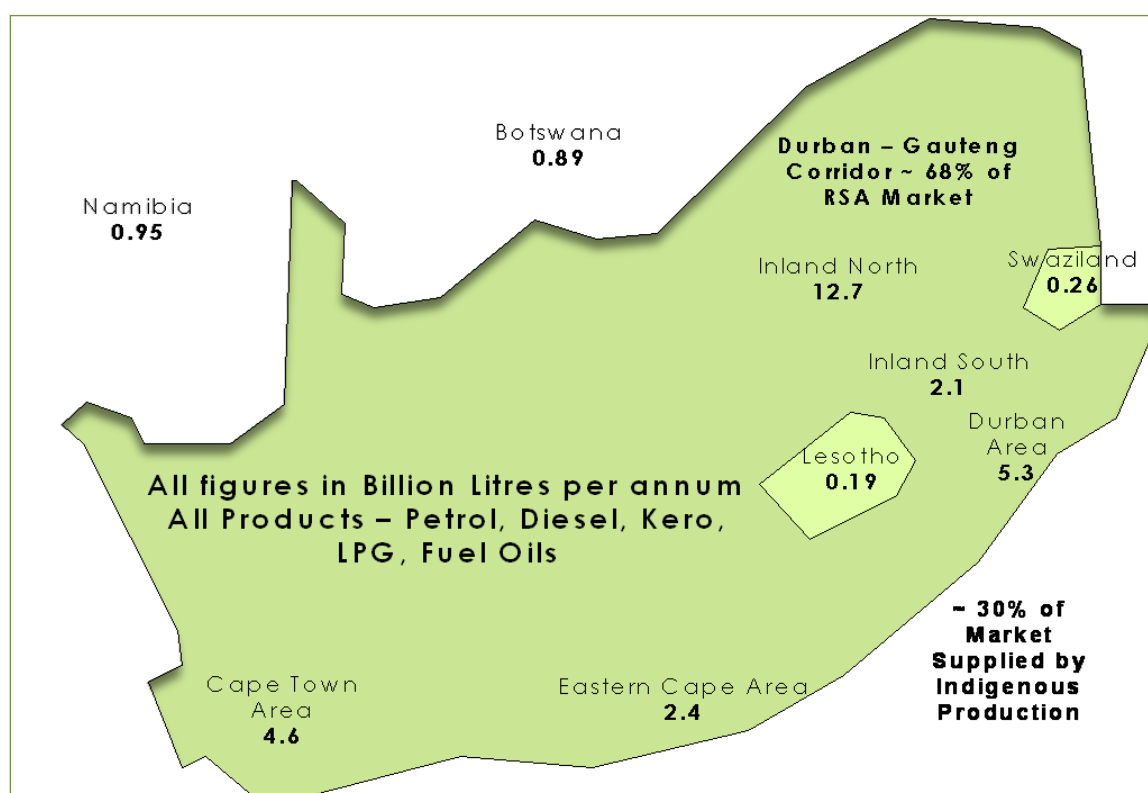
Source: SAPIA

7.5.3 Refining Capacity

South Africa has the second largest refining capacity in Africa at 692,000bbl/d, and it is only surpassed only by Egypt at 726,250bbl/d. The country's existing refineries are on average between 40 and 50 years old and use outdated technology. To upgrade these refineries to meet new clean fuels product specifications and emission standards will require significant investment (PetroSA). South Africa has 4 refineries and 2 synthetic fuels plants which means there are six refineries in total and they are as follows

- Caltex Chevref Refinery which has a 5.5mt/year and it is located in Cape Town;
- Shell and BP have joint ownership of the 8.2mt/year Sapref refinery in Durban;
- Petronas Durban Refinery which is owned by Engen which has a capacity of 6mt/year Enref and is located in Durban;

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- Sasol and Total have joint ownership of the 4.2mt/year Natref refinery which is located in Sasolburg;
- Sasol I, II, III which has a capacity of 150 000bbl/d; and
- PetroSA which is located in Mosssel bay and has a capacity of 45 000 bbl/d.

The table below depicts that South African refineries produced at least 692 000 bbl/d of which almost 195 000 bbl was produced from synthetic fuel in 2009. The decrease in the capacity of Natref refinery can be attributed to the fact that Natref disinvested capacity to 92 000 bbl/d in 2008 for purpose of downscaling to clean fuels and for the required electricity consumption reduction.

Table 7-11 SA Refining Capacity

Refineries	Capacity (bbl/d)				
	1992	1997	2007	2008	2009
Sapref	120 000	165 000	180 000	180 000	180 000
Enref	70 000	105 000	125 000	125 000	125 000
Chevref	100 000	100 000	100 000	100 000	100 000
Natref	78 000	86 000	108 000	92 000	92 000
Sasol	150 000	150 000	150 000	150 000	150 000
PetroSA	45 000	45 000	45 000	45 000	45 000
Total	**513 000**	**651 000**	**708 000**	**692 000**	**692 000**

Source: SAPIA 2009 Annual Report

7.5.4 Petroleum Distribution Network

The major role players in Multinational in South Africa's downstream petroleum markets are BP, Chevron, Engen, PetroSA, Sasol, Shell and Total SA. They operate storage terminals and distribution facilities at the major ports and have distribution facilities throughout South Africa. There are four means to distribute product from the refineries and import terminals to regional centres:

- By multi product pipeline (petrol and diesel) from Durban;
- By coastal tanker from Durban, Cape Town and Mossel Bay to storage terminals at East London, Port Elizabeth, Mossel Bay and Cape Town;
- By road tanker from refineries and terminals;
- By railcar from refineries and terminals.

The map below shows all the petroleum depots which were available in South Africa in the year 2007. In Limpopo Province the location of the depots are in Bela-Bela (Waterberg District), Mokopane (Waterberg District), Thabazimbi (WaterbergDistrict), Polokwane (Capricorn District), Hoedspruit (Mopani District) and Makhado (Vhembe District). Currently there are 200 depots and 4600 service stations in South Africa.

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Map 7-5 Petroleum Depots in South Africa
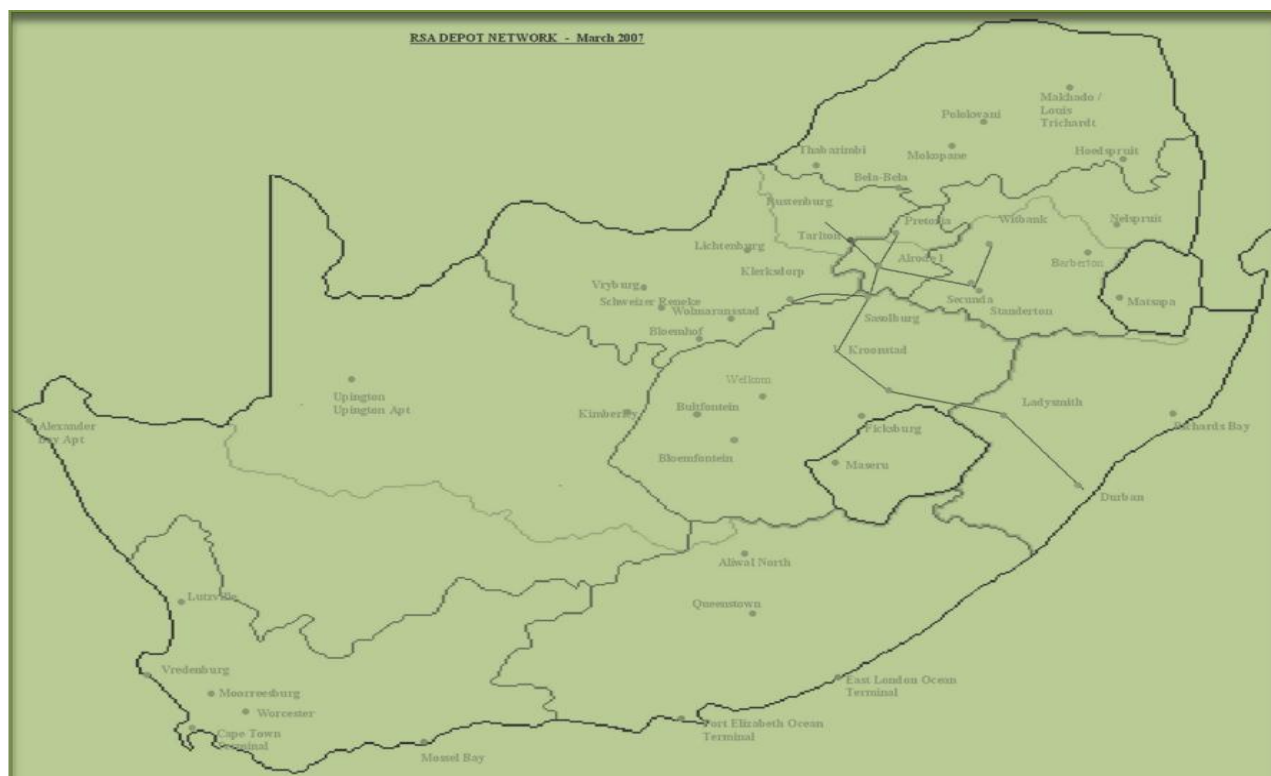
Source: SAPIA

7.5.5 Mthombo Crude Refinery

This crude oil refinery is an initiative of PetroSA and it is going is to be located at the Coega Industrial Development Zone(IDZ) near Port Elizabeth. If all the mandatory requirements are fulfilled it is set to be in full production by 2016. This refinery will have the capacity to produce 360000 bbl/day. Not only will the refinery be able to satisfy the needs of the South African market for petroleum products for the next two decades, but it will also be able to export excess products to the rest of southern Africa and beyond. The refinery should save the country about R18bn on its balance of payments annually.

7.5.6 Sasol Mafutha (CTL)

Sasol is planning to expand its coal to liquid fuels capacity by embarking on a new venture to be known as the Mafutha CTL. The possible location of this plant will be in the coal rich Waterberg district in Limpopo Province. Production is expected to reach at least 80 000bbl/day.

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7.5.7 New Multi-Product Pipeline (NMPP)

Transnet has invested in a 24" pipeline between Durban and Jameson Park which is expected for start up at the second half of 2010. This pipeline will have the capacity for 7.5 billion liters.

7.5.8 Petroline

Petroline was awarded the licence to build a fuel line between Mozambique and Kendal. The 16" pipeline between Maputo via Nelspruit to Kendal is expected to have an initial capacity of 3.5 billion liters of and it is expected to start up in the second half of 2010.

7.6 PETROL AND DIESEL CONSUMPTION

South Africa consumed approximately 11.5 billion litres of unleaded petrol during 2007.Petrol consumption in South Africa has been increasing steadily since 2002.National demand for refined fuels already exceeds South Africa's refining capacity and the demand is set to increase further. Diesel consumption is forecasted to grow at 6% and petrol at 2% per annum between 2009 and 2020.According to SAPIA in 2007 95% of petrol consumed was sold through retail outlets such as petrol stations. In the very same year 51% of diesel consumed was used for transport but only 38% of this was sold through retail outlets (most of which was used for on-road transportation.

Figure 7-39 Consumption of petroleum products in South Africa

Source: SAPIA(2010)

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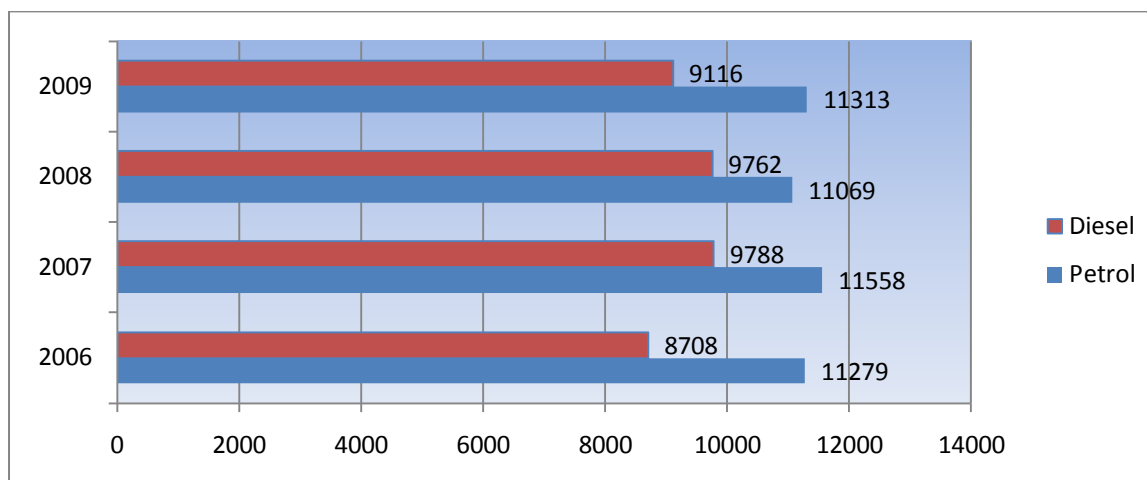
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7.7 FUEL SALES IN LIMPOPO

The figure below depicts the petrol sales for Limpopo in 2009. At least 323 178 813 litres of petrol were sold in 2009. It should be noted that this statistics were sourced from the Department of Energy website.

Figure 7-40Petrol Sales in Limpopo
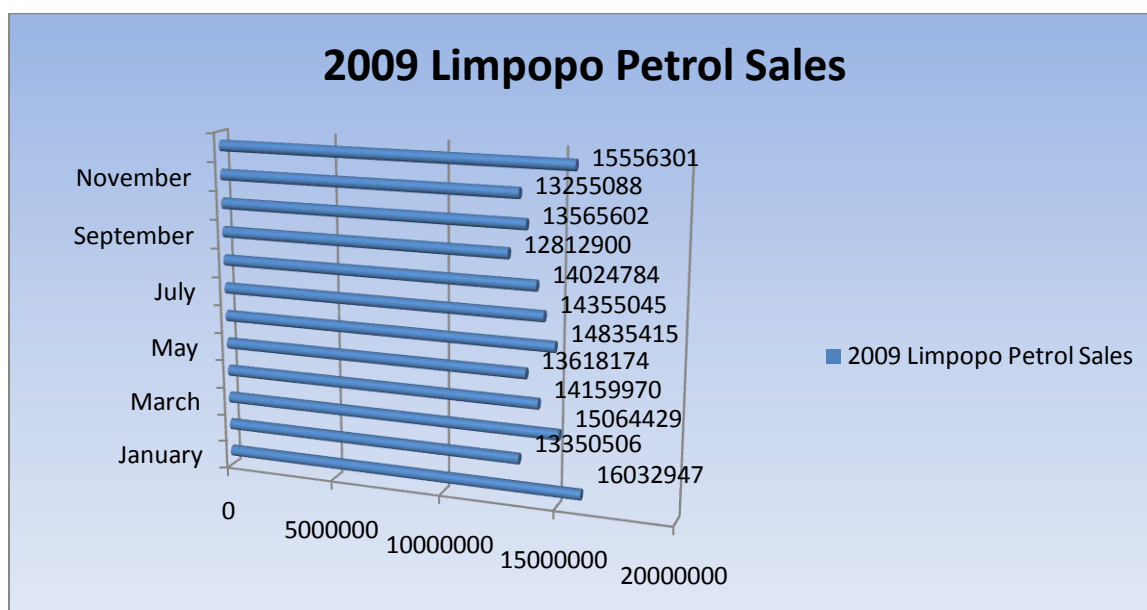
Source: DoE

The figure below indicates the sale of petrol by district for the year 2009. In Mopani an estimated 4 135 066 litres of petrol was sold. Capricorn for the same year petrol sales were 59 763 513 litres.

Figure 7-41 Petrol Sales by District

Source: DoE (June 2010)

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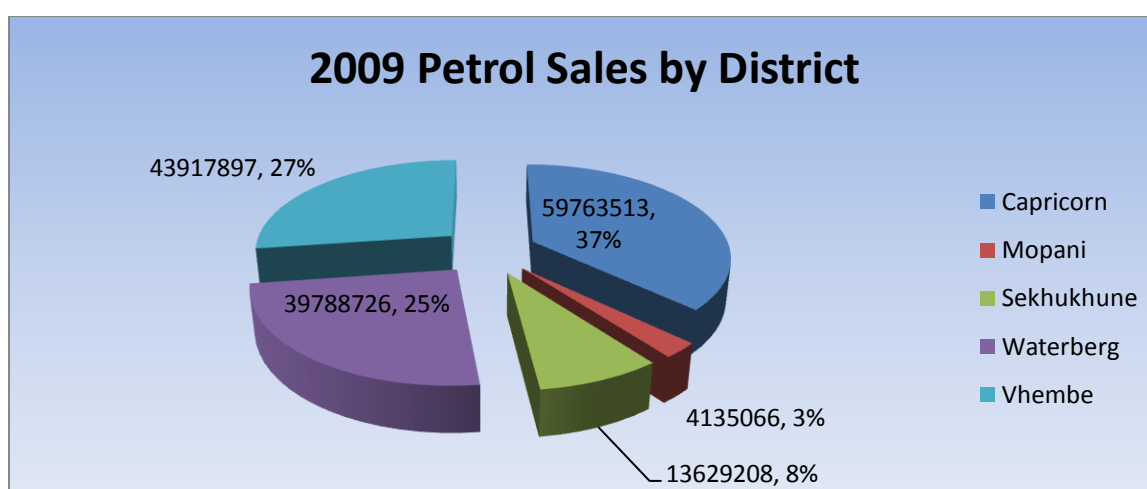
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The figure below is showing the diesel sales for 2009 in Limpopo. Diesel sales were estimated at 322 596 926 litres.

Figure 7-42Diesel Sales in Limpopo
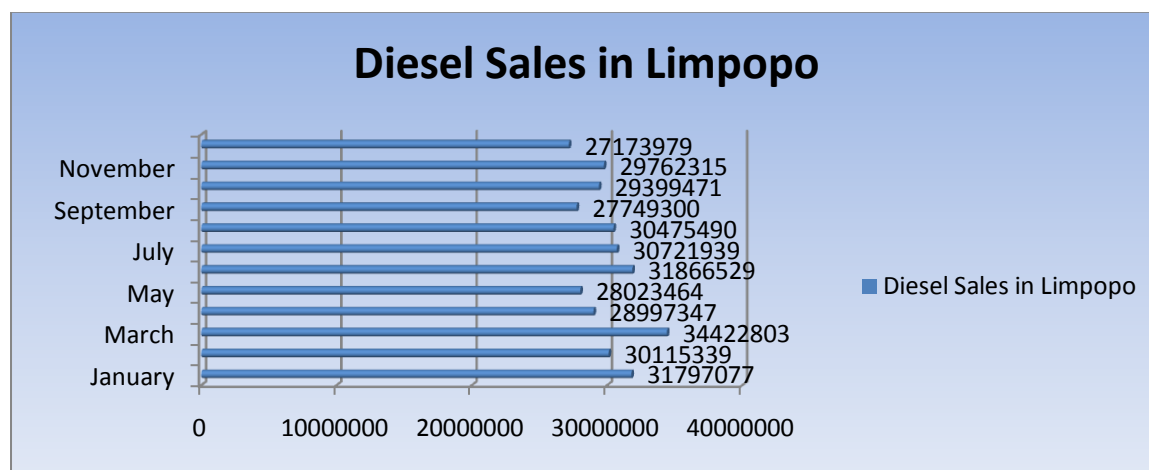
Source: DoE (June 2010)

7.8 SUMMARY AND CONCLUSION

It is evident that petrol and diesel supplied in South Africa comes from various sources, which are as follows

- Crude oil refined at South African refineries;
- Coal and gas processed and refined at Sasol;
- Gas processed and refined at PetroSA; and
- Direct imports of finished product and fuel blending components.

Crude oil for the four crude refineries comes from various countries especially the Middle East. The fact that crude oil is imported is exposing South Africa to a number of events that could either interrupt supplies or lead to higher oil prices thereby undermining economic growth and development. If South Africa is to maintain a cogent energy security plan, the following issues deserve a serious attention:

- Access to reliable, affordable, clean, sufficient and sustainable sources of energy to meet demand at affordable prices;
- Promotion of diverse energy resources; and
- Promoting sustainable development in energy planning. By creating a link between supply and demand, key consideration should be on economic growth, poverty alleviation, and promoting environmental integrity.

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SECTION 8: ANALYSIS OF IMPACT OF FUEL COSTS ON THE MACRO ECONOMY

The primary focus of this section is on the impact of rising fuel costs on the South African economy in recent years particularly the year 2008. Focus is on both the direct and indirect effects of the increases of fuel prices, mainly on the macroeconomic indicators as well as the channels through which these effects are transmitted. This section will also review evidence of the economic and socio-environmental effects of high and rising fuel prices in South Africa. The approach followed in this section does not purport to represent projections; it seeks to provide indications of how the economy could respond to the fuel price increase.

The aspects listed below will be discussed in this section.

- Fuel Price Determination in South Africa
- Composition of Fuel Prices
- Trends of Fuel Prices in South Africa
- Drivers of Fuel Prices
- Macroeconomic Impacts
- Impact on the Transport Sector
- Potential Solution for the High Fuel Prices
- Policy Options for Public Passenger Transport

8.1 INTRODUCTION

Upward increases in international crude oil prices partly account for escalation in domestic inflation attenuated by the strength of the rand against the dollar. Higher fuel prices increase the cost of everything we buy, especially food. That's because a lot of food costs depends on transportation. High oil prices will ultimately increase inflation. According to Nkomo (2006), the time lag between the oil and petrol price increases has fallen from six months in the 1970s and two months in the early 1990s to about a month since the mid 1990s.

High oil prices have an adverse impact on businesses, consumers, and the government budget, to name a few. As a result net oil-importing countries see their terms of trade deteriorate jeopardizing their balance of payments positions and possibly leading to lower economic growth than in the absence of the oil shock. The negative effect of rising oil prices is thus potentially large for net oil-importing countries. In principle, the net effect should be positive for net oil-exporting countries, as positive effects offset negative effects. This section provides a comprehensive analysis of these issues.

South Africa imports a large proportion of its crude oil requirements, which include industrial use as well as personal consumption. Hence, any change in prices could push up

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allied costs. A global rise in crude oil prices could spur the inflationary pressures which would push up overall cost of living.

Higher energy prices result in higher production costs for a range of goods and services which use fuel such as manufactured goods, food, and transportation services though this impact is difficult to quantify. The high costs also directly hit the urban poor through the extra cost of purchasing fuel.

The overall effects of the fuel price increases on the economy depend to a large extent on the structure and the state in which the economy find itself in. For example, if the economy is already suffering from high inflation and unemployment, then fuel price increases have the potential to cause severe damage by limiting economic policy options.

8.2 FUEL PRICE DETERMINATION IN SOUTH AFRICA

The subsection below analysis the methodology that is used for determining fuel prices in South Africa.

8.2.1 Method of Determining Fuel Price

The price of retail petrol in South Africa is regulated by government, whereas for diesel the government only regulates the wholesale price meaning that retailers are free to set their own diesel pump price. Both the price of diesel and petrol are subject to changes every month on the first Wednesday of the month. The responsibility of determining or calculating the new price has been delegated to the Central Energy Fund (CEF) by the Department of Minerals and Energy (DME). Pursuant to the Petroleum Product Act, 1977 (Act 120 of 1977), the government fixes the petrol price by zones to recognise the differences in costs associated with the transportation of petrol between various geographic areas, the country is divided into 50-plus pricing zones.

In calculating the price of fuel two elements are considered, that is the international element also known as Basic Fuel Price and the domestic element. The international element is based on the actual costs which a South African importer will incur when buying petrol from an international refinery and the transport costs related to bringing the product to South Africa. The domestic elements are the actual costs which are incurred locally and they are determined by a number of factors which will be discussed below.

8.2.2   Basic Fuel Price Formula

This formula reflects the realistic cost of importing a litre of product from international refineries with products of a similar quality compared to local South African specifications on a sustainable basis. This element changes on the first Wednesday of every month based on the average daily international price movements and exchange rate fluctuations from the 26th of the previous month to the 25th of the month preceding the price change. It is

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intended to establish a realistic estimate of what it would cost to import substantial volumes of refined fuel.

BFP is based on the spot prices quoted daily in international markets. The BFP of petrol is based on 50 percent of the price quoted in the Mediterranean area and 50 percent of the price in Singapore. This formula is influenced and comprises of a number of factors which reflect the actual costs of importing petrol. In the figure below it is shown that the basic fuel price was at its highest in 2008 whereby in July it reached 723c for petrol and 892c for diesel. During this period the prices of both petrol and diesel increased significantly.

Figure 8-432008Monthly Basic Fuel Price

BASIC FUEL PRICE 2008

RSA CENTS/LITRE

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
■ PETROL 93	441.6	458.6	519.6	575.6	606.6	651.6	723.2	682.6	593.6	564	519	358
■ DIESEL 0.05	509.6	516.6	594.6	711.6	758.6	829.6	892.6	870.6	706.6	650.6	626.6	545.6
■ PARAFIN	500.1	502.1	578.1	696.1	749.1	820.1	869.1	867.1	721.1	656.1	617.1	542.1
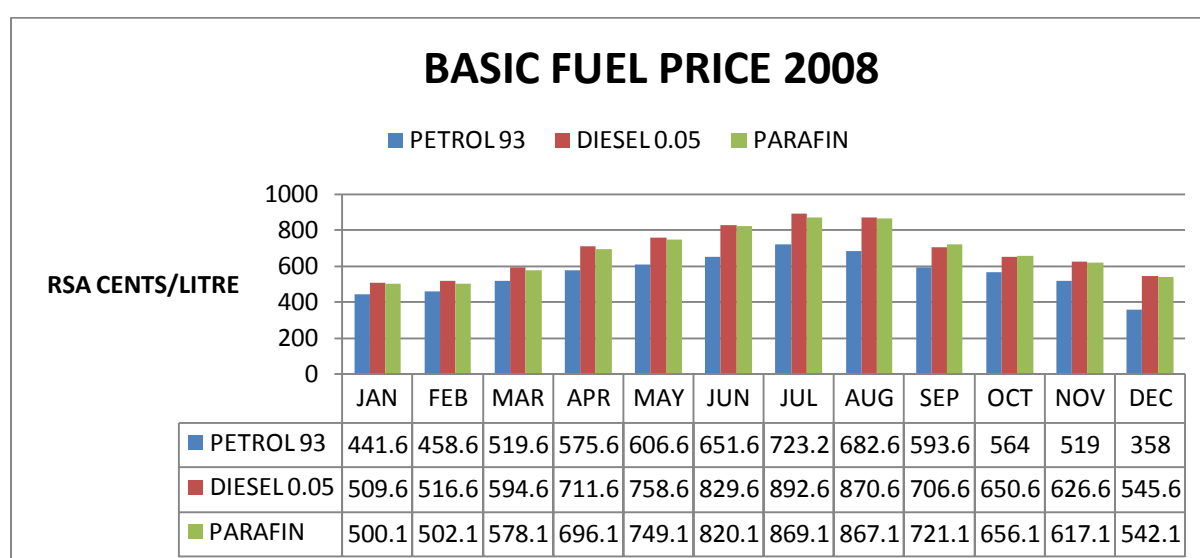
Source: CEF

International Market Spot Prices

The largest component of the basic fuels price is the price that one would be paying on international markets when physically importing product to South Africa. The FOB (Free On ship's Board) product prices from different locations in the world, based on international product availability and product quality, are used. The petrol FOB price is calculated as 50% of the Mediterranean spot price for Premium unleaded petrol and 50% of the Singapore spot price for 95 Octane unleaded petrol. For the FOB price of Diesel, the new BFP formula use spot prices calculated as 50% of the Mediterranean price for Gas oil and 50% of the Arab Gulf price for Gas oil, plus the quoted spot price market premiums applicable.

Freight Cost to Bring Product to South African Ports

The freight component of the BFP reflects the cost of voyages from Augusta (in the Mediterranean), Singapore and Mina-al-Ahmadi (in the Arab Gulf), in 50:50 combinations as appropriate to the international markets used in the FOB calculations of the products concerned. Tariffs as published by the World Scale Association for transporting refined

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products via medium range vessels to a weighted average for South African coastal ports, plus demurrage for an average 35 000 ton vessel for 3 days, adjusted with the Average Freight Rate Assessment (AFRA) of the London Tanker Brokers Panel, plus a 15% premium for transporting fuels to South Africa.

Insurance Costs

The insurance cost is calculated as 0.15% of the product FOB and freight costs. This is done mainly to cover insurance cost, as well as other costs such as letters of credit, surveyors' and agents' fees, and laboratory costs.

Ocean Loss Allowance

The terms of trading with petroleum products internationally are very complex; this is because in shipping and insurance, a loss of 0.3% for products has been accepted as a normal leakage/clingage and evaporation loss. Simply put, this means that the "normal" loss is not insurable and has to be accepted by the buyer. The buyer therefore has a financial loss of 0.3% of FOB, Insurance and Freight costs.

Wharfage

The BFP calculates Wharfage charges in terms of the ruling National Ports Authority of South Africa contract tariffs for petroleum products.

Coastal Storage

This element covers the cost of providing storage and handling facilities at coastal terminals. Storage is calculated based on the typical cost of international product storage per ton per month for 25 days worth of stock. This cost factor is escalated annually in accordance with movements in the Producer Price Index as at June of each year.

Stock Financing Cost

This charge is for the financing of 25 day's stock at an interest rate of 2 percentage points below the ruling prime rate. The BFP as determined above is converted to SA cents per litre by applying the applicable SA Rand/US Dollar exchange rate (four banks selling rates at 11H00am averaged over the period 26th of the previous month to 25th of the month before the price change), and constant litre per gallon factor for petrol.

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8.2.3   Domestic Elements

The petrol price differs from one area to another e.g. coastal and inland in South Africa. This is mainly influenced by certain domestic elements which need to be added to the international price. To arrive at the final pump price in the different pricing zones certain domestic primary and secondary transport costs, government imposts, taxes, levies, retail and wholesale margins needs to be added to the international element. These elements are described below.

Transport Costs (Zone differential)

This element recovers the cost of transporting petroleum products from the nearest coastal harbour to the inland depot serving the area or zone. Transport to the different pricing zones are determined by using the most economical mode of transport such as

- Pipelines (C zones);
- Road (B zones); and
- Rail (A zones).

This is the only element which values differ per pricing zone, and is the reason why the petrol price is not the same for the whole country. The magisterial district price zones are based on the cost of moving fuels from coastal refineries to the inland distribution centres by pipeline, rail, and road by private bulk petroleum products transporters. These costs are adjusted annually subject to the approval by the Minister of Minerals and Energy. The pricing zones in Mopani and Capricorn are indicated on the table below:

Table 8-12 Pricing Zones

PRICING ZONE	MAGISTERIAL DISTRICT	DISTRICT
12 C	Polokwane(South of Tropic of Capricorn)	Capricorn
13 C	Bochum	Capricorn
	Polokwane (North of Tropic of Capricorn)	Capricorn
62 C	Namakgale	Mopani
63 C	Bolobedu	Mopani
	Letaba	Mopani
	Ritavi	Mopani
64 C	Giyani	Mopani

Source: DoE

Delivery Costs (Service differential)

This element compensates marketers for actual depot related costs (storage and handling) and distribution costs from the depot to the end user at service stations. The value is calculated on actual historical costs of the previous year, averaged over the country and industry.

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Wholesale (Marketing) Margin

Money paid to the oil company through whose branded pump the product is sold, to compensate for marketing activities. This margin is controlled by the government, allowing for changes based on the oil companies' return on their marketing assets. The formula used to determine the wholesale margin is based on the results of a cost/financial investigation by a chartered accountant firm into the profitability of the wholesale marketers. The level of the margin is calculated on an industry basis and is aimed at granting marketers a return of 15% on depreciated book values of assets, with allowance for additional depreciation, but before tax and payment of interest.

Retail Margin

The retail margin is fixed by DME and is determined on the basis of actual costs incurred by the service station operator in distributing petrol. Account is taken of all proportionate driveway related costs such as rental, interest, labour, overheads and profit. The way in which the margin is determined creates an incentive to dealers to strive towards greater efficiency, to beat the average and to realise a net profit proportionate to their efficiency.

Equalisation Fund levy

The statutory fund levy is a fixed monetary levy, and the fund is regulated by ministerial directives issued by the Minister of Mineral and Energy Affairs in concurrence with the Minister of Finance, as laid down by the Central Energy Fund Act, No 38 of 1977 as amended. In terms of Ministerial Directives the Fund is principally utilised to smooth out fluctuations in the price of liquid fuels through slate payments; to afford synfuel producers tariff protection and to finance the crude oil premium.

Fuel Tax

This is the tax which is levied by the government and it is annually adjusted by the Minister of Finance. It is effective from the price change in April of each year, announced in the Minister of Finance in his annual budget speech.

Customs & Excise Levy

A duty collected in terms of the Customs Union agreement.

Road Accident Fund (RAF)

The Road Accident Fund receives a fixed value which is used to compensate third party victims in motor accidents.

Slate Levy

A levy paid by the motorists recovering money "owed" to the oil companies, due to the time delay in the adjustment of the petrol pump price.

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8.3   COMPOSITION OF FUEL PRICES

8.3.1   Composition of a Petrol Price

The figure below shows the composition of the inland price of 93 octane as at 3rd March 2010. This price is comprised of the following elements: Fuel Tax: 150.000c/l, Basic Price 421.482c/l, Retail Margin (M) 72.70c/l, Wholesale Margin: 50.868, Service Cost Recoveries: 10.800c/l, Custom & Excise: 4.00c/l, Pipe Levy: 0.180c/l, Incremental Inland Transport Recovery Levy: 3.00c/l **(TOTAL:791.00c/l)**

Figure 8-44 Composition of Petrol Price
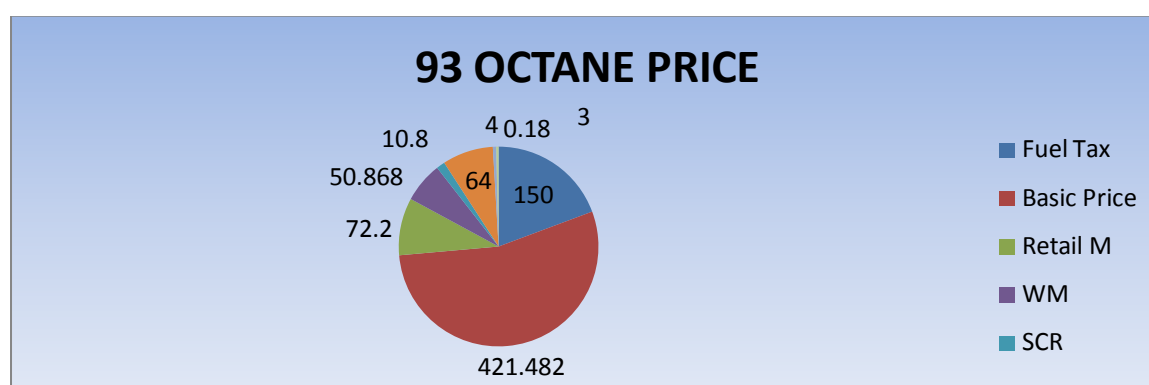
Source: DoE

8.3.2   Composition of Diesel Price(0,5% Sulphur Content)

The figure below depicts the composition of the inland price of diesel for 03 March 2010. This price is comprised of the following elements: Fuel Tax: 150.000c/l, Basic Price 421.63c/l, Wholesale Margin: 50.86, Service Cost Recoveries: 10.800c/l, Custom & Excise: 4.00c/l, Pipe Levy: 0.180c/l, Incremental Inland Transport Recovery Levy: 3.00c/l**(TOTAL:705.85c/l)**

Figure 8-45 Composition of Diesel Price

Source: DoE

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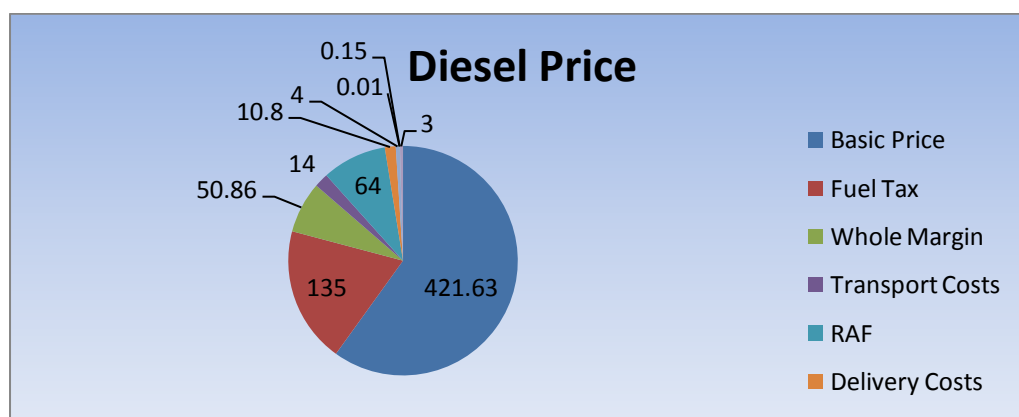
8.4   TRENDS OF FUEL PRICES IN SOUTH AFRICA

From the figure below it is evident that the price of petrol increased by 25.94% from an average price of R5.86 in January 2007 to R7.38 in January 2008. In 2008 alone, the price of petrol increased by a further 43.22% from R7.38 in January 2008 to about R10.57 in July 2008. On the other hand, the price of diesel increased by about 32% from an average price of R5.47 in January 2007 to R7.22 by January 2008. Between January and July 2008, the graph shows an exponential growth in the price of diesel from R7.22 to R11.39. The average price of diesel, therefore, increased by 57.8% from January to June 2008. The average percentage changes for petrol and diesel during the period under review were 3.1% and 4.1% respectively. The percentage changes show that in general fuel prices are rising. The largest percentage change for petrol was 11.6% recorded in April 2007. On the other hand, diesel recorded the largest price percentage change in April 2008 when the price increased by about 16%.

Figure 8-46History of Fuel Prices
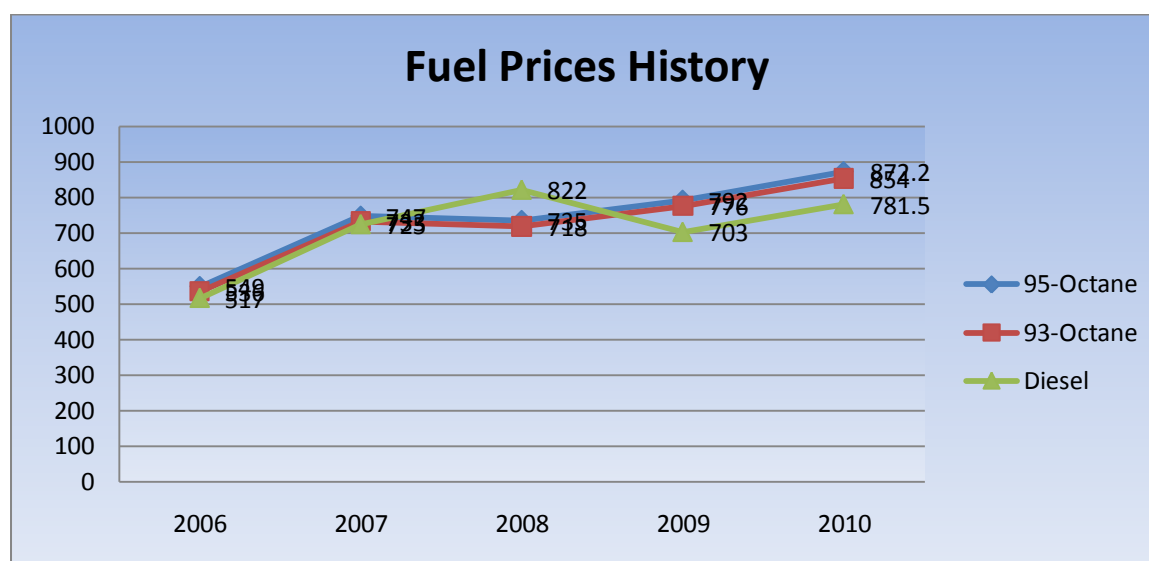
Source: DoE

8.5 DRIVERS OF FUEL PRICES

The major drivers of fuel prices in South Africa are international crude oil prices, Rand/Us dollar exchange rate, geographic location and state taxes and levies. These factors will be discussed in the sub-sections below.

8.5.1 The Rand/US Dollar Exchange Rate

Fuel prices in South Africa are linked to the price of crude oil in international markets and it is quoted in US dollars per barrel. International fuel prices are essentially driven by supply and demand for the products in a particular market. The petrol price in South Africa is

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therefore directly linked to the price of petrol quoted in US dollars at refined petroleum export orientated refining centres in the Mediterranean area, the Arab Gulf and Singapore.

8.5.2 International Crude Oil Prices

Crude oil prices combined with the Rand/Dollar exchange rate have a major impact on fuel prices. A crude-oil refinery's biggest input cost is crude oil. In order for a refinery to make a profit, the price for the product manufactured from crude oil has to be higher than that of the crude oil price. When crude oil prices increase, the petrol price has to increase so that crude oil refineries are able to cover their own costs.

8.5.3 Geographic Location

The geographic location of where the petrol is sold has an impact on the price fuel in South Africa. The price of fuel is much cheaper at the coast than in the inland regions. This is as a result of the transportation mode used to transport fuel from the coastal depots to the inland region.

8.5.4 State Taxes and Levies

Fuel levies and taxes also drive the prices of fuel as they comprise about 25% of the total price.

8.6 MACROECONOMIC IMPACTS

The kinds of response of the economy to fuel price shock depend on the nature of the shock, the state of the economy and the macroeconomic policies adopted. For example, in an economy already sufferings from high inflation and unemployment, then the oil price increase have the potential to cause severe damage by limiting economic policy options.

Vulnerability of a country to rising fuel costs is dependent on the intensity with which oil in its various forms is used. For example, in the presence capital-energy complementarities, oil price increase will probably affect the GDP by lowering the demand for capital services. This effect is attenuated under mark-up pricing strategy.

The extent to which the impact of fuel costs can harm the economy is also influenced by the nature of its monetary policy response. Suppose, for argument sake, the Reserve Bank responds to evidence of rising inflation with a monetary tightening, the resultant increase in interest rate is going to have output effect. The actual impact of oil changes varies markedly by country, and depends on, at least, two factors: the degree to which they are net oil importers and the energy and oil intensities of their economies.

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GDP

- National income (GDP), will suffer a negative income effect as the oil bill rises and to the extent that general exports are depressed. Fortunately for SA the effect of depressed exports is mitigated by revenue raised from exports of minerals like gold, platinum, and etc.

- The other effect of oil price increase on output of the economy derives from the wage-price spiral. This situation arises in cases where wages are set in line with past price increase, while prices themselves are set in line with past wage increases. To the extent that real wage is prevented from falling, the adjustment will take place through a decline in value added, subsequently followed by decrease in GDP.

- Fuel price increases have significant impacts on the economy's level of real gross domestic product (GDP) and economic performance. It reduces the national output, changes the structure of spending and production and shifts the economy to a lower economic growth path. This affects the rate of inflation and, at the same time, alters the structure of relative prices, and the economy's import bills are strained adding to the adverse shift in their terms of trade.

- A recent study by Fofana (2007) use three levels of analysis to track the channels by which South Africa and its population are directly impacted by a sustained US $20 a barrel increase of oil price. The study uses an input-output model combined with a household survey for South Africa to track the direct impacts of high oil prices. Assuming a zero price elasticity of oil and oil products demand, the study suggested that the doubling of oil and oil products prices reduces GDP by 0.2% in South Africa. The modifications in petroleum products prices are translated into an increase in the oil input bill, in particular, among the high intensive oil input industries.

Inflation

- As the price of crude oil goes up, inflation increases as the price of every item in the basket of goods rises. The increase in allied costs such as production, storage and distribution costs lead to what is called cost push inflation. Rising fuel costs impact negatively on households budgets through higher costs for domestic fuel and power used in households operations. Furthermore, given the fact that the transport sector is virtually dependent on fuel, any rapid rise in fuel prices has got cascading effects throughout the economy.

- Not only do fuel and other energy prices constitute a portion of the actual CPI, but downstream impacts on other commodity prices will have a lagged effect on the CPI inflation.

- The PPI measures prices at the level of the first significant commercial transaction. The PPI aims at measuring the cost of production rather than the cost of living. Fuel is a vital input for the production of a wide range of goods and services, because it is used for transportation in businesses of all types. Higher fuel prices thus increase the costs of

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inputs, and if the costs increases cannot be passed on to consumers, economic inputs such as labour and capital stock may be reallocated. Higher fuel prices can cause worker layoffs and idling of plants, reducing economic output in the short term. Increases in the fuel prices partly account for escalation in domestic inflation resulting from increase in allied costs of production. These higher costs are passed on to consumers; the magnitude thereof depends on the price elasticity of demand of goods and services concerned.

Exports and Imports

- Oil represents the single largest item on South Africa's import account and liquid fuels, which are almost exclusively used for transportation, form a significant proportion of these imports.
- An increase on oil price changes the balance of trade between countries and exchange rates. Net oil-importing countries normally experience deterioration in their balance of payments, putting downward pressure on exchange rates. Rising prices of imported oil increases the amount of foreign exchange reserves required to finance the purchase of oil.
- As the price goes up, the foreign exchange reserves decreases, and the value of debits rise on the current account of SA's trade balance leading to a trade deficit. South Africa is a net importer of final petroleum products, which costs the country R18.5 billion a year.

Employment

- In Essama-Nssah (2007), a decline in employment is recorded for the formal semi and low skilled labour categories particularly in the services sector that suffers the most. The majority of those who became unemployed belong to the bottom three income deciles. The paper reports that high-skilled workers gain from the shock compared to other skill categories. The results show a 1% increase in the poverty gap index meaning that the difference between actual income and income required in sustaining a minimum standard of living increased by 1%. Inequality increases after the shock. This is shown by the increase in Gin coefficients in both urban and rural areas.
- McDonald and van Schoor (2005) found that the crude oil price shock benefits more the unskilled than the skilled workers and the rural than the urban households under the assumption that scarce factors, skilled workers and capital, are immobile across sectors.

Households Spending

- The most impacts of fuel price increases would be on the cost of living for households. These impacts include increase in expenditure on energy goods as well as on non-energy goods. These impacts have `direct' effects, for example transport costs affected by fuel

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price increases, and `indirect' effects, where the prices of goods reflect increased costs from the inputs of other goods themselves affected by energy prices.

▪ Oil and its allied products are used for many different purposes in South Africa. In rural areas, where there is no electricity, paraffin is used for domestic purposes and as a perfect substitute for electricity. In most cases, the price of fuel rises while the consumer's income is fixed since income is determined by wage bargains which happen annually. Subsequently, consumers lag behind each time fuel prices are adjusted in line with global market developments and hence they become worse off.

8.6.1 National Economy

In 2008 fuel accounted for more than 5% of the weighting in the CPIX basket of products. This is because the price of fuel had risen in the first few months of 2008, after a leap of more than 25%. Again in 2008 the rising cost of fuel and food both global trends prompted the bank to raise its key repo rate by four percentage points to 11%.The figure below does not however imply that the oil price was the sole cause of the increase in the CPI as from June 2008. What is implied is this that, there is correlation between increase in oil price and the increase in the CPI as shown in the graph above. In 2008 CPI increased by 4.4 percentage point.

Figure 8-47CPI(2008-2009)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
CPI 2008	95.4	96	97.4	98	98.7	100.1	101.4	102	102.6	102.8	102.9	102.7	
CPI 2009	103.1	104.3	105.7	106.2	106.6	107	108.2	108.5	108.9	108.9	108.9	109.2	
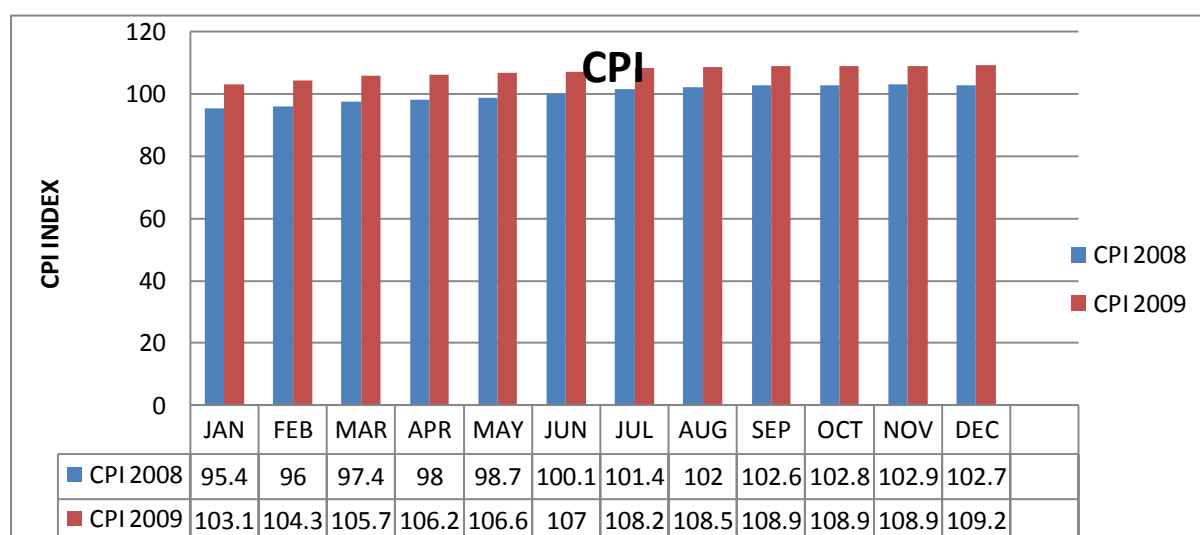
Source: StatsSA

In the figure below, the transport cost takes a sizable portion of the income of the majority of South Africans, in particular black people. This derives from apartheid government policies which made it impossible for the black community to stay near their places of employment and accompanied by inadequate public transport.

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Figure 8-48 Consumption Expenditure by Households(2002-2009)

CONSUMPTION EXPENDITURE BY HOUSEHOLD

	2002	2003	2004	2005	2006	2007	2008	2009
FUEL	28634	29486	30701	31324	31796	33140	33145	27468
TRANSPORT	140022	147121	159936	179783	196043	195887	182597	165317
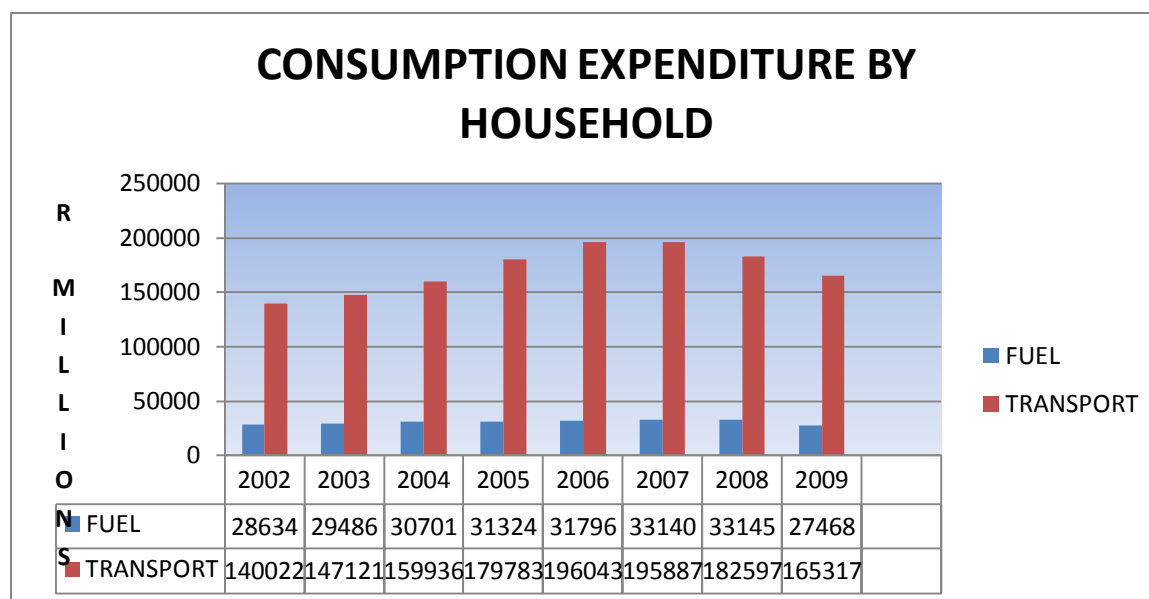
Source: Stats SA

In the figure below growth of the national GDP declined from 4.5% in 2007 to 3.75% in 2008, this is a decline of 0.75 percentage point.

Figure 8-49 South Africa GDP 2007-2009

GDP

	1 2007	2 2007	3 2007	4 2007	1 2008	2 2008	3 2008	4 2008	1 2009	2 2009	3 2009	4 2009
GDP	6.5	5.5	5.1	4.9	4.1	5.1	3.8	1.9	-0.7	-2.7	-2.2	-1.4
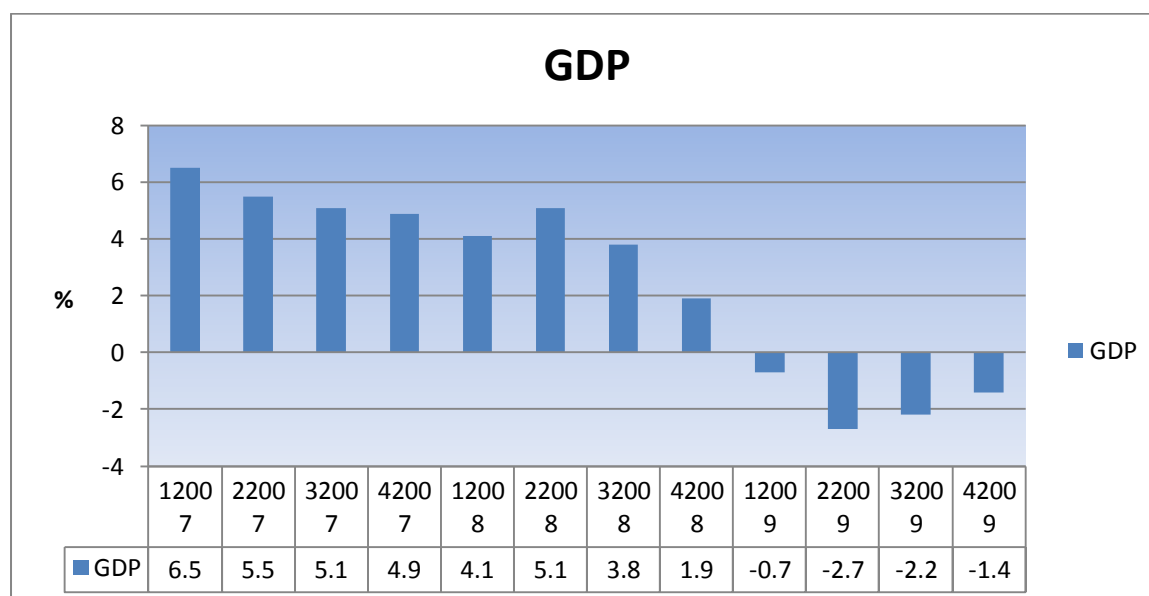
Source: Statistics South Africa

The figure below indicates that the current account deficit of the South African economy has been growing sharply since 2003, reaching 12% of its GDP in 2007. The significant rise of the current account deficit means that the value of imports for goods and services has recorded

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a more important increase, in particular the import of oil and oil products, than the value of exports.

Figure 8-50 External Balance of Goods (2002-2009)

EXTERNAL BALANCE OF GOODS

R MILLIONS	2002	2003	2004	2005	2006	2007	2008	2009
TRADE BAL	-44924	-29750	4229	7390	43256	59160	68891	20627
IMPORT	283004	264752	311759	360362	476966	574322	739852	554161
EXPORT	333251	291434	310525	358361	447690	533791	704293	556432
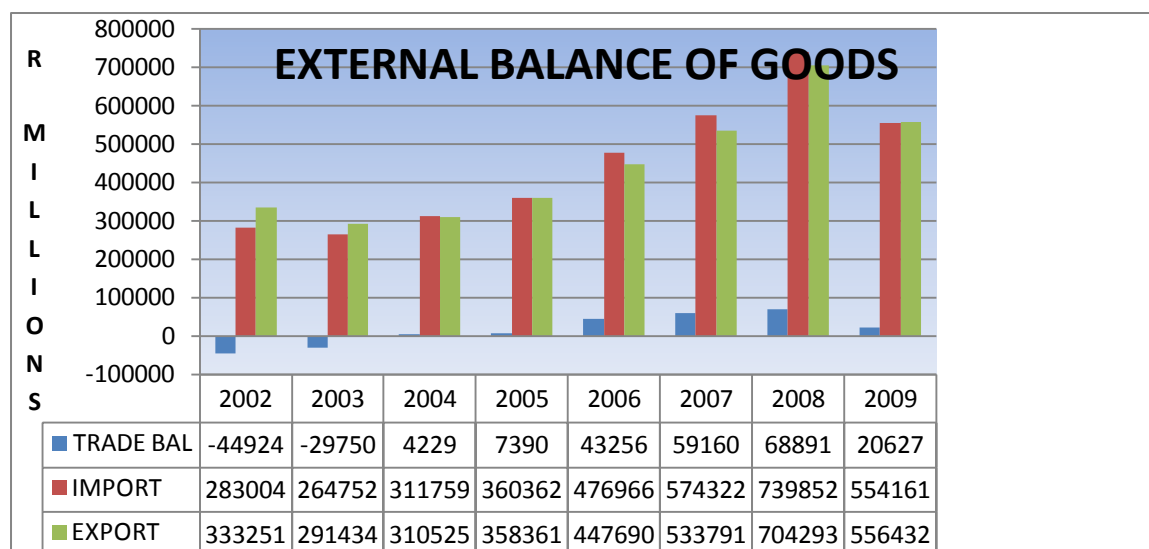
Source: SARS

Figure 8-51 PPI 2009

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009 PPI TOTAL OUTPUT	9.2	7.3	5.3	2.9	-3	-4.1	-3.8	-4	-3.7	-3.3	-1.2	0.7
2009 PPI EXPORT	2.6	1.6	0	-2.7	-6	-9.7	-9.3	-9.2	-11.2	-13.1	-11.9	-6.1
2009 PPI IMPORT	-5	-8.8	-10.1	-14.7	-16.7	-17.9	-17.5	-17.8	-16.2	-10.2		
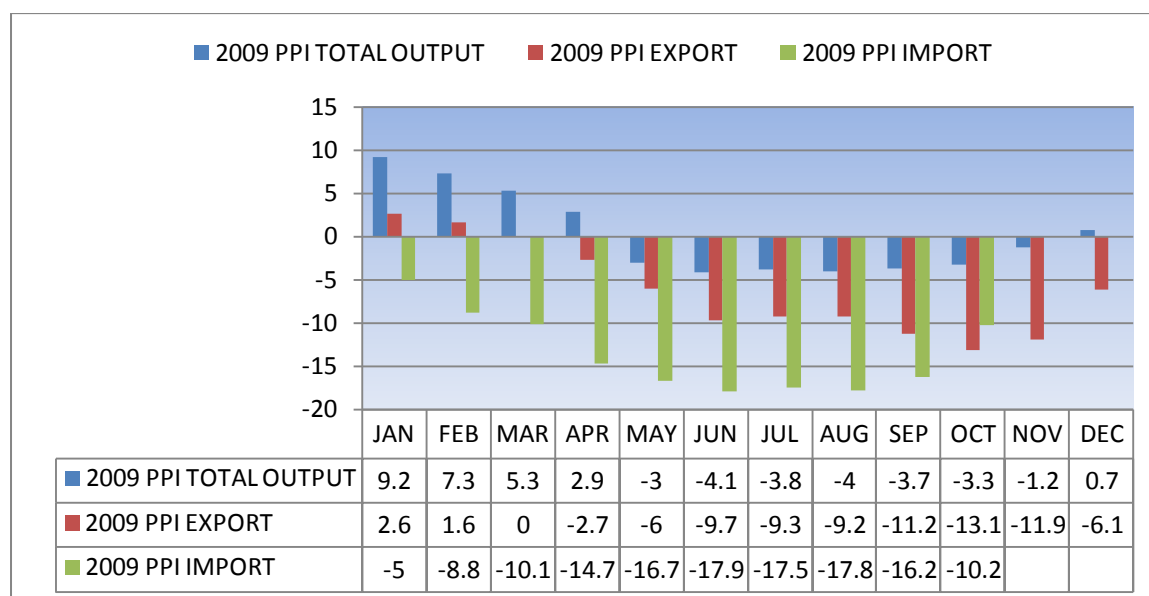
Source: Stats SA

The figure above confirms the fact that crude oil price affects the cost of our import bill and subsequent effects in allied industries show itself through the increase decrease in import PPI.In 2008 the rate of increase of the PPI was increasing at an increasing rate from April

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(12.4%) to July (18.9 %) and thereafter it was increasing at a decreasing rate. The figure below is showing that the trade balance improved by 13% in 2008.

Figure 8-52 Y-O-Y Trade Balance 2008

YEAR ON YEAR TRADE BALANCE 2008

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
EXPORT	4E+10	5E+10	5E+10	6E+10	6E+10	6E+10	6E+10	6E+10	6E+10	7E+10	5E+10	5E+10
IMPORT	5E+10	5E+10	6E+10	7E+10	6E+10	6E+10	7E+10	6E+10	7E+10	7E+10	6E+10	5E+10
TRADE BAL	-1E+10	-6E+09	-5E+09	-1E+10	-2E+09	-2E+08	-1E+10	-1E+09	-5E+09	-6E+09	-7E+09	-2E+09
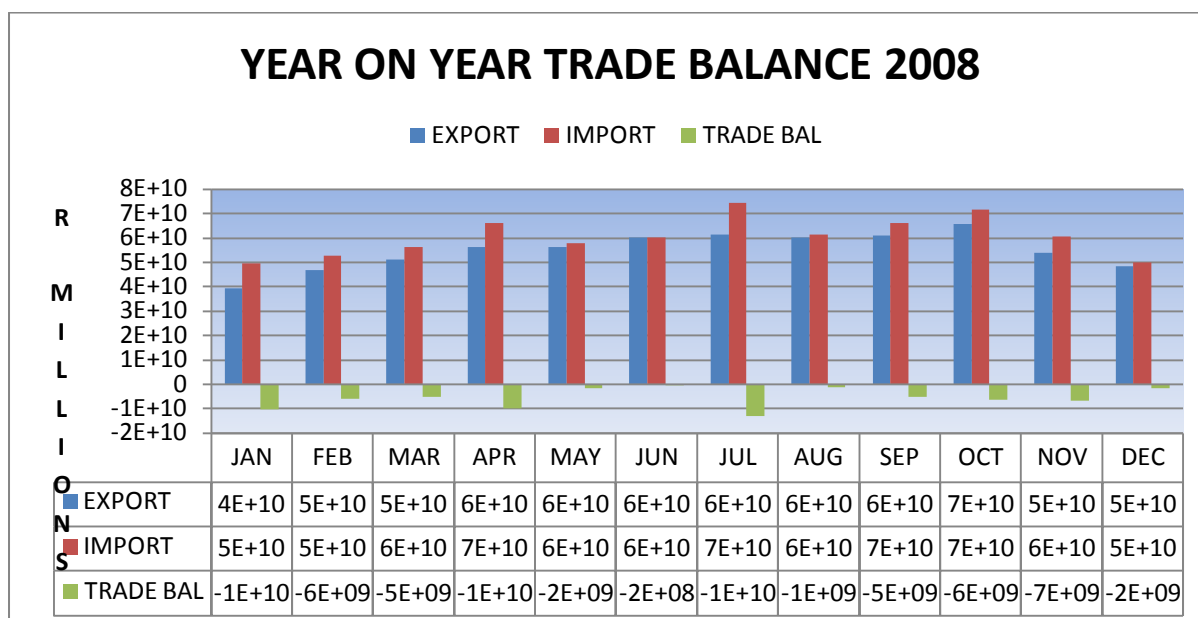
Source: SARS

Unemployment rate decreased from in 2008 by 1.3 percentage points notwithstanding the fuel price reaching the highest price during the year 2008. However, these results are not surprising given the fact these years were the build-up to 2010 World Cup.

Figure 8-53 EAP and Unemployment in SA

EAP & UNEMPLOYMENT

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
EAP	1E+07	1E+07	1E+07	1E+07	1E+07	1E+07	1E+07	2E+07	1E+07	2E+07	2E+07	2E+07	2E+07
UNEMPLOYMENT	2E+06	2E+06	3E+06	3E+06	4E+06	4E+06	4E+06	4E+06	4E+06	4E+06	4E+06	4E+06	4E+06

YEAR

Source: IHS Global Insight 2010

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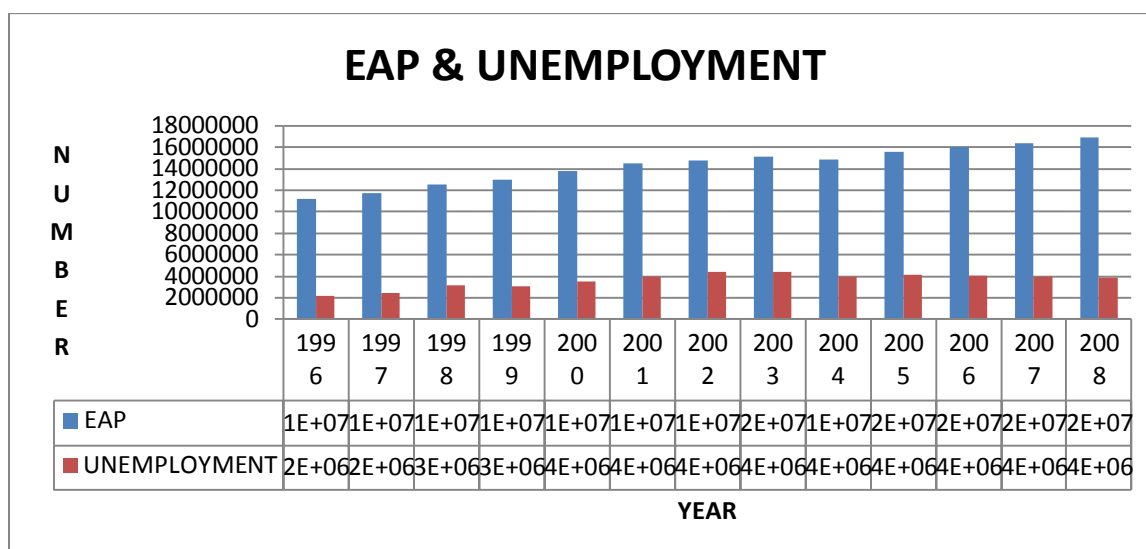
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8.6.2 Provincial Economy

The figure below shows that the share of petrol in the CPI is to large extent influenced by the oil price. In July 2008, where the price of oil was high, the share of petrol in the CPI was also high. During 2008 the rate of change of the CPI was highest during the month of June at 1.6 %. From the figure below, one can see that the petrol price peaked around the month of July at 118.6, whereas the public transport CPI also peaked at the same time and remained stable thereafter. These goes to confirm the old adage that prices are flexible upwards but stick downwards.

Figure 8-54 Limpopo CPI
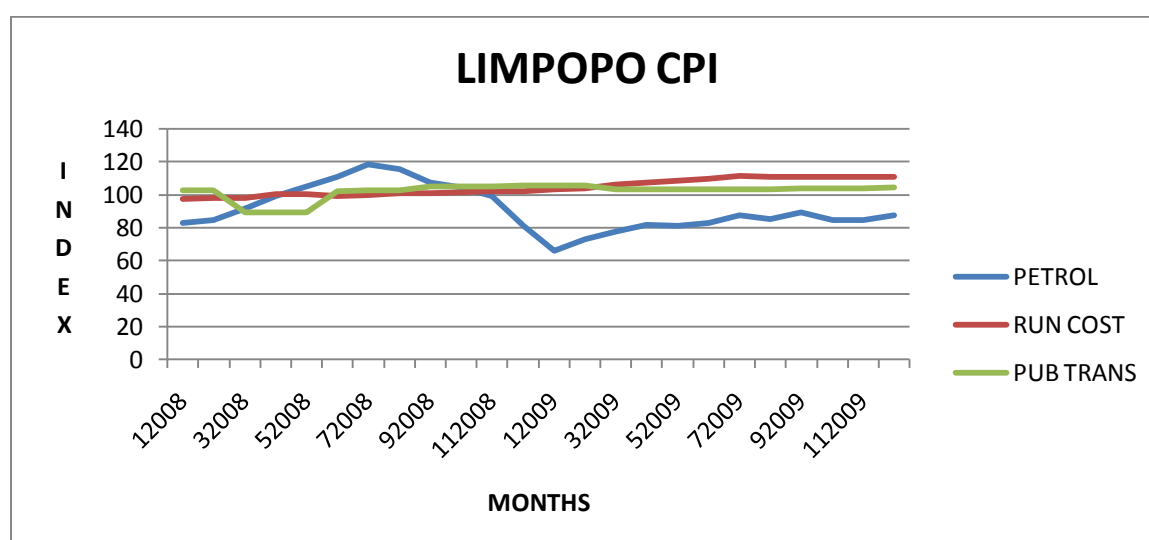
Source: Statistics South Africa

In 2008 the GDP in Limpopo was higher than the previous year's as shown in the figure below. This is hardly surprising given the economic landscape of the Limpopo province. In this province, the mining sector has become an anchor in terms of value added to the GDP. The contribution of the mining industry to the GDP, between 2007 and 2008 increased by 3.2 percentage points. The transport sector which by its nature is highly affected by fuel price increase, suffered a 1 percentage decrease in terms of its contribution towards the GDP. The rest of the sectors suffered no decrease or marginal decrease in their value added towards GDP. In the figure below the GDP growth rate of Limpopo has been declining from 2007 where the growth rate was 4.4% compared to a growth of 4.6% in 2006. In 2008 the year in which fuel prices were very high the growth declined by 1.4 percentage points.

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Figure 8-55 Limpopo GDP (2006-2008)
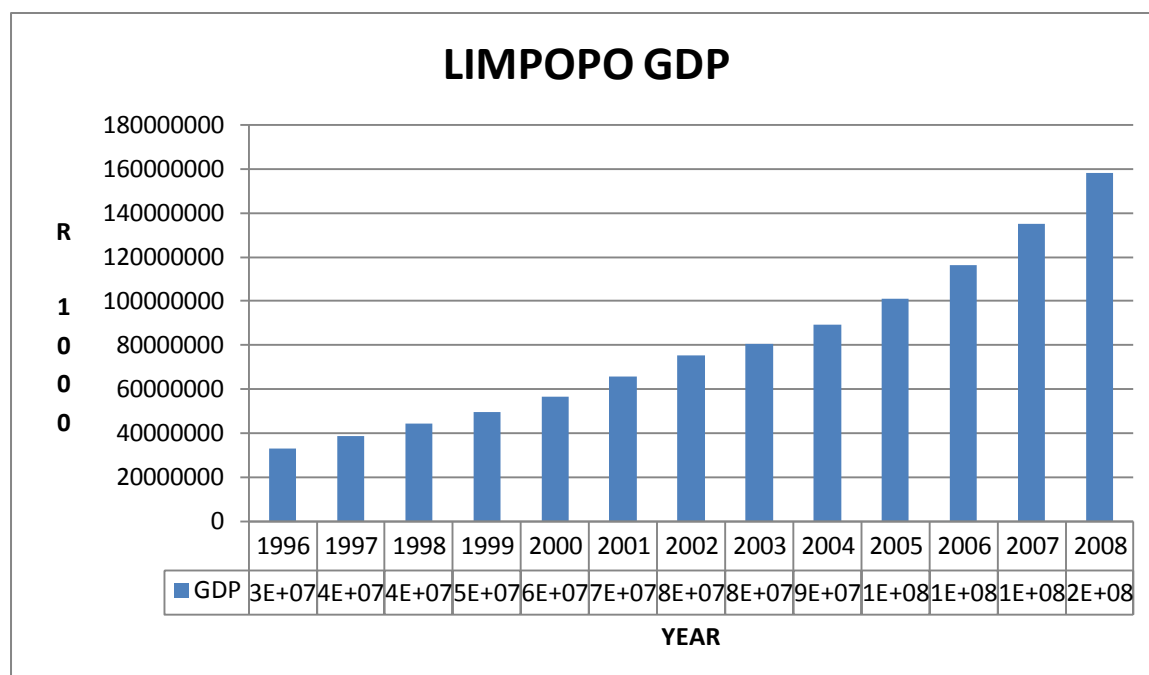
Source: IHS Global Insight 2010

The national (SA) trade balance from 2007 to 2008 improved by 13% whereas for Limpopo Province the trade balance improved by a whopping 49% for the same period. This situation can be attributed to the nature and the structure of the economy of the province of which mining is becoming an important sector. From the figure below it shows that on the trade side the province was not been unduly affected by rising fuel prices like it did with the national economy.

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Figure 8-56 Trade balance in Limpopo

EXPORT, IMPORT &TRADE BAL

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Export	1E+06	1E+06	2E+06	2E+06	2E+06	2E+06	3E+06	2E+06	2E+06	4E+06	7E+06	1E+07	2E+07
Import	2E+05	2E+05	4E+05	4E+05	4E+05	4E+05	5E+05	6E+05	9E+05	1E+06	2E+06	4E+06	6E+06
Trade BALANCE	1E+06	1E+06	1E+06	1E+06	1E+06	2E+06	2E+06	1E+06	1E+06	3E+06	5E+06	5E+06	1E+07
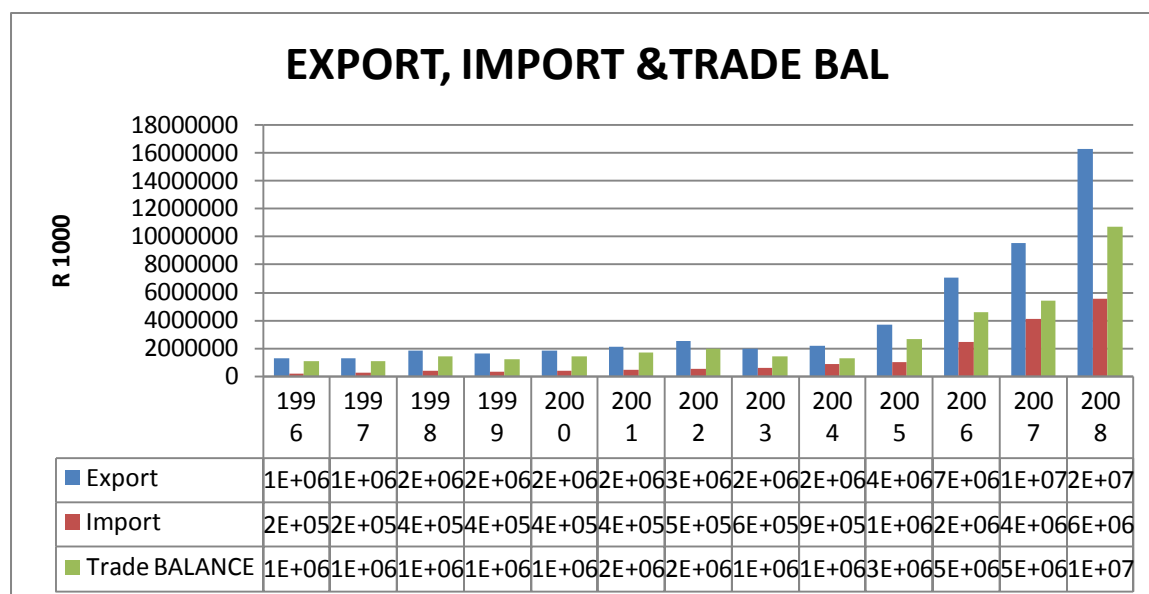
Source: IHS Global Insight 2010

The figure below indicates that between 2007 and 2008 there has been a marginal increase in the unemployment rate of 0.4 percentage point. This could probably be attributed to the fuel price increase which reached its peak during 2008. To pin point where exactly did these unemployment come from will require sectoral analysis.

Figure 8-57 Unemployment in Limpopo

LIMPOPO UNEMPLOYMENT

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
UMENPLOYMENT	8E+05	8E+05	9E+05	1E+06	1E+06	1E+06	1E+06	1E+06	1E+06	1E+06	1E+06	1E+06	1E+06

YEAR

Source: IHS Global Insight 2010

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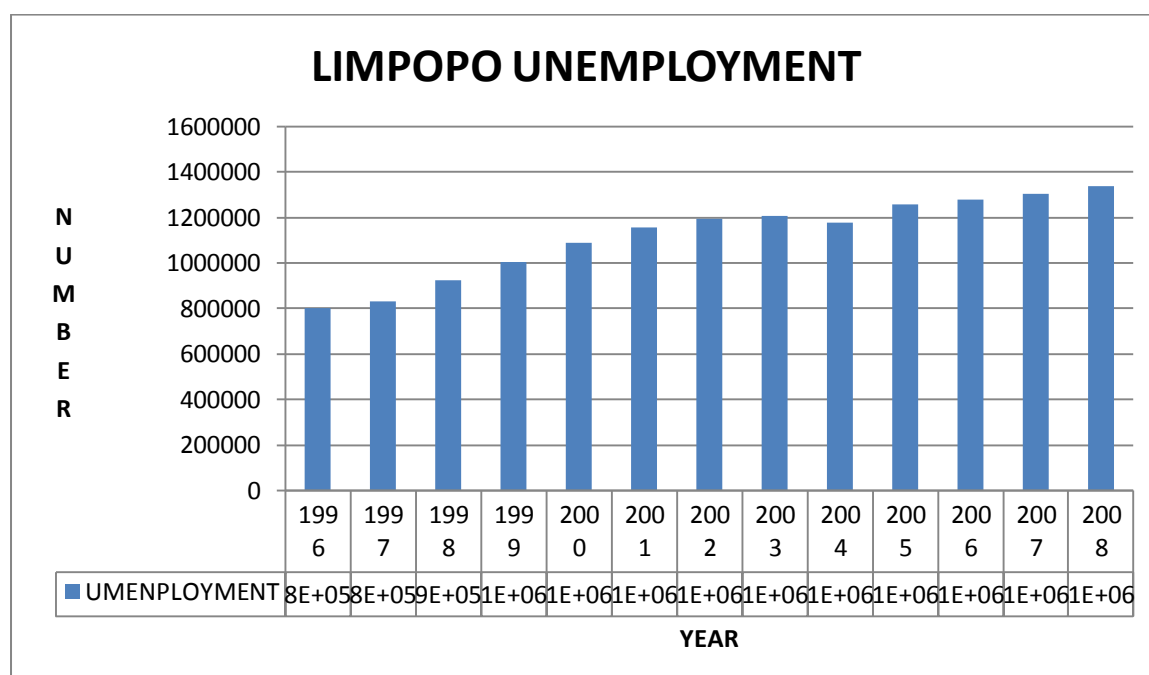
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8.6.3 Capricorn Economy

Over the period 2006-2008 the GDP growth rate in Capricorn on average was declining. This decrease in GDP growth rate coincided with the steady increase in global oil price increase. The growth in GDP in 2006 was 7.9%, in 2007 it was 7.0% and in 2008 it was 4.0%. This is an in indication that growth in the GDP in 2008 declined by 3.0 percentage points.

Figure 8-58 Capricorn GDP (1996-2008)
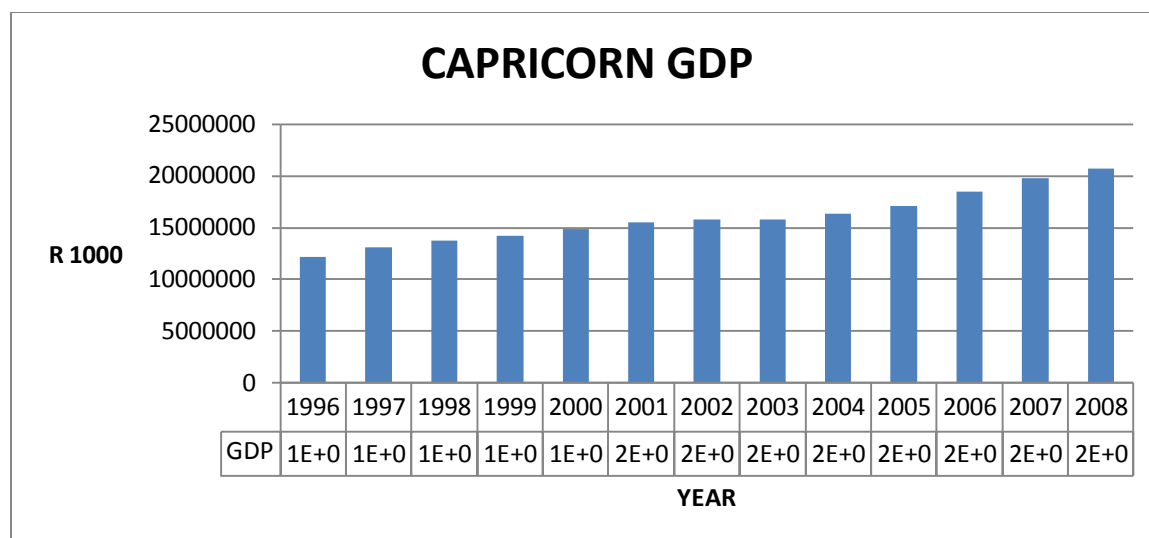
Source: IHS Global Insight 2010

From the figure below, exports for Capricorn on average from 2006 to 2007 were relatively higher than the imports. However, much as the exports were higher during that period, there was a remarkable decrease during 2008, the very year which experienced higher oil prices. During that period the trade balance declined by 68%. The main exports in Capricorn are food beverages, tobacco and metal products and machinery.

Figure 8-59 Trade Balance in Capricorn

Source: IHS Global Insight 2010

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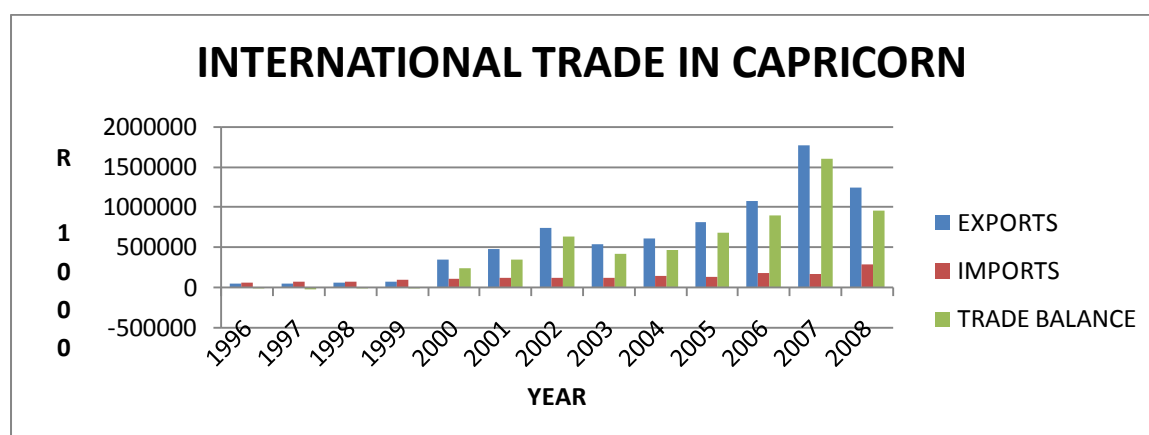
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In 2008 the unemployment rate in Capricorn decreased by 1 percentage point.

Figure 8-60 Unemployment in Capricorn
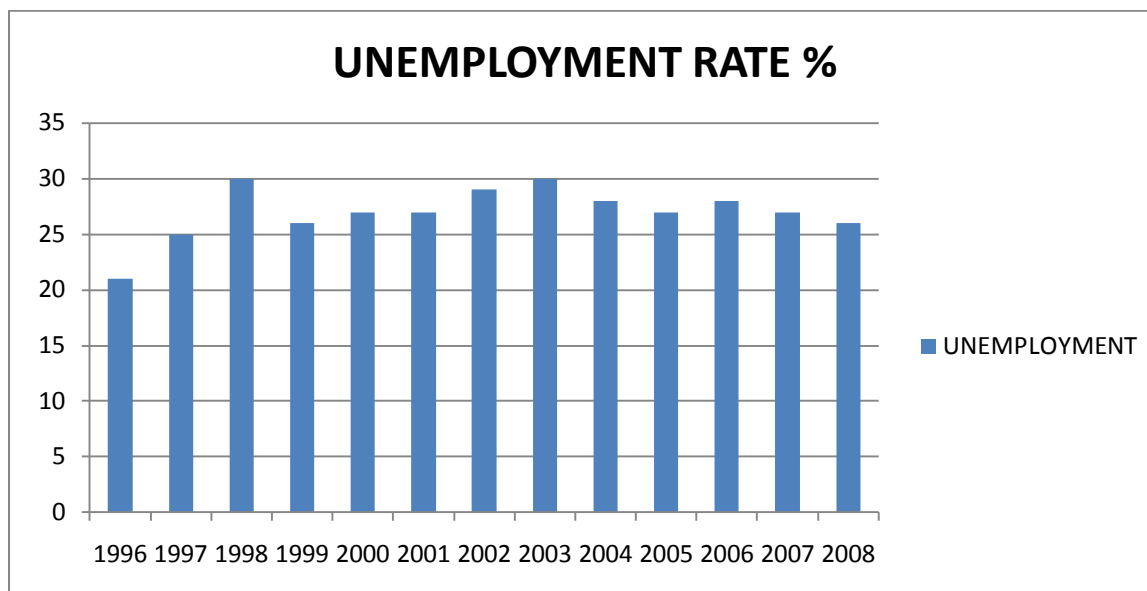
Source: IHS Global Insight 2010

8.6.4 Mopani Economy

Over the 1996-2008 periods, the real GDP grew by 4.1% on average. However, in the high fuel price period like the year 2008, the economy grew on average by 1.4%. This is an indication that spiralling fuel costs have a major impact on the GDP.

Figure 8-61Mopani GDP(1996-2008)

Source: IHS Global Insight (2010)

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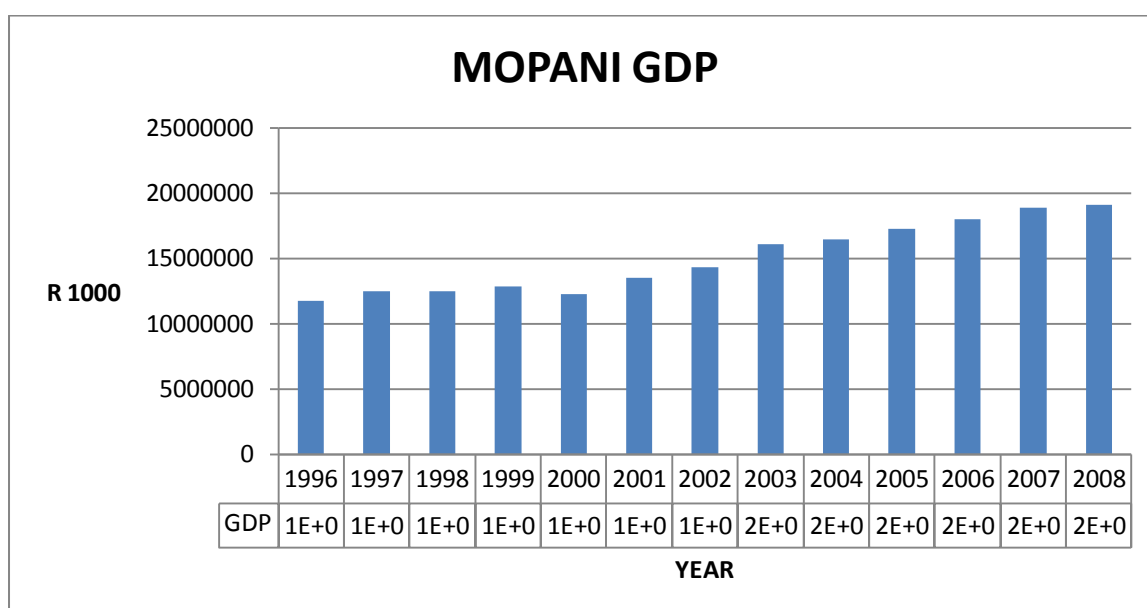
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The international trade figure below confirms the argument that the impact of high fuel price depends on the state and nature of the local economy. Despite high oil price in the year 2008, exports in Mopani did well. The trade balance improved by 34.6%. This has something to do with the structure of Mopani economy. The major contributors to exports in Mopani are mining and agriculture.

Figure 8-62 Trade balance in Mopani
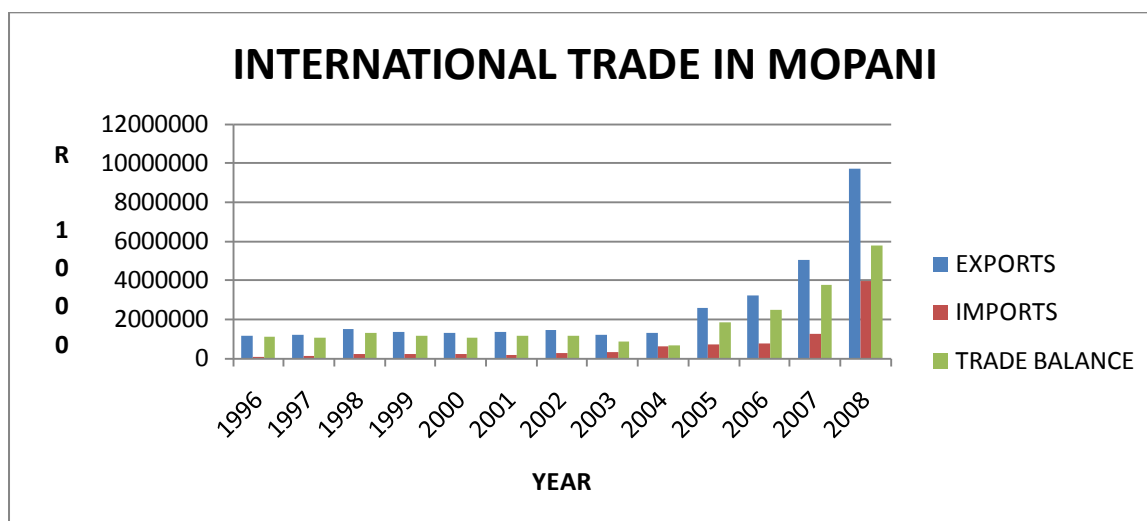
Source: IHS Global Insight 2010

During the high fuel period in 2008 the unemployment rate in Mopani decreased by 1 percentage point.

Figure 8-63 Unemployment in Mopani (1996-2008)

Source: Global Insight 2010

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8.7 IMPACT ON THE TRANSPORT SECTOR

The transport sector is very energy intensive and therefore the impact of higher oil prices translated into higher fuels prices can be readily seen. The figure below depicts the sectoral consumption of petroleum products at a national level. Transport sector (road, aviation) is a major consumer at 75%. It is followed by the industrial sector with a consumption of 5%.

Figure 8-64 Sectoral Consumption of Petroleum Products

Source: Energy Digest Statistics 2009(DoE)

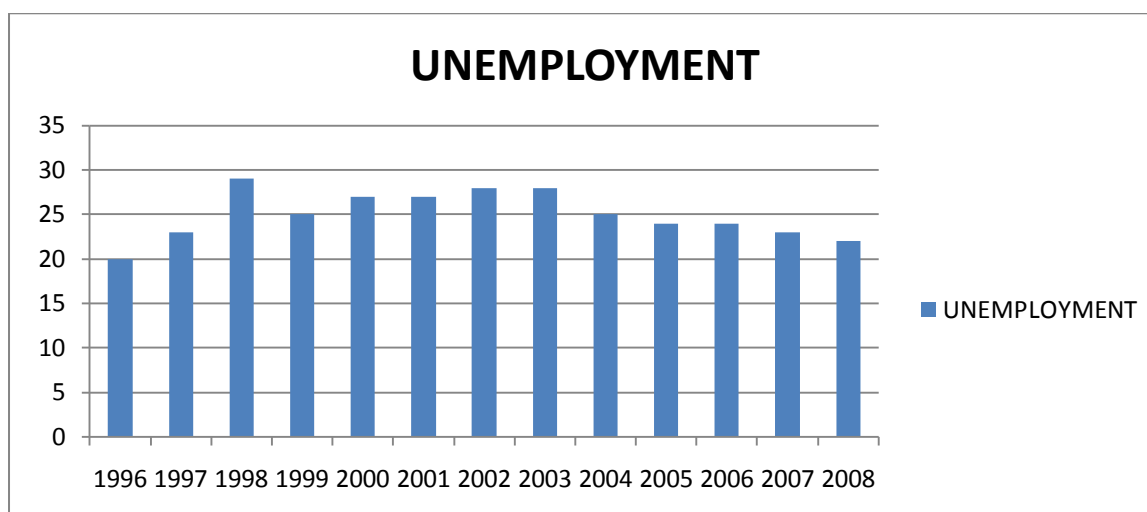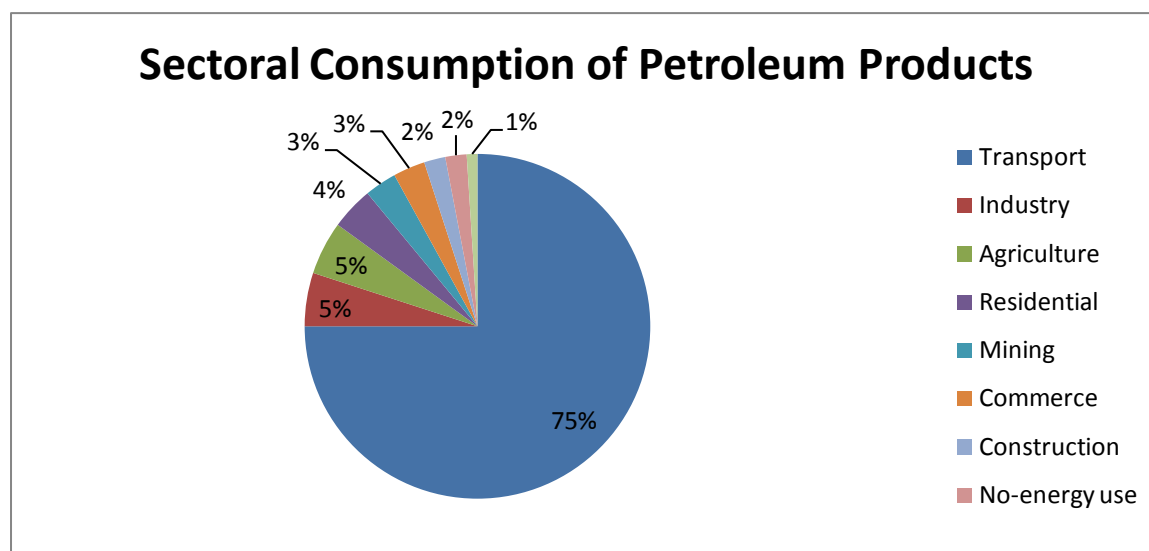Rising fuel prices have an impact on public transport operators. This is because fuel is a major contributor of the operational costs of public transport. Add on top of this the costs of other petroleum products. To cushion this increases operators are then forced to increase transport fares which then has an impact on poor and rural households who relies on public transport for mobility. In the table below we calculate the impact of a 48c increase in the price of petrol on the operating costs of a minibus taxi. We also calculate the impact of an increase of 48.50c in diesel using the vehicle operating costs which were calculated on section 5(5.1) of this report.

Table 8-13 Changes in operating costs after the increase of fuel prices

COSTING PARAMETER	UNIT	BUS	MINIBUS TAXI
Fuel price increase(Q)	c/l	48.50	48.0
Fuel Price Increase(R)	c/l	751.95	858.00
Fuel Costs after Increase(S)=(RXL)/100	c/km	308.30	118,50
Running costs after increase in fuel price (T)=(S+M+N)	R/km	5,521	2,180
Additional annual fuel cost(U)=(Q/100)x(L/100)XO	R/year	6 414	4 414
Total Vehicle costs after increase(V)=P+U	R/year	**1 117 380.69**	**271 067.54**

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From the table above the increase in the price of fuel has resulted in the following changes:
- Operating costs of a bus: Change from R1 117 380.69 to R1 123 794.69 which translate to an additional fuel costs of R6 414-00/year;
- Operating costs of a minibus taxi: Change from R271 067.54 to R275 481.54 which is an additional fuel cost of R4 414-00/year.

8.8 POTENTIAL SOLUTION FOR THE HIGH FUEL PRICES

8.8.1 Conservation

Because the transport sector consumes about 75% of energy in South Africa, the biggest efficiency gains can be accomplished there. Public policy initiatives such as additional fuel taxes, fuel efficiency standards for vehicles and the introduction of austerity measures could dampen demand and push prices down. Many countries across the world have introduced fuel efficiency standards with varying levels of success.

The introduction of hybrid technology which combines an internal combustion engine with an electric motor allows auto manufacturers to increase efficiency without compromising safety or performance. Because of their high efficiency, hybrid electric vehicles can attain from 20% better to over twice the mileage of a conventional gasoline engine. But while conservation in the transportation sector is desirable one should not overstate its benefits. It takes a long time to replace the on road vehicle fleet so even if fuel economy standards are imposed it will take more than a decade for their effects to be fully felt as new vehicles displace old ones.

8.8.2 Strategic Reserves

To compensate for the low oil reserves, major oil consuming countries are taking steps to insulate their economies from supply disruptions by creating liquidity mechanisms of their own. South Africa keeps a strategic reserve of about 10.3 million barrels. While certainly costly to build, strategic reserves would have the long-term benefit of keeping the market liquid and hence reducing the economic impact of supply disruptions.

8.8.3 Shift to Alternatives

Throughout the world alternative fuels make a mere 2% of the transportation fuel market. But rising oil prices have brought to a spike in demand and in production of gasoline replacements. In many countries motor fuel is blended with ethanol, an alcohol fuel made from corn or sugar cane. In Brazil, for example, ethanol accounts for 20% of the country's transportation fuel market today.

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More promising an approach is the use of electricity as a transportation fuel. In order for these electricity sources to displace petroleum electricity must become a transportation fuel. This can be done by using a new vehicle technology that is a small step technological forward beyond hybrid electric vehicles: plug-in hybrid electric vehicles (PHEVs). Such vehicles can be optionally plugged into the electric grid and provide the stored electric energy for much of a typical day's drive. Like no-plug hybrids, PHEVs have an internal combustion engine and liquid fuel tank, and thus do not face the range limitations of electric-only vehicles.

In recent years a great deal of attention was given to hydrogen. Hydrogen enthusiasts claim that when hydrogen is used to power fuel-cell vehicles it will do so with more than twice the efficiency of today's gasoline engine and with zero emissions.

8.8.4 Other Solutions

Hammed Amusa, Njeri Wabiri and Krish Chetty present an appeal for a comprehensive investigation intothe security of the country's oil supplies, and recommend a coordinated and considered approach to oil importing. They propose the following

- For import adjustment strategies which must include a policy to import constant quantities of oil each month, which are shown to slash both the general and specific risks of the oil import portfolio.
- Diversifying away further from Middle Eastern oil suppliers, to suppliers in lower-risk regions such as Europe, North America and Russia.
- Strategic partnerships between private-sector firms engaged in sourcing crude oil imports, and subsidiaries of the Central Energy Fund. Such a partnership ought to include efforts to foster bilateral relations with oil suppliers from less-risky regions.

8.9 POLICY OPTIONS FOR PUBLIC PASSENGER TRANSPORT

8.9.1Shift to Non Petroleum Fuel

Higher oil prices are gradually encouraging the development of some alternative energy resources as replacements for traditional petroleum products. Though many of these non-petroleum fuels carry a great deal of promise for the ground an increase in investment is required.

8.9.2 Reductions in Vehicle In-use Fuel Intensity

According experts vehicles on the roads typically use 10-20% more fuel per kilometre than indicated by their rated efficiency. While many of the reasons for this gap are inevitable due to traffic congestion and other factors, there are also a number of potential measures to significantly reduce this gap. The IEA(2008) estimates that a 5%-10% reduction in average

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fuel consumption per kilometre could be achieved through a combination of the following measures:

- Stronger inspection and maintenance programmes to target fuel efficiency;
- Adoption of on-board technologies that improve in-use fuel efficiency and improve driver awareness of efficiency;
- Better and more widespread driver training programmes; and
- Better enforcement and control of vehicle speeds.

8.10 SUMMARY AND CONCLUNSIONS

The magnitude of the impact of fuel costs on the economy is function of, among other factors, the state of dependence of that particular country on imported fuel. Because South Africa imports a sizable proportion of its fuel needs in the form of crude oil, it stand to reason that the impact of rising fuel costs is huge. The structure of the economy and the speed at which the effects are transmitted are important in the quest for understanding the impact of fuel costs on the economy of South Africa. Due to its dependence on imported crude oil, increase in crude oil prices directly and indirectly affects the macro economy and its attendant consequences.

The impact of fuel costs on the economy in general and macro economy in particular has cascading effects. Armed with it's a relatively price inelasticity, increase in fuel cost can disrupt the macroeconomic fundamentals, such as the level of inflation, the economic growth (GDP), and trade deficit.

All in all, increase in fuel cost can be expected to generate increased uncertainty about inflation, interest rates, exports and exchange rate and as results, have a general dampening effect on consumption and investment. As a result of these effects as well as rising production costs, labour demand is likely to fall and unemployment to rise.

The continued adherence to an automatic pricing mechanism that leads to a follow-through to retail prices is consistent with Government's general economic policy commitment to allowing price signals to guide resource allocation. It is especially important to maintain this commitment in a situation where the economy has suffered a supply-side shock that is completely beyond its control.

In some other countries Government's have responded by decreasing fuel taxes, decreasing consumption taxes (VAT) and providing fuel subsidies. These policy actions have imposed substantial fiscal costs in some cases and are insufficient as well as regressive. The loss of revenue from decreasing taxes and diversion of revenue to provide subsidies may require cuts in government expenditure in areas such as education and health, which would have a detrimental effect on social welfare.

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SECTION 9: ANALYSIS OF IMPACT OF INTEREST RATES

This section will be focusing on the way interest rates impacts the macro economy. We are going to look into how interest rates affects the following

- Repo Rates
- Prime Lending Rates
- Factors Affecting Interest Rates
- Macro-Economic Impacts
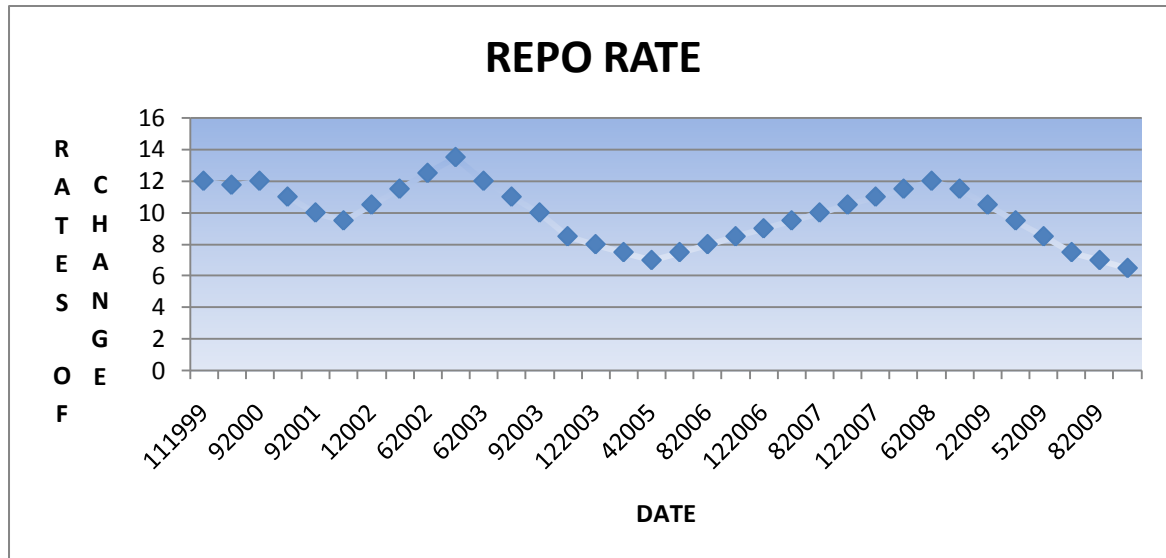- Sectoral Impacts

9.1 INTRODUCTION

Our economy is interlinked with interest rates. Interest rates are part of government monetary policy to manipulate the economy. Interest rates are controlled by the Reserve Bank and at least six times a year, a committee called the Monetary Policy Committee (MPC), meet to decide on whether the repo rate should be changed by increasing or reducing but based on number of factors. When there are some changes in the interest rates, the economy is affected directly. It is an interconnected system. If for instance inflation rates are on the rise, the reserve bank will most likely increase the interest rates. Banks will also have to raise their interest rates to pay for the higher interest levied by the reserve bank.

9.2 REPURCHASE/REPO RATE

The repurchase or repo rate is the interest rate at which the Reserve Bank lends money to private banks. It is determined by the Reserve Bank at each meeting of its MPC, and it is expressed as a rate per annum. The repo rate serves as a benchmark for the level of short-term interest rates. For example, if the repo rate increases, banks have to pay more for repo funds.

The repo rate is one factor that controls the supply of money in South Africa. When the repo rate is lowered, the money supply is increased. This is a good way to encourage business growth and consumer spending, because businesses and consumers can borrow money at cheaper rates. However, an increase in the money supply makes the currency more vulnerable to inflation. Just as with any other commodity, when there is more money available, the value of money decreases. The figure below depicts the movement of interest rate for the period between 1999 and 2009.

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Figure 9-65 History of repo rates

Source: SARB

9.3 PRIME LENDING RATES

The prime lending rate is the interest that the various banks charge their clients and it is influenced by the repo rate. Banks lending rates are determined by three main factors: their cost of funding, the credit risk profile of the client and the degree of risk appetite of the bank itself, which includes not only appetite for credit risk but also for liquidity and interest rate risk. Banks use their funding cost as a basis for determining the interest rate charged on a loan, by adding a risk premium that reflects the credit risk profile of a client and the bank's risk appetite at a particular time.

The figure below is an indication that the prime overdraft rate mimics the movement of the repo rates. This is due to the fact that it has become somewhat customary of the commercial banks in SA to always adjust their prime rate by 3.5% margin every time the repo rate changes.

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Figure 9-66 History of Prime Lending Rates
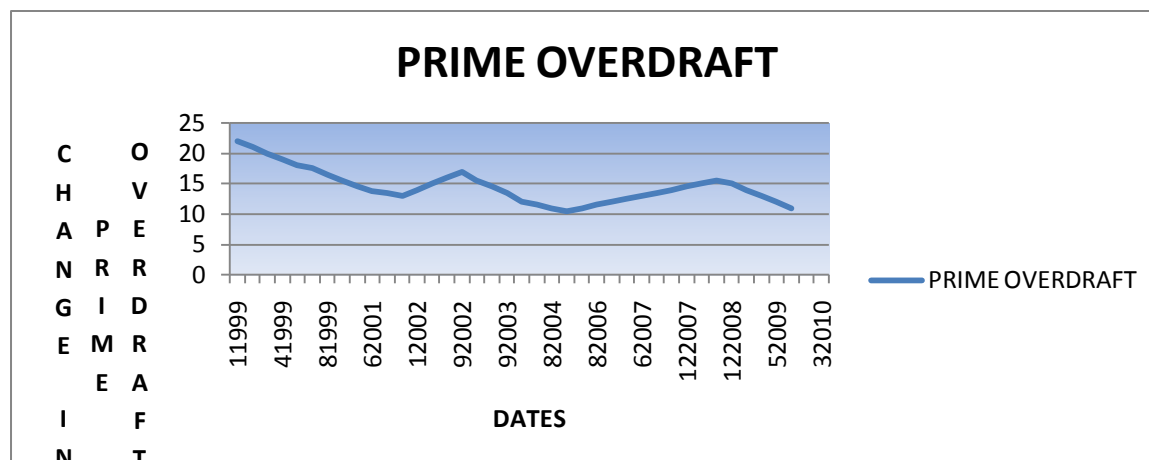
Source: SARB

9.4 FACTORS AFFECTING INTEREST RATES

The following are some of the major components which affect interest rates directly

- The very low saving ratio of South Africa requires relatively high interest rates;
- The high inflation in South Africa also contributes to high interest rates because interest rates have to be at least higher than current and expected inflation to encourage domestic saving;
- Inflation in South Africa is well above that in the country's main trading partners, which are typically more economically developed with more diversified sources of saving and tax revenues; and
- The price of crude oil.

9.5 MACRO-ECONOMIC IMPACT

9.5.1 Inflation

Oil price increase $\longrightarrow$ Inflation $\longrightarrow$ Interest rate

Every increase in fuel prices are likely to cascade to a country`s growth and inflation prospects. This is due to the fact that fuel price increases translate to higher prices. As price increase, inflation targeting government will raise interest rate through repo rate to prevent knock-on effects. Higher inflation rate elicit larger interest rate increase which subsequently squeeze consumption and investment demand.

9.5.2 Growth Domestic Product

Higher interest rate results in sluggish investment and high rate of business failure, in particular small and medium enterprises due to their dependence on bank credit facilities. It stands to reason that the fall in consumption and investment demand will led to a decline in

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gross domestic product (GDP). This is exacerbated by the decrease in region`s imports due to global growth derived from high oil price increase.

9.5.3 Balance of payments

An increase in interest rates reduces consumer spending (more attractive to save, less incentive to borrow, lower disposable income after paying increased mortgage costs). Lower consumers spending will lead to lower import spending and therefore improve the current account. Higher interest rates also lead to an appreciation in the exchange rate. This makes exports more expensive and imports cheaper. This tends to worsen the current account (assuming demand is relatively price elastic). A stronger rand reduces the demand for SA goods and services. This reduces the exports which then reduces the output, and shifts domestic spending to imported goods.

9.6 SECTORAL IMPACTS

In this subsection the sectoral impacts of interest rates will be discussed, focusing on the transport sector, employment and household impacts.

9.6.1 Transport Sector

As it has been mentioned in the earlier parts of this section, the rise by the Reserve Bank of the repo rate will result in banks increasing their prime lending rates which will automatically bring the monthly repayments of vehicles up. The rise in interests is one of the major reasons which cause vehicle repossessions, coupled with the rising fuel prices. In the year 2008 at least 6000 vehicles per month were being repossessed in South Africa. Car repossessions have been rising by 20% year on year. In Mopani alone at least eighteen minibus taxis were repossessed in 2009 which is about 1.8%.

Increase of the prime lending rates by banks will mean that public transport operators will have to pay more on monthly vehicle repayments. This will translate to an increase in the vehicle operating costs as it is depicted in the table below.

Table 9-14 Impact of a 3.5% interest rate increase

COST GROUP	UNIT	COSTS	
		BUS	**MINIBUS TAXI**
FIXED COSTS	**R/YEAR**	802654	87663
OPERATING COSTS	**R/YEAR**	142 956	51 288
RUNNING COSTS	**R/km**	5,323	2,114
TOTAL VEHICLE COST	**R/YEAR**	1 118 520.69	271 391.54

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The table above is showing changes in the total vehicle operating costs after an increase in prime lending rates of 3.5%. The change in the vehicle monthly instalments will be as follows;

- Bus: R454 618+3.5% =R470 529.63,
- Minibus taxi: R49 228 +3.50% = R50 950.98.

This represents an extra R15 911.63 per annum on vehicle instalments for buses and an increase of R1722.35 per annum for a minibus taxi.

Figure 9-67 Registration of buses and minibuses for the period 2007-2009
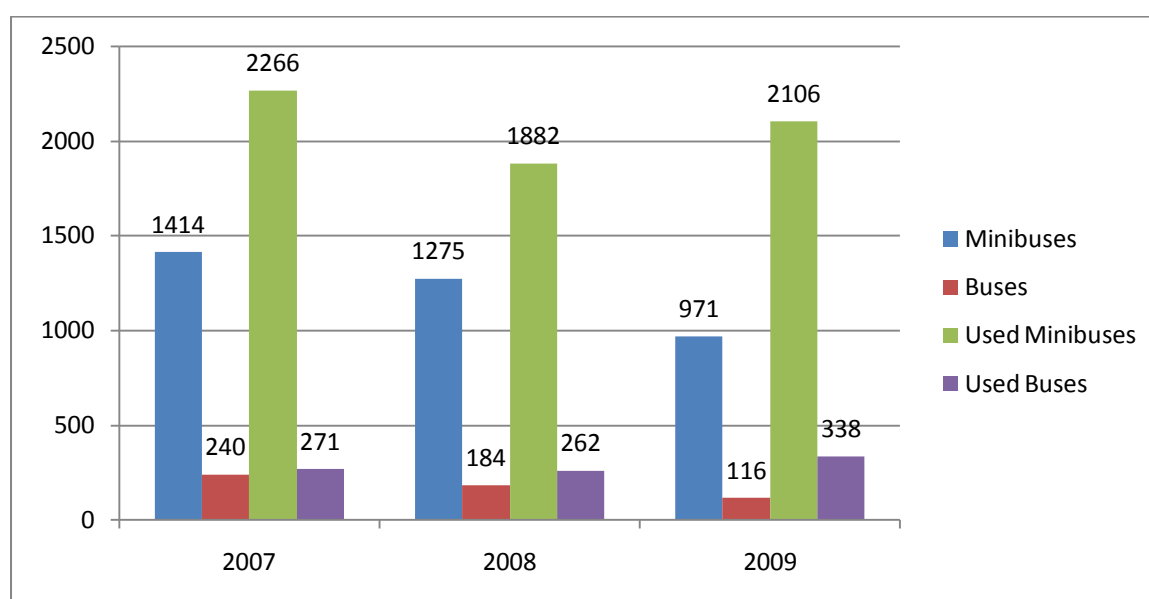
Source: eNatis 2010

The figure above shows the decline in the registration of new buses and minibuses in 2008 and 2009 in Limpopo Province. This change could partly be attributed to the higher interests during these periods. It is also interesting that in 2009 there was an increase in used buses and minibuses and this is again evidence that the transport sector is heavily affected by the rise in interest rates.

9.6.2 Employment

Rising interest rates impact some businesses more than others. Interest rate-sensitive industries include construction, automobiles, and capital goods. Small firms also tend to be hit harder than large firms, which can cushion the blow of rising rates by financing investment internally. Furthermore, low-wage workers are much more likely to lose their jobs during economic slowdowns.

9.6.3   Household

The hike in interest rate will have a negative impact on household spending. The effect of higher interest rates does not affect each household equally. Those households with large mortgages will be disproportionately affected by rising interest rates. Other ways in which interest rates affect households is as follows

- **Increases the cost of borrowing**. Interest payments on credit cards and loans are more expensive. Therefore this discourages people from borrowing and saving. People who already have loans will have less disposable income because they spend more on interest payments. Therefore other areas of consumption will fall.

- **Increased incentive to save rather than spend.** Higher interest rates make it more attractive to save in a deposit account because of the interest gained.

- **Reduced Confidence**. Interest rates have an effect on consumer confidence. A rise in interest rates discourages investment; it makes consumers less willing to take out risky investments and purchases.

9.6.4   Other Effects of Interest Rates

- **Higher interest rates increase the value of the rand**. A stronger rand makes SA exports less competitive reducing exports and increasing imports. This has the effect of reducing aggregate demand in the economy.
- **Rising interest rates affect both consumers and firms**. Therefore the economy is likely to experience falls in consumption and investment.
- **Government debt interest payments increase.** Higher interest rates increase the cost of government interest payments. This could lead to higher taxes in the future.

9.7 SUMMARY AND CONCLUNSION

The effect of interest rate adjustments are notoriously difficult to gauge in advance. Neither the strength of the impact nor when the impact will be at its peak can be determined with any certainty. The effect of rising interest rates can often take up to 18 months to have an effect. The effect of a rise in interest rates also depends upon other variables in the economy**.** At times, a rise in interest rates may have less impact on reducing the growth of consumer spending.

In summary changes in interest rates influences interest rates charged for overdrafts, mortgages, loans and savings accounts. This change then affects the price of financial assets such as bonds and shares as well as the exchange rate of the currency. This in turn affects the consumer and business demand and thereby the output. This then impacts the employment levels and wage costs - which finally influence producer and consumer prices and thus the CPI and PPI.

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SECTION10: RECOMMENDATIONS

Already it is a known fact that the fuel price is largely determined by developments on international commodity and currency markets, and therefore there are limited interventions that can be made by the South African government to control it. We will explore a number of interventions which can be implemented by the LRDT to minimise the effects of fuel prices on public passenger transport.

In section 8 we indicated that interest rates are determined by the Reserve bank and this implies that there are also limited interventions that can be made by the LRDT to minimise its impact on public passenger transport sector. This is mainly because macro-economic are issues that fall under national government.

We also recommend that the inputs which were made by both taxi and bus operators (discussed in Section 4 of the report) should also be considered. Even though some of them are more operational they also warrant further consideration.

Therefore the main objective of this section will be to discuss a variety of intervention which can be considered to make transport more affordable hence making it more accessible. Success of the implementation of some of the interventions is also dependent on the involvement of all public passenger transport stakeholders. The following aspects will be discussed under this section

- Public Transport Subsidies
- Use of alternative fuelled vehicles
- Safe and Fuel Efficient Driving (SAFED)
- Other Recommendations

10.1 PUBLIC TRANSPORT SUBSIDIES

10.1.1 Background

The term subsidy implies that the user of a service is paying less than the cost of the service, with the balance 'subsidised' or paid for by others, usually government. Such a subsidy may come from government at any level or sphere. In the South African context the funding originates either from the national fiscus (money from tax payers)or from municipalities (money from property rates and other sources of municipal revenue).In most countries the subsidy issue only emerged during the second half of the 20th century, when ownership and use of the car grew rapidly and the cost of public transport developed in an unfavourable way due to the relative increase of labour costs. In most countries governments decided to cover the deficits by some kind of subsidy scheme. There are various motivations for such a policy.

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- Subsidies may be motivated because of the social function of public transport. Vulnerable groups such as low income households, persons without a driver licence, elderly and persons with a handicap, need public transport to avoid problems of social exclusion.
- Public transport subsidies may be motivated as a second best instrument to address urban transport problems caused by car use when the possibilities of directly addressing these problems are restricted. These problems relate to noise, pollution, parking externalities and congestion. By subsidising public transport it is expected that a modal shift will take place away from the private car.
- A third argument for subsidies may be that public transport is characterised by economies of scale, so that marginal costs are below average costs. Hence, marginal cost pricing being welfare optimising would lead to deficits to be covered by subsidies.
- A fourth argument would be that there are positive externalities in public transport: an increase in travel volumes leads to a supply response in terms of higher frequencies and this leads to a decrease of scheduling costs of new and existing travellers.

10.1.2 Form of Subsidies

There are four main criteria to determine the suitability of a subsidy system, namely:

- Degree of advancement of efficient public transport: It must encourage effective operations and optimisation of resources by operators.
- Degree to which it promotes social objectives: It should strive to achieve social objectives.
- Fairness: If a specific system is chosen above another because of its fairness, it should be clearly stated in which respect.
- Cost of administration: The cost to determine the allocation of subsidies must be minimised.

10.1.2.1 Supplier-Side Subsidy

Supplier-side subsidy can consist of various types of methods. One of the types of subsidies most frequently used is a supplier-side subsidy paid directly to the operator. One method of supplier-side subsidy is a tariff subsidy. Tariff subsidy refers to the transport operator receiving a direct tariff subsidy for offering specific services at fare prices that produce insufficient total revenues to cover costs. Another method of supplier-side subsidy is a capital subsidy. This entails an amount paid to the supplier to replace (and/or maintain) vehicles. The most prevalent advantage of capital supplier-side subsidy is that it is easily administrated.

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10.1.2.2 User/Demand-sided subsidy

User/Demand-side subsidy is paid directly to the commuter. This is a form of compensation passed on to the commuter for the use of public transport services. It is an effective policy for narrowing inequalities, because it focuses exclusively on the poor. This subsidy encourages healthy competition among operators and promotes greater efficiency of public transport services. These subsidies ensure that scarce financial sources are allocated more efficiently and equitably.

In practice, this type of subsidy to public transport commuters will be in the form of discounted ticket cards sold to target groups, at a price less than the actual value of the service provided. A user-side subsidy gives the commuters a choice of operator and mode of transport to suit their needs. In these instances, operators have an incentive to satisfy the needs of commuters, thus encouraging their future patronage. User-side subsidies guarantee that only trips that are actually taken are subsidised, in contrast with supplier-side subsidies where subsidies are paid without knowing what the money is used for.

The main advantage of this approach is that subsidies are rendered to the most disadvantaged target group and also guarantees that only trips actually taken are subsidised. User-side subsidy is more difficult to administrate, but encourages operators top provide services to meet the people's needs and to deliver efficient and cost effective services. There are three types of user-side subsidies: conventional user-side subsidy; organisationally-focused, user-side subsidy and corridor-focused, user-side subsidy.

The advantage of compensating the commuter is that it will motivate operators to compete for maximum commuter trips and service levels rather than take subsidies for granted. User-side subsidies also have considerable flexibility. Subsidy targeted groups can be varied by such criteria as, among others, income, age, transport mode, class of service, and time of day travelled.

When user-side subsidies alone are considered, efficient use of transport resources are promoted. Placing subsidies in the hands of users encourages operators to function optimally in order to qualify for this income stream. Public bodies can thus ensure that commuter needs are being met and costs are controlled. User-side subsidies lower the effort levels necessary for public bodies to be able to monitor service and fares. Operators will, inmost cases, be bound to provide service levels and fares that will best satisfy their commuters' needs.

Administration is the biggest disadvantage of a user-side subsidy approach. Commuters must be identified and reimbursed. Tickets must be handled in such a way as to minimise fraud. However, today different electronic systems and computer software programmes exist to assist with the administration of user-side subsidy.

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10.1.3 MODELS FOR FUNDING SUBSIDIES

In South Africa the national government makes a fixed annual contribution to the provincial transport departments. This contribution is mostly agreed to before the start of the financial year. There are other international models which can be implemented to increase revenue for funding of public transport such as

10.1.3.1 Versement Transport in France

This is a tax system which local government may levy on businesses specifically for the funding of public transport. The provincial government determines the percentage subject to a maximum set by central government. This generates substantial revenues which can then be used to subsidise public passenger transport.

10.1.3.2 Parking Levies in Great Britain

Companies are subjected to local taxes for their parking places(who may in turn charge them to the employees that come to work by car). The main aim of this system is generation of budgets and shift in modes of transport.

10.1.3.3 Beneficiary pays principle

This principle is recommended by the International Association of Public Transport as it also reduces the burden on government funds. This principle provides that those who benefit from a service should meet its costs. Therefore focus should be on

- Routes servicing shopping centres should be financially supported by their developers;
- Routes servicing newly developed properties whose value increases when served by public transport to be assisted financially by their developers.

10.2 INVESTING IN ALTERNATIVE FUELS POWERED VEHICLES

There is need for investigations into the introduction of alternative fuelled vehicle. Alternative Fuel Vehicle refers to a vehicle that runs on a fuel other than traditional petroleum product or diesel and any method of powering an engine that does not involve petroleum. A transition to cleaner bus and minibus taxi service could have a positive impact on reduced fuel consumption, public health and could also contribute to global climate protection. Public passenger vehicles could be powered by the following fuels

Liquefied Petroleum Gas (LPG): It is a mixture of hydrocarbons, mostly propane, and also propylene, butane, and butylenes.

Compressed Natural Gas (CNG): It consists of 85-99% of methane and it is primarily extracted from gas wells or in conjunction with crude oil production, but it can also be produced as a "by-product" of landfill operations. This gas has been used for many years throughout the world as an alternative energy source and fuel for vehicles.

Biodiesel: It is produced from vegetable oils of different origins, e.g. soybeans, peanuts and other vegetable oils, such as used cooking oil, or even from animal waste. In Europe, biodiesel is already used commercially. The most common crop used there is rapeseed, and to some extent sunflowers.

Hydrogen: it has a higher flame speed, wider flammability limits, higher detonation temperature, burns hotter, and takes less energy to ignite than gasoline. It can also be produced on site (e.g. in a vehicle or at a local gas station) by reforming conventional gasoline, methanol, ethanol and diesel fuel. When used as a fuel in an internal combustion engine, hydrogen burns more efficiently than petrol, and burning hydrogen creates less air pollution.

Hybrid: It has two power sources. One converts fuel into useable energy, and the other, an electric motor powered by an advanced energy storage device, lowers the demand placed on the first power source.

Ethanol: Ethanol is produced primarily by the fermentation of starch from grains (mostly corn) or sugar from sugar cane. It is commonly used as an oxygenate in reformulated gasoline and in a gasoline blend called "gasohol." These fuels can be burned in gasoline engines. Specialized engines are necessary in order to burn pure ethanol.

In South Africa an extensive study was conducted by the South African National Energy Research Institute (SANERI) on operating South Africa's public transport on CNG. It was determined that CNG is the only viable alternative fuel source that is available for immediate implementation in South Africa. As such SANERI has partnered with CNG Holdings has already opened a pilot filling station in Langlaagte (Johannesburg) and the conversion of vehicles has already started. In the Western Cape the first LPG filling station was opened and it is located in Culemborg, Cape Town. (Source: www.saneri.co.za 2010)

There are many different arguments for and against the various bus systems described, in comparison to conventional diesel systems, which are brought forward by different experts and stakeholders. In many cases the published opinions and assessments are non uniform and even contradictory. All of the approaches listed in this section have different characteristics in terms of energy efficiency and most have the potential for being better suited than conventional diesel buses with regard to their regional and/or global environmental effects but only if implemented carefully.

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The question of which technology in combination with which fuel type can be used to achieve the greatest overall, or the most desirable specific environmental improvements compared to the use of conventional diesel buses, can only be determined by means of a thorough analysis which takes all the relevant local conditions into consideration. Important factors in this context include:

- The structure of the existing public transportation system;

- The availability and prices of conventional and alternative fuels;

- Cost implications for the transition to alternative bus propulsion systems.

The table below provides a first impression of the most important characteristics, in terms of advantages and disadvantages, of the various bus systems in comparison to conventional diesel buses. Buses and fuels are treated as a single system in the table.

Table 10-15 Analysis of Alternative Fuels and Buses

Fleet Type	Advantages	Disadvantages
CNG Bus and CNG Fuel	• Potential for lower emissions • Lower fuel costs • Uses inherently sulphur free fuel	• Higher capital costs • Less developed fuelling infrastructure • Less experience with operation and maintenance • Lower driving range • CNG buses costs R2 334 460 which is more than 25-50% of ordinary buses.
LPG Bus and LPG Fuel	• Reduction in fuel consumption as the calorific is 20% lower than petrol and diesel • Lower fuel costs • Longer engine life • LPG supply exceeds the demand in most petroleum-refining countries • LPG costs in fleets typically range from 5% to 30% less than those of traditional petroleum, • Fuelling station cost is similar to, or lower than, that for a comparably sized diesel dispensing system.	• Lack complete infrastructure (gas pipelines, refuelling gas stations) • Higher costs compared to diesel buses and lower driving ranges. • The buses more than 25-50 than comparable diesel bus
Ethanol Bus and Ethanol Fuel	• Lower emissions • Uses inherently sulphur-free fuel • Renewable fuel may leads to lower greenhouse gas emissions and independence from oil imports	• Requires higher volumes of fuel • Lower technical reliability • Less experience with operation and maintenance • Higher capital costs • Potential problems with fuel infrastructure • Fuel costs unreliable, dependent on

		agriculture
Hybrid Bus	▪ Potentially lower fuel consumption and emissions ▪ Potential to run in local zero emission mode ▪ Recover kinetic energy via regenerative braking	▪ Higher to much higher capital costs ▪ Increased weight might offset some or all of the fuel consumption reduction if engine is not downsized. ▪ Two different systems may necessitate additional maintenance requirements ▪ Less experience with operation and maintenance ▪ The estimated cost for hybrid buses is R2979915 per bus. ▪ Significant costs for retraining, maintenance and spare parts.
Biodiesel	▪ Renewable fuel leads to lower greenhouse gas emissions and independence from oil imports ▪ The production of biodiesel is much more expensive than conventional diesel from fossil resources.	▪ Higher fuel production costs, dependent on agriculture ▪ Lower energy content, leading to a higher fuel requirement of about 15% on a weight basis ▪ Additional land use, as land area is taken up and various agricultural inputs with their environmental effects are inevitable

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10.3 SAFE AND FUEL EFFICIENT DRIVING (SAFED) PROGRAMME

Safe and Fuel Efficient Driving (SAFED) is based on a highly successful United Kingdom programme and which provides commercial truck and bus drivers with consistent and effective fuel-efficient driver training. It is a driver development course, consisting of assessment and training and it aims to improve the safe and fuel-efficient driving skills of truck and bus drivers through defensive driving and vehicle maintenance.

Participants are taught techniques for factors such as

- Optimising travel speed and gear selection;
- Ensuring appropriate engine speeds at which gears are changed;
- Reducing aggressiveness of accelerator and brake pedal use; and
- Reducing the amount of time the driver leaves the truck idling.

Use of safe and fuel-efficient driving techniques learnt through SAFED can reduce fuel consumption by 10 percent. The benefits of the programme include,

- Increased fuel savings and lower costs for operators
- Reduced reliance on imported fossil fuel
- Improved road safety
- Increased economic productivity
- Improved workforce skills.

10.4 PUBLIC PRIVATE PARTNERSHIPS

Initiatives to finance potential taxi and bus operators should be encouraged. This should take a form of PPP whereby the public sector institutions and the private sector pool resources together to provide vehicle finance to public transport operators. This initiative could be modelled on the partnership between ABSA Vehicle and Asset Finance and Independent Development Corporation which is discussed in the table below.

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Table 10-16 Partnership between ABSA & IDC

South Africa's Black Taxi Industry and black business in general was given a massive boost with the signing of an agreement between Absa Vehicle and Asset Finance (AVAF) and the Industrial Development Corporation (IDC).The new arrangement will also see millions of South African commuters enjoy new standards of safety when thousands of new, legally-compliant, taxis enter the market. The deal, the first of its type in South Africa, sees the bank undertaking to provide up to R300 million in funding to emerging taxi-operators and black entrepreneurs wishing to enter the industry. For its part, the IDC has agreed to underwrite up to 50% of any losses incurred by Absa, if clients financed under the scheme default on their payments.

"We've been a strategic partner of the IDC since 2006, so this joint initiative is a perfect fit for us," says Marcel de Klerk, Managing Executive of Absa Vehicle and Asset Finance (AVAF). "It is in line with our goal of doing all we can to support the Taxi Recapitalisation Project's objective of putting compliant taxis on the roads. It will also lower barriers and make it easier for operators to enter the market. In addition the agreement will enhance the travel experience and safety of millions of commuters who daily make use of taxis.

"The IDC recognises the positive contribution this product will make to developing emerging transport entrepreneurs and the growth of the taxi industry in particular where the potential for creating new job opportunities is greater. This is in line with the IDC's "Leadership in Development" strategy where we seek to stimulate the creation of jobs by funding opportunities that promote entrepreneurship, BEE and SME development," says Katinka Schumann, Divisional Executive for Services Sectors at the IDC."We are focused and dedicated to nurturing and supporting the development of the South African taxi industry and to building partnerships in aid of stimulating a competitive economy", concluded Schumann."It is yet another shining example of how government and the private sector can form partnerships that benefit and develop our country."

The interest-rate on loans granted will be capped at a maximum of Prime + 4% and applicants must have a deposit of between 15% and 20% of the total loan-value."Before any loan is granted, we will undertake a detailed analysis, to ensure the projected route-income generated by the taxi to be financed will be enough to cover the expenses of the taxi operator, as well as the monthly loan-repayments," says De Klerk. Clients will be subject to normal AVAF credit-worthiness ratings and the maximum finance term is a maximum 54 months but AVAF may restructure the agreement for a longer or shorter term.

Source: www.idc.org

10.5 OTHER RECOMMENDATIONS

There other initiatives that is some can also be implemented to minimise the impact of fuel costs and interest rates on public passenger transport

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- **Improvement of road conditions:** Road conditions also contribute to high maintenance costs. The majority of roads within Limpopo are gravel and it has been proven that driving on a gravel roads increases the consumption of fuel. Therefore the provincial government should continue prioritizing the improvement of both provincial, districts and local roads.

- **Introduction of passenger in major areas**: The provincial government should look at fast tracking the introduction of a passenger rail network.

- **Regular maintenance of vehicles:** Taxi and bus operators should look at maintaining their vehicle on a regular basis as this will also limit and improve the consumption of fuel.Age and maintenance level of vehicles are also factors contributing to fuel usage. LRDT should look at initiating public awareness campaigns aimed at disseminating information on the importance of regular maintenance of vehicle. These campaigns should be targeted to both bus and taxi operators.

- **Buying fuel in bulk:** Operators should look at buying diesel in bulk from the petroleum companies is cheaper than refilling at a service station. This will also entail investing in tanks. This is an option which can be considered by bus operators considering the fact that diesel is only regulated at a wholesale price and not at pump price.

- **Separate lanes:** Separates lanes for public transport increases the operating speed of vehicles and also reduces fuel consumption as there are less stops. This could be considered for areas such as Polokwane and Tzaneen where there is also a problem of high traffic volumes.

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SECTION 11: STAKEHOLDER PARTICIPATION AND CONSULTATION

This section will be focusing on discussing the stakeholder and consultation processes which were undertaken during this study. A summary of all the stakeholders' workshops and meetings held will be made.

11.1 INTRODUCTION

In undertaking this study there was a wide involvement of a wide range of stakeholders' participation and consultation which included Provincial Government and District and Local Municipalities and Transport Forums. The interested and affected parties were identified and invited to a series of workshops with the assistance of the District Municipality who played a catalytic role in this regard.

The following role players were consulted and involved in the public participation process:

- Limpopo Department of Roads and Transport;
- Mopani District Municipality;
- Capricorn District Municipality;
- Mopani District Transport Forum;
- Maruleng Transport Forum;
- Blouberg Transport Forum
- Transport officials of each Local Municipality;
- Greater Letaba Transport Forum;
- Limpopo Bus Operators Association;
- Mopani District Taxi Council;
- Bus operators;
- Taxi operators; and
- Capricorn Commuters Association.

11.2 MEETINGS

Meetings were first held with Mopani and Capricorn District, the purpose being to brief them about the project and to get them participate by assisting in the arrangement of meetings with the local municipalities and transport forums. The Mopani District Municipality informed the respective local municipalities under their jurisdiction and as such a follow up meeting was held with Mopani District Transport Forum as well as transport officials from the five local municipalities.

After that a series of consultative workshops were held with Maruleng Local Transport Forum, Mopani District Taxi Council and Greater Letaba Local Transport Forum. We are still to conduct other workshops with the remaining local transport forums on dates still to be confirmed.

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Within Capricorn district we experienced major challengesin terms of meeting with the respective transport forums. For reasons beyond our control we were unable to secure meetings with the following local transport forums

- Polokwane Transport Forum does not exist;
- Lepelle-Nkumpi Transport Forum has just been formed and the constitution still needs to be ratified by council;
- Molemole Transport Forum never responded to our request to meet them;
- Aganang Transport Forum never responded to our request to meet with them.

A summary of meetings and workshops that were conducted during this study is shown in table the below.

Table 11-17 Meetings and Workshops

DATE	MEETING/WORKSHOP	LOCATION
14 April 2010	Meeting with Mopani District Municipality Officials	MDM Office
16 April 2010	Meeting with Capricorn District Municipality	CDM Office
27 April 2010	Meeting with Mopani District Municipality	MDM Office
13 May 2010	Maruleng Local Transport Forum	Maruleng Office
27 May 2010	Mopani Taxi Council Workshop	Namakgale
02 June 2010	Greater Letaba Transport Forum	Council Chambers
06 August 2010	Blouberg Transport Forum	Council Chambers
18 August 2010	Mopani District Transport Forum	Tzaneen Disaster Management Centre

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APPENDICES

APPENDIX A: TAXI ASSOCIATIONS

The taxi associations in Capricorn District Municipality are the following:

- Polokwane Local and Long Distance Taxi Association;
- Rehona Taxi Association;
- United Zebediela Taxi Association;
- Zebediela Long Distance Taxi Association;
- Lepohong Peace Taxi Association;
- Bakone Taxi Association;
- Senwabarana Taxi Association;
- Boyne Taxi Association;
- Bochum Taxi Association;
- Flora Park Taxi Association;
- Ikageng Taxi Association;
- Kromhoek Taxi Association;
- Lebowakgomo Taxi Association;
- Leporogang Taxi Association;
- Machaka-Ramokgopa-Makgato Taxi Association;
- Maja-Chuene Taxi Association;
- Mankweng Taxi Association;
- Mashashane-Maraba Taxi Association;
- Mehlareng Taxi Association;
- Molepo Taxi Association;
- Moletjie Taxi Association;
- Seshego-Polokwane Taxi Association;
- Sekgosese Taxi Association;
- United-Mphahlele Taxi Association;
- Westernburg Taxi Association.

The taxi associations in Mopani District Municipality are the following:

- Phalaborwa Taxi Association;
- Lulekani Taxi Association;
- Maswanganyi Tax Association;
- Giyani Town Taxi Operators;
- Nsami Taxi Operators;
- Bakgakga Taxi Association;
- Nkowankowa Taxi Association;
- Twananane Taxi Association;
- Mooketsi Taxi Association;
- Homu Taxi Association;

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- Nwamitwa Taxi Association;
- Letaba Taxi Association;
- The Oaks Taxi Association;
- Molototsi Taxi Association;
- Pusela Taxi Association;
- Simajiko Taxi Association;
- Tiyimeleni Taxi Association;
- Giyani Taxi Association;
- Rotterdam Taxi Association;
- Buta Taxi Association;
- Tzaneen-Accornhoek Taxi Association.

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APPENDIX B: DETAILED EXPLANATION OF FIXED AND VARIABLE COST

FIXED COSTS (STANDING COSTS)

Fixed costs are costs which are incurred whether the vehicle is used or not and when vehicles do not cover significant kilometres or work for long hours, these costs will be high and difficult to recover. To get a measure of the fixed cost per kilometre, the annual fixed cost is divided by the actual, or estimated, annual kilometres travelled. They are mainly made up of:

➢ **Depreciation and interest**

Depreciation is based on the assumption that all vehicles are new and financed via an instalment sale, financial or operating lease. The net amount to depreciate is based on:
- Vehicles (Taxis and Buses)   : 20%a year over five years.
- Auxiliaries   : 25% a year straight line.
- Trailers   : 10% a year.

➢ **Vehicles Licences**

Licence fees for vehicles are based on the vehicle's tare mass current Limpopo tariff as at 1st April 2009. The fees used in this study are as follows
- 8500kg bus   : R6 072.00
- 1998kg minibus taxi   : R360.00

➢ **Admin Costs**

These are costs that are required for operational purposes such as office space, telephones etc. This cost is generally divided between the vehicles operating out of depot.

➢ **Interest rates**

Interest on the cost of vehicles is calculated at the prime lending rate of 2010.

➢ **Salaries**

This refers to driver salary in the case of minibus taxis. In the case of buses it refers to the salary of the driver and the assistant.

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➢ **Insurance**

It is assumed that the driver has had a driver licence for over five years. Insurance is determined according to a sliding scale based on the purchase price. Premiums are set at 6.5% of the purchase price for buses and 10.5% for minibus taxis.

VARIABLE/RUNNING COSTS

These costs are incurred when the vehicle is running. They are as follows:

➢ **Fuel**

It is a major cost in transport operations. Consumption of fuel is calculated according to a formula that assumes the vehicle is always fully loaded, travels at average speed. The price of fuel is based on the inland price of fuel as well as petrol pricing zones in Limpopo Province.

➢ **Maintenance**

The assumed cost of maintenance is based on the estimates of Automobile Association (AA).

➢ **Tyre**

Tyre costs are calculated by dividing the cost of a tyre by its expected kilometre life.