



**Factors affecting environmental sustainability of the downstream oil industry in Western
Cape, South Africa**

By

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PREFACE

This thesis is towards a Master of Technology in Business Administration degree prepared at the Department of Business Administration at Cape Peninsula University of Technology. The theme of the study was inspired by the need to enhance oil companies' responsibility towards sustainable practices given the rate at which the physical environment is being degraded. The results of this study will be shared with policy makers, academics and managers of oil companies involved in decision-making.

The author would like to give special thanks to Prof Ferreira for the overwhelming support, patience and helpful criticism that has moulded me into the researcher I am today. Special thanks go to my wife, Grace and my daughter Nokutenda, for inspiring and standing by me when the going got tough. I would also like to thank my parents, Pastors Mr and Mrs Tondhlana for praying for me and my brothers, Dr Gladman Thondhlana and Dr Blessing Makwambeni for their valuable input into this project.

DECLARATION

I, Lawrence Tondhlana, declare that the contents of this dissertation represent my own unaided work, and that the dissertation has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.



05 September 2018

Signed

Date

Abstract

The oil industry has been a major contributor to economic development in many countries; providing jobs, revenue, infrastructure and businesses to third parties. However, this development has also come with adversity on the physical environment. The oil industry accounts for the highest Green House Gas (GHG) emissions in the world, making it the number one polluter. In addition, South Africa has been regarded as the biggest polluter in Africa, with fossil-based fuel cited as the major cause of environmental degradation. South Africa's physical environment is also cited as having degraded more than most countries in Africa. This proposition requires players in the oil industry to urgently address this situation. As the future of economic development is likely to be spearheaded by the oil industry, concerns have been raised at the slow rate of addressing oil companies' operations which causes the environment to be less sustainable. This study uses a qualitative content analysis to explore the oil companies' actions towards addressing environmental adversity caused by their unsustainable operations. In order to be environmental sustainable, oil companies must; incorporate environmental sustainability into missions and visions, financial investment into sustainable initiatives, involve top management in environmental programs, engage stakeholder, comply and align organisational processes and operations with environmental legislations and introducing renewable energy.

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ABBREVIATIONS

NGO	Non-Governmental Organisation
CEM	Corporate Environmental Management
SAMSA	South Africa Maritime Safety Authority
SAPIA	South Africa Petroleum Industry Association
NERSA	National Energy Regulator of South Africa
PASA	Petroleum Agency South Africa
PPA	Petroleum Products Act No.20 of 1977
CO ₂	Carbon dioxide
SO ₂	Sulphur dioxide
PM	Particular Matter
BUSA	Business Unity South Africa
CAIA	Chemical and Allied Industries' Association
APPA	Atmospheric Pollution Prevention Act No.45 of 1965
DEAT	Department of Environmental Affairs and Tourism
UNFCCC	United Nations Framework Convention for Climate Change
GHG	Green House Gas
ISO	International Organisation for Standardisation

CHAPTER ONE

1.1 INTRODUCTION

This chapter provides a basic overview of the study. It builds a case for environmental sustainability in the downstream oil industry in South Africa, citing how environment sustainability has become important through to the events leading to sustainability issues. The chapter also highlights the study's objectives and questions as well as a brief account of the methodology used by the researcher.

The rate at which business operations are degrading the environment is alarming, yet efforts to address these problems are in short supply. Innovest (2007:3) argues that although progress has been made in terms of making investors aware of climate risks, little has been done to turn awareness into solid investment action, specifically consolidating climate risk contemplations specifically into their actual stock determination and portfolio development processes. South Africa is regarded as the number one polluter in Africa, and in the past 20 years, its physical environment has degraded more than most countries (Pinto, 2012 cited in Nortjé, Middelberg, Oberholzer and Buys 2014:52). Rasmeni and Pan (2014) also echo the view that South Africa contributes significantly to greenhouse emissions. In 2009, the International Energy Agency listed South Africa as the top carbon dioxide emitter in the world. The rate at which environmental concerns are being addressed is slower than the rate at which the environment is being degraded (Shrivastava, 1995). This is despite the fact that the sustainability of businesses depends on the sustainability of the environment. The continual use of non-renewable resources without regenerating renewable resources may hamper growth and production in the future (Wills, 2009). The oil industry has created wealth for countries around the world and remains the primary source of energy but oil-based development has been accompanied by considerable environmental adversity (Gurumo and Lixin, 2011). The nature of oil companies' operations degrades the environment through activities such as the disposal of waste and emissions of gases into the atmosphere, water and land. Business operation processes in the oil industry harm the environment and put businesses at risk of running out of non-renewable resources and eventually being forced out of business. Business practices that harm the environment can also harm the reputation of the business (Naimi, 2011).

Kharaka and Dorsey (2005) as well as Ingelson and Nwapi (2014) depict the existence of a relationship between oil businesses' activities and environment sustainability. They identify the adverse effects of exploration such as degradation of soils, surface and groundwater and ecosystems. Wills (2009) concluded that incorporating environmental sustainability into visions presents a strong business case. Previous studies have mainly focused on the relationship between environmental sustainability and financial performance (Aggarwal, 2013; Wills (2009); Cortez and Cudia, 2011). Abubakar (2014:250) notes that the implementation of sustainability initiatives can give organisation distinctive competitive advantages over those that are not making any effort. There is increasing pressure for companies in the oil industry to adopt environmentally sustainable measures to save the environment and the future of their businesses (Ambec and Lanoie, 2008; Smith and Perks, 2010). Tsado, Adamu, and Aderinola (2014) argue that the public is becoming more aware of the effects of companies' operations on communities. This means that engaging in sustainable practices is no longer an option but a requirement. Improving an organisation's environmental footprint can also lead to a positive financial performance (Ambec and Lanoie, 2008:46). This observation is opposed to the dominant assumption that environmental sustainability initiatives are costly and reduces competitiveness. In this context the intention of this study is to understand factors that are crucial to the attainment of environmental sustainability in the downstream oil industry.

1.2 PROBLEM STATEMENT

The natural environment has become unsustainable due to the unintentional operations of companies in the downstream oil and gas industry in South Africa. Demand for petroleum products is projected to increase as the world economy grows. According to Everett, Ishwaran, Ansaloni and Rubin (2010:20), economic growth brought about by global demand will have negative consequences on the environment because the more production and consumption increases; the more the environment will be degraded. Although there have been efforts by oil companies to move towards environmental sustainability, oil companies do portray images of their business that are not fully representative of what they do (Schweitzer, 2010). South Africa is regarded as the number one polluter in Africa with the oil and gas sector cited as a major source of pollution globally (Pinto, 2012 cited in Nortjé et al. 2014:52).

Environmental problems caused by unintentional business activities in the oil industry have increased substantially, yet efforts to address these problems are still lagging behind (Shrivastava, 1995). The risk of failing to engage in environmental sustainability practices is growing; thereby making it necessary for management to incorporate it into their strategic plans (Shrivastava, 1995). Failure to fully comprehend the factors affecting environmental sustainability in the downstream oil industry will lead to environmental strategies being unsuccessful.

1.3 KEY QUESTIONS PERTAINING TO THE STUDY

The study seeks to answer the following questions.

- 1) What are the factors affecting environmental sustainability in the downstream oil industry?
- 2) In what way is management addressing these factors?
- 3) Which strategies can be used to improve environmental sustainability in the downstream oil industry?

1.4 RESEARCH OBJECTIVES

In light of the problem statement and in particular, the need to bring environmental sustainability in businesses to the foreground, the following objectives guide this study.

- To identify factors affecting environmental sustainability in the downstream oil industry.
- To evaluate measures being used to address factors affecting environmental sustainability in the downstream oil industry.
- To recommend strategies that can be used to improve environmental sustainability in the downstream oil industry.

1.5 DELIMITATIONS OF THE STUDY

This study focuses on companies involved in downstream oil activities in the Western Cape Province of South Africa. The five companies selected for the study are: Sasol, PetroSA, BP, Chevron and Engen. Western Cape Province boasts of three primary oil production facilities

based in Cape Town, Saldanha Bay and Mossel Bay. According to Wesgro (2017), Mossel Bay refinery, is South Africa's leading facility producing 36 000 barrels per day. Western Cape Province boasts of state of the art infrastructure and effective engineering capacity. Due to its geographical location and links to West Africa, it has managed to lure international exploration and oil refining companies to its coast (Wesgro, 2017). This entails more oil refining activities which give rise to more pollution. Sasol is an internationally integrated chemical and energy company based in Johannesburg but operating in the Western Cape. PetroSA is a South African state-owned oil company with its refinery in Cape Town. Mozambique, Angola and South Africa are the three Southern African countries in which BP (British Petroleum), operates. In South Africa BP's refinery is located in the city of Durban, on the east coast. It also operates in the Western Cape. Chevron South Africa (Pty) Limited, a subsidiary of Chevron International, is a leading refiner and marketer of petroleum products in South Africa. Chevron's refinery is located in Cape Town (Kilian, 2016). Engen Petroleum is a South African oil and gas company with its refinery in Durban and its operations in terms of distribution and selling stretching to the Western Cape. Although these companies' refineries are scattered all over the country, the effects of their operations affect the whole country.

1.6 RESEARCH METHODOLOGY

The study used a qualitative, descriptive approach. The intention was to allow an intensive investigation into factors affecting environmental sustainability in the downstream oil industry. The research methods utilised in the study consisted of literature and documentary analyses.

1.6.1 Literature Search

The study made use of documents published externally. They include published sustainability reports, annual integrated reports, environment policies and other key documents found on corporate websites. The study focused on company documents published in the last seven years.

1.6.1.1 Selected theoretical criteria for the study

The collected data was analysed using a qualitative content analysis. The intention was to obtain a more concise explanation of the circumstance or case. The insights gleaned from the analyses consisted of ideas to explain the circumstance or case (Elo and Kyngas, 2007:108). When

researchers use content analysis, they have to decide whether to use deductive or inductive content analysis. This study used deductive content analysis because factors that affect environmental sustainability have been identified in existing theory in contexts outside South Africa. It was necessary to find out if these factors apply in the South African context.

1.7 Summary

The chapter provided a brief account of the study examining the starting point of the theme being studied in relation to the body of literature existing. It analysed gaps in the existing literature which formulated the problem statement of this study. The chapter also discussed reasons why Cape Province in South Africa was chosen as a study area of this research. The next chapter assesses the downstream oil industry in South Africa, discussing its contribution to the economy of South Africa and the challenges it is facing.

CHAPTER TWO

OVERVIEW OF THE DOWNSTREAM OIL INDUSTRY IN WESTERN CAPE

2.1 INTRODUCTION

This section assessed the downstream oil industry in the South Africa. It ought to understand the parties involved and taking into consideration their contribution to the economy and legislations governing the industry. The section also inquires into the need for sustainability in the downstream oil industry in the South Africa as well as the challenges companies are facing in moving towards environmental sustainability.

2.2 STRUCTURE OF THE DOWNSTREAM OIL INDUSTRY IN SOUTH AFRICA

The downstream oil industry is also known as the refinery industry. Activities involved in the downstream oil industry are refining, transportation, marketing and distribution. “*PetroSA, the Central Energy Fund, the National Energy Regulator of South Africa (NERSA) and PASA, as well as the members of the South African Petroleum Industry Association (SAPIA), are the major actors in the country’s liquid fuels market and in particular the downstream refinery segment of the industry*” (SAMSA, 2011:3). According to SAMSA, (2011:4), SAPIA has seven members that represent all the major oil companies doing business in South Africa. These members are BP, Chevron, Engen, PetroSA, Shell, Sasol and Total. SAPIA represents the collective interests of the South African petroleum industry. The association has a strategic role in addressing a range of common issues relating to the refining, distribution and marketing of petroleum products, as well as promoting the industry’s environmental and socio-economic progress. SAPIA fulfils this role by proactively engaging with key stakeholders, providing research information, expert advice and communicating the industry’s views to government, members of the public and the media (SAPIA, 2015).

2.3 CONTRIBUTION OF THE DOWNSTREAM OIL INDUSTRY TO THE SOUTH AFRICAN ECONOMY

The downstream oil industry is a noteworthy contributor to the South African economy as it contributes:

- *R6 billion in annual payroll;*
- *R72 billion in duties and levies” (SAPIA, 2014:35).*

“The petroleum industry contributes to the South African economy by:

- *Supplying the fuel that contributes about 6.5% to the country’s GDP;*
- *Supplying approximately 18% of South Africa’s primary energy;*
- *The industry’s operations sustained about 750 300 jobs in South Africa in 2014, this represents about 4.9% of the total formal employment in South Africa;*
- *The industry collects more than R66 billion in fuel taxes on petrol and diesel, which is an important source of revenue for the government” (SAPIA, 2016: 31).*

SAPIA’s Annual Report (2014) shows that petrol product consumption increased by 78.6 % between 1988 and 2014. Although SO₂, PM and Co₂ emissions have decreased by 1.3 %, SO₂ emissions increased by 11.72 % between 2007 and 2014 (SAPIA, 2014). The SAPIA Annual Report (2013) shows that the refining industry was not able to meet capacity for diesel and petrol products in 2013. According to SAPIA (2016), in the 3 years leading up to 2016, member companies invested close to R20 billion in infrastructure development in the petroleum industry. SAPIA members also financed refinery maintenance to the tune of R1.7 billion during the same period (SAPIA, 2016:27).

2.4 LEGISLATION GOVERNING THE DOWNSTREAM OIL INDUSTRY IN SOUTH AFRICA

The National Environmental Management Act 107 of 1998 (NEMA) and the Atmospheric Pollution Prevention Act 45 of 1965 (APPA), are the two main Acts that regulate the environmental impact of the energy sector in South Africa (Davidson, Winkler, Kenny, Prasad, Nkomo, Sparks, Howells and Alfstad. 2006:88). The Department of Environmental Affairs and Tourism (DEAT) manages the APPA Act and regulates the emissions of greenhouse gases (Davidson et al.2006:89).

According to Davidson et al. (2006:89), the Air Quality Act (No. 39 of 2004), regulates both local and global air pollution. The Act has a system in local legislation that can be used as a guideline to implement global obligations by providing local companies with information on

pollutants, demanding plans on pollution prevention and supervising the use of certain fuels. Promotion and regulation of the production of petroleum products is done by The Petroleum Agency of South Africa (PASA) (Bowman Gilfillan African Group, 2016:354).

PASA's role is to advise and administer the receiving and evaluation of applications for petroleum rights and permits, monitoring compliance with permits and rights and making recommendations to the Minister (Bowman Gilfillan African Group, 2016:354). The Petroleum Products Act (PPA) regulates the downstream sector. To manufacture or wholesale petroleum products in South Africa, it is obligatory to acquire the relevant license in terms of the PPA (Bowman Gilfillan African Group, 2016:358).

South Africa is a member of the Kyoto Protocol, which commits its members to set emission reduction targets that are internationally binding. However, South Africa resorts under non-annex 1 countries of the Kyoto Protocol, which are not required to make specific commitments to emissions reductions. In this regard it is logical and important to study the South African context and evaluate efforts undertaken to reduce environmental degradation. Mining Online (2016) noted *“that the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), although outdated and in need of revision to be in line with international standards, is still the main law governing air pollution in South Africa”*.

2.5 THE NEED FOR SUSTAINABILITY

Economic development has been inextricably linked to growing energy use as well as the growth of carbon emissions. According to South Africa's Minister of Mineral Resources, Mosebenzi Zwane, South Africa's economic growth will depend on oil and gas in the future (Fin24:2017). Renewable energy can be the solution needed to break that correlation in order to enhance sustainable development (IPCC, 2011). Goodland (1995) asserts that the rate of the present wasteful system of development will lead to the physical environment not being able to sustain businesses if sustainability issues are not addressed immediately. A number of studies have established that the human rate of consumption of natural resources is overwhelming the rate at which they are being replaced (Porter and Krammer, 2011). This study seeks to understand factors that affect sustainability with the aim of influencing businesses to design measures that can reduce the rate at which the environment is being degraded, making it possible for their

businesses to be sustainable too. Various studies have proved that South Africa is the largest emitter of greenhouse gases on the African continent (Earthlife Africa, 2014; Pinto, 2012 in Nortjé et al. 2014:52). The country must assist in averting further cataclysmic global climate change. Countries that are members of the United Nations Framework Convention for Climate Change (UNFCCC) must meet their emissions targets. As South Africa is a Third World country, it is not bound by this resolution. For this reason, South Africa has to be at the forefront in fostering sustainability in order to avoid relaxation (Earthlife Africa, 2014).

2.6 CHALLENGES FACED BY COMPANIES IN THE DOWNSTREAM OIL INDUSTRY IN SOUTH AFRICA

According to Berg (2012:20), the challenges that affect the downstream industry in the United States of America's are also relevant to the local refinery industry. The challenges cited by the US Department Of Energy (2012) in Berg (2012) include environmental regulations, increasing cleanliness standards for fuels, global uncertainty about future consumer choices, pressure to reduce emissions of Co₂, attaining adequate profit margins and proactively dealing with public scrutiny on environmental issues and global warming.

SAPIA (2015) has outlined key challenges that afflict the oil industry in South Africa. These challenges affect all companies. One of the challenges faced by companies in the downstream industry in South Africa is translating policy into equitable regulations that can be used by the industry in a constructive manner (SAPIA, 2015). There is no doubt that environmental sustainability of oil companies will lead to a low carbon economy. The challenges companies in various industries face in South Africa in transitioning to a low carbon economy are similar to those faced by oil companies in moving towards environmental sustainability.

Kaggwa, Mutanga, Nhamo and Simelani. (2013:12) listed some of the challenges.

- The pace at which new technology needed for transitioning to a low carbon economy is slow. There is a need for the country to import green technologies, which tend to be expensive.
- South Africa lacks skills and the basic infrastructure needed to successfully apply and adopt the productive use of green technologies.

- Legislations like the emissions tax tend to be costly for vehicle users and create an additional tax burden. The legislation might end up being repealed.

2.6.1 Environmental and social effects of oil refining

According to a study conducted by Kadafa and Ayuba (2012) in the Niger Delta, Nigeria, oil exploration and exploitation has had adverse effects on the environment. This includes destruction of farmland and water sources, marine life and large scale clearance of mangrove forests that have been supporting wildlife. Other effects include air pollution, water pollution, solid wastes and ecosystem demolition (Narimisa and Basri, 2011). Oil refining has social effects too. Refining oil creates health risks for employees through exposure to toxic gases that may lead to diseases like pneumonia and dermatitis. Oil refining operations can also cause headaches, mental problems and cancers due to exposure to carbon monoxide and adjacent communities are not spared of the effects too (Epstein and Selber, 2002; O'Rourke and Connolly, 2003). According to O'Rourke and Connolly (2003:605), "*a 1994 analysis of 264 childhood leukaemia clusters in the United Kingdom showed relative, non-random proximities to oil refineries*". A University of Cape Town study revealed that asthma cases were almost nine fold higher among children living near the Chevron refinery in Cape Town than that of others residing in Cape Town areas (IOL, 2013).

2.7 SUMMARY

Oil production contributes substantially to South Africa's economy as it provides jobs for thousands of people, income to households as well as the much-needed infrastructure. As the economy of South Africa is projected to grow, mainly due to an increasing demand for oil products, alarm bells have been rung on oil companies' slow pace in addressing environmental concerns regarding increased oil production activities. Inconsistencies in environmental regulations impede oil companies in South Africa from moving towards sustainability. This section outlined the need for sustainability as well as the challenges faced by oil companies in South Africa in their quest to move towards environmental sustainability. The next chapter reviews the body of literature on environmental sustainability in the oil industry and other relevant industries

CHAPTER THREE

ENVIRONMENTAL SUSTAINABILITY IN THE DOWNSTREAM OIL INDUSTRY IN DIFFERENT ENVIRONMENTS

This chapter outlines and explains the major theoretical concepts informing the study. It reviews the body of literature on environmental sustainability in the oil industry and other relevant industries. The research focussed on studies germane to the overall objectives of this study. The literature used was gleaned from books, journals, online newspaper articles and online articles. For credibility, the researcher chose authors who have been cited frequently and mostly, journals and articles that have been published.

3.1 INTRODUCTION

The definition of environmental sustainability has been evolving, yet the underlying concepts are still agreed upon by most researchers. This section looks at the various definitions of environmental sustainability with the aim of identifying one that is relevant to the oil and gas industry. The reasons why companies have to transition to environmental sustainability are revealed in this section. Drivers of environmental sustainability as well as the benefits, challenges and risks of not engaging in environmental sustainability are also discussed in this chapter. Lastly, the chapter looks at environmental strategies that management can use to improve their operations towards environmental sustainability.

3.2 DEFINING ENVIRONMENTAL SUSTAINABILITY

Sutton's (2004) definition of environmental sustainability clearly explains the need to maintain the physical environment. Relevant to the Gas and Oil industry, Lyn (2003) cited in Tsado et al. (2014:32), defines sustainability as meeting the needs of the people with minimum environmental effect while waiting for other energy sources. This suggests that environmental sustainability in the oil and gas industry cannot be achieved without venturing into alternative energy sources. Natural resources are finite, their continued use leads to extinction, which gives rise to sustainability issues (Sutton, 2004: i). Efficient energy and resource usage helps to save materials and energy while improvement in technology can also help to reduce pollution.

3.3 WAY FORWARD FOR OIL COMPANIES

According to the South African National Climate Change Response Strategy (2004), South Africa, as a signatory to the UNFCCC, has to fulfil certain obligations, including:

- Keep an update of GHG emissions.
- Develop and execute projects that will combat climate change.
- Advance technologies, applications and operations that will reduce the emissions of toxic gases into the atmosphere.
- Engage in platforms created to discuss and find solutions to the effects of climate change.
- Take climate change issues into consideration when crafting policies and initiatives with a perspective to reduce negative impacts on the environment.
- Train and engage in education and invest in public awareness of issues related to climate change (South African National Climate Change Response Strategy, 2004).

3.4 ENVIRONMENTAL SUSTAINABILITY AND COMPANY PERFORMANCE

Pursuing environmental sustainability helps companies to meet customer needs. Berzengi and Lindbon (54:2008) in their study found that companies were doing their best to use the most developed technologies to create new products that are environmentally friendly and which closely meet the demands of their customers. Adams, Thornton and Sepehri (2010:11) concluded from their study that organisational reputation and brand loyalty can be built by venturing into corporate sustainability initiatives. This can increase shareholders' wealth in the long run. Innovation, which plays a pivotal role in environmental sustainability, contributes to competitive advantage. Innovation is critical in reducing the cost of complying with environmental regulations, which in turn deliver other competitive advantages (Porter and Linde, 1995). Lin & Ho (2008:17) cited in Smith and Perks, (2010:2), concur that the natural environment has provided a competitive platform for businesses on which they can develop new and inventive ways to improve their global standing and performances. The result of their study shows that innovation can provide a competitive advantage for the organisation (Maletic, M., Maletic, D., Dahlgaard, Dahlgaard-Park and Gomiscek. 2014:9). Environmental sustainability also impacts positively on a company's financial performance. Cortez and Cudia's, (2011:333) study of Japanese electronics companies concluded that environmental costs affect revenue creation

positively. More efficient use of natural resources, like energy, reduces operating costs and makes business sense (Perera, Putt Del Pino and Oliveira, 2013).

3.5 BENEFITS OF ENGAGING IN ENVIRONMENTAL SUSTAINABILITY

Wills (2009) mentioned direct cost saving as one of the benefits of engaging in environmental sustainability. The use or reuse of a limited number of resources can impact the environment positively, which can lead to a reduction in costs (Wills, 2009). The relationship between a business and its stakeholders (NGOs, pressure organisations, media), is essential. Ambec and Lanoie (2008:51) suggested that less pollution leads to lower liability costs, which in turn might reduce potential fines and litigation costs. Governments give tax credits to businesses that engage in environmentally sustainable practices like recycling and using renewable energy among others. Products that are environmentally friendly are more likely to attract more customers than those that are unfriendly but this development is more evident in more regulated and scrutinised industries like the energy industry. Another benefit is a reduction in the cost of labour. Employees normally do not want to be associated with a business with a poor environmental reputation. Studies have shown that an effective environmental initiative can reduce labour costs (Ambec and Lanoie, 2008:57).

Businesses can also enhance their profitability by engaging in environmental sustainability. According to Wills (2009), factors that can lead to an increase in profits include; the development of a constant improvement culture, maintaining processes that have been successful, employing a skilled workforce and recycling materials will lead to a reduction in operation costs. Wills (2009) indicated that natural resources like oil from fossils have a finite life and in the future, economic growth and production will be hampered if they cannot be replaced. Benefits of environmental sustainability stretch to the economy as a whole. According to (Everett et al.2010), economic development depends on the physical environment as it provides the capital required to produce products and services. The same environment also retains and processes undesirable by-products in the form of contamination and wastes. Ecological resources help to eliminate economic and social well being risks, managing risks of flooding and controlling the local climate. This enhances economic development and maintaining the natural environment is a key factor in sustaining development for the more

extended term (Everett et al. 2010). According to a UC Davis study (USA), researchers tracked stock prices of firms around the time companies voluntarily issued press releases disclosing carbon emission information. Their main finding was that in the days after the press releases were issued, companies saw their stock prices increase significantly. In other words, disclosing information on GHG emissions benefits shareholders (Godelnik, 2012; Fischer, 2012).

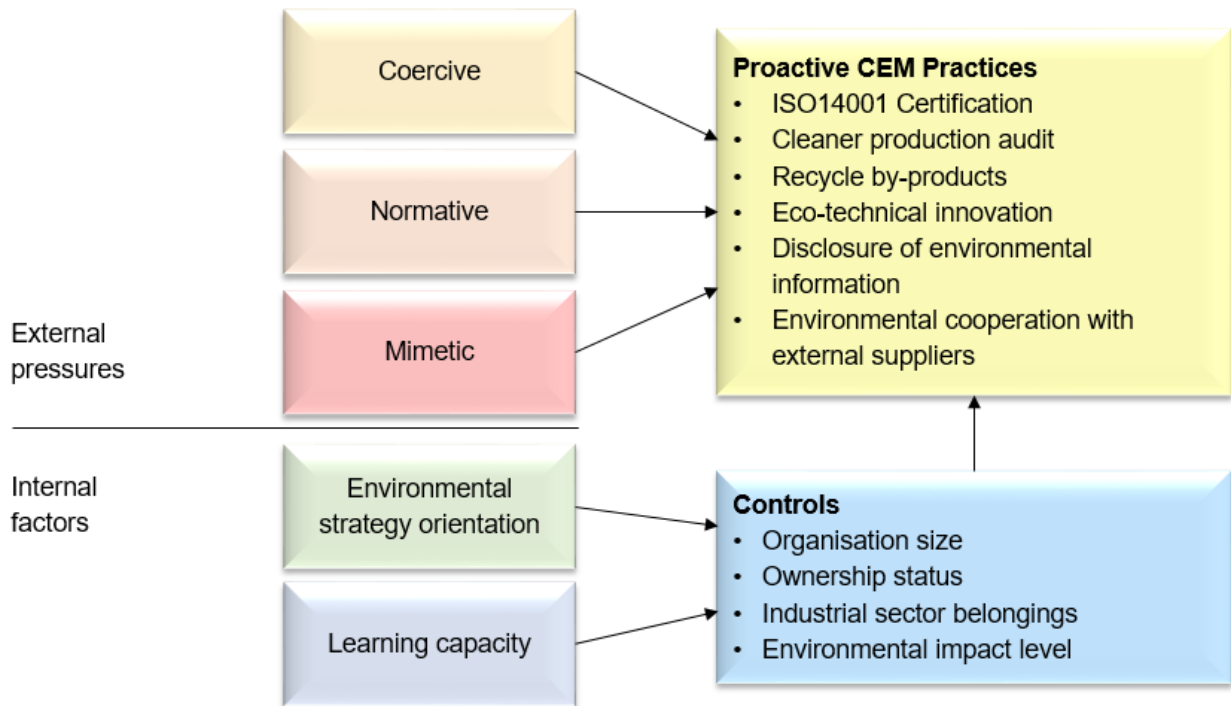
3.6 FACTORS AFFECTING ENVIRONMENTAL SUSTAINABILITY

The following section discusses the framework which outlines the factors for proactive Corporate Environment Management.

3.6.1 Analytical Framework and determinant factors for proactive Corporate Environmental Management

Epstein and Roy (1998) outlined environmental sustainability factors as corporate culture, competitive positioning and environmental performance.

Figure 3.1: Analytical framework and determinant factor for proactive Corporate Environmental Management (CEM).



Source: Liu, X., Liu, B., Shishime, Yu, Bi, and Fukitsika. 2010.

Liu, X., Liu, B., Shishime, Yu, Bi, and Fukitsika (2010:1709) proposed the following internal factors that affect environmental sustainability: learning capacity, environmental strategy orientation, coercive, normative and mimetic factors. Other factors from different authors are also discussed.

- **Learning capacity**

According to Liu et al. (2010:1710), a factor that is important in determining whether a firm is able to engage in sustainability initiatives is its learning capacity. Self-learning, education and training enhance the ability of employees to implement environmental initiatives (Liu et al., 2010). Sustainable development and human knowledge is inextricably linked. This nexus provides a platform to resolve corporate and environmental issues (Khare, 2005).

- **Environmental strategy orientation**

Liu et al. (2010) argue that attitudes and subjective norms lead to behavioural intention and willingness to pursue an environmental strategy.

- **Government and environmental agencies**

Organisations' implementation of ISO 14001 is necessitated by the pressure from government agencies and international environmental agencies. Governments may force compliance through offering incentives or announcing mandatory requirements (Liu et al. 2010). For example, Nike was criticised for causing pollution in local rivers and this forced the company to invest in sustainability initiatives (Henderson, 2015).

- **Environmental pressure groups**

This pressure comes from environmental lobby groups and individuals who may file lawsuits against a company's products to force compliance (Liu et al. 2010). This could affect a company's image.

- **Competitors**

This pressure comes from leading companies in an industry that might be the first to adopt new technology, processes and ideas. In order to match competitors performances, companies are likely to imitate leading companies' standards in their industry (Liu et al. 2010).

- **Corporate Culture**

According to Epstein and Roy (1998:287), successful environmental sustainability in an organisation is determined by the corporate culture that the organisation aims to preserve. There is a need for the transformation of behaviour, as well as of industry technologies and structures (Kaggwa et al., 2013).

- **Environmental Performance of Business Units and Facilities**

Corporate environmental performance is also affected by the age of their manufacturing machinery (Epstein and Roy, 1998:287). If the machinery is old, there is bound to be more pollution and waste. Abubakar (2014:34) identified government regulations, involvement of top management, company reputation, stakeholder pressures, environmental standards, competitive pressures, resource depletion and low carbon economy as factors affecting environmental sustainability in the oil industry.

- **Human skills**

A study by Namuyondo (2014:47) on sustainability and oil exploration in Uganda shows that oil companies are more ready with qualified specialised work force.

- **Financial Investment**

Ecological improvements regularly require large amounts of financial investments and are normally regarded as high risk (Rademaekers, Williams, Ellis, Smith, Svatikova and Bilsen. 2012:16).The Green Economy Summit highlighted the fact that substantial growth in investment was necessary to achieve climate change mitigation (Kaggwa et al.2013).

- **Image**

Lyon and Maxwell (2008) link the growth of businesses to the production of ecologically friendly products. They elaborated by claiming that if an organisation's activities are environmentally friendly, this has the potential to attract better employees as they might want to be associated with a company that has a positive image.

3.7 ENVIRONMENTAL SUSTAINABILITY CHALLENGES

According to the Draft Energy Efficiency Strategy of the Republic of South Africa (2004:10), there are a number of environmental sustainability challenges which include; energy pricing, energy efficiency, knowledge deficiency, institutional thinking, resistance to change and lack of investment confidence. The installation of expensive machinery often leads to the achievement of high energy performance but, investors may not be willing to tie their investments up in projects that take time to realise profits (Draft Energy Efficiency Strategy of the Republic of South Africa, 2004:11). Bergh (2012) listed financial, economic, market, institutional, organisational, behavioural and technological factors as challenges that companies face in pursuing environmental sustainability.

3.8 ENVIRONMENT AND STRATEGY

Orsato (2006) argues that there is a need for organisations to align their business strategies with environmental strategies so as to avoid resource wastage. Orsato (2006:131) proposed four strategies that managers can use to be competitive. These strategies are; eco-efficiency, beyond compliance leadership, eco-branding and environmental cost leadership. According to Porter and Linde (1995), waste is the result of inefficient use of resources. Using the eco-efficiency strategy, businesses must use resources efficiently and this can fuel innovation, leading to innovative business systems in organisations. Orsato (2006:132) posits that businesses that aim to reduce their environmental footprint must focus on the eco-efficiency strategy. According to Piasecki et al. (2009:104) cited in McKay and Khare (2005:III.59-60), planning an environment management strategy must include giving attention to the key issues stated below. These issues include strategically crafting environment sustainability into visions and policies, modifying staff functions so that they reflect the significance of the initiatives, instituting motivational

programmes for the business to get internal support and engaging with strategic, external stakeholders, who are crucial in achieving environmental sustainability (McKay and Khare, 2005).

3.9 BUSINESS RISKS OF NOT ENGAGING IN ENVIRONMENTAL SUSTAINABILITY

Berns, Townend, Khayat, Balagopal, Reeves, Hopkins, and Kruschwitz, et al. (2009) acknowledge that in the near future, business strategies will not succeed without incorporating sustainability and the threats of not acting firmly are increasing. Willard (2005:1) outlined risks associated with businesses that do not engage in environmental sustainability and these include:

“regulatory bans or restrictions on sales reduced market demand for product, customer boycott and reduced acceptance, expensive regulation-driven process changes, reduced process yields, pollution and waste treatment upgrades and competitive disadvantage from energy or material inefficiency.”

Pollard and Stephen, (2008) posits that it is so imperative to recognise the indivisibility of business risks from environmental risks and ecological sustainability from business sustainability issues.

3.10 SUMMARY

The fact that South Africa is the highest emitter of toxic gas in Africa and yet the country is doing little to curb the emissions is the main reason that oil companies have to increase their sustainability initiatives. Firms that engage in environmental sustainability enjoy a positive perception from their customers. Engaging in environmental sustainability is no longer a choice, as there are numerous risks associated with environmentally unsustainable practices such as boycott by customers as well as regulatory bans. The next chapter looks into the methodology applied in the study of factors affecting the sustainability of the downstream oil industry in Western Cape.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter provides an account of the methods used to conduct the study. It explains and justifies the research approach used by the researcher to conceptualise the factors that affect environmental sustainability in the downstream oil sector in the Western Cape Province of South Africa. The chapter identifies and elucidates the research methods used to collect data and the sampling criteria used to select the companies that were studied. Lastly, results of the study are presented.

4.2 OVERVIEW OF THE RESEARCH METHODS USED

The section explains how documents were analysed to support the view point of this study and justification of data analysis used.

4.2.1.1 *Document research*

The study focused on the following downstream oil companies: Sasol, PetroSA, BP, Chevron, and Engen. According to Saunders et al. (2009:258), documentary data includes written materials such as notices, correspondence (including emails), minutes of meetings, annual sustainability reports, diaries, transcripts of speeches and administrative and public records. The documents that were used in this study were published externally. They include sustainability reports, annual integrated reports, environment policies and corporate websites. Company documents published in the past five years were used in the study.

4.2.1.2 *Qualitative data analysis*

This chapter explains how the collected data was analysed.

4.2.1.3 *Qualitative content analysis*

Content refers to materials or publications that are in a document, while content analysis refers to the systematic analysis of material found in a message (Prasad, 2009:2). Written publications

like journals, letters, newspaper articles, online correspondence, symbols, television and radio constitute material can be used for content analysis (Prasad, 2008:3).Schreier (2012:3) cited in Cho and Lee (2014:5) explains that when using qualitative content analysis, the researcher's aim is to have an in-depth interpretation of the materials in a way that will answer the research questions. This is consonant with the researcher's design, which is a qualitative, descriptive study. The purpose of the study is to obtain a more concise and broad explanation of the circumstance or case, and the result of the analysis should be ideas explaining the circumstance or case (Elo and Kyngas, 2007:108). Heikkilä and Ekman (2003:138) cited in Cho and Lee (2014:6), explain that questions such as how, what and why can be best answered using qualitative content analysis.

4.2.1.4 Deductive or inductive content analysis

In situations where there has been no previous research dealing with observed facts, the best technique to use is inductive content analysis (Elo and Kyngas, 2007:107). A deductive approach is mainly used in situations where there is a need to develop a hypothesis to test a previous theory in a different environment or to compare environments (Elo and Kyngas, 2007:107). Researchers can use the deductive approach if the purpose of the study is to evaluate existing theory or retest subsisting data in an incipient environment (Cho and Lee, 2014:4). This study made use of the deductive approach. Factors that affect environmental sustainability have been identified in existing theory in contexts outside South Africa but there is a need to find out if those factors apply to the South African context.

4.2.1.5 Justification for using content analysis

The reason why little research has been conducted in South Africa, particularly in the oil industry, is because of the protectionist nature of oil companies. The oil industry, being a sensitive industry, has acted as a barrier to research. Companies, in trying to protect their images, resist being studied. A positive note is that oil companies are under constant pressure to report their activities and all the necessary information regarding their activities can easily be accessed through their published reports. According to Prasad (2008:7), both document analysis and content analysis techniques are non-reactive, which makes them suitable for research topics where sensitive data is difficult to access. One advantage of document analysis and content

analysis is their ability to take out undesirable interaction influences between participants and the researcher (Kondracki, et al., 2002 cited in Cho and Lee, 2014). Another advantage of using these methods is their flexibility, as data can be obtained from multiple sources while allowing the researcher to process large quantities of data.

4.4 CHOOSING THE RESEARCH DESIGN AND STRATEGY FOR THIS STUDY

The researcher used a qualitative, descriptive approach with the intention of allowing an intensive study of important themes. “*Descriptive design involves working through the texts with a deductively formulated category system and registering the occurrence of those categories, in a nominal way or in category frequencies*” (Mayring, 2014:12). Although factors that affect environmental sustainability have been proposed in contexts outside South Africa, there is a need to find out if these factors also apply in the downstream oil and gas industry in South Africa. In light of this, the qualitative, descriptive approach was most suitable for this study. Qualitative research seeks to understand the underlying motivations and reasons for a given situation (Hoepfl, 1997). According to Hancock, Ockleford and Windridge (2007:6), qualitative research often produces new ideas or hypotheses. The research problem is that business operations in the oil industry are largely considered to be environmentally unsustainable. In this regard, there is a need for researchers to acquire deeper insight into the underlying challenges. Qualitative research is useful in answering questions such as how, why and what, while quantitative research tends to be more appropriate when answering questions like how many and how much?

4.4.1 Justification for the chosen research approach

The researcher will acquire a deeper understanding of, and insight into, factors affecting environmental sustainability in the oil industry.

Environmental sustainability is a relatively complex research topic that requires a comprehensive understanding that can be obtained by using a qualitative research approach.

“The qualitative habit of intimately connecting context with explanation means that qualitative research is capable of producing well-founded cross-contextual generalities, rather than aspiring to more insubstantial de-contextual versions” (Mason, 2002:1).

4.5 RESEARCH METHODS

The research method used to gather data consisted of literature and documentary research.

4.5.1 Literature research plan used in the research

Table 4.1: Literature research plan used in this research

Parameter	Narrow	Wider
Subject area	<p>Environmental management in the downstream oil industry</p> <p>Corporate environmental sustainability in the downstream oil industry.</p> <p>Factors affecting environmental sustainability of businesses in the downstream oil industry.</p> <p>The link between environmental sustainability and company performance in the downstream oil industry.</p> <p>Challenges of environmental sustainability in the downstream oil industry</p>	<p>Environmental management</p> <p>Corporate sustainability</p> <p>Factors affecting environmental sustainability of businesses</p> <p>Link between environmental sustainability and economic performance</p> <p>Challenges of environmental sustainability faced by companies.</p>
Business sector	Downstream oil industry	Industries that produce significant carbon emissions and wastes
Period of publication	Last 10 years	Last 25 years
Literature output	Current books, journals, white papers, newspaper articles and correspondence. Sustainability reports, company websites, annual reports.	Books, journals, white papers, newspaper articles

4.5.2 Literature research process

The following process was used in the literature research:

- Downloading literature output relating to factors affecting environmental sustainability of the downstream oil industry.
- Categorising the extracted literature.
- Determining the final list of categories.

4.6 CRITERIA FOR CHOOSING COMPANIES

The companies used in the study were chosen on the basis of the quantity of barrels of oil they refine per day as well as their visibility of corporate reporting. The more barrels they refine, the more gases they emit and the more the environment is at risk. Five companies were chosen. The information regarding the quantity of barrels they refine per day was found in SAPIA's 2016 Annual Report.

**Table 4.2: List of oil refining companies in South Africa
Capacity (barrels per day)**

Refineries	1992	1997	2007	2010	2013	2014	2015
Sapref (BP and Shell)	120 000	165 000	180 000	180 000	180 000	180 000	180 000
Enref (Engen)	70 000	105 000	125 000	120 000	120 000	120 000	120 000
Chevref (Chevron)	100 000	100 000	100 000	100 000	100 000	100 000	100 000
Natref (Total)	78 000	86 000	108 000	108 000	108 000	108 000	108 000
Sasol	150 000	150 000	150 000	150 000	150 000	150 000	150 000
PetroSA	45 000	45 000	45 000	45 000	45 000	45 000	45 000
Total	513 000	651 000	708 000	703 000	703 000	703 000	703 000

Source: SAPIA 2016

4.7 SAMPLE SIZE

The research was based on five companies in the downstream oil industry in Western Cape.

4.8 VALIDATION

It is one of the responsibilities of the researcher to ensure that documents used in the research are authentic and have integrity (Mogalakwe, 2006:225). Multiple sources of data, including sustainability reports and corporate online articles were used to ensure validity.

4.9 CREDIBILITY

On the question of credibility, scholars posit that the documents consulted must be free from distortion (Mogalakwe, 2006:226). The documents used were prepared for the research purpose and were not subject to alteration. As only five companies were used, the only drawback was that of generalisation, because the downstream oil industry in South Africa encompasses an inordinate number of companies. This limitation is offset by the fact that the researcher chose the five biggest oil companies, which translates to the fact that the larger the quantity of oil that they refine per day, the greater the emissions and the greater the impact on the environment.

4.10 SIGNIFICANCE OF THE STUDY

This study provides managers with knowledge and understanding of the factors that affect environmental sustainability with the aim of improving their decision-making that will, in turn, reduce the impact of their operations on the environment. The knowledge will also help to improve the performance of businesses with regard to environmental sustainability. Businesses are in continuous search of methods by which their operations can become environmentally sustainable and enhance their overall business performance (Kleindorfer, Singhal, Luk and Wassenhove, 2005). If these factors are known, academics, research and business organisations can determine the efficacy of command and measures that can address these challenges.

4.11 ETHICAL CONSIDERATIONS

Saunders, Lewis and Thornhill (2009:183) define ethics as it relates to how the researcher's behaviour is acceptable to the participants in a research work. Saunders et al. (2009:184) state "*research ethics as relating to questions about how researchers formulate and clarify their research topic, design their research and gain access, collect data, process and store data, analyse data and write up their research findings in a moral and responsible way*". The

researcher used published company reports already in the public domain and did not need permission to access them. Data obtained from the published material was only used for academic purposes.

4.12 PRESENTATION OF RESULTS

The section below outlines the result of the study. The section begins by presenting factors affecting environmental sustainability in downstream oil industry in Western Cape. Secondly, the section discusses various initiatives undertaken by oil companies to address the factors. Lastly, strategies undertaken by oil companies to combat environmental degradation will be discussed.

Table 4.3: Factors affecting environmental sustainability of companies in the downstream oil industry in the Western Cape Province, South Africa

BP	Chevron	Engen	PetroSA	SASOL
1.Competitors	1.Regulations	1.Regulations	1.Regulations compliance	1.Regulations
2.Stakeholder engagements	2.Finance	2. Natural capital	2.Innovation, Research and Development	2.Financial capital (costs)
3.Research capability	3.Innovation	3. Technology	3.Technology	3. Research and development
4. Human skills	4.Human skills	4.Human skills	4.Human skills (Training)	4. Human skills
5. Low carbon economy	5.Climate change	5.Climate change	5. Climate change	5.Low carbon economy
	6.Renewable energy	6.Finance	6.Stakeholder engagements	6.stakeholders
				7.Climate change

4.13 INITIATIVES UNDERTAKEN BY DOWNSTREAM OIL COMPANIES IN WESTERN CAPE TO ADDRESS THESE FACTORS.

The section below discusses various initiatives undertaken by downstream oil companies in Western Cape to address environmental sustainability issues.

4.13.1 SASOL's initiatives to address the factors affecting environmental sustainability of downstream oil industry.

- **Legislation**

Although SASOL is involved in the transformation processes of the laws regarding the administration of air quality as an individual company, it also partners with BUSA, CAIA and SAPIA in the same regard. As a matter of transparency the company uses independent stakeholder engagement in its application process. It has also forged a partnership with the government of South Africa in order to explore other options for enhancing air quality. This involves carrying out research on the sustainability of offset programmes that could lead to reductions in emissions, while concurrently addressing social issues such as employment and economic development (Sustainable Development Report, 2013).

- **Financial capital**

Finance is a major factor affecting environmental sustainability at Sasol. As sustainability initiatives expand, so does expenditure on financing the process. Environmental financial obligations increased by R700 million from 2010 to 2011. In 2011 SASOL's total environmental expenditure was an estimated R1.5 billion. This figure includes an estimated R400 million used for operational expenditure. Capital projects related to environment expenditure amounted to R961 million and the utilisation of long-term environmental provisions which was R182 million (Sustainable Development Report, 2011).

- **Human skills**

According to its sustainability report (2011), SASOL believes that the challenge of climate change can be addressed through using skills in technology innovation. The company awarded bursaries in the area of environmental engineering to the tune of R3.85 million while sponsorships for environmental programs cost them R27 million. In its bid to invest in new energy, the company assigned R100 million to the New Energy business division (Sustainable Development Report, 2011).

- **Research and development**

SASOL believes that environmental sustainability should be spearheaded by research and development. The amount that the company invested in 2011 towards research and development was R1.1 billion. SASOL foresees expenditure relating to renewable and low carbon initiatives increasing sharply in the near future. In 2011, the company undertook numerous initiatives with the aim of combating carbon emissions and their related effects. From 2010-2013, SASOL spent R560 million on SASOL Synfuels, which is one of the company's low-carbon programs (Sustainable Development Report, 2011).

- **Low carbon economy**

As a way of moving towards low carbon economy, SASOL's main objective is to expand its gas-to-liquid (GTL) range of products. The company constructs a risk profile for projects exceeding R150 million and effects concluding funding solutions. Sasol uses a carbon calculator to evaluate the GHG track of all new programs. This allows program teams to input carbon costs into wholesale programme expenses. The company's C.E.O chairs the GEC committee, which is responsible for setting up environmental and climate change strategies. All programs relating to the environment and climate change are dealt with by this committee. This is intended to create organisation-wide cooperation, evaluation and designing a structure to allow wider support of programs being advanced by businesses. Another role of the committee is to drive the group and provide a path for issues relating to the climate and environment with the help of industrial experts (Sustainable Development Report, 2011).

- **Engagements**

Sasol has partnered with the SA Government at all levels in a bid to realise its aim of working as a team to improve the environment. This cooperation aims to build enhanced perception by the company of the government's goals, an acknowledgement by the government in respect of external factors faced by SASOL, acknowledgement by the Department of Environmental Affairs of SASOL's master plan, intended to effect adherence to regulatory requirements (Sustainable Development Report, 2011).

- **Climate change**

The involvement of top management is important for the attainment of environmental sustainability at Sasol. Top managers, including the CEO and GEC, are responsible for SASOL's strategy on climate change. Sub-committees and expert committees are responsible for providing ideas and advice to the CEO and GEC. The primary responsibility of the committee is to ensure that the company initiatives in response to climate change are incorporated into the core strategy of the company. The committee monitors its engagement with the government and other partners on issues relating to regulations and other climate change issues (Sustainable Development Report, 2013).

4.13.2 BP's initiatives to address the factors affecting the environmental sustainability of the downstream oil industry.

- **Stakeholder engagements**

In a bid to take advantage of collective efforts to reduce emissions in the sector, BP became a member of the Climate and Clean Air Coalition's Oil and Gas Methane Partnership. This constitutes part of its initiatives to cooperate with peers and external stakeholders, including governments and non-governmental organisations (NGOs) on an acceptable approach to combat methane emissions from oil and gas operations. External partners' capacity to perform is useful to the success of BP's initiatives. BP works with its partners in the supply chain for operational efficiency. The company cooperates with supply chain partners who share the same vision of ethical sustainability. The expectations and requirements for acceptable practices for its partners are incorporated into the company's Operations Management System (OMS). Apart from acquiring formal permits to operate, BP has to be accepted by the communities in which it wishes to operate. A company's success is based on whether communities offer to cooperate with them or not. Several of the company's operational activities might affect surrounding communities negatively and BP consults with communities on the likely adverse effects and possible solutions to combat those effects.

- **Lower carbon economy**

Investing in renewable energy is not only good for the environment but for the business as well. As the demands for a lower carbon economy are increasing, BP has been making frantic efforts to meet this demand by venturing into natural gas and other renewable energies.

- **Human skills**

One advantage of on-the-job training is that employees are tested in real life situations to gain experience. At BP industry experts work with graduate trainees for a period of 3 years during which they impart knowledge and expose trainees to areas that are critical to the organisation's success. The learner employees join the company in various departments and are rotated through different roles. During the period of training, the graduate trainees will acquire vast knowledge, practical experience, and technical skills within and outside the business (BP, 2017).

- **Research capability**

Innovation in technology for better production and fossil fuel use takes centre stage at BP. To achieve this, the company is involved within-house research and partnerships with individuals and academic institutions. In trying to augment its research capability, the company has been a supporting partner to Princeton University's Carbon Mitigation Initiative since 2000, the year in which the initiative was established. This initiative provides a platform for experts to design strategies that can be used to combat carbon emissions safely and effectively at lower costs. BP also partners with 15 universities through its Energy Sustainability Challenge, where studies are carried out on the effects of shortages of natural resources on energy supply and demand (BP, 2017).

- **Legislation**

Given that BP operates globally, it is exposed to different environmental regulations. BP's Operating Management System is designed to address and manage this complexity.

- **Emissions management**

Operational efficiency is at the centre of BP's initiatives to reduce GHG emissions that have adverse effects on the environment. In order to be accountable for its emissions, the company factors carbon cost into its investment decisions and operational strategies. The company recognises the role GHGs occupy in climate change and aims to manage its GHG emissions through operational energy efficiency, reductions in flaring and venting, and by factoring a carbon cost into its investment appraisals and engineering designs of new projects. BP also participates in global GHG reduction initiatives. The company reviews its emissions and assesses possible mitigation measures at a companywide level and provides guidance for its businesses to manage emissions in line with applicable local requirements. BP takes a holistic approach to its GHG management by tracking and understanding its Co2 and methane emissions.

4.13.3 Chevron initiatives to address the factors affecting the environmental sustainability of the downstream oil industry

- **Chevron's principles**

Chevron's performance with regard to the environment is governed by the company's 4 principles, which are:

- 1) Positioning the environment on centre stage when making decisions.
- 2) Minimising the company's environmental footprint.
- 3) Operating in a responsible manner.
- 4) Keeping the company's operational sites safe.

- **Regulations**

Various laws, international, local government and environmental, regulate different sections of the company. The regulatory requirements are ever evolving, from regulating how companies operate to how they sell their products. Laws regulating companies' carbon footprint continue to change at local and international levels (Annual Report, 2014).

- **Finance**

Chevron includes the costs incurred in complying with environmental regulations governing its operational performance in its overall business cost calculations. The company anticipates that these costs may have a positive impact on the results of operational performance, but does not foresee these costs having much impact on the firm's cash flow (Annual Report, 2014).

- **The Chevron Technology Ventures**

Chevron uses its Operation Excellence Management System (OEMS) to enhance its environmental footprint. Apart from the OEMS, the company also uses Environmental Stewardship (ES) to evaluate its vulnerability to threats and opportunities relating to the environment. Chevron audits its environmental footprint. This puts the company in a better position to make sound decisions on how to improve its operations with regard to the protection of the environment (Chevron, 2016).

- **Human skills**

Chevron believes that investing in its workforce is fundamental to supporting organisational capabilities as it helps to grow a pool of experts who are results oriented. The Chevron Way, which encompasses the company's vision, mission, processes and strategies, is used as the basis for recruiting and developing the workforce. The company views its 58 000 strong workforce as an essential part of the firm's success. The company commits itself to meeting the employees' needs, which includes the development of their careers and expertise. With this in mind, the company keeps an open communication system with its employees. This is essential for motivation and achievement of the company's goals (Chevron South Africa, 2017).

- **Renewable energy**

According to Chevron, its renewable energy technologies are integral part of leveraging the firm's strengths and can be used for competitive economic returns. Chevron's endeavour to develop renewable energy alternatives is enhanced through engagement with government and academic institutions on renewable energy research and development. The company's renewable energy technologies include bio-fuels, wind power and solar energy. These developments are

supported by a strong engagement with academics and governments on researches relating to developing renewable energy. The company shares its resources with its partners in order to advance technology that can lead to more renewable energy in the future (Chevron South Africa, 2017).

- **Corporate reporting**

The literature gathered in this study shows that corporate reporting is a push factor that compels firms to engage in environmental sustainability. Chevron complies and reports on its environmental sustainability efforts. The company reports information about its environmental initiatives and footprints on emissions through the Carbon Disclosure Project. The Carbon Disclosure Project works with corporations to disclose carbon emissions through the provision of a system that assesses and shares important environmental information and measures companies' transparency in reporting carbon emissions. In 2015 Chevron got 99 out of a 100 on CDP analysis, thereby becoming the top company in the world with regard to carbon emissions (Chevron South Africa, 2017).

4.13.4 Engen's initiatives to address factors affecting the environmental sustainability of the downstream oil industry

- **Data management**

Data quality influences decisions that are made, and to a greater extent, the success of achieving the company's goals. In a bid to ensure a high quality of data, Engen has been conducting audits and independent assurances to test for shortcomings in its control mechanism, which then enhances the reliability of the data. Engen has realised positive results from these efforts and it is now a member in the initial stage of the carbon emission targets submissions, with the programme that will run until 2020 (Engen Integrated Report, 2015).

- **Legislation**

The installation of Engen's Vapour Recovery Unit at all its plants enabled the company to align itself with environmental legislation. Engen anticipates the value brought by being involved in voluntary carbon reduction initiatives as shown by its involvement in the voluntary carbon

budget programme spearheaded by the South African Department of Environmental Affairs. According to the company's integrated report (2015), this program will run until 2020 and the Department will allocate carbon emissions targets to companies participating in the programme. The companies will then report back on the progress they would have made in meeting the targets. This programme's main purpose is to determine the influence of the system. The results will then be used for the second phase of the programme scheduled to commence after 2020 (Engen Integrated Report, 2015).

- **Technology**

Availability of water is an important factor in the production of oil, as oil refineries consume vast quantities. Engen operates in areas where water is not easily available, hence the need to develop an adaptation strategy. In light of this, the company has introduced water saving strategies at its Durban refinery (Engen Integrated Report, 2015).

- **Human skills**

The evidence gathered from the document analysis shows that Engen acknowledges and values the importance of an expert workforce in spearheading technology and innovation in environmental sustainability. In the years 2012, 2013 and 2014, the company invested in employee development through training, which benefited 60% of the total workforce. In 2015, Engen launched the Operation Academy that equips the company to evaluate and enhance its principal operational competencies. The introduction stage of this initiative involves training managers and supervisors on how to evaluate employees against expected capabilities. The company's 2015 integrated report shows that more than 100 managerial employees have been up-skilled with a quarter of them being accredited as master assessors (Engen Integrated Report, 2015).

- **Climate change**

Potential climate change effects such as flooding, insufficient water supply for operations, severe storms, increased vulnerability to diseases and interruption of the supply chain are considered as risks to business. Weather related incidents can have a significant, negative impact on the company as they can cause the loss of assets and revenues. As the topic of climate began to

gather momentum in 2014, the government proposed new laws, which include the declaration of greenhouse gases (GHG) as a priority air pollutant, carbon budgets and desirable national emission reduction objectives. Due to this development, Engen was forced to assess its strategy on the administration of climate change and energy programs. Another measure that might have a significant, direct impact on company operations is the proposal for carbon tax by the government. This tax will impose more costs on fossil fuel use, particularly at refineries. The implementation of this tax might not yield the desired result as companies will pass the costs on to the consumers (Engen Integrated Report, 2014).

- **Finance**

In 2012 Engen invested R250 million in refining. The company increased its funding towards the refinery to the tune of R800 million in 2013. According to the integrated report (2012-2013), the company's capital expenditure at the refinery focuses mainly on the environment, apart from other obligations (Engen Integrated Report, 2012-2013).

4.13.5 PetroSA's initiatives in addressing the factors

- **Regulations compliance**

In order to ensure the highest corporate governance standards, PetroSA's board of directors ensures that the company subscribes to the King William III Report on good corporate governance. The company also subscribes to good corporate governance principles as outlined in the amended Public Finance Management Act 1 of 1999 and the companies Act 71 of 2008 (as amended). The annual Corporate SHEQ Management Plan outlines that the Corporate Safety, Health, Environmental, Quality and Security Department must administer and evaluate corporate performance, internal audits and monitoring.

- **Innovation, Research and Development**

PetroSA partnered with the University of the Western Cape to create the PetroSA Synthetic Fuels Innovation Centre (PSFIC) at the institution in 2010. The two main purposes of the partnership are to develop the Conversion of Olefins to Distillates (COD) technology for the company and develop industry experts for South Africa (Annual Report, 2013). To show its

commitment to this initiative, the company signed a R36 million sponsorship agreement with the university to fund the project (PetroSA, 2017).

4.13.5.1 TECHNOLOGY

- **The G-T-L technology**

PetroSA's management strategies with regard to the environment are enhanced by its technology, which is used to lower the effects of the company's operations on the environment. The company was the first in the world to introduce the gas-to-liquids refinery that produces one of the cleanest fuels in the world using processes that are environment friendly (PetroSA, 2017).

- **The Conversion of Olefins to Distillates(COD) technology**

The company's COD technology generates lower aromatic content fuels and solvents for indoor use and biodegradable fuels. These products are regarded as the cleanest on the market due to their environmentally friendly qualities (PetroSA, 2017).

- **Fischer Tropsch technology**

Apart from the COD technology, PetroSA uses the Fischer Tropsch technology, which converts methane-rich gas into ultra-clean, low-sulphur, low-aromatic, synthetic fuels and high value products.

- **Climate change**

In a bid to address climate change concerns, the company adopted a climate change statement that compels the company to make efforts to curb GHG emissions caused by its operations. In the future the company is going to use a carbon footprint calculator it developed to budget and measure its GHG reductions. The company developed a Co2management strategy that will enhance how the company manages its carbon emissions in the future. This demands determining and applying possible GHG emission mitigation opportunities and energy efficiency initiatives (PetroSA, 2013).

- **Human skills**

To ensure that the company is able to respond to risks as well as comply with legislation in 2014, PetroSA engaged in extensive training and awareness programmes for its employees. The company offers the Graduate-in-Training programme, which aims to train graduates in different divisions in order to equip them with practical skills that are needed in the company's operations (PetroSA, 2014).

- **Stakeholder engagements**

Long term sustainable growth as well as the achievement of long term goals is linked to how the company manages its stakeholders (Integrated Annual Report, 2014). The company recognises that stakeholders are critical for the achievement of strategic goals and long-term sustainable growth. PetroSA developed an integrated stakeholder engagement strategy guided by King III and the International Integrated Reporting Council (IIRC). Input was also sought from senior management and the Social and Ethics Committee of the PetroSA board of directors (the Board). Alignment with all stakeholders on the Environmental Impact Assessment process (EIA) has begun (Integrated Annual Report, 2015). In 2014 PetroSA conducted a survey to determine how the community perceived the company. The results of the survey showed favourable results on the company's relationship-building drive. More than 70% of the people interviewed in the Eden District Municipality area perceived PetroSA positively, up from 69% the previous year. Most employees interviewed showed a general satisfaction with the company's performance in a variety of areas, mainly its support of transformation initiatives (PetroSA, 2014).

Although companies are required to obtain a licence to operate, they must also acquire an informal approval from the communities in which they seek to operate. If communities do not approve companies' operations, it will be difficult for the companies to operate successfully in those areas. In a bid to win community support, the company created the community stakeholder forum in Mossel Bay as a way of creating a platform of mutual interest between the company and the community on a wide range of issues. Issues discussed on this platform are job opportunities for the locals, training and empowerment of local businesses (PetroSA, 2014).

4.14 STRATEGIES BEING UNDERTAKEN BY DOWNSTREAM OIL COMPANIES IN WESTERN CAPE TO ADDRESS FACTORS AFFECTING ENVIRONMENTAL SUSTAINABILITY.

The section explains various strategies being undertaken by downstream oil companies in the Western Cape to address factors affecting environmental sustainability.

4.14.1 SASOL Strategies

- Incorporating sustainability into the company's core activities.
- Consulting with the government regarding legislations on air quality.
- Undertaking initiatives aimed at addressing climate change.
- Incorporating sustainability into the company's product range.
- Aligning the management of its product offering with international obligations.
- Integrating sustainability into the vision and mission.
- Investing in renewable energy.

Improvement on carbon emissions can only be possible if companies benchmark their performances with their own previous performance. SASOL periodically assesses its emissions targets in a bid to find ways to lessen its carbon footprint.

- **Investing in energy efficiency and innovation**

SASOL works with host governments' to find concrete and sustainable solutions to combat the risk of climate change and to enhance economic growth. The company also leverages its good practices to enhance its operational efficiency and plant maintenance. In driving energy efficiency improvements across the group, the company is continuing its focus on raising awareness, improving practices to maximise operational energy efficiency and enhancing plant stability. SASOL also works with its host governments to find practical and sustainable solutions to mitigate climate risk, while balancing economic development and growth drivers. The company has also issued new sets of GHG mitigation targets for its South African and international operations. In light of this, SASOL has updated its energy efficiency targets.

- **Participating in climate change policy processes**

PetroSA admits that most of its GHG emissions occur in South Africa and that the company continuously engages in government policy activities relating to climate change mitigation. According to Sasol, a good environmental policy should be able to reduce the carbon intensity of the economy while also taking into cognisance the socio-economic impact of such policies.

4.14.2 BP strategies

Below are the strategies the company is undertaking to address factors affecting environmental sustainability in the downstream oil industry in Western Cape.

- **Incorporating sustainability into its portfolio**

BP has incorporated renewables into its portfolio in ways that allow sustainability to emanate from the core activities of the company. BP's portfolio includes oil, gas and renewable energy. This eclectic approach allows the company to meet increasing energy demands through a mix of fuels and technologies. This approach enhances the company's transition to a lower-carbon economy.

- **Tracking and understanding Co2**

Tracking emissions is important for control purposes in any oil company. At BP the company tracks its carbon emissions for the purpose of monitoring its progress on reducing its carbon footprint. The company understands the short and long term effects of its operations on the climate. As a way of keeping its records on emission intensity, the company tracks its GHG intensity.

- **Supporting research**

In order to better understand how technology is evolving, the company has been investing in start-up firms.

- **Engaging with external technology-focused entities.**

The data collected in the study shows that BP engages in regular and in-depth assessments of future innovation and has forged partnerships with innovation-focused organisations. The company's 'Technology Outlook' assesses how technology can enhance access to primary energy resources. It also explores how technology can be used to improve the power and transport sectors, particularly with regard to carbon emission mitigation (Sustainability Report, 2015).

4.14.3 Chevron's strategies

Below is an explanation of strategies Chevron is undertaking to become environmentally sustainable.

- **Investing in renewable energy and energy efficiency**

Chevron is one of the world's leading producers of geothermal energy. It supplies abundant, reliable energy to millions of people in Indonesia and the Philippines. The company also invests in energy efficiency technologies to improve the performance of its operations worldwide (Corporate Responsibility Report Highlights, 2014).

- **Incorporating environmental sustainability into of Chevron's values**

The company's commitment to protecting people and the environment, including developing energy safely and reliably, is ingrained in 'The Chevron Way' (Corporate Responsibility Report Highlights, 2014).

- **Include the Environment in Decision Making**

Chevron has developed tools for identifying, assessing and ranking emission reduction methods by integrating GHG factors into decision making and overall project development and management (Corporate Responsibility Report Highlights, 2014).

- **Alignment with environmental standards**

Chevron uses its Operational Excellence Management System (OEMS) to manage any potential impact from activities that may affect the environment. Through the application of its corporate processes and standards and its work with industry groups, the company's businesses identify meaningful information that enables them to prioritize and focus their continuous improvement efforts. The company's OEMS is aligned with ISO 14001:2004 and OHSAS 18001:2007, as well as with the Centre for Chemical Process Safety's *Guidelines for Risk Based Process Safety* (Corporate Responsibility Report Highlights, 2014).

4.14.4 Engen's strategies

Below are the strategies Engen is undertaking in its endeavour to become environmentally sustainable.

- **Values driven workforce**

The company's values, which include integrity, team work and performance, shape employees' behaviour. Apart from the company's values, employees must adhere to the PETRONAS Code of Ethics and Business Ethics (CoBE), which emphasises the need for each employee to maintain morality in their daily tasks.

- **Aligning activities with environmental legislation**

The completion of the Vapour Recovery Units (VPUs) at the company's facilities has enabled Engen to align itself with environmental legislation. VPUs reduce carbon emissions by recovering the gas that is discharged into the atmosphere.

- **Compliance with internal compliance standards**

In a move to improve its assurance systems, Engen undertook a systems audit that was completed in 2015. The main purpose of the programme was to ensure that all recommended mechanisms were applied equally in all sections of the company and that the conception of these mechanisms would be aligned in all sections (together with internal environmental compliance principles).

- **Participatory approach**

Engen continues to engage as a member of the Energy Efficiency Leadership Network (EELN), which builds on a commitment made by companies to the then Energy Minister in 2012. Companies promised to incorporate convectional energy issues into their decision making and operations. One of the high points of Engen's 2014 operational year was the signing of the National Business Initiative (NBI) agreement to be part of the Private Sector Energy Efficiency (PSEE) programme. This agreement calls for energy efficiency baseline studies to be conducted by PSEE at the NBI member companies with a view to implementing the Energy Management System (ISO, 50001), among member companies. Engen has become a participant in this programme, which is co-funded by the NBI. The baseline studies will cover office buildings, depots, terminals, the refinery, other operations and fleet management.

- **Benchmarking with international standards**

In order to keep up with international standards, the company calculates its carbon emissions using internationally recognised benchmarks and ideals to enable the reporting of data that is of a high quality.

- **Complying with legislation**

Engen manages its environmental footprint by conforming to relevant legislation, internal standards and accepted international standards. As the regulations change, the significance of complying with environmental legislation and ethical practices becomes more important. The continuous change in regulations compels the company to align its operations with legal requirements (Engen Integrated Report, 2014).

4.14.5 PetroSA's strategies

The following section explains the strategies PetroSA undertake to ensure environmental sustainability of its operations.

- **Incorporating environmental sustainability into the mission statement**

PetroSA provides hydrocarbons and related quality products through its widely proven technologies. This has been necessitated by the company's GTL technology, which has been widely approved to produce low-sulphur, low-aromatic fuels for the market.

- **Strategic innovative partnerships**

The company believes that strategic, innovative partnerships are important enhancers of collaborative research, development and delivery. New products, services, processes and developments are made successful through these strategic partnerships.

- **Introducing clean fuels through technology**

PetroSA's interest and participation in GTL.F1 is central to its growth strategy. The energy efficient Low-Temperature Fischer Tropsch Technology continues to attract interested clients and has become the focus of numerous studies during the past year. The GTL.F1 technology offering is proprietary, with only a limited number of individuals in the world having in-depth knowledge of the process. PetroSA has also seconded skilled individuals to support various studies and projects on a full-time basis to fast track the growth and transfer of this unique technology. PetroSA, together with its joint-venture partner, Air-Liquide, continues to focus on GTL.F1 research with a view to continuously improve the technology, both locally and abroad.

- **GTL technical expertise**

Expertise is an important ingredient for a company to enhance its operational capabilities. PetroSA, as the pioneer of GTL technology, signed a consultancy agreement with a North American GTL project developer to offer support and expertise. The agreement shows the company's commitment to GTL technology within its operations as a basis for transition to low emissions operations.

- **Involvement of top management in sustainable initiatives**

Top managers at PetroSA spearhead the company's sustainability initiatives. The board of directors have an important role in ensuring that the company is perceived as a responsible

corporate citizen in mitigating the effects of company operations on communities and the environment in which it operates.

4.15 SUMMARY

This chapter presented a discussion of the research methodology that informed the study. It went on to outline the research design and strategy as well as the data analysis method informing the study. The chapter also justified its choice of research approach in light of the study's objectives. It further identified the companies the researcher studied as well as the selection criteria. Lastly, the results of the study were presented. The next chapter discusses the findings of the study and conclusion to the research.

CHAPTER FIVE

FINDINGS AND CONCLUDING REMARKS

5.1 INTRODUCTION

This chapter summarises the key findings of the study. It discusses the major lessons learnt and provides recommendations. Firstly, the researcher compares the findings in the downstream oil industry in South Africa with what has been proposed by different studies in the body of literature that was reviewed. The chapter ends by providing recommendations that can be used by managers of oil companies to improve environmental sustainability of the downstream oil industry in South Africa.

5.1.1 Factors that affect environmental sustainability of downstream oil companies.

The study indicates that most factors that affect environmental sustainability of various industries outside the South African context are also evident in the downstream oil industry in South Africa. These factors are: regulations (Liu et al., 2010; Henderson, 2015), human skills (Namuyondo, 2014; Liu et al., 2010; Khare, 2005), environmental pressure groups (Liu et al., 2010), corporate culture (Kaggwa et al., 2013; Epstein and Roy, 1998) and financial investment (Rademaekers, 2012; Kaggwa et al., 2013). The study result also shows that factors which include; low carbon economy, climate change and renewable energy also affect the environmental sustainability of downstream oil industry in Western Cape, South Africa. Factors more prevalent to the unique contextual factors include; stakeholder management, research capability, financial investment and human skills.

5.1.2 Initiatives being undertaken by downstream oil companies to address environmental sustainability.

The following section explains the initiatives being undertaken by downstream oil companies to address environmental sustainability.

- **Capacity development**

Literature points out that self-learning, education and training enhance the ability of employees to implement environmental initiatives and solve environmental issues (Khare, 2005; Liu et al., 2010; Lyon and Maxwell, 2008). The study's results indicate that most companies in the downstream oil industry in South Africa are engaging in a number of initiatives, which include training and awareness programs to enhance their employees' learning capacity. For example, SASOL believes that environmental sustainability can be addressed through harnessing skills in technology innovation. Consequently, it has been involved in a number of training programs for its employees. Similarly, BP, Chevron, PetroSA and Engen have also been up-skilling their workforce in a bid to enhance their capacity to handle sustainability initiatives, as well as expand their knowledge base. New knowledge is necessary to spearhead innovation associated with environmental sustainability.

- **Legislation**

Governments may force compliance through offering incentives or announcing mandatory requirements (Liu et al., 2010; Abubakar, 2014:34). While Sasol complies with all legislation enacted by the government, the company also engages in voluntary emission reduction initiatives. This involves carrying out research on the sustainability of offset programmes that lead to reduction in emissions while concurrently addressing social issues such as employment and economic development. BP uses the company's OMS to comply and manage the environmental regulations while Engen uses its technology, the Vapour Recovery Unit, to align itself with environmental legislation. PetroSA's board of directors ensure that the company complies with environmental legislation by adhering to the King William 3 Report on good corporate governance. The company also engages in internal and external audits of SHEQ Management Systems for certification. As a result, the company has internal and external legal compliance audits.

- **Climate change**

The results of the study indicate that climate change is a factor affecting the environmental sustainability of the downstream oil industry in South Africa. SASOL uses its top managers,

including the CEO and GEC, for the company's strategy on climate change. This helps to instil commitment in lower management as the highest decision making body spearheads the climate change initiatives. Engen on the other hand, periodically assesses its strategy on the administration of climate change and energy programs to evaluate the impact of the strategy. PetroSA has adopted a climate change policy statement that compels the company to make efforts to curb GHG emissions caused by its operations.

- **Low carbon economy**

Abubakar (2014:34) posits that low carbon economy is a key factor affecting environmental sustainability. This study's results show that the need to move to a low carbon economy compels companies in the downstream oil industry in South Africa to engage in environmentally sustainable initiatives. As a way of moving to a low carbon economy, SASOL's main objective is to expand its GTL range of products. The GTL technology produces the cleanest fuels on the market. BP has been making frantic efforts to meet the demand for cleaner fuels by venturing into natural gas and other renewable energies. By the end of 2016 the company had invested \$300 million in emerging technology companies – of which a substantial amount was dedicated to low carbon solutions.

- **Research and development**

The findings of the study show that companies in the downstream oil industry in South Africa have been making substantial investments into research and development in a bid to become environmentally sustainable. For example, SASOL believes that environmental sustainability is spearheaded by research and development. From 2010-2013 SASOL spent R560 million on SASOL Synfuels, this is one of the company's low-carbon programs. Innovation in technology for better production and fossil fuel use also takes centre stage at BP. To achieve this, the company is involved in in-house research and partnerships with individuals and academic institutions. Similarly, Chevron's endeavours in the renewable energy arena are enhanced through their engagement with government and various academic institutions in renewable energy research and development. This development is supported by strong engagement with academics and governments regarding research related to developing renewable energy.

- **Stakeholder management**

The evidence emerging from the study shows that stakeholder management also affects environmental sustainability of downstream oil industries in South Africa. SASOL has partnered with the South African government at all levels in a bid to consolidate its aim of working as a team to improve the environment. In a bid to make use, and take advantage, of collective efforts, BP became a member of the Climate and Clean Air Coalition's Oil and Gas Methane Partnership as part of its effort to cooperate with external stakeholders,(who include governments, non-governmental organisations and its peers), on an accepted perspective to combat methane emissions from its oil and gas operations. PetroSA recognises the importance stakeholders towards the achievement of its strategic goals and long-term sustainable growth. In light of this, PetroSA developed an integrated stakeholder engagement strategy guided by the King III report, the International Integrated Reporting Council (IIRC), senior management, as well as the Social and Ethics Committee of the PetroSA Board of Directors.

- **Finance**

The findings of the study indicate that finance affects environmental sustainability of downstream oil industries in South Africa. Vast sums of capital are needed to finance environmental sustainability initiatives that include acquisition of plants, training programs, research and development and awareness campaigns. In 2011 SASOL spent more than R1 billion on researches and development. Over the past decade the company spent approximately R20 billion on environmental initiatives. The same applies to BP, which invested R3.3 billion on technological innovation, (with half of the amount focusing on low carbon solutions), by the end of 2016. Notably, in 2010, PetroSA put R36 million into a research and development partnership with the University of Western Cape.

5.1.3 Strategies being undertaken by downstream oil companies to address environmental sustainability.

Researchers have proposed strategies that managers can pursue to become environmentally sustainable. These strategies include strategically integrating environment sustainability into visions and policies; modifying staff functions so that they reflect the significance of the

initiatives; motivational programmes for the business to gain internal support; engaging with strategic external stakeholders who are crucial in achieving environmental sustainability (McKay and Khare, 2005). Other strategies proposed by researchers include: environmental cost leadership; eco-efficiency; beyond compliance leadership and eco-branding. It is important in this study to find out if these strategies also apply to the downstream oil industry in South Africa.

Several scholars have argued that planning an environment management strategy must pay attention to strategically crafting environment sustainability into visions and policies (Piasecki et al. 2009:104 cited in McKay and Khare, 2005:III.59-60). The study's findings show that incorporating environmental sustainability into the vision, portfolios and decision making processes is a strategy that companies undertake in the downstream oil industry to become environmentally sustainable. Sasol's strategy involves incorporating sustainability into the company's core activities. The importance of incorporating renewables into the portfolio is that it shows how committed the organisation is to sustainability issues. BP's portfolio includes renewable energy so as to transition to a low carbon economy. Ingrained in 'The Chevron Way' is the company's commitment to protecting people and the environment, which includes producing energy safely and reliably. Chevron has developed tools to identify, assess and rank emission reduction methods; conduct economic analyses and integrate GHG factors into decision making and overall project development and management. On the other hand, PetroSA provides hydrocarbons and related quality products by leveraging its proven technologies and harnessing its human capital for the benefit of all its stakeholders. BP factors a carbon price in its investment and engineering designs.

The study's results theorise that the transition to a sustainable environment in the downstream oil industry in South Africa involves adopting innovative steps as well as eco-efficiency initiatives. In driving energy efficiency improvements across the group, SASOL is continuing its focus on raising awareness and improving practices to maximise operational energy efficiency and plant stability. BP undertakes periodic and thorough reviews of potential innovations and collaborates with external technology-focused bodies. Its 'Technology Outlook' examines what technology can do in terms of access to primary energy resources and how it might change the power and transport sectors, especially in the context of reducing carbon emissions. PetroSA's GTL technology is the company's strategy to transition to environmental sustainability through

offering cleaner and environmentally friendly products. To further reduce Volatile Organic Compound (VOC) emissions, Engen has installed Vapor-Recovery-Units (VRUs) at several of its operations. This helps to improve the company's material efficiency by capturing carbon that would have escaped into the atmosphere.

The study's results also indicate that companies in the downstream oil industry in South Africa engage with stakeholders as a strategy to become environmentally sustainable. PetroSA believes that strategic, innovative partnerships are important enhancers of collaborative research, development and delivery. Research is necessary to come up with ways to reduce environmental degradation. New products, services, processes and developments are made successful through strategic partnerships. Engen also engages as a member of the Energy Efficiency Leadership Network (EELN), which is built on a commitment made by companies to the then Energy Minister in 2012. BP believes that stakeholder engagement is the key to a low carbon economy. Chevron uses its Operational Excellence Management System to foster communication and engagement with stakeholders like communities and regulatory authorities to address sustainability concerns.

The findings of the study also show that companies in the downstream oil industry in South Africa have gone beyond complying with regulations to foster environmental sustainability. For example, Sasol engages in voluntary emission reductions such as undertaking research to find ways of reducing emissions. Such efforts include the expansion of its GTL technology. Top managers at PetroSA spearhead the company initiatives on sustainability. The board of directors has an important role in ensuring that the company is perceived as a responsible corporate citizen with regard to the effects of the company's operations on the environment and the community. In a bid to improve its assurance systems, Engen implemented a systems audit that was completed in 2015. The main purpose of the programme was to ensure that all recommended mechanisms are equally applied in all sections of the company together with internal environmental compliance principles.

The success of Chevron's Operational Excellence (OE) is based on the company's leadership. From setting objectives and providing vision to leading by example, leaders motivate employees to achieve set objectives. They direct the Management System Process, setting priorities and

monitoring the progress of plans that focus on the highest-impact items. Leaders visibly demonstrate their commitment to environmental sustainability through personal engagement with the workforce and by showing concern for the health and safety of every individual. They demonstrate the same commitment to protecting the environment and work process risk mitigation.

At Engen, governance starts with board of directors, this is composed in accordance with the King Code of Good Governance. The Board ensures that the manner in which the company conducts its business meets the highest standards applicable to a company of its stature. Through the implementation of strict governance principles, the board optimises business performance while maintaining compliance with relevant regulations. The Board of Directors at PetroSA is mindful of the numerous and diverse economic, social and environmental issues that impact the organisation. They are mandated to monitor the way in which they contribute and challenge the sustainability of their business (PetroSA Annual Integrated Report, 2014). At Sasol, the chief executive officer and the group executive committee (GEC) are accountable for the company's climate change strategy. In this regard, they receive advice and assistance from various GEC sub-committees and specialist committees (see page 14). A dedicated project team steered by a mandating committee, under the leadership of a GEC member, is responsible for executing the climate change strategy. The committee ensures that the company's response to climate change is integrated into its core strategy. It also co-ordinates engagement with government and other stakeholders on regulatory and related climate change developments (Sasol Sustainable Development Report, 2013). All in all, the leadership of the company is expected to be at the forefront of sustainability initiatives so as to provide direction and inspiration to the rest of the staff. The findings of the study also show differences and similarities between different companies in the downstream oil industry in Western Cape Province. Below are the differences and similarities noted by the researcher.

- **Regulations**

Although all companies cite regulations as a major factor in environmental sustainability, the initiatives to address this factor differ from company to company. Sasol uses partnership as a way of addressing this factor. Sasol partners with other organisations like SAPIA and

government in administration of air quality. Engen is involved in a voluntary carbon budget programme spearheaded by the South African Department of Environmental Affairs in a move to reduce emissions. PetroSA's board of directors ensures that the company subscribes to King William III's Report on good corporate governance in a bid to comply with regulations relating to carbon emissions. Engen also uses its Corporate Safety, Health, Environment, Quality and Security Department to monitor if the company is adhering to environmental regulations. In my view, companies must use partnerships, voluntary carbon budget as well as subscribing to ethical standards in order to comply with environmental regulations.

- **Research**

Companies in the downstream oil industry in South Africa do make use of institutions of higher learning to advance innovation. Sasol, BP and PetroSA cite research and development as the solution to environmental issues in the oil and gas industry. For innovation, BP and PetroSA do in-house research and partner with academic institutions and individuals. BP partners with Princeton University's Carbon Mitigation Initiative to design strategies that can be used to combat carbon emissions. PetroSA also partnered with the University of Western Cape to develop technology that could be used to reduce carbon emissions in the oil industry. This involves a major injection of capital into the projects, with Sasol investing R1.1 billion towards research and development in 2011 and PetroSA injecting R36 million into the partnership.

- **Human skills**

All companies emphasise the use of human resources to address environmental sustainability issues in the oil industry. Most of the companies in the downstream oil industry in Western Cape use on-the-job training for employee development. BP and PetroSA introduced graduate traineeship as a way of equipping their employees with the practical skills needed in their operations. On completion, the graduates are deployed to strategic business areas that are key to business success. Sasol awarded bursaries in the area of environmental engineering so as to develop a skilled workforce, which is needed to combat carbon emissions and operating technology.

- **Climate change**

Climate change is one of the major factors affecting the environmental sustainability of oil companies in the downstream oil industry in Western Cape. PetroSA uses a climate change statement, which is a guideline that compels the company to make efforts to curb GHG emissions caused by its operations. SASOL uses engagements as a way of combating climate change. The company continuously engages in government policy activities relating to climate change mitigation.

5.1.4 Recommendations

- Companies must incorporate environmental sustainability into missions, visions and decision making process.
- Environmental sustainability initiatives must be well backed by financial investments.
- The top management must be at the forefront of leading environmental sustainable initiatives so as to inspire and impart confidence in the rest of the employees.
- Companies must improve their stakeholders' network so as to achieve environmental sustainability. This mainly involves partnering with institutions for research and development and governments for policy making and implementation.
- As the production of non-renewable energy is facing scrutiny due to its polluting nature, it is advisable for companies to find alternatives in the form of renewable energy.

5.2 Conclusion

The aim of this study was to identify factors affecting environmental sustainability of downstream oil industry in Western Cape. Based on this aim, factors affecting environmental sustainability in the oil industry in Western Cape as well as strategies to address the factors were discussed. One of the key lessons learnt from this research is that environmental sustainability must be incorporated into the vision, mission, strategies and decision making of oil companies in order to reflect the significance of sustainability issues in the company's strategy. This correlates with the findings of previous studies (Wills, 2009). According to IFC (2012), the long term

understanding of resource use and how stakeholders' needs are addressed, depends on the inclusion of sustainability into strategic decisions. The reason why firms have gone beyond compliance and incorporate environment issues into visions and missions is the need to align themselves with stakeholders' expectations and increasing scrutiny by environmental agencies and pressure groups (Garrod et al.1997, cited in Buysse and Verbeke, 2003:453).

Capital allocation decision processes must also include environmental sustainability so as to invest and realise associated benefits that include improvement of the image of the company as well as the lowering of risks associated with unsustainable practices. For example, SASOL is producing one of the cleanest fuels on the market due to its investment in GTL technology. According to General Foundation (2015:16), investing in sustainability drives product innovation and also reveals the quality of the company's resource efficiency. The result of the study by General Foundation (2015:16) indicates that complete inclusion of environmental factors into investment decisions transforms into favorable outcomes. A study by Khan, Serafeim and Yoon (2015:1) shows that firms that invest materially in sustainability enhance the value of their shareholders.

Top management must spearhead environmental sustainability initiatives. This can be done through establishing committees that deal with environmental sustainability issues in the company. For example, PetroSA's CEO and Group Executive Committee are responsible for environmental issues. This ensures that top management is actively involved in environmental issues and that it considers how these issues may affect the long term strategy of the company. It also ensures that sustainability issues are integrated into its core strategy, coordinating the company's engagement with government and other stakeholders on regulatory and related environmental sustainability issues. According to Epstein (2010:44), involving top management in sustainability annihilates disputes as they are settled at the top and are well collaborated into organisational systems.

Stakeholders are critical for the achievement of strategic goals and long-term sustainable growth. Oil companies must partner with governments in order to come up with regulations that enhance sustainable practices. Collaborating with research institutions on innovation and new technology is the key to reducing a company's environmental footprint. For example, PetroSA partnered

with the University of Western Cape in 2010 to develop the Conversion of Olefins to Distillates (COD) technology for the company. This partnership has also helped to develop industry experts in South Africa. COD technology produces fuels that have low content sulphur and aromatics. According to Spence (2011:8), sound corporate social responsibility (CSR) programs are enhanced by creating strong relationships with external stakeholders. *“Partnerships allow the full range of skills and capacities offered by governments, donors, private sector, SMEs, NGOs and communities to be used”*(Shaad and Wilson, 2009:24).

Companies must introduce renewable energy if they are to survive in the long run. The British government announced that it will phase out all petrol and diesel vehicles by 2040 (The Guardian, 2017), which means that the future of non-renewable energy is at risk. Chevron’s portfolios of renewable energy technologies include bio-fuels, wind power and solar energy. Other notable observations include the need to train employees so that they are skilled in environmental practices. Opportunities arise when firms trade in renewable energy. According to Shaad and Wilson (2009), there might be realistic business opportunities for using associated gas rather than flare gas. All in all, venturing into environmental sustainability should be a well thought process as it is no longer a voluntary issue, but can bring tangible business benefits.

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