

**A CRITICAL ANALYSIS OF THE FISCAL INCENTIVES AVAILABLE IN THE
RENEWABLE ENERGY INDUSTRY – A COMPARISON BETWEEN SOUTH
AFRICA, INDIA, CHINA AND BRAZIL**

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Submitted to the University of Cape Town

In part fulfilment of the requirements for the degree MCom (Taxation)

Faculty of Commerce

University of Cape Town

Date of submission: 26 May 2017

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ABSTRACT

South Africa relies significantly on the use of non-renewable resources to generate its electricity requirements. The release of carbon dioxide and other harmful gasses during the process of electricity generation has a negative impact on the quality of human and animal health and wellbeing.

The South African renewable energy sector is currently in its infancy in comparison to the global renewable energy sector. A brief analysis and comparison of the renewable energy sectors of the other countries selected in this dissertation (i.e. Brazil, China and India) will be performed to highlight the common challenges in these countries in an effort to demonstrate the relevance and importance of the tax and limited related incentives to assist in reducing these challenges and increase the use of renewable energy resources in electricity power plants.

Once the relevance and importance of tax and related incentives are highlighted, this dissertation analyses and examines the specific tax incentives available to enterprises operating in the renewable energy sector in South Africa, India, China and Brazil. Based on the analysis, recommendations and/or enhancements to the current corporate tax incentives available in South Africa will be discussed in detail. This dissertation will also discuss whether any of the recommendations and/or enhancements could be incorporated into the existing South African Special Economic Zones Act.

As there are 108 solar and wind energy power plant being constructed in Brazil, but no significant corporate tax incentives currently available to qualifying taxpayers, the regulatory policy setting out the renewable energy targets and how it will be achieved is an important consideration. It was found that if there were periodic updates to the regulatory policy and it was mandatory for electricity utility companies (such as Eskom) to ensure that there is a mix between renewable energy and non-renewable energy sources based on the regulatory policy, it would ensure that the delays currently being experienced in the expansion of the renewable energy sector would be significantly reduced.

This dissertation found further that the accelerated capital allowances available to qualifying taxpayers in South Africa are considerably more favourable than similar accelerated capital allowances available in the other countries selected in this dissertation. However, the tax holiday (available to taxpayers in India) would be more favourable from a corporate tax liability perspective. In addition, there are favourable customs and VAT related incentives available in the other countries selected in this dissertation that may be implemented in South Africa in order to reduce the costs and facilitate the importation of various components required in a renewable energy plant.

LIST OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Meaning</u>
BRIC	Brazil, Russia, India and China
BRICS	Brazil, Russia, India, China and South Africa
GW	Gigawatts
GDP	Gross Domestic Product
HTNE	High and New Technology Enterprises
ITA	Income Tax Act of South Africa, No. 58 of 1962
IRP	Integrated Resource Plan
IBFD	International Bureau of Fiscal Documentation
DTI	South African Department of Trade and Industry
SARS	South African Revenue Services
VAT	Value-Added Tax

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CHAPTER 1: INTRODUCTION TO THE STUDY

1.1. BACKGROUND

The South African economy significantly relies on the use of non-renewable resources for its current energy generation requirements (such as electricity, fuel etc.). The use of non-renewable resources for the generation of electricity has an adverse impact on the environment due to the release of carbon dioxide and other harmful gasses during the process of electricity generation. This impact on the environment also negatively influences the quality of human and animal health and wellbeing. A study performed by the Green Peace Organisation found that the use of coal is the main reason for carbon dioxide emissions in the world. This causes harm to people's health and wellbeing due to the pollution of the environment and the use of valuable water resources in electricity generation process (Green Peace, 2011:3).

South Africa has experienced intermittent rolling electricity blackouts during the past decade due to age of the generation fleet, poor maintenance standards and increasing demand for electricity. The current electricity generation capacity in South Africa is approximately 45 Gigawatts ("GW"). This consists of 3 GW of electricity generation capacity from Renewable Energy Independent Power Producers and Eskom capacity of 42 GW (of which a significant portion of the capacity is derived from coal powered power stations). These powered power stations consume large amounts of coal which cannot be replenished once consumed in the electricity generation processes. In 2013, it was estimated that the proven coal reserves in South Africa would only last an estimated 116 years (Lehohla, 2016:32).

In 2010, the Department of Energy in South Africa developed an Integrated Resource Plan ("IRP"). The primary object of the IRP is to determine the optimal mix of energy obtained from non-renewable and renewable energy sources based on environmental, political, price and other relevant factors. One of the aims of the IRP is to also decrease the reliance of electricity produced from coal powered power stations to approximately half of the current percentage. To achieve its goals, the IRP proposes that at least 20% of the electricity generated in 2030 (estimated to be approximately 85GW) will be acquired from renewable energy sources (Department of Energy, 2011:9).

South Africa has implemented a Renewable Energy Independent Power Producer Procurement Program (“REIPPPP”) over the past 5 years which aimed to increase the renewable energy electricity generation infrastructure through private sector investors. The implementation of the REIPPPP resulted in the amendments to the corporate tax incentives to include specific tax incentives for the generation and transmission of electricity from specified renewable energy sources in South Africa.

The South African REIPPPP was introduced with a first round of competitive bidding in August 2011, for renewable energy projects to generate and transmit electricity into the national electricity grid for both industrial and residential usage. As a result, the first wind project and solar projects reached commercial operation in February 2014 and April 2014 respectively (Energyblog, 2014).

The Department of Energy has awarded tenders in rounds one to four of the REIPPPP with a combined capacity of approximately 6 500 MW, of which renewable energy power plants with a combined capacity of 3 000 MW are fully currently operational, whilst renewable energy power plants with a combined capacity of 1200 MW are currently being constructed (Department of Energy, 2016). The REIPPPP has advanced to a fifth round of competitive bidding to obtain 1 800 MW and as of March 2017, the list of successful bidders and their projects has not yet been released.

1.2. PROBLEM STATEMENT

South Africa is a member of the BRICS (Brazil, Russia, India, China and South Africa) group of countries. The term “BRIC” (with South Africa included later in the group) was first used by Goldman Sachs economist Jim O’Neil in his paper “Building better global economic BRICs”¹ published in 2001 to discuss the state of the world economy.

The BRICS group of countries, other than South Africa, have common characteristics such as leading emerging markets with high growth rates which are considered to have strong political and economic influence regionally and globally (Global Diplomatic Forum, 2015). Although South Africa does not possess these similar characteristics, it expressed its desire to be included in the BRIC’s group where after much consideration and deliberation, South

¹ <http://www.goldmansachs.com/our-thinking/archive/archive-pdfs/build-better-brics.pdf>

Africa was invited to become a member of the BRIC's group. This invitation was a strategic decision on the basis that the inclusion of a strong African developing economy will assist in improving trade relations with other African countries and improve the prominence of the BRIC group of countries (Arkhangelskaya, 2015).

For the purposes of this dissertation, the developing economies in Africa may be considered more comparable to the South African economy than the BRICS countries. However, the availability of data and documentation regarding the renewable energy industry, the incentives and the challenges experienced in implementing renewable energy power plants in those countries could be difficult to obtain for the purposes of a meaningful comparison. Therefore, this dissertation will focus on the BRICS countries due to factors such as (1) the implementation of regulatory policy to increase the use of renewable energy for the purposes of generating electricity in those countries; (2) the mix of the current and projected electricity generation capacity as compared to total electricity generation capacity; and (3) the availability data in relation to the regulatory policies, renewable energy sectors and tax and related incentives. The utilisation of the BRICS group of countries for this dissertation will also provide a global perspective to the analysis that will be performed in chapter 5 of this dissertation.

Each of the BRICS countries have varying levels of electricity generation capacity which consist of coal powered power plants, nuclear power plants, hydro-electric power plants and more recently wind and solar power plants. A substantial barrier to these BRICS economic markets achieving much higher growth levels than currently experienced is inadequate infrastructure (Lawson & Heacock, 2006:117-120). As a result, the BRICS Development Bank was formed to assist emerging and developing countries in order to enable the BRICS group of countries to successfully address infrastructure gaps and sustainable development requirements. (BRICS Bank, 2014).

The term infrastructure has varying meanings attached to it depending on the subject matter and context of the discussion. Infrastructure can be categorised as either social infrastructure or economic infrastructure. The latter would typically consist of the "infrastructure that promotes economic activity, such as roads, highways, railroads, airports, sea ports, electricity, telecommunications, water supply and sanitation" (Fourie, 2006: 530–556). The Oxford English Dictionary defines infrastructure as "the basic physical and organisational structures

and facilities (e.g. buildings, roads, power supplies) needed for the operation of a society or enterprise” (Oxford University Press, 2016). The structures and facilities set-up for the generation and transmission of electricity is an important part of the economic infrastructure. It was predicted that the required investment in electricity infrastructure will equate to approximately 28% of the total infrastructure investment in the BRICS countries (Lawson & Heacock, 2006:117-120).

It was also predicted that the BRICS economies could be larger than the economies of the G6 (Japan, United Kingdom, Germany, France and Italy) within a period of 40 years (Dominic & Roopa, 2003:2). The ability to use the technologies readily available, tested and implemented in the developed countries is one of the ways that the BRICS countries could achieve higher growth rates in comparison to the G6 (Dominic & Roopa, 2003:2). In this regard, a significant portion of the technical equipment used during the implementation of rounds one to three of the Renewable Energy Independent Power Producer Procurement Programme was imported from Europe and China (Eberhard, Kolker, & Leigland, 2014:22).

As noted in section 1.1 above, the IRP aims to curb the generation of electricity from non-renewable energy sources in the long term. Eskom is currently constructing a 4800MW coal powered power plant called Kusile to meet the electricity demands in the short term and this power plant has not yet been completed due to delays in procurement of goods and services, technical issues and labour problems (Business Tech, 2015).

The cost of electricity generated from renewable energy sources such as wind and solar has clearly decreased significantly over the past few years. More recently, a presentation by the Council for Scientific and Industrial Research at the Economies of Regions Learning Network conference in August 2015 showed that the average cost of electricity generated from a gas power plant (used during load shedding periods) is currently in excess of the tariff charged by the Renewable Energy Independent Power Producers in South Africa (CSIR Energy Centre, 2015:3).

A study performed by Business Enterprises at the University of Pretoria for Green Peace International highlighted the costs of constructing coal powered power plants such as Kusile in comparison to the construction of renewable energy power plants. It found that *“it would be possible to develop no less than 500% of Kusile’s proposed power generation capacity,*

assuming that renewable electricity generation capacity was funded from only 30% of Kusile's external costs" (Green Peace, 2011:4). The quantum of electricity generated from renewable energy power plants as compared to non-renewable energy power plants differ due to the lower generation capacity of renewable energy plants. For example, the electricity generated from a coal powered plant would differ from a solar power plant as the solar power plant will be restricted by the number of hours of sunlight in a day (Tiwari, 2016).

One mechanism to encourage investment in infrastructure by either foreign or local investors is to offer tax incentives. A draft report called "Tax Incentives for Investment – A Global Perspective" issued by the Organisation for Economic Co-operation and Development highlighted three key reasons why governments in developing countries tend to offer tax incentives to encourage investment. The draft report states that the three reasons are as follows "tax incentives are much easier to provide than to correct deficiencies in, for example, infrastructure or skilled labour; tax incentives do not require an actual expenditure of funds or cash subsidies to investors; and tax incentives are politically easier to provide than funds." (Organisation for Economic Co-operation and Development, 2007:5). The above mentioned three reasons are important factors which will be discussed in further detail in chapter 3 of this dissertation.

1.3. RESEARCH APPROACH AND METHODS

An analysis of the renewable energy sectors and the corporate tax regimes in the selected countries will first be performed. The relevant information will be obtained from existing legislation, commentary and guides on this legislation, industry data and research bodies such as the International Renewable Energy Agency.

A critical research methodology approach will be adopted to determine if there are any recommendations and/or enhancements to the current renewable energy related corporate tax incentives available in South Africa.

1.4. RESEARCH OBJECTIVE

The objective of this dissertation is to critically analyse the current corporate tax incentives for the South African taxpayers engaged in the manufacturing of components used in the renewable energy sector and the South African taxpayers engaged in the generation and transmission of electricity from renewable energy sources. This critical analysis will

determine if there are any recommendations and/or enhancements that may be beneficial to corporate tax incentives currently available to South African taxpayers.

To achieve the stated objective of this dissertation, the following is necessary:

- 1.4.1 To provide a brief overview of the renewable energy sector and illustrate the challenges faced by enterprises operating in the selected countries.
- 1.4.2 A synopsis of the corporate tax regimes in the selected countries.
- 1.4.3 To critically analyse the renewable energy tax regimes offered in South Africa compared to the other selected countries.
- 1.4.4 To determine if there are any recommendations and/or enhancements to the current corporate tax incentives available in South Africa and to consider whether any of the recommendations could potentially be included as part of an existing South African tax regime, specifically the tax regime available to taxpayer's operating in the South African Special Economic Zones.

1.5. LIMITATION OF SCOPE

This dissertation is aimed at providing recommendations and/or enhancements to the current tax incentives available to South African corporate taxpayers in the renewable energy industry. These recommendations will be based on an analysis of the tax incentives offered to taxpayers in comparable emerging markets.

The dissertation will focus exclusively on the corporate income tax regime specific to the renewable energy industry. Extraneous economic factors and political policies that may have influenced the current tax regime of the renewable energy sector in South Africa may be referred to in the dissertation, but these additional economic factors and political policies will not be analysed or form part of the recommendations and/or enhancements discussed in chapter 5 of this dissertation.

The corporate tax regime of most of the BRICS groups of countries will form part of the analysis of this dissertation. However, for the purposes of this dissertation, the potential tax incentives available in Russia have been excluded from this dissertation on the basis that there is no clear tax policy in pursuit of renewable energy in Russia. A dissertation focussing on the development of renewable energy in Russia concluded that the Russian government does not promote the development of renewable energy on the basis that it would not create

political influence in the world and that there is currently no shortage of oil and gas resources in the country (Chernysheva, 2014:56-57).

1.6. STRUCTURE OF DISSERTATION

The structure of the dissertation will be as follows:

- Chapter 2 will provide a brief summary and highlight the challenges faced by the renewable energy sector in South Africa, Brazil, India and China.
- Chapter 3 will provide an overview of tax incentives; and the reason for implementing tax related incentives for the renewable energy sector. The relevant types of incentives and an overview of the tax incentives specific to the renewable energy sector in South Africa will also be addressed.
- Chapter 4 aims to critically analyse the corporate tax incentives available to taxpayer's operating in the renewable energy industry in South Africa, India, China and Brazil.
- Chapter 5 outlines considerations around whether there are any recommendations and/or enhancements to the corporate tax incentives available in South African and whether any of those recommendations and/or enhancements could potentially be included as part of or in addition to an existing tax regime, specifically the tax regime available in the South African Special Economic Zones.
- Chapter 6 will provide a discussion of the research objectives and how each of the objectives were accomplished in this dissertation.

CHAPTER 2: AN ANALYSIS OF THE RENEWABLE ENERGY SECTORS AND THE CHALLENGES ENCOUNTERED IN SOUTH AFRICA, CHINA, INDIA AND BRAZIL

2.1 INTRODUCTION

The purpose of this chapter is to provide a brief analysis and comparison of the renewable energy sectors in the selected countries, namely Brazil, China, India and South Africa. This analysis will highlight the common challenges faced during the implementation of renewable energy power generating facilities in these countries in an effort to demonstrate the relevance of the tax incentives. The significance of tax incentives will be discussed in further detail in chapter 3 and 4 of this dissertation.

2.2 METHODS OF OBTAINING ELECTRICITY GENERATION CAPACITY

South Africa has historically obtained its electricity generation capacity through a state owned power company called Eskom. As mentioned in Chapter 1, there is an active effort in the form of the South African REIPPPP to obtain electricity from renewable energy sources. The importance of considering the method adopted to obtain renewable energy capacity is particularly important given that it will determine whether an electricity generator and distributor meets the requirements and if so, whether it will be successful. In 2011, the Department of Energy introduced the competitive bidding process which has awarded tenders for the generation and transmission of renewable energy in South Africa (Eberhard, Kolker, & Leigland, 2014:1). The bid price in a competitive auction would be determined by various factors such as cost to produce electricity, cost of finance, type of plant and the required/desired return on capital for the investor.

Similar to South Africa, Brazil obtains new capacity from the open market. However, the Brazilian bid system comprises of a reverse auction rather than a competitive bidding system. The reverse auction system allows for the government to set a maximum price that they are willing to pay to the potential independent power producers. In turn, the bidders with the lowest price sign agreements for the next twenty years to supply electricity to the Brazilian power distribution companies (Haynes and Boone, LLP, 2016). Brazil has hosted several solar and wind power reverse auctions between 2009 and 2015 which awarded contracts totalling 10GW of capacity to the successful bidders. It is estimated that 3GW of this 10GW capacity would result in investments of approximately USD 3 billion over the next three

years (Haynes and Boone, LLP, 2016). The Brazilian Development Bank (“BNDES”) has been providing the renewable energy project companies that were successful in the bidding process with financing (Haynes and Boone, LLP, 2016). This is particularly important given the current state of the economy which has been experiencing negative growth. It may have been more beneficial to the economy if these projects are funded by foreign investments (Forbes, 2016).

In order to achieve the renewable energy generation targets, India is following suit and intends implementing competitive auctions, specifically for wind power, which will target procuring 1 GW of capacity from independent power producers (India Wind Turbine Manufacturers Association, 2016).

China is following a very different approach to the countries discussed above. In China, the electricity power distribution companies are required to purchase electricity generated by approved independent renewable energy power plants. If the cost is in excess of the traditional energy power plants (such as coal/nuclear), the excess is subsidised (by the government) through a surcharge added to the price of electricity paid by all electricity consumers (Solidiance, 2013:14).

The most prevalent methods of obtaining renewable energy capacity namely; the feed-in tariff policy, the competitive/reverse auction bidding policy and the net metering/net billing policy will be discussed in further detail in chapter 3 of this dissertation.

2.3 ELECTRICITY GENERATION MIX

The combination of renewable energy generation capacity to total electricity generation capacity varies in each of the BRICS countries. The total electricity generation capacity typically consists of coal powered power plants, nuclear power plants, hydro-electric power plants, wind and solar power plants. The table below summarises the electricity generation capacity from renewable energy sources as compared to total energy generation capacity in South Africa, Brazil, India and China.

Table 1: Electricity generation mix	<u>SOUTH AFRICA</u>	<u>BRAZIL</u>	<u>CHINA</u>	<u>INDIA</u>
Total Electricity generation capacity (in GW)	45	133	1 508	288
Electricity generation capacity from renewable energy sources	11%	83%	33%	13%
Source: South Africa - ESKOM, 2016; Brazil - Coelho, 2015; China - Energy Post, 2016; India - Ministry of Power, Government of India, 2016				

2.3.1 Brazil

Based on the data in table 1 above, it is evident that the energy generation capacity in Brazil (of 133 GW) is significantly attributable to electricity generation capacity from renewable energy sources. These resources include hydro-electric power, wind and bio-mass. This differs from the electricity generation capacity in South Africa which consists significantly of electricity generation capacity from non-renewable energy sources such as coal and nuclear power. The significant reliance on hydroelectric power in Brazil began in the 1970's and 1980's as a result of the discovery of Brazil's large network of flowing rivers (Luomi, 2014:6). It was evident that these rivers could support the potential hydro-electric power plants (Luomi, 2014:6).

In Brazil, the key long term considerations relate to the utilisation of the unexploited potential hydroelectricity capacity, the cost of electricity generated from other sources and the impact of introducing new renewable energy onto the national electricity grid. It is estimated that electricity consumption in Brazil will be consistent with developed countries such as France, Spain and Italy by 2050. In order to cope with this increased demand, the estimated electricity generation capacity, which will mainly arise from renewable energy sources, will increase to 207GW by 2024 (Coelho, 2015:18). The proposed increase to 207GW is justified by data indicating that a significant amount of the potential electricity generation capacity could be obtained specifically from hydroelectric sources (unexplored capacity of 261GW) and wind power (unexplored capacity of 350GW). This is remarkable when compared to the South Africa IRP whereby it is proposed that at least 20 percent of the electricity generated in 2030 (estimated to be approximately 85GW) will be acquired from renewable energy sources.

2.3.2 China

In 2011, China enacted its 12th Five Year Plan (for the period 2011-2015) which aimed to increase the use of non-fossil fuel energy to 15 percent by 2015 and 20 percent by 2010. To achieve this target, China planned to invest RMB 5.3 trillion (approximately USD 7.95 billion) for the generation and transmission of electricity during the period 2011 to 2015 (KPMG, 2011:2). The achievement of this goal is evident in the current mix of China's electricity generation capacity which comprises 13 percent of renewable energy electricity generation capacity. There are two main reasons for China's interest in renewable energy (Solidiance, 2013:6) which can be summarised as follows:

- the energy consumption has doubled in past 10 years; and
- the desire for reduction of reliance on fossil fuels and reduction of greenhouse emissions.

The desire to reduce the reliance on fossil fuels and consequently, the reduction of greenhouse emissions is important in cities such as Shanghai and Beijing where air pollution from coal power stations renders the air virtually unbreathable (Martin, 2016).

2.3.3 India

The Government of India has recognised that electricity is one of the key drivers for economic growth and the alleviation of poverty in India. In 2005, the government committed itself to provide electricity to all households in India (Ministry of Power, Government of India, 2005). Following on to this commitment, the Government of India published a report on India's Renewable Energy Roadmap. This Roadmap aims to identify the steps that the respective stakeholders in the Government and private sector could implement for the increase in renewable energy generation facilities in the short term (Government of India, 2015:4-10). The increase in the electricity generation capacity between 2011 and 2015 was 114 GW which resulted in India being considered the fourth largest producer of electricity in the world (KPMG, 2015:66).

2.4 MANUFACTURING OF RENEWABLE ENERGY COMPONENTS

The renewable energy sector in South Africa is insignificant compared to both China and India. The implementation of the REIPPPP in rounds 1 to 3 resulted in a significant portion of the technical equipment being imported from Europe and China (Eberhard, Kolker, & Leigland, 2014:22). However, this increased demand locally has stimulated the desirability and growth of manufacturing components for the renewable energy sector in South Africa. More recently, there has been an increase in the number of wind turbine and solar panel manufacturing plants built in South Africa, and several of these manufacturers have taken full advantage of the benefits offered to entities operating within the specifically demarcated South African Special Economic Zones. These specifically demarcated Special Economic Zones have been set up to encourage trade and investment which for example, creates employment opportunities in South Africa and ultimately benefits the South African economy (Department of Trade and Industry, 2016). There are Special Economic Zones such as the East London Industrial Development Zone which has positioned themselves for investment in renewable energy power generation and manufacturing plants (East London IDZ, 2016:4). The use of Special Economic Zones and the applicability to the renewable energy sector together with an overview of its specific tax incentives will be discussed in further detail in chapter five of this dissertation.

The manufacturing sector in China is enormous as it is the world leader in the manufacture of solar panels. The solar panel sector has been experiencing annual growth rates of approximately 2.4 percent between 2010 and 2015 (Dezan Shira and Associates, 2016). Although global demand for solar panels is decreasing, leading Chinese manufacturers are increasing production which may lead to an oversupply in the Global market. However, China has committed to install renewable energy capacity of 56GW in 2016 which would theoretically result in the demand in China compensating for the oversupply of locally manufactured solar panels in the global market (Martin, 2016).

The current solar panel manufacturing sector in India is considered insignificant compared to the Chinese solar manufacturing industry. In China, one manufacturer called Trina Solar has a manufacturing capacity that is greater than the combined manufacturing capacity of India's solar manufacturing industry (The Economic Times, 2016). The current capacity of wind power manufacturers in India is approximately 9500 MW per annum. India is currently exporting turbines and related components amounting to USD 500 million annually. Five

years ago, this amount was double the current value of exports whilst the wind power manufacturing sector had one third of the current capacity. This significant reduction of exports was caused by the high cost of debt and the cost of shipping the large equipment. This resulted in the Indian wind power manufacturing sector no longer being able to compete with the prices in the global economy (Hindu Business Line, n.d.). A key factor was the lack of integrated manufacturing lines in India. Participants of a survey conducted by Bridge to India with companies Chief Executive Officers showed that 60 percent of the participants anticipate that they do not expect there to be an integrated manufacturing line by 2022. However, the Government of India is committing itself to increase domestic solar manufacturing in India through a policy intervention which will aim to achieve a competitive solar manufacturing sector (The Economic Times, 2016). One way of achieving a competitive renewable energy sector would be through the introduction of tax incentives, specifically to the renewable energy manufacturing sector. This will be discussed in further detail in chapter five of this dissertation.

2.5 CHALLENGES

The participants in the South African renewable energy sector can gain significant insight into potential challenges and possible solutions to the common problems faced by similar enterprises in each of the countries considered in this dissertation. The common challenges will be discussed in further detail below.

2.5.1 Grid constraints

Grid constraints, common to all the selected countries, are largely due to the age and the type of technology used in the provincial/national electricity transmission grids (Hover, 2016).

In the modern era, grid connections are not simply constructing additional power lines and substations. The implementation of “smart grids” will assist power transmission companies to ensure that the transmission grid is more predictable, manageable and balanced so that there is seamless integration of electricity from renewable energy and non-renewable sources (Committee on U.S.-China Cooperation on Electricity from Renewable Resources, 2010). The investment in a smart grid whilst taking into consideration the infrastructure multiplier effect, can be considerably beneficial to the economy. In certain scenarios, the multiplier effect can result in economic growth of

ZAR 2 for every ZAR 1 spent on infrastructure (World Wide Fund for Nature, 2014:34). If the government policies incentivise infrastructure spending, the effect on growth in the economy could be boosted resulting in much higher growth rates than those currently being experienced in South Africa.

The grid constraint challenge faced by enterprises in India, Brazil and China is mainly due to the location of the electricity generation plants in relation to where the electricity is utilised by the end customer.

Recently, there have been several uncompleted transmission projects in Brazil that have not met their commitments and recent reverse auctions did not yield expected bids. This has resulted in challenges to transmit electricity from the north east regions to the major cities located in the south east (Haynes and Boone, LLP, 2016).

In March 2016, China's National Energy Administration published a statement that six of the northern states have suspended the approval of new wind projects. At this stage, these six states have more installed capacity than the rest of China combined due to the high gale force wind and bright sunlight which makes it suitable for both wind and solar farms (Lui, 2016). The main reason for the suspension of any new wind projects is due to the wastage of electricity generated by these farms. This is due to either lack of transmission infrastructure from these regions to the big cities or the lack of connection of the wind project to the national grid. China has not been able to keep pace with upgrading and installing new transmission lines from these inland regions to the coastal cities. In 2015, the estimated electricity unused was approximately 15 percent of China's total wind power generation (Lui, 2016).

The city of Zhangjiakou in China is facing a problem similar to the northern regions where excess electricity is being generated. However, this city is incentivising industries that require large amounts of electricity (such as electronic data centres and hydrogen production facilities) to relocate to Zhangjiakou (Hover, 2016).

India faced a far more complex problem as a result of the design of the electricity grid which previously separated each region (i.e. a decentralised electricity grid). In 2014, the regional grids were combined to form one national electricity grid which assisted

with stabilising the grid and prevent power cuts in certain regions as available capacity can be obtained from other regions now (Bhaskar, Raj, & Ramanathan, 2014). However, the lead time to connect newly constructed renewable energy plants to the national electricity grid ranges between one to three years (Government of India, 2015).

The particular challenge of electricity being produced but wasted due to insufficient grid infrastructure occurred in 2009 in the state of Texas in the United States of America where 17 percent of the electricity generated was wasted and a curtailment plan had to be implemented. This challenge was overcome by erecting new transmission lines that were incorporated into the grid specifically to cater for these renewable energy power plants and currently the wastage is less than 0.5 percent of electricity generated (Hover, 2016). If a similar approach is adopted by the countries discussed in this dissertation to erect smart grids that cater specifically for renewable energy plants, the grid constraints challenge currently being experienced could be conquered.

In South Africa, Eskom has acknowledged that it is currently experiencing challenges to connect renewable energy projects to its already congested and ageing national grid. The current Eskom grid is much more difficult to access and more often requires a new substation and/or new lines for new connections (Magoro, 2015). To overcome this challenge, Eskom encouraged renewable energy projects to apply for a “self-build” option. The “self-build” option is elected in the case where it is more cost efficient and faster to “self-build” substations and connection lines using Eskom’s specifications than risk delays in reaching commercial operation due to any potential delays in Eskom connecting the project to the national electricity grid.

2.5.2 Reliance on one type of energy source

Brazil’s heavy reliance on hydroelectric power has recently caused major problems due to the severe drought the country has experienced for the past two years. The drought has caused a shortage of water in the country and consequently resulted in a lack of sufficient water supply for certain hydroelectric power plants to operate. With the hydroelectric plants operating at a reduced capacity, it has resulted in electricity blackouts in some of the major hubs in Brazil. Brazil has recognised that the reliance

on one type of power source requires intervention and it has sought assistance from Princeton University. The university will provide support to power generation companies to incorporate other sources of electricity, such as the vast amount of unutilised wind power, into the electricity generation mix to assist with managing the demand and supply of electricity (Princeton University, 2016).

This is particularly relevant in the South African context due to the high reliance on coal. This challenge faced by Brazil highlights the importance of a diversified renewable energy mix for both renewable energy and non-renewable energy sources.

2.5.3 Employment

The shift from electricity generated from coal power plants to electricity generated from renewable energy could result in job losses in both the mining and energy sectors. These job losses are because the skill sets required by employees of these two different electricity generation plants may not be interchangeable. In order to substantiate this theory, the Rock Environment and Energy Institute in China found that the quantum of job losses suffered in the coal mining and power generation sectors will not be offset by the growth in the renewable energy manufacturing and power generation sectors. This effect will create a challenge in China for the period 2020 to 2030. After 2030, the job losses in the coal sectors will be offset by the increase in job opportunities in the renewable energy sector (EnergiewendeGER, 2016).

Another key challenge faced by companies in general is the lack of sufficiently skilled manpower. A key concern highlighted by a survey conducted on 40 of the solar companies in India found that the Government of India wishes to increase the renewable energy generation capacity by 100GW by 2022 which will create demand locally for components and an immediate shortage of sufficiently skilled manpower (Chawla, 2016).

This type of challenge would similarly affect other countries that are quickly moving from non-renewable energy sources to renewable energy sources.

2.5.4 Technological advancements

Lower quality turbines, which are Chinese domestic brands or foreign brands produced in China, are almost half the prices as compared to wind turbines which are developed and produced in advanced markets such as the United States, Denmark and Spain (Gosens & Lu, 2014:301-318). However, these sub-standard wind turbines create inefficiencies as these wind turbines with double the energy generation capacity are producing less electricity than the wind turbines used in the United States (Bloomberg, 2016). The output comparison of the quality of the wind turbines is not necessarily related to the turbine location but rather the quality of the wind turbines. A study performed on the turbine quality in China as compared to the turbine quality in the United States found that “*the output from a specific type of wind installation (the GE 2.5 megawatt turbine) as a standard for comparison, concluding that overall turbine quality in the United States is higher than in China*” (Harvey, 2016).

The use of these sub-standard technologies will create inefficiencies in the renewable energy sector. However, the use of the low quality wind turbines in China is as a direct result of the policy aimed at the quantity rather than the quality of installed capacity (Gosens & Lu, 2014:301-318).

2.5.5 Domestic manufacturing

The implementation of the REIPPPP in rounds 1 to 3 resulted in a significant portion of the technical equipment being imported from Europe and China (Eberhard, Kolker, & Leigland, 2014:22). However, this increased demand locally has stimulated the desirability and growth of manufacturing components for the renewable energy sector in South Africa.

The developing countries, such as those considered in this dissertation, need to compete with the economies of scale found in developed countries. As a result, the local manufacturing of Solar Photovoltaic units in India is non-existent which contributes to the scale, quality and price that local manufactures are able to domestically produce these units (Government of India, 2015:31-37). However, the demand in the local and export markets for the locally manufactured components would typically influence the growth levels that the manufacturing sector would experience.

The ability to acquire sufficient land impacts on the costs and the growth of the renewable energy sector as the manufacturing plants. This is due to the electricity generation plants requiring large amounts of land due to the size of the components. This is particularly important in a country such as India where its Land Acquisition Act requires the approval of at least 80 percent of those affected by the renewable energy development be obtained prior to the acquisition of the land (Government of India, 2015:49-53). In February 2015, Jacob Zuma, the president of South Africa proposed new legislation be implemented which, *inter alia*, limits foreign ownership of land and limits the amount of land that any person can own to 12 000 hectares (The Presidency - South Africa, 2015). This proposed law may negatively impact the renewable energy generation sector, which requires large amounts of land for the projects and in turn affect the supply of electricity, the demand for locally manufactured components and will reduce foreign direct investment in South Africa.

The Department of Information Technology in India introduced a Special Incentives Package Scheme whereby a government grant based on 20 percent of capital expenditure and 10 percent of production turnover for a period of 10 years (Ministry of Communication and Information Technology, 2015). These percentages are increased for companies operating in the Special Economic Zones (Ministry of Communication and Information Technology, 2015). The incentives described above are available once an investment threshold is exceeded and available prospectively from the date of application (Ministry of Communication and Information Technology, 2015). The Special Incentives Package Scheme available in India will be discussed in further detail in Chapter four.

2.5.6 Finance

The ability to obtain long term finance is a crucial challenge for renewable energy projects. As renewable energy projects require a significant upfront capital investment, the lenders must be willing to provide large amounts of funding upfront. It is currently more of a challenge to finance a renewable energy project than any other infrastructure investment (Government of India, 2015:41).

In South Africa, the funding of projects in rounds 1 to 3 consisted on average of two thirds debt. The major financiers of the debt have been the four big commercial banks

in South Africa, insurance companies such as Old Mutual, the Industrial Development Corporation and the Development Bank of Southern Africa (Eberhard, Kolker, & Leigland, 2014:20-22).

As mentioned in section 2.2, Brazil has estimated that 3GW of the 10GW electricity generation capacity awarded through reverse auctions between the period 2009 and 2015 would result in investments of approximately USD 3 billion over the next three years. Currently, the BNDES has been providing the renewable energy project companies with financing (Haynes and Boone, LLP, 2016). Given the current state of the Brazilian economy, which has been experiencing negative growth, it may be more beneficial to the economy if these projects are funded by foreign investments (Forbes, 2016).

EY has developed a methodology of determining which countries are more attractive destinations for renewable energy investors. This methodology takes into consideration factors such as macro-economic stability, security and supply, affordability, finance availability and energy market access. As of October 2016, United States is ranked first, followed by China and India whilst Brazil is ranked eight and South Africa is ranked ninth out of the 40 countries listed in the index (EY, 2016).

2.5.7 Collateral

A major concern of the investors of renewable energy plants located in India is the lack of a strong financial position of the national power company in India. This concern stems from the concession to provide electricity at a significant discount to agricultural consumers in order to support the socio economic objectives of the government. This increases the financial constraints of the National Power Company in certain areas where the electricity consumer base consists of a large number of agricultural consumers (Government of India, 2015:61).

In recent years, Eskom which is a state owned entity, required significant financial assistance from the South African Government. In June 2015, two bills were passed by the National Assembly that approved a cash injection of R23 billion from the Government and approved the conversion of a subordinated loan to equity (Essop,

2015). This is an important factor that reduces the risk of failure of the renewable energy providers on the basis that the Government will be required to intervene in the event of a default by Eskom.

In South Africa, the implementation agreement in respect of the REIPPPP was signed between the successful bidders and the Department of Energy lessened the impact of the potential investors concerns. This agreement ensured that in the event of a defaulting on the payment for the electricity supplied to Eskom, the Government will guarantee the payment (Eberhard, Kolker, & Leigland, 2014:33).

2.6 CONCLUSION

The South African renewable energy generation and transmission tax incentives cannot be compared to the incentives offered in other developing economies without taking into consideration the renewable energy industry and its challenges experienced in those countries. These challenges may assist with the understanding of the reasons behind the current tax incentives, and particularly if there are any other types of incentives that will be more beneficial to the taxpayer and the economy.

CHAPTER 3: AN OVERVIEW OF TAX INCENTIVES SPECIFIC TO THE RENEWABLE ENERGY SECTOR

3.1 INTRODUCTION

An analysis performed by HSBC Bank indicated that during the period of October 2008 to January 2009, fifteen percent of tax related incentives totalling USD 2 800 billion which were announced by world economies related to the generation and transmission electricity from renewable energy sources as well as energy efficiency and wastewater infrastructure (Barar, Egeland, & Steenblik, 2013:10). The monetary value of tax related incentives specific to the generation and transmission of electricity from renewable energy sources is indicative that a vast number of the world's economies are seriously considering and implementing tax related incentives specific to the generation and transmission of electricity from renewable energy sources. However, in countries where the revenue collection and cost figures are not publicly available, the true benefit and costs of these incentives are not known to the taxpayers (James, 2013:21).

According to KPMG, there are several types of tax incentives implemented by Governments in support of the generation and transmission of renewable energy such as tax credits, government grants, tax holidays, tax incentives and non-tax related incentives (KPMG, 2011:1).

The focus of chapter two of this dissertation was to highlight the challenges faced by renewable energy enterprises operating in the economies analysed in this dissertation. The purpose of this chapter is to highlight the reasons for implementing tax incentives in respect of the generation and transmission of electricity from renewable energy sources and the relevance of these tax incentives in assisting with overcoming the challenges faced in these economies in order to increase the use of renewable energy electricity power plants.

3.2 SUMMARY OF THE REASONS FOR IMPLEMENTING TAX RELATED INCENTIVES FOR THE RENEWABLE ENERGY SECTOR

There are several reasons for the implementation of tax related incentives for the generation and transmission of electricity from renewable energy sources, which have already been

highlighted in chapter one and two of this dissertation. These reasons can be summarised as follows:

- challenges faced by economies considered in this dissertation, such as the high upfront capital expenditure required to set-up the power plants, inadvertently creates significant funding barriers for new entrants to the renewable energy sector;
- the use of non-renewable resources for generating electricity for the purposes of both residential consumption and industrial processes has a negative impact on the environment due to, *inter alia*, the release of carbon dioxide and other harmful gases during the electricity generation from non-renewable energy sources such as coal. This negatively impacts *inter alia*, the environment and the quality of human and animal health. The 2010 South African Integrated Resource Plan aims to curb the use of non-renewable resources for generation electricity in the long term;
- the South African economic growth rates of between 1.3 and 2.2 percent for the 2013 to 2015 calendar years have been far lower than the growth rates of the other BRICS countries highlighted in chapter two of this dissertation. A substantial barrier to the BRICS economic markets achieving high growth levels is inadequate infrastructure (Lawson & Heacock, 2006:117-120). In the past decade, South Africa reached the stage where the decision to implement renewable energy generation capacity into its existing fleet of coal and gas intensive power plants was most desirable due to ageing of the countries generation fleet, poor maintenance standards and increasing demand for electricity.

The use of renewable energy resources to generate electricity would decrease the reliance on non-renewable resources for the electricity generation which was estimated in 2013 to only be sufficient for the next 116 years (Lehohla, 2016:32). To encourage the use of renewable energy resources for electricity generation, tax incentives would assist the investors to achieve sufficient returns on their investment.

The use of the most appropriate tax related incentives would also significantly decrease the tax liability for the first few years of operations of these new entrants to the renewable energy sector. The reduction of the tax liability in the first few years of operations may not decrease the upfront capital expenditure required by these enterprises. However, it will encourage

enterprises which, once operations commence, typically have cash flow constraints and significant debt repayments to invest in these power plants.

3.3 THE RELEVANCE OF TAX INCENTIVES

The Oxford English Dictionary defines an ‘incentive’ as “a payment or concession to stimulate greater output or investment” (Oxford University Press, 2016). Governments typically provide incentives in the form of government grants and/or specific tax incentives to encourage investment in a particular sector or region. These incentives may typically also be in the form of government grants, loans or rebates and/or tax concessions such as reduced income tax rates, accelerated depreciation allowances or special tax regimes for qualifying enterprises of a particular industry and/or region (James, 2013:52).

An analysis performed by James in his paper “Tax and Non-Tax Incentives and Investments: Evidence and Policy Implications” indicated the prevalence of various types of tax incentives implemented world-wide (James, 2013:3-5). It is noted that these are not specific to the renewable energy sector. However, it is evident that the Organisation for Economic Co-operation and Development (OECD) countries, which consist significantly of developed countries, appear to be moving away from tax holidays/tax exemptions and reduced tax rates. In his paper, James summarised the prevalence of tax incentives throughout the world in the following table:

Table 2: Prevalence of Tax Incentives around the World

	Number of Countries Surveyed	Tax holiday/ Tax exemption	Reduced Tax rate	Investment allowance/Tax credit	VAT exemption/reduction	R&D Tax Incentive	Super-deductions	SEZ/Free Zones/EPZ/Free port	Discretionary process
East Asia and Pacific	12	92%	92%	75%	75%	83%	8%	83%	25%
Eastern Europe and Central Asia	16	75%	31%	19%	94%	31%	0%	94%	38%
Latin America and the Caribbean	24	75%	29%	46%	58%	13%	4%	75%	29%
Middle-East and North Africa	15	73%	40%	13%	60%	0%	0%	80%	27%
OECD	33	21%	30%	61%	79%	76%	18%	67%	27%
South Asia	7	100%	43%	71%	100%	29%	57%	71%	14%
Sub-Saharan Africa	30	60%	63%	73%	73%	10%	23%	57%	47%

As mentioned in section 1.2 of this dissertation, a draft report published by the OECD titled “Tax Incentives for Investment – A Global Perspective: experiences in MENA and non-MENA

countries” highlighted three key reasons why governments in developing countries tend to offer tax incentives to encourage investment. These three reasons which are; “tax incentives are much easier to provide than to correct deficiencies in, for example, infrastructure or skilled labour; tax incentives do not require an actual expenditure of funds or cash subsidies to investors; and tax incentives are politically easier to provide than funds” are important considerations in the discussion of the relevance of tax incentives (Organisation for Economic Co-operation and Development, 2007:5).

There are several types of tax incentives related to the renewable energy sector in South Africa which were legislated to meet particular economic, social and environmental goals of the country. These goals can briefly be outlined as follows:

- **Weak infrastructure:** an incentive policy for a country with weak infrastructure can incentivise investment in infrastructure. This would typically increase investment in the economy and more particularly in infrastructure as compared to a policy incentivising manufacturing activities (James, 2013:24).
- **High unemployment rates:** an example of an incentive to reduce the high unemployment rate in South Africa and enhance the skills of the youth in South Africa is the implementation of an Employment Tax Incentive. The employment tax incentive encourages the employment of youth between the ages of 18 and 29 by providing the employer with rebates based on the value of the employees’ tax liability. There are a number of requirements that need to be met which will not be discussed in further detail in this dissertation. However, a recent report called the “Employment tax incentive descriptive report” issued by the National Treasury is of particular relevance due to the quantum of the employment tax incentives provided to South African corporate taxpayers. The report indicated that an amount of R6.3 billion was claimed by enterprises in the two year period of January 2014 to February 2016 and that this incentive supported five percent of all jobs (based on employment tax certificate date) in South Africa for the 2015 employees’ tax year (National Treasury, 2016:2).

It is noted that although a tax incentive would be a “cost” to the fiscus, the enterprise would typically generate revenue, other than in the form of income tax, for the Tax Authorities. An example of this would be that employees of the enterprise, who may have been unemployed, would now be contributing taxes to the fiscus. Furthermore, there would be a knock-on effect

in the economy where the company and its employees would be procuring goods and services which typically benefit the fiscus through an increase in the income tax liabilities of the enterprises supplying the goods and services.

According to Brauner & Stewart, there is a conflict between increasing tax revenues and tax reform for purposes of developing the economy. If a country reduces the tax rates, it would essentially reduce the amount of tax collected by the Tax Authorities and consequently reduces the value of government spending on items such as education, health care and poverty relief (Brauner & Stewart, 2012). This consideration together with the view that the tax incentives may not be important in determining if an investment is made in a particular sector or region indicates that a policy to incentivise a particular region/industry may have not been crucial as the investment would have been made regardless of the type and quantum of the incentive (James, 2013:16-19).

It is difficult to determine whether a change in investment policy increases investment due to other non-tax related factors that may encourage investment (James, 2013:16-19). However, for countries with a good investment appetite, the knock-on effect of tax related incentives could be up to eight times stronger than a country in which investors require more than tax incentives to encourage investment (James, 2013:1). A report “Options for low income countries’ effective and efficient use of tax incentives for investment” indicated that the use of investment tax credits and accelerated depreciation resulted in higher investment rather than the implementation of tax holidays and/or exemptions. However, the report went on further to state that *“in most low income countries, the effectiveness and efficiency of tax incentives cannot be assessed due to lack of data and the absence of analytical tools and skills.”* (IMF, 2015:3).

To quantify the effect of tax incentives, studies performed by The World Bank, The International Monetary Fund and the Organisation for Economic Co-operation and Development found that a 10 percent increase in the corporate tax rate typically lowered the foreign direct investment by 0.45 percent of Gross Domestic Product (“GDP”) (James, 2013:8). Based on the GDP for South Africa in 2015, a 10 percent increase in the corporate tax rate would decrease GDP by approximately USD 1.4 billion.

There are concerns that enterprises, who may use tax incentives to determine an ideal location for their investment can cause harm to developing economies by encouraging ‘tax competition’ (Brodzka, 2013:32). Tax competition could be harmful when economies compete with one another to such an extent that the real cost of the incentive outweighs any benefit derived from the investment. Another concern that tax incentives do not encourage investment is when developing countries implement tax incentives without performing a cost/benefit exercise so that they can compete with developed economies. However, these taxes create a heavy burden on the developing economy and is subject to abuse by enterprises (Brodzka, 2013:32).

3.4 OVERVIEW OF RELEVANT TAX INCENTIVES

There are several types of incentives that are widely used in the world. The purpose of this section is to highlight these types of incentives before going into the specifics of the tax incentives offered in the countries analysed in this dissertation.

3.4.1 Tariff policies

There are various policies implemented throughout the world to determine the most appropriate tariff per kilowatt of electricity generated and transmitted by these renewable energy producers. The tariff policy enables the renewable energy producer to earn, *inter alia*, a desired profit margin and consequently return on their investment.

Based on the 2016 Global status report issued by Renewable Energy Policy Network, there are wide range of tariff policies implemented throughout the world. At the end of 2015, the following three types of policies were the most widely implemented throughout the world:

- 110 jurisdictions (i.e. at provincial and national level) had enacted feed-in policies;
- 64 countries had held renewable energy tenders (i.e. the competitive bidding process); and
- 52 countries had adopted net metering / net billing policies.

In South Africa, the National Energy Regulator initially approved the introduction of a feed-in tariff policy during 2009. This policy was based the tariff per kilowatt on estimated costs to generate electricity plus a 17 percent return on equity (Eberhard, Kolker, & Leigland, 2014:17). The feed-in tariff determined in 2009 was revised during 2011 as it needed to take into the impact of interest rate and exchange rates changes in South Africa. The revised policy and the uncertainty of future revisions to the policy was determined to be non-competitive procurement and therefore prohibited in terms of the government and public entity procurement regulations (Eberhard, Kolker, & Leigland, 2014:4-8).

In 2011, the Department of Energy introduced the competitive bidding process which awarded tenders for the generation and transmission of renewable energy (Eberhard, Kolker, & Leigland, 2014:4-8) To date, a combined electricity generation capacity of approximately 6 500 megawatts was awarded through four rounds of the competitive bidding process (Department of Energy, 2016).

Each of the three tariff policies mentioned above will be outlined briefly below and where relevant, it will include the significant advantages and/or disadvantages of the tariff policy in question.

3.4.2 Feed-in tariff policy

The feed-in tariff model guarantees a price per kilowatt of electricity regardless of the type and extent of the equipment used by the producer, the desired profit margin for that particular project and the costs incurred in generating and transmitting the electricity to the consumer and/or power distributor (Couture & Gagnon, 2009).

An analysis of the various feed-in tariffs implemented in Europe and Northern America found that there are several variants of this model implemented in these regions (Couture & Gagnon, 2009). The analysis yielded the following results:

- *Fixed price model*

This model fixes the price per kilowatt of electricity for the full contractual period and can be based on the type of renewable energy project (such as solar, wind, bio mass etc.). In order to encourage the investment in renewable energy, these fees are usually set higher than the retail or wholesale price of electricity. However, this

may be a disadvantage if the electricity price and/or costs are significantly different to the upfront fixed price during the contractual period.

- *Fixed price model with adjustments*

The fixed price model with adjustments provides for price adjustments which may be agreed upfront or adjusted as and when required. The typical adjustment ranges from inflationary adjustments which increases the price based on the current inflation rate to a smoothing adjustment which decreases the price due to higher upfront tariffs.

- *Premium price model*

This model is dependent on the retail price of electricity and would include a premium above this price to encourage investment (for environment or social reasons). This would create an incentive to increase production of renewable energy when demand peaks and the electricity is most needed by the consumer.

- *Percentage of retail price model*

The percentage of the retail price model allows for a predetermined percentage of the retail price to be paid to the renewable energy producer and can be fixed either above or below the average retail price of electricity.

In countries where the implementation of renewable energy has been a success, the feed-in tariff was determined with reference to its costs in order for the efficient development, construction and operation of the particular project (Couture & Gagnon, 2009). The feed-in tariff should arguably ensure that it allows for a sufficient and appropriate margin in order to encourage investment in such projects. A method of encouraging investment in renewable energy projects can be achieved by fixing the price, guaranteeing the level of output and the number of years which the power distributor/consumer will be required to purchase the electricity from the project company (Couture & Gagnon, 2009).

3.4.3 Competitive auctions

The competitive auction process is typically set-up by the Government's Energy Department in order to acquire new renewable energy electricity supplies in a cost effective manner.

Based on the report “*Renewable Energy Auctions: A Guide to Design*”² issued by the International Renewable Energy Agency, the main advantage of competitive auctions is that electricity from renewable energy sources can be attained in a transparent and cost effective manner. The transparency of the auction process is important in developing countries. In South Africa, allegations of corruption, maladministration and wastefulness of public funds are reported on a daily basis in newspapers, televisions and reports. The transparency of these competitive auctions allow for a free and fair bid process in order to obtain and implement the best available technology at market related prices. The report highlights three key elements of a successful auction’s design:

- Auction demand

The ability to control the type of renewable energy, the location of the power plant and required output of such a power plant in order to meet the requirements of implementing renewable energy.

- Qualifications requirements

The auction should ensure that the bidders meet the requirements to participate in the auction. The bid submission documents should ensure that the equipment that will be used, the location of the project and the experience of the bidder is clearly documented.

- Winner selection process and seller’s liability

The winner selection criteria and the seller’s commitment to delivering quality electricity on time is important. These requirements should be clearly documented and implemented to ensure a smooth auction process.

The nature of a competitive auction to some extent exposes the real price of the renewable energy generation process as it would typically encourage competitive behaviour amongst the potential bidders. For example, the bid price in round four of the South Africa REIPP Program compared to round one was significantly lower. This could be due to increased competition in the renewable energy sector, newer cost effective technologies and economies of scale.

²http://www.irena.org/DocumentDownloads/Publications/Renewable_Energy_Auctions_A_Guide_to_Design.pdf

There are disadvantages to the competitive bidding process such as the high costs to manage the process and the fact that certain projects may under-cut their competitors but are not able to deliver due to delays in construction and/or achieving predetermined output and quality requirements.

3.4.4 Net metering/net billing

The renewable energy net metering/net billing policy allows for consumers to transmit electricity generated by solar panels, owned and located on the consumer's property, to the regional/national grid. Typically, these solar panels would generate power in excess of the consumers' requirements during daylight hours which can be used to offset any electricity charges when the particular consumers demand exceeds their own generation capacity (Solar Energy Industries Association, 2016). For example, a school and/or church generating excess additional electricity would contribute to the peak demand of an office block during the day. The aim of the net-metering policy is to reduce the energy bill from the energy producer rather than the supply of electricity from the energy producer (NEIA, 2014:1).

An advantage of net metering allows for the mitigation of loss of electricity due to long distance transmission lines (Solar Energy Industries Association, 2016). However, an important consideration that needs to be taken into account when implementing net metering is that when a significant number of consumers are participants in the net metering system, the energy producers will have excess supply during off periods and would have great difficulty to meet demand for electricity usage during peak periods (Netzero Guide, 2016).

3.4.5 Government grants

The South African Department of Trade and Industry ("DTI") provides financial support to companies across a range of specifically selected industries to encourage investment, stimulate growth and create employment in South Africa.

The Critical Infrastructure Grant provides funding for the installation of critical infrastructure which enables the general public to receive basic services such as sanitation, water and electricity. However, this grant cannot be used to fund

infrastructure which will be installed on private property for a specific project (Ugu South Coast Development Agency, 2016).

The infrastructure (such as roads, electricity transmission lines) constructed and installed specifically for the generation and transmission of electricity in terms of the REIPP Program would typically not qualify for such grant. This is mainly due to the set-up of the project infrastructure as a significant amount of the infrastructure is installed on privately owned land. Any infrastructure constructed would be specifically used by only one project.

There are other grants offered by the DTI which may be relevant for companies in the renewable energy manufacturing sector such as the Manufacturing Competitiveness Enhancement Programme which provides access to a manufacturing production incentive and loan funding from the Industrial Development Corporation and the incentive offered for the development of innovative products and/or processes under the Support Programme for Industrial Innovation offered by the DTI.

The DTI has assisted a number manufactures in the renewable energy sector such as SMA Solar Technology South Africa and Jinko Solar through its trade and investment promotion activities. The DTI stated in its 2014/2015 Annual Report that the DTI “helped secure Jinko’s commitment by energetic reduction of red tape, facilitation and guidance and support on local content requirements” ((Department of Trade and Industry, 2015:49).

3.4.6 Accelerated tax depreciation on qualifying plant and equipment

Accelerated tax depreciation is a type of corporate tax incentive which allows enterprises to reduce its taxable income and consequently tax liability by an amount higher than what would ordinarily be allowed based on the value which the asset diminishes.

The use of accelerated tax depreciation benefits the capital intensive sectors/industries more than it would benefit industries were there are no significant capital expenditure. The advantage of accelerated tax depreciation is that it increases the return on capital

for investors by increasing the after-tax profits and cash due to the deferral of the corporate tax liability.

In South Africa, the use of accelerated tax depreciation in respect of qualifying plant and equipment has been implemented specifically in respect of those qualifying assets used for the generation of electricity from renewable energy sources. The detailed analysis of the accelerated tax depreciation specific to the renewable energy sector will be discussed in point 3.5 below.

3.5 FISCAL INCENTIVES AVAILABLE TO ENTERPRISES OPERATING IN THE RENEWABLE ENERGY SECTOR IN SOUTH AFRICA

The specific tax incentives available for enterprises engaged in the renewable energy sector in South Africa typically differs based on which subcategory of the renewable energy sector the enterprise is engaged (such as capital allowances and government grants specifically available to enterprises engaged in manufacturing the various renewable energy power plant components; and capital allowances on qualifying assets used for the purposes of generating and transmitting electricity from renewable energy sources).

The following South African income tax incentives are based on the provisions of the Income Tax Act of South Africa, No 58 of 1962 (“ITA”). In terms of section 12B, section 12C and section 12D of the ITA, the qualifying expenditure for which capital allowances can be claimed is deemed to be the lesser of the actual cost to the taxpayer or the arm’s length cost of acquiring the asset in terms of a cash transaction. The qualifying expenditure should be reduced in the case where the expenditure includes an amount which was recovered/recouped by the taxpayer if the expenditure was incurred to acquire a replacement asset which was damaged or destroyed.

3.5.1 Scientific and technological research and development

A specific tax deduction at a rate of 150 percent in terms of section 11D of the ITA is available in respect of qualifying scientific and technological research and development expenditure. The term “research and development” is defined in section 11D and means the systematic investigative/experimentation which the outcome is not certain. A summary of the specific types of systematic investigation and experimental activities listed in the ITA is summarised as follows:

- discovering non-obvious scientific or technological knowledge;
- creating or developing an innovation in terms of the Patents Act, a functional design in terms of the Designs Act, computer program of an innovative nature as defined in the Copyrights Act and includes any knowledge essential to the use of such innovation, functional design or computer program; or
- improvements for the purposes of an improving the functions, performance, reliability or quality of such innovation, functional design or computer program.

The term research and development as defined in the ITA specifically excludes activities such as routine testing, analysis or quality control carried out during normal business operations and the development of internal business processes unless it is anticipated that it will either sold or licenced to non-connected persons.

The provisions of section 11D require that the taxpayer must actually incur the expenditure on research and development activities carried out in South Africa after the approval by the Minister of Science and Technology before the deduction can be claimed. If the expenditure incurred in respect of the research and development activity does not meet the requirements of section 11D, it may qualify for the tax deduction in terms of section 11(a) of the ITA. The requirements of section 11(a) of the ITA need to be considered, particularly whether the expenditure is revenue in nature.

3.5.2 Accelerated capital allowance in respect of assets used in the process of manufacture

An accelerated capital allowance in terms of section 12C of the ITA is available for eligible taxpayers incurring expenditure for the acquisition of machinery, plant, implement, utensil or articles used in the process of manufacture.

The applicable capital allowance is calculated at a rate of 20 percent per annum of the qualifying expenditure on a straight line basis for used qualifying assets. The capital allowance for new and unused qualifying assets is increased to 40 percent in the first year in which the asset is brought into use and thereafter at a rate of 20 percent per annum for three successive tax years.

The term “process of manufacture” is not defined in the ITA which led to the South African courts deciding whether a particular activity and which part of the activity qualifies as a process of manufacture. The South African Revenue Services (“SARS”) has issued Practice Note 42 (“PN42”) on the 27 November 1995 which sets out examples of the various types of activities which SARS considers to be processes of manufacture or processes similar to a process of manufacture. The examples in PN42 are not a definitive endorsement that a taxpayer is carrying on a process of manufacture or a similar process. In *CIR v Stellenbosch Farmers' Winery Ltd 1988*, the court referred to an earlier judgement which held that the pertinent consideration in determining whether the activity should be considered a process of manufacture is that it must produce something which is essentially different from the article that existed before it had undergone such process. It is noted that whether the article is "essentially different" is one of degree and depends on the facts of the particular case having regard to a change in the nature, form, shape, utility etc. of such a product.

3.5.3 Accelerated capital allowance in respect of assets used for the purposes of generating electricity

Section 12B of the ITA contains the specific provisions which allows taxpayers to claim accelerated capital allowances on qualifying expenditure incurred to acquire machinery, plant, implements, utensils or articles which are brought into use by the taxpayer for the purposes of generating electricity from the following sources: wind power; photovoltaic solar energy concentrated solar energy; hydropower (not more than 30 megawatts); or biomass (organic wastes, landfill gas or plant material).

The qualifying expenditure is calculated with reference to the direct cost of acquisition of the asset and includes the direct cost of installation/erection of the respective assets. The accelerated capital allowances are claimed over a three-year period from the date which the asset is brought into use. An allowance of 50 percent of the total qualifying expenditure in year one; 30 percent in year two and 20 percent in year three.

A recent amendment to the section 12B allows taxpayers to claim 100 percent of the qualifying expenditure if electricity is generated from photovoltaic solar energy with a total capacity of less than 1 megawatt.

3.5.4 Capital allowances in respect of the lines and cables used for the transmission of electricity

In terms of section 12D of the ITA, capital allowances at a rate of 5 percent per annum may *inter alia* only be claimed if the expenditure incurred by the taxpayer related to the acquisition or improvements to the lines or cables and any earthworks or supporting structures that form part of such line or cable used for the purposes of transmission of electricity.

A capital allowance in terms of section 12D may only be claimed in respect of the expenditure incurred relating to the acquisition of new and unused qualifying assets and must be owned and directly used by the taxpayer. However, section 12N of the ITA deems the taxpayer to be the owner of the asset under certain circumstances. For the purposes of determining whether the taxpayer is deemed to the owner of the assets in terms of section 12N of the ITA, the following requirements should be met:

- the taxpayer should hold the right of use or occupation of the land (or building);
- the taxpayer incurred the expenditure to effect the improvement to such land (or building);
- the taxpayer uses or occupies the land (or building) to derive or produce income; and
- the taxpayer effected the improvement to the land (or building) in terms of either:
 - a public private partnership as defined in section 1 of the ITA;
 - the Independent Power Producer Procurement Programme; or
 - an agreement which the right of use or occupation of the land (or building) owned by the South African Government or certain specific entities which the receipts/accruals are exempt from tax.

3.5.5 Capital allowances in respect of new and unused buildings

Section 13quin of the Income Tax Act allows the taxpayer a capital allowance at a rate of 5 percent per annum of the cost of any new and unused buildings (or

improvements to a building) owned and used by the taxpayer for the purposes of producing income in the course of the taxpayer's trade.

The qualifying expenditure is deemed the lesser of the actual cost or the arm's length cost of the acquisition of such asset in terms of a cash transaction. Furthermore, the qualifying expenditure on which the capital allowances in terms of section 13quin of the Income Tax Act can be claimed by the taxpayer is reduced to 55 percent (or 30 percent in the case of an improvement to the building) of the part of the building which was acquired by the taxpayer without erecting or constructing it.

3.5.6 Capital allowances in respect of roads and fences

The South African National Treasury Department has recently proposed an amendment to the ITA which allows taxpayer to deduct expenditure actually incurred in constructing roads or erecting fences for the purposes of trade. However, the deduction for the expenditure incurred in the construction of roads and erection of fences are limited to those taxpayers engaged in the generation of electricity exceeding 5 megawatts from wind power; solar energy; hydropower (not more than 30 megawatts); or biomass (organic wastes, landfill gas or plant material). The provisions of section 12U will only be applicable to years of assessment commencing on or after 1 April 2016. As historic bidding rounds did not take into account the proposed changes contemplated in section 12U, National Treasury has stated that a retrospective deduction will not be considered (National Treasury, 2016:38-39).

3.5.7 Expenditure of a capital nature

The South African REIPPPP had numerous requirements with which renewable energy project companies were required to comply before the tender to supply electricity from a renewable energy source to the National Grid was granted. Once the tender is awarded, the project companies are required to reach financial close for which a significant amount of legal documents are required by lenders, the shareholders and/or the South African Department of Energy before the "licence" to supply electricity and the construction phase of the power plant could begin to take place.

The deductibility of potentially capital in nature expenditure should be considered in light of the requirement of the ITA and relevant case law. Particularly, the upfront “licence” fee paid to the Department of Energy; the legal, consulting and professional fees incurred for the purposes of complying with the requirements of the tender and the financial close processes. There are several principles laid down by the South African courts that may assist with determining the deductibility of such expenditure:

- In *Secretary for Inland Revenue v Cadac Engineering Works (Pty) Ltd 1965*, it was held that in determining whether expenditure is capital or revenue one needs to look at the purpose of the expenditure and what it was designed to effect.
- In *Commissioner for Inland Revenue v George Forest Timber Company Limited 1924*, the court found that there is a difference between expenditure incurred in respect of creating a source of profit (i.e. capital in nature) and expenditure incurred in respect of earning the income.
- In *New State Areas Ltd v Commission for Inland Revenue 1946*, the court discussed the principle laid down in *British Insulated Helsby Cables v Atherton (1926, A.C. 205)* wherein the court held that there is good reason that expenditure incurred for the purpose of bringing into existence an asset or creating an enduring benefit, the expenditure incurred would be considered capital in nature rather than revenue in nature.

Based on the principles of the abovementioned court decisions, the expenditure incurred in respect of the legal, consulting and professional fees; and the upfront licence fee paid to the Department of Energy would be considered capital in nature on the basis that the purpose of these types of expenditure incurred by the project company was incurred in order to create an enduring benefit (i.e. obtain a 20-year licence to supply electricity to Eskom).

There are no specific capital allowances available in respect of these types of capital in nature expenditure incurred by South African taxpayers.

3.6 CONCLUSION

The benefits of electricity generation from renewable energy sources will lessen the negative impact on the environment as well as the health and welfare of the human race. The

investment in the renewable energy sector will assist to relieve the growing demand for electricity in South Africa which may allow the economy to reach high growth rates with the increased investment in basic infrastructure. Government's effort to increase infrastructure investment in the renewable energy sector is based on the view that providing tax and related incentives are easier from a policy point of view when compared to it incurring the significant capital expenditure upfront through government related funding.

The significant challenges faced by entrants to the renewable energy sector in both South Africa and globally, can be reduced to the extent that tax and related incentives offer an appropriate solution to those challenges. There are several variants of tax and related incentives implemented in the world which may be an important consideration from an investor's perspective in determining whether an investment is suitable and desirable. However, there are other related and unrelated factors which could increase the investment in renewable energy.

A detailed analysis of the various tax incentives offered in South Africa, Brazil, China and India will be analysed in further detail in chapter five of this dissertation.

CHAPTER 4: AN ANALYSIS OF THE TAX INCENTIVES AVAILABLE CHINA, BRAZIL AND INDIA FOR THE RENEWABLE ENERGY INDUSTRY

4.1 INTRODUCTION

Chapter three of this dissertation highlighted the need for tax incentives for enterprises operating in the renewable energy sector. Thereafter, it discussed the concept of tax incentives and the common types of incentives implemented in the world.

There are several variants of tax and related incentives implemented in the world which may be an important consideration from an investor's perspective in determining whether an investment is suitable and desirable. The purpose of this chapter is to analyse and examine the specific tax incentives available to enterprises operating in the renewable energy sector in South Africa, India, China and Brazil.

4.2 HIGH LEVEL COMPARISON OF THE REGULATORY POLICIES AIMED AT PROMOTING RENEWABLE ENERGY

Before considering and analysing the corporate tax incentives, there is merit in examining the type of regulatory policies implemented in the countries considered in this dissertation. A report issued by the OECD called "Regulatory Policy and the Road to Sustainable Growth"³ highlights the importance of governments implementing effective regulatory frameworks which *inter alia* can assist in achieving sustainable growth levels. Based on the report, the regulatory, fiscal and monetary policies are the three key levers of state power. The first of these three types of policies, namely: the regulatory policy will be discussed in further detail in this chapter.

The regulatory policy ensures that the public interest (such as its citizens and corporate taxpayers) is considered when implementing new or even managing existing regulations due to the potential negative public perception when regulatory policy is used as a lever of state intervention (OECD, 2010:11).

³ <http://www.oecd.org/regreform/policyconference/46270065.pdf>

The table below summarises the regulatory policies aimed at promoting the renewable energy sector and the fiscal incentives implemented in each of the countries considered in this dissertation:

Table 3: Summary of the renewable energy promotion policies and incentives

Regulatory Policies	South Africa	Brazil	China	India
Renewable energy targets	Yes	Yes	Yes	Yes
Electric utility quota obligation	Yes	No	Yes	Yes
Biofuels obligation/mandate	Yes	Yes	Yes	Yes
Heat obligation/mandate	Yes	Yes ¹	Yes	Yes ¹
Feed-in tariff	No	No	Yes	Yes
Auctions	Yes	Yes	Yes	Yes
Net metering/net billing	No	Yes	No	Yes ¹

¹ State/Provincial level only

Source: KPMG, 2015

The current electricity generation mix differs in each of these countries due to factors such as the size of the economy, the related demand and supply, and the level of supply required to meet the demand for electricity. As discussed in Chapter 1, the DOE in South Africa developed an IRP which aimed to determine the optimal mix of energy obtained from non-renewable and renewable energy sources based on environmental, political, price and other factors. Although IRP is not decisive regarding the option (i.e. nuclear, renewable, coal etc.) that will be followed, it nevertheless determines the optimal generation mix based on a range of factors. These factors include technological advancements, cost of each of the factors, greenhouse gas emissions and demand for electricity. Similarly, the Government of India published a report on India's Renewable Energy Roadmap which aims to identify the steps that the respective stakeholders in the Government and private sector should take to increase investment in renewable energy generation facilities in the short term (Government of India, 2015:4-10).

Based on table 3 above and the analysis performed in section 2.3 of this dissertation, it was established that there are steps taken in each of these countries to set out the renewable energy targets, the processes and considerations that are required to achieve the necessary in both the short term and long term.

The policy decisions and the related lessons learnt in developed economies may assist in formulating and implementing renewable energy policies in developing economies. Keay's identified a number of lessons as a result of the regulatory policy implementation in the United Kingdom to reduce greenhouse gas emissions by 80 percent before 2050. The policy lessons include the importance of honesty and transparency in developing and implementing the policy; the design of support schemes such as the appropriate tariff policies; the market barriers in respect of developing and improving renewable energy power plants should be reduced; and the incentives should encourage cost reduction and innovation (Keay, 2013:8-10).

Although these policy lessons are based on the outcome of the policy implementation in the United Kingdom, these policy lessons should be taken into consideration, if applicable, when designing and implementing renewable energy regulatory policies in other jurisdictions. An obligation on the electricity utility company (i.e. the company that distributes the electricity) is an important consideration in developing and implementing regulatory policies. This obligation ensures that the renewable energy targets set out by the government are supported and implemented by the electricity utility company. For example, in South Africa, Eskom is required to purchase the electricity generated from the approved renewable energy power producers in terms of the Power Producers Agreement. However, the South African renewable energy sector is currently experiencing a lack of commitment from Eskom to meet renewable energy targets. Currently, there are at least 37 Independent Power Producers waiting on Eskom to sign the Power Producer Agreements (Mtongana, 2017). Eskom's reasons for delaying the signing of the Power Producer Agreements is that there is currently an excess of electricity compared to a few years ago when these bids were awarded and that the tariff based on their calculations outweighs the benefits if it procured from these Independent Power Producers (Mtongana, 2017). The lack of maintenance of old power plants and investment in new power plants in the past has resulted in the demand for electricity exceeding the supply of electricity in South Africa. The Council for Scientific and Industrial Research published a report in 2015 which stated that Eskom had saved R5 billion

as a result of procuring electricity from Independent Power Producers rather than using diesel during peak electricity usage periods. Eskom's reliance on coal powered plants to generate electricity together with its disapproval of implementing an optimum electricity mix which includes renewable energy power plants could result in similar disastrous conditions for the economy in the future.

All of the countries selected in this dissertation except Brazil have an obligation on the utility to purchase electricity from renewable energy sources. There are currently 108 wind power plants and 46 hydroelectric power plants being constructed in Brazil (Norton Rose Fulbright, 2016). Once these power plants have been constructed and have started operations, it would be interesting to see if the lack of an obligation on the electricity utility company to procure electricity from these sources would result in electricity being produced by these power plants but not being purchased by the electricity utility company. Taking into consideration Brazil's current predicament of relying mainly on one source for its electricity generation, the electricity utility company may well not have a choice in the matter until such time that the rivers begin flowing at a normal rate such that the hydro-electric power plants can operate at its optimal capacity.

In 2013, South Africa announced that it would implement mandatory blending of biofuels with petrol and diesel from 1 October 2015 due to the inadequate special tax incentives for biodiesel producers that failed to draw interest from prospective investees (Ethanol Producer Magazine, 2013). A similar approach could be followed to ensure that there is an obligation on Eskom to procure and produce electricity from renewable energy sources so that there is an optimum mix of sources used for the purpose of generating electricity. This obligation on the utility company will be considered in further detail as part of the recommendations and/or enhancements to the current renewable energy incentives in chapter 5 of this dissertation.

The regulatory policies related to the most common types of methods used to procure electricity in the world namely; Feed-in tariffs, competitive auctions and net metering has been discussed at length in chapter 3 of this dissertation and will not be considered in further detail in this chapter.

4.3 TAX INCENTIVES AVAILABLE CHINA, BRAZIL, INDIA AND SOUTH AFRICA FOR THE RENEWABLE ENERGY INDUSTRY

For the purposes of the analysis of the tax incentives available in China, Brazil, India and South Africa, a high-level summary of the types of incentives has been compiled below and thereafter each type of incentive shall be discussed by examining the specific variants of that incentive offered in each country:

Table 4: Summary of the renewable energy tax incentives

Type of incentive	South Africa	Brazil	China	India
Accelerated capital allowances for generation/transmission of electricity from renewable energy sources	Yes	No	Yes	Yes
Accelerated capital allowances for assets used in the process of manufacture	Yes	No	No	No
Tax holiday for the generation/transmission of electricity from renewable energy sources	No	No	No	Yes
Additional tax deduction on scientific research and development expenditure	Yes	No	Yes	Yes
Government grants/financing	No	No	Yes	Yes

4.3.1 Accelerated capital allowances for generation/transmission of electricity from renewable energy sources

4.3.1.1 South Africa

As discussed in section 3.5.3 of this dissertation, there are specific provisions in the ITA that are available to South African taxpayers engaged in generating electricity from renewable energy sources such as wind power; photovoltaic solar energy; concentrated solar energy; hydropower (not more than 30 megawatts); or biomass (organic wastes, landfill gas or plant material). The accelerated capital allowances are claimed over a three-year period from the date which the asset is brought into

use. An allowance of 50 percent of the total qualifying expenditure incurred to acquire machinery, plant, implements, utensils or articles in year one; 30 percent of the total qualifying expenditure in year two and 20 percent of the total qualifying expenditure in year three.

In terms of section 12D of the ITA, capital allowances at a rate of 5 percent per annum may *inter alia* only be claimed if the expenditure incurred by the taxpayer related to the acquisition or improvements to the lines or cables and any earthworks or supporting structures that form part of such line or cable used for the purposes of transmission of electricity.

4.3.1.2 Brazil

Brazil has not yet implemented any significant corporate tax incentives for the enterprises operating in the renewable energy sector, and the standard tax laws would be applicable to the enterprises operating in the renewable energy sector (Norton Rose Fulbright, 2016). There are a large number of renewable energy plants (108 wind power plants and 46 hydroelectric power plants) currently being constructed which may not be able to compete with the returns achieved by conventional energy projects due to the substantial initial cost of setting up the power plants (Norton Rose Fulbright, 2016). Taking into consideration the relevance of tax incentives discussed in chapter 3, the significant challenges faced by entrants to the renewable energy sector in Brazil, could be reduced to the extent that tax and related incentives offer an appropriate solution to the challenges. Currently, there is an exemption available until 31 December 2021 from paying State Tax for enterprises engaged in the generation of wind and solar renewable energy (International Renewable Energy Agency, 2015:5).

The standard tax laws are applicable to the Brazilian renewable energy sector. As per Corporate Tax Country Analysis published by the International Bureau of Fiscal Documentation (“IBFD”), the calculation of taxable income takes into account the following: net revenue from the supply of goods and services less expenditure incurred in respect of providing those goods/services; any other income such as interest; any general business related expenditure; and capital gains in respect of the disposal of assets (Tonanni & Gomes, 2016). There are relevant general provisions of

the Brazilian tax laws that are worth noting as it will be a key consideration to enterprises engaged in the renewable energy sector:

- Capital allowances in respect of the cost of buildings is calculated based on the straight line method over 25 years (Tonanni & Gomes, 2016). For plant, equipment and machinery, the capital allowances are calculated using the straight line method over the useful life of the asset as per Interpretation Note 162.1988. The allowance ranges from 4 to 50 percent depending on the category of asset (Tonanni & Gomes, 2016).
- Generally, expenditure incurred in respect of starting-up the operations are capitalised and may be deductible over a period of five years for corporate tax purposes (Tonanni & Gomes, 2016).
- Assessed losses can be carried forward for an infinite number of years unless there is a change in control and activity of the company (Tonanni & Gomes, 2016). However, the carried forward assessed losses can only be offset to the extent that it does not exceed 30 percent of taxable income in any year of assessment. It is noted that this restriction has been challenged in the Brazilian courts as being unconstitutional, it has yet to be brought before the Brazilian constitutional court (Tonanni & Gomes, 2016).

4.3.1.3 India

The Indian Finance Tax Act provides for accelerated capital allowance at a rate of 80 percent (with an additional 20 percent for projects installed after 1 March 2005) calculated based on the written down basis in respect of qualifying assets acquired by wind and solar renewable energy power plants (KPMG, 2015:38). However, the accelerated capital allowance rate (of 80 percent) is reduced to 15 percent for any wind turbines installed between the periods 1 April 2012 to 1 April 2014 (KPMG, 2015:38).

- A wind or solar project may elect to use the straight line method as opposed to the written down basis but it cannot do so in the case where the company is eligible for Generation Based Incentives (KPMG, 2015:38).
- There are currently proposed amendments to the Indian Finance Act which reduces the accelerated capital allowance rate from 80 percent to 40 percent (PWC, 2016).

4.3.1.4 China

An enterprise operating in the renewable energy sector would qualify to apply the standard Chinese tax laws. The operating expenditure incurred for the purposes of producing taxable income would be considered deductible for corporate tax purposes, unless the deduction for such expenditure is specifically not allowed in terms of the tax law such as certain provisions, donations, sponsorships and fines in respect of unlawful operations (Deloitte, 2015:11-12).

Expenditure incurred in respect of the acquisition of capital assets would qualify for capital allowances calculated with reference to the pre-determined write-off period and the nature/category of the capital asset using the straight-line method (Ma, 2016). The current standard capital allowance rates available to all Chinese taxpayers appear to be similar in certain instances when compared to the standard capital allowance rates available to all South African taxpayers. Fixed assets that require continuous replacement due to factors such as advancement in technology or exposure to severe corrosion may be eligible for accelerated capital allowances which should not be higher than 60 percent of the standard capital allowance write-off period (Ma, 2016). The following are examples of the most relevant asset categories and standard write-off periods: Building and structures (20 years); machinery, mechanical equipment and other production equipment (10 years); appliances, tools and furniture used for production and business operations (5 years); vehicles (4 years); electronic and digital equipment (3 years); and any other fixed assets (3 years) (Ma, 2016).

4.3.1.5 Analysis of the accelerated capital allowances available in South Africa, Brazil, India and China

It is clear from the discussion in section 2.3 of this dissertation that China has the highest renewable energy electricity generation capacity followed by Brazil, India and South Africa. However, the required optimal mix of renewable energy generation plants in comparison to conventional power plants have to be taken into consideration when determining the quantum of renewable energy electricity generation capacity that needs to be built in order to reach the optimal mix level.

The South African variant of the accelerated capital allowances offered to the enterprises engaged in the generation and transmission of electricity from renewable

energy sources are considerably favourable to the corporate tax incentives offered in the other selected countries. These specific incentives ensure that a significant portion of the upfront capital expenditure, incurred for the purposes of constructing the renewable energy power plant, is deductible for income tax purposes over the first 3 years of operations.

In South Africa, the capital allowances available in respect of expenditure incurred in respect of transmission lines and auxiliary assets are less favourable than those related to expenditure incurred on constructing and erecting the power generating renewable energy plant. A significant issue has arisen in South Africa due to inadequate grid infrastructure. In terms of Eskom's self-build program, numerous renewable energy project companies have incurred expenditure for the erection and installation of the transmission lines from the power plant's substation to the nearest Eskom grid connection point. The reason for the renewable energy project opting for the self-build program is due to uncertainty regarding the timing of when Eskom will erect and install the transmission lines from the power plant's substation to the nearest Eskom grid connection point. In terms of these self-build agreements, the transmission lines and related assets are built on behalf of Eskom and once constructed, the ownership thereof is transferred to Eskom. As the ownership of these transmission lines and related assets are transferred to Eskom, it would typically not be considered the asset of the taxpayer. If these assets were owned by the taxpayer, it would qualify for accelerated allowances in terms of section 12D of the ITA respectively. It will need to be considered whether section 12N of the ITA would deem the taxpayer to be the owner of the asset if certain requirements are met. The South African National Treasury has recently acknowledged that where the taxpayer does not own these type of grid connection equipment but has incurred the expenditure, it will consider amendments to the ITA in the future to specially include provisions in the ITA to grant such taxpayers an allowance in respect of the expenditure incurred on grid connection and related costs (National Treasury, 2016:38-39).

The Brazilian Government took advantage of the large network of flowing rivers by encouraging the utilisation of these rivers for the purposes of generating electricity through the erection of hydro-electric power plants in the 1970's and 1980's. Whilst

Brazil currently does not offer any special capital allowances to promote the generation of electricity from renewable energy sources, its current electricity generation capacity of 133 GW is made up significantly (83 percent) of electricity generation capacity from renewable energy sources (mainly hydro-electric power plants). Based on the table per section 4.2 above, it has also implemented regulatory policies aimed at promoting the use of renewable energy sources for the generation of electricity.

As discussed in section 4.2, there are a large number of renewable energy plants currently being constructed in Brazil which may not be able to compete with the returns achieved by conventional energy projects due to the substantial initial cost of setting up the power plants (Norton Rose Fulbright, 2016). Taking into consideration the lessons identified by Keay's, an important policy lesson is that the adequacy of the design of support schemes should be analysed to determine if it actually encourages the use of renewable energy in comparison to the traditional methods of obtaining energy. The standard laws applicable to enterprises engaged in the generation and transmission of electricity from renewable energy sources may not provide the significant boost that the renewable energy power plants require to compete with conventional energy projects. If special tax incentives are implemented in Brazil, it would need to ensure that the standard rules regarding the maximum portion of an assessed loss that can be set-off against taxable income do not apply. If it does apply, any special tax incentives may need to be limited to taxable income and the excess carried forward to the next year.

In Brazil, the determination of when an enterprise has commenced operations is an important factor given that expenditure incurred in respect of starting-up the operations are capitalised and may be deductible over a period of five years for corporate tax purposes. As a meaningful comparison, South Africa also allows pre-trade related expenditure to be deducted once trade has commenced. However, the provisions of section 11A of the ITA allows for expenditure incurred prior to the commencement of trade to be allowed as a deduction in full in the year that operations commence (but is limited to income from that specific trade) rather than being allowed to claim such expenditure over a period of 5 years.

The accelerated capital allowance available in India is calculated at a rate of 80 percent (with an additional 20 percent for projects installed after 1 March 2005) calculated on a written down basis. However, where any enterprise is not claiming generation based incentives (which will be discussed in further detail in section 4.3.5 below), it can adopt the straight line basis. The Indian accelerated capital allowance rates using the straight line method or the written down basis at a rate of 80 percent will be significantly more favourable to taxpayers in India in the first year of operations. However, if the rate of 15 percent is applied, it will obviously be less favourable to taxpayers in the first few years of operations as it would typically result in taxable income due to the high initial costs but lower operating costs. It is noted that the reason for the decrease in the rate (from 80 percent to 15 percent) and subsequent reinstatement of the 80 percent rate is due to the significant and fundamental weaknesses in the accelerated capital allowance scheme. A case study performed by the International Institute for Sustainable Development on India's accelerated capital allowance policy for wind projects, identified that accelerated capital allowances resulted in a large number of non-competitive Independent Power Producers developing wind projects with a few kilowatts of capacity in order to take advantage of these favourable accelerated capital allowances (International Institute for Sustainable Development, 2015:iv-v). It was found that there was no motivation for wind projects to be efficient and operate effectively by investing in the latest higher-capacity wind turbines due to the accelerated capital allowance being based on the initial capital costs rather than the actual output of such power plant (International Institute for Sustainable Development, 2015:iv-v). These significant and fundamental weaknesses in the accelerated capital allowance scheme led to the implementation of the Generation Based incentive by the Ministry of New and Renewable Energy which will be discussed in further detail in section 4.3.5 below.

In China, the standard laws applicable to the renewable energy enterprises does not provide similar accelerated capital allowances in respect of qualifying expenditure incurred on the plant and equipment used to generate electricity from renewable energy sources. This is an important corporate tax incentive for taxpayers as a result of the significant upfront capital expenditure incurred to set-up these renewable energy power plants. However, based on the write-off period per section 4.3.1.4 above, it appears that the various components used in the power plant may qualify for

a write-off period of between 3 to 5 years. Where foundations and towers are constructed for the wind turbines, these may be regarded as building/structures which qualify for a write-off period of 20 years. If one takes into consideration the high initial capital costs of setting up these power plants, the related capital allowances would typically result in an enterprise being liable for corporate tax after a few years of operations.

There are specific capital allowances available in South Africa and India for enterprises engaged in the generation and transmission of electricity from renewable energy sources. The standard tax laws apply in China and Brazil. The accelerated capital allowances available in South Africa (50% in year 1, 30% in year 2 and 20% in year 3 of the qualifying capital expenditure), the accelerated capital allowance available in India (at a rate of 80% of qualifying capital expenditure) and the standard tax laws applicable in China (various components used in the power plant may qualify for write-off period of between 3 to 5 years) would typically ensure that the enterprise deducts the high initial capital expenditure for corporate tax purposes in the first few years of operations. Although, the rates and methods of calculating the accelerated capital allowance would differ, the accelerated capital allowances on qualifying expenditure incurred on the construction of renewable energy power plants assist taxpayers in alleviating the significant challenges by reducing the tax liability for the first few years of operation. Whilst there are no specific capital allowances in Brazil, there appears to be sufficient encouragement as a result of the implementation of regulatory policies based on the fact that there are currently 108 wind power plants and 46 hydroelectric power plants being constructed in Brazil (Norton Rose Fulbright, 2016).

The findings of this particular section should not be taken into consideration in isolation of the favourable tax holiday which essentially extends the period in which a taxpayer is not liable for corporate taxes. A tax holiday is available to enterprises engaged in the generation and transmission of electricity in India and it will be analysed in further detail in section 4.3.3 below.

4.3.2 Accelerated capital allowances for assets used in the process of manufacture

4.3.2.1 South Africa

As discussed in section 3.5.2 of this dissertation, there are specific provisions in the ITA that are available to South African taxpayers incurring expenditure for the acquisition of machinery, plant, implement, utensil or articles used in the process of manufacture. The applicable capital allowance is calculated at a rate of 20 percent per annum of the qualifying expenditure on a straight line basis for used qualifying assets. The capital allowance for new and unused qualifying assets is increased to 40 percent in the first year in which the asset is brought into use and thereafter at a rate of 20 percent per annum for three successive tax years.

4.3.2.2 Brazil

Brazil has not yet implemented any significant corporate tax incentives for enterprises operating in the renewable energy sector and the standard tax laws would be applicable (Norton Rose Fulbright, 2016). The standard tax laws discussed in section 4.3.1.2 of this dissertation will be equally applicable to enterprises engaged in the manufacturing spectrum of the renewable energy sector.

4.3.2.3 India

Capital allowances can be claimed on qualifying expenditure incurred on acquiring plant and machinery at a rate of 15 percent calculated using the written down method (Shah, 2016). If the plant and machinery is new and used by a manufacturer, the rate is increased by 20 percent.

An Indian taxpayer acquiring new plant and machinery between 1 April 2014 and 31 March 2018 for the purposes of manufacture may be entitled to a once off investment deduction of 15 percent of the cost of qualifying assets (EY, 2014:16-17). The cost of the new plant and machinery must exceed INR 250 million (Deloitte, 2015:17).

Previously, a similar investment deduction of 15 percent was available for the acquisition of plant and machinery between the 1 April 2013 to 31 March 2015 for the purposes of manufacture if the qualifying expenditure exceeds INR 1 billion (Deloitte, 2015:17).

A location based incentive is available to enterprises engaged in the manufacturing or production of any item (other than tobacco, plastic bags, pan masala and petroleum oil/gas refineries) if the facility's activities start before 1 April 2017 and is located in Northeast India (EY, 2014:6-7). The incentive allows for a tax deduction of 100 percent of the profits derived from the qualifying facility for a period of 10 years (EY, 2014:6-7).

Furthermore, the Government of India introduced a special incentive package scheme in 2012 which provides a taxpayer with a percentage based incentive if the company incurs capital expenditure in excess of a predetermined amount. The applications processes initially ended in July 2015 however it was extended for a further 5 years (Government of India, 2015). As part of the special incentive package scheme, an incentive is available for 10 years from the date of notification that the authority has received the application of the eligible manufacturer/fabricators of Solar Photovoltaic components (Government of India, 2015). For example, a manufacturer of Solar Photovoltaic panels/modules is required to invest a minimum of INR 100 million in order to qualify for a 20 percent tax incentive on such capex, and the rate is increased to 25 percent for companies operating within a Special Economic Zone (Government of India, 2015).

4.3.2.4 China

China plans to encourage the growth of High and New Technology Enterprises (“HTNE”) where pre-determined qualifying sectors are *inter alia* eligible for special tax incentives (KPMG, 2015:22). As per KPMG’s publication on “Taxes and Incentives for Renewable Energy”, the renewable energy sectors such as solar, wind, biomaterial and geothermal are eligible for the prestigious HTNE status and the benefits thereof (such as qualifying for the special tax regime) (KPMG, 2015:22).

For an enterprise to be eligible for these special tax incentives, it firstly needs to be included in the specific list of sectors as per the HTNE guidelines and thereafter certain compliance requirements need to be met to obtain the HTNE status (Ma, 2016). As per Corporate Taxation - Country Analyses of China published by the IBFD (Ma, 2016), the following is a high-level summary of the requirements that need to be met before a qualifying enterprise can obtain the HTNE preferential status:

- the company should be incorporated for more than one year;
- the company must possess intellectual property which is used in the manufacture process and it should have acquired such intellectual property through means such as research and developments activities or direct acquisition;
- the employees involved in scientific research and development should be at least 10 percent of the total employees of such company;
- the proportion of scientific to sales revenue should meet certain predetermined ratios such as 5 percent if the previous year's revenue is less than CNY 50 million. Furthermore, at least 60 percent of such research and development expenditure must have been incurred in China;
- there should be no serious safety or quality breaches etc. during the previous year.

Once the HTNE status certificate is issued, it is valid for three years (China Briefing, 2016). The HTNE status enables the enterprise to apply the reduced corporate tax rate of 15 percent (as compared to the standard corporate tax rate of 25 percent) (Orrick, 2010:1-8). For high and new technology enterprises operating in specifically demarcated Chinese special economic zones, this rate is reduced to 12.5 percent for the three years from the year in which the enterprise generates revenue (Orrick, 2010:1-8).

4.3.2.5 An analysis of the tax incentives available to enterprises engaged in the manufacturing spectrum of the renewable energy sector

In South Africa, a capital allowance is available for enterprises engaged in qualifying manufacturing processes (or similar processes). Accelerated capital allowances can be claimed at a rate of 40 percent in year one and 20 percent in year two, three and four for new and unused plant and machinery used in the processes of manufacture. This allowance does not require pre-approval but the requirements of section 12C of the ITA must be met before the allowance can be claimed.

The capital allowances available in India are less favourable due to the method which the capital allowances are calculated. In India, capital allowances are calculated at 35 percent of the qualifying expenditure on the written down method. This results in the effective rate decreasing from year two onwards and may be offset by the once off tax

deduction of 15 percent of the value of the new assets acquired during the specified period (if the enterprise is eligible for it). The investment allowance is over and above any other deductions allowed in terms of existing tax legislation and depending on the type of project and the location thereof. The allowance is calculated with reference to 35 to 100 percent of the costs of the new and unused manufacturing assets. There are several requirements, which will not be discussed in further detail, that an enterprise must comply with before the investment allowance may be claimed.

The location based tax holiday available to manufacturers setting up operations in the specified states located in North East India is comparable to an extent to Special Economic Zones in other countries whereby reduced corporate tax rates (albeit not zero) is available to qualifying enterprises. However, the location based tax holiday is aimed at encouraging manufactures to set-up facilities in those regions due to potential factors such as availability of electricity, personnel and land rather than the reasoning for Special Economic Zones (i.e. encouraging foreign direct investment and exports). This location based tax holiday could be seen as an adaptation of the modern version of a Special Economic Zone. This will be discussed in further detail in Chapter 5 of this dissertation.

The concession to apply a reduced tax rate of 15 percent (and 12.5 percent for those operating in Special Economic Zones) for qualifying HTNE's is only available in China. There are no similar provisions to apply a reduced rate for similar enterprises in the other countries selected in this dissertation. A major concern regarding the compliance requirement in respect of the HTNE status is that the core intellectual property must be owned by the enterprise. A challenge by large multi-national companies is that the intellectual property, which is core to the global manufacturing of their branded renewable energy components, has already been developed and is exploited in numerous other countries around the world (The US China Business Council, 2013:1-2). The outright sale and subsequent licence back of the intellectual property may not be viable due to exchange control restrictions if the components are manufactured and sold in various parts of the world.

The HTNE concession in China reduces the corporate tax rate to below the standard corporate tax rate found in any of the other countries discussed in this dissertation.

Whilst the same concerns and challenges would typically apply to the other countries discussed in this dissertation, this reduced rate could encourage the growth of the renewable energy manufacturing sector in those other countries. In the South African context, as discussed previously a significant amount of the plant and equipment was imported during the construction of the power plants in round 1 to 3, this reduction in the corporate tax rate could result in the plant and equipment being constructed in South Africa rather than abroad. This will be considered in the recommendations and/or enhancements to the current South African tax incentives in chapter 5 of this dissertation.

4.3.2.6 Tax holiday for the generation/transmission of electricity from renewable energy sources

India is the only country selected in this dissertation to offer a tax holiday to enterprises engaged in the generation and transmission of electricity from renewable energy sources. The Indian renewable energy tax regime offers a favourable tax concession to taxpayers by providing a 10-year corporate tax holiday to qualifying enterprises engaged in the generation and transmission of electricity from renewable energy sources (KPMG, 2015:38). Eligible taxpayers are required to either: (1) commence generating electricity from renewable energy sources; or commence transmitting/distributing electricity using new lines; or (3) perform substantial renovation/moderations to an existing electricity transmission line before 31 March 2017 (KPMG, 2015:38). The 10-year corporate tax holiday is not required to be utilised over 10 consecutive years but rather it can be utilised in 10 out of 15 years (KPMG, 2015:38).

The renewable energy electricity generation capacity (114 GW) added by India between 2011 and 2015 is enormous compared to the renewable energy electricity generation capacity of the other countries discussed in this dissertation. Given that the renewable energy environments are significantly different in each country, if the favourable tax holiday available in India was a minor consideration, it would have provided sufficient encouragement to investors and contributed significantly to the increase in renewable energy power plants located in India.

The corporate tax holiday is not extended to the minimum alternative tax liability levied in India (KPMG, 2015:38). This particular incentive ensures that an enterprise

is not liable for corporate tax during a significant portion of the life of the plant but the enterprise will still be liable for minimum alternative tax in India. The minimum alternative tax liability in India is not determined with reference to taxable income, but rather it is determined with reference to the accounting profit or loss of the company after taking into consideration certain tax adjustment such as provisions for unascertained liabilities, exempt income, expenditure incurred in respect of such exempt income, depreciation recognised on the revalued portion of an asset, any income taxes/provisional taxes and dividends paid/payable included in profit or loss (Department of Revenue, 2015:1-18).

A company with a minimum alternative tax liability in excess of its corporate tax liability, can carry forward the excess taxes for 10 years (i.e. it can be used to offset corporate tax payable in a year in which it exceeds the minimum tax payable) (Department of Revenue, 2015:1-18). If the corporate tax concession is utilised in a tax efficient manner over the allocated 15-year period, it could ensure that any corporate tax liabilities in the 5 years in which the concession would not apply is offset by the minimum alternative tax paid during non-corporate tax paying years.

4.3.3 Additional tax deduction on scientific research and development expenditure

4.3.3.1 South Africa

As discussed in chapter 3.5.1, a specific tax deduction at a rate of 150 percent in terms of section 11D of the ITA is available in respect of qualifying scientific and technological research and development expenditure. The provisions of section 11D require that the taxpayer must actually incur the expenditure on research and development activities carried out in South Africa after the approval by the Minister of Science and Technology before the deduction can be claimed.

4.3.3.2 Brazil

A corporate tax deduction of 100 percent of the expenditure incurred on research and development activities can be claimed by taxpayers in Brazil. The law changed with effect from 1 January 2016 which allows that the deduction be increased between 160 and 180 percent depending on certain factors such as the increase in number of

research staff. However, the application of this law has been suspended for the 2016 calendar year. Assets used for the purposes of research and development activities are written-off for tax purposes in the year in which the asset is acquired. (Tonanni & Gomes, 2016).

4.3.3.3 India

An entity engaged in manufacturing or production of any item (other than those items specifically prohibited) is eligible to claim a deduction in respect of scientific research and development expenditure (including assets acquired). This deduction can be claimed at a rate of 200 percent incurred by an approved in-house research and development facility approved by the Department of Scientific and Industrial Research (Deloitte, 2015:3). The entity is required to retain separate accounting records for the research and development facility and a progress report should be submitted to the relevant authority (EY, 2014:12-14).

There are also customs duty exemptions available in respect of goods imported for research and development purposes. However, there are strict requirements such as export turnover of INR200 million in the prior year, a research and development department which has been registered with the Department of Science and Research and the goods cannot be sold/transferred for 7 years (EY, 2014:12-14)

4.3.3.4 China

Enterprises engaged in scientific research and development activities in China may qualify for a “super deduction” which allows for qualifying scientific research and development expenditure to be claimed at a rate of 150 percent for corporate tax purposes (Ma, 2016). Capital allowances based on 150 percent of the cost of capital assets acquired for research and development activities may be claimed (Ma, 2016).

There is currently no requirement to obtain pre-approval for the research and development activities from a government department or tax authority before the additional deduction may be claimed for corporate tax purposes (Ma, 2016). The enterprise is however required to submit various documents supporting the tax deduction upon submission of the annual income tax return in which the super deduction is claimed. These documents include the project plan, list of employees

within the research and development division, contracts with the competent science-technology department, accounting records for research and development expenditure and any other documents required by that specific provincial tax authority (Ma, 2016).

4.3.3.5 An analysis of the research and development incentives offered in South Africa, Brazil, India and China

The research and development deduction of 200 percent on qualifying expenditure incurred in India is significantly higher than the research and development deduction of 100 percent of the qualifying expenditure incurred in South Africa, China and Brazil. The research and development must be approved by the Minister of Science and Technology in India and South Africa. However, it appears that the in-house research and development facility needs to be approved in India as opposed to the South African requirement that the specific research and development activity is approved. Based on EY's tax incentives guide, it was noted that the Department of Science and Research has been reviewing the applications in detail before approval is granted for the in-house research and development facility (EY, 2014:12-14). The process and documents required may not be the same but applications in both countries go through a rigorous review process before approval is granted.

The research and development "super deduction" of 150 percent is available in China. A Chinese taxpayer is required to submit various documents supporting the tax deduction upon submission of the annual income tax return rather than obtaining pre-approval for the deduction before the research and development expenditure is incurred by the taxpayer.

4.3.4 Government grants/financing

There are currently no government grants or finance available in South Africa. The grants and funding arrangement offered in Brazil, China and India will be discussed below.

4.3.4.1 Brazil

A number of programmes have been implemented to assist with the development of the renewable energy sector such as the Programme to Incentivise Alternative Electricity Sources. The programme aims to develop energy generation capacity from

renewable energy sources such as wind, biomass and hydropower (International Renewable Energy Agency, 2015:3-6). Furthermore, a special fund was formed in 2015 which aims to provide finance of USD 9.7 billion for the electricity generation capacity in the Brazil's North East region (International Renewable Energy Agency, 2015:3-6).

4.3.4.2 India

The Renewable Energy Law made available special funds in China. These funds are overseen by the local finance bureaus and renewable energy government agencies in order to assist with the development of renewable energy power plants in China. These funds were designated for the broader development of the renewable energy sector such as scientific and technical research, renewable energy projects in rural areas, localisation of renewable energy manufacturing facilities (KPMG, 2015:38). The special fund was also envisaged to fund significant grid connection costs incurred by power companies to connect the various renewable energy plants to the National Electricity Grid (KPMG, 2015:38).

4.3.4.3 An analysis of the government grants or funding

As discussed in Chapter 2, the high initial capital costs typically result in debt financing and the interest thereon being a significant cash flow output. If such debt is financed through low interest loans, this would be a considerable incentive for multi-nationals to start-up operations in those countries. Data available in South Africa indicates that funding of the renewable energy projects in round 1 to 3 consisted on average of two third debt. These loans were provided by the big four commercial banks in South Africa, insurance companies such as Old Mutual, the Industrial Development Corporation and the Development Bank of Southern Africa (Eberhard, Kolker, & Leigland, 2014:20-22). It is noted that a low interest loan is provided to qualifying enterprises engaged in the generation of electricity from renewable energy sources in Brazil.

A Generation Based Incentive is not a corporate tax incentive per se, but rather a payment by the government based on the electricity generated by the power plant. This incentive is specific to the wind projects commissioned on or after 1 April 2012 in India. There are no such incentives available in the other countries selected in this

dissertation. As previously discussed in this dissertation, a wind or solar project may elect to use the straight line method as opposed to the written down basis, but it cannot do so in the case where the company is eligible for Generation Based Incentives (KPMG, 2015:38). The purpose of implementing the incentive in India was to ensure that power plants with a high cost but a low quality were not constructed (to take advantage of the favourable accelerated capital allowances) as it encourages enterprises engaged in the generation and transmission of electricity from renewable energy sources to operate effectively and efficiently.

4.3.5 Other – Brazil import duties

There are currently exemptions available for import tax on certain imported components of the renewable energy plant (such as wind power equipment, wind turbine components) and reduced import tax of between 2 and 10 percent) in respect of solar PV equipment (International Renewable Energy Agency, 2015:3-6).

The exemption of Brazilian import duties in respect of certain components of the renewable energy plant is not a corporate tax incentive. A similar exemption is not available to imported components in South Africa, India or China. However, it may not be as relevant to China or India (due to the manufacturing plants already setup in those countries but it is relevant in South Africa considering that during the implementation of rounds one to three of the REIPPPP, a significant portion of the technical equipment used for these projects was imported from Europe and China (Eberhard, Kolker, & Leigland, 2014:22).

4.3.6 Other – Chinese Value-Added Tax incentives

There are Value-Added Tax (“VAT”) incentives offered in China that are worthy of mentioning that were not identified in the analysis of the tax incentives available in the other jurisdictions analysed in this dissertation. There are specific VAT incentives offered to enterprises engaged in the generation and transmission of renewable energy from wind and solar sources in China in the form of a refund of 50 percent of output VAT levied on the sale of wind power or a refund of 50 percent of the VAT levied on the sale of self-produced photovoltaic solar power (KPMG, 2015:22). However, it is noted that India offers a reduced VAT rate of 5 percent (compared to the standard rate of 15 percent) in respect of developing renewable energy projects (KPMG, 2015:22).

4.4 CONCLUSION

The renewable energy sector is significantly smaller in South Africa, however the accelerated capital allowances available to qualifying taxpayers in the renewable energy sector are considerably more favourable than similar accelerated capital allowances available in the other countries selected in this dissertation. However, the tax holiday (available to taxpayers in India) are considered more favourable from a corporate tax liability point of view. Considering that minimum alternative tax is still payable in India, the overall tax benefit under that system may not be more favourable in the short term. A detailed financial analysis will need to be performed to confirm that this is the case.

The electricity generated in Brazil is obtained significantly from hydro-electric power plants. However, there are a number of solar and wind energy power plant being constructed in Brazil. There are funding initiatives in Brazil but there are no significant corporate tax incentives currently available to qualifying enterprises engaged in the generation and transmission of electricity from renewable energy sources. If Brazil implements specific tax incentives for the generation and transmission of electricity from wind and solar power, it would be interesting to examine the type of incentives that are implemented and how those incentives compare to the other BRICS countries.

The tax incentives available in China where manufactures of renewable energy power plant components are eligible for a reduced tax rate of 15 percent. Given that China is one of the largest manufacturers in the world, this policy encourages enterprises to maintain the growth in the manufacturing sector. As a significant amount of the components used in the renewable energy power plants in South Africa have been imported, a special tax incentive aimed at encouraging growth in this sector would be beneficial to any economy significantly reliant on the importation of the components used in the construction of the renewable energy plants.

**CHAPTER 5: RECOMMENDATIONS AND/OR ENHANCEMENTS TO THE
CURRENT CORPORATE TAX INCENTIVES AVAILABLE IN SOUTH AFRICA
AND THE APPLICABILITY OF THE SPECIAL ECONOMIC ZONES FOR
RENEWABLE ENERGY ENTERPRISES**

5.1 INTRODUCTION

Chapter four of this dissertation analysed the specific tax incentives available to qualifying enterprises operating in the renewable energy sector in South Africa, India, China and Brazil. The aim of this chapter is to consider whether there are any recommendations and/or enhancements to the current corporate tax incentives available in South Africa and if any of the recommendations and/or enhancements could be incorporated into the existing South African Special Economic Zones Act.

**5.2 RECOMMENDATIONS AND/OR ENHANCEMENTS TO THE CURRENT
CORPORATE TAX INCENTIVES AVAILABLE IN SOUTH AFRICA**

As discussed in chapter 1, the REIPPPP has advanced to a fifth round of competitive bidding to obtain 1 800 MW. However, as of February 2017, the list of successful bidders and their projects has not yet been released. If the regulatory environment is not encouraging the growth in this sector, any additional tax related incentives would typically not be relevant. One of the findings of the analysis performed in chapter four was that Eskom should be encouraged and obligated to ensure that the goals set out in the IRP to ensure a sufficient mix of electricity generation capacity are met. If it was mandatory for electricity utility companies (such as Eskom) to ensure that a certain electricity generation mix is adhered to, it would ensure that there are no delays in constructing power plants that have won bids to supply electricity in South Africa. As discussed in section 4.2 of this dissertation, South Africa has adopted an obligation that fuel producers include a blend of biofuels in petrol and diesel being produced. A similar approach could be followed so that there is an obligation to ensure that the electricity generation capacity includes a specific percentage of electricity generated from renewable energy sources. This proposed obligation can be phased in over time to allow for sufficient time for a proper bid process and construction of the power plants. In the recent 2017 State of the Nation Address by the President of South Africa, it was stated that the Power Purchase Agreements that are currently awaiting approval by Eskom will be signed (Zuma, 2017) . This is a step in the right direction and a firm commitment by the South

African Government given the uncertainty currently faced by the prospective Independent Power Producers.

Once the regulatory policies are legislated to firmly implement the use of renewable energy resources to generate electricity, the current tax incentives specific to the renewable energy sector could potentially be revised to encourage further investment. The renewable energy environment in Brazil currently has no special tax incentives available for these taxpayers. However, there are already a large number of power plants being constructed due to the implementation of the most appropriate regulatory policy.

The regulatory policies related to the type of electricity generating plants should be revised more regularly. The South African 2010 IRP, which was based on information available at that time, suggested that the IRP should be updated every two years by the Department of Energy (Department of Energy, 2011:7). An updated 2010 IRP was prepared in November 2013 by the Department of Energy which suggested that the IRP be updated on a more regular basis. As the renewable energy sector is evolving and growing in South Africa, there is more data available regarding the impact of the renewable energy power plants on the electricity grid and more information is now available regarding the actual costs associated with setting up these renewable energy plants.

A possible amendment to the current legislation relating to the grid connection costs could be considered in the short term. As mentioned in section 3.5.4, the South African National Treasury has recently acknowledged that where the taxpayer does not own these type of grid connection equipment but has incurred the expenditure, it will consider possible amendments to the ITA in the future to include specific allowance for those assets (National Treasury, 2016:38-39).

The current accelerated capital allowances available to enterprises engaged in manufacturing components used in the renewable energy power plants and the accelerated capital allowances available to the enterprises engaged in the generation of electricity from renewable energy sources are considered more favourable allowances in comparison to the variants of accelerated capital allowances found in the other countries discussed in chapter four of this dissertation.

Although there are favourable tax allowances in South Africa, there are no tax rate benefits available to the majority of enterprises engaged in the renewable energy sector. The Indian tax law provides a significant tax benefit to enterprises generating and transmitting electricity from renewable energy sources through a 10-year tax holiday. Whilst the Chinese tax law provides a significant tax benefit to enterprises engaged in the manufacturing of certain components used in the power plants. A suggestion to allow manufacturers of renewable energy components and the enterprises engaged in the generation and transmission of electricity from renewable energy sources to take advantage of the provisions of the Special Economic Zones Act through a similar reduced rate regime will be considered in further detail below.

Although it is not a corporate tax incentive, support from the South African Government in the form of a low interest loan could be provided to qualifying enterprises. This in turn will reduce the tariff charged to consumers and encourage growth in the renewable energy sector, particularly if there is a requirement to purchase locally manufactured components for the construction of the renewable energy power plants.

5.3 APPLICABILITY OF THE SPECIAL ECONOMIC ZONES ACT

A Special Economic Zone is a specifically demarcated area which aims to offer more favourable laws and regulations in comparison to a country in which the Special Economic Zone is located and the country from which the investment originates (Saggers, 2015:7-11). The South African Government initially established the Industrial Development Zones programme in order to *inter alia* increase foreign direct investment (Department of Trade and Industry, 2016). The Industrial Development Zones programme was unsuccessful in attracting the anticipated level of foreign direct investment which resulted in the introduction of the Special Economic Zones Act in 2013.

The South African Special Economic Zones Act allows for a reduced corporate tax rate of 15 percent (as compared to the standard corporate tax rate of 28 percent); accelerated capital allowances; employment tax incentives; and reduced or exempt Value Added Tax and Custom duties (Saggers, 2015:28-36). The favourable employment tax incentives could encourage multi-national corporations to setup facilities in South Africa which results in skills being transferred to South African employees. These favourable tax incentives are only available to qualifying enterprises that meet the criteria such as incorporated and/or is

effectively managed in South Africa; engaged in a qualifying activity from a fixed place of business in the Special Economic Zone; and at least 90 percent of its income should be derived from carrying on the qualifying activity in the Special Economic Zone (Saggers, Roeleveld, & West, 2016:77)

There are several types of Special Economic Zones within South Africa, namely; Industrial Development Zones, Free Port, Free Trade Zone and Sector Development Zone which each have a specific purpose. For example, the Sector development zone is defined in the Special Economic Zone Act No 16 of 2014 as follows: “a zone focused on the development of a specific sector or industry through the facilitation of general or specific industrial infrastructure, incentives, technical and business services primarily for the export market.” It is also apparent that the Special Economic Zones were formed to attract foreign direct investment by providing more favourable laws and regulations as compared to those offered in the country from which the investment originates (Saggers, 2015:14-26)

The main aim of the Special Economic Zones Act is to support the increase in foreign direct investment; the creation of jobs in South Africa and increase in exports of the country. It also allows for testing of new policies and approaches similar to the more modern Special Economic Zone approach implemented in China (Saggers, 2015:14-26). There is a distinct shift amongst modernised Special Economic Zones to include other non-traditional activities within the Special Economic Zones model such as industrial, commercial, residential and tourism activities (Saggers, 2015:14-26). If such approach is followed, it would specifically allow for activities which are not typically included in the traditional approach to implementing Special Economic Zones. The typical location of a traditional Special Economic Zone near port facilities may change if the modernised Special Economic Zones model implemented by China is adopted world-wide. However, the long-term economy strategy of the country needs to be considered if/when the traditional Special Economic Zones model is reconsidered as the benefits may outweigh the costs of adopting the modern approach to Special Economic Zones.

There is a small number of solar and wind turbine equipment manufacturers currently taking advantage of the favourable Special Economic Zones laws. As at the date of this research, the Coega Industrial Development Zones, which was formed in 1999 and is located 20 kilometres north of Port Elizabeth in the Eastern Cape province of South Africa, has attracted three

manufacturers of solar and wind turbine equipment, namely; DCD Wind Towers, Electrawinds and Powerway (Coega IDZ, 2016). There is concerns that when these components are exported from these Special Economic Zones into South Africa, the customs and VAT levied on the components will be based on the value of the components including South African raw materials and labour costs (Saggers, Roeleveld, & West, 2016:166). This could result in a higher cost for South African customers as compared to components fully manufactured offshore and directly imported into South Africa.

The Coega Industrial Development Zones is currently positioning itself to become the solar and wind turbine equipment hub for the Eastern Cape as there are several renewable energy projects being proposed in the Eastern Cape (Coega IDZ, 2016). The Eastern Cape Industrial Development Zones is also positioning itself to manufacture and supply electricity from renewable energy sources in the Eastern Cape Industrial Development Zones. This Industrial Development Zones has advertised that it has suitable land for electricity generation from both wind and solar facilities with established relations with the top 100 users; and the local authority for the connection of the power plant to the grid and supply of electricity to a nearby Buffalo City Municipality (East London IDZ, 2016).

The promotion of national economic growth and export is one of the broad purposes of Special Economic Zones in South Africa. The set-up of manufacturing facilities and renewable energy power plants in the existing zones for the purposes of export will assist with achieving this goal. Taking into consideration that if the locally manufactured components are utilised in South Africa or if the electricity generated from renewable energy sources within the Special Economic Zone are consumed within the South African borders, the goal of increasing exports will not be accomplished unless the electricity is exported elsewhere in the continent. As South Africa exports electricity to neighbouring countries, this could result in more electricity being generated from renewable energy sources for export purposes but it will not ensure that a significant amount of the new power plants take advantage of the favourable Special Economic Zone tax laws.

The existing Special Economic Zone Act may cater for enterprises engaged in the generation and transmission of renewable energy. One of the specific purposes of a Special Economic Zone is to provide a location for the establishment of a targeted investment. A “targeted investment” is defined in the Special Economic Zone Act as “*investments in support of*

government's economic and industrial development policies". As discussed in Chapter one of this dissertation, a substantial barrier to economic markets achieving high growth levels is inadequate infrastructure and the structures and facilities set-up for the generation and transmission of electricity is an important part of the economic infrastructure. If the investment in renewable energy power plants could be seen as a "targeted investment", the existing Special Economic Zones Act could incorporate the large number of new renewable energy power plants. The reduced income tax rate of 15 percent and the full rebate on customs duties and VAT on any imported power plant components, would provide a much needed boost to the economy through reduced electricity prices through a lower tariff charged by these renewable energy power producers. The increase in job opportunities and related transfer of new skills would benefit the economy through lower unemployment and higher collection of personal taxes. However, it will need to be considered whether the loss to fiscus would be offset by the increase in other relevant taxes (such as increase in the collection of personal taxes due to job creation and the increase in VAT due to consumer spending etc.).

There is no clear evidence on how the reduced corporate tax rate of 15 percent was determined for enterprises operating in the South African Special Economic Zones (Saggers,2015:29). As per Saggers, one of the recommendations to the Special Economic Zones Act would be that the advisory board is provided with the power to designate lower corporate tax rates to specific zones in order to attract investment to that particular zone (Saggers, 2015:74). In the context of the renewable energy sector, the location based tax holiday available to manufacturers setting up operations in the specified states located in Northeast India is comparable to an extent to the South African Special Economic Zones whereby reduced corporate tax rates (albeit zero) is available to enterprises. The purposes of the location based tax holiday in India was most likely to encourage manufacturers to set-up facilities in those regions due to potential factors such as availability of electricity, personnel and land. However, the location based activity model could be implemented in the renewable energy industry in South Africa in specific areas where there is an abundance of sunlight/wind for the power plants and there are sufficient Eskom grid connection points. This would encourage the prospective bidders to set-up plants in and around those regions and it will reduce the significant grid connection costs burden on both the enterprise and Eskom.

5.4 CONCLUSION

The purpose of the current Special Economic Zone is primarily focused on foreign direct investment and the export market. There are several manufacturers of solar and wind turbine equipment that have taken advantage of the favourable laws and regulations of the Special Economic Zone. However, there is scope in the current legislation to set-up a much broader Special Economic Zone for enterprises engaged in the renewable energy sector.

CHAPTER 6: CONCLUSION

6.1 INTRODUCTION

The purpose of this dissertation is to provide the reader with an analysis of the tax and related incentives available to enterprises operating in the renewable energy sector in South Africa, India, Brazil and China.

This chapter provides a discussion of the research objectives which formed part of the structure of this dissertation and how each objective was accomplished.

6.2 ACHIEVEMENT OF RESEARCH OBJECTIVES

The four research objectives as set out in chapter 1.3 of this dissertation and how these objectives were accomplished are discussed below:

- **To provide a brief overview of the renewable energy sectors and illustrate the challenges faced by enterprises operating in the countries selected in this dissertation**

Chapter 2 first discussed the approach followed by South Africa, Brazil, China and India in obtaining electricity generation capacity from renewable energy sources. It was found that each of these countries adopted a distinct type of method (i.e. competitive bidding, reverse auctions or a feed-in tariff regime) based on the country specific laws and regulations. For example, in South Africa, the competitive bidding system was implemented due to a competition law/tender contravention of the initial proposed feed-in tariff regime.

Chapter 2 secondly discussed the electricity generation mix in each of the countries and provided an overview of the renewable energy components manufacturing sectors. It was found that there are varying levels of electricity generation capacity in each of the countries. Brazil relies significantly on hydro-electric power for the generation of its electricity. This was mainly due to the discovery of the large network of flowing rivers that could support hydro-electric power plants.

Chapter 2 finally discussed the 5 common challenges faced by the countries considered in this dissertation, namely: Grid constraints; reliance on one type of energy source; employment; technology advancements; domestic manufacturing; finance; and collateral. Where relevant and possible, a solution which has been based on the research performed on these countries, are provided to the each of the above mentioned common challenges. One of the highly relevant challenges is the reliance on one type of energy source for the generation of electricity. As discussed in chapter 1, the current electricity generation capacity in South Africa significantly relates to coal powered power stations. These coal powered power stations consume large amounts of coal which cannot be replenished once it has been consumed in the electricity generation processes. It was estimated (in 2013) that the proven coal reserves in South Africa would only last an estimated 116 years.

- **To provide a synopsis of the corporate tax regimes in the countries that will form part of the analysis of this dissertation**

Chapter 3 firstly provided a summary of the reasons for implementing tax related incentives in the renewable energy sector. The three significant reasons for the implementation of tax related incentives are as follows:

- there are a number of challenges faced by enterprises operating in the renewable energy industry which create significant barriers to entry for new entrants to the market;
- the use of non-renewable resources for generating electricity has a negative impact on the environment; and
- as inadequate infrastructure was found to be a substantial barrier to the BRICS economic markets achieving high growth levels, the implementation of renewable energy power plants will create additional supply for domestic and industrial purposes.

Chapter 3 secondly discussed the relevance of tax incentives and provided a brief overview of the types of tax related incentives that are widely used in the world. There are several types of tax incentives related to the renewable energy sector in South Africa which were legislated to ensure that particular economic, social and environmental goals of the country are met. It was found that it is difficult to determine whether a change in investment policy increases investment as a result of other non-tax related

factors that may have encouraged investment. For an economy with a good investment appetite, the knock on effect of tax related incentives could be up to eight times stronger than a country in which investors require more than tax incentives to encourage investment.

Chapter 3 lastly provided a detailed discussed of the most relevant and widely used fiscal incentives offered to enterprises operating in the renewable energy industry in South Africa. There are already a number of favourable incentives available in South Africa such as the accelerated capital allowances for enterprises engaged in the renewable energy sector.

- **To critically analyse the renewable energy tax regimes offered in South Africa compared to countries that will form part of the analysis of this dissertation**

Chapter 4 provided a high-level comparison of the regulatory policies in South Africa, India, China and Brazil. Based on the analysis, the number of regulatory policies used to promote renewable energy is more prevalent in India as compared to South Africa, China or Brazil. All the countries considered in this dissertation have implemented regulatory policies regarding achieving renewable energy targets. However, the renewable energy targets vary in each of the countries due to the level of demand and required supply to meet such demand.

Chapter 4 provided a detailed analysis of the renewable energy tax regimes as compared to India, Brazil and China. Although the renewable energy sector is significantly smaller in South Africa, the tax incentives specific to the renewable energy sector are considerably favourable to enterprises operating in the manufacturing spectrum and enterprises engaged in the generation and transmission of electricity from renewable energy sources.

There were a number of other interesting and beneficial tax regimes such as the tax incentives available in China whereby manufactures of renewable energy power plant components are eligible for a reduced tax rate of 15 percent. As a significant amount of the components used in the renewable energy power plants in South Africa have been imported, a special tax incentive such as the one implemented in China aimed at

encouraging growth in the renewable energy manufacturing sector would be beneficial to the South African economy.

- **To determine if there are any recommendations and/or enhancements to the current corporate tax incentives available in South Africa and to consider whether any of the recommendations could potentially be included as part of an existing South African tax regime, specifically the tax regime available to taxpayer's operating in the South African Special Economic Zones**

Chapter 5 firstly discussed whether there are any recommendations and/or enhancements to the current corporate tax incentives available in South Africa. It was found that in order to encourage the use of renewable energy resources for the purposes of electricity generation, the regulatory policy should be refined to obligate the utility companies to procure a predefined percentage of electricity from renewable energy power producers.

Chapter five secondly provided a brief overview of the Special Economic Zones and considered whether there are any provisions in the Special Economic Zones Act that would be applicable to the renewable energy sector. It was found that there is scope in the current legislation to provide enterprises generating and transmitting electricity from renewable energy sources with an even more favourable tax regime in South Africa.

6.3 CONCLUSION

The renewable energy sector is currently in its infancy in South Africa. There are several key common challenges that are evident in the countries selected in this dissertation such as grid constraints, rapid technological advancements, employment, reliance on one type of resource, high initial setup costs and related finance requirements. A number of lessons can be learnt from the challenges faced by these countries and how these countries dealt and/or intends to deal with these challenges. To the extent that tax and related incentives can offer an appropriate solution to alleviate these challenges, it may be beneficial to the growth of the renewable energy sector by reducing the burden on new entrants and existing market players. Regulatory policy ensures that the public interest (such as its citizens and corporate taxpayers) are considered when implementing new or even managing existing regulations due to the potential negative public perception when regulatory policy is used as a lever of state intervention. As the renewable energy sector is evolving and growing in South Africa, there

is more data available regarding the impact of the renewable energy power plants on the electricity grid and more information is now available on the actual costs associated with setting up these renewable energy plants. The regulatory policies should be revised more regularly to ensure that the optimal mix of generation capacity is devised and implemented in South Africa. If it was mandatory for electricity utility companies (such as Eskom) to ensure that a certain percentage of electricity being generated and transmitted in South Africa is procured from renewable energy sources, it would ensure that there are no delays in constructing power plants that have won bids to supply electricity in South Africa.

The accelerated capital allowances available to qualifying taxpayers in the renewable energy sector in South Africa are considerably more favourable than similar accelerated capital allowances available in the other countries selected in this dissertation. However, the tax holiday (available to taxpayers in India) will be considered more favourable from a corporate tax liability point of view as it effectively reduces the corporate tax liability to nil for a specified number of years.

The existing Special Economic Zone Act may cater for enterprises engaged in the generation and transmission of renewable energy as one of the specific purposes of a Special Economic Zones is to provide a location for the establishment of a targeted investment. This potential application of the Special Economic Zone Act should be considered by the Government and the companies operating within the renewable energy sector in further detail to determine if this would encourage growth and reduce the significant challenges faced by new entrants to the renewable energy sector.

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