MOTIVES BEHIND THE IMPLEMENTATION OF RENEWABLE ENERGY SOURCES IN SOUTH AFRICAN BUSINESSES

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Abstract

There are numerous advantages and disadvantages for companies to implement renewable energy in South Africa. The motives (drivers or challenges) behind the decision to implement renewable energy resources or not is what this research will be addressing. Economic and environmental motives were the major motives behind implementing renewable energy sources in literature. The main objective for this research was to identify and describe the motives and challenges of implementing renewable energy sources in SA businesses, aligning these with sustainability pillars. The data collection method that was used in this research was documentation analysis and questionnaires. The companies that were chosen for this research were sampled from Kwa-Zulu Natal. Results showed that economic motives were the main decisions for companies implementing renewable energy or not, although there were also significant environmental and social motives that businesses need to consider. This research has provided an understanding of the motives that can have a positive or negative impact on companies who want to install renewable energy for their business.

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Chapter 1 - Introduction

1.1 Setting the context

Since South Africa's adoption of the Constitution in 1996, three government policy papers have been created as a foundation for South Africa's Renewable Energy (RE) programme and have been unambiguous in its mandate for a sustainable energy future (Department of Energy, 2015, p. 24). The policies have recently become a global phenomenon and have been receiving a lot of praise worldwide (Department of Energy, 2015, p. 24). South Africa was ranked by the United Nations Environment Programme (UNEP) among the top-10 renewable energy investing countries in 2014 (Department of Energy, 2015, p. 24). In the same year, South Africa "breached the 500 MW of utility scale solar power" (Department of Energy, 2015, p. 24), and (for installations sized 5MW and above) was the 10th biggest solar market in the world (Department of Energy, 2015, p. 24). In 1998, throughout the world renewable energy was still in its beginning phase and many people were sceptical of certain aspects of renewable energy, including the financial and technical reliability and viability, as well as the price at which the renewable energy technologies would be able to deliver (Department of Energy, 2015, p. 25).

1.1.1 Alternative Renewable Energy Sources available in South Africa

Renewable energy is defined as energy that is obtained from natural resources which can be cyclically replenished by nature (Luthra, Kumar, Garg and Haleem, 2015, p. 764). The different types of renewable energy sources available in South Africa include biofuel, hydro-power, solar-power and wind-power (Department of Energy, 2014, p. 1).

Biofuel is a renewable hydrocarbon energy source that results from biomass and has the potential to be a sustained alternative energy source of liquid fuels (von Maltitz, Haywood, Mapako and Brent, 2011, p. 1). According to Langeveld, Dixon and van Keulen (2014, p. 63) biofuel production and consumption in Brazil has been integrated in the economy and through dedicated research has assisted Brazil in providing an energy efficient fuel and an effective mitigation process of greenhouse gases. Although biofuel is accessible from a number of sources, in order to produce

the biofuel, the process requires special facilities that run on fossil fuels (Solway, 2008, p. 43).

Hydro energy uses the natural water cycle as a source to generate electricity (Luthra, *et al*, 2015, p. 764). Hydropower energy is dependent on flowing water, waves or tides (Solway, 2008, p. 45). A disadvantage could be the interference with the surrounding community's view and dams in the process; it may also destroy a major portion of natural areas and disturb human settlements (Solway, 2008, p. 45).

Solar energy is available mostly everywhere on the earth and there are sustainable technologies for solar energy which use only simple material (Zahedi, 2011, p. 4777). The resource that solar-energy develops can provide for all of the world's energy and there are no military or security risks that can occur from using it (Zahedi, 2011, p. 4777). Solar-energy is abundant everywhere and has minimal environmental impacts unlike other energy sources, furthermore there are many advantages associated with solar energy such as a decrease in fuel costs, easier maintenance procedures and it does not have to be transported (Zahedi, 2011, p. 4777).

The conversion of wind energy is a well-developed technology procedure and uses free fuel (Zahedi, 2011, p. 4777). It is assumed that in certain applications the production of energy cost is as low as other renewable energy technologies (Zahedi, 2011, p. 4777). The environmental impact of wind energy is very low and using wind energy adds to the security of energy supply and there is enough storage capacity to use as a base load (Zahedi, 2011, p. 4777). The production of wind energy does not produce as much pollutants as other energy sources (Saidur, Rahim, Islam and Solangi, 2011, p. 2425). Other positive environmental impacts that wind-power technologies create is the decrease in water consumption and a mitigation process that helps reduce greenhouse gases (Saidur *et al*, 2011, p. 2425). Wind-power is dependent on weather patterns and on the geographical location and can cause an impact on the environment such as endangering bird populations (Solway, 2008, p. 45). Other negative impacts of wind-power technologies include: noise pollution, where noise has an effect on reducing property values that lie within the radius of the wind-turbine construction (Saidur *et al*, 2011, p. 2428); wind

turbines also have a visual impact based on the characteristics of the wind turbine such as: the colours or contrast, the size of the wind turbine, how far it is located from local residences, the time period on whether the turbine is moving or stationary and the history of the wind turbine (Saidur *et al*, 2011, p. 2425).

1.1.2 Triple Bottom Line

In recent times, energy regulation has been a changing topic driven by economic, environmental, security, and social issues (Msimanga and Sebitosi, 2014, p 420). From a business perspective, sustainable development is the idea of implementing business strategies and methods that meet the needs of stakeholders and the enterprise while been able to enhance, protect and sustain natural resources for future generations (Weybrecht, 2014, p. 15). A way in which businesses can implement the idea is by using The Triple Bottom Line method which is an integrated focus on the communities where people (social), the planet (environment) and profit (economics) operate simultaneously in (Fry and Nisiewicz, 2013, p. 1). When a company is economically oriented, then its main considerations relate to employment and to maximising shareholder value; therefore, the more economically orientated the company is, the more its ethical and social factors will be of less importance (Wagner and Svennson, 2014, p. 343). Environmental and social issues must be prioritised instead of being second to economic outcomes and by initialising the triple bottom line approach, economic, environmental and social factors must be managed simultaneously (Wagner and Svennson, 2014, p. 343). With all these elements integrated and the way they affect each other, sustainability helps by seeing the world as a system and how different things interact with one another within that system (Weybrecht, 2014, p. 15). Recently studies over the past decade have shown that South Africa has a significant renewable energy resource base which indicates that South Africa has an important potential role in renewable energy development in the country's power supply (Pegels, 2014, p. 127). Major industries have considered installing alternative energy sources, as well as connecting these installations to their utility's electrical grid as a result of the increase in electricity demand (Pegels, 2014, p. 127).

1.2 Issues that were addressed in the research

The issues that were addressed in the research included the drivers and challenges (or barriers) that Kwa-Zulu Natal companies faced if they decided to implement or not renewable energy sources for their business. During the 2008 period, Durban went through a crisis of energy shortages and due to poor management of the national electricity supply, the entire country plunged into uncontrolled blackouts for the majority of the year (Aylett, 2012, p. 1387). With numerous advantages and disadvantages for implementing renewable energy resources, certain companies do not go through with the decision to implement renewable energy resources. The motives (which could be a driver or a challenge) behind these decisions to install renewable energy or not, is what the research will look for.

1.3 Why the research was conducted?

Due to the widespread availability of fossil fuels, coal reserves are the main generators of energy in South Africa (Sekoai and Daramola, 2015, p. 224). It has been indicated by mineralogists that as a result of South Africa being so reliant on coal to generate energy, this could reduce the minerals at a rate earlier than expected (Sekoai and Daramola, 2015, p. 224).

During 2015, many South African industries and companies were affected by the energy crisis (Donnelly, 2015, p. 1). It was considered to be a major threat to South Africa's economic outlook over the forthcoming years (Donnelly, 2015, p. 1). According to the Donnelly (2015, p. 1), economic growth could be suppressed to 1% of GDP for the 2015 year as a result of further deterioration in electricity supply. It was also noted that the mining and manufacturing sectors would be affected the most because of their "high-intensity electricity usage" (Donnelly, 2015, p. 1). The Kagiso Purchasing Managers' Index (PMI), which is a tool used to rate the productivity of the country's manufacturing industry (CIPS, 2013, p. 1), had dropped to 45.4 points in April in comparison to March where it was rated at 47.9 points, but then eventually going up to 50.8 points in May (Mannak, 2015, p. 1). Scores below 50 indicate a contraction and according to Mannak (2015, p. 1), load shedding was the main cause of this. The manufacturing industry was not the only sector affected in South Africa. The tourism, hospitality and retail industries were also victims of the

energy crisis. With regards to the retail sector, operational costs were increasing rapidly in many supermarkets, as well as a loss of production and increased waste (Mannak, 2015, p. 1).

Eskom has been South Africa's primary power utility, and since the beginning of 2008, they have been under immense pressure to meet the high energy demands across South Africa (Sekoai and Daramola, 2015, p. 224). According to the Energy Information Administration (2013, p. 1), Eskom has been functioning at full-scale as a result of the high energy demands throughout South Africa and it has been predicted that "Eskom operates at 40 gigawatts in comparison to the country's peak demand at 36 gigawatts" (Energy Information Administration, 2013, p. 1). This has caused extensive, recurring power outages throughout South Africa, which has resulted in a decline in the economy "estimated at 253-282 million US Dollars" (Energy Information Administration, 2013, p. 1). Eskom management has been criticised for numerous reasons including lack of investment, poor long-term planning, poor maintenance of the grid, a rundown infrastructure and shortfalls in corporate governance (Mannak, 2015, p. 1). This has been one of the few reasons that have prompted the need to explore cleaner high energy demands and even decrease carbon footprints (Sekoai and Daramola, 2015, p. 224).

The point of this research is to get a better understanding of the motives behind the implementation of renewable energy sources and to see if these motives are similar or if they differ in companies from the various industries in Kwa-Zulu Natal.

1.4 Objectives of the Research

The objective of the research is as follows: Identify and describe the motives and challenges of implementing renewable energy sources in SA businesses in the Kwa-Zulu Natal Region, aligning these with sustainability pillars. As stated above, the sustainability pillars consist of economic (profit), social (people) and environmental (planet), and the motives of the companies that were analysed in the research methodology were categorised into one or more of the sustainability pillars.

1.5 Outline of the whole study

For the purpose of this research, this thesis will investigate companies' motives for implementing renewable energy that are based in Kwa-Zulu Natal. The structure of this thesis proceeded as follows: in chapter 1, the introduction involved setting the context of the research as well as the issues that were addressed. In chapter 2, there was literature review on the motives, which were categorised as either drivers and/or challenges, that businesses could experience by implementing (or not) renewable energy sources; and evaluating the types of benefits associated with the motives including a descriptive overview of the economic, social and environmental aspects linked with renewable energy sources. This was followed by chapter 3, the methodology which provided information on how the research was conducted and how the data was collected. Chapter 4 contains the results and findings of how the data was analysed and a discussion of the research findings. Recommendations from the researcher will also be included in this chapter. The research was concluded in chapter 5 and it provided an overview of the study and literature, as well as an indication on how the objectives, main findings and recommendations relate to one another.

Chapter 2 - Literature Review

With the energy crisis that South African businesses have faced over the past few years (Mannak, 2015, p. 1), and the present generation and consumers viewing renewable energy as the way forward (Sekoai and Daramola, 2015, p. 224), businesses need to adapt in order to meet these changing stakeholder considerations and formulate strategies and possibly implement renewable energy sources to try and meet certain business or stakeholder requirements (Mohammed, Mustafa and Bashir, 2013, p. 453). Although the issues mentioned before are just examples of the numerous drivers or challenges that businesses have faced, this could result in businesses implementing or not implementing alternative, renewable energy sources (Mohammed, Mustafa and Bashir, 2013, p. 453). This chapter will address the motives behind the implementation of renewable energy sources in South African businesses.

A theoretical definition for the term motives for implementing renewable energy was defined in this research as "the drivers and challenges of an individual or a company" (Tulsian and Pandey, 2002, p.22). These terms were used interchangeably but for this research, "motives" was the term used. It is acknowledged that there are motives as to why organisations have chosen to go the route of sustainable practices, and in contrast, there are motives as to why businesses have not chosen the sustainable route (Bugaje, 2004, p. 2).

The growing demand in energy relating with social and economic growth in developing countries has caused limitations to carbon-based fuels to be the main energy supply source (Aslani and Mohaghar, 2013, p. 570). The option of alternative renewable energy sources is considered to be the safer process and could provide many benefits for international, national and local businesses compared to using fossil fuels (Karytsas and Theodoropoulou, 2014, p. 480). From a business perspective, renewable energy sources can contribute towards acquiring the main objectives set out by businesses (Karytsas and Theodorpoulou, 2014, p. 480). According to deLlano-Paz, Calvo-Silvosa, Antelo and Soares (2015, p. 50) replacing fossil fuel technologies with renewable energy sources creates many positive effects. Most of South African businesses rely heavily on fossil fuel-based energy sources,

predominately most of the energy is coal-generated electricity and Eskom is the main energy supplier for the entire country's electricity grid (Krupa and Burch, 2011, p. 6255). With the on-going energy crisis around South Africa and a revamping process of the national energy policy Eskom has embarked on, South African businesses and neighbouring African countries are looking to deploy renewable energy sources (Krupa and Burch, 2011, p. 6255). According to the U.S. Energy Information Administration (2014, p. 76), renewable energy sources are projected to becoming the fastest-growing source of electricity supply, exceeding the growth rate for natural gas-fired generation. South Africa has the potential to install renewable energy sources and possess many promising renewable energy resources (Krupa and Burch, 2011, p. 6255).

2.1 Eskom's Renewable Energy Rebate Program

Many companies in South Africa, especially in the manufacturing and agricultural industries, have been investing in renewable energy options (Thetard, 2016, p. 1). Over the years, electricity bills have been rising exponentially and with the option of installing renewable energy sources, it makes more sense for companies to go the renewable energy route than it did in previous years (Thetard, 2016, p. 1).

Eskom has created a rebate system for companies and households as part of their integrated demand management program where they conducted a rebate tariff system of "R1.20/kWhr consumed on-site over a three year period" (Thetard, 2016, p. 1). This program was introduced back in July 2012 and was used to significantly reduce the payback periods for renewable energy projects, as well as increase the usage and need for renewable energy sources (Thetard, 2016, p. 1). Recently Eskom announced that they have suspended this initial project as the "quota of 20 MW has been filled up" according to (Thetard, 2016, p. 1). Eskom is now engaging with NERSA (National Energy Regulator of South Africa) to extend and reassess the rebate program again (Thetard, 2016, p. 1).

2.2 Motives of Renewable Energy Sources

This section will deal with identifying the various motives that influence an organisation's decision on whether or not the organisation will implement or not

renewable energy sources. Tulsian and Pandey (2002, p.22-2) described business motives as the "needs, wants, drives or impulses within an individual or organisation". It is highlighted that business motives are expressions or primary energisers of an individual or organisation's behaviour which initiates the person or organisation to take action (Tulsian and Pandey, 2002, p. 22-2). Motives are linked with the direction of where the business is heading for the specific goals or achievements set out by the business (Tulsian and Pandey, 2002, p. 22-2). Motives may vary between businesses and is a continuous process that is goal-oriented and can relate to the interaction with the business and natural environment (Tulsian and Pandey, 2002, p. 22-2). Key motives will be identified through literature that will explain the decisions as to why businesses implement or not renewable energy sources in the various industries around South Africa.

2.2.1 Drivers of Implementing Renewable Energy Sources

Business drivers are mentioned as an attribute of a business function that motivates the behaviour and implementation of that business function in order to reach the business strategic objectives for the organisation (Baron, Clarke, Hertroys and van Oosterom, 2003, p. 16). For the purpose of this literature review, this definition will be used as the basis for the various types of drivers used for implementing renewable energy sources by the alternate South African industries. Important business drivers indicate the direction of where the business is heading towards and integrating the mission and scope of the organisation's projects (Baron *et al*, 2003, p. 16). Business drivers can either be internal or external. External business drivers are not under the organisation's control and normally occur outside or exterior of the organisation (Barksdale and Lund, 2001, p. 8). An internal business driver is caused by internal decisions within a business and may occur as a response to an external business driver (Barksdale and Lund, 2001, p. 8). Business drivers are a mixture of external and internal factors that direct an organisation's strategy and performance needs towards specific goals (Barksdale and Lund, 2001, p. 8).

The main drivers for the current focus on implementing alternative renewable energy sources include the energy crisis or power outages currently occurring in South Africa, as well as the climate change and fossil fuel depletion (Mezher, Dawelbait and Abbas, 2012, p. 315). Several factors that influence the promotion of renewable

energy sources include the variety of geographical conditions and certain energy policy barriers within the different countries across the world, as well as the impact of the environment associated with renewable energy sources and the availability of technological development (Mezher, Dawelbait and Abbas, 2012, p. 316). To help mitigate carbon dioxide and greenhouse gases that contribute towards global warming, some businesses have chosen to implement renewable energy sources to counteract climate change and get off the grid with regards to the power outages issue (Mezher, Dawelbait and Abbas, 2012, p. 315).

The potential, long term attractiveness of a growth market in renewable energy is another significant driver identified (Tate, Mbzibain and Ali, 2012, p. 402). It is also stated that due to climate change issues and mitigation of greenhouse gases, some businesses are looking to reduce or replace fossil fuel sources (Tate, Mbzibain and Ali 2012, p. 402). These issues are considered significant drivers for businesses implementing and going to renewable energy sources (Tate, Mbzibain and Ali 2012, p. 402). Within the agricultural industry, the drivers for farmers include the ability to reduce business costs and expand farm incomes (Mbzibain, Hocking, Tate and Ali, 2013, p. 32). These concepts represent a basic understanding that renewable energy can play a substantial role in contributing to farm business performance (Mbzibain *et al*, 2013, p. 32). The need to provide environmental benefits is another driver for agricultural companies adopting renewable energy where the business can combat climate change, reduce greenhouse gas emissions, providing clean air and reduce fossil fuel usage (Mbzibain *et al*, 2013, p. 32). This indicates that environmental benefits are linked with these specific drivers.

According to Barksdale and Lund, (2001, p. 8) an economic driver can occur through the variation of economic driven situations. Within the power sector, renewable energy can provide multiple drivers which can lead to possible benefits for the business. Zahedi (2012, p. 4775) states the integration of Renewable Energy–Distributed Generation (RE-DG) provide many opportunities and challenges. Generated electricity goes through high voltage transmission lines in central power stations and is distributed to other power stations and customers (Zahedi, 2012, p. 4778). Through this process, transmission lines increase the costs of a power system because they are an expensive component and some of the electricity

supplied by the power stations is sometimes lost in the transmission lines before it reaches the end consumer (Zahedi, 2012, p. 4778). As an economical driver, power stations using RE-DG will eliminate the need for transmission lines as they are connected to the distributed network and are closer to the load, therefore resulting in cost savings and reducing power loss (Zahedi, 2012, p. 4778). Other motives that influence power stations to implement RE-DG are the improvement in power quality and reliability of the service (Zahedi, 2012, p. 4778). This is due to the RE-DG being closer to the load centres which makes it easier to regulate the voltage system and there would be a reduction in the number of customers due to power outages (Zahedi, 2012, p. 4778). Using RE-DG enables power industries to protect and preserve non-renewable resources and limit the usage of non-renewables for electricity generation by using renewable resources (Zahedi, 2012, p. 4778). This can be seen as an environmental driver from a business point of view. An environmental driver can be classified as general categories of factors that can directly influence biodiversity (Globio, 2015, p. 1). Environmental drivers are also referred to as direct drivers, which are factors that explicitly influence ecosystem processes (Millennium Ecosystem Assessment, 2005, p. 57). Various examples of key direct drivers influencing biodiversity include climate change, habitat change, invasive species, overexploitation and pollution (Millennium Ecosystem Assessment, 2005, p. 57). Another environmental driver of RE-DG is once more for the power industries to mitigate greenhouse gases and move from using high carbon-based technologies to low or carbon-free technologies (Zahedi, 2012, p. 4778).

Government policies that promote renewable energy technologies are categorised by price-setting and quantifying-forcing policies that demonstrate direct prices and quantity strategies the South African government has opted to follow (Msimanga and Sebitosi, 2014, p. 420). Although the quantity-forcing approach is seen as a competitive bidding incentive for renewable energy sources, it is a limiting policy in the sense that it excludes certain stakeholders and the proposed quantity targets might not be suitable to achieve the required level set out by the government (Msimanga and Sebitosi, 2014, p. 420). A reduction in investment cost policies which can lead to cheaper, voluntary investments in renewable energy sources is another way government policies can promote renewable energy (Msimanga and Sebitosi, 2014, p. 420). Facilitating market activities and public investments provide

a broader range of public policies that cause a decline in market barriers and enhance emerging renewable energy markets (Msimanga and Sebitosi, 2014, p. 420). Renewable energy projects could have a significantly impact to the community where companies operate in. Large wind power projects, in some of the developed countries' rural communities, have created many employment opportunities (United States Government Authority Office, 2004, p. 2). A community can form a partnership with local firms or institutions that have installed renewable energy for their business (Devine-Wright, 2014, p. 38). If a community accepted an obligation to reduce greenhouse gases or make a commitment to energy conservation that is equivalent to the emission saving offered by the company or institution (Devine-Wright, 2014, p. 38).

Implementing financial procedures efficiently can have a significant role in decreasing business costs and renewable energy investments (Halff, Sovacool and Rozhon, 2014, p. 375). Examples of the factors that would decrease business costs include: capital costs through subsidies that favour sustainable energy solutions; operating costs would be reduced through tax credits; revenue would improve with carbon credits and a financial support would be provided through loans and guarantees (Halff, Sovacool and Rozhon, 2014, p. 375).

2.2.2 The Challenges associated with implementing Renewable Energy Sources

There is limited literature with regards to the definition of business challenges. For the purpose of this review, strategic challenges will be used in this context. Strategic challenges are referred to as "pressures or events that apply a critical influence on an organisation's ability to achieve future success" (Baldrige Glossary, 2002, p. 1). A list of barriers will be explained based on literature.

Climate change is illustrated as a major challenge to business operations and living standards within South Africa and neighbouring African countries (Krupa and Burch, 2011, p. 6255). According to the Intergovernmental Panel on Climate Change, (2007, p. 8) climate change refers to an alteration of climate that can be identified by certain changes based on the variability and average of its parameters that continues over an extended period. This change in climate can occur at any time as a result caused by natural or human activity (Intergovernmental Panel on Climate

Change, 2007, p. 8). South Africa has been ranked as an excessively high emitter of greenhouse gases based on the reliance of carbon-based fuels and having a relatively high energy concentration per unit of GDP (Krupa and Burch, 2011, p. 6255). The challenge of climate change can be met through developing low-carbon economic practices that are powered by renewable energy, which will result in improving the social and economic well-being of millions of people (Saadi, Miketa and Howells, 2015, p. 130).

A barrier can be stated as a business or individual's opinion or an understanding of concurrent operating factors and circumstances that emerge from either the business, or the system the business operates in where the circumstance has a negative effect on the process of the business and reduces the chances of obtaining the outputs that the business or individual wants to achieve (Biesbroek, Klostermann, Termeer and Kabat, 2012, p. 1127). Barriers can be classified as financial or economic barriers, environmental barriers, institutional, political and regulatory barriers, market barriers, social barriers and technical barriers (Luthra *et* al, 2015, p. 765). Certain barriers may be based in specific countries or regions or on particular technologies (Luthra *et al*, 2015, p. 765).

2.2.2.1 Challenges to investment/investing in renewable energy

Berns, Townend, Khayat, Balagopal, Reeves, Hopkins and Kruschwitz (2009, p. 7) indicated that there are three main challenges towards investing in sustainable matters. The first challenge is that in practice, forecasting and planning past the five-year time period is a difficult process and the calculations for the costs and benefits of sustainability investments within a specific time frame is challenging compared to the economic approach (Berns *et al*, 2009, p. 7). The next challenge is assessing certain factors of sustainability investments (Berns *et al*, 2009, p. 7). Some businesses find it challenging to put variables to externalities for their business activities and this makes it more difficult for the business to get a value for their sustainability investments (Berns *et al*, 2009, p. 7). The final challenge is for companies to plan against high uncertainty (Berns *et al*, 2009, p. 7). Strategic planning is a traditional practice for companies and companies try to predict certain factors for their business by evaluating certain standards and execute strategies based on the calculations (Berns *et al*, 2009, p. 7). Sustainability drivers are

unpredictable and require certain companies to adopt new practices and frameworks for their business (Berns *et al*, 2009, p. 7).

2.2.2.2 Capital Cost Increase

Renewable energy technologies are greatly expensive as literature states that it is more costly for businesses to import technologies which may be efficient, but would be cheaper to produce locally and require high primary investment costs (Luthra *et al*, 2015, p. 765). Due to businesses addressing the need for capital cost to be low rather than minimising operation costs, this may deter businesses' decisions from adopting renewable energy technologies (Luthra *et al*, 2015, p. 765). The development of distributing electricity in rural areas is an important long-term investment plan and many African countries face financial constraints due to a low national income, lack of capital and international funding to implement renewable energy technologies (Ahlborg and Hammar, 2014, p. 120). Transmission of electricity over long distances develops into a geographical barrier and leads to increased costs for the end consumer (Ahlborg and Hammar, 2014, p. 120). With regards to organisational and institutional barriers, implementation of renewable energy comes down to poor planning, inefficient legal frameworks set out at the national level for certain countries, and absence of human capital or ineffective project management (Ahlborg and Hammar, 2014, p. 121).

2.2.2.3 Insufficient Financing Procedures

Economic and financial problems are vital aspects that hinder the development of renewable energy sources in developing countries (Luthra *et al*, 2015, p. 765). There are hardly any financing schemes to encourage the adoption of renewable energy technologies by various businesses and industries, especially small and medium enterprises face a real financial difficulty in obtaining sustainable technologies (Luthra *et al*, 2015, p. 765). Insufficient government mechanisms are also a major barrier to promoting the adoption of cleaner technologies (Luthra *et al*, 2015, p. 765).

Recently NERSA held public hearings to finalise the new rules for solar photovoltaic (PV) generators (Thetard, 2015, p. 1). The suspension of the rebate program has had a negative impact not only on renewable energy projects, but also management

and owners have reconsidered their options on installing renewable energy sources or investing in cleaner energy sources (Thetard, 2016, p. 1). The disadvantage for renewable energy projects is that the payback period for them are generally lengthy (Thetard, 2016, p. 1), in comparison to alternative energy efficient technologies, where the payback periods are estimated to be less than 3 years and in certain cases 18 months (Thetard, 2016, p. 1).

2.2.2.4 Alternative Source to Fossil Fuel

Limitations for businesses using fossil fuel include the concern about security of supply and pollution (Waters, 2013, p. 122). According to Waters (2013, p. 122), "large quantities of gas and oil come from countries that are politically unstable". Reduced availability and fluctuating prices have led various businesses to uncertainty about using fossil fuel (Waters, 2013, p. 122). With the extraction of coal being a source of air pollution, fossil fuel has a negative impact on the environment and has caused some companies to look for alternative sources of energy (Waters, 2013, p. 122).

2.2.2.5 Inadequate Government Regulations

Different policies and mechanisms are developed for renewable energy technologies in various countries. In the year 2003, South Africa introduced a renewable energy policy called the "White Paper on Renewable Energy" where South Africa targeted their energy supply to be 4% renewable by 2013 (Langeveld, Dizon and van Keulen, 2014, p. 179). Policies and mechanisms for the development of renewable energy may not be similar or equal the target that was set out by government officials (Luthra *et al*, 2015, p. 767). Political interference, corruption and other political issues are major barriers for adopting renewable energy practices (Luthra *et al*, 2015, p. 767). The inconsistent behaviour from many developed countries have resulted in their failure to uphold their pledged agreements to support green initiated energy projects that have been implemented in specific developing countries, which has resulted in a lack of funding for renewable energy projects for the sub-Saharan African power industries (Suberu, Mustafa, Bashir, Muhamad and Mokhtar 2013, p. 636). Certain countries in sub-Saharan Africa are unable to exploit their renewable energy capabilities for electricity independently because of the development, demonstration, research and financial barriers of renewable energy that vary based

on the socio-political and economic demands of the specific country (Suberu *et al*, 2013, p. 636). There is also no initiative plan to integrate a renewable energy process within the sub-Saharan African regions (Suberu *et al*, 2013, p. 636). There is a higher cost for power sectors involved in distributing, generating and transmitting electricity as a result of low population density in rural areas (Suberu *et al*, 2013, p. 636).

2.2.2.6 Inadequate Technology

Inadequate technology is a risk that could possibly occur if the technology underperforms or becomes out-dated at an early (Luthra *et al*, 2015, p. 766). Renewable energy technologies are at a cost disadvantage in comparison with other primary energy sources on the basis that it is a new development approach (Luthra *et al*, 2015, p. 766). The flow of information and communication of technology transfer is one of the major barriers for industries and prohibits them to develop linkages within their businesses to obtain renewable energy technologies (Luthra *et al*, 2015, p. 766). Businesses have a chance to optimise the resources required to support their strategy if they utilise information technology efficiently (Luthra *et al*, 2015, p. 766). Consumers may not have access to the latest technology updates and information on renewable energy, which is a result in lack of awareness about the advantages and disadvantages of renewable energy sources and poor marketing strategies applied by businesses or suppliers of renewable energy parts (Luthra *et al*, 2015, p. 765). Most rural communities are unaware of or have not encountered renewable energy systems and technologies as a result of inefficient education, lack of information distribution of accessible government policies and support systems and the alternative renewable energy sources and technologies available (Luthra *et al*, 2015, p. 765). Another technical barrier is that the implementation of renewable energy technologies is difficult to produce and maintain (Luthra *et al*, 2015, p. 766). Studies and research on renewable energy are still in its development phase, especially in developing countries and there is a need for large investments in research and development for renewable energy technologies (Luthra *et al*, 2015, p. 765).

2.2.2.7 Geographical Barriers

There may be certain geographical constraints to implement renewable technologies and based on the area and weather conditions, specific renewable energy sources may be limited and inconsistent in production or service (Luthra *et al*, 2015, p. 767). Managers would need to take into consideration the different elements that may affect certain renewable energy resources, such as for solar energy, daylight hours are limited in certain areas (Luthra *et al*, 2015, p. 767), or access to certain renewable energy facilities due to inadequate terrain might be difficult for certain companies to implement renewable technologies (Jordan-Korte, 2011, p. 120).

2.2.2.8 Pressure from Media

The media, including business publications, magazines and outlets, have increased the awareness and importance of sustainable issues within the business environment (Esty and Winston, 2009, p. xii). Various media communications has greatly increased their coverage for business-environment topics, as well as special cover stories and sections on businesses that have gone green (Esty and Winston, 2009, p. xii). Esty and Winston (2009, p. xiii) have identified three key areas: 1) many stakeholders for companies hear about sustainability and going green messages frequently and therefore they are growing more concerned about the topic (Esty and Winston, 2009, p. xiii). 2) Due to the media interest in the environment, this represents a vote in confidence in the green economy and will continue to publish more stories on the issue (Esty and Winston, 2009, p. xiii). 3) Companies would have to be more concerned on how they operate in the green economy (Esty and Winston, 2009, p. xiii).

2.2.2.9 Pressure from Competition

There is generally a primary motive as to why certain companies go green including responding to their competitors (Andreas, Cooperman, Gifford and Russell, 2011, p. 217). A company that implements an environmental strategy to build competitive action could possibly change the competitive plating field (Esty and Winston, 2009, p. 84).

2.2.2.10 Convenience for Business

The question arises to whether renewable energy technologies are convenient or not for specific businesses (Maithani, 2008, p. 205). According to Maithani (2008, p.

205), a long-term strategy and policy is required for renewable energy to be convenient and play a role for a businesses that are addressing various factors or issues within the company. Those factors include low carbon growth which could contribute to increasing long-term economic growth, energy security, reduced fuel price, improved living standards, provide new business opportunities and the possibility of creating new job opportunities (Maithani, 2008, p. 205). For certain individuals and companies, money and convenience are strong motives when it comes to purchasing renewable energy technologies (Reynolds, 2016, p. 31). Specific individuals purchase renewable energy based on their beliefs and values on the environment (Reynolds, 2016, p. 31).

2.2.2.11 Environmental and Social Issues

There are environmental and social impacts that can occur through the implementation of renewable energy sources (Luthra *et al*, 2015, p. 767). As the human population growth expands, consumption and demand for natural resources will rise, which raises the question of whether the world's natural resource are capable of meeting the demands of the growth (Luthra *et al*, 2015, p. 767). For bioenergy projects, development, operational and technology costs are major barriers to the development of the projects as well as the impact of specific legislation processes (Tate, Mbzibain and Ali, 2012, p. 402). A natural barrier for bioenergy projects is the access and limitation of biomass usage (Pegels, 2010, p. 4947).

Global changes in energy policy have had a direct or indirect influence on promoting renewable energy incentives and barriers in South Africa (Msimanga and Sebitosi, 2014, p. 420). Literature has summarised that the most important barriers to renewable energy are competing fuels subsidies; environmental externalities such as certain renewable energy resources emit greenhouse gases and increase in capital costs (Msimanga and Sebitosi, 2014, p. 420). From a political perspective, some of the barriers include an inefficient legal framework for private power producers, integrating or maintenance of multiple renewable energy interconnection requirements and complex liability insurance requirements (Msimanga and Sebitosi, 2014, p. 420). There is also insufficient access to credit, new development requirements and risks in technology performance and not enough local technical or

commercial expertise available in South Africa (Msimanga and Sebitosi, 2014, p. 420).

2.2.2.12 Need for Storage Capacity

With alternative weather patterns and irregular geographical distribution of renewable resources, storing energy from renewable energy sources will be difficult (Luthra *et al*, 2015, p. 766). Due to the requirement of having a storage device to store continuous power, various industries will need to dispose of storage devices frequently which are a major environmental problem (Luthra *et al*, 2015, p. 766). As a result of the growing population, demand for electricity will increase significantly and having a few renewable energy sources implemented will not meet the required demand (Luthra *et al*, 2015, p. 765). Integrating multiple renewable energy systems with the main power grid is difficult to produce and maintain (Luthra *et al*, 2015, p. 767). Ineffective institutional policies have provided no support to renewable technologies and limited participation from the private sector, as well as reduced linked programs have reduced the motivation for existing mechanisms to accommodate for new emerging markets (Luthra *et al*, 2015, p. 765). Literature states that specific barriers in the United Arab Emirates (UAE) for the development of renewable energy sources include cost, market technology and policy legislation (Mezher, Dawelbait and Abbas, 2012, p. 324). These barriers are associated with infrastructure and institutional issues, a shortage of commercial skills and information regarding renewable energy development, a lack of comparative legal and policy mechanisms, high primary capital costs joined with inefficient risk management framework for fuel-prices and the exclusion of environmental externalities related to the cost (Mezher, Dawelbait and Abbas, 2012, p. 324). The deployment of renewable energy resources for the diffusion of both solar and wind-power technologies in Greece were hindered by the lack of financial resources, poor planning and lack of storage capacity, as well as inefficient connectivity to the main electrical power grid for all the islands of Greece (Eleftheriadis and Anagnostopoulou, 2015, p. 157). Literature states that the majority of renewable energy sources are classified as a long-term investment and recent studies shows that financial institutions prefer to invest in short-term projects, since renewable energy projects have a longer payback period and increased investment costs compared with fossil fuel energy sources (Eleftheriadis and Anagnostopoulou, 2015,

p. 160). Inadequate development of electricity grids has been a major setback for the expansion of renewable energy technologies (Eleftheriadis and Anagnostopoulou, 2015, p. 160). The physical infrastructure within the power sector is normally costly and with regards to private investment, does not produce sufficient returns (Eleftheriadis and Anagnostopoulou, 2015, p. 160). Complex and long bureaucratic processes of offering securities of building permits that is caused by insufficient skills and awareness for the deployment of renewable energy technologies (Eleftheriadis and Anagnostopoulou, 2015, p. 160). This leads to problems related to storage capacity plans regarding the suitability of building sites which has resulted in long litigation processes, therefore delaying the securities of building permits (Eleftheriadis and Anagnostopoulou, 2015, p. 160).

2.3 Expected findings based on literature

There are many opportunities and benefits for businesses to implement or approach renewable energy sources. The key findings of context found in literature show the main drivers that businesses implement renewable energy sources is based on economic (WWF, 2014, p. 14) and environmental aspects (WWF, 2014, p. 8), as well as through government interventions and policies they have put in place to combat the energy crisis (Delgado-Ramos and Carlo, 2015, p. 25). The economic drivers that were included were the possible financial opportunities and long-term returns on utilising renewable energy (Edenhofer, Pichus-Madruga, Sokona, Seyboth Kadner, Zwickel, Eickemeier, Hansen, Schlomer, von Stechow and Matschoss, 2011, p. 879). From the environmental perspective, climate change is the major driver for businesses to approach renewable energy technologies (Savage and Lin-Hen, 2012, p. 1). Governments issuing policies internationally, nationally or locally outline the importance and concern for higher energy demand and moving from carbon-based energy sources to carbon-neutral or carbon-free energy sources (Godwell, 2014, p. 26). All the drivers are linked to specific benefits which can improve operational procedures and help businesses identify and set attainable strategic goals (D'Amato, Henderson and Florence, 2009, p. 1). There are many economic disadvantages for various industries in developing countries and this hinders the decision of the industries as to whether they will pursue renewable energy development (Winkler, 2005, p. 30).

Climate change is outlined as the most serious challenge businesses and countries face (Edenhofer *et al*, 2011, p. 488). Businesses in South Africa depend on coal-fuel energy sources; as a result companies will find it difficult and complex to move to another alternative energy source and will be unable to mitigate greenhouse gases efficiently (Blowfield and Murray, 2014, p. 240). The key barriers identified in the literature were high capital costs for adopting renewable energy practices and the skills and expertise required to maintain and produce renewable energy technologies (IIED, 2013, p. 1). There is a gap between policies being authorised and the actual implementation of the policies from government officials (Godwell, 2014, p. 76). Government regulations need to be monitored and coherent with existing policies in order to avoid conflicting interests from the various stakeholders (Godwell, 2014, p. 158). Technological issues have also been key barrier to the deployment of renewable energy (Smith and Taylor, 2008, p. 107). Some concerns for businesses for adopting renewable energy technologies are based on the geographical locations (Smith and Taylor, 2008, p. 107). These motives experienced by various industries in South Africa and several countries have identified whether businesses adopt renewable energy sources on the basis of environmental, social or economic benefits, or have illustrated that businesses will obtain all benefits. The majority of the benefits were linked with economic and environmental benefits based on literature provided.

Chapter 3 - Methodology

In this chapter is an explanation of how the researcher gathered and analysed the data for the research, as well as information regarding the type of methodological approach that was used for this research. The goal of this research was to identify and describe the motives and challenges of implementing renewable energy sources in SA businesses within Kwa-Zulu Natal, aligning these with sustainability pillars. This will be done by: 1) assessing literature on the current state of renewable energy sources in South Africa, 2) identifying the various companies in Kwa-Zulu Natal that a) have implemented renewable energy sources for their businesses or not, and b) selecting the companies that were categorised in the same industry; 3) identifying the various motives and challenges that businesses have faced; and lastly 4) aligning these motives with the sustainability pillars that have been described in chapter 1.

3.1 What approach does the research question necessitate and why?

The paradigm that was used for this research is post-positivism, with the ontological view of critical realism (Guba and Lincoln, 1994, p. 110). Based on this view it is recognised that "posture of proponents that claims about reality must be subjected to the widest possible critical examination to facilitate apprehending reality as closely as possible" (Guba and Lincoln, 1994, p. 110). Post-positivism can be interpreted as "the belated fulfilment of logical positivism professed subordination of philosophy to science, the "naturalisation of epistemology" (Zammito, 2004, p. 8). The purpose of post-positivism would be to "argue for the pursuit of logic in discovery", as well as for the significance of multiple considerations in justification (Zammito, 2004, p. 13). The methodology that was used for this research was mixed methods, consisting of close-ended and open-ended questions in the questionnaire. According to Johnson and Onwuegbuzie (2004, p. 14), both qualitative and quantitative research is vital and useful. The main objective for mixed methods is to obtain the strengths and reduce the weaknesses of both qualitative and quantitative in single research studies (Johnson and Onwuegbuzie (2004, p. 15).

3.2 Which data collection methods are linked to the research?

It is specified that the post-positivism paradigm still rely on scientific methods to interpret and gather data, although the results are viewed as evidence-based probabilities instead of absolute truths (Guest, Namey and Mitchell, 2012, p. 7). The main objective was to produce a "reasonable approximation of reality" that is closely related to what is observed (Guest, Namey and Mitchell, 2012, p. 7). The data collection methods that are linked with the post-positivism paradigm include: participants' responses, observations (Guest, Namey and Mitchell, 2012, p. 7), surveys and questionnaires (Cleland and Durning, 2015, p. 246).

3.3 Which methods were used?

The data collection method that was used in this research was Likert-Scale questionnaires. All companies were sampled from Kwa-Zulu Natal for convenience of the sampling, as the researcher is based there.

A questionnaire was designed to obtain the participant's preferences from a set of statements (Bertram, n.d.) about the companies' motives in implementing renewable energy sources or not. The questionnaire contained close-ended and open-ended questions. This means the questionnaire has a stimulus that the participants read and then they selected the most appropriate response from dichotomous choices available (Paltridge and Phakiti, 2015, p. 88). The list of statements were the motives identified in the literature review and the participants selected from the choices available: 'Strongly Disagree'; 'Disagree'; 'Neither Agree nor Disagree'; 'Agree'; or 'Strongly Agree' if the motive that was indicated was based on their decision to implement renewable energy resources or not. An open-ended question was set at the end of the questionnaire whereby the participant was required to write a response to the stimulus question (Paltridge and Phakiti, 2015, p. 88). The stimulus question was indicated as follows: 'If other, please give a brief description of the motive'. This questionnaire was designed to produce objective data (Paltridge and Phakiti, 2015, p. 88).

3.4 How was the data collected?

The data was collected in the following manner: 1) based on convenience sampling, the companies that were selected were from the same industry and had either

implemented renewable energy resources or not. These companies were asked whether or not they would either participate, via email or through phone calls. 2) The participant then received four documents either electronically or via a hard copy for the participants to fill in. The first document was a participation letter informing them of the research and the procedure that was going to take place. The second two documents were consent forms which were read and signed by the participants: a) An informed consent form (see appendix 1) to allow the use of the participant's responses for academic study and b) An institution consent form (see appendix 2) to show that the researcher can conduct the research within their company. Finally the fourth document was the questionnaire for the participant to complete (see appendix 3). The participants could either complete the questionnaire electronically or if they chose to, via a meeting with the researcher to have a face-to-face interview. Participants had to indicate on the questionnaire 'Yes' or 'No' whether their company implemented renewable energy sources and then choose between five response alternatives: 'Strongly Agree'; 'Agree'; 'Neither Agree Nor Disagree'; 'Disagree'; or 'Strongly Disagree' for the listed motives on the questionnaire. If there was another motive involved that was not listed in the decision making process for implementing renewable energy sources or not, the participants were then instructed to include comments on their motive at the end of the questionnaire in the space that was provided for them.

3.5 How was the data analysed?

For this research, the data was analysed by using frequency distribution within a frequency table (McGraw-Hill Connect, 2011, p. 40). From there, the analysed data was then aligned with the sustainability pillars: economic, social or environmental. A discussion then followed after the analysed data had been aligned.

3.6 How were the participants chosen?

Convenience sampling was used to focus on certain characteristics of industries that have the highest energy usage rate in South Africa, as well as the companies that were selected from the KZN Top Businesses in their respective sectors, which was provided online by the KZN Top Business Portfolio website (http://kzntopbusiness.co.za/site/kzn-top-businesses). These sectors were selected

because according to the Energy Research Centre (2009, p. 1), the sectors that use the most amount of energy are the industrial and mining using more than two-thirds. Of South Africa's petroleum products, the transport sector uses three-quarters therefore there should be measures implemented to improve the efficiency within these sectors (Energy Research Centre, 2009, p. 1). Within those specific industries, the sampling sizes were made up of ten companies (two companies from each industry: one company that utilises renewable energy and one that does not). For this research the questionnaires were sent to senior managers of the companies from the specific industries in Kwa-Zulu Natal that have been selected. The companies that were found implementing renewable energy sources was through the use of online media, or given information to the researcher about renewable energy projects through contacts from companies that were involved in renewable energy business or renewable energy projects.

3.7 How did the researcher ensure that the data is reliable and valid?

Anonymity, obtaining permission and transparency were the ethical considerations that were considered by the researcher when distributing questionnaires to the relevant participants (SagePub, 2011, p. 54). Any breach of integrity during the execution of a research study, whether it is through unintentional errors or outright falsification of the data, will weaken or even invalidate the investigation.

To ensure all companies concerned were aware of this, a letter was included with the questionnaire describing the purpose of the study as well as the purpose of the questionnaire. An informed consent was included with the letter specifying that participants must have a complete understanding of the purpose and methods of the research. An institution consent form was also used for the participant's institution to take part in the research. Participation was voluntary, and names of the participants have remained anonymous.

Chapter 4 - Results and Findings

The companies that participated in this research are in five different industries in KZN respectively. Two companies were selected from each industry, one that has implemented renewable energy source (indicated as "RE" in this research) and one that has not implemented any form of renewable energy source for their business (indicated as "NRE" in this research). The five industries that were selected for this research included: manufacturing (Company A and Company B), agriculture (Company C and Company D), retail (Company E and Company F), automotive sector (Company G and Company H), and social and community services (Company I and Company J). The proportion of the data analysed will be discussed in the following chapter.

4.1 Frequency Distribution Tables

As indicated by figure 1, five out of the ten companies (three RE and two NRE) agreed that investment challenge were the reasons behind their decision to implement or not renewable energy sources. Two of the companies (one RE and one NRE) indicated that they strongly agreed the motive was part of their decision to implement renewable energy for their business, and three companies (one RE and two NRE) neither agreed nor disagreed.

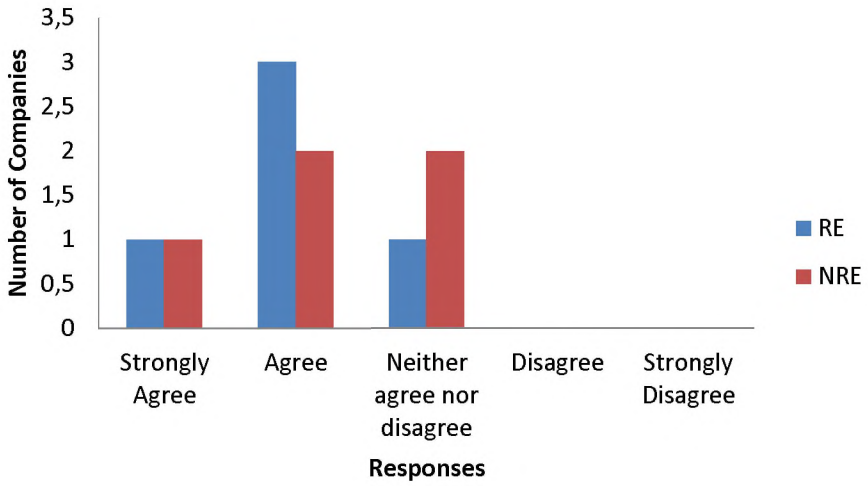

Figure 1: Frequency distribution histogram: Challenges to investment/investing in renewable energy

All the RE companies indicated that implementing renewable energy sources, led to a decrease in the costs for their business. Two of the RE companies strongly agreed and the other three companies agreed to the motive. For the NRE companies, three of the companies agreed that it would decrease their business costs if they had implemented renewable energy sources although the other two NRE companies disagreed on the motive. (See figure 2).

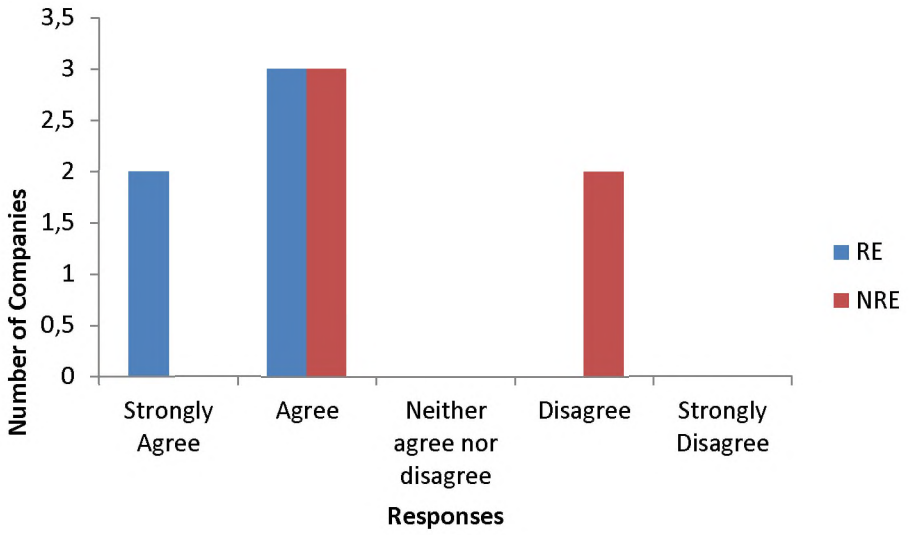

Figure 2: Frequency Distribution Histogram: Decrease Business costs

Five out of the ten companies (two RE and three NRE) agreed that capital costs would increase for implementing or not renewable energy resources compared to the other five companies (three RE and one NRE) who neither agreed nor disagreed on the motive. For the companies implementing renewable energy sources, this indicates that the capital cost for renewable energy parts were expensive, therefore justifying the decision for the companies that did not implement renewable energy sources. (See Figure 3).

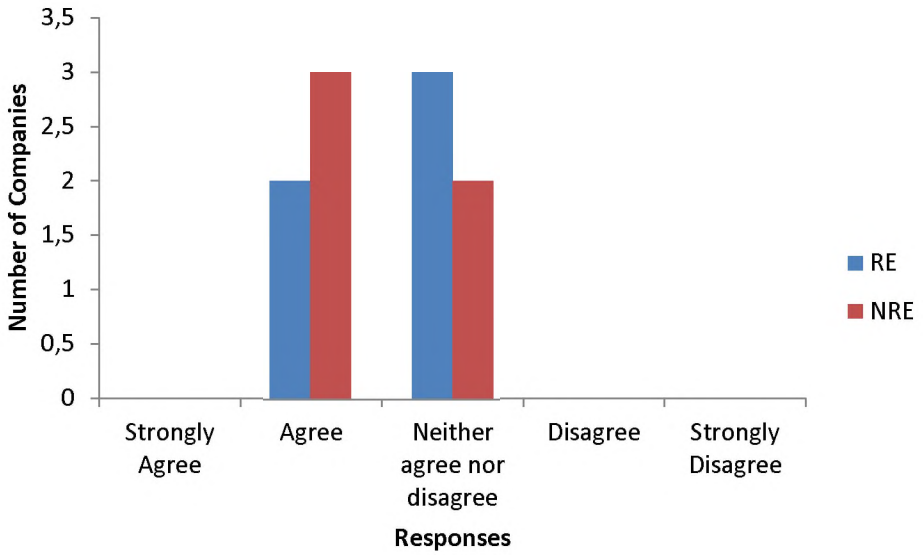

Figure 3: Frequency Distribution Histogram: Capital Cost Increase

Again the RE companies had similar opinions to the motive "contribution to the community" as they did for decreasing business costs. Three RE companies strongly agreed, while the remaining two agreed on the motive. Three of the NRE companies agreed that it would contribute to the community if they had implement renewable energy for their business whereas one NRE companies neither agreed nor disagreed on the decision and one NRE disagreed that it would contribute to the community. On this basis, implementing renewable energy sources would contribute to the community where the company operates in. (See Figure 4).

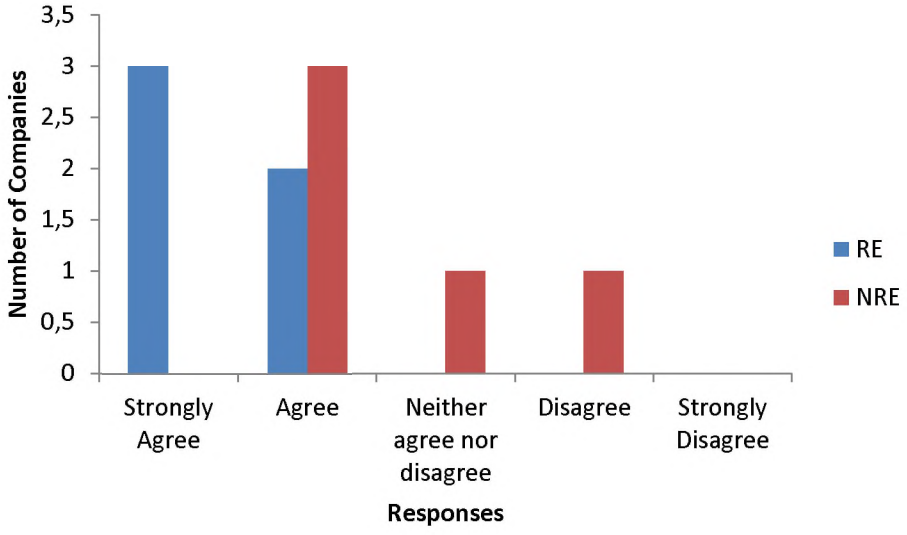

Figure 4: Frequency Distribution Histogram: Contribution to the Community

There were a mixed set of results for power outages as a motive behind the companies' decision. Two of the RE companies chose to neither agree nor disagree on the motive whereas the other three RE companies selected different choices respectively. For NRE companies, three companies strongly agreed that power outages were a reoccurring issue in previous years. The companies considered implementing renewable energy resources but due to other reasons decided against it. This follows that power outages was not a strong case for implementing renewable energy sources or not. (See Figure 5).

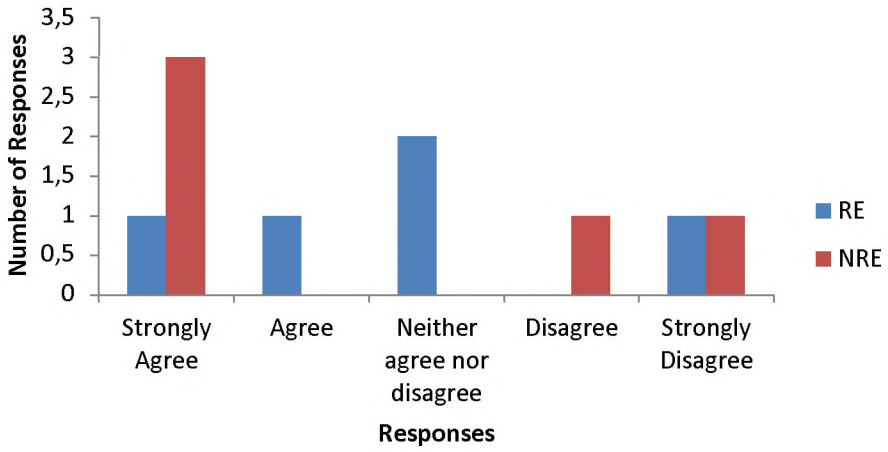

Figure 5: Frequency Distribution Histogram: Power Outages

Climate change was another motive that was strongly agreed and agreed upon by all the RE companies. As for the NRE companies, two companies strongly agreed implementing renewable energy sources is due to climate change issue, whereas two NRE companies neither agreed nor disagreed and the remaining NRE company strongly disagreed that implementing renewable energy is not caused by concerns on climate change. Therefore climate change is a major motive for implementing renewable energy sources. (See Figure 6).

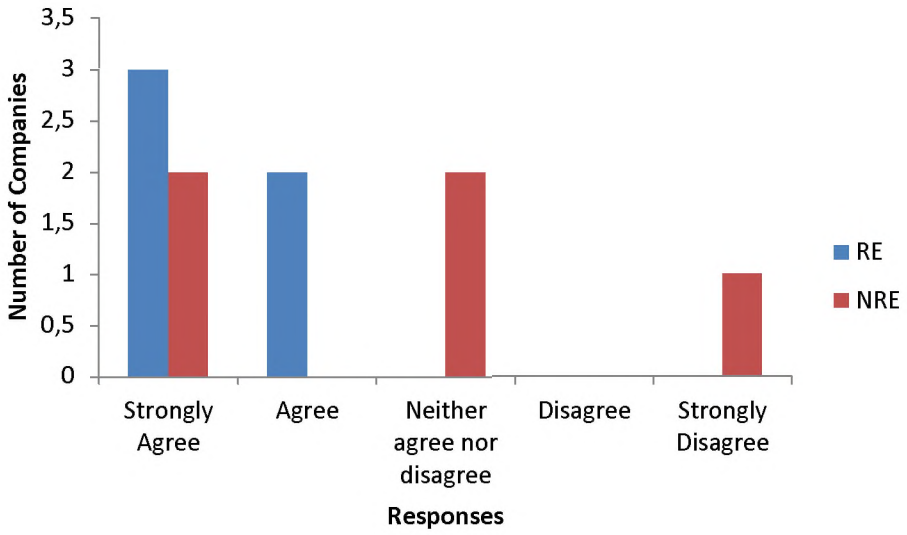

Figure 6: Distribution Frequency Histogram: Concern for Climate Change

Six companies (two RE and four NRE) agreed that using alternative energy sources instead of using fossil fuels is a key motive. Three RE companies and one NRE company strongly agreed to changing to renewable energy sources, therefore alternative source to fossil fuel is a main motive for implementing renewable energy sources as a result of using cleaner energy. (See Figure 7).

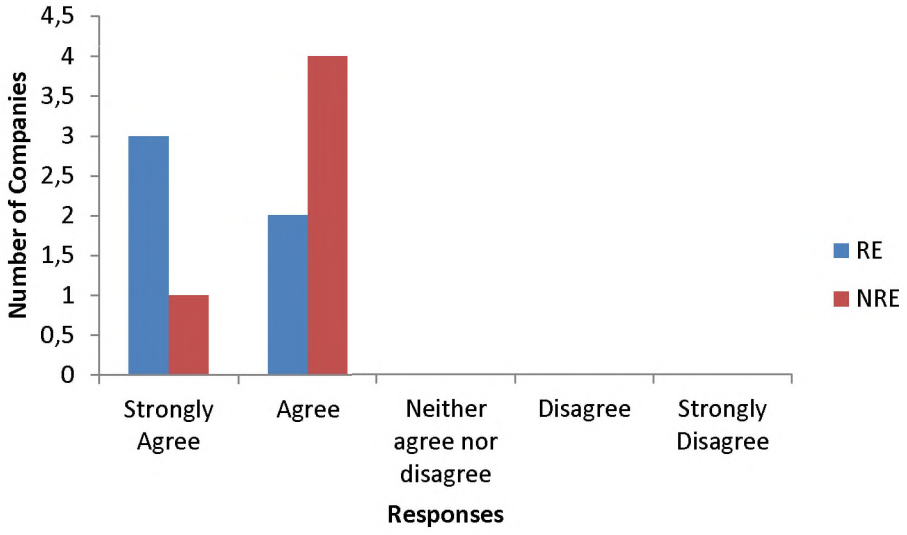

Figure 7: Distribution Frequency Histogram: Alternative Source to Fossil Fuel

Nine out of the ten companies agreed and strongly agreed that implementing renewable energy sources would help reduce greenhouse gases. The one NRE company neither agreed nor disagreed on the motive. Therefore mitigating greenhouse gases is a strong motive for implementing renewable energy sources. (See Figure 8).

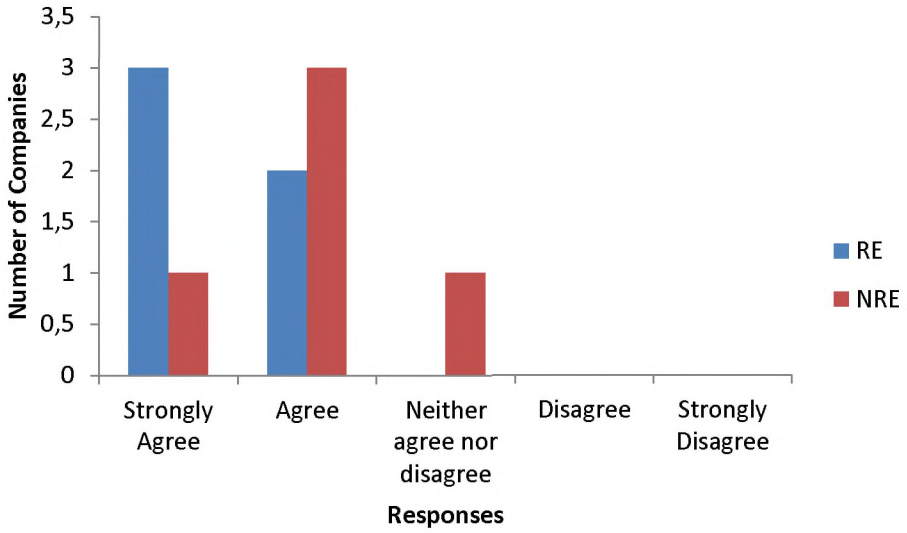

Figure 8: Frequency Distribution Histogram: Mitigate Greenhouse Gases

Two companies both from RE and NRE agreed that there was insufficient financing procedures for renewable energy. Two RE and three NRE neither agreed nor disagreed on the motive for their decision, with one RE company strongly disagreeing to the motive. This indicates that from both sets of companies there were insufficient financing procedures in South Africa; in relation to Eskom's rebate system being recently suspended has had a negative effect on the decision of businesses looking into renewable energy projects. (See Figure 9).

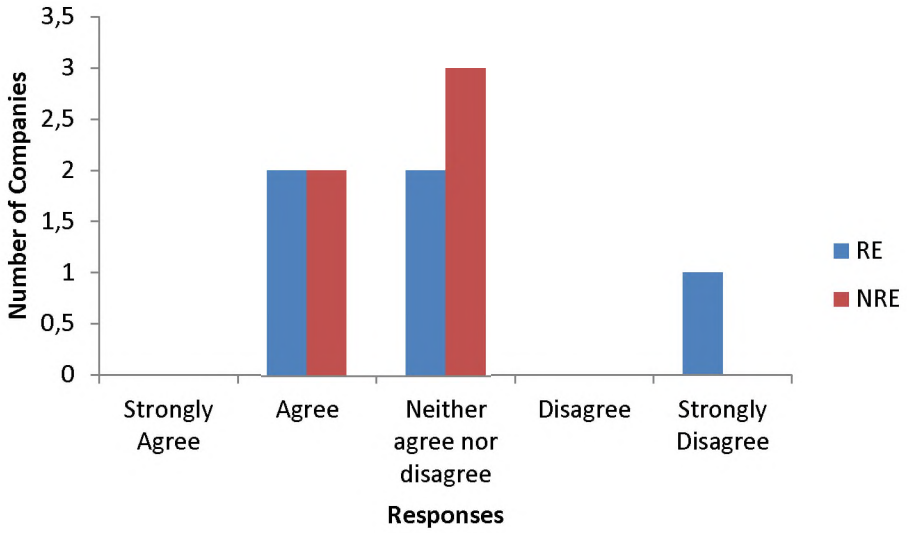

Figure 9: Frequency Distribution Histogram: Insufficient Financing Procedures

As seen in figure 10, four RE companies neither agreed nor disagreed that government regulations affected their decision to implement renewable energy sources, where one RE company agreed that there were insufficient government regulations but still opted to implement renewable energy. One NRE agreed that there were insufficient government regulations, three companies neither agreed nor disagreed and one company disagreed on the concept.

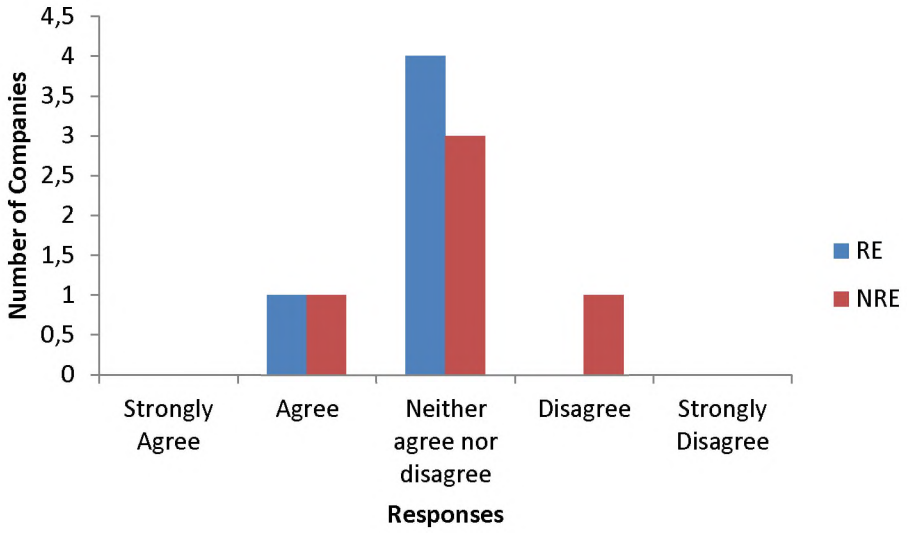

Figure 10: Frequency Distribution Histogram: Inadequate Government Regulations

Five companies (two RE and three NRE) chose neither agreed nor disagreed on geographical barriers being a motive. One RE and one NRE disagreed on the motive, and two RE companies and one NRE company indicated that they strongly disagreed that geographical barriers was a challenge for them implementing renewable energy sources. Therefore, geographical barriers were not a main motive for implementing renewable energy sources or not. (See Figure 11).

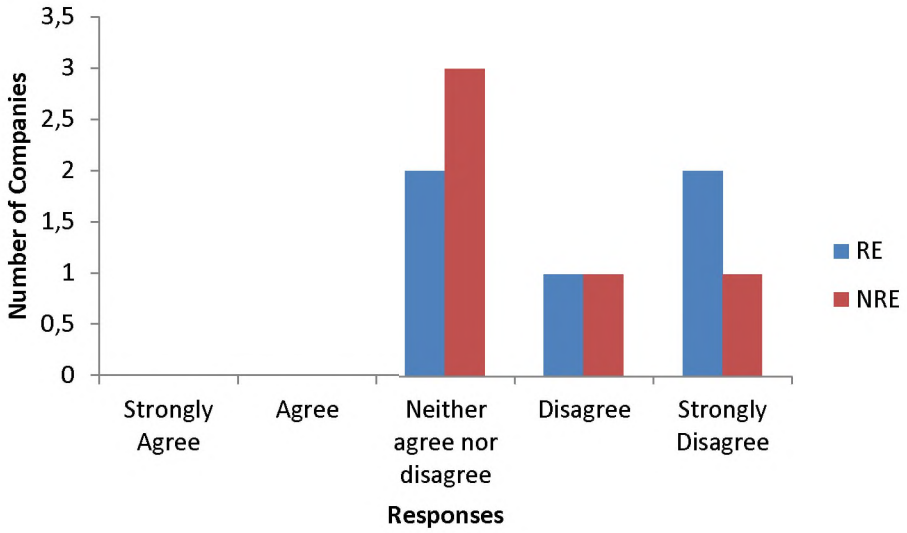

Figure 11: Frequency Distribution Histogram: Geographical Barriers

Figure 12 indicates that two RE companies neither agreed nor disagreed on the concept, as well as for four of the NRE companies. One RE agreed there were inadequate renewable energy technologies but still proceeded to go the renewable energy route. Two RE companies disagreed and strongly disagreed that renewable energy technologies were inadequate. One NRE agreed that there technology available is inadequate.

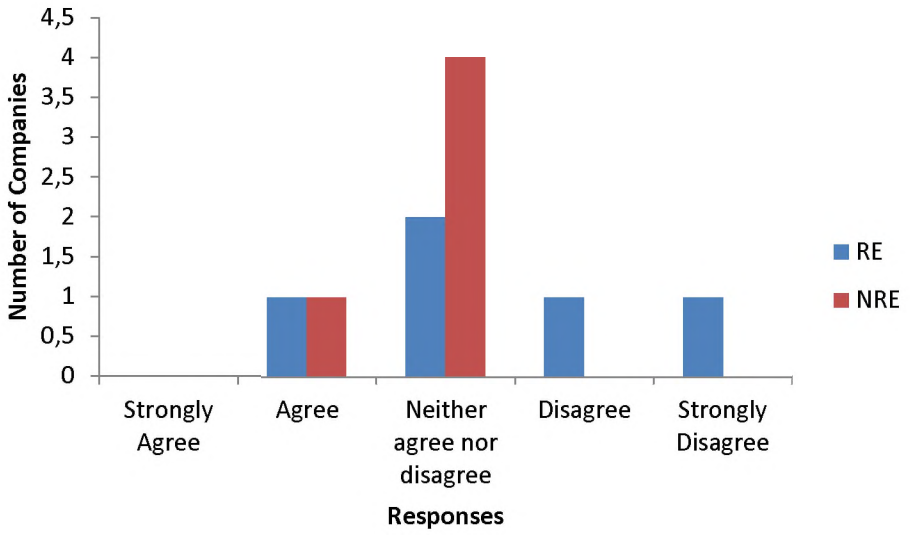

Figure 12: Frequency Distribution Histogram: Inadequate Technology

As shown in figure 13, two of the RE companies strongly disagreed that there was any pressure from the local community for the companies to utilise cleaner energy, as well as one NRE company for not implementing an alternative energy source. Two NRE companies also disagreed that there was any pressure from the community and one RE company did not base their decision to implement renewable energy due to the community. As a result, there was no pressure from the communities where the companies operate in to implement renewable energy sources.

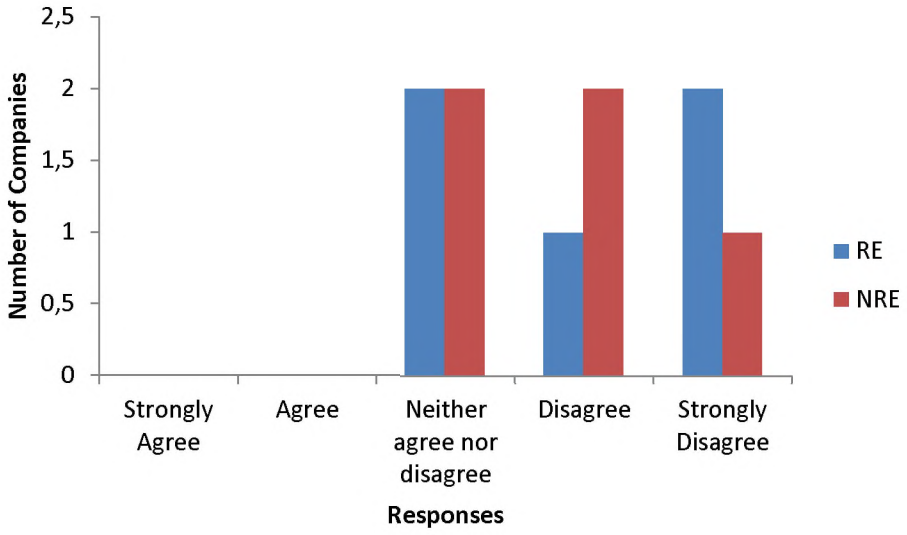

Figure 13: Frequency Distribution Histogram: Pressure from Community

The results showed that there was no pressure from any form of media to implement sustainable energy. Two RE companies strongly disagreed with one NRE company selecting the same decision. One RE company and three NRE companies disagree on the concept and the remaining two RE and one NRE companies neither agreed nor disagreed. (See Figure 14).

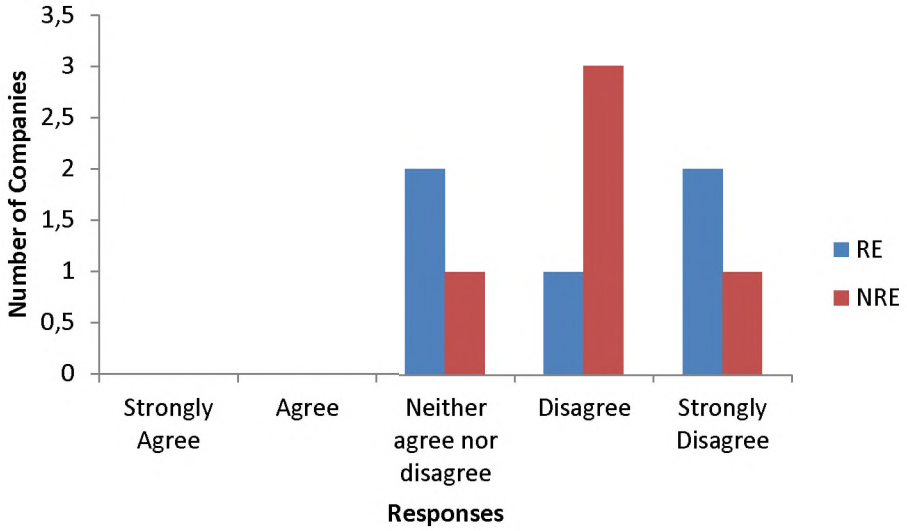

Figure 14: Frequency Distribution Histogram: Pressure from Media

This motive has similar results to pressure from community (seen in Figure 15), where two NRE companies disagreed that there was no pressure from their competitors to implement renewable energy sources, and four companies (three RE

and one NRE) indicated that they strongly disagreed with the motive. Although, there was one NRE that did agree to this concept and they were pressurised from competitors to implement alternative energy resources. The decisions to implement renewable energy sources or not was not caused by any pressure from competition.

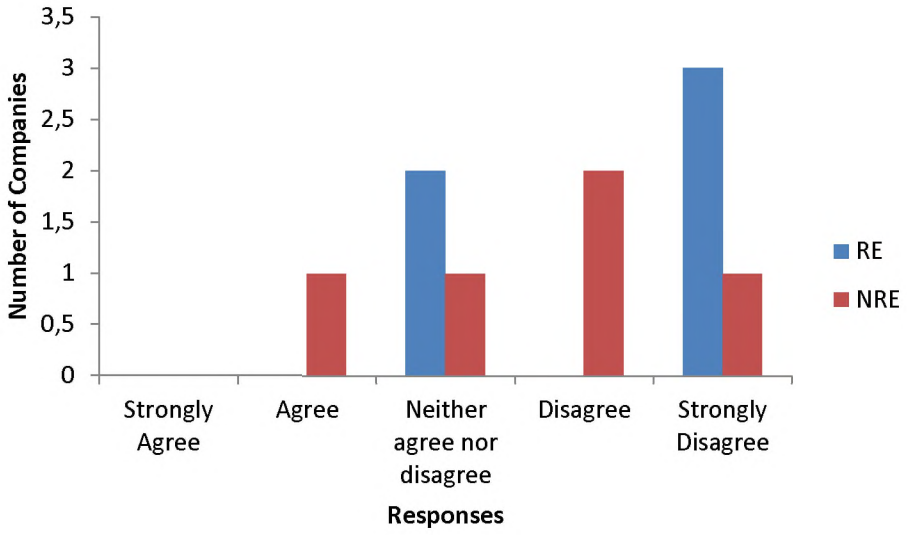

Figure 15: Frequency Distribution Histogram: Pressure from Competition

In figure 16, it can be seen that three RE companies agreed and the other two RE companies indicated that they fully understood renewable energy systems and complimented it by installing renewable energy projects. Each NRE company chose a different answer for this motive, with two of the companies agreeing that they understood renewable systems.

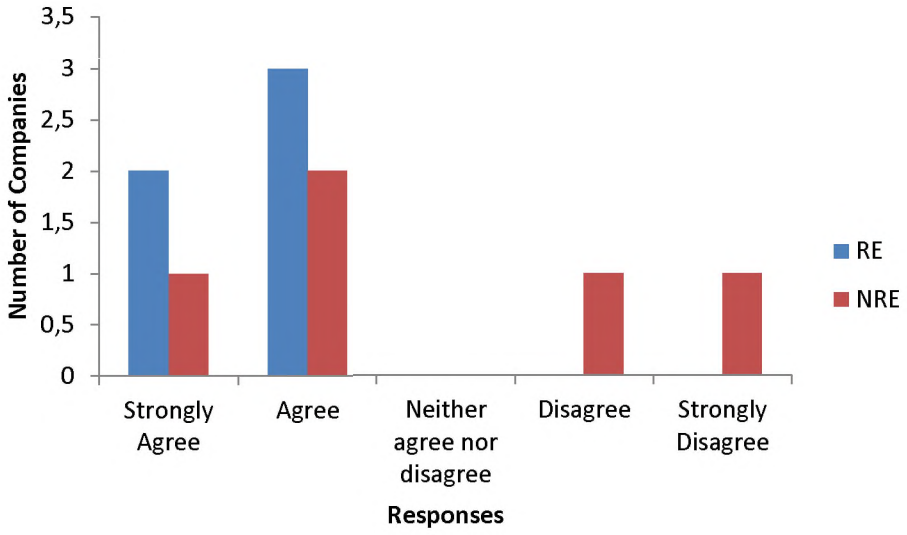

Figure 16: Frequency Distribution Histogram: Understanding of Renewable Systems

There were more dispersed responses for the following motive. Two RE companies strongly agreed it was convenient for their business to implement renewable energy sources, as well as two other RE companies and two of the NRE company agreeing that there decision to implement renewables or not was also convenient for their business. One NRE disagreed that it was inconvenient for their business not to implement renewable energy sources and one RE strongly disagreed that there was any convenience for implementing renewable energy sources. (See Figure 17).

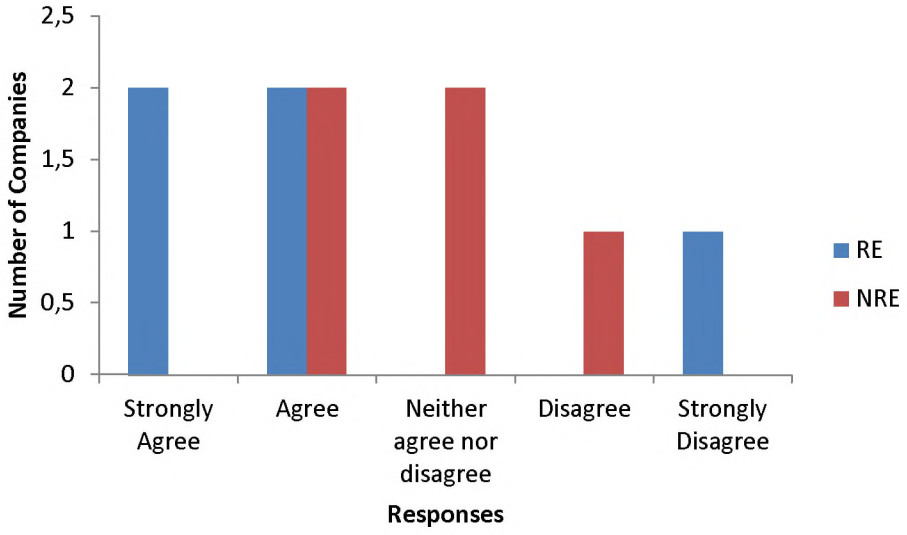

Figure 17: Frequency Distribution Histogram: Convenience for Business

4.1.1 Other motives indicated by companies

For this statement, each company indicated whether there was another motive to implement renewable energy sources or not for their business. As shown in Figure 18, two RE companies and two NRE company neither agreed nor disagreed that there was another motive therefore possibly indicating that their motive was already stated from the previous motives in the questionnaire. The rest of the companies all strongly agreed that there were other motives behind implementing or not implanting renewable energy sources. These motives will be discussed below.

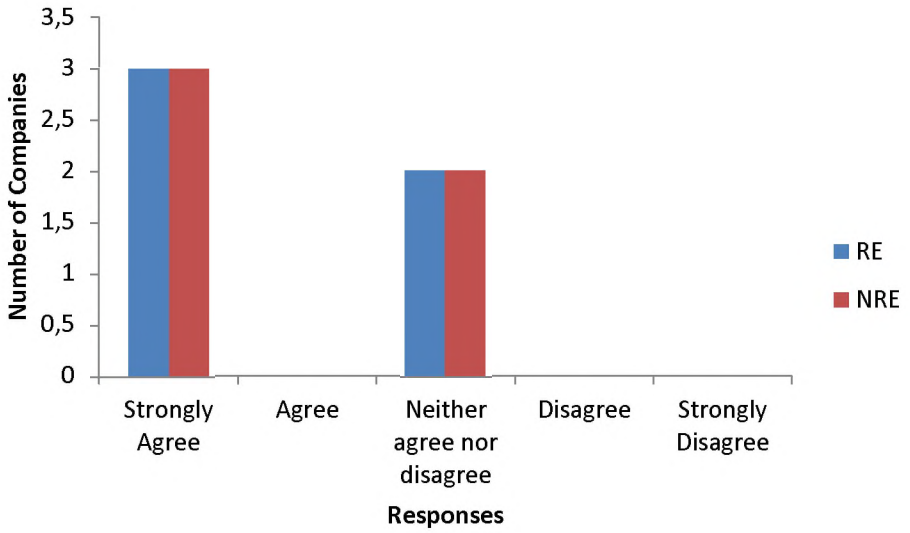

Figure 18: Frequency Distribution Histogram: Other motives indicated by companies

Company A did look at implementing renewable energy sources due to the frequent power outages that were occurring over the last two years and that there machines had to operate on a twenty four hour basis. When the machines were not operating, they took a long time to power back on and if a power outage occurs during operation time, the raw material inside the machine solidifies and it takes time to clean the machines and start operating again. This leads to loss of resources, operation time and extra labour costs that the company could not afford and lose massive production time for their products. Company A opted not to implement any renewable energy sources due to the following reasons: Costs and installations for solar panels being too expensive as a result of the R/$ exchange rate being too high during the period and the payback period of installing the renewable energy project was too costly for their type of business. On this finding, the motives behind not

implementing renewable energy resources for Company A were on an economic perspective.

Company D have historically generated renewable energy in the form of electricity from biomass. Their main motive was for the contribution to the surrounding community as they sell the electricity back onto the national grid rather than just use it for their own use.

Company E have not implemented any renewable energy sources, their reason being that even though corporate got scored on "Green policy", for their branch, the payback period was not financially efficient for their business.

Company F have implemented solar panels for the business as part of their commitment to the 'Green Policy' as well as a combination of creating greater energy self-sufficiency, mitigate against energy cost increases and supporting a shift to renewable energy investment.

Company G have not implemented any renewable energy sources due to the cost of renewable energy being too high at the moment as the product is relatively new in the market.

Company I have implemented solar panels as their form of renewable energy for their business. By installing renewable energy, company I have reduced running costs which is an incentive to tenants, it has also increase the employment rate for the area and company I have mentioned that the renewable/waste to energy is a huge spinoff for advertising products.

Company B, Company C, Company H and Company J were the companies that chose to neither agree nor disagree that there were any other motives behind their decisions to implement or not renewable energy sources.

4.2 Categorising Motives

One of the main objectives of this study was to align the found motives, from Kwa-Zulu Natal company responses, to the sustainability pillars. Table 1 shows the corresponding sustainability pillars for each response. Eight of the motives are indicated as economic; five as social; and four as environmental. The category other was made up of economic and social motives, five out of six companies responding

with economic motives. There are more economic motives than social or environmental motives listed in the table.

Table 1: Showing the listing of motives from Kwa-Zulu Natal companies either as Strong or Weak motives for implementing or not renewable energy sources

RE Companies		NRE Companies	
Strong Motives	**Weak Motives**	**Strong Motives**	**Weak Motives**
Challenges to investment/investing in renewable energy	Capital Cost Increase	Challenges to investment/investing in renewable energy	Concern for Climate Change
Decrease Business Costs	Power Outages	Decrease Business Costs	Inadequate Government Regulations
Contribution to the Community	Inadequate Government Regulations	Capital Cost Increase	Insufficient Financing Procedures
Concern for Climate Change	Insufficient Financing Procedures	Contribution to the Community	Inadequate Technology
Alternative Source to Fossil Fuel	Inadequate Technology	Power Outages	Geographical Barriers
Mitigate Greenhouse Gases	Geographical Barriers	Alternative Source to Fossil Fuel	Pressure from Media
Understanding of Renewable Systems	Pressure from Media	Mitigate Greenhouse Gases	Pressure from Community
Convenience for Business	Pressure from Community	Understanding of Renewable Systems	Pressure from Competitors
Other	Pressure from Competitors	Other	Convenience for Business

The motives were then listed under strong or weak motives by how many companies agreed/strongly agreed or disagreed/strongly disagreed, this is determined by the majority proportion of the companies' responses. It should be noted that neither agree nor disagree responses contributed to a motive being listed under weak because it did not influence the companies' decision to implement renewable energy or not. From there using the corresponding pillar that they were categorised in, it can be seen whether that pillar is of greater significance or not in determining the motives behind the implementation of renewable resources.

From Table 1, it can be seen that there were more strong motives, for implementing or not implementing renewable energy, than weak motives. Of the motives listed as both strong and weak, the majority were of the economic pillar. Under strong motives there were less social than environmental influences whereas under the weak motives environmental had less influence than the social aspect.

4.3 Represented Data as Proportions

To best illustrate the findings, proportions were used to describe how often the responses were chosen between the total companies. Of the companies, 50% responded to agreed that implementing renewable energy sources would lead to challenges to investment/investing in renewable energy with none of the companies responding that they disagreed or strongly disagreed with this motive (Figure 19).

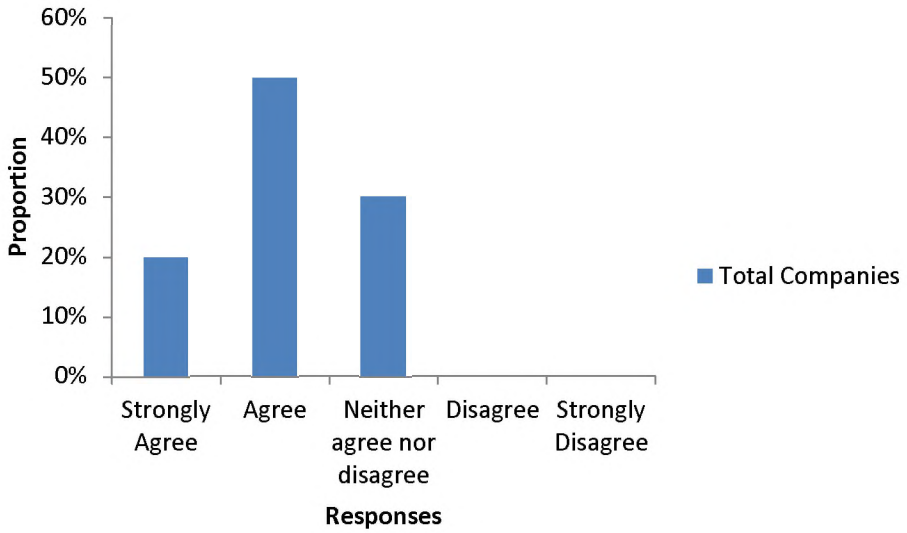

Figure 19: Proportion of companies' responses for Challenges to investment/investing in renewable energy

In regards to decrease business costs, 60% of companies stated they agreed with the motive, however, 20% disagreed with the motive (Figure 20).

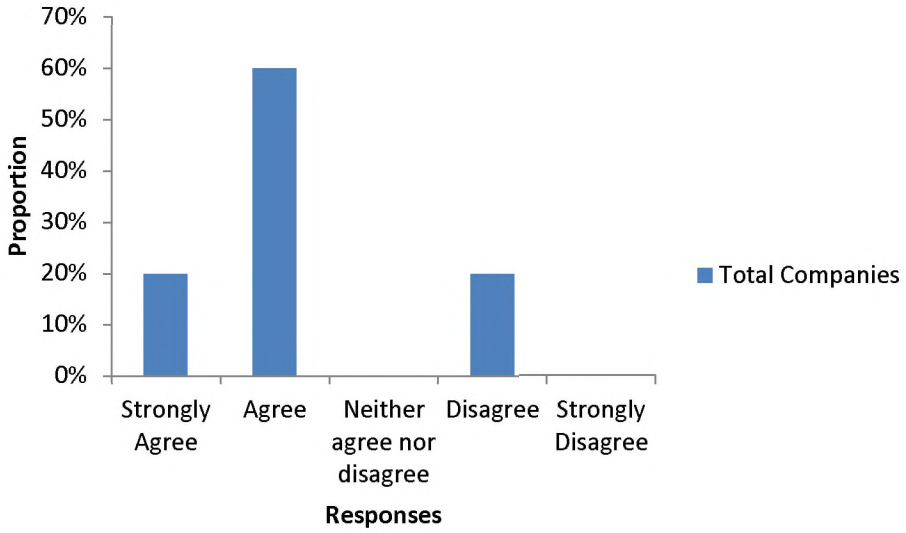

Figure 20: Proportion of companies' responses for Decrease Business costs

It can be seen that 50% of companies neither agreed nor disagreed that costs of capital would increase; however, 50% of the companies agreed that it would (Figure 21).

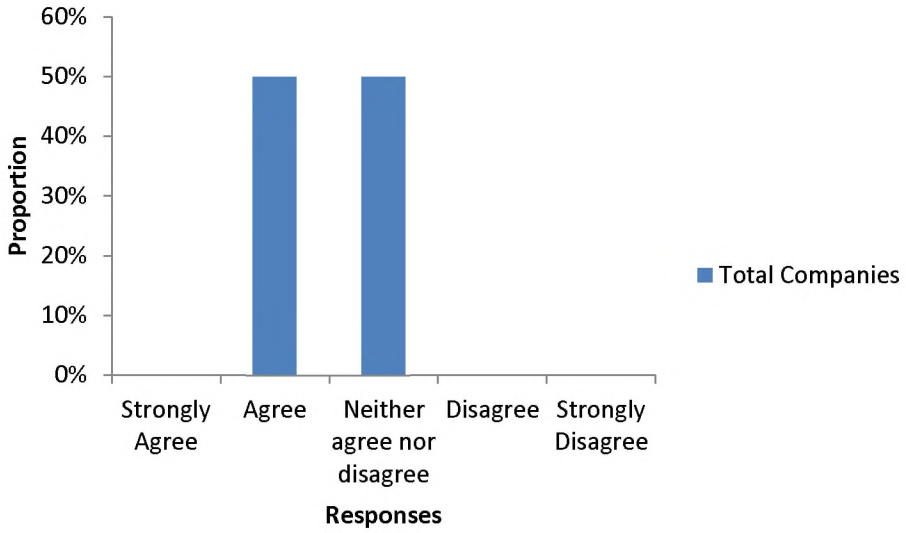

Figure 21: Proportion of companies' responses for Capital Cost Increase

Of the total companies 40% agreed/strongly agreed that power outages were a contributing motive for implement or considered implementing renewable resources whereas 30% disagreed/strongly disagreed and 20% neither agreed nor disagreed (Figure 22).

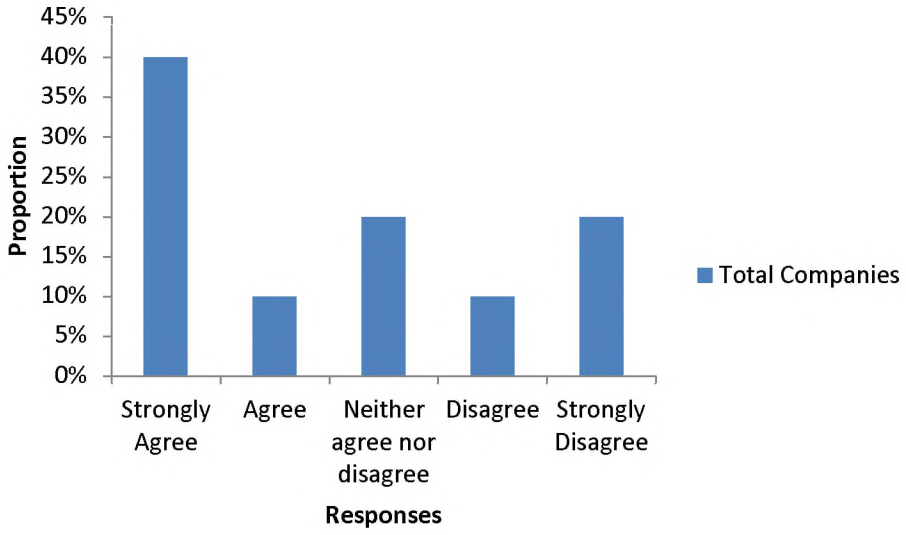

Figure 22: Proportion of companies' responses to Power Outages

Only 10% of companies responded that insufficient funding was not an issue although 50% of companies neither agreed nor disagreed, and the remainder agreed as seen in figure 9B (Figure 23).

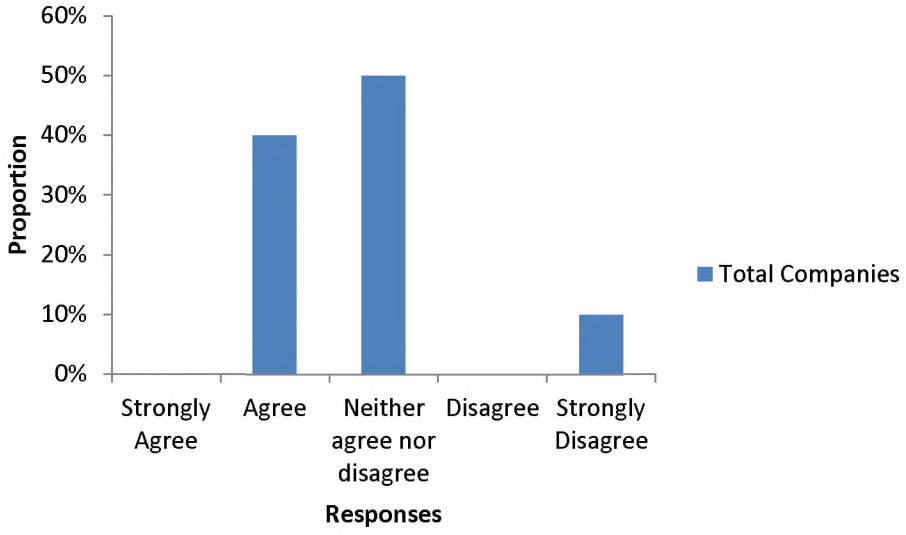

Figure 23: Proportion of companies' responses to Insufficient Financing Procedures

Figure 24 shows that 60% of companies neither agreed nor disagreed that inadequate technologies were of concern for their decision-making.

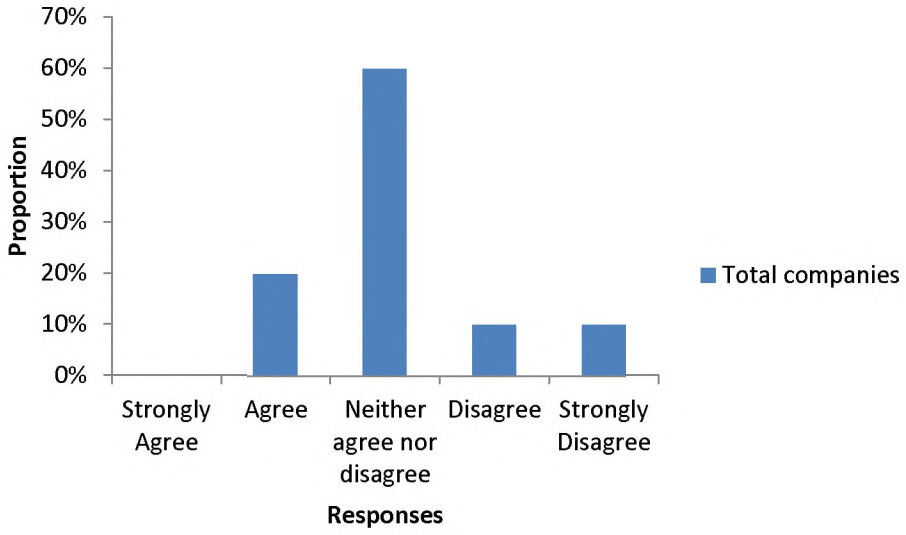

Figure 24: Proportion of companies' responses to Inadequate Technology

Pressure from competitive companies did not seem to influence whether or not companies considered renewable energy resources as figure 25 shows that 60% of companies indicated that it did not affect their decision.

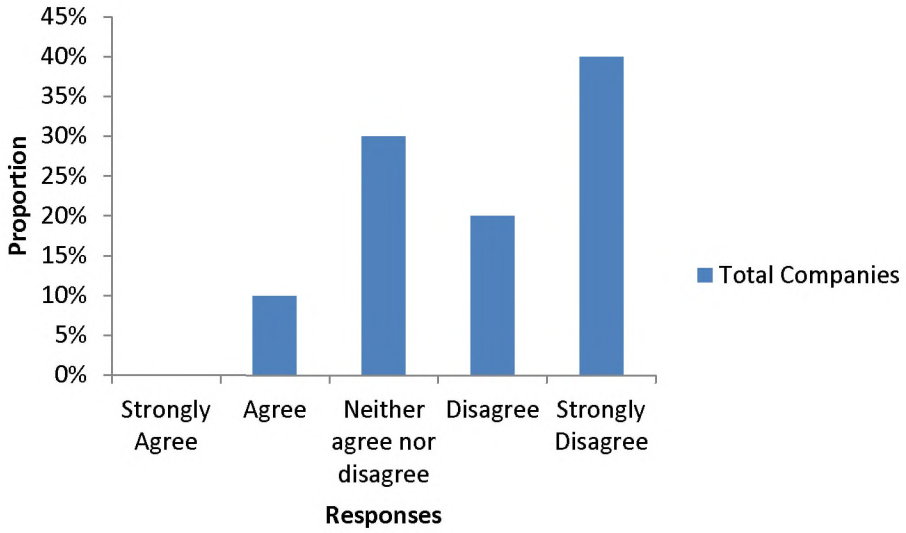

Figure 25: Proportion of companies' responses to Pressure from Competition

In regards to convenience for the business, 60% of companies responded that it was convenient for their business to implement or not renewable energy as seen in figure 26.

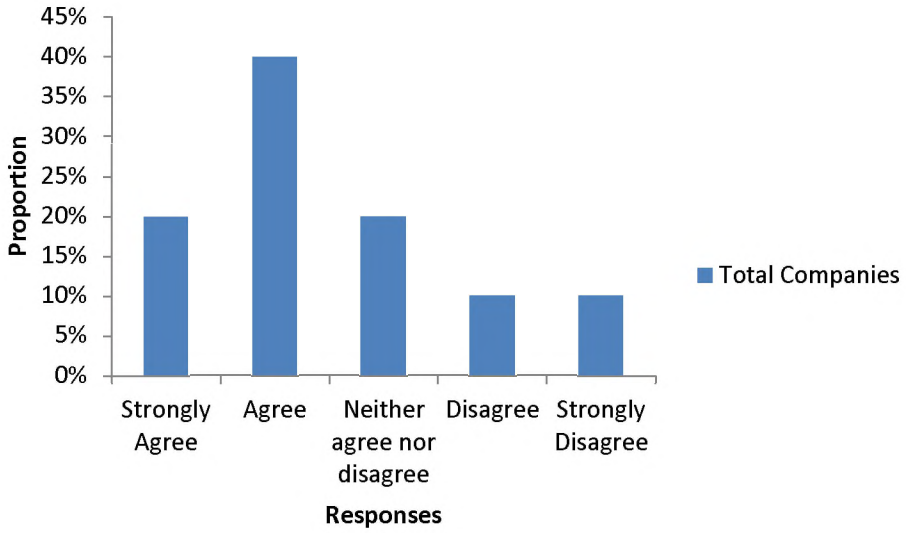

Figure 26: Proportion of companies' responses to Convenience for Business

It is shown in Figure 27 that 80% of companies agreed/strongly agreed that implementing renewable energy resources would contribute to the community.

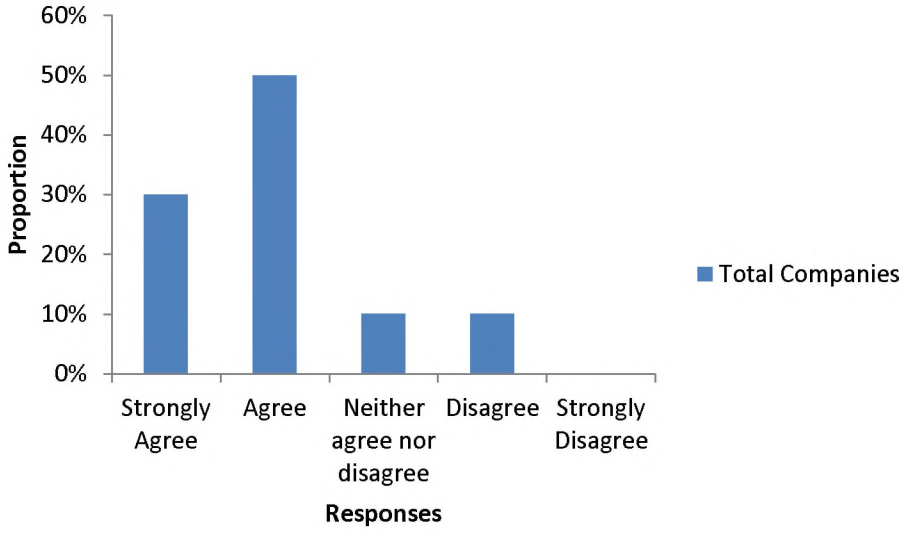

Figure 27: Proportion of companies' responses to Contribution to the Community

Inadequate government regulations, shown in Figure 28 only seemed to influence 20% of companies whereas 70% neither agreed nor disagreed with this motive.

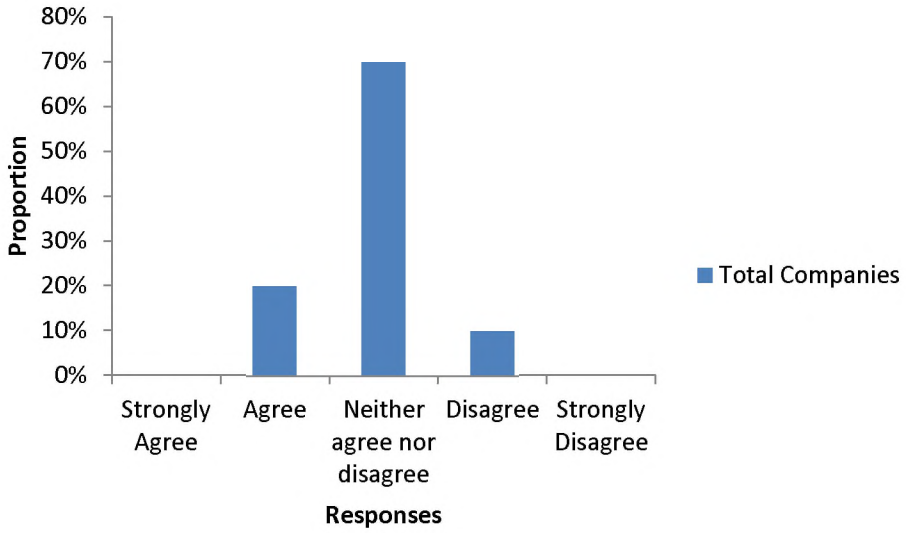

Figure 28: Proportion of companies' responses to Inadequate Government Regulations

Pressure from media and the community played little influence in decision-making as 70% and 60% of the companies disagreed/strongly disagreed with both motives (figures 29 and 30).

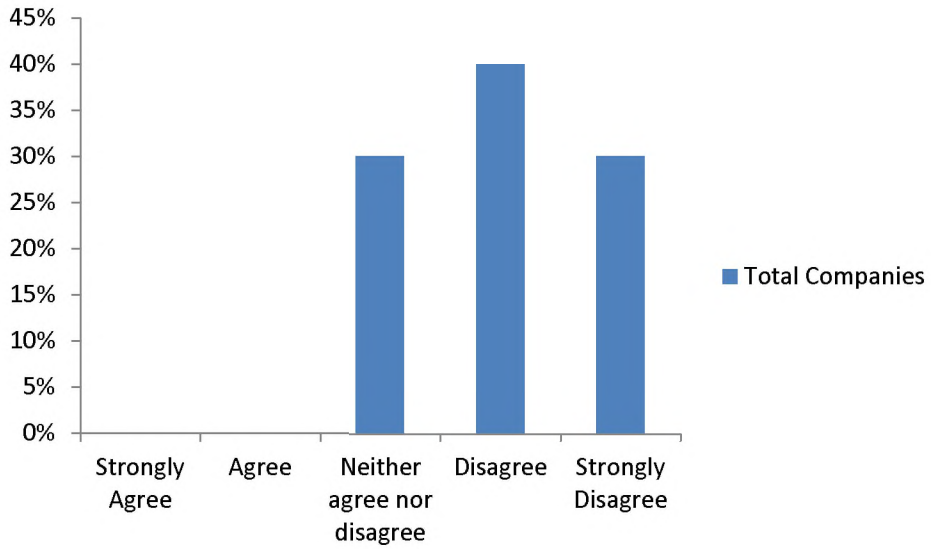

Figure 29: Proportion of companies' responses to Pressure from Media

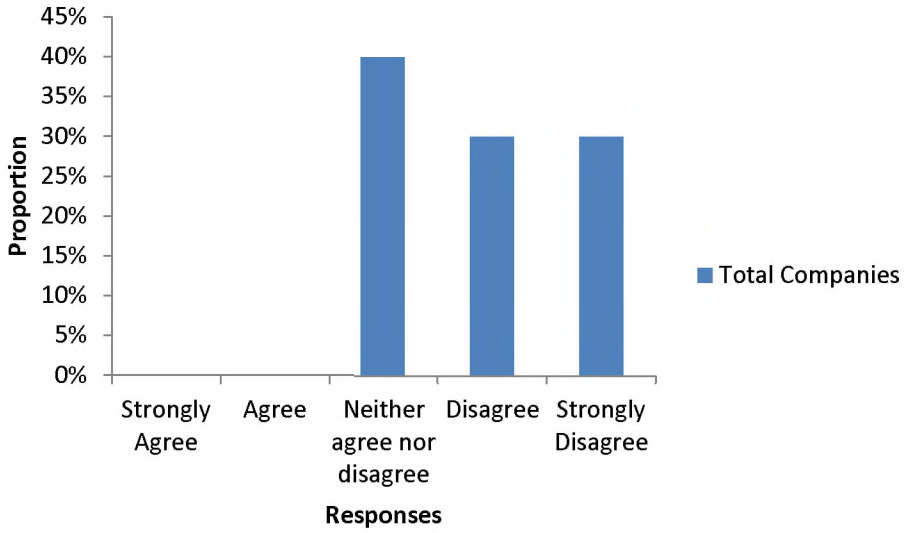

Figure 30: Proportion on companies' responses to Pressure from Community

Figure 31 showed that 50% of companies agreed having greater knowledge of renewable energy resources contributed to their decision, in comparison, 20% of the companies disagreed/strongly disagreed with the motive.

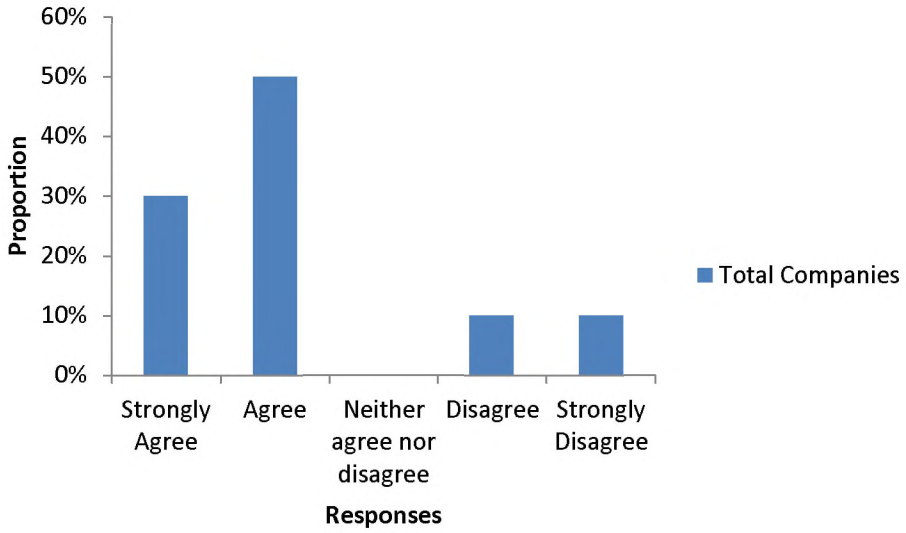

Figure 31: Proportion of companies' responses to Understanding of Renewable Systems

It was found that 50% of companies strongly agreed and 20% agreed that climate change was a concern for their decision to implement or considered implementing renewables shown in figure 32.

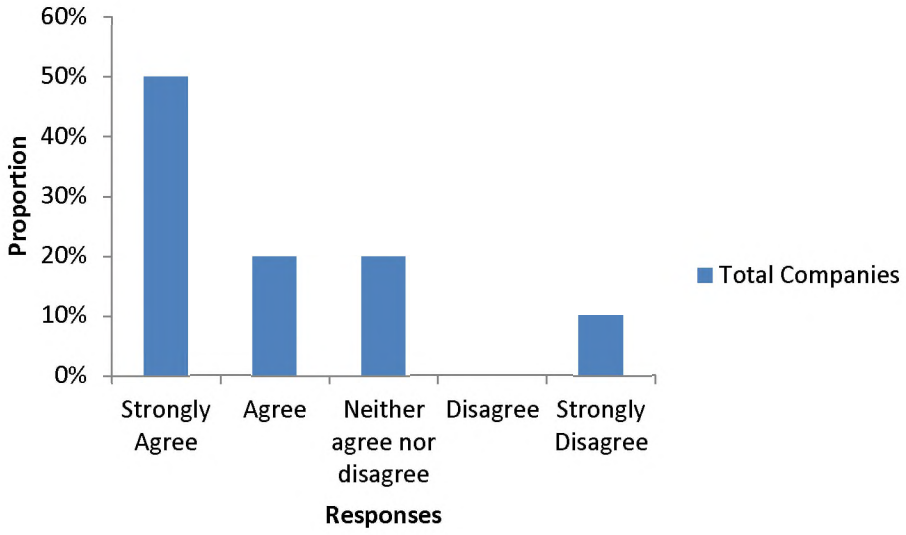

Figure 32: Proportion of companies' responses to Concern for Climate Change

As seen in figure 33 all companies agreed or strongly agreed that renewable energy sources are an alternative to using fossil fuels.

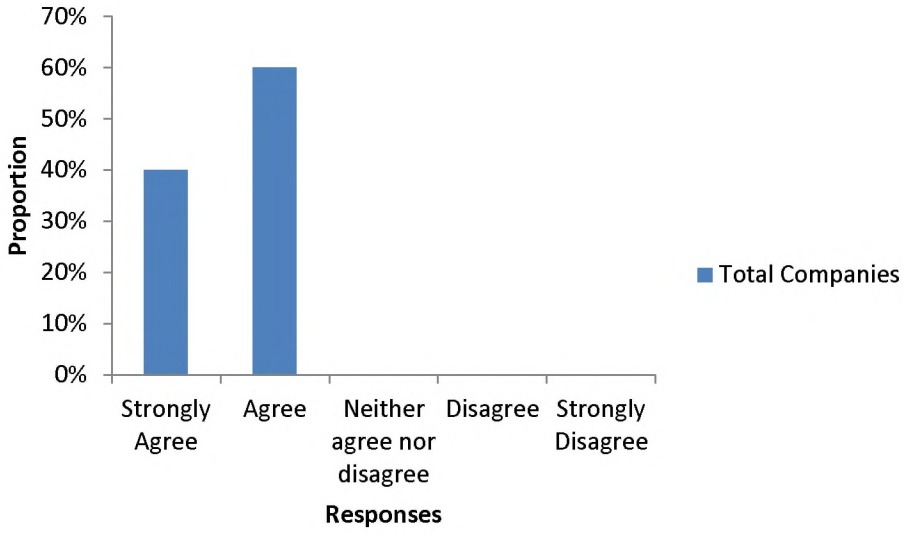

Figure 33: Proportion of companies' responses to Alternative Source to Fossil Fuel

The greatest percentage of companies (50%) indicated they agreed that renewable energy sources can help to mitigate greenhouse gases (Figure 34).

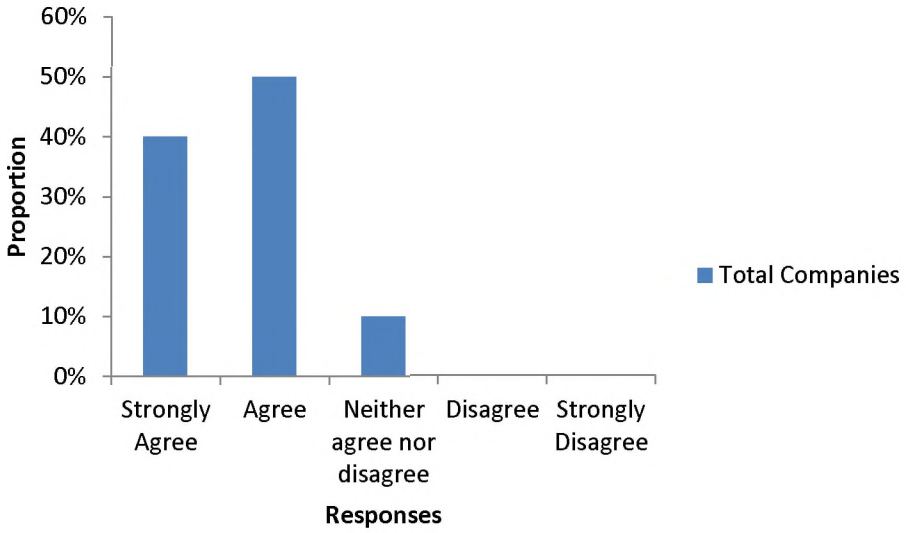

Figure 34: Companies' responses to Mitigate Greenhouse Gases

In Figure 35, it can be seen that geographical barriers did not seem to be a concern for companies when deciding whether or not to implement renewable resources as 50% disagreed/strongly disagreed.

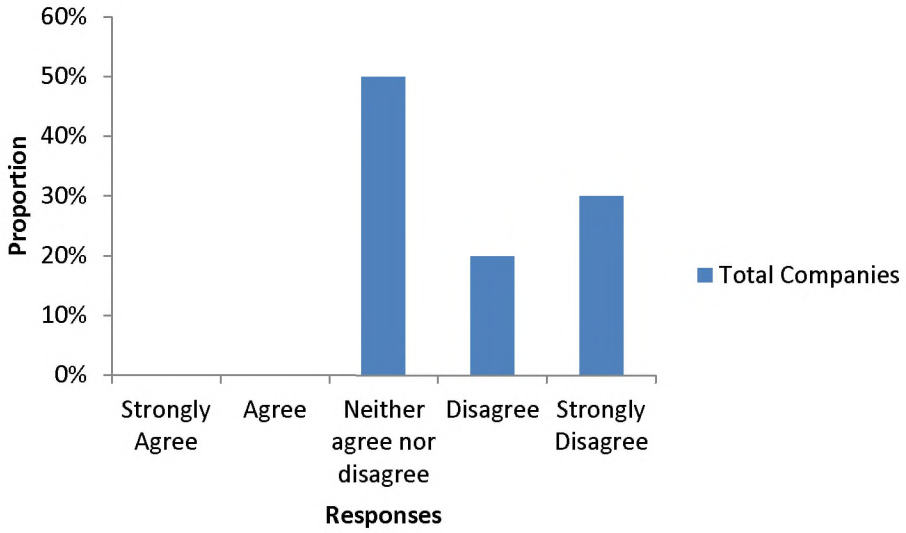

Figure 35: Proportion of companies' responses to Geographical Barriers

Finally, in figure 36 it can be seen that 60% of the companies indicated that there were other motives behind their decision to implement or not renewable energy. The remaining 40% of companies did not indicate other motives in their decision-making.

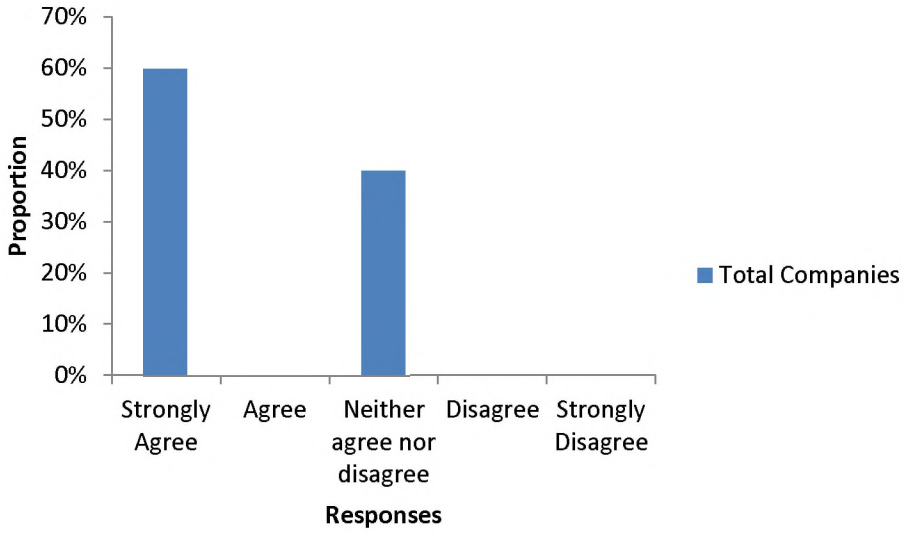

Figure 36: Proportion of companies' responses to Other motives indicated by companies

Chapter 5 - Discussion and Conclusion

The final chapter of this research includes a discussion of the research findings and a description as to whether the findings supported the issues that were raised in the literature review. The chapter also includes how the findings contributed to the research in regards to the topic stated. Recommendations are also provided by the researcher for future reference in this study procedure. Finally a conclusion that indicates how the objectives, main findings and recommendations relate to the overall study and literature will be discussed.

5.1 Aligning the Motives to the Sustainability Pillars

The motives that were mentioned in the questionnaire were categorised into economic, social or environmental pillars. Under the economic pillar, the following were categorised as either economic drivers or challenges: Challenges to investment/investing in renewable energy; decreases business costs; capital cost increase; power outages; insufficient financing procedures; inadequate technology;

pressure from competition; and convenience for business. The social pillar included: Contribution to the community; inadequate government regulations; pressure from media; pressure from community and understanding of renewable systems. And finally, under the environmental pillar, the following were included: concern for climate change; alternative source to fossil fuel; mitigate greenhouse gases and geographical barriers. Each significant motive that was explained in 'Other' was categorised as follows: Company A: Economic; Company D: Social; Company E: Economic; Company F: Economic; Company G: Economic; Company I: Economic. As indicated in Table 1, overall there were more economic motives in comparison to the social and environmental motives. As discussed in literature, there seemed to be more examples of economic motives for implementing renewable energy resources or not. The list of strong motives in Table 1 were identified as being the major influences to the companies' decisions for renewables, whereas the weak motives did not have a major impact on the decisions.

Msimanga and Sebitosi (2014, p. 420) indicated that a reduction in renewable energy investment policies and efficient methods to facilitate pubic investments could reduce market barriers and enhance emerging renewable energy markets. In comparison to what Berns *et al* (2009, p. 7) said, where investing in sustainable investments would prove to be challenging, the motive for challenges to investment/investing in renewable energy in findings showed that majority of the companies agreed that renewable energy resources would provide for challenges to investment/investing in renewable energy. Therefore agreeing to what Msimanga and Sebitosi (2014, p. 420) had found and therefore challenges to investment/investing in renewable energy is a strong motive for implementing renewable resources. Halff, Sovacool and Rozhon (2014, p. 375) specified that there were numerous factors that would decrease business costs if the financial procedures for renewable energy projects were efficient. As shown in the findings, most of the companies agreed that renewable energy resources would decrease their business costs, thus it is regarded as a strong motive. Companies' capital costs would increase substantially due to renewable energy technologies being expensive and that businesses opt not to install renewable energy projects and they rather address the need to reduce their capital costs (Luthra *et al*, 2015, p. 765). Of the total companies, 50% agreed that their capital cost would increase and 50%

neither agreed nor disagreed on the motive. In this circumstance, both responses need to be considered. For NRE companies, three of the companies agreed that the companies' capital cost would increase if they did implement renewable energy resources, hence the strong possibility of those companies researched in advance or knowledge of implementing alternative energy sources and the impacts it has on the business. Three of the RE companies agreed as well to their capital cost increasing, therefore agreeing to what Luthra *et al* (2015, p. 765) stated where renewable energy projects would substantially increase a company's capital cost. This motive was considered as neutral as it depends on specific companies' responses and whether or not they implement renewable energy resources or not. It was stated in the literature review that the reoccurring power outages were one of the main drivers for South African businesses to focus on implementing alternative energy sources (Mezher, Dawelbait and Abbas, 2012, p. 315). Although, the findings did show that there were different responses for the motive, the majority of the companies' responses were disagreeing, strongly disagreeing or neither agreeing nor disagreeing. Therefore, the power outages that South Africa companies experienced were not a strong case for implementing renewable energy sources. Luthra *et al* (2015, p. 765) indicated that financial problems hindered the development of renewable energy sources and with the suspension of the rebate program, has had a negative on renewable energy projects (Thetard, 2016, p. 1). Insufficient financing procedures are regarded as a weak motive as a result of the companies' responses being neither agree nor disagree on the motive. It was explained by Luthra *et al* (2015, p. 766) that renewable energy technologies were at a disadvantage in relation to other energy sources since it is a new development approach and that the technologies could underperform or become out-dated quickly. This motive was categorised as weak due to it not having that much influence on companies implementing or not renewable energy sources. According to Andreas *et al* (2011, p. 217) and Esty and Winston (2009, p. 84), companies use sustainable innovation to create value and build a competitive advantage over their competitors. In comparison to the previous sentence, most of the companies disagreed and strongly disagreed that there was no pressure from their competitors to implement renewable energy, hence it is consider a weak motive in this research. Renewable energy is considered convenient for companies in the long-term where they were trying to improve or eliminate certain aspects in their business (Maithani,

2008, p. 205). In relation to this statement, 60% of the companies agreed and strongly agreed that implementing renewable energy technologies would be convenient for the business. This motive is based on the different aspects or issues faced by each company respectively.

Renewable energy projects could help have a positive or negative impact to the community where the project or company is situated at (Devine-Wright, 2014, p. 38). It was found that 77% of the companies strongly agreed or agreed that implementing renewable energy resources would help contribute to the community. Therefore contribution to the community in this research is a strong motive. Inadequate government regulations and lack of government regimes for renewable energies had a negative impact for developed and developing countries to adopt renewable energy projects Luthra *et al* (2015, p. 767) (Suberu *et al*, 2013, p. 636). Majority of the companies responded neither agreeing nor disagreeing to the motive and therefore it is considered a weak motive as it was not a major influence for the companies. There has been pressure from the community for Eskom to meet high energy demands in South Africa (Sekoai and Daramola, 2015, p. 224). From a business perspective, majority of the companies disagreed or strongly disagreed that there was any pressure from the community, where they are situated at, to utilise cleaner energy sources, therefore it is categorised as a weak motive. Even though there has been a great increase in the media coverage on the business-environment topic (Esty and Winston, 2009, p. xii), majority the companies responded that there was no pressure from the media for them to implement renewable energy resources, where 67% of the companies disagreed and strongly disagreed that the motive had any influence on their decision. Understanding of renewable energy can have a significant impact to contribute to business performance, especially in agricultural industries (Mbzibain *et al*, 2015, p. 32). In comparison, the companies that took part in this research were from various sectors and majority indicated that they have a thorough understanding of renewable energy whether or not they implemented renewable energy. As a result, understanding of renewable energy is indicated as a strong motive.

Climate change was one of the main motives for businesses implementing alternative energy sources and to counteract the issue (Mezher, Dawelbait and

Abbas, 2012, p. 315). Majority of the companies from both sides responded that they agreed and strongly agreed that their businesses do consider climate change as an issue. Therefore, agreeing that climate change is a main issue for going the renewable route, it is indicated as a strong motive for implementing renewable energy resources. Tate, Mbzibain and Ali (2012, p. 420) did explain that mitigation of greenhouse gases and replacing fossil fuels with another source is considered a significant driver. All the companies agreed and strongly agreed that replacing fossil fuel to renewables as their main energy source, and all the companies excluding one, indicated that they strongly agreed and agreed that implementing renewable energy resources would help mitigate greenhouse gases. Alternative source to fossil fuel and mitigation of greenhouse gases are both categorised as strong motives. Luthra *et al* (2015, p. 767) specified that there could be geographical barriers when it comes to manufacturing, the ideal location or weather conditions for renewable energy sources, although most of the companies responded that they neither agreed nor disagreed or disagreed/strongly disagreed that there were no geographical constraints for implementing renewable energy or not. As a result, geographical barriers is considered a weak motive for this research.

The motives that were recorded the most as a 'strong motive' for implementing renewable energy resources or not were categorised as economic as seen in Table 1. This includes all the economic motives obtained from literature as well as the five economic motives that were explained by the specific companies that responded to the 'Other'. The outcome could be due to companies being financially/economic orientated or as a result of the higher number of economic motives for implementing renewable energy resources that were used from literature for the research. A possibility could be that majority of businesses make most of their decisions based on the bottom line pillar. Even though there is an increase in environmental and social issues for businesses to consider when implementing renewable energy projects, there only a few environmental or social strong motives that were taken into consideration by the companies for implementing renewables or not. For some of the NRE companies, they have acknowledged that they know of the environmental and social aspects for renewable energy, and are considering implementing one form in the future, but based on certain economic factors, such as the payback

period; costs of the renewable energy projects; etc., could not afford to at that moment in time to implement renewable energy sources or not.

All of the RE companies decisions took the environmental motives into considerations and this shows that companies are progressively responding to environmental issues and to try reduce their impact in an efficient manner.

5.2 Conclusion

Businesses are faced with many challenges on a daily basis, and with the intensifying aspect of sustainability, most companies are able to adapt or simply unable to deal with their sustainability issues for the time being. Renewable energy is a broad and much debated topic for most individuals and companies in South Africa. Renewable energy has been strongly considered to help provide energy security and to improve companies' sustainability issues (Luthra *et al*, 2015, p. 772). A comprehensive literature review was carried out to identify the various motives for companies implementing renewable energy resources. The main findings from the literature review were that companies would implement renewable energy projects based on economic and environmental motives (WWF, 2014, p. 14). The motives were categorised in reference to the sustainability pillars: Economic, Social or Environmental. Results showed that economic motives were mostly considered in the decision making for installing renewable energy projects or not, although there are significant environmental and social motives for companies to take into consideration.

This research has provided an understanding of the motives that can have a positive or negative impact on companies who want to install renewable energy for their business. It also has provided a benchmark for companies making difficult decisions towards implementing renewable energy resources. From the proposed questionnaire, companies could be permitted to evaluate on the different motives that may come up when making a decision on sustainable energy in South Africa in the most efficient and effective way. It may also provide help for managers from renewable energy firms to focus on particular strengths and improve on weaknesses for their products. Renewable energy projects may have an important role to play in South Africa and have a significant impact on the economy, society and the

environment. This research has suggestions for managers with an interest in renewable energy technologies to solve different issues that their businesses may have experienced. In the context of environmental, social and economic advantages of renewable energy, South Africa could become a leader in the development of renewable energy and the government could augment strategies and eliminate inappropriate methods for sustainable energy.

5.3 Limitations and Recommendations for further research

The limitations of this research may be within the methodology section. The data could have been collected through interviews to get a more descriptive analysis of the companies' motives. Categorising companies could include the size of the company in terms of i.e. the number of employees, turnover, the area size of premises, etc. Using convenience sampling produced limitations, due to the method being exposed as a form of bias from a number of biases. Convenience sampling could have led to the under-representation or over-representation of particular groups within the sample. Since the sampling frame is not known, and the sample is not chosen at random, the inherent bias in convenience sampling means that the sample is unlikely to be representative of the population being studied. This undermines your ability to make generalisations from your sample to the population you are studying. Furthermore there were limitations regarding the questionnaire (Appendix 3) used in the methodology, where the focus was mainly identifying barriers from literature and not on the impact of the decision for the companies. However, the challenges faced in this study were carried out in an appropriate manner and was free from bias to produce results that were satisfactory to the research question.

For further research, since this research only surveyed one province in South Africa (i.e. Kwa-Zulu Natal), it would be interesting to see if the results would be similar between companies in different provinces. The sample size could also be increased to gain more accurate and viable data, as well as better readings per sector. Furthermore, it should be researched whether the same motives do occur in years to come, due to the increasing awareness of sustainability issues and corporate social responsibility. Another interesting topic that could arise from this research is whether

businesses decisions or motives to go green, or to improve on their sustainability issues, is based on a business case or a moral case.

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Appendices

Appendix 1: Informed Consent Form

Research Project Title:	**Motives Behind The Implementation Of Renewable Energy Sources In South Africa Businesses**
Principal Investigator(s):	**Brendon Michael Smith**

Participation Information

- I understand the purpose of the research study and my involvement in it
- I understand the risks of participating in this research study
- I understand the benefits of participating in this research study
- I understand that I may withdraw from the research study at any stage without any penalty
- I understand that participation in this study is done on a voluntary basis
- I understand that while information gained during the study may be published, I will not be identified and my personal results will remain confidential
- I understand that I will receive no payment for participating in this study

Information Explanation

The above information was explained to me by: Brendon Michael Smith

The above information was explained to me in: ☐English ☐Afrikaans ☐isiXhosa ☐isiZulu ☐Other:

and I am in command of this language

OR, it was comprehensibly translated to me by:

Voluntary Consent		
I, , hereby voluntarily consent to participate in the above-mentioned research.		
Signature:	Witness signature:	Date: / /

Investigator Declaration	
I, Brendon Michael Smith, declare that I have explained all the participant information to the participant and have truthfully answered all questions ask me by the participant.	
Signature:	Date: / /

Translator Declaration	
I, , declare that I translated a factually correct version of: 1. all the contents of this document 2. all questions posed by the participant 3. all answers given by the investigator In addition, I declare that all information acquired by me regarding this research will be kept confidential.	
Signature	Date: / /

Appendix 2: Institution Participation Letter

DEPARTMENT OF RHODES BUSINESS SCHOOL

Tel: [+27] 046 603 8612

Fax: [+27] 046 603 8613

E-mail: mba@ru.ac.za

03 June 2016

To Whom it may concern

Re: Invitation to conduct research at your institution

Brendon Smith (under the supervision of Ms. Leticia Greyling) is a Business School postgraduate student [Masters] at Rhodes University carrying out research on Motives behind the implementation of renewable energy sources in South Africa Businesses. The aim of this research is to identify the various motives that businesses face when implementing renewable energy sources. The participation and cooperation of your institution is important so that the results of the research are accurately portrayed.

The research will be undertaken by using a Likert Scale Questionnaire with senior managers. The data to be collected from this research will be mixed methods. The identity of your institution and the employees who voluntarily consent to participate will be treated with complete confidentiality. The collection of this data will require from each participant about 5-10 minutes completing.

We look to you for guidance in identifying a senior manager at your institute that would be suitable to do the questionnaire (at a time and date that suites them).

Attached for your information is a copy of the participant's Informed Consent Form. If you have questions or wish to verify the research, please feel free to contact us.

If you would like your institution to participate in this research, please complete and return the attached form.

Thank you for your time and I hope that you will find our request favourable.

Yours sincerely,

Brendon Michael Smith	Leticia Greyling
Research Student	Supervisor

Motives behind the implementation of renewable energy sources in South Africa Businesses

Institution Consent Form

Participation Consent
I consent for you to approach the senior managers of the organisation to participate in the Motives behind the implementation of renewable energy sources in South Africa Businesses.
I acknowledge and understand:
• The role of the institution is voluntary. • I may decide to withdraw the institution's participation at any time without penalty. • Employees [Senior managers] will be invited to participate and that permission will be sought from them too. • Only employees who consent will participate in the project. • All information obtained will be treated in strictest confidence. • The employees' names will not be used and individual employees will not be identifiable in any written reports about the study. • The institution will not be identifiable in any written reports about the study. • Participants may withdraw from the study at any time without penalty. • A report of the findings will be made available to the institution. • I may seek further information on the project from Brendon Smith on 072 699 4914.

Full Name:	
Position:	
Signature:	

Date:	

Please return to:	g10s5156@campus.ru.ac.za

Appendix 3: Questionnaire

Research Project Title:	**Motives behind the implementation of renewable energy sources in South Africa Businesses**
Principal Investigator(s):	**Brendon Michael Smith**

Has the company implemented | Yes | No | renewable energy sources or not

For each of the questions below, indicate the degree to which the decision was made to implement or not renewable energy resources where: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Challenges to investment/investing in renewable energy	1	2	3	4	5
Decreases Business Costs	1	2	3	4	5
Capital Cost Increase	1	2	3	4	5
Contribution to the community	1	2	3	4	5
Power outages	1	2	3	4	5
Concern for climate change	1	2	3	4	5
Alternative source to Fossil fuel	1	2	3	4	5
Mitigate greenhouse gases	1	2	3	4	5
Inadequate Government Regulations	1	2	3	4	5
Insufficient Financing Procedures	1	2	3	4	5
Inadequate Technology	1	2	3	4	5
Geographical Barriers	1	2	3	4	5
Pressure from media	1	2	3	4	5
Pressure from community	1	2	3	4	5

Pressure from competition	1	2	3	4	5
Understanding of renewable systems	1	2	3	4	5
Convenience for the business	1	2	3	4	5
Other	1	2	3	4	5

If other, please give a brief description of the motive: