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**Regulatory uncertainty and transport biofuels investments
in South Africa**

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Abstract

This paper investigates the impact of regulatory uncertainty on the development of the South African transport biofuels industry. A qualitative research methodology was used to study investor behavior in response to conditions of continued regulatory uncertainty. The sample included key members of the South African transport biofuels value chain, including; major oil companies, biofuels manufacturers and the applicable government agencies. The collected field data was analysed against literature on investments under conditions of uncertainty, the South African petroleum products pricing principles and global best practices in the transport biofuels sector. Amongst others, the results revealed that continued regulatory uncertainty impacts investor confidence negatively, delays investments and where investors have considerable market power, they do not conform to institutional pressure.

Keywords

Regulatory uncertainty

Transport biofuels

Biofuels investments

Institutional pressure

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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Glossary and abbreviations

E: Ethanol

B: Biodiesel

E5 or E10: Refers to 5% or 10% blending of ethanol with petrol

B2 or B5: Stands for 2% or 5% blending of biodiesel with fossil based diesel

Growers: Crop or feedstock farmers

Producers: Refers to biofuels manufacturers or processors

Blenders: Refers to the major oil companies – BP, Shell, Engen etc.

Biodiesel: Also referred to as non-synthetic diesel

Fossil fuels: Also refers to Mineral Fuels or Conventional Fuels

Gasoil: Fossil/Mineral/Conventional diesel

GDP: Gross Domestic Product

Mogas: Fossil/Mineral/Conventional petrol (also called Gasoil)

AvGas: Aviation fuel

Gashol: Ethanol mixed with petrol

DoE: The South African Department of Energy

NDP: National Development Plan

Transport biofuels: Also referred to as large scale biofuels investments

1 CHAPTER 1: INTRODUCTION TO RESEARCH PROBLEM

1.1 Introduction and Background

The use of biological matter as a source of fuel began when man discovered fire. Wood was the first biofuel (Biofuels International, 2011). The German inventor, Rudolf Diesel designed the first diesel engine to run on peanut oil. Henry Ford's Model T was initially designed to run on fuel derived from hemp, a high-growing variety of the Cannabis plant and its products, which include fiber, oil, and seed (Government of Canada, 2013). When oil was discovered in large quantities it became a cheaper source of fuel and led to the reduction of biofuels.

South Africa started blending biofuels in the 1920's by deriving ethanol from sugar cane and mixing it with petrol. Between the 1970's and early 1990's South African involvement in the further development of alternative fuel sources was largely in response to sanctions placed on the apartheid government (Blanchard, Richardson, O'Farrell, & von Maltitz, 2011). However, blending was stopped as cheaper oil based fuels made biofuels blending uneconomical (Pradhan & Mbohwa, 2014).

In recent years, the need to mitigate the energy crisis by increasing the energy mix with alternatives such as biofuels has become paramount.. Furthermore, biofuels have the potential to reduce South Africa's dependence on imported fuels and as well as reduce pollution levels in keeping with South Africa's international commitments to environmental protocols (Pradhan & Mbohwa, 2014)

From an economic perspective, key economic benefits include an increased number of jobs, rural development and economic growth. Given these economic imperatives and political will, the South African Cabinet approved the draft Biofuels Industrial Strategy of 2006. After wide public consultation, the National Biofuels Strategy was finalised and approved by Cabinet in 2007 (Blanchard, Richardson et. al, 2011). The strategy sets out a 2% penetration (or 400 million litres) to the current transportation annual national fuels volume. In support of these aspirations, the then Minister of Energy, Ben Martins, approved regulations which gave effect to the strategy and set the blending commencement date of 01 October 2015 (Department of Energy, 2015). The regulations were supported by existing biofuels incentives mainly in the form of tax benefits.

Despite the targets, published regulations and financial incentives, to date, South Africa has 200 small biofuels manufacturers that are focused in the non-transport market. There's a need for large-scale biofuels manufacturers to meet the 400 million-litre requirement for the transportation industry.

1.2 Defining Biofuels

Biofuels are made by converting organic organisms into fuel by extracting the energy content within them (Pieterse, 2013). Mineral fuels however are made from converting fossil matter such as crude oil and coal into the conventional petrol and diesel. There are three kinds of biofuels; first, second and third generations. The key difference between them is the feedstock or the input crops and the processing method used to generate liquid biofuels (Nigam & Singh, 2010).

1.3 First Generation Biofuels

The first generation of biofuels are popular and produced in large quantities across the world. They make up 85% of the biofuels liquid mix and are made from sugars, grains or seeds and generally require a simple process to convert them to liquid biofuels (Pieterse, 2013). The most common biofuel is ethanol made from sugar fermentation extracted from starch in corn kernels and other starchy crops (Nigam & Singh, 2010). In South Africa, the approved crops for bioethanol are sugar cane and beet. On the other hand, biodiesel is made from vegetable fats. In South Africa, the approved crops are sunflower, canola and soya beans. Useful by-products captured from the fuel production process are oil cake which is used for animal feed and glycerin which has multiple applications.

1.4 Second-generation Liquid Biofuels

These biofuels are less common and made from the cellulosic process or lignocellulosic biomass. They use the non-edible residue of food crop or the non-edible whole plant biomass such as grasses or trees (grown for energy production). The main advantage of the production of second-generation biofuels from non-edible feed-stocks is that it limits the food versus fuel competition associated with first generation biofuels (Nigam & Singh, 2010).

The complexity with second-generation biofuel however is that it requires more sophisticated processing production equipment calling for more investment per unit of production and larger-scale facilities to confine and curtail capital cost scale economies. To achieve the potential energy and economic outcome of second-generation biofuels,

further research and development effort is required.

1.5 Third-generation Liquid Biofuels

Thus where first generation biofuels put a strain on food and water resources, second-generation biofuels from non-food crop resolve some of these issues. However, there is concern over competing land use or required land use changes in both these classes. Third generation biofuels on the other hand, are made from microscopic organisms such as microbes and algae and thus are seen to resolve the land pressure issues associated with first and second generation biofuels (Nigam & Singh, 2010).

1.6 Differences: Biofuels and Fossil Fuels

In the context of this document, biofuels and fossil fuels fulfill the same purpose around transportation energy. However, there are noteworthy differences as captured in Table 1.1 below.

Table 1.1: Fossil fuels versus biofuels

Biofuel	Fossil Fuel	Differences	Produced From
Ethanol	Gasoline	Ethanol has half the energy mass of gasoline, but produces less carbon dioxide (CO ₂)	Mainly sugarcane, wheat & corn
Biodiesel	Diesel	Slightly less energy than diesel, but damaging to normal car engines	Mainly vegetable oil resources such as palm, sunflower, peanut, soybean
Biobutanol	Butanol	Biobutanol has less energy than gasoline	Same feed-stocks as ethanol, i.e. corn, wheat, beet, sugar
Methanol	Methane	Methanol has less energy content than methane but is in liquid form	Natural gas

Source: Pieterse (2013)

1.7 Uses of biofuels

The most commonly known use of biofuels is for transportation purposes in ordinary motor vehicles. The application extends to aviation and racing cars. From a non-transportation perspective, they are also used in the pharmaceuticals, beverage and food industries (Pradhan & Mbhowa, Development of biofuels in South Africa: Challenges and opportunities, 2014). Oil cake is the by-product of the soybean feed-stock (used in production of ethanol) and it's used as animal feed. Glycerol, a by-product of biodiesel production is used in pharmaceuticals, cosmetics, toothpaste, paints and other commercial products.

1.8 The South African Biofuels Strategy

The South African National Biofuels Strategy of 2007 states that for a pilot period of five years a two percent penetration level of biofuels in the national fuel supply or 400 million liters per annum must be achieved. The recommended blending is up to E2 for ethanol and up to B5 for biodiesel. The approved crops for ethanol are sugarcane and sugar-beet while sunflower, canola and soya beans are approved for biodiesel. The strategy targets new and additional land and proposes that basic food crops such as maize be excluded during the five-year pilot phase. Approximately 1.4% of arable land will be allocated out for this purpose out of the currently underutilised 14% (Department of Energy, 2007).

1.9 Benefits of the Biofuels Strategy

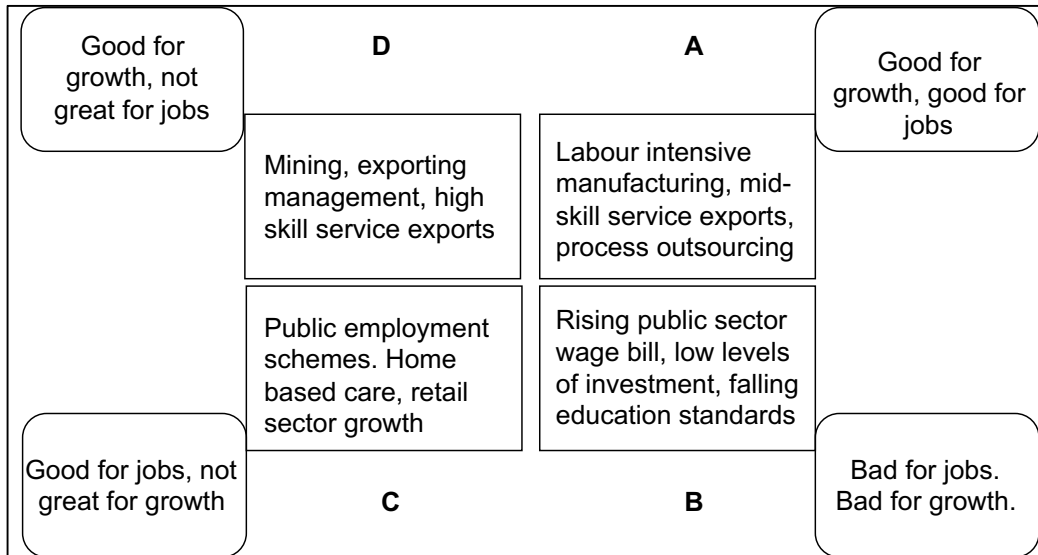
Consistent with the National Development Plan (NDP), the South African government claims that the key benefits of the biofuels strategy is to address issues of poverty, rural development and job creation. Ultimately addressing these issues will contribute to a more vibrant economy and respond to the global warming challenge as set by the Kyoto protocol (Department of Energy, 2014).

1.9.1 Job Creation

As at second quarter 2015, South Africa had 36 million people classified under working-age population. Of this universe, 15.7 million people are employed, 5.2 million unemployed and 15.1 million are not economically active. This results in an unemployment rate of 25.0%, labour absorption rate of 43.5% and labour force participation rate of 58.1% (Statistics South Africa, 2015).

To reduce poverty and eliminate inequality, job creation is very important and has been a key objective of the current government. Figure 1.1 below demonstrates a great model for how South Africa wishes to create jobs through the National Development Plan (NDP). The transport biofuels industry falls squarely in quadrant A.

Figure 1.1: The quandary of growth and job creation.



Source: National Development Plan Summary (2011)

To promote large-scale job creation, South Africa will have to focus on growing labour intensive sectors where she has a comparative advantage and improving her functioning of the labour market.

Biofuels industry contribution to the above NDP aspirations will be the delivery of 25000 jobs and therefore achieve a 0.6% reduction in unemployment.

1.9.2 Rural development

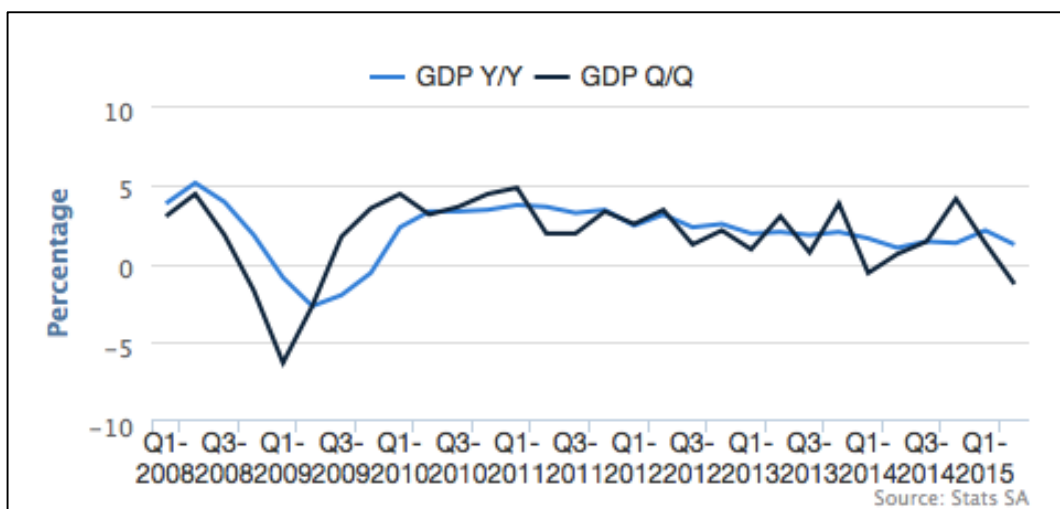
Another key goal of the NDP is to create an inclusive economy and promote rural development. The biofuel's industry contribution to the promotion of rural development is therefore through greater participation in farming by rural areas and agro processing during the manufacturing of biofuels.

1.9.3 Economy

Many South Africans do not participate in the economy as marked by the 25% unemployment rate. This figure continues to grow given current labour unrest in the mining industry and the depressed commodity prices.

Gross Domestic Product (GDP) as at second quarter of 2015 was standing at 1.5% quarter on quarter (Statistics South Africa, 2015). The graph in figure 1.2 below depicts the SA GDP growth rate over the last eight years.

Figure 1.2: SA GDP Growth



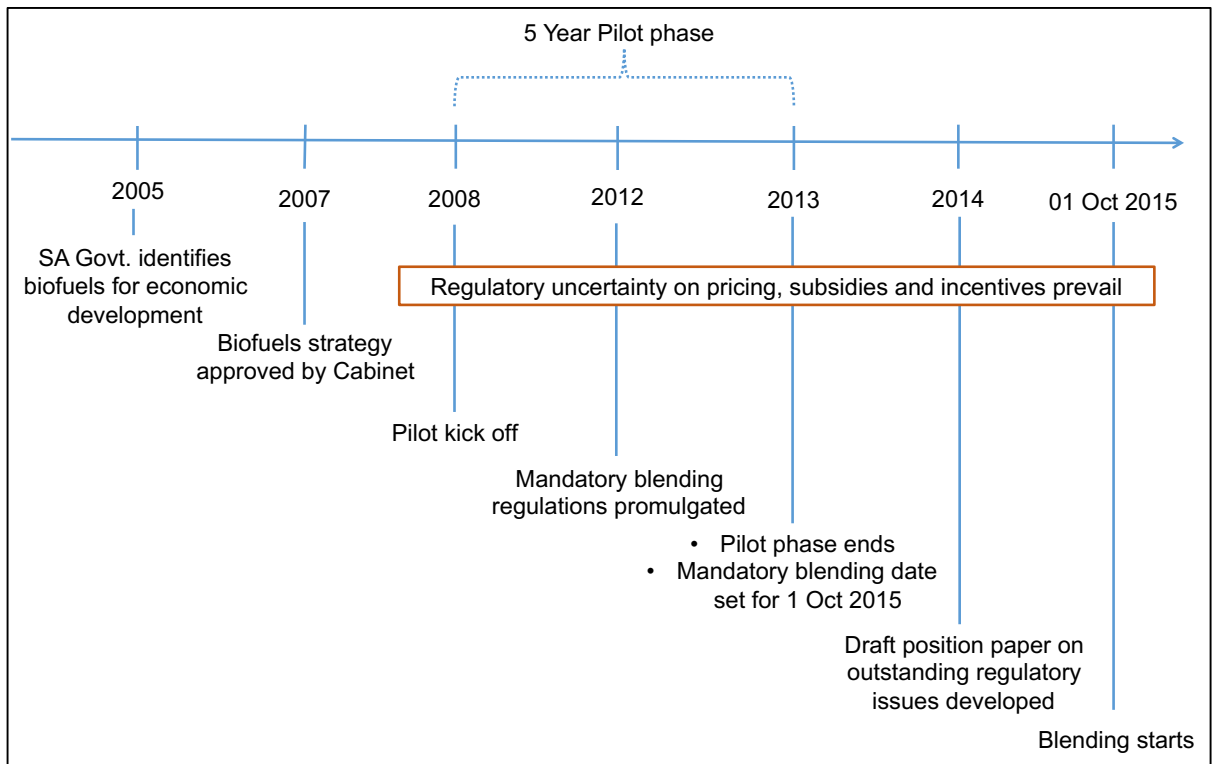
Source: Statistics South Africa

The biofuels industry will deliver 0,05% of GDP growth and savings of R1,7 billion in balance of payments. These are very important contributions to the NDP objectives.

1.10 Regulations

The South African petroleum industry is highly regulated. Initiatives in this environment must be matched by the requisite regulatory adjustments. Figure 1.3 below plots the development of the biofuels initiative and supporting regulatory framework (or the lack thereof on a time line).

Figure 1.3: SA biofuels journey



Adapted from Department of Energy (2014)

As Figure 3 shows, ten years ago the South African government acknowledged biofuels as a key project for economic development. When the biofuels strategy was approved by cabinet and the five-year pilot phase given the go ahead, key regulatory issues around pricing, subsidies and incentives were not in place and remain absent to date. This regulatory uncertainty is the key reason for the lack of material investments in biofuels (Department of Energy, 2014) .

It's worth mentioning that the Petroleum Pricing Act of 1977 currently allows for 100% tax exemption on bioethanol and 50% fuel levy rebate for biodiesel. Other incentives in the form of depreciation where all renewable energy projects (including biofuels) qualify for an accelerated depreciation allowance at a targeted decline rate of 50:30:20

per respective year over three years. Despite these incentives however, they have not been sufficient to kick-start material investment in transport biofuels. Only small scale biofuels manufacturers have currently risen to the opportunity.

Other outstanding regulatory issues concern the following and need to be conclusively finalised:

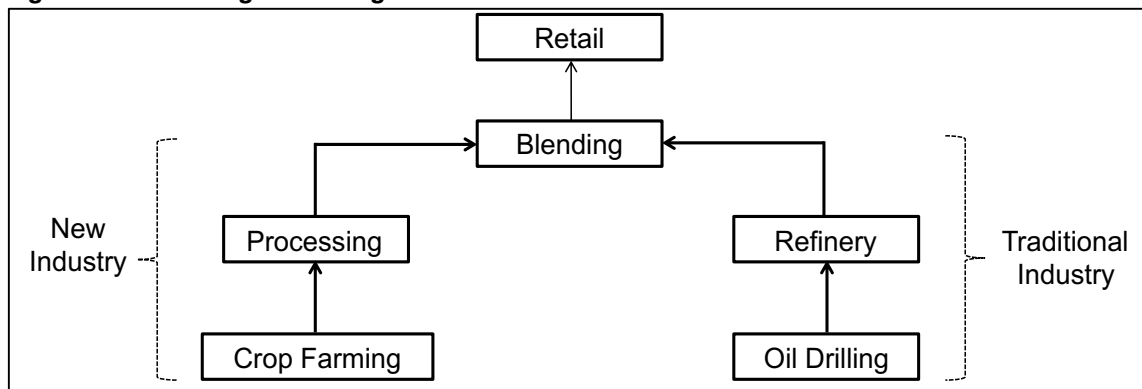
1. The location of blending - this could either occur at the refinery or at fuel distribution depot level. It is recognised that the refinery option would impose significant cost implications on the transportation of biofuels to the major refineries. It is thus broadly believed that blending will most likely be regulated to occur at the fuel distribution depot level.
2. As government will likely impose a fuels levy to subsidise the industry, the regulations will need to outline the administration and subsidy disbursement methodology that will be applied.
3. Equally important therefore, is the need for regulations that stipulate the criteria that will be applied for eligibility for subsidies.

The above regulatory concerns were supposed to be resolved by 01 October 2015. At the time of writing, these issues, they remain outstanding.

1.11 Key Challenge/ Research Problem

At the heart of the biofuels introduction conundrum (as reflected in Figure 1.4 below) are the yet to be fully understood macro and micro implications of merging this fledgling agro-based renewable fuels industry with the existing extensive, long established and nationally critical fossil fuel production and distribution mega-industry. Further, the rigorously defined and regulated rules of this current industry have set the precedent in terms of operating parameters and financial returns for investment. All costs are recovered through a long standing regulated margin and pricing framework. It is the little understood implications of these rules of the game and how they are set to drive investment decisions in biofuel operations that this paper seeks to explore.

Figure 1.4: Convergence of agro-based and traditional fuel industries



Adapted from the Department of Energy (2014)

There's no previous academic studies conducted to understand the effects of regulatory uncertainty on investments in the South African transport biofuels industry. The only material available is media statements and limited government documentation. Therefore, this study seeks to explore the subject from an academic perspective by identifying relevant theoretical constructs that are set to broaden perspective on relevant concerns.

Ultimately, the primary objective of the research is to understand the impact of regulatory uncertainty on investor behavior and the associated cost of the same uncertainty. Therefore, this is broken down into the following subsets:

1. The effect or impact of regulatory uncertainty on investor behaviour in relation to transport biofuels in South Africa
2. The cost of regulatory uncertainty

3. Other key factors relevant to the successful introduction and viability of a biofuels industry in South Africa.

1.12 Research Motivation

South Africa's current unemployment rate of 25% and low economic activity as indicated by the 2015 second quarter GDP growth of -1.5% (Statistics South Africa, 2015) clearly shows a need to address unemployment and low growth. Despite the regulations, financial incentives and clear targets from government, there has been low take-up of investment opportunities in manufacturing of transport biofuels processing plants and the associated broader value chain for the transportation sector.

Given the opportunities for economic growth, job creation, rural development, carbon emissions reduction as well as some incentives from government, the slow uptake of investment and lack of progress in the transport biofuels sector calls for deeper examination of underlying motivations and constraints.

1.13 Research scope

The research will be limited to:

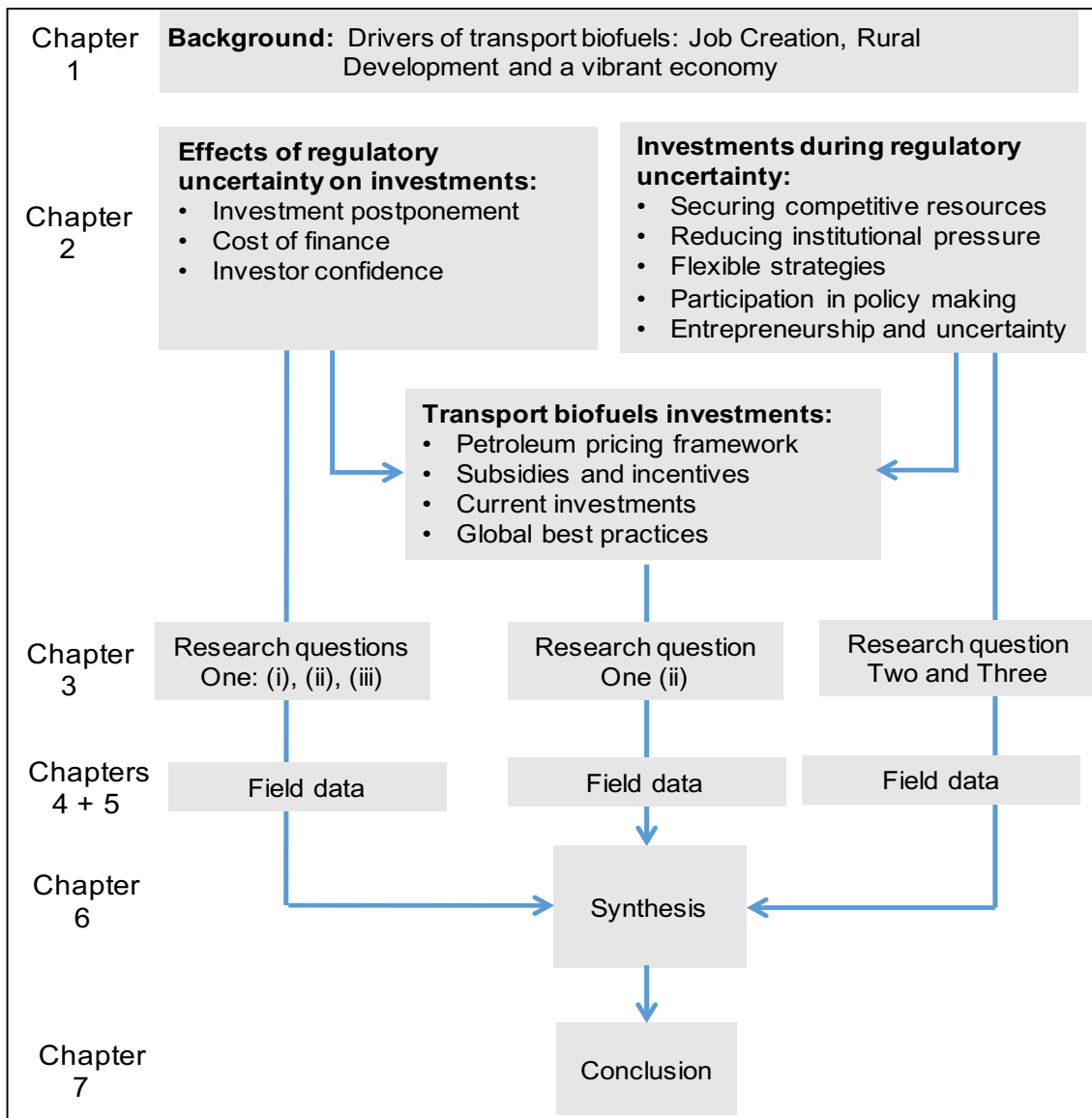
- Supply side measures related to biofuels investments in the South African context, specifically, regulatory uncertainty around subsidies and incentives.
- Key learnings from countries similar to South Africa where biofuels investments were successfully made

1.14 Structure of the report

Currently, government's key mandate is to create a vibrant and inclusive economy, as stated in the 2030 aspirations of the NDP (National Planning Commission, 2011). Amongst other things, this can be achieved through job creation and rural development. Investments in the transport biofuels in the South African economy is therefore a means to achieving the economic growth objective through job creation and rural development.

The structure of this document follows the above thinking as summarised in Figure 1.5 below.

Figure 1.5: Cohesion



1.15 Conclusion

This chapter introduced biofuels as an alternative and cleaner source of fuel. It also introduced South African biofuels industry, its intended role in the economy and how it fits within the broader National Development Plan aspirations. Regulatory and economic challenges leading to the implementation of the industry have been encountered and thus Chapter two seeks to examine the theoretical context of some of these challenges.

2 CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Chapter one reviewed the background behind biofuels and their role in the states programme to stimulate the economy and advance rural development. It further highlighted how biofuels will need to align within the traditional liquid fuels program and therefore inherent challenges associated with this goal.

The South African liquid fuels industry is regulated. All automotive fuel sector business streams must either adapt into the existing regulatory mould or be accommodated through the promulgation of new regulations and certainty thereof.

Therefore, chapter two reviews relevant theoretical aspects related to:

- Regulatory certainty and investor behaviour
- The regulated liquid fuels pricing mechanism
- Current investments in biofuels in South Africa under regulatory uncertainty
- Macro-economic impact of regulatory uncertainty, and;
- Finally review of global best practices on biofuels and benefits of a supportive regulatory framework

2.2 Regulatory Uncertainty

There are two types of uncertainties, a continuous and discontinuous uncertainty. An example of the continuous uncertainty is found on the stock market and refers to the ongoing inability to predict the price of shares. A discontinuous uncertainty on the other hand refers to temporary anticipated intervention in the business environment such as the introduction of a new regulation (Doh & Pearce II, 2004).

Regulatory uncertainty is a subset of an observed environmental uncertainty and is defined as the inability to foresee the future state of the regulatory environment (Hoffman, Trautmann, & Hamprecht, 2009).

2.3 Effects of Regulatory Uncertainty on Investments

Regulatory uncertainty has various effects on investments decisions. The most common being the creation of an incentive to postpone the investment. The ensuing section discusses the effects of regulatory uncertainty on the cost of credit as well as a firm's share price.

2.3.1 Investment Postponement

Uncertainty has received much scholarly attention within the field of management science. There appears to be a common understanding in the literature that its existence breeds inactivity. That is, when investors and organisations are faced with a condition of uncertainty they delay investment in long term capital commitments until more information arises (Marcus & Kaufman, 1986). This view is supported by Yang, Burns and Backhouse (2004), that although organisations need to adapt to their operating environment, uncertainty as part of the same environment has led to many industrial failures due to postponement by would be investors.

According to the real options theory, firms will delay capital spending in long term and irreversible investments particularly when there's enough uncertainty to guarantee that the delay might result in additional value for investors (Linnerud, Andersson, & Fleten, 2014).

The classical investment appraisal technique of Net Present Value (NPV) doesn't account for changes in the environment. That is, future cash flows are discounted today at a discount rate determined by the company. If the sum of these present values is positive, the firm implements the project. Where the NPV is zero, the firm is indifferent and may carry on with the project at its own discretion. In the event that it's negative, the project is abandoned. Real options theory on the other hand accommodates for future changes in the environment by affording management the flexibility to amend the project when new information arises. It is this flexibility in project appraisal that has lent the adoption of real options theory in projects under uncertainty. (Cesena, Nutale, & Davalos, 2013)

This theory was tested in Norway during a 12-year period of uncertainty when the Norwegian government was discussing the dynamics of the subsidy scheme for the country's renewable power generation programme. It was found that professional investors such as electricity corporations employed the wait and see approach whilst the non-professional investors such as farmers rushed to invest in the alternative power plants as if the investment opportunity was now or never (Linnerud, Andersson, & Fleten, 2014).

Contrary to real options theory, family owned firms which could be regarded as non-professional investors are more sensitive to uncertainty than non-family owned companies. Therefore, they also tend to delay their investment awaiting more information before embarking on an investment (Bianco, Bontempi, Golinelli, & Parigi, 2012).

2.3.2 Cost of Credit

Uncertainty has direct impact on the cost of finance. Financiers view transactions with regulatory uncertainty as high risk and reflect this in a relatively higher cost of credit or interest charge, ultimately leading to lower profits and constricted economic growth (Gilchrist, Sim, & Zakrajsek, 2010)

2.3.3 Share Price / Investor Confidence

Regulatory uncertainty has far reaching implications on the wealth of shareholders too. According to Pastor and Veronesi (2012) policy uncertainty on average has a negative impact on returns on the stock market. Larger policy uncertainty will bring a much lower share performance due to the loss of investor confidence in the underlying forces driving the company.

The opportunity cost of investing in shares of a company that is under a great deal of regulatory uncertainty rises when the firm in question is faced with irreversible investment decisions (Bontempi, Golinelli, & Parigi, 2010). For example, investment in specialist property, plant and equipment found in the biofuels industries (Kang, Lee, & Ratti, 2013).

2.4 Investment During Uncertainty

There are opposing views to the common wait and see attitude referred to above. For example, Hoffman, Trautmann and Hamprecht (2009) argue that firms consider many factors and may even pursue and fast track investments in the light of high uncertainty.

Amongst others, reasons include:

- Securing competitive resources as required by the resource based view (RBV)
- Leveraging the first mover advantage
- Leveraging complementary resources
- Reducing institutional pressure
- Applying flexible strategies and
- Participating in policy making

2.4.1 Securing Competitive Resources

The requirement to secure these resources is based on the resource based view theory (RBV). The resource based view is a well-known two decades old strategic management concept. As elegantly described by Kraaijenbrink, Spender and Groen (2010), it aspires to explain that if the firm is to achieve an ongoing competitive advantage, then it needs to acquire and control valued, uncommon and non-replaceable internal resources. Therefore, on these grounds, the firm should grab the first opportunity and invest in the face of uncertainty in the quest to acquire these unique and non-substitutable resources. Acquiring these resources puts time pressure on the investor to act now rather than later (Hoffman, Trautmann, & Hamprecht, 2009)

2.4.2 Leveraging Complementary Resources

Complementary resources exist when a firm can use its current resources to meet other production needs. It also applies if a firm can sell one set of products as complementary to another line of products already in their offering. For example, if a firm currently manufactures fossil based fuels, biofuels will be complementary in an environment where the two may be sold separately or as a blend. Furthermore, internal human resources such as chemists and engineers deployed for the two products could be interchanged. The potential to leverage complementary resources justifies an investment even under levels of regulatory uncertainty (Hoffman, Trautmann, & Hamprecht, 2009). They give the firm the potential to diversify service offerings and potentially increase returns (Walter, 2012)

2.4.3 Reducing Institutional Pressure

The concept of reducing institutional pressure is based on institutional theory where organisations in the same industry show similar characteristics and behaviours when they are faced with the same external pressures. In this case, firms will experience the same pressure on decision making coming from either the regulatory uncertainty, normative, or cognitive institutional environment. Normative pressure sways an organization's strategic decisions by the need to comply with norms that are generally considered right. This pressure can come from all stakeholders within the firm's environment such as suppliers, government, non-government organisations, customers and even society as a whole (Hoffman, Trautmann, & Hamprecht, 2009).

Furthermore, when a firm initiates a move that gains them favour in the market place, the competition generally follows to counter that move. Under extreme cases such as price war, continued competitor counter actions may even drive profits to zero (Makadok, 2010). The same applies with investments, when firms invest to reduce institutional pressure and the competition may follow suit. This behaviour was experienced in 2012 in Germany when the power generation industry faced high levels of regulatory uncertainty from the European carbon emissions trading programme. (Linnerud, Andersson, & Fleten, 2014)

2.4.4 Flexible Strategies

Instead of waiting for the regulations to be finalized, firms can employ flexible strategies which exploit various regulatory scenario outcomes. For example, during the regulatory uncertainty which arose post the Kyoto Protocol, there was no clarity on the levels of acceptable carbon dioxide emissions from vehicles. Therefore, firms in the energy and transportation sectors in Germany simultaneously developed engines with efficient fuel consumption and alternative fuels such as electric and fuel cells (Hoffman, Trautmann, & Hamprecht, 2009).

However, strategic flexibility is costly as firms have to commit considerable resources and could potentially walk a path that could potentially lead nowhere (McGrath & Nekar, 2004). Furthermore, it only makes sense in the early days of regulatory uncertainty and as costly as it could be the benefits outweigh the risk of losing competitive advantage particularly if the time span before the resolution is of uncertainty is long.

2.4.5 Participation in Policy Making

Engau and Hoffman (2009) argue that the lack of strategic planning understanding of politicians and their poor knowledge of the impact of regulatory uncertainty on the firm makes it difficult for regulators to design effective regulations without continued uncertainty. However, firms are also to blame for lengthening periods of uncertainty. During uncertainty, companies invest money and effort pursuing policy participation strategies such as lobbying which ultimately distracts policy maker's focus and thus reduces the efficiency of the policy design process. This unstructured participation temporarily slows down political decision making and only serve to lengthen periods of uncertainty.

2.5 Regulatory Uncertainty and Entrepreneurship

"The transition towards renewable energy production will not occur without the involvement of entrepreneurs who dare to take action amidst uncertainty" (Meijer, Koppenjan, Pruyt, Negro, & Hekkert, 2010, pp 1222). Uncertainty is part of every business and it is central to entrepreneurial action. However, this doesn't mean entrepreneurs should pursue business opportunities even in the face of great risk accruing from uncertainty such as that from public policy. The ability of entrepreneurs to identify uncertainty, assess the associated risk and develop mitigating alternatives around it is one of the determinants of the level of enterprise success (McKelvie, Haynie, & Gustavsson, 2011).

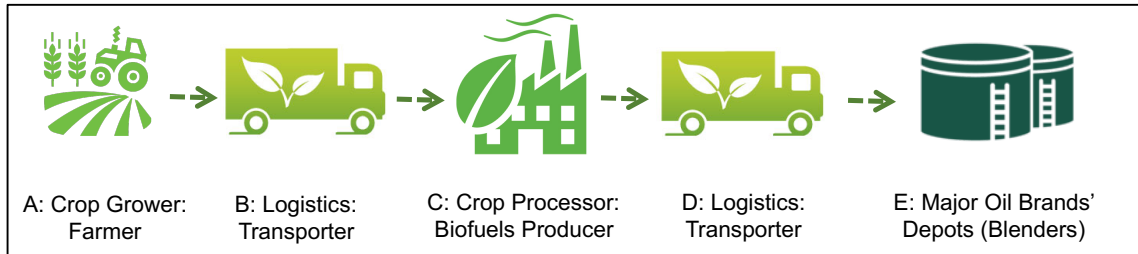
2.6 Regulatory Uncertainty and Biofuels Investments

The ongoing delay in biofuels investments due to regulatory uncertainty in South Africa is good as it affords the country the opportunity to conduct a comprehensive evaluation on impacts and benefits of alternative crops and newer technologies (Blanchard, Richardson, O'Farrell, & von Maltitz, 2011). It is with this view that the remainder of this chapter reviews literature on the state of biofuels investments in South Africa and the regulatory impact of biofuels investments in global emerging markets, particularly within BRICS economies where biofuels were successfully introduced. BRICS is the acronym for an association of five major emerging national economies, Brazil, Russia, India, China and South Africa. The BRICS members are all developing or newly industrialised countries, but they are distinguished by their large, fast-growing economies and significant influence on regional and global affairs (Armijo, 2007).

2.7 The Biofuels Value Chain

In broad terms, the biofuels value chain has the following participants as shown in figure 2.1 below:

Figure 2.1: Participants in the transport biofuels value chain



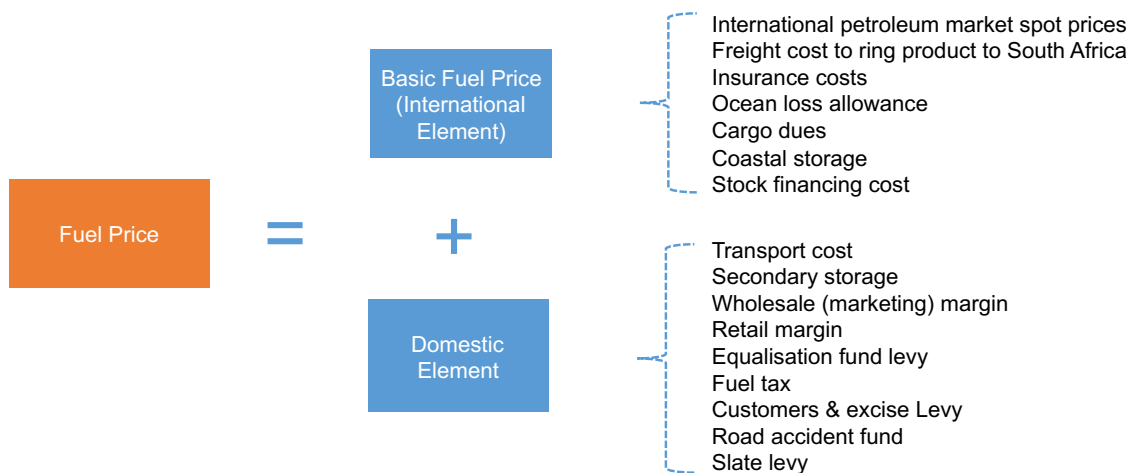
Investments are required in part A, C and D of the above value chain. To date, no meaningful capital investments have been made in this value chain due to regulatory uncertainty.

2.8 Regulated Fuel Price and Biofuels

The major delay in the establishment of biofuels investments in South Africa is the regulatory uncertainty in terms of pricing and its related mechanisms such as subsidies and incentives (Pradhan & Mbohwa, 2014). In South Africa, the government's Department of Energy (DoE) regulates petroleum product pricing. Depending on the product, regulation can start from the refinery gate and end up to the retail level at filling stations. For example, petrol and paraffin are regulated up to the retail level while diesel is regulated only up to wholesale value. Liquefied petroleum gas (LPG) is regulated up to the refinery gate (Nkomo, 2006).

The Basic Fuel Price (BFP) makes up the largest portion of the retail price. It is a notional import parity pricing formula intended to establish a realistic estimate of what it would cost a South African company to import fuel from an international refinery and transport it onto the South African shores (Richardson, Lemmer, & Outlaw, 2007). Figure 2.2 below demonstrates how BFP fits within the retail fuel price.

Figure 2.2: Composition of fuel price. Source: SAPIA, 2015



The BFP is based on spot prices quoted daily in international markets and it's used to determine the over or under recovery in terms of daily international prices of fuel. The differential is effected through monthly price changes at retail level. This monthly adjustment is also a mechanism to keep wholesale and retail margins constant (Nkomo, 2006).

2.9 Impact of Basic Fuel Price on Biofuels

South African refineries don't set their own prices. The BFP is used as the transfer price between the oil company's refining and marketing departments. With the introduction of biofuels in the value chain, the regulated pricing mechanism must enable the fuel blenders to recover the cost of biofuels. The blenders will pay biofuels manufacturers based on BFP. As the fuel price is regulated, to ensure that producer's margins are protected, government subsidies and or incentives must cover any shortfall resulting from the fluctuation of BFP due to international crude oil movements (Borman, von Maltitz, Tiwari, & Scholes, 2013).

To illustrate the point further if the *Jatropha* plant was used as a feedstock for biodiesel, a factory gate price of 2,7 to 3,6 times greater than the current BFP would be required in order to meet the minimum wages (Borman, von Maltitz, Tiwari, & Scholes, 2013).

2.10 Current Incentives for Biofuels Investors

There are readily available incentives in South Africa to promote investment in the biofuels industry. These include:

2.10.1 Fuel Tax and Rebates:

- Bioethanol is 100% exempt from fuel tax
- Biodiesel manufacturers receive a rebate of 50% on the general fuel levy

2.10.2 Depreciation:

- All renewable energy projects (including biofuels) qualify for an accelerated depreciation allowance of 50:30:20 over three years.

Furthermore, Ernest and Young (2014) suggests that a regulatory framework for the implementation of further incentives in the form of subsidies may encourage investment activity for large biofuels manufacturers. The current proposal of these subsidies is between 4.5 cents and 6.5 cents per litre for the 20 years starting from 1 October 2015. If successfully implemented, these subsidies will generate a 15% rate of return for investors (Ernest and Young, 2014).

2.11 Current Biofuels Investments in South Africa

Despite the regulatory uncertainty for major biofuels investments, South Africa has more than 200 biofuels companies producing biodiesel on small scale mostly using waste vegetable oil (Van Zyl & Prior, 2009). These plants generally serve the non-transport biofuels market such as the food and beverage sectors and pharmaceuticals (Pradhan & Mbohwa, 2014).

As Table 2.1 below shows, eight manufacturing licenses have been issued or granted by government. Production plans for these manufacturers have been put on hold due to regulatory uncertainty. The largest manufacturer of the production portfolio being the canola oil feedstock biodiesel manufacturer, Phyto Energy (Adeyemo, Wise, & Brent, 2011).

Table 2.1: Summary of envisaged biofuels projects

Company Name	Crop / Feedstock	Capacity (million Liters/annum)	Location	License Status
BIOETHANOL				
Mabale Fuels	Sorghum	158	Bothaville, Free State	Issued
Ubuhle Renewable Energy	Sugarcane	50	Jozini, Kwazulu Natal	Issued
E10 Petroleum Africa CC	Sugarcane + Other	4,2	Gauteng, Germiston	Granted
Arengo	Sorghum & Sugar beet	180	Cradock, Eastern Cape	Granted
Total bioethanol capacity		392,2		
BIODIESEL				
Rainbow Nation Renewable Fuels	Soya Bean	288	Port Elizabeth, Eastern Cape	Issued
Exol Oil Refinery	Waste Vegetable Oil	12	Krugersdorp, Gauteng	Granted
Phyto Energy	Canola	500	Port Elizabeth, Eastern Cape	Application in process
Basfour 3528	Soya Bean	170	Berlin, Eastern Cape	Issued
Total biodiesel capacity		970		

Source: Government Gazette, 2014

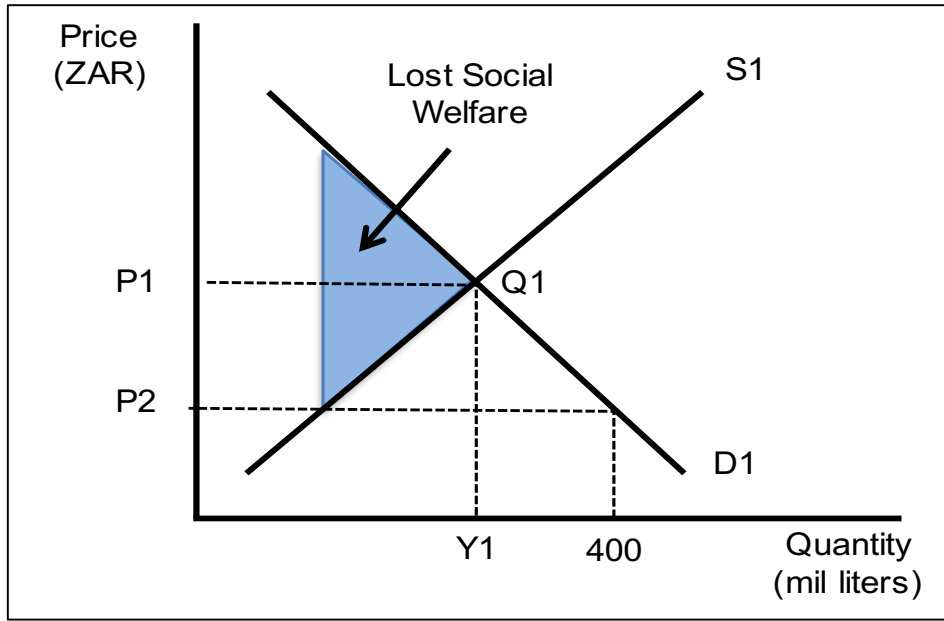
Other than investments in the manufacturing plants, feedstock is also an important part of the biofuels value chain and considerable investment attention must be afforded to this area. According to the biofuels strategy, small-scale farmers must produce 25% of the feedstock that goes into biofuels processing plants.

2.12 Economic Impact of Regulatory Uncertainty

According to the political economist, Adam Smith (1723-1790), conditions necessary for *laissez-fair* or totally unregulated capitalism to operate efficiently might not always hold. This particularly applies in situations where the free market system will not provide goods and services for which people couldn't pay for them (for example public goods such as the army). Another scenario includes goods for which there is a missing market due to unfavourable operating conditions. Government intervention when these free market ideals do not exist could deliver desirable outcomes for the greater good of the society (Miles, Scott, & Breedon, 2012).

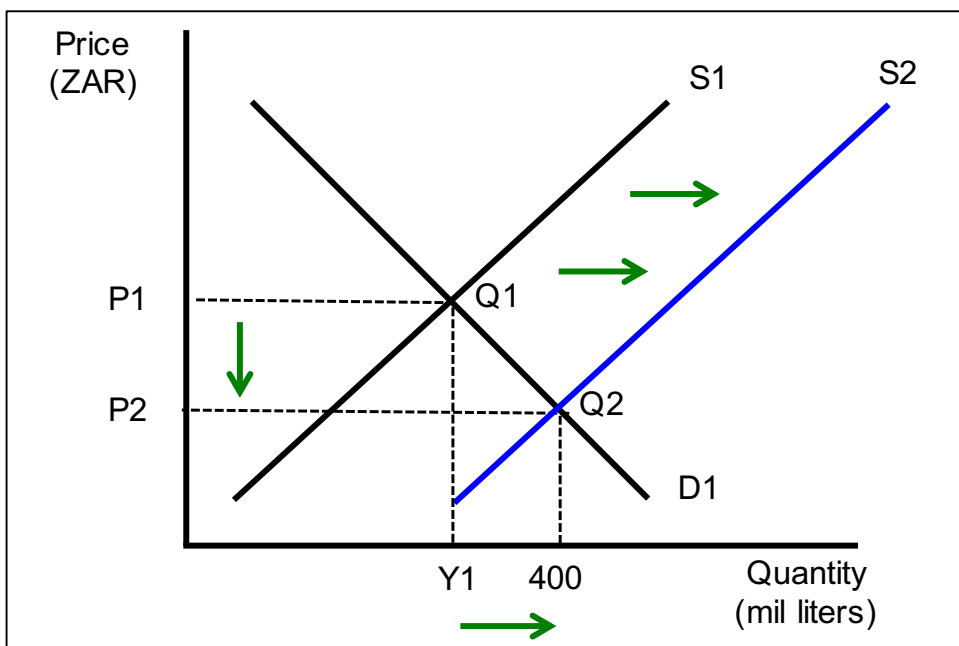
Biofuels is a society-desired good for which capitalism is willing but unable to serve sufficiently due to pricing and regulatory inefficiency. As per Adam Smith's counsel, government intervention will be necessary to induce the supply side activity as depicted in figures 2.3 and 2.4 below:

Figure 2.3: Current Scenario: Low Incentives and Regulatory Uncertainty



Source: Baye & Smith (2013)

Figure 2.4: Desired Scenario: Higher Subsidies/Incentives & Certainty



Source: Baye & Smith (2013)

The biofuels strategy has set the demand to 400 million litres of bioethanol and biodiesel. Currently, the 200 biofuels companies operating in South Africa supply quantity Y_1 (in Figure 2.3), which is far less than the required demand, and predominantly serve the non-transport market. This supply is met through the market equilibrium price of P_1 (in Figure 8), which has limited government incentives. It is worth noting that the current scenario also brings an undesirable loss in social welfare as depicted in the shaded area in Figure 8 (Baye & Prince, 2013).

As the fuel price is regulated, to meet the demand of 400 million litres at fluctuating BFP (basic fuel price) prices such as P_2 would bring financial loss to investors, for example due to high minimum labor costs (Borman, von Maltitz, Tiwari, & Scholes, 2013). Therefore, to rectify this market inefficiency and improve social welfare, the government needs to stimulate the supply side through higher incentives and subsidies to shift the supply curve S_1 to S_2 as shown in figure 2.4 above. This shift in supply through regulatory certainty on subsidies will bring about a market equilibrium of quantity Q_2 (figure 2.4), which will remove the loss in social welfare currently experienced in figure 2.3 above.

2.13 Learning from Our Peers

Within the top seven biofuels producing countries, large quantities are mainly produced in USA and Brazil. Combined they account for 81% of the world production of 50.4 million ton of oil equivalent (toe). Until 2004, Brazil was the world leader in ethanol production and even exported some of her output (Rovere, Pereira, & Simoes, 2011). Per table 2.2 below, China, only contributes three percent.

Table 2.2 World top 7 biofuels producing countries

Country	Percentage Contribution	Quantity (toe)
USA	50%	25 200 000,00
Brazil	31%	15 624 000,00
France	5%	2 520 000,00
Germany	6%	3 024 000,00
Spain	2%	1 008 000,00
China	3%	1 512 000,00
Argentina	3%	1 512 000,00

Source: BP Statistical Review of World Energy: 2011

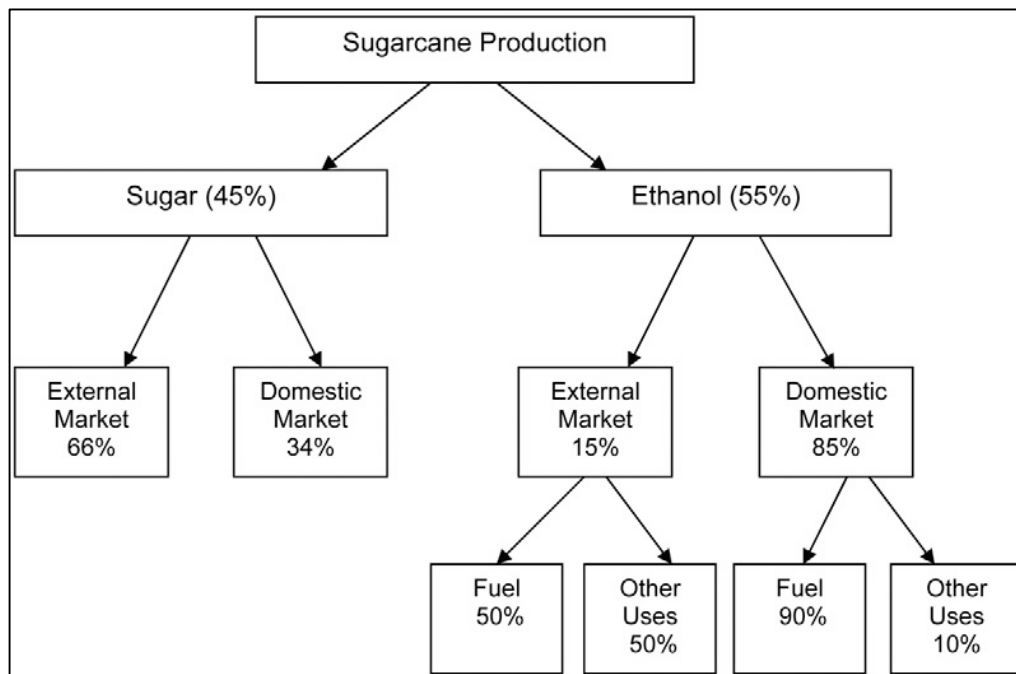
Brazil is one of the five major emerging economies within the BRICS conglomerate and has a rich history in biofuels production. They mainly produce ethanol from sugarcane. Brazil is worth consideration in this study as it's the largest emerging economy producing biofuels, especially ethanol.

The Brazilian biofuels activity dates back to 1931 with the formalization of regulations that allowed ethanol blends (gasohol) of up to E40. Subsidies and tax incentives by the government were estimated to have paid for up to 80% of all the investments made for alcohol production and distribution. The government also financed distribution of ethanol by installing ethanol pumps at every service station part owned by the government, Petrobras (Nass, Pereira, & Ellis, 2007).

Although government subsidies kicked off the building of the Brazilian ethanol infrastructure, sugarcane-based ethanol production is currently economically viable largely without government subsidies. This was possible because of economies of scale and competition together with significant increases in agricultural yield (Nass, Pereira, & Ellis, 2007).

Brazil's vast untapped land mass allows new lands to be used for bioenergy production without reducing the farm area devoted to food production. The ability to serve both sectors, food and bioenergy production, gives flexibility in the marketplace, as evidenced in 2006 when the use of the Brazilian sugarcane production was split almost equally between sugar and ethanol as Figure 2.5 shows.

Figure 2.5: Brazil's sugarcane market split



Source: Nass, Pereira, & Ellis (2007)

The Brazilian experience highlights the need for growers to be continually aware of changing externalities and for producers to rely on markets rather than government subsidies. Other than subsidies, the success of the biofuels industry in Brazil is attributable to a number of other factors, below is a summary of key ones:

2.13.1 Car Engine Technology

One of the most important factors that led to the development and market uptake of biofuels in Brazil was regulatory enforcement for the commercialization of Flexible Fuel Vehicles (or commonly known as FFVs). These cars can run on both conventional mineral petrol and diesel and any blending proportion of biofuels. In fact, Brazil's FFV car park is the only one in the world that can use up to E100 (100% ethanol) or gasoline. The regulatory certainty gave vehicle manufacturers the certainty to develop FFVs and thus affording customers a choice of using an energy mix of their choice.

In the early 2006, about 75% of new cars manufactured in Brazil were FFVs which cost no more than conventional cars. In 2008 ethanol became the second most consumed liquid fuel in transport biofuels after diesel. By July 2010, 95% of all cars sold in Brazil was an FFV (Charlita de Freitas & Kaneko, 2011)

2.13.2 Cost to Consumers

Followed by the relatively cheaper price of ethanol compared to petrol. To further encourage development and use by making the ethanol cars competitive to consumers, the government placed a lower tax on ethanol-fueled cars than on gasoline-fueled cars.

2.13.3 Other Brazilian Regulatory Stimulants

The Brazil government offered investors regulatory certainty on various aspects of the biofuels value chain with the view to encourage and stimulate the industry:

- Biofuels producers were offered incentives to buy sugarcane from family owned farms in the poor regions of country. This gave farmers the incentive to produce biofuels feedstock and thus alleviate poverty in the poor regions of Brazil.
- Investors were offered low interest rates on biofuels loans
- Ethanol prices were set and widely communicated. Ethanol producers were guaranteed that the state-owned oil company, Petrobras, would purchase, for a fixed price, all ethanol produced under the quota system. This gave producers of ethanol a guaranteed market for their product.
- Export quotas were set on sugarcane, the feedstock for ethanol. This gave confidence needed for sugarcane growers and completed the cycle of control from field to market.
- Direct investment in research and development by the government to increase production at reduced cost
- Depending on which region within Brazil the producer acquired their feedstock, they could qualify for as much as 100% tax break (Nass, Pereira, & Ellis, 2007).

Although subsidies are no longer in place in Brazil, they were essential in developing the biofuels industry. Consequently, Brazil's dependence on foreign oil has reduced (Nigam & Singh, 2010).

2.13.4 United States of America

Although the United States is not part of the BRICS economies, it has the largest biofuels industry in the world and provided investors with regulatory certainty.

For example, in at least 21 states, tax incentives are offered to ethanol retailers or producers and retailers are paid up to 50% of the cost of installing the biofuels infrastructure to accommodate E85 (that, is petrol blended with 85% of bioethanol). To discourage ethanol imports and increase local production, heavy tariffs of USD 0,54 per gallon (or 3,78 liters) are imposed (Waltz, 2007).

By 2008 the retail subsidy on ethanol was up USD 0,51 per gallon (Hertel, Tyner, & Birur, 2010).

2.14 Conclusion

This chapter reviewed investor behavior under conditions of regulatory uncertainty. The theoretical frame works discussed articulated that some investors choose to pursue their investments while others defer decision making until regulatory certainty has been achieved. Where investors pursue the investment, amongst other things, they do so to secure competitive and complementary resources and to reduce institutional pressure.

In terms of biofuels investments, where they were pursued in global markets it was under highly supportive regulatory conditions. The South African liquid fuels pricing dynamics were reviewed and the relationship with the loss in social welfare established. The same loss is not supportive of the National Development Plan's objectives discussed in chapter one.

3 CHAPTER 3: RESEARCH QUESTIONS

3.1 Introduction

The previous chapter outlined the theoretical concepts of the challenges surrounding the introduction of the transport biofuels industry. The same challenges informed the research problem articulated in section 1.11 of chapter one.

A research question is a statement concerned with the logical relationship among concepts, which may be judged as true or false if it refers to observable phenomena (Zikmund, 2003). In broad terms, the below questions seek to uncover regulatory and other reasons for the lack of investment in the sector. Given the time elapsed and financial losses incurred since the adoption of the biofuels strategy in 2007 and the ongoing regulatory uncertainty, the below questions also test if investors have the necessary confidence in the South African leadership to still pursue biofuels.

Research questions deepen the researcher's appreciation of research problems. Furthermore, they aid in the translation of the same research problems into a sharper inquiry (Zikmund, 2003).

Ultimately, the primary objective of the research is to understand the impact of regulatory uncertainty on investor behavior and the associated costs of the same uncertainty.

3.2 Research Question One: Impact of Regulatory Uncertainty

- i. What is the impact of regulatory uncertainty on investment activation in the transport biofuels industry in South Africa?
- ii. What is the financial cost of regulatory uncertainty for investments in the transport biofuels in South Africa?
- iii. What is the impact of regulatory uncertainty investor confidence?

3.3 Research Question Two: Participant Cooperation

Which participant's behavior within the transport biofuels fuels value chain is not supportive of the introduction and formation of this industry?

3.4 Research Question Three: Other

What are other necessary conditions for the introduction of biofuels in South Africa?

3.5 Conclusion

With research questions now defined, chapter four will outline the methodology used to collect the data to assist in providing answers to these questions.

4 CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

Having defined research questions in the preceding chapter. The aim of this chapter is to describe the research methodology used to collect the data in response to the impact of regulatory uncertainty towards the development of the transport biofuels industry in South Africa. Additionally, this chapter discusses the population, sample, research instrument, data collection process and research limitations.

To appreciate the dynamics and interplay of data in studies, researchers are encouraged to use both qualitative and quantitative research methods (Onweugbuzie & Leech, 2005). However, as this was a new industry context, the research problem and its associated research questions lent themselves to a meaningful qualitative study design. The dynamics of this research are further discussed in the chapter.

4.2 Type of study and research design

According to Lewis and Saunders (2012), there are three types of studies, namely:

- **Descriptive Study** seeks opinions of respondents and informs the researcher on 'what' is happening as opposed to 'why' it is happening.
- **Explanation Study** is the opposite of a descriptive study and explains the relationships between two variables by answering the "why" question.
- In **Exploratory Studies**, the research aims to seek new insights. It asks questions to analyse a situation in a new lense.

From a South African petroleum industry perspective, the introduction of transport biofuels can arguably be described as a source of meaningful structural change within the industry. Although blenders (that is, major oil brands) may have performed this task elsewhere in the world, they have not done so before in the South African economic and legislative context. All the players have a conceptual understanding of the industry and associated value chain. Additionally, as explained in chapter one, forging a relationship between the two agricultural and the traditional oil industries also brings its own unique dynamics.

From a research perspective it was critically important to immerse the researcher in the underlying industry issues before embarking on the data collection exercise. This was achieved through informal and unstructured pre-interviews with the South African Petroleum Industry Association (SAPIA) and Edward Nathan Sonenburg (ENS), a legal firm with a strong understanding of the South African green energy and liquid fuels regulations.

Therefore, combined with the above fact finding industry conversations and literature review, the state of 'what' was and could happen in the industry was well understood, the missing link which this study set out to examine was the 'why' implications of navigating certain choices that need to be made. Thus an exploratory, qualitative approach was taken allowing for sufficient flexibility to capture the magnitude of divergent perspective and give practical insight into the multiple world view perspectives of the various influencing stances that characterise the biofuels value chain.

- **Focus Groups**

The option of data collection through focused groups was considered but deemed unsuitable as it would not have facilitated the kind of openness required to get to the heart of issues. Additionally, oil companies need prior clearance from the competition commission to meet in the same room. Otherwise the meeting would be deemed unethical and facilitating collusive conversations. Thus reaffirming the inappropriateness of focused groups.

4.3 The Population

The population is the total set of possible members in a particularly defined universe (Saunders & Lewis, 2012). The relevant population of the South African biofuels industry for the study included all players involved with the implementation of the biofuels strategy. A few years ago, the Department of Energy put together a Biofuels Implementation Committee (BIC), with the key mandate to resolve all operational aspects around the introduction of biofuels in the country. Thus members of the BIC were regarded as the population frame for this study. Thus the following groups were included:

- **Farmers**

The agricultural source of the biofuels stock feed has for the first time established a direct link between the agricultural industry and the petroleum sector for the necessary provision of feedstock, specifically soya bean in case of ethanol and canola seed in the case of Biodiesel. The farming community has thus become an important stakeholder in this renewable energy value chain.

- **Oil Companies (also referred to as major blenders)**

South Africa has five major international and two local refining fuel brands. The major players include BP, Shell, Total, Chevron and Engen. The local players are Sasol and PetroSA. These brands own and share critical supply chain infrastructure including refineries and depots. The said depots are set to be the critical convergence point between biofuels producers and major oil brands as blending facilities.

- **Logistics**

Services of logistic firms are required to ship biofuels from manufacturers plants to blending locations. Oil companies have established own fleet and third party contracted logistics assets used to move finished product from depots to the retail sites. A key player in supporting the logistics backbone is Transnet, the national state owned transportation management enterprise. Transnet operates the national petroleum products pipeline and rail networks which strategically facilitate bulk regional transfer of fuel products.

- **Biofuels Manufacturers**

This group forms the back bone of the value chain. At the time of writing, only two large scale or transport biofuels producers were still actively committed to building manufacturing plants. Eight other fledgling large scale manufacturing investment projects had already been shut down due to delays in the implementation of biofuels.

- **Blenders**

Include largely oil companies and to a limited extent third party fuel depot operators.

- **Government Departments**

Mainly included the Department of Energy (DoE) and its supporting structures such as the National Energy Regulator (NERSA) and Central Energy Fund (CEF). The DoE as the custodian of the liquid fuels sector is therefore responsible for the coordination of input and decisions from other government bodies such as National Treasury, Department of Agriculture etc. The consolidated inputs are used by the DoE to finalise the regulations in consultation with the cabinet.

- **Associations**

These include Grain SA and represent the voice of various farmers. Also important is SAPIA, they represent the consolidated voice of all oil companies.

- **Others**

This group includes supporting organisations which play a non-core role in the biofuels industry. An examples include legal firms playing advisory role to the above players, financiers and consultants.

4.4 Pilot or Pre-testing

The first questionnaire was tested with three respondents and they highlighted the need to make certain adjustments. For example, they advised that the questionnaire repeated certain questions around the reasons for material investments. Based on their feedback, it was amended to ensure content and construct validity by rephrasing key questions as well as restructuring the logical order of the overall questionnaire. Furthermore, the number of questions were also reduced from 15 to 9.

With regards to the quantitative part of the interview where respondents were asked to specify costs incurred to date, for example, in the preparations leading to the planned launch of production and blending facilities, a cognitive interviewing technique was used to ensure they deliver the required feedback. Cognitive interviewing is defined as the administration of preliminary survey questionnaires in conjunction with the collection of additional verbal data from responses and comparing it to determine if the questionnaire generates the desired responses from participants (Beatty & Willis, 2007).

4.5 The Sample

The researcher selected a sample that helped to answer the research questions by using purposive sampling under the ambit of non-probability sampling techniques. Given the small size of the universe, 16 potential respondents in total, from the outset, the researcher undertook to capture input from all the members of the biofuels implementation committee. This was essential to achieve full representation and sufficient diversity within the sample and data set.

It's important to note that although the sample is relatively homogenous as all participants are within the biofuels industry. It has heterogeneous elements as the organisations represented fulfill very different roles in the value chain and further the direct respondents engaged held different departmental roles in the various organisations.

4.6 Response Rate

The most important participants in the study were biofuels manufacturers, oil companies and government departments as they are either directly impacted by the regulatory uncertainty or influence it. These participants were sufficiently interviewed, thus making the data representative, inclusive and relevant.

Participants such as logistics operators are necessary as part of the biofuels implementation committee but don't contribute to the prime investment discourse around the introduction of the biofuels industry.

Although it was challenging to secure interviews with all the respondents. Nine interviews out of 15 invitations were conducted. Thus giving a very good response rate of 60% and in excess of that in terms of representativity, inclusivity and as already discussed above.

4.7 Unit of Analysis

The unit of analysis for the research shows what data should be provided and by whom. Additionally, it also indicates the required level of aggression (Zikmund, 2003)

In this case, the unit of study, being regulatory uncertainty, is the reason behind the non-material investments in biofuels.

4.8 Research Instrument

Semi-structured discussion guides were used to collect qualitative data through face to face and telephonic interviews. The discussion guides addressed the identified core themes as follows:

1. Impacts of regulatory uncertainty on the transport biofuels industry:
 - i. Investment postponement
 - ii. Financial costs
 - iii. Investor confidence
2. Co-operation of all participants in the sector
3. Costs of regulatory uncertainty
4. Other requisite conditions for the development of the sector

The questions in Table 4.1 below were used to guide the interviews. Their relationship to research questions is also shown.

Table 4.1: Themes captured in interview discussion guides

Interview Question	Response to research question?
Given the ongoing delays from a regulatory perspective, in your opinion, do you think the SA government takes Biofuels as a priority?	Investor Confidence: Research question 1 (ii)
From the petroleum industry perspective, do you believe there's support for the introduction of biofuels in South Africa?	Co-operation of participants in the sector: research question 2
In your opinion, what are key reasons for the lack of investments in the transport biofuels value chain in South Africa? Provided choices: Regulatory, Financial, Investor Confidence, Supply/Demand or other?	Testing for other causes of lack of investment in the sector and reinforcing research question 1 (ii) and (iii)
What form of government incentives do you believe will bring more investment activity?	Financial cost: research question 1 (ii)
Please provide a range estimate for the incentives mentioned in 5 above (for example X cents per litre margin for wholesale fuels)?	Subset of research question 1 (ii)

In your opinion, what non-governmental related conditions must be satisfied to kick start material investments in biofuels?	Other required conditions: research question 4
As the regulations come into effect on 1 October 2015, how do you think South Africa will meet the mandatory blending targets?	Testing strength of the promulgated regulation and compliance by participants. Reinforces research question 2
To date how much has your company spent on Biofuels and therefore what would be the waste of continued delays in this space?	Financial costs: research question 2
Do you have other thoughts that you'd like to share on the topic?	Further insights not tested in the questionnaire. Reinforces research question 4

The full questionnaire is presented in appendix one.

4.9 Data collection process

The questionnaire described in the preceding section was used to guide the in-depth face to face and telephonic interviews. In many cases the tool was shared with the respondents a few days before the scheduled interview took place. As recommended by Saunders and Lewis (2012), this approach was followed to afford the respondents sufficient time to prepare for the conversation and therefore share deeper insights. All interviews were recorded through a voice recorder and transcribed into Microsoft Word format before analysis.

Semi structured interviews were used as data collection method for the following reasons:

- i. Respondents spoke freely without the limitations of a yes or no answer. Thus giving the researcher rich data for analysis. For example, the biofuels manufacturers were more open to sharing of information and in some cases wishing to guide the research process. As the companies are still small and non-operational, the respondents were CEO's in the waiting. These conversations were rich and candid.
- Most respondents were senior executives and therefore bound by confidentiality to their organisation. Some questions were difficult to answer directly without

sharing confidential information. In such cases, the unstructured nature of the interview allowed respondents to share their broader thoughts around the confidentially sensitive questions.

- Respondents were passionate about biofuels and mostly had dedicated over five years of their professional careers to the industry. The unstructured nature of the interviews also allowed them to share in depth the underlying sources of their concerns over the progress in establishing an operating regulatory framework to formally activate the industry. It almost seemed as if the interviews afforded them the much needed opportunity to vent.
- Building relationships requires informal conversations to put respondents at ease. When they were relaxed, they spoke openly.
- The process allowed for probing of answers that enabled clarification as well as requesting further information. It also allowed the researcher to pursue new areas of discovery opened up by the interviewee.

4.10 Data capturing and Analysis Process

During the interviews, all respondents were requested permission to record interviews through an electronic device. All recordings were transcribed into Microsoft Word format in preparation for coding or grouping into various categories linked to the research problem. The qualitative data analysis software, Atlas.ti, was then used to categorise respondent's data into meaningful subsets which addressed research questions.

4.11 Research Limitations

The research process and methodology choice presented some operational challenges in the field and resulted in the following limitations:

- **Sample Size**

Given the relatively small population of respondents, when the researcher was collecting data he was advised by other respondents that another student from the Gordon Institute of Business Science was also conducting research in biofuels and in some instances had already interviewed some respondents. This resulted in a reduced response rate as

the same respondents refused to participate in another interview on a similar subject matter.

- **Data Collection Bias**

Given the corporate nature of some respondents, particularly oil brands, they requested Non-Disclosure Agreements to be concluded. However, the same agreements precluded the researcher from using some of the interview information shared in the research. There was a fair level of caution with information sharing as they needed to manage risk around leakage especially where government is involved. The large size of these firms also made it challenging to locate the relevant person to interview. Where interviews were eventually secured, they were rescheduled many times.

Many companies, investors and individuals lost money in the biofuels environment. Some farmers sold their land to the government and financiers back in 2008 when they were told that biofuels were coming to live. The same land has been sitting unproductive for all these years. Therefore, conversations with biofuels participants in some cases were emotionally charged. This was a potential limitation to the data as objectivity was sometimes questionable.

- **Communication**

The researcher's mother tongue is not English. Therefore, his interpretation of words is potentially different to that of an English man. The situation got worse when one respondent was French and their pronunciation of words was unfamiliar to the respondent.

Conducting interviews telephonically was found to be problematic. It makes an already difficult process even more challenging. Unreliable connectivity; audibility concerns as well as frequently dropped calls made respondents lose patience with the interview process affecting the reliability of the data captured in these discussions.

4.12 Conclusion

This chapter outlined the research methodology used to capture data towards identifying and examining the underlying forces driving the biofuels industry through the use of an exploratory study. Data was collected with the specific intent of using it to frame

understanding about the reasons or factors inhibiting the development of the biofuels industry in South Africa. This data is presented in detail in the preceding chapter.

5 CHAPTER 5

5.1 Introduction

The purpose of this chapter is to present the results of interviews conducted with the sample of respondents outlined in the methodology section of this report, Chapter 4. The results are presented in such a way as to give clear appreciation of the responses directly related to research questions and sub-questions that were outlined in Chapter 3 and are again stated here for ease of reference.

5.2 Profile of Respondents

The universe of the South African transport biofuels as shown in table 5.1 below, is made up of 16 member organisations of the BIC, which formed the sample of the research.

Table 5.1: The South African biofuels universe

Industry Player	Names	Part of BIC?	Quantity	Invited	Interviewed
Farmers (x1)	Various, represented by Grain SA	Yes	1	Yes	No
Oil Companies (x7)	BP, Total, Shell, Engen, Sasol, Caltex and PetroSA	Yes	7	Yes	Yes (BP & Total)
Logistics (x1)	Transnet	Yes	1	No	No
Transport Biofuels Manufacturers (x3)	Mabele Fuels, Phyto Energy & Awango	Yes (except Awango)	3	Yes	Yes (All)
Associations (x1)	SAPIA, SABA	Yes	2	Yes (SAPIA)	Yes (SAPIA)
Government (x1)	DoE and CEF	Yes	1	Yes (CEF)	Yes (CEF)
Developmental Finance Institutions (x2) (DFIs)*	IDC, DBSA	No	2 (IDC)	Yes (IDC)	Yes
Other (x1)	ENS	No	1	Yes	Yes
Total	16	16	15*	15	9

Developmental Finance Institutions (DFIs) such as the Industrial Development Corporation (IDC) and the Development Bank of South Africa (DBSA) do not form part

of the BIC Organisations such as Tongaat Hullet and the South African Sugar Associations have been excluded from the above list as the approved feed-stocks do not include sugarcane at this stage.

Membership of the BIC is important as the DoE values input into the direction of the implementation drive from these members. All members of the above universe but Transnet were invited to participate in the interview process. Transnet was not invited as it doesn't influence the regulatory framework at this stage.

5.3 Presenting the Results

For ease of reading and comprehension, the results will be presented in the following format:

1. Presentation of the research question
2. Narration and intention of the question
3. Presentation of respondents verbatim quotations
4. Narration and summary of respondents answers (and clarification of jargon)

At the end of the presentation of the results, respondent's feedback is presented in a short graphical format to highlight the most pertinent issues extracted from the data.

All respondents were promised confidentiality. Therefore, their feedback has been masked under code names P1 to P10. Due to the small population and therefore relatively small sample size, it is not possible to cluster feedback according to respective respondent's categories as it would reveal the respondent's identities or organisations. For example, as one transport biofuels funder was interviewed, grouping their response under sub-group "financiers" would clearly reveal the name of the financier in question and thus be in breach of research ethics. Where known people's names in the industry are used, they have been renamed as Mr. XXX or Ms. YYY etc. The same applies to company names unless information pertaining to these firms is already in the public domain.

5.4 Research Question 1: Impact of Regulatory Uncertainty – Part One

i. What is the impact of regulatory uncertainty on investment activation in the transport biofuels in South Africa?

As outlined in chapter one of this report, the South African government adequately articulated the strategy for transport biofuels introduction in the country. Additionally, financial incentives in the form of tax breaks and depreciation benefits were available to biofuels manufacturers. Despite this, investments in the sector are still not forthcoming due to regulatory uncertainty. Therefore, the first research question sought to uncover the impact or effect of this uncertainty.

Respondents Feedback:

Table 5.2: Respondents feedback, Question: 1 Part 1

P1	<i>They wanted to publish the regulation in 2013, they wanted to publish it in end of 2014, they wanted to publish it on March 2015 then they postponed it to June 2015 and still nothing happens</i>
P1	<i>They said okay, let's have a look on the still existing projects because most of the projects are already dead because of this long time it took until now where they didn't release the regulation. And waiting for money, a hell of money sitting around, doing nothing and waiting that something happens</i>
P4:	<i>As far as I'm aware there have been no investments in hardware as yet because has not been regulatory certainty as to timing. There's no point in companies investing now and biofuels only becoming available in five years' time. So we have to wait until the whole pricing mechanism is sorted out</i>

P4	<p><i>Without proper pricing framework within our regulated markets and for surety for investors that there will be an adequate return from the investment, there will be no investments.</i></p>
P5	<p><i>So for investors to come in, question is, how are you going to make money? So that is another issue and that is a regulated area. So, its supply and demand, regulation is quite important but I think in terms of just running a business, these are the two that we want to focus on. All of them are quite important because if I look at them, without this regulatory certainty that there is a market for the product then the investor is not going to be confident, there is not going to be that certainty that anybody is going to come in to invest.</i></p>
P6	<p><i>That tap, that R127 milliion it's not going to be more than that. I don't think we well get any further investment in our firm. Frankly it would be a very reckless investor who will recapitalize us because things have just not happened from a regulatory perspective.</i></p>
P7	<p><i>Regulatory and policy certainty are critically important. Investors need guarantees.</i></p>
P10	<p><i>You know what, who knows! In the two or three years that I have been involved in biofuels in this country umm, the government, one half of the Government they say it's a massive priority, its number two priority only to Eskom in the Department of Energy. So they will say that one day and then the next day in another forum they will say actually it makes no sense to do it right now.</i></p>

Summary of Feedback

The data clearly articulates the direct link being made between regulatory uncertainty as the cause of the delays in investment activation to formally initiate production of transport biofuels. More importantly, they have also stated uncertainty in terms of financially related investment aspects that need to be clarified before investors could logically be expected to view the opportunity favorably again. Namely; pricing, subsidies, incentives and the timing of these aspects.

In addition to delayed investments, respondents highlighted the following with regards to regulatory uncertainty:

- Threats of license cancellations by the department of energy
- There notable gap between intention and action
- How a large number of transport biofuels projects have died because of the extended duration that has lapsed between government's initial indication of intent and the still unresolved activation commitments.
- That without regulatory certainty no investor would be prepared to commit to the projects beyond feasibility studies and investment in hardware.
- Lack of regulatory certainty leads to speculation in terms of government priorities

Level of Required Subsidies

Therefore, given the reported delays in the preceding section and given that there are currently incentives for biofuels, there's a need to determine the level of incentives or subsidies required. Questioning on this aspect resulted in the following remarkably diverse response illustrating well the complexity of the challenge that needs to be resolved

Table 5.3: Respondents feedback, Question: Level of subsidies

P7	<i>Although incentives mechanisms are not yet in place, I believe 4-5 cents per litre per budget speech of 2014 would be acceptable. But there's huge pressure on the fiscus.</i>
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P6	<p><i>For bio ethanol what they have proposed was a hundred percent rebate in general fuel levy and that extra call it R1.50 whatever the number is, it makes a big difference. So all I'm saying is that the general fee levy is around R3.10, I think at the moment.</i></p>
P1	<p><i>It was intended to have a subsidy regime established which gives the biofuels industry a subsidy which covers the gap between the BFP the basic fuel price without all the add-ons, the basic fuel price and a necessary price to have a 15% ROA, return on assets on the business. And when they started to calculate that, it was round R2.50 per litre for diesel.</i></p>
P1	<p><i>And last year, over the last year it happened that the petrol price dropped dramatically so the needed subsidy to achieve 15% ROA increased round about by double the price, not R2.5 but round about R5.</i></p>
P10	<p><i>So [our internal regulatory advisor] is probably the best person to talk to I can put you in touch with him and you can ask him. He will probably tell you that it is crap because I remember asking him for the model years ago and he told me that's its crap and I ran with that because I eventually got down to it. But it is something that can give you an idea of what kind of subsidy is required. But it's a big subsidy, it's huge.</i></p>
P9	<p><i>What we wanted to do was to subsidize the biofuels manufacture to an extent of guaranteeing a 15% of returns on assets.</i></p>
P9	<p><i>We got Government then saying, you must tell me at the bidding stage that you want R12 a litre. I know that these guys would pay me R10 and then I will subsidize the difference which is R2 per litre that's what the subsidy is about.</i></p>

P9	<p><i>We are going to run a competitive process. We are going to advertise to the investor community and say South Africa has its door open for biofuel manufacturers, just tell me in how many years' time how much you want per litre. If you want 30% that's okay I am hoping to God in heaven that there is someone who is happy with 12% and I will subsidise that person. So the greedy capitalist who wants 40% will not make it through the door.</i></p>
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Summary of Feedback:

The respondents have provided a range of subsidies and incentives.

- 4 – 5 cents per litre
- R2,50 per litre
- Full rebate on fuel levy, which according to one respondent it's believed to be R3,10 per litre
- A subsidy to ensure 15% return on assets (ROA), which is what government previously proposed
- Some simply state that a “huge” subsidy is required
- An auctioning mechanism to determine the correct level of subsidy, for example R2 a litre

Further to this however, one respondent shared that new mechanisms for the determination of these subsidies and incentives has been put forward and are being added to the options already under consideration.

5.5 Impact of Regulatory Uncertainty Part Two

ii. What is the financial cost of regulatory uncertainty for investments in the transport biofuels in South Africa?

When the biofuels strategy was adopted in 2007 and mandatory blending regulations promulgated, this sent a positive signal to the investor community. A signal of commitment by the South African government to introduce biofuels in the country. Based on this, investors and other potential players within the biofuels value chain kicked off preparatory work at a financial and non-financial cost to business.

This question was intended to assist in determining the cost of the resultant regulatory uncertainty. The second part addresses the non-financial costs.

Respondents Feedback

Table 5.4: Respondents feedback, Question: 1 Part 2

P6	<i>P6: Because if I look at the entire biofuels industry if you look at our cash spend, if you look at the total cost to date I mean I would think the industry has probably burnt easily half a billion rand conservatively, conservatively.</i>
P1	<i>P1: We have two kinds of investment, the direct investment taking money doing something and non-remunerated investment for example, I am sitting here talking with you not being paid [laughs]. This is the sweat capital or whatever broad intellectual property without remuneration and so on. So I would say direct investment is 8 million euros that's what is at the moment 120 million rand and the same amount approximately not remunerated yet.</i>
P1	<i>P1: The team, how big? Directly, direct employees round about 20 and then we have Joburg staff contractual relationships with engineers with companies here for example KPMG, we have a team from KPMG doing work for us. We have financing specialists hired on contractual basis so</i>

	<i>altogether we are around 50.</i>
<i>P6</i>	<i>R125 million there abouts potentially lost investment, [a competing] company has also put R110 million plus in their investment.</i>
<i>P6</i>	<i>I think off hand if you look at the history there must have been at least eleven biofuel projects that have been proposed since 2005. At the moment if you look at the licensed biofuels producers I think there are eight according to the Department of Energy. But even of those eight a number of them have gone belly up since they published the numbers.</i>
<i>P6</i>	<i>But if you look at the companies that had a dedicated team to develop a project, a number of these projects have just packed up. Each one I would estimate spent at least 10 million, 10 million plus; company YYY spent plus a 100 million, company XXX plus a 100 million, company ZZZ was about 50 or 60 bar, yeah so.</i>
<i>P9</i>	<i>Between 2006 and 2010 we have spent roughly R20 million doing a feasibility study and so on. So that's all we spent and then we will spend a lot of money now just supporting government, not money but my bosses like to say my time is money, but I think they pay me so little that it doesn't contribute anything but we spend a lot of time now supporting government that's what I do.</i>
<i>P5</i>	<i>The plan for this year was for R10m but we only done about R5m because there is no plan. The plan for this year was R10 million but we have only done about R5 million.</i>

Summary of Feedback

In financial terms, the unique (that, is non-repeated) figures by the respondents are:

Table 5.5: Estimated financial losses by investors

Biofuels Startup Firm	lost investment (R million)	Comment
Firm A	120	
Firm B	2 + 5	Two syndicated investments
Firm C	127	
Firm D	110	
Firm E	60*	Ave. of the reported R 50 million; R60 million and R 70 million
Firm F	20	
Firm G	20	
Firms H, I & J	30	R10 mil for each firm
Total	R494 million	

Source: Respondents interviews data

One respondent estimated that the total estimated spent so far is in the region of ZAR 0,5 billion to ZAR 1 billion. Therefore, conclusively with this range and the reported figures above, it is reasonable to assume total spend as **ZAR 750 million**, being the mid-point of ZAR 0,5 billion and ZAR 1 billion.

All investments have a financial and non-financial element. Captured from respondent's feedback in the preceding question, below are the estimated non-financial costs:

- Blenders non-financial cost include effort expended lobbying with government and preparations for the blending process
- Manufacturers lost sweat capital on effort expended in feasibility studies, government lobbying, fund raising, environmental impact assessments, site applications, licensing etc. One reported a total of 50 employee effort with 20 based in South Africa and 30 globally.
- Eight biofuels firms which have shut down also went through the process mentioned in the manufacturers section above.

- Banks and other financiers also expended effort in the evaluation of the business cases for entrepreneurs in the arranging of finance
- The regulators and their associated agencies equally devoted a fair amount of time in the development of biofuels industry

Given the cost incurred, lost investments as well as time expended on the initiative. It's evident that regulatory uncertainty on biofuels investments has been an expensive exercise without any realised returns. The fact that a number of the licensed biofuels companies have also shut down points to the extreme cost incurred to the economy as well. For example, losses in tax revenue, jobs and the associated multiplier effect.

5.6 Impact of Regulatory Uncertainty Part Three

iii. What is the impact of regulatory uncertainty on investor confidence?

Given the ongoing delays with the implementation of biofuels, financial and non-financial losses incurred in the preparation phase, this question was intended to ascertain the level of investor confidence in the leadership of the South African government to implement the biofuels industry.

Respondents Feedback

Table 5.6: Respondents feedback - Question 1 Part 3

P1	<i>This is an interesting situation for government, you make a law but don't tell how to fulfil on requirement. It's a useless exercise to do that.</i>
P2	<i>REFIT collapsed after the constitution challenged it. So a lot of bidders, people who wanted to provide independent power who went through ESKOM, a lot were granted tenders without proper tender proceedings having been followed.</i>
P4	<i>Government has to make some decisions and give some direction. Once that happens the industry has said that they are supportive of the introduction of biofuels as long as it's done in a logical and rational manner.</i>
P6	<i>A lot of companies have lost money in biofuels right now, I can tell you that, and frankly again it will affect investor confidence but not just in biofuels. In my mind it will affect investor confidence in just about everything that government says.....</i>
P6	<i>It's a mandatory upliftment not a mandatory blending. The regulation isn't really written that well.</i>
P6	

	<p><i>Well frankly it's been very disheartening, I think all the individuals involved in biofuels have become very jaded when we look at government's ability to implement. We have actually become very negative.</i></p>
P6	<p><i>Unless it's something politically driven, something like nuclear which does not make much sense for the country seems to be going ahead hammer and tongs regardless of the fact it doesn't make a hell of a lot of sense. When we've got huge natural gas deposits next to us in Mozambique and we could be producing power from natural gas a lot cheaper and a lot quicker.</i></p>
P6	<p><i>I think biofuels has become an investors' cautionary tale that you cannot take government's call it high level plans seriously until they have fully implemented everything and they have crossed every 't' and dotted every 'i' on the regulatory front.</i></p>
P9:	<p><i>You can't ask for this and its brought to you and then you ask for that, and then you ask for that, it says to me you don't want to make a decision, decide!</i></p>
P9	<p><i>There is a time when you have got 80% of the information and then you must move if you get it wrong that's so, but you can never get 100%.</i></p>
P9	<p><i>We just wait. It is unfortunate that nothing has come out of the department of Energy so that we have some leadership input on that.</i></p>

Summary of Feedback:

There's a clear message of negativity being sent by the industry (including government agencies) against the government. The loss of confidence is well articulated in the respondent's frustration with regulatory uncertainty. Below is a summarised version of key respondent's feedback:

- Investors deem the South African government as pursuing a useless exercise of developing a law without the requisite regulations for its implementation. There also appears to be a track record of failure in government's ability to implement the country's key projects. For example, one of the country's important projects to increase the stability of the electricity supply, REFIT was cancelled due to government's lack of leadership in following due process for the appointment of key vendors.
- One of the respondents believes that political motivations as opposed to sound investment rationale drives government's implementation appetite.

5.7 Research Question Two: Participant Cooperation

Which participant's behavior within the transport biofuels value chain is not supportive of the introduction and formation of this industry?

Research question two set out to ascertain which other players within the transport biofuels value chain did not behave in a way consistent with the industry majority or didn't conform to institutional pressure to bring about investments in the sector. In the context of this research, if any participant didn't conform to the institutional pressure, then by implication their behavior was not supportive of the formation of the initiative in question. The concept of institutional pressure was introduced in the theory section of chapter two by Hoffman, Trautmann and Hamprecht (2009) and it is discussed further under the relationship to theory reviewed section below.

Respondents Feedback:

Table 5.7: Respondents feedback - Question 2

P1	<i>If there is biofuels available in the country to be blended it reduces income of oil companies. It's reduced in exactly in the amount biofuel will be blended to diesel or to petrol, because they have to buy it from the producer to blend it and to sell it....</i>
P1	<i>It is an additional activity they normally want to avoid so the support from the petrol industry is definitely not given</i>
P5	<i>The question is, if we invest in the actual blending facilities or in the processing of the bio-fuels considering that it is tedious, it's capital intensive and it's costly to handle the products, are we going to lose money or are we going to gain money or are we going to be neutral?</i>
P5	<i>It's not a business opportunity, it can be made to be an opportunity but even that has got a cost attached to it so, it would be quite a long term project in terms of it making money, it will not be implemented tomorrow, it's a long term project.</i>

P2	<p><i>At this present moment I don't know of any petrol chemical company that has come forward and said this is what I can offer to make this thing work. So as far as support broadly stated I don't think the support has been substantive or concrete enough. And I am sure they have their own valid reasons for that.</i></p>
P6	<p><i>Frankly my experience working at company YYY and XXX, has been initially there was actual hostility from the petroleum industry. The whole biofuel initiative has been perceived as a nuisance investment so the oilcos a few years ago were just seeing this as more of a hassle so there was general resistance, this was more of a pain.</i></p>
P9	<p><i>I think that you can disrupt my operations if I am going to get a financial benefit so I think for them they are holding the shortest end of the stick and therefore they are an unwilling party; that's my personal assessment.</i></p>
P9	<p><i>So the blenders in my view have got to have a buy-in, because people can stifle things with excuses you know. The regulations are not enough I tell you, we will finish these regulations and the oil companies are going to hold us ransom. They are going to hold us hostage. You have to force the oil companies to come to the table.</i></p>

The broader industry doesn't believe that major oil firms are supportive of the introduction and formation of the transport biofuels sector. The main reason being that they perceive it as an activity that will make oil firms lose income as it will displace their current volume by the mandatory blended equivalent. Additionally, for the effort expended, there's a belief that it will merely make them cost neutral.

Over and above these financial reasons, the participants have a general negative perception of oil firms holding the industry hostage and being unwilling participants.

Further discussions with the oil industry however, reveal the reasons for the lack of participation as captured in the below feedback:

Table 5.8: Respondents feedback - Question 2 – Reasons: lack of participation

P4	<p><i>As far as oil companies are concerned, there are costs of taking up biofuels and they cannot see a return on that investment. They need some kind of cost recovery mechanism.</i></p>
P5	<p><i>So, if the model that is being proposed with the legislation in the actual regulation does address the cost part of it. Then? Then we are more than willing to do it, I am not saying that we are not willing to do it, but then, you know, we need to look at the whole future</i></p>
P2	<p><i>I can tell you that here at our firm we have a couple of petroleum clients, I cannot mention names; but one of our major petrol clients was very excited about the project. They were prepared to find an entrepreneur who was promising and would help that entrepreneur develop their business so that they could give him a contract.</i></p>
P5	<p><i>It's something that we do recognise the value in the country so, what it does for the economy that is being recognised so, yes, from that point of view, you seek a willingness to participate but I will be honest with you, the project is very tedious and it's a costly</i></p>
P5	<p><i>It's very important that it doesn't come out as if we do not want to do it, however in reality, it's a project which has to make money for us, we are a capital organization so, whatever we do has got to make money for us</i></p>

P5	<p><i>We have a recognition that we are operating in a society or in a country where there are objectives, everyone has got objectives, national objectives, of course job creation, poverty alleviation, currently land utilization, we are operating in a country that has got all of those so. We are not going to say we are not going to be involved, if the government comes and says this is for poverty alleviation, we are not going to say we are not going to do that. We are not going to fork out money and just go through with it, but we are saying just meet us halfway because the project as a whole, it does alleviate poverty, the entire project.</i></p>
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The above response from the oil companies confirm that they are not willing to participate in the sector unless key financial fundamentals have been put in place. They are supportive of the job creation and poverty alleviation aspirations of the initiative but the transport biofuels project's financials should intrinsically hold value.

5.8 Research Question Three: Other Necessary Conditions

What are other necessary conditions for the introduction of biofuels in SA?

Over and above the regulatory, pricing and subsidy related conditions, there were indications that other factors at play were necessary for the introduction and formation of the biofuels industry.

Respondents Feedback

Table 5.9: Respondents feedback - Question 3

P2	<i>The one I can think of is entrepreneurial will. You cannot do this without entrepreneurs</i>
P6	<i>There are some headaches with ethanol because there is something called the RVP the Rate Vapor Pressure that goes up which is also one of the constraints but typically what they do in the USA and the EU, what happens is that they are given a waiver if you are blending ethanol. So they anticipated the same thing happening here in South Africa you get these very strict Clean Fuels 2 requirements you throw in ethanol, you meet at least one of those very strict requirements</i>
P10	<i>You can buy in the interim from other producers from the likes of Hulett's, the big sugar producer, you can buy sugarcane from them for the time being until the backend of the supply chain is set up appropriately. All the other kinds of issues, tax issues, transportation issues all of that can be resolved</i>

Summary of Feedback

Over and above entrepreneurial will, respondents believe that the use of biofuels such as ethanol will assist the oil companies in meeting the Cleaner Fuels II mandate as set out by the Department of Energy and thus act as a catalyst for industry kick off.

6 CHAPTER 6

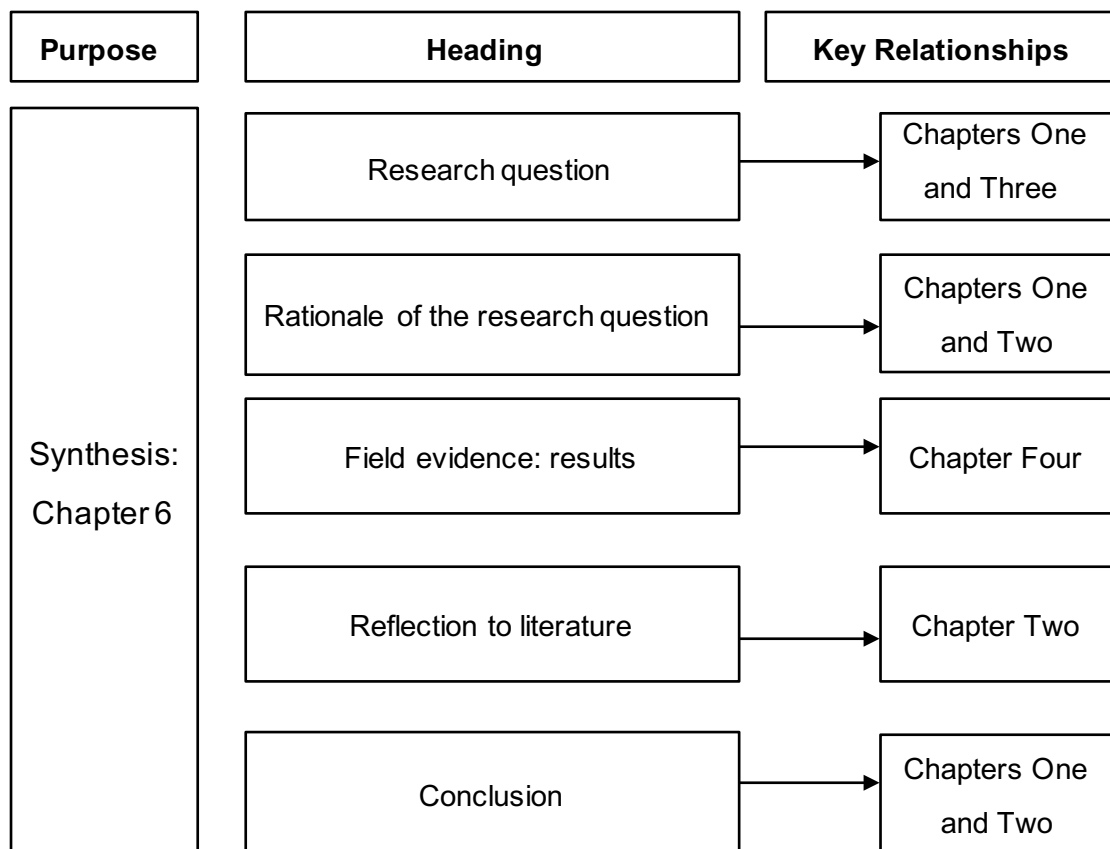
6.1 Introduction

Chapter five discussed the data collected from the field in the quest to respond to the four research questions outlined in chapter three. These questions were identified in chapter one as a result of the impact that regulatory uncertainty has had as a perceived reason leading to the lack of investments in the transport biofuels sector of South Africa.

Therefore, in this chapter, all the four research questions will be used to drive the discussion to synthesize all concepts and collected data against theoretical underpinnings discussed in the literature review section, chapter two.

For ease of comprehension and to solidify the relationships with all the report's chapters, the following approach in figure 6.1 is adopted in the discussion of chapter six.

Figure 6.1: Synthesis Approach



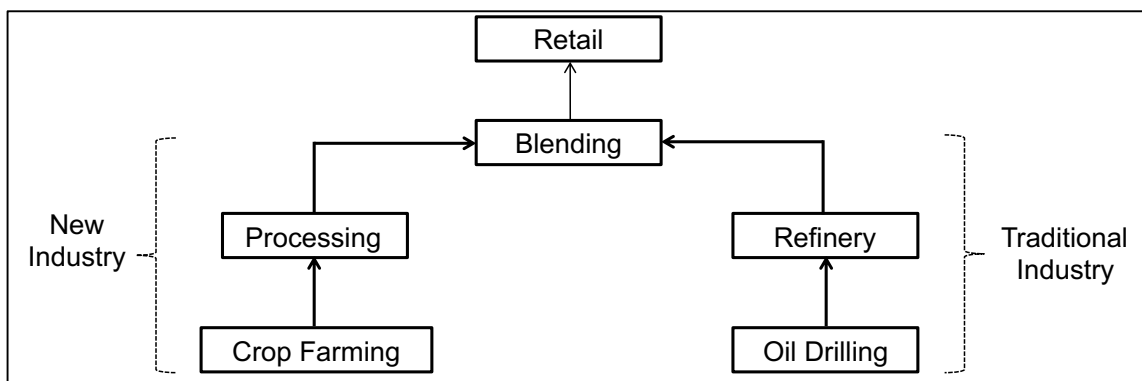
As the collected data is a key part of the synthesis process, concerns around the limitations of the sample and methodology used will be discussed in relation to the

literature.

Finally, in the concluding section of each research question, the discussion will state if research objectives were met, confirm the literature with reference to the collected data, dispute and (or) form an opinion.

The overall conclusion of this chapter, will make reference back to the convergence of fossil fuels and agro-based industries which effectively gave rise to the regulatory uncertainty experienced in the formation of the transport biofuels industry. This concept was introduced in chapter one and as re-captured in figure 6.2 below for ease of reference:

Figure 6.2: Convergence of agro-based and traditional fuel industries



Adapted from Department of Energy (2014)

Literature reviewed highlighted the impact of uncertainty around investor behavior and in conjunction with chapter one, formed the basis of the primary research questions under study. That is, the impact of regulatory uncertainty on investor behavior and the associated costs of the same uncertainty.

From a process perspective, this chapter continues with the cohesion structure outlined in **Error! Reference source not found.** of chapter one.

6.2 Research Question One: Impact of regulatory uncertainty

- i. What is the impact of regulatory uncertainty on investment activation in the transport biofuels industry in South Africa?
- ii. What is the financial cost of regulatory uncertainty for investments in the transport biofuels in South Africa?
- iii. What is the impact of regulatory uncertainty investor confidence?

6.2.1 Question Rationale

Chapter one of this research stated the reasons for the South African government to introduce the concept of transport biofuels. A matching strategy with targets was formulated and approved by cabinet. Additionally, biofuels incentives in the form of tax breaks and depreciation benefits were also available to incentivise the introduction and development of the industry. However, there is still no transport biofuels projects in South Africa.

Non-academic articles have directly linked the reason for the lack of transport biofuels as arising from regulatory uncertainty. Therefore, with the benefit of theoretical considerations there's a need for an academic study to test these assertions and understand what the cost of the delays has been as well as the resultant impact on investor confidence. The research further test what level of incentives and subsidies would be required to bring about investments.

6.2.2 Summary of Evidence from Data

- **Investment Postponement**

As seen in appendix one, the respondents were given five options in the questionnaire as probable causes of delayed investments in the transport biofuels industry. Namely; Regulatory, Financial, Investor Confidence, Supply/demand levels of biofuels and other. Respondents have articulated the regulatory uncertainty as the cause of the delays in transport biofuels. Most specifically, it's the regulatory uncertainty around pricing, subsidies, incentives and the timing of these aspects.

- **Cost of Finance**

In addition to delayed investments due to uncertainty, findings from the data reveal that uncertainty resulted in lost early stage investment as nine of the eleven biofuels startup manufacturing companies have closed down. These firms lost investments in financial, time and effort expended. Table 6 below summaries the estimated financial losses:

Table 6.1: Estimated financial losses by investors

Biofuels Startup Firm	lost investment (R million)	Comment
Firm A	120	
Firm B	2 + 5	Two syndicated investments
Firm C	127	
Firm D	110	
Firm E	60*	Ave. of the reported R 50 million; R60 million and R 70 million
Firm F	20	
Firm G	20	
Firms H, I & J	30	R10 mil for each firm
Total	R494 million	

Source: Respondents interviews data

One respondent estimated that the total estimated spent so far is in the region of ZAR 0,5 billion to ZAR 1 billion. Therefore, conclusively with this range and the reported figures above, it is reasonable to assume total spend as **ZAR 750** million, being the mid-point of ZAR 0,5 billion and ZAR 1 billion.

Although non-financial costs don't affect the cost of credit, they are worth reporting in a discussion about the cost accruing from regulatory uncertainty. Below is a summary of these non-cash costs as reported by respondents:

- **Manufacturers:** Effort expended in feasibility studies, government lobbying, fund raising, environmental impact assessments, site applications, licensing and so forth. One manufacturer reported a total of 50 employee effort with 20 based in South Africa and 30 globally.

- **Banks and other financiers:** Effort expended effort in the evaluation of the business cases for entrepreneurs in the arranging of finance
- **Major oil companies:** Although they were seen as unsupportive, they expended effort in lobbying government and in early stage preparations at depots levels for blending purposes

- **Government:** The regulators and their associated agencies equally devoted a fair amount of time in the development of biofuels industry.

- **Investor Confidence**

Below is a list of verbatim quotes made by respondents' which lead to the conclusion that investors have lost confidence in the implementation of the biofuels industry:

- *A lot of companies have lost money in biofuels right now, I can tell you that, and frankly again it will affect investor confidence but not just in biofuels*
- *Well frankly it's been very disheartening*
- *I think all the individuals involved in biofuels have become very jaded when we look at government's ability to implement*
- *We have actually become very negative.*
- *I think biofuels has become an investors' cautionary tale*

Reference was also made to REFIT (Renewable Energy Feed – In Tarif), one of the failed renewable energy programmes conceived by the department of energy. (REFIT) Therefore, there's perception of continued inability at government's level to implement strategy initiatives in the energy sector.

6.2.3 Regulated Fuel Price and Related Subsidies

In the preceding sections, respondents clearly mentioned that regulatory uncertainty on pricing and related subsidies are a hindrance to the development of the industry. Below are the estimated levels of subsidies they believe are necessary. Their views are diverse given the participant's different contexts and motivations:

- 4 – 5 cents per litre
- R2,50 per litre
- Full rebate on fuel levy, which according to one respondent it's believed to be R3,10 per litre

- A subsidy to ensure 15% return on assets (ROA), which is what government previously proposed
- Some simply state that a “huge” subsidy is required
- An auctioning mechanism to determine the correct level of subsidy, for example R2 a litre

Per above feedback, it's clear that there's no single subsidy that participants agree on. Therefore, a decisive value would be required. To this end, one of the participants has suggested that the regulator should hold a competitive auctioning process to determine the accepted level of return on assets.

6.3 Snapshot of key quotes by respondents

Below is a list of noteworthy quotations directly from respondents per section of the above findings.

Investment Postponement:

P10: The main thing for biofuels producers for not investing is the fact that they just don't know what the subsidy is going to be.

P7: Regulatory and policy certainty are critically important. Investors need guarantees.

P6: Without the regulated selling price it's a toothless regulation.

Cost of Finance:

P6: ...if I look at the entire biofuels industry if you look at our cash spend, if you look at the total cost to date I mean I would think the industry has probably burnt easily half a billion rand conservatively.

P6: I don't think we will get any further investment in our firm. Frankly it would be a very reckless investor who will recapitalize us because things have just not happened from a regulatory perspective.

P6: No biofuels producer will get finance from the bank which means they won't start construction. This is not an international investment opportunity, nobody probably is going to go, wow South Africa it's such a wonderful opportunity for biofuels, nobody.

P6: Mandatory blending regulations so from the bank's point of view, I mean the banks are very risk averse, from their point of view regulation is higher than a contract.

Investor Confidence:

P6: Yes, we just wait. It is unfortunate that nothing has come out of the department of

Energy so that we have some leadership input on that.

Regulated Fuel Price and Related subsidies:

P4: Without proper pricing framework within our regulated markets and for surety for investors that there will be an adequate return from the investment, there will be no investments.

6.4 Relationship with Reviewed Theory

The collected data is evaluated against reviewed theory in two ways;

- Effects of regulatory uncertainty on investments,
- Regulated fuel price on transport biofuels and;

Effect of Regulatory Uncertainty:

Doh and Pearce II (2004) define a discontinuous uncertainty as a temporary anticipated intervention in the business environment such as the introduction of a new regulation.

Regulatory uncertainty affects investments in three ways, investment postponement, increase in finance costs and reduction on share price due to low investor confidence.

- **Investment Postponement:**

When investors and organisations are faced with a condition of uncertainty they delay investment in long term capital commitments until more information arises (Marcus & Kaufman, 1986). Furthermore, consistent with the real options theory, firms will delay capital spending in long term and irreversible investments particularly when there's enough uncertainty to guarantee that the delay might result in additional value for investors (Linnerud, Andersson, & Fleten, 2014).

- **Cost of Finance:**

The additional effect of regulatory uncertainty is its negative impact on the cost of finance in that financiers increase interest rates to account for the relatively higher risk associated with regulatory uncertainty (Gilchrist, Sim, & Zakrajsek, 2010).

- **Investor Confidence:**

Literature review also shows that regulatory uncertainty affects shareholders as it reduces the share price due to loss in investor confidence. The opportunity cost

of investing in shares of a company that is under a great deal of regulatory uncertainty rises when the firm in question is faced with irreversible investment decisions (Pastor & Veronesi, 2012).

Regulated Fuel Price and Biofuels:

As chapter one and two articulated, fuel price in South Africa is regulated. One of the fuel price components is the basic fuel price (BFP) and it's a key factor of the required regulatory certainty on the subsidy level to bring about activity in the transport biofuels (Pradhan & Mbohwa, 2014).

6.5 Conclusion to Research Question One

The objective of research question one was to assess the impact that regulatory uncertainty has had in terms of investment activation in transport biofuels. Firstly, the findings from the respondent's data reveal that biofuels investors delayed investment in long term irreversible capital investments due to regulatory uncertainty.

This view is supported by Yang, Burns and Backhouse (2004), that although organisations need to adapt to their operating environment, uncertainty as part of the same environment has led to many industrial failures due to postponement by would be investors.

Secondly, data also revealed that investors lose money during periods of continued uncertainty. Specifically in this context, an indicative computation of about R750 million of essentially irretrievable sunk investment has been lost by start-up firms in the transport biofuels sector. This further confirms the literature that uncertainty increases the cost of credit as financiers reflect the associated level of risk with high interest rates (Gilchrist, Sim, & Zakrajsek, 2010). The opportunity cost of these irreversible capital investment projects increases with the ongoing uncertainty (Bontempi, Golinelli, & Parigi, 2010).

Thirdly, findings in the data also confirm that regulatory uncertainty leads to a loss in investor confidence. As one respondent put it, this will affect future projects as well: "*P6: I can tell you that, and frankly again it will affect investor confidence but not just in biofuels*"

In terms of pricing, there was overwhelming evidence to confirm a potentially significant level of subsidies will be required to support the viability of the new sector. This scenario

is well aligned with the consequential impact of regulated pricing scenarios akin to that in South Africa in the form of the BFP framework (Borman, von Maltitz, Tiwari, & Scholes, 2013). Furthermore, it confirms that the integration of the new agricultural based fuel industry with the established rules of the mature fossil fuels industry will be a complex and challenging process.

In closing regulatory uncertainty constricts economic growth due to project delays, losses in investments, high cost of finance and other future investment losses arising out of the due the reduced investor confidence.

6.6 Research Question Two: Participant cooperation

Which player's behavior within the transport biofuels value chain was not supportive of the introduction and formation of this industry?

6.6.1 Question Rationale:

As outlined in chapter five, research question two seeks to ascertain which other players within the transport biofuels value chain did not behave in a way consistent with the industry majority or didn't conform to institutional pressure to bring about investments in the sector. In the context of this research, if any participant didn't conform to the institutional pressure, then by implication their behavior was not supportive of the formation of the initiative in question. The concept of institutional pressure was introduced in the theory section of chapter two by Hoffman, Trautmann and Hamprecht (2009) and it is discussed further under the relationship to theory reviewed section below.

6.6.2 Summary of Evidence from Data

There was general consistency from respondents in terms of the experienced lack of support for the introduction and development of the transport biofuels industry by the major oil companies (or blenders) operating in South Africa. The negative behavior stated by respondents includes:

- Hostility
- Resistance and
- Unwillingness to participate

Furthermore, respondents believe that the oil companies see the transport biofuels as a:

- Nuisance
- Hassle
- Pain and
- Tedious investment

As further stated by respondents, the major reasons for the oil companies' unsupportive behavior towards the development of the industry includes:

- **Loss of income:**

As the oil brands currently sell all their output in the market place, the blending rates will displace their fuels volume (by the mandatory blending rates; E2 and B5). For example the E2 rate will displace the oil companies volume by two percent as it must now be bought from the biofuels manufacturers.

- **No benefits:**

The costs for establishment and ongoing operation of blending facilities will be neutral. That is, no additional profit for additional effort.

Feedback by the oil companies and some agents of government states that oil companies do see biofuels as a *nuisance investment*. However, given their strong imperative to deliver returns to shareholders, they are willing to participate in the project if it makes financial sense for them. In other words, if the effort expended has a commensurate financial return.

6.7 Relationship to Literature Reviewed:

Theory advises that although investors tend to postponement investment during times of regulatory uncertainty, there are compelling reasons for the same investors to proceed with their investments during such uncertain times. Reasons mentioned include:

- i. Securing competitive resources as required by the resource based view (RBV)
- ii. Leveraging the first mover advantage
- iii. Leveraging complementary resources
- iv. Reducing institutional pressure
- v. Applying flexible strategies and
- vi. Participating in policy making

For the purpose of this research only the fifth reason, that is, reducing institutional pressure, was tested. Literature on reducing institutional pressure with regards investments under conditions of uncertainty stated that firms in the same industry will show similar characteristics and behaviours when they are faced with the same external pressures. This pressure comes from normative or cognitive institutional environment. Normative pressure will force firms to comply with norms that are generally right in order to please stakeholders such as suppliers, government, non-government organisations, customers and even society as a whole (Hoffman, Trautmann, & Hamprecht, 2009). The same concept partly explains why competing firms will counter a competitor's offer in the

market place in order to regain favour with customers and other stakeholders (Makadok, 2010).

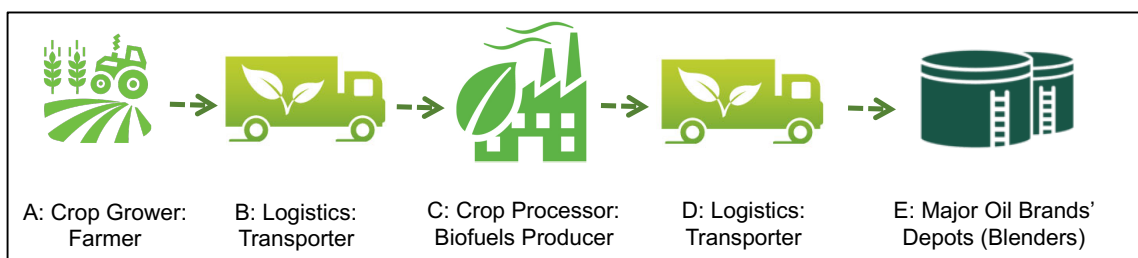
When applied to investments or the introduction of products which increase consumer welfare, firms may invest in new plants or develop new offerings to reduce institutional pressure. Equally, the competition may conform to normative and cognitive expectations and thus follow suit to alleviate institutional pressure. This behaviour was experienced in 2012 in Germany when the power generation industry faced high levels of regulatory uncertainty from the European carbon emissions trading programme. (Linnerud, Andersson, & Fleten, 2014)

6.7.1 Conclusion of Research Question Two

Literature on reducing institutional pressure with regards investments in under conditions of uncertainty state that firms in the same industry will show similar characteristics and behaviors when they are faced with the same external pressures (Hoffman, Trautmann, & Hamprecht, 2009).

In the context of the transport biofuels industry and its participants as discussed in chapter two and captured by figure 6.3 below, the major oil companies or blenders are critical players in the value chain. This is reinforced by figure 10 above and chapter one.

Figure 6.3: Participants in the transport biofuels value chain



The evidence from data collected suggests that even if other players in the industry have publicly demonstrated participation in the formation of the transport biofuels industry, the oil companies are not conforming to this institutional pressure. Their participation will only be forthcoming if there are material benefits.

Therefore, the evidence from the data disputes theory that firms in the same industry will

conform to institutional pressure and invest even under conditions of regulatory uncertainty.

As stated by one respondent, the industry needs to force oil companies to participate through mandatory blending regulations. However, even that will not be sufficient as expressed by this respondent: *“P9: The regulations are not enough I tell you, we will finish these regulations and the oil companies are going to hold us ransom. Is that the right word? They are going to hold us hostage.”*

The objectives of research question two were two fold; to identify non-governmental participants who's behavior was not supportive in the formation of the industry and therefore not consistent with the theory on institutional pressure. The identification of these participants is important in that special focus can be paid to them.

6.8 Research Question Three: Other

What are other necessary conditions for the introduction of biofuels in SA?

6.8.1 Question Rationale

Over and above the regulatory, pricing and subsidy related conditions, this question seeks to uncover other necessary conditions critical for the establishment of the industry.

6.8.2 Summary of Evidence from Data

Respondents mentioned the following points as other key conditions necessary for the introduction of transport biofuels:

- Entrepreneurial will
- Availability of crops
- Supply chain issues related to feedstock

6.8.3 Snapshot of Key Quotes by Respondents

P2: The one I can think of is entrepreneurial will. You cannot do this without entrepreneurs

6.8.4 Relationship with Reviewed Theory

According to theory, entrepreneurs thrive in uncertainty. However, this is dependent on the type of uncertainty in question (McKelvie, Haynie, & Gustavsson, 2011).

In the case of transport biofuels, the delayed investments are evidence of coherence with theory that continuous uncertainty such as the one in regulation will kill entrepreneurial action.

6.8.5 Conclusion to Research Question Three

Although evidence from one of the respondents suggest that one of other required factors to develop the sector is entrepreneurial will, bigger evidence as suggested by the investment delays proves that regulatory uncertainty is more significant a factor than entrepreneurial will when investment in irreversible projects is required.

6.9 Conclusion to Chapter Six

The purpose of the research questions was to seek answers to the lack of investments in the transport biofuels by following an academic process to examine the specific issues. Respondents feedback was evaluated against theoretical underpinnings in regulatory uncertainty and pricing frameworks particular to regulated contexts as is the case with the South African fuels industry.

Despite research limitations around the size of universe, related sample and the infancy of the transport biofuels in the country, some research objectives were met and in one case modifications to theory are proposed.

The research confirmed that regulatory uncertainty leads to investment postponement, negatively affects the cost of finance and has a negative impact on the investor confidence.

In terms of investors pursuing their investments under conditions of uncertainty in order to reduce institutional pressure, evidence from the field suggests that where investors have considerable market power relative to other players in the same industry, they will not conform to institutional pressure. Therefore, this finding is proposed to the theory of institutional pressure.

7 CHAPTER 7: CONCLUSION

7.1 Introduction

The previous chapter synthesized results of data collection presented in chapter five with the business and academic research needs identified in chapter one and theoretical concepts outlined in chapter two. The result was a response to the research objectives set out in chapter one and expanded on in a question format in chapter three.

In many ways the findings for the first research question and its related subsets were concurrent with the theory on the impact of regulatory uncertainty and investor behavior. In the second research question however, findings were not consistent with theory and therefore an enhancement was proposed, specifically, where investors have considerable market power relative to other players in the same industry, they will not conform to institutional pressure and pursue investments in the face of regulatory uncertainty.

In this chapter, the background of the research questions and their objectives are outlined in the context of principal findings. Then lessons learned are presented in the form of implications for management. In the latter part of the chapter, research limitations are shared and suggestions for future research are proposed.

7.2 Principal findings

According to the South African government, the primary reason for the introduction of transport biofuels is to address issues of poverty, rural development and job creation. Furthermore, addressing these issues will contribute to a more vibrant economy and respond to the global warming challenge as set by the Kyoto protocol (Department of Energy, 2014). At the heart of the national development plan (NDP) is the development of the economy through interventions such as the transport biofuels. Amongst other things, successful development of this sector will assist the country in meeting the NDP objectives in the following way:

- Creation of 25 000 new jobs and thus reduce unemployment by 0,6%
- Economic growth will rise by 0,05% and;

- Deliver annual savings of R1,7 billion in balance of payments

As expressed by one the interviewed respondents: *“P1: the big difference is between having an intention and then doing it”*

Therefore, principal findings in this research are:

- Consistent with theory, regulatory uncertainty, particularly on pricing, results in lack of investment. Furthermore, uncertainty increases investments finance costs and reduces investor confidence. In the context of the NDP aspirations, this will not propel the country in realising the benefits of the transport biofuels industry.
- Given the implications of the pricing framework on industry progress the government must consider alternative funding mechanism for transport biofuels investors. Unfortunately applying the existing pricing rules of the new sector is not likely to bear desired fruits.
- The established industry participants such as major oil companies continue to receive negative perception from other participants. Their perceived lack of cooperation or conformance to the theory of reducing institutional pressure requires that government develop and implement compelling alternative ways of ensuring sector participation. As one respondent put it: *“P9: The regulations are not enough I tell you, we will finish these regulations and the oil companies are going to hold us ransom. Is that the right word? They are going to hold us hostage”*.
- Limiting regulatory uncertainty through participation in policy making gives firms insight into the strategic direction of the regulation (Engau & Hoffman, 2009). In the case of the transport biofuels, the regulator formed the biofuels implementation committee (BIC). This platform afforded participants an opportunity to gain insight into the regulation, however, it clearly didn't bear fruit as participants still mention uncertainty as a key factor of inactivity.

7.3 Implications for Management

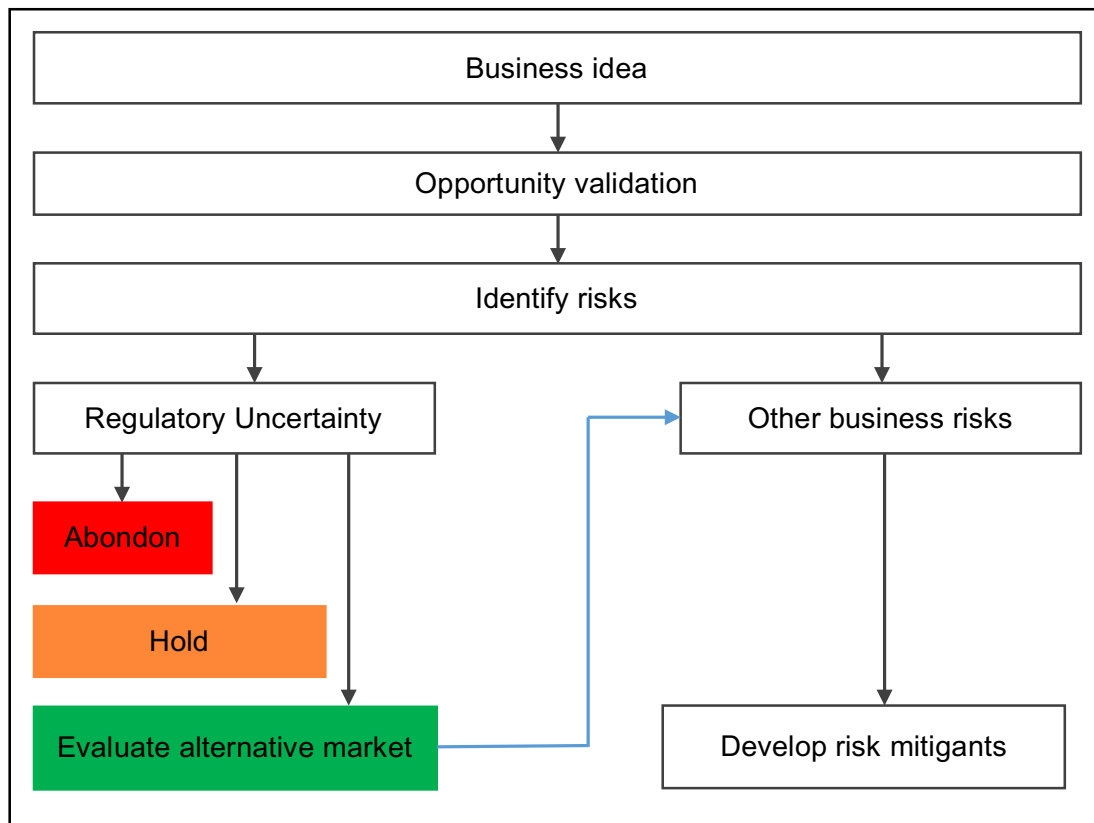
“The transition towards renewable energy production will not occur without the involvement of entrepreneurs who dare to take action amidst uncertainty” (Meijer, Koppenjan, Pruyt, Negro, & Hekkert, 2010). Uncertainty is part of every business. In fact, uncertainty is central to entrepreneurship action. The ability of entrepreneurs to identify uncertainty, assess the associated risk and develop mitigating alternatives around it is one of the determinants of the level of enterprise failure (McKelvie, Haynie, & Gustavsson, 2011).

Given the amount of lost investments by start-up transport biofuels manufacturing firms due to regulatory uncertainty, one of the key implications for management is that extreme caution must be taken where regulatory uncertainty is concerned. As one of the respondents advised: *“P6: I think biofuels has become an investors’ cautionary tale that you cannot take government’s high level plans seriously until they have fully implemented everything and they have crossed every ‘t’ and dotted every ‘i’ on the regulatory front”*.

The lesson for government officials is that ongoing uncertainty destroys value and delays the deployment of needed funds in opportunities that could enhance societal welfare. It is therefore suggested that South African regulators should seek to learn from how regulatory certainty advanced the development of the transport biofuels in developing markets such as Brazil and advanced economies like the United States.

The lessons learned culminate into figure 7.1, a proposed generic model for pursuing investment opportunities riddled by uncertainty. It is based on the synthesis of the literature reviewed and most importantly the collected data from investors who lost significant capital in the hope of developing the transport biofuels sector based on broad strategy documents developed by the South African government.

Figure 7.1: Proposed generic risk model for investments under regulatory uncertainty



Summary of process to be followed in the application of the model:

1. An investment opportunity arises in the form of a business idea
2. Validate the business opportunity by testing the underlying assumptions around customer needs, market size etcetera.
3. Identify the risks associated with the business opportunity
4. Group risks into two categories, regulatory and other
5. **If significant risks are classified under regulatory uncertainty, then:**
 - Consider abandoning the idea completely,
 - Holding off until greater insight into the strategic direction of the regulatory uncertainty has been established, or;
 - Evaluate alternative markets for your products;
 - Identify other business risks and;
 - Develop risk mitigants
6. **Where major risks are classified under 'other', then**
 - Develop risk mitigants

7.4 Suggestions for future research

The following are suggestions for future research:

- Consumer education in biofuels is important as the end users may not embrace it. For example, in Australia when ethanol was first introduced, consumers didn't embrace it as they believed it leads to higher fuel consumption. The logic was simple, ethanol has lower energy density and reduces engine performance. Thus necessitating harder acceleration to achieve desired performance. Ultimately this would lead to higher fuel consumption and expenditure. Research is thus required on the best approach of encouraging user adoption through consumer education.
- Feedback from the field has proved that government subsidies are required for transport biofuels. Given the projected number of 25000 jobs envisaged from the industry, each of these jobs will come at a cost. The key question is given other job creation opportunities the government has at its disposal and the limited financial resources, what is the comparable cost per job with biofuels and does the difference justify the pursuit of transport biofuels?
- Up to 15% of petrol is generally mixed with a chemical that increases its oxygen content so that it can burn (Antoni, Zverlov, & Schwarz, 2007). One of these chemicals is called MTBE (Methyl Tertiary Butyl Ether) and it is harmful to the environment (Birur, Hertel, & Tyner, 2007). A more environmentally friendly alternative is ethanol and can serve the same purpose.

The United States replaced MTBE with ethanol as one of the interventions to increase wide adoption of biofuels and to reduce toxins in underground water.

Therefore, there's a need for a study to determine if the replacement of MTBE with ethanol in South Africa could kick start the transport biofuels industry even in the midst of regulatory uncertainty.

7.5 Conclusion

This research has demonstrated the impact regulatory uncertainty has had on the development of the transport biofuels and the associated loss in economic value and consumer welfare. Moreover, it has demonstrated that uncertainty does breed inaction and that contrary to theory, institutional pressure does not necessary act as a catalyst for investments under conditions of uncertainty if the participants in the industry hold significant market power.

It is hoped that management in industries where regulatory uncertainty exists, will learn from the misfortunes of transport biofuels participants and apply an impartial, unemotional and rigorous opportunity evaluation process as proposed by the model in figure 13 above.

Leadership is an influence relationship among leaders and followers who intend real changes and outcomes that reflect their shared purpose (Daft, 2011). Therefore, as leadership involves influence and people to effect an intended change, trust and confidence in leadership are inherent requirements in this influence relationship. The lost investor confidence in the South African government has a negative ripple effect on many parts of the economy, including social activity, welfare and more importantly the unmet targets of the National Development Plan.

In closing, initiating change is not an end in itself (Maak & Pless, 2006). The South African government leadership needs to act as effective change agents to mobilise stakeholders, building and sustaining commitment among industry participants by reducing regulatory complexity.

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9 APPENDICES

Appendix I: Interview Guide

CONSENT LETTER

Dear Sir/Madam,

REQUEST TO PARTICIPATE IN AN INTERVIEW AND/OR SURVEY FOR THE STUDY OF BIOFUELS INVESTMENTS IN SOUTH AFRICA

I am studying for Master of Business Administration (MBA) at GIBS, University of Pretoria and are conducting a study on biofuels investments in South Africa. I request your participation in the research through a 30-40 minutes interview.

According to the Department of Energy (2014), it is envisaged that successful implementation of the biofuels industrial strategy will deliver economic benefits for South Africa. They include, the creation of approximately 25 000 new jobs, increase in GDP by 0,05% and R1,7 billion of balance of payments. Additionally, the SA government has amended applicable regulations and proposed incentives for investors. Despite this, we have not seen active large scale investments within the biofuels value chain, including; feedstock farming, storage, processing and distribution.

Therefore, I wish to understand financial or economic reasons for the lack of large scale investments in the biofuels value chain.

Your participation in this research is voluntary and you can withdraw at any time without penalty. We further assure you that all information shared will be kept confidential.

Should you have any concerns, please you can either contact myself or my supervisor.

Our details are provided below.

Kind Regards,

Researcher: Thabo Mongoma

Phone: 27 82 596 3899

Email: thabo.mongoma@gmail.com

Supervisor: Tanya Van Meelis

Phone: 27 71 193 5585

Email: tanya@morbeitradeandinvest.co.za

By signing this document, you agree to participate in the interview and give consent for your feedback to be used in the research.

Participant Signature.....**Date:**.....

Interview Guide

Why are we not seeing large scale developments in SA Biofuels?

The below questions are grouped in clusters. Please feel free to respond to questions which only pertain to your organisation.

- 1) Given the ongoing delays from a regulatory perspective, in your opinion, do you think the SA government takes Biofuels as a priority?

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.....
.....

- 2) From the petroleum industry perspective, do you believe there's support for the introduction of biofuels in South Africa?

.....
.....
.....

The following questions relate to reasons for the lack of large scale biofuels investments in South Africa:

- 3) In your opinion, what are key reasons for the lack of large scale investments in the biofuels value chain in South Africa? Please tick as many options as necessary in the list below and indicate which one is the most important:

- Regulatory
- Financial
- Investor confidence in SA government
- Supply/Demand levels of biofuels
- Other (please specify):.....

Please provide reasons for your choice above:

.....
.....

The following questions relate to government intervention:

- 4) What form of government incentives do you believe will bring more investment activity?

.....
.....

- 5) Please provide a range estimate for the incentives mentioned in 5 above (for example x cents per litre margin for wholesale fuels)?

.....
.....

- 6) Other than incentives, what other form of government intervention would be necessary to bring about investment in biofuels?

.....
.....

Regulatory and other:

- 7) As the regulations come into effect on 1 October 2015, how do you think South Africa will meet the mandatory blending targets?

.....
.....

- 8) To date how much has your company spent on Biofuels and therefore what would be the waste of continued delays in this space?

.....
.....

- 9) Do you have other thoughts that you'd like to share on the topic?

.....
.....

Thank you for your participation

Appendix II: Ethical Clearance

Gordon Institute of Business Science

University of Pretoria

Dear Thabo Mongoma

Protocol Number: **Temp2015-01822**

Title: **Biofuels Investments in South Africa**

Please be advised that your application for Ethical Clearance has been **APPROVED**.

You are therefore allowed to continue collecting your data.

We wish you everything of the best for the rest of the project.

Kind Regards,

Adele Bekker

Appendix III: Originality Report

The originality report generated by the Turnitin tool resulted in a similarity index of 14%, which is acceptable according to the GIBS research guidelines. Please refer to the Turnitin report starting on the next page.

Kindly note that the references or bibliography section of the research document was **not excluded** in the generation of the Turnitin report. When excluded, it returns an even lower similarity index of 9%. This report however, is not attached. Should the reader need to refer to it, it can be accessed from the GIBS Aspire system.