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THE CONTRADICTORY STATE: SOUTH AFRICA'S VARYING APPROACHES TO ITS ENERGY POLICY

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by

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ABSTRACT

This research report addresses two main questions: firstly, do South Africa's environmental and energy policies contradict each other in terms of building a sustainable and green developmental state? Secondly, is there any clear policy coordination within the State's departments? The research is an analysis of the state's energy policies addressed by the National Development Plan (2011), Integrated Resource Plan Energy policy (2010) Carbon Tax Bill 2018, and the Industrial Policy Action Plan 2018/2019. These policies show the link between strategies for development and the mitigation and adaptation of programmes for building a green developmental state.

This research report adopted a qualitative research method to explore South Africa's varying approaches to energy policy. The study uses several policy discussion documents drawn up by numerous departments of South Africa's national government: namely, the Department of Energy and Mineral Resources; Department of Environment, Forestry and Fisheries; Department of Trade Industry and Economic Development; and the National Treasury. Policy produced by the Department of Energy and Mineral Resources' Integrated Resource Plan (2018) fail to show amply the urgency and necessity for the so-called 'just transition' required for labour in the radical shift from fossil fuels (decarbonisation) to address greenhouse gas (GHG) emissions in the local electricity industry, especially for ESKOM, the country's electricity supply utility.

South Africa's economy was developed within the mineral energy context: coal has, therefore, played a significant role in its previous industrial development. After a period in which almost no attention was paid to climate change the South African government has succeeded in drafting policies which seek to mitigate the current deficiencies of the present economy for the requirements of the global climate crisis: the decarbonisation of the fossil fuel economy. However, the government has currently not provided adequate follow-up leadership for these policies and, in addition, they have proved contradictory. As a result, progress has been detrimentally slow in implementation.

Fundamentally, the state has not succeeded in guiding vital economic activity by providing subsidies to the manufacturers and consumers of clean technologies. There is, therefore, a need to coordinate policies and have a coherent implementation system. This study, therefore, provides an evaluation of the SA energy policy, which should be better framed by a concern for reducing inequality in labour issues that provide a just transition towards developing a green economy with a consistent and rational implementation system to replace the current paralysis and gridlock.

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DEDICATION

Mhani Annah Mamayila Ngobeni

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DECLARATION

I declare that this report is my own unaided work. It is submitted in partial fulfilment of the requirements of the degree of Master of Arts in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university. _____ Ashley Nyiko Mabasa (1278916) _____day of 20 April 2020

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ABBREVIATIONS & ACRONYMS

ANC	African National Congress
AEB	Atomic Energy Board
ASGISA	Accelerated and Shared Growth Initiative for South Africa
CEF	Central Energy Fund
COP21	21st Conference of the Paris Accord (climate)
DMR	Department of Mineral Resources
DMER	Department of Mineral and Energy Resources
DoE	Department of Energy
DEAT	Department of Environment Affairs and Tourism
DTI	Department of Trade and Industry
ESKOM	Electricity Supply Commission (formerly ESCOM)
GHG	Greenhouse Gas
IDC	Industrial Development Corporation
IEP	Integrated Energy Plan
ILO	International Labour Organisation
INEP	Integrated National Electricity Programme
IPP	Independent Power Producers
IPAP	Industrial Policy Plan Action
IPPC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
ISCOR	Iron and Steel Corporation of South Africa
LPG	Liquefied Petroleum Gas
MIGDETT	Mining Industry Development and Employment Task

	Team
MPRDA	Mineral and Petroleum Resources Development Act
NAMAs	Nationally Appropriate Mitigation Actions
NIPF	National Industrial Policy Framework
NDC	Nationally Determined Contribution
NDP	National Development Plan
NERSA	National Energy Regulator of South Africa
NPC	National Planning Commission
PMG	Parliamentary Monitoring Group
RDP	Reconstruction and Development Programme
REIPPs	Renewable Energy Independent Power Producers
SASOL	South African Synthetic Oil Liquid
SIPs	Strategic Investment Projects
SLP	Social and Labour Plan
SMMEs	Small-to-Medium and Micro Enterprises
SWHs	Solar Water Heaters
WMO	World Meteorological Organisation
UCOR	Uranium Enrichment Corporation
UNFCC	United Nations Framework Convention for Climate Change

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1. CHAPTER 1. BACKGROUND SOUTH AFRICA'S ENERGY POLICY

1.1. Introduction

This research report explores the post-apartheid South African government's different policy approaches to the state's energy policy since the climate crisis has become a concern to activists, scholars, and various states around the world. For most of the twentieth century, the developmental agendas of many countries were based on the burning of fossil fuels, despite the growing evidence that burning fossil fuels are detrimental to the natural environment. The German Institute for Economic Research has pointed out that the annual costs of climate change from the mid-century to 2019 was about USD $2 000 billion (DIW, 2004). The renewable energy represents a move away from fossil fuels production to mitigate global climate change needs by the reduction of carbon dioxide in energy production.

The call for the so-called 'just transition' by South Africa's trade unions, social movements and political parties to enable change to low carbon and climate resilient energy production is essentially an attempt to address the consequences of the shift of energy production compatible to climate change. Different social groups – activists, scholars and policy makers, for example – have rallied to seek an adaptation for energy production within contemporary societal conditions.

In 2010, the International Labour Organisation (ILO) at the United Nations (2018; p 3) refers to a 'Just Transition' as a conceptual tool in which trade unions capture the difficulties of the transition in to a low-carbon and climate resilient economy by emphasising the necessity of public policy to increase the benefits and lower hardships

for workers and communities in the shift from carbon-intensive energy to low carbon-intensive energy – as facilitated by renewable energy. Significantly, therefore, the ILO concedes that the transition from carbon-intensive energy to low carbon-intensive production should increase benefits to the workers rather than further impoverish them.

1.2 The South African Response to Climate Change and Alternative Energy

With growing scientific evidence and pressure from civil society, the South African state has started to embrace renewable energy from early years of the post-democratic state in 1994. However, it has done so without shifting away from its reliance on coal, which has often led to contradictory policies from different government departments.

In this research report, it can be seen that the different ministerial departments in South Africa represent a contradiction in their policies for the shift from a coal-intensive energy system to a renewable energy system. These inconsistent policies are the focus of this study specifically in relation to the following South African departmental policies:

- **Department of Energy and Mineral Resources.** Integrated Resource Plan (2011 and 2019); White Paper on Energy Policy (1998); Mineral Petroleum Resource Development Act (2002); Renewable Energy Policy (2003); and the Integrated National Electrification Programme.
- **Department of Environmental Affairs, Forestry and Fisheries.** National Climate Change Response White Paper (2011); and National Climate Change Strategy (2004).
- **National Treasury**: Carbon Tax (2019).
- **Department of Trade, Industry and Economic Development: Industrial Policy Action Plan (2010/2018).**

It is currently considered imperative that the world must respond to development that is accountable to the current global climate crisis. The United Nations has convened several climate summits to prompt member states about the need to devise an alternative vision, alternative development, and activism to enable climate justice (Angus, 2010). These decisions entail that climate change is not a phenomenon solely experienced by South Africa but is a global phenomenon that must be managed as the risks associated with climate crisis are “weighed against security threats, economic fluctuations, human rights debates, and geopolitical posturing” (Burch et al, 2014: p 15).

The policy inconsistencies in South Africa, however, have hindered the progression of adaptations towards climate change via renewable energy. Furthermore, the SA government's policy contradictions not only illustrate how South Africa's state is not decisive and committed about tackling the climate change by transformation of energy production from the fossil fuel to renewable energy but, it also exhibits the South African government’s incapacity to construct cohesive and coordinated state institutions. This has resulted in the slow pace of the implementation of the renewable energy sector in post-apartheid South Africa. The literature review in this research, therefore, demonstrates the South African government’s ambivalent approach towards renewable energy does not offer an opportunity for a convincing paradigm shift – from carbon-intensive energy to renewable energy.

1.3 Research Rationale

The rationale for this research is primarily evidenced in the data that several departments of the current SA government have been drafting policy documents that propose adaptation to climate change. These policies include the following departments and their documents:

- **Department of Environment and Tourism.** The 2004 policy document: National Climate Change Response Strategy for South Africa;
- **Department of Trade and Industry.** The Industrial Policy Action Plan (2009);
- **Department of Minerals, Resources and Energy**. The Integrated Resource Plan (2010); and
- **The Office of the Presidency.** The National Development Plan (2011).

These various policies from several of government departments assert a developmental and industrialisation objective while also proposing mitigation and adaptation processes towards climate change.

This research contributes to an understanding of the diverse government department policies and the way in which this lack of cohesiveness across state institutions becomes an impediment to renewable energy projects. This research further suggests that contradictory policies are implemented which have led to undesirable outcomes, and that some departments, such as National Treasury, are more powerful than others.

If the state is serious about its climate change commitments it is imperative to align its different department policies to tackle climate change since without clear policy planning, direction and coordination it can lead to policy inconsistencies, which then creates tough conditions for the state to deal with the overall consequences of the

carbon emission issue. This study contributes to understanding the challenges encountered through the policy contradictions of South Africa's energy production in moving from high carbon intensive (coal and fossil fuel) to its failure to implement a consistent renewable energy approach.

1.4 Research Questions

To understand the contradictory state approach, this research is guided by the following questions.

1. **What is the current South African state's approach to renewable energy?**
2. **How do the policies contribute to, or contradict the establishment of renewable energy?**
3. **The policies are:**
    - **Department of Energy and Mineral Resources:** White Paper on Energy Policy 1998, Mineral Petroleum Resource Development Act 2002; Renewable Energy Policy 2003; and Integrated National Electrification Programme; Integrated Resource Plan 2011 and 2019;
    - **Department of Environmental Affairs, Forestry and Fisheries:** National Climate Change Strategy 2004; and White Paper on National Climate Change Response 2011;
    - **National Treasury:** Carbon Tax 2019; and
    - **Department of Trade, Industry and Economic Development:** The Industrial Policy Action Plan 2010/2018.

1.5 Outline of this Research Study

Chapter 2 provides a literature review by locating the themes of the 'developmental state', 'fossil fuel capitalism' and the 'just transition globally' within current South African state in the literature. The chapter shows how the South African government needs to rethink the aspects of developmentalism and integrate systematic pathways to achieve success. The chapter also discusses South Africa's attempts at building a green developmental state. For further conceptual clarity, the proposals are made for future systematic pathways for building the developmental state based on renewable energy.

Chapter 3 describes the methodological approach of this research. This research used the qualitative document analysis approach by which the author analysed documents from different government departments. This chapter shows how the documents are thoroughly analysed, for example, the Integrated Resource Plan and Carbon Tax.

Chapter 4 provides an overview of the historical development of South Africa's coal and gas industries and locates the emergence of coal globally and locally within different industrial eras. The chapter also traces the nuclear discourse in South Africa historically and currently.

Chapter 5 explores different government departmental policy documents and shows the contradictions and similarities. In doing so, this chapter also presents the analysis of the Integrated Resource Plan, Mineral and Petroleum Resource Act, 2002; Industrial Policy Plan Action, Carbon Tax; the National Development Plan (2011); the South Africa National Climate Change Response (White Paper) (2014). Then a

discussion follows on the contradictions between these Departmental policy documents.

Chapter 6 concludes the research report and sums-up the research discussions.

1.6 Conclusion

This study contributes to the energy debate around the so-called 'just transition' in South Africa by focusing on the energy policies in the various government departments. These particularly include the Department of Energy and Mineral Resources; the Department of Trade, Industry and Economic Development; and the National Treasury. In the chapters that follow, the contradictions of the energy policy will be investigated insofar as they concern the following SA government initiatives:

- the National Development Plan;
- the Industrial Policy Action Plan;
- the Carbon Tax; and
- Mineral and Petroleum Resources Development Act, 2002.

The formulation, objectives and contradictions of the above-mentioned energy policies will be assessed in this research to provide insight into the impact certain energy policy contradictions that have so far impeded the building of a socially and ecologically just energy policy transition for South Africa.

2. CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This literature review intersects with the plethora of literature on development, the developmental state, fossil fuel capitalism, and energy. These different themes in the literature relate to this research when they specifically focus on South Africa's developmental state and the development renewable energy in the 21st century.

2.2 Approaches to Developmentalism

There is no consensus in defining the term ‘development’ as it is a contested concept. Clearly, the definition of development must reflect the social context. However, ‘social democratic’, and ‘socialism’ have different models as does ‘social formation’ in the sense of the development of society under capitalism. Hence, Evans (2010, p. 37) clearly defines development as a constantly changing concept.

Evans (2010, p. 37) contends that a state’s developmental failure or success is linked to epistemology in that development is driven by the knowledge of its previous production and a reflection on the social formation of that period. In the 21st century, different theories within development studies have emerged that try to analyse why Third World countries remained underdeveloped while Western countries developed. In different periods, various theories of development have emerged. These are:

- The Modernisation Theory (Rostow, 1960);
- The Dependency Theory (Frank, 1966, Santos, 1971); and
- World System Theory (Wallerstein, 1987).

These dominant theories were part of the surge of developmentalism in the twentieth century and its epistemological justification for that development. Rostow's 5-stage theory argues that there are five stages of development from a traditional society and it concludes that what induces development is the take-off stage of high mass-consumption (So, 1990, p. 29). In this regard, Rostow had argued sixty years ago that for the Third World to develop, it needs a stimulus package to restructure its technology innovation and to support entrepreneurship (Rostow, 1960, p. 4). For Rostow, a Five-stage Theory of Development begins with take-off stage which results in industries expanding and which then allows for reinvestment in new production. This requires manufactured goods, leads to urbanisation and a new class of entrepreneur will then emerge to support the private sector: all boosting development. Rostow's (1990) Five-stage Theory of Development is based on fossil fuel energy data which suggests that high mass consumption can be an indicator of the country's development. The weakness in Rostow's theory is the failure to recognise that industrially-led development relies on the expropriation of natural resources and the environment.

In later decades, other researchers (Frank, 1987; So, 1990) have acknowledged a Dependency Theory (as influenced by the World System Theory) which emerged in the context of Latin America's economic stagnation, the rise of unemployment, currency devaluation, and the decline in terms of trade. This arose owing to Latin America's development strategy of state protectionism of the local markets and import substitute industrialisation. However, the Dependency Theory attributes development

through the promotion of a degree of protectionism of local markets and import substitution industrialisation.

Ignoring the socio-cultural history of less developed countries led to the Modernisation Theory of development in 20th century. This assumes that Third World countries are in the early stages of development by reflecting on the experience of Western countries. Put differently, Williams (2014, p. 4, citing Gerschenkron, 1962), has argued that Third World development is due to its distinctive experiences - for example, most of the countries in the Third World experienced colonialisation which altered their path of development. However, Frank's (1966. p. 17) argument, premised in the Dependency Theory, believes that Third World countries are underdeveloped because of the exploitation by Western countries of the market relations between them (metropolis) and the Third World countries.

Furthermore, the Dependency Theory argues that development studies fail to adequately account for economic relations between the metropolis and the economies of their colonies with their social-historical mercantilist and capitalist modes of production, however, the development studies do not embrace the contradictory relationship between the metropolitan and colonial economies. Moreover, the developmental state literature is a contradiction of the Dependency Theory inasmuch as it suggests – often with note to newly industrialising countries in East Asia – that market relations at an international level simply cannot explain the variation between the 'periphery' and the ability of some 'peripheral' countries (such as South Korea) to semi-industrialise and even fully industrialise their development. The difference lies in

the state's form, which is, in turn, shaped by class structure (Evans, 1989a: Freund, 2019).

The Dependency Theory emerged as the result of the failure of the Economic Commission of Latin America's developmental strategy of the state to protect domestic markets and industrialisation via Import Substitute Industrialisation (or ISI). However, Chibber (2014) in studying India, rejects So's (1990) argument of protectionism as a mode of development, concurs with Chibber's (2014) that protectionism and ISI can account for the underdevelopment of the Third world countries. So (1990) had argued that protectionism and ISI can be non-developmental when the state protects its domestic markets to the extent that it results in the domestic market not competing and lacking in technological innovation, which makes domestic markets inadequate for developmental programmes.

Furthermore, Evans (1983) states that within the framework of the Dos Santos (1970) and Frank (1966) argument for Dependency Development and the metropolis-satellite structure, the development of the Third World countries can happen with the 'triple alliance' model when international capital, local capital and the state forge an alliance. In this case, the Dependency Theory notes that the state must facilitate development by:

- demonstrating entrepreneurial initiatives;
- implementing a clampdown on the urban working class to minimise the labour unrest; and
- lobby the international capital to invest in their industrialisation.

Conversely,(Parenti (2015) argues that industrialisation needs to be guided by the state in 21st century development, which, in the case of the energy industry, must be done by euthanising the fossil fuel industry to transform it to clean energy by the state exercising its relative autonomy over the capital.

Many twentieth and twenty-first-century researchers have tried to understand why Third World countries are underdeveloped compared to First World countries, but few have highlighted the consequences of fossil fuel capitalism in the development of the least economically developed countries. Both the Modernisation and Dependency Theories have failed to link industrialisation to climate change and twentieth century industrialisation was highly dependent on the burning of fossil fuels.

Immanuel Wallerstein (1969) acknowledges that the Dependency Theory and Modernisation Theory are not adequate tools for the interpretation of developed and underdeveloped states because they negate "cyclical rhythms and secular trends of the world economy as a whole" (1990, p. 201). The World System scholars view underdevelopment as the result of geo-politics whereby there are unequal power relations between core and peripheral states. Williams (2014, p. 4) concurs with his contention that underdevelopment happens because of a country's structural location within the world economy.

So (1990, p. 202) citing Wallerstein, argues that during the Seventeenth century the core countries (France and Britain) increased their share of the total market and increased their concentration of the capital. This reduced their costs by improving their techniques of cereal and textile production, which resulted in boosting the productivity

of the core countries in Western Europe and led to the displacement of production from Southern and Eastern Europe. In this respect, Wallerstein recognises the state as the main factor that led to the development of these now developed countries.

In addition, another reason argued by So (1990) is that Wallerstein's analysis identifies colonisation as a cause of underdeveloped states (So, 1990). However, while colonisation gave core countries the advantage of creating new markets and protected their manufacturers –not all imperial countries in East and Southern Europe managed to create new markets although they both had major empires. It appears, therefore, that World System researchers acknowledge the relevance of globalisation in terms of Third World underdevelopment, but the research also overlooks how geopolitics affected Third World countries for resolving energy – environmental conflict. Perhaps World Systems Theory of the twenty-first-century development needs to be amended to incorporate the ecological limits in interpreting twenty-first century development.

2.3 The Emergence of the Developmental State

By the 1980s, East Asia's economy was steadily expanding and diametrically opposed to the expectation of the Modernisation, Dependency and World-System Theories (Williams, 2014). This has resulted in different authors, Chalmers Johnson (1982), Amsden (1989), Wade (1990), Castells (1992) and experts from the World Bank (1993) studying the growth of the East Asian economies whereby the model of its development has been extensively discussed. In his book, *MITI and the Japanese Miracle,* Johnson (1982) discusses how Japan's development was considered as that of a capitalist developmental state due to the structure of the state itself, and its

efficient, flexible policy process and ability to develop and implement economic strategy.

Nevertheless, much research in the literature on the developmental state have focussed on constructing the Weberian ideal of the bureaucratic state with appropriate and effectively functioning state institutions. This study's review, therefore, stresses the developmental state institutions but also picks up on the analysis on the 21st-century developmental state from Williams (2014) and constructs South Africa's green developmental state as a substitute for its 'mineral-energy complex.'[1][1] Chibber (1995) contends that the fiasco of building a developmental state in India as opposed to South Korea can be attributed to the South Korean state's capacity to facilitate its rising domestic middle classes better.

In a developmental state, it is the state that focuses on catching-up with industrialisation by building state capacity (which is relatively autonomous from capitalist influences at the same time as being able to discipline capital). Fine (2013, p. 171) citing Castells (1992, pp. 56-57) defines the developmental state as:

> A state is developmental when it establishes as its principle of legitimacy its ability to promote and sustain development, understanding by development the combination of steady high rates of growth and structural change in a productive system, both domestically and in its relationship to the international economy.
> Fine (2013, p.171)

Evans (1992) agrees with Castells (1992) that a state in development needs to have the principles of fighting corruption and augmenting relative autonomy embedded in

[1][1] the name given to the high carbon emission developmental institutions which were the basic unit of South Africa's economy,.

its developmental goals. Moreover, Fine (2013, p. 171) has provided an argument following White's (1998) contention that there is a requirement for the democratic developmental state to consider consensus, strong state institutions, participatory democracy, international environment and social structure with social relations, social class and gender.

Additionally, Fine (2013) and White (1998) pre-empt the contention by Williams (2014) that the contemporary or 21st century developmental state must contradict the twentieth century developmental state that was shaped by fossil fuel and carbon intensive industries which were ecologically detrimental. In his book, *Twentieth-Century South Africa. A developmental history,* Bill Freund (2019) contends that the basis of South Africa's developmental state from the 1920s to 1940s was embedded in the building of its energy industry concentrated in coal-intensive operators like ESCOM, SASOL and the state's steel company ISCOR.

These high carbon emission developmental institutions were the basic unit of South Africa's economy, now characterised as the 'mineral-energy complex'. Fine (2013) argues that South Africa's developmental state had sprung up around its fossil fuel mining history and can be traced back to the advent of mining in the 1870s. The state has since been central in leading South Africa's development in the twentieth century by monopolising the energy and steel industrial institutions. South Africa's developmental phase from the 1920s to the 1940s was supported by the Mineral Energy Complex.

According to Mkandawire (2001), the developmental state may take two routes: ideological and structural. In terms of ideological, this embraces the mission of enhancing the rates of accumulation and industrialisation. By and large, Mkandawire (2001) places a disclaimer that developmental states must not be only based on economic performance as it is likely to render the idea meaningless. Instead, the spirit of a developmental state must be based on building sustainable and steadfast economic growth to provide transformation in the productive system – both domestically and internationally (Mkandawire, 2001).

Mkandawire (2001) further argues that the developmental state needs to be consistent with a democratic system and he has emphasised that the lack of a coherent ideological approach on development as a nationalist project can be attributed to the failure of that particular developmental state. Moreover, he has noted that that the lack of an ideology for development is the reason for the cultural rejection of development by African leaders and their followers (2001, p. 295). By the same token, the World Bank capitalises on the lack of an ideological approach in African countries for the developmental state through its Economic Development Institute which has trained senior African government officials (United Nations Institute for Development and Economic Planning, IDEP) as policymakers in non-interventionist, neo-liberal approaches (Mkandawire, 2014). This, therefore, implies that African countries must produce their own epistemological understanding and relevant institutions which will train the policymakers to reflect on their distinct economic and ecological peculiarities.

However, according to Meckling (2018), industrial policy under the developmental state can be used as a tool for climate crisis mitigation and for taking developmental

route. This can occur when the industrial policy alters the economic composition of its fossil fuel sectors to enable for paradigm shifts in the politics of directive or regulation. Furthermore, in terms of carbon energy, the developmental state can become a counterbalance to political forces by establishing rational authority in state institutions to discipline the carbon-intensive firms. In this regard, the developmental state must provide subsidies to the manufacturers and consumers of clean technologies.

The section on the developmental state will be inadequate for this research without concentrating on the energy industry under capitalist mode of production. Since 1870s the South African energy industry has been transforming under unique developmental circumstances from the coal industry to oil, and now there is the prospect of factoring in renewable energy.

2.4 Fossil Fuel Development

One emphasis of the developmental state, then, is to address the negative consequences of this sort of capitalist mode of production: unemployment, poverty, and inequality. Engels (1848) historically claimed that capitalism intends to revolutionise its production to boost its productivity. This entails that the capitalist mode of production always develops itself to adapt to the constant changes in society. Moreover, Satgar (2017, p. 55) has more recently shown that the capitalist mode of production transformation over 500 years (in this case, mercantile accumulation which took place from the 1400s until 1800s in the West) was followed by the monopoly industrial accumulation, which occurred from the 1750s to 1980s; and the

contemporary techno-financial accumulation, which began globally from 1973 and has lasted until the present.

Foster (2018) has argued that capitalism has always had an opportunistic relationship with nature. In his paper 'Marx, value, and nature' Foster (2018) uses Marx's abstract to put forward an argument that all human society under the capitalist system rests on the free appropriation from nature, which it is found in material resources and labour. This statement by Foster (2018) highlights the fact that it is in substantial relations and labour. In addition, Foster (2018) contends that humans cannot survive without the appropriation of nature and production. Foster's (2018) assertion, therefore, agrees with the Anthropocene argument that attributes environmental degradation to human action. However, Foster's (2018) argument also diverges from the same Anthropocene argument by arguing that people have a mutual relationship with nature because human nature appropriates from nature and reproduces from nature.

Altvater (2006) has described fossil energy as "a thick energy source". As earlier argued by Satgar (2017, p. 55) that capitalism depends on accumulation, Altvater (2006) adds that the capitalist mode of production is premised on the consumption of limited fossil fuel deposits at and at the same time fossil fuel boosts globalisation. Equally, the fossil-fuel regime driven by capitalist forces has been harmful to human nature and the environment because of solar radiation. Furthermore, Altvater (2006) has unequivocally argued that fossil fuels are harmful towards nature, for instance, the 'greenhouse gas effect', ozone layer depletion, loss of biodiversity, deforestation, the disappearance of tropical rain forests, and so on. Foster (2018) also contends that

the capitalist mode of production has expropriated the environment and is therefore at the heart of fossil fuel capitalism because in producing work using fossil fuel energy the atmosphere absorbs greenhouse gases and subsidises the accumulation of the capitalist system.

The conundrum is that while the fossil fuel industry has been at the heart of boosting the foundation of the democratic system in many states, at the same time it can also be attributed to undermining the democracies of other states. Williams (2017) notes that the carbon-intensive sector, particularly the coal and oil industries have has consequences for the democratic system. To generate electricity, the coal industry once had a large number of workers concentrated in the mining areas near industries sourcing coal, who were used in the transportation of coal as well as for distributing coal and generating electricity out of coal. Williams (2017, p. 232) has pointed out that labour unions were established as a consequence of the large number of workers required in the coal industry and this has resulted in making political claims for labour in a democratic system.

Conversely, the shift from coal to oil was accompanied by further consequences for the democratic system. It has been argued that:

> The rise in overt militarism and imperialism at the outset of the 21st century can plausibly be attributed largely to attempts by the dominant interests of the world economy to gain control over diminishing world oil supplies.
> (Foster, 2018)

Foster's (2018) argument, therefore, agrees with the one made by Williams (2017, p. 235) that the 'geopolitics' of oil has subsequently resulted in anti-democratic

tendencies mostly in oil- producing countries such as Venezuela, the Middle-East and several African states. However there are differences in each: the state that depends on coal makes it easier for the workers to organise and mobilise to make their political demands, while the state depending on petroleum companies has fragmented labour power due to the fact that its technology demands less labour. Mitchell (2009) has suggested that oil-flow production involves less workers and the oil pipelines were invented and planned as the way forward for reducing the capacity of humans to interrupt the flow of energy. In addition, the oil transportation uses ports, unlike coal which uses the railways, and it has been argued (Mitchell, 2009) that the oil tankers can leave the ports without workers and this, therefore, phases-out the power of local forces to control sites of energy. However, should a labour protest occurs the oil tankers can be re-routed to transport supplies elsewhere.

2.5 Transition to a Renewable Energy Regime for Global Development

Jacklyn Cock (2007, p. 50) has succinctly highlighted that renewable energy is a source of energy that is clean, affordable and safe. Cardoso Marques et al (2012), however, have pointed out that the renewable energy provides for two advantages insofar as development is concerned. The first advantage being that renewable energy has huge possibility for environmental preservation that is clean. The other advantage is that renewable energy will result in the decarbonisation of some currently installed productive capacity based on the burning of the fossil fuel and, in the short term, this may not be beneficial for economic development.

Newell and Mulvaney's (2008) paper 'The political economy of the "just transition' trace the history of the concept 'just transition'. These researchers argue that the concept was developed in the 1980s by the US trade union movement in response to a new emerging tendency of regulations to prevent air and water pollution, which had led to the closure of industries considered to be the cause. Furthermore, the social movements in Britain, particularly the Trade Union Congress, have consistently campaigned for fossil fuel industries to restructure to low carbon. Whereas South African trade unions, such as National Union of Metalworkers (NUM), while consistently campaigning for the shift to low carbon industrial development have also voiced a sense of anxiety about the social impact of restructuring one of the world's most carbon-intensive economies. For them, renewable energy brings an adaptation towards climate change which could be detrimental to jobs in society. Williams (2018, p. 241) has alluded to the fact that coal will remain the "primary energy source" because coal continues to have a crucial role in the space around the power of labour and the democracy. However, Williams (2018 p. 241) also contends that it is necessary to have an alternative energy in the mix which will be socially owned and particularly suitable: like renewable energy.

Stephens (2019, p. 4) contends that renewable energy has the possibility of strengthening the construction of the developmental state. For him renewable energy can provide both a direct benefit for mitigation towards the climate crisis and also intensify the democratisation process in which the communities, labour, state, and capital can be involved in the ownership of renewable energy. In these notions, therefore, it is becoming increasingly clear that renewable energy quickens the transformative potential of moving away from fossil fuel reliance.

Hein Marais (2018) provides a different argument from Ashley's (2018) that of creating climate jobs as a way of exercising hegemony over the society to buy into the idea of mitigating the climate crisis. Marais (2018) contends that the universal basic income grant can facilitate the process of transition from coal-intensive to renewable energy. Climate change mitigation will affect the status quo of current employment and will undoubtedly result in significant disruption the oil, gas, and petroleum industries.

Of course, some trade unions in South Africa such as National Union of Mine workers have been sceptical about just transition and shedding jobs in the coal mines. However, Newell and Mulvaney (2012, p. 3) contend that just transition intends to take appropriate steps to protect jobs in carbon-intensive industries. Amongst the measures envisaged for unavoidable job loss, are adequate support for the sectors affected by decarbonisation through compensation and retraining for many new employment opportunities.

Some scholars have proposed that the state has the responsibility of building a social and ecological just transition society. Newell and Mulvaney (2012, p. 2) have postulated that government has a steering and enabling role in the degree of support it gives to those affected by access to clean energy. It needs to intervene in the competing powerful interests at centre of renewable energy production in a sustained effort to transition to less carbon-energy consumption.

However, Newell and Mulvaney (2012, p. 2) have also pointed out that in academic circles the term ‘just transition’ is derived from ‘socio-technical transition’ in the

literature. They further contend that the term ‘socio-technical transition’ refers to “deep structural changes in systems, such as energy that involve long-term and complex reconfigurations of landscapes with technology, policy, infrastructure, scientific knowledge, and social and cultural practices towards sustainable ends” (2019, p. 2).

Finally, Stephens (2019, p. 4) has presented another interesting argument: for a just transition to take place it is necessary to have a need for resisting fuel-based energy system – this resistance includes resisting fossil fuel-based technologies and other institutional and cultural norms. In addition, Stephens (2019, p 4) contends that resistance methods against fossil capitalism include efforts to delegitimize the fossil fuel industry and stop investments in infrastructure that continues to rely on fossil fuel. In this case, Stephens (2019, p. 4) proposes a radical method of resistance towards fossil fuel capitalism; namely, to allow a just transition process.

2.6 Conclusion

This literature review unpacks the term ‘development’ and how the concept has been contested. The Modernisation Theory has analysed development according to the country’s social formation premised on a five-stage scheme. This review has shown how development, led by the state, emerged in East Asia by defying the expectation of the dominant theories of development at the time. However, the East Asian development states promote fossil fuel-led development and this is, therefore, currently blind to the ecological implications.

The review also shows how fossil fuel has been central to the development of capitalism by supporting productivity. In addition, the literature also shows the

proposed systematic pathways of 21st century development in a developmental state which promotes renewable energy. For example, Uruguay's development is based on renewable energy instead of fossil-fuel, and currently 90% of their electricity is generated from renewable energy. Uruguay's renewable energy regime has been led by a democratic government at national level as the government played an important role in transition from carbon intensive energy to renewable by investing 3% of its annual GDP in renewable energy development.

3. CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter outlines the post-apartheid approach to renewable energy in South Africa. Davis (2014, p.14) argues that the intention of research is to determine the approach and applied methodology. It may be worth noting that the South African State's approach to energy and their budding contribution to global climate justice by the reduction of greenhouses gas is linked to the policies and governance of diverse state departments. An examination of these policy documents and their proposals is made in this study by using a qualitative research approach rather than a quantitative analysis method to gather data.

3.2 The Research Design

The distinction between qualitative and quantitative research approaches have been broadly discussed in the literature. It has been noted that a qualitative research technique:

> is not concerned with numerical representatively, but with the deepening of understanding of a given problem. The objective of the qualitative research is to produce in-depth and illustrative information in order to understand the various dimensions of the problem under analysis.
> (Queiros, Faria & Almeida 2017, p. 370).

The above authors go on to argue that qualitative research focuses on the meanings, motives, aspirations, beliefs, values and attitudes, which correspond to a deeper

space of relationships, processes and phenomena that cannot be reduced to the operationalisation of variables (Queiros, Faria & Almeida, 2017, p. 370). The main disadvantage of qualitative research approaches is that their findings are not generalisable to the entire population "with the same degree of certainty that quantitative analyses can" (Atieno, 2009, p.17). Conversely, quantitative research method focuses on the gathering of data that can be quantified and generalised to the traits of the wider population (Queiros, Faria & Almeida, 2017) It is also less time-consuming because it uses statistical software packages to analyse data. However, Queiros, Faria and Almeida, (2017, p. 370) have argued that qualitative research "focuses on objectivity and is especially appropriate when there is the possibility of collecting quantifiable measures and variables and inferences from samples of a population". The qualitative research method, therefore, is an appropriate instrument to study the state's policy towards renewable energy in South Africa. Therefore, the point of departure for the choice of qualitative research is that the method is appropriate to answer the research question that requires an exploration of variety, experience and perception rather than a quantification.

Furthermore, the qualitative research concentrates on the insider standpoint and gives an in-depth description and understanding of the various departmental energy policies. The qualitative research method assists in gathering thorough details of vast information on the state approaches to energy as opposed to the quantitative method which relies on substitution on the grounds of large sample size. A qualitative research approach then, is more useful in this study to examine the natural setting and offer a holistic understanding of all South African energy policies.

The qualitative research techniques used in this research included document analyses to gather data from four departments that have established renewable energy and its power relations as the drivers of the green developmental state. The following entities chosen on the basis of their policies are:

- The Department of Trade, Industry and Economic Development;
- The Department of Energy and Mineral Resources;
- The Department of Environmental Affairs and Fisheries; and
- The National Treasury.

3.3 Documentary Analyses

As previously mentioned, the documents analysed for this study were valuable research instruments to gather the data in terms of "[q]ualitative document analysis or review of document" (Greenstein, Roberts & Sitas, 2003, p. 65). However, Silvar (2012, p. 140) also contends that the disadvantage of using document analysis as a research tool is that it is not universally recognised. Other researchers have defined documentary analysis as:

> [T]he systematic procedure for reviewing or evaluating documents both printed and electronic material. Like other analytical methods in qualitative research document analysis [it] requires that the data be examined and interpreted in order to elicit meaning, gain understanding and develop empirical knowledge.
> (Bowen, 2009, p. 27).

Since documentary analysis relies on collecting and analysing documents this research also involved a comprehensive examination of documents and reports from the Parliamentary Portfolio Committee of Energy. Other documents closely reviewed were sourced via the websites of the four entities above (Department of Energy and

Mineral Resources; Department of Trade, Industry and Economic Development; and National Treasury). Strategic documents were also sourced from the National Archives of South Africa at Pretoria. All the policy documents analysed are shown in Table 3.1 below.

Table 3.1 The strategic policy documents examined in this study

Departments	Policy Documents
National Planning Commission	1. National Development Plan 2011
Department of Energy and Mineral Resources	1. Integrated Resource Plan (2011/2018/2019) 2. 1998 White Paper on Energy Policy. 3. Mineral Petroleum Resource Development Act 2002. 4. Renewable Energy Policy (2003) 5. Integrated National Electrification Programme (2012)
Department of Trade, Industry and Economic Development	1. Industrial Policy Action Plan Action (2010/2018)
Department of Environmental Affairs, Forestry and Fisheries	1. National Climate Change Response White Paper (2011) 2. National Climate Change Response Strategy (2004)
National Treasury	1. Carbon Tax (2019)

The Parliamentary Monitoring Group (PMG) was also used to access several parliamentary bills and records. These were accessed in the minutes of the Energy Portfolio Committee meetings of state departments in relation to energy policy. They were as follows:

- Electricity Regulation Amendment Bill, 2006.
- National Energy Bill, 2008.
- Electricity Regulation Act 4 of 2006.

- Energy Regulation Act of 2006.
- Carbon Tax Bill discussion.
- Carbon Tax Draft Bill 2019

The purpose of this study's literature review, however, is to trace the development strategies of the 20th century based on the fossil fuel capitalism and carbon-intensive energy policy within South Africa as well as in the international context. The review of the literature enhances an understanding of the historical context of South African society that has undergone political transformation from apartheid to democracy. The study's focus is on the concepts of developmentalism of the 20th and 21st century that included the developmental state, modernisation, dependency theory, and just transition.

4. CHAPTER 4: SOUTH AFRICA'S COAL, GAS AND NUCLEAR ENERGY SYSTEMS

4.1 The Start of the Global Energy System

This chapter discusses the periods before, during and after the Industrial Revolution and covers the manifestation of the energy system as a major driver of a series of industrial revolutions around the world. The suggestion that society is not static, but always undergoes a constant transformation to improve the productive forces was made in the Communist Manifesto (1848) as follows: "Meantime the markets kept ever growing, the demand ever rising. Even manufacturers no longer sufficed. Thereupon, steam and machinery revolutionised industrial production" (Marx and Engels 1848 translated in 2009, p 39).

In pre-industrial times, before the discovery of coal, Europeans had used wood to generate energy, which was then an abundant resource, and therefore, by being plentiful it was not incentivising to mine coal (Miller, 2005). Coal was used as a domestic heating fuel in some parts of the Roman Empire, particularly Britain around 1700s (Landels, 1978, p. 32). However, coal was not as easily accessible as wood, which was still mainly used to generate energy, since the wood and coal replaced water wheels coal became dominant.

During the expansion of the Roman Empire BC into AD, the Romans were exposed to mining in France and Britain. Although German coal was mined from the 10th century[2]coal was restricted locally and used only on a small scale for domestic

[2] As mentioned, the 1025 Charter of the French Priory of St Sauveuren-Rue (Schobert, 1987)

purposes (Miller, 2005) at that time. Consequently, coal had to be rediscovered in Europe in the Middle Ages. However, it was not until about the 13^{h} century that the industrial use of coal was established in Europe (Miller, 2005). Coal particularly became perceived as good fuel for iron forges and for metalworking by the village blacksmiths for its slow burning properties, similar to charcoal. The commercialisation of coal[2[2]] started when it was marketed in Europe at a more reasonable price than charcoal.

In the 1700s, the invention of the steam engine helped Britain to technologically improve textile and metallurgical manufacturing with steam power: the steam engine was based on coal. This set in motion what is now referred to as the 'First Industrial Revolution' which dates from 1750 – 1850 in Britain. Findlay and O'Rourke (2007, p. 321) have argued that European society before the industrial revolution had relied on organic sources of energy such as human power, wood, and animal (horse)power.

They further note that in pre-industrial revolution times, society was therefore dependent on the fertility of the earth's surface: particularly the forests from which the wood was taken. Another source of energy relied on the vagaries of wind and waterpower that were directly linked to time and place. In the Eighteenth Century, however, Britain started to run out of forests, but as coal availability was in abundance the new technologies allowed it to tap for the "first time in a prolonged and systematic way the vast reserves of subterranean fossil fuels that the world has been drawing on ever since to sustain its continuous growth of population and production" (Findlay & O'Rourke, 2007, p. 321).

[2[2]] The World Coal Institute (2010) in its report 'The coal resource. A comprehensive overview of coal' defines coal as a fossil fuel. As a combustible, sedimentary and organic rock.

In the first industrial revolution, therefore, Belgium, England and France became significant coal mining centres (Miller, 2005). Initially, the coal was used close to the areas where it was mined. Miller (2005) makes the argument that since coal was commonly mined in bulk it required high transportation costs. Under the rise of a capitalist society people had to move to the cities because those controlling the means of production wanted their labour force to be located near mines and factories. However, when wood became scarce (mostly in cities) coal became an alternative means for generating energy.

Later in this first industrial revolution, it was discovered that coal could also generate a gas. In other words, coal was not only limited to fuel combustion but could be used to generate gas as another source of energy. Consequently, a manufacturing gas industry was established to use the power of coal gas (Miller, 2005). In 1810, the British government legislated an Act of Parliament to encourage the formation of industries to supply coal gas to London (Miller, 2005 citing Elliot, 1981). This Act was meant to regulate the gas industry in London and ushered in support to the gas industries for the production of gas as a supplementary energy source from the coal industry.

Malm (2013, p. 6) explains that Britain was the first economic system to be driven by the development of the capitalist mode of production and this type of production spread to other “advanced capitalist countries” in the following decades of the 19th century. The significance of coal is that capitalism in Europe began by being linked to fossil fuel development and it continued to develop as such when Europeans started to convert coal to gas for fuel energy in the transport and textile industries.

Since the first industrial revolution is intrinsically related to the use of coal, the spread of industrial manufacturing techniques from England to Germany, and later to France and the United States were able to benefit rapidly as they were larger suppliers of coal. Coal, therefore, became the essential energy source in this era of global development.

In the 1800s, most users of the coal in Britain purchased coal for heating homes for instance and also for cooking their meals. Malm (2015, p.18) has asserted that the use of coal for domestic reasons in Britain could have fostered the rise of its fossil economy as coal was used for manufacturing salt, soap, lime, ale, bricks, glass, copper, pottery and other commodities. Globally, coal use expanded from generating shifting from sourcing coal for cooking to the manufacturing sector. This raised coal consumption in the 1800s; particularly when the iron industry in the mid-1800s. Britain iron industry consumes about 10% to 15% of all coal, surpassing the use of coal by domestic household (Nef, 1966). In terms of functionality, therefore, coal has been used in different ways; from producing electricity to petrol. However, converting coal to fuel resulted in the universalization of coal, which raised the coal consumption. Malm (2015, p. 18) characterises the process of turning coal to fuel as source of mechanical energy and '"rotary motion".

By the end of nineteenth century (from 1870-1914) electric power was considered central to the second industrial revolution in Britain. This was defined by the transformation of the chemical industry and internal combustion engine (Rosenberg, 1998, p. 8). In the Second Industrial Revolution, the use of energy expanded as several pioneering industries (the oil, steel and electricity sectors) saw the importance

of increasing their productivity. This second phase of development of new technologies resulted in the establishment of mechanical public transport and airplanes and led to the exit of the horse and cart and steam engine trains.

4.2 The Development of the Coal Energy System in South Africa

Since coal had become an important global commodity it was, therefore, critical for the development of the world's economy. By the end of the first decade of the 21st century coal accounted for about 30% of primary energy globally and 40% of global electricity production (Schernikau, 2010, p. 3). Consequently, South Africa's industrial development and modes of production were first organised around energy production sourced from coal. South Africa's economy has been dependent for decades on coal energy, and therefore coal's development has been central to the country's development.

The coal industry in South Africa has its origin in the late 19th century, initially inland in the colony of Natal where rail connections linked mines to Durban and to the Witwatersrand area. Freund (2019, p. 179) notes that coal was important for fueling trains and ships. In addition, coal was intrinsically linked to the mining sector, as electrification was necessary for the big mining corporations. By 1948, the gold mines were using 59% of the electricity produced in South Africa (Freund, 2019, p. 177). In 1973, several decades later, the demand for coal increased after global oil price rose overnight. In this case, the 1973 Oil crisis led to high demand of a coal, however, there was a concern of price fixing in the coal industry however, the regulation of coal price

was put into place to avoid price fixing scheme. (Freund, 2019, p. 178) The termination of price fixing for coal was set up by stages with the Coal Resource Act of 1985.

Up to 94% of South Africa's energy source has been generated through the combustion of coal in the past over decades.Currently, South Africa's coal resource holders are Coal of Africa, South 32, Firestone Energy, Anglo American, Exxaro, and Glencore (Schernikau, 2016, p 134). The large coal reserves are found in the Waterburg district of Limpopo and also in Mpumalanga. Until recently, Europe was the main consumer of South Africa's coal; however, this began to change when Asia's demand for coal (Schernikau, 2016, p. 134). In 2006, coal exports to Europe accounted for about 75% or 50 million tons of South Africa's total exports in comparison to about 30% in 2015 (Schernikau, 2016; 134).

Currently, the development of the energy system in South Africa is complex and multifaceted. Coal is used for electricity production and has played critical role as fuel in the country's steel and cement production. In 2010, a report from the World Coal Institute (2010) stated that coal was then a rapidly growing energy source compared to gas, oil, nuclear, hydro-energy and renewable energy. To date, coal in South Africa continues to be the dominant energy source up to the third decade of the 21st century. However, it has been suggested in a discussion document 'Energy Accounts for South Africa 2002 – 2009' that the South African energy sector would remain dominated by coal as a key resource only until 2020.

In terms of South Africa's experience, the Iron and Steel Corporation of South Africa (ISCOR) was established in 1928 and started operating at Pretoria in 1934. In due course, ISCOR consumed larger quantities of coal, hence, ISCOR established its own coal mines such as Grootgeluk mine, which also produced coal for ESKOM and supplied 3 990 MW Matimba power station; Matimba is the largest dry-cooled power station in the world. Williams (2018) (cited in Fine and Zavareh Rustomjee 1996) has made the argument that South Africa's mineral resources; namely, gold, diamonds, coal and the steel industry have shaped South Africa's economy for the past 140 years. In such a 'mineral energy mix', coal has been the predominate mineral resource that has shaped South Africa's economy and social structure.

In 1878, the discovery of the Vaal River coalfield in South Africa by George Stow (who was a geologist commissioned by the Orange Free State Volksraad to find diamonds and gold) led to exploitation of the first coal deposits in South Africa.[3][3] Stow, nevertheless, was fascinated by the value of the coal. He found further funding from the diamond-mining sector at Kimberley when he met Sammy Marks a "remarkable industrial pioneer" (Freund 2019, p. 50). Marks had become successful in the diamond industry, but when the introduction of water pumps in Kimberley by Cecil John Rhodes in the late 1800s resulted in a rapid demand for fuel in Kimberley, Marks ventured into an association with Stow in 1880 with the intention to exploit coal for energy production. In 1882 they established Bedworth Colliery, which produced 360 tons of coal in the first year and a further 720 tons in 1884.

[3][3] Stow surveyed the northern part of the Orange Free State (Freund, 2019) and although he discovered coal near the junction of the Vaal and the Taaiboschspruit Rivers, the Orange Free State Volksraad terminated further funding of Stow because he failed to discover diamond and gold rather he discovered coal which Orange Free State Volksraad deemed as a useless metal.

In 1880 the Sammy Marks coal company expanded by acquiring two new mines; namely. Cornelia and Central. However, coal production then slowed due to of the outbreak of the First Boer War between 1880 and 1881. In August 1897, Marks incorporated Vereeniging Estates Ltd (VEL) to add to his monopolistic ownership of mines (Freund, 2019). In 1910, VEL signed a contract with Victoria Falls and Transvaal Power Company to supply coal. Many years later in 1950, 60% of Vereeniging Estates Limited was sold directly to the South African Electricity Supply Commission (Escom, now ESKOM). Hence, ESKOM has relied on coal power, since the acquisition of VFPC, to the present.

The coal electricity generation began in 1890 when the Kimberley Municipality commissioned its 300Kw power station (Energy Research Institute, 1980, p. 26). The Victoria Falls Power Company (VFPC) was one of the first companies supplying South Africa with electricity and by 1915 the VFPC had built four power stations dependent on coal.[4][4]

By 1969, South Africa and Japan made a small-scale export coal deal (Marquard 2006, p. 109). It then became essential for coal resources of the Eastern Transvaal (now Mpumalanga Province) to get to Richards Bay. Richards Bay was created as a new port on the Zululand coast (facing east, towards Asia) for the purpose of exporting eastern Transvaal coal. However, by 1975, the shortage of coal in South Africa led to the establishment of the Patrick Commission, (from 1970 to 1975) to devise new forms of regulating coal. The role of then Department of Mines (later Department of Mines

[4][4] VFPC power was meant to be based on a hydroelectric source. This intention was replaced by coal but still limited to hydroelectric facilities which were built in the 1930s.

and Industry) in this Energy Supply Commission became the key factor in changing policy for the country's entire energy sector. In later decades, owing to the depletion of South African gold mines, the country's electricity consumption rapidly shifted to the state-owned entities (SoEs) of ESCOM, SASOL, and ISCOR.

Therefore, under the apartheid government from 1948 to 1994 there was inconsistency of state energy policy (Freund, 2019). At this time, energy planning was supported as the rudimentary solution to the apartheid State's energy policy challenges. Freund (2019) adds that not much happened due to lack of capacity and data – insomuch as the planners met but the plan never happened. Freund (2019, p.181) believes, therefore, that the costly expense of energy and the problems involved in resolving energy policy with the government's conflicting desires "greatly reduced the potential of South Africa's developmental state" (Freund 2019, p.181).

Freund (2019, p.181) further argues that the character of South Africa developmental state is heavily linked to its carbon footprint, and despite the disintegration of the nascent developmental state from the 1970s, the carbon footprint remained. From 1940s onward, and in contention to this argument, however, there were consistent energy policies evidenced by massive expansion of coal stations centralised by ESKOM which pushed other producers (such as local municipalities) out of the energy business. This energy supply was supplemented with coal from SASOL reserves and by nuclear energy from 1950S. Overall, however, the pattern was consistent, as there was extensive multi-year planning which included a special capital projects fund with ESKOM reporting to a single authority in the state.

Williams (2018) has contended, therefore, that coal was a significant mineral in South Africa's developing economy. Using the barometer of value-added to the overall mining output, Williams asserts that its production and value as a commodity outperformed platinum, which ranked second, with gold as third. Williams (2018, p. 241) further contends that coal's value-added rose to 22.5% in 2013 from 17.4%t in 1993, while platinum's value added came in at 21% and gold at 18.5% in 2013 (from 51.1% in 1993). Coal's contribution to the economy rose from R37 billion in 1993 to R51 billion in 2013, whereas gold dropped from R115 billion to R31 billion in the same period (Stats SA 2015) and coal was the third largest export earner.

Besides export, South Africa continues to be dependent on coal production, which is combusted to produce electricity. However, since it has been scientifically proven that burning of coal contributes to causing the climate crisis this has now entailed addressing the challenges caused by the emission from coal fired power plants (Williams 2014, p, 135). As argued earlier, the developmental history of coal internationally and locally has been crucial in carbon intensive energy production. Coal contributed immensely to South Africa's industrialisation. Therefore, it is imperative to consider the history and the importance of coal when conducting the study on South Africa's energy policy. The developmental history of coal can also be linked to the history of nuclear and gas energy.

A discussion of the development of nuclear energy in South Africa is essential as it locates South Africa's government as well as its nuclear energy policy position. While, nuclear energy has been part of South Africa's energy system. However, Freund (2019) has suggested that nuclear energy in South Africa failed to find economic

viability in the context of contributing to the developmental state. Initially, the apartheid government used its nuclear know-how to threaten liberation movements such as ANC with nuclear weapons, consequently there was no nuclear technology development. Then in 1970s the South African government's nuclear energy power plan at Koeberg failed to integrate nuclear energy to the heart of mineral energy complex and, to date, this remains part of South Africa's contemporary nuclear energy discourse.

4.2.1 The development of nuclear energy in South Africa

In the 1950s and 1960s, nuclear energy was the epitome of modernity (Grandin, Jagers & Kullander 2010, p. 26). In those two decades ample energy was assured for many, despite some anxiety about waste and safety which later inhibited the enthusiasm in the decade to follow: the 1970s.

Two disasters halted the building of nuclear energy in many countries: the 1979 disaster at Three Mile Island, Pennsylvania, USA; and the 1986 nuclear power station disaster at Chernobyl, Ukraine, USSR (Grandin et al, 2010, p. 26). Both disasters ignited the issue of safety: in the 1979 disaster at Three Mile Island the nuclear power plant melted and released radiation; whereas the 1986 Chernobyl disaster saw the nuclear power station explode, resulting in about instant 4 000 deaths and the release of a huge radiation plume over Northern Europe (World Health Organisation, 2012). However, while both accidents led to some nuclear plants becoming decommissioned around the world there was less impact in southern Africa. One researcher has pointed out that the response of the South African nuclear industry to the Chernobyl accident was to reassure the "public about the safety of Koeberg" (Fig, 2006, p. 463). The then

government took advantage of the accident to educate South Africans about the severe potential dangers of nuclear energy.

Grandin (2010), however, notes three advantages for nuclear energy:

- it is a reliable base for electricity;
- has high capacity; and
- demands little material for building and fuel for operation.

Grandin (2010) then finds that nuclear energy has a less detrimental impact on the environment.

For South Africa, uranium mineral resources have been significant for the global generation of a nuclear energy source. In 1977, the report released by the Department of Planning and the Environment argued that South Africa had been an essential producer of Uranium since the 1950s, and that the mineral was exported due to a lack of nuclear facilities in South Africa. As a result South Africa became the major exporter of energy in Africa (Department of Planning and the Environment, 1977, p. 79). Fig (2006, p. 467) has revealed that local gold mining firms had a clandestine agreement with the United States and United Kingdom to extract uranium from the gold mines and mine dumps. This export deal to the US and UK lasted for about 10 years and these countries used it to manufacture bombs.

Marquard (2006, p.197) further explains that South Africa became involved in world nuclear affairs after the discovery of its uranium reserves in the 1940s. He describes how various prime ministers in South Africa (initiated by Jan Smuts in the 1940s) used the country's uranium reserves as leverage to advance global nuclear technology

and expertise. Marquard (2006) highlights how Prime Minister Jan Smuts played a significant role in the preliminary round of nuclear diplomacy. After Smuts' death in 1950, an agreement was reached to combine a Development Agency as a cooperative uranium procurement agency established by the United States of America (USA) and United Kingdom to buy all of South Africa's uranium production (Newby-Fraser, 1979, p. 24).

The apartheid government that followed then established the nuclear structure through the notion of the so-called 'nuclear establishment' (Marquard, 2006, p. 198). The term nuclear establishment was used to refer to the collection of state agencies whose main purpose was to develop and endorse nuclear technology in South Africa. The intention of these government nuclear organisations in South Africa was to monitor the uranium exploration as a manufacturing process on behalf of the State. Marquard (2006) has pointed out that from the beginning, this was done through a Uranium Research Committee which was set up in 1948 by the Atomic Energy Board. This board was established in terms of the Atomic Energy Act (35/1948) which stipulated the powers of the board as regulators and supervisors of all features of Uranium production, nuclear energy and nuclear technologies.

In the 1950s, the Atomic Energy Board's functions were extended from regulation into a research programme to investigate numerous facets of nuclear technology. Thereafter, the Uranium Enrichment Corporation (UCOR) was established to split the strategic elements of the nuclear programmes – energy and nuclear technology (Marquard, 2006). The fundamental role of UCOR was also to augment research in building of the "Y-Plant" (Marquard, 2006, p. 199). The Y-Plant was a 1970 pilot project

for the use of extensive technology in South Africa and was then prolonged beyond the 1970s to produce weapons-grade enriched uranium (Hofmänner, 2002, p. 313). In essence, the South African government's intention was to use uranium for weapon exploration rather than for energy generation. However, in the late 1970s, the nuclear programme expanded to produce nuclear fuel for ESKOM's new nuclear plant.

However, ESKOM was involved in a sequence of inquiries in the late 1950s and therefore mandated a series of committees to investigate the viability of producing nuclear power in South Africa from the next decade. This involved ESKOM, the Industrial Development Corporation (IDC), and the nuclear establishment (Marquard, 2006). From 1958, ESKOM was also represented on the Atomic Energy Board (AEB). In 1969 ESKOM developed its independent nuclear engineering division which started to build Koeberg nuclear power station in the 1970s. Marquard (2006) has also alluded to the substantial involvement of the IDC in the 1950s and 1960s for inventions and developing nuclear power in South Africa with ESKOM and AEB.

South Africa's first nuclear power plant, situated in Koeberg north of Cape Town, was begun after the South African government signed a contract with a French consortium in 1976 (Rennkamp & Bhuyan, 2016, p. 3). The construction of the Koeberg power plant was envisioned by the electricity planners of the 1960s, who had identified the need to construct a power station in the Western Cape due to its rapid energy demand (ESKOM, 1996). Koeberg was also aimed at reducing the Western Cape's dependency on the supply of electricity from the ESKOM's coal-fired power stations located in distant Mpumalanga (then E Tvl) Province. Long distance supply lines were inefficient, and a solution was for the government to build

1 800 MW of nuclear capacity at Koeberg. In 1967, the government purchased the Duinefontein site on which the Koeberg plant was to be constructed (Marquard, 2006, p. 94). This site was identified by the AEB because, at the time, Escom (now ESKOM) had no expertise on nuclear energy. However, in June 1967 Escom indicated a desire to be involved in the building project and wrote to the Council which raised concerns over the Nuclear Safety asking for a joint discussion on the building of a nuclear station in the Western Cape (Marquard, 2006, p. 94)

In 1969, Jan Haak, the then Minister of Economic Affairs, had remarked that the government was to embark on a process of building nuclear power plants in the Western Cape, Eastern Cape and Natal (*Financial Mail* 28/3/1969, cited in Marquard, 2006). It was reported that Escom had been excluded from the discussion and headlined as 'Energy for next Century'. Jan Haak's announcement stated that he believed coal was not going to be sustainable. The announcement, clarified in the *Financial Mail* (28/3/1969, cited in Marquard, 2006) reported Haak had said, "Escom needs to build up generating capacity from its present 7 000 MW to 62 000 MW by the turn of the century, and when new power stations are added, they will almost be nuclear" (*Financial Mail*, 28/3/1969 cited in Marquard, 2006).

In 1969, Escom's desire to participate in the building of the nuclear power plant and the proposal by AEB to build an additional generating capacity of 62 000 MW led to an agreement with the AEB concerning the jurisdiction of nuclear power in which Escom would only build and operate nuclear power plants and the AEB would license them to international standards through its innovative division (which developed into the Council for Nuclear Safety) (Newby-Fraser, 1978, p. 128; Marquard, 2006, p. 216).

Escom then proceeded to establish its own Nuclear Power Engineering Division in its Mechanical Engineering Department (Marquard, 2006; 216 citing the Escom Annual Report, 1969, p. 64).

In 1976, Escom's contract was signed with a French Consortium to build the Koeberg power plant in May 1974, when Valery Giscard d'Estaing was elected as the president of France (Van Vuuren, 2017). At the time, the apartheid government, fearing an imminent trade embargo, gave the French private sector consortium of Framatome-Spie Batignolles-Alsthom a lucrative $1 billion contract to build South Africa's nuclear power station at Koeberg (Van Vuuren, 2017, p. 229)

Early in 1980s, the construction was delayed due to sabotage by ANC underground guerrillas (Marquard, 2006). The political liberation forces of the ANC had argued that the building of the nuclear power plant would have a severe environmental impact and that South Africa was not economically viable for nuclear power, given that the deal included an R800 million export credit agreement with a French bank (Financial Mail, 17/12/1976, cited in Marquard, 2006). It is worth noting here, that at that time, South Africa's apartheid government did not intend to opt for nuclear energy as an alternative to the generation of coal-intensive energy due to environmental detriments, but because of the presumption that coal would run-out and as a consideration of energy security for the Western Cape.

According to Freund (2019, p. 176) uranium extraction lacked a developmental ethos in South Africa and instead was regarded as an expensive folly. Therefore, the SA reserves of uranium did not lead to building the developmental state in South Africa,

and did not contribute to functions that could work effectively in the global economy. Freund (2019) has further stressed that South Africa had mixed success as a development state: it managed to break reliance on raw materials via massive industrialisation; yet was not a globally competitive manufacturer and so, perversely, relied on raw material exports for forex rather than the manufacture.

However, Freund (2019) believes that some concrete success in making technology made South Africa a good trading partner, rather than just a customer for very expensive material. In the same breath, Freund (2019, p. 176, cited in Marquard 2006, p. 210) states that nuclear power had the potential to become the heart of the mineral-energy complex had it been more economic, but adds that there was probably no sense of "departure from the defining core complex itself" which is the coal (2019, p. 176).

Since the construction of Koeberg, the South African government had not considered constructing another nuclear power plant until 2010. In 2010, the former government of President Zuma recommended an energy plan that nuclear energy should represent 13% of South Africa's energy mix by 2030. However, to achieve this, the country would need to budget R1 trillion for eight new nuclear plants (Hofstatter, 2018, p. 42). This received numerous critiques in 2016 as the National Treasurer questioned the building of nuclear energy which would add 9 600 megawatts to the power grid at a time when ESKOM had already spent over R300 billion on two new mega coal power stations.

The next section critically discusses the history of gas energy in South Africa. Gas has been used to supplement coal and nuclear energy production.

4.2.2 The Development of Gas Energy in South Africa

The Development Bank of South Africa (2016) has referred to natural gas as a ‘combustible gas’ which is formulated with methane along with different quantities of other high alkanes, ethane, propane and butane, nitrogen, hydrogen sulphide, and carbon dioxide. The formation of a gas varies; however, organic matter is converted to form natural gas in broadly the same ways that other fossil fuels (namely, oil and coal) are formed; great heat and compression break down the carbon bonds in organic material over time through a thermogenic process to create fossil fuel (Merven, 2017). The advantage of natural gas, however, is that it causes minimal damage to the environment due to its “superior environmental performance” (Department of Mineral Resources (DMR) 2005, p. 5). Therefore, gas has increasingly become a fuel option for modern energy usage.

Gas is linked to the thermogenic process to create fossil fuels, as gas is linked with oil; although oil is in the shallow deposit, whereas gas is found to be in a deeper deposit (Merven, 2017). Natural gas can also be produced by biogenic methane and the biogenic methane is produced by methanogenic microorganisms found in the intestines and in landfills (Miller, 2005). In other words, this is one of the ways of generating natural gas. For instance, the eThekwini landfill gas to electricity project was the first such application in South Africa.

In terms of the history of piped gas, around 500 BC the Chinese began to use crude bamboo ‘pipelines’ to transport gas that seeped to the surface and this gas was used to boil sea water to get drinkable water. In 1897, the Cape Gas and Coke company in

Cape Town introduced gas to South Africa (DMR, 2005). Other gas plants followed in Port Elizabeth, Kimberley, Grahamstown and eventually in Johannesburg in 1892.

According to Daniel and Lutchman (2006, p. 492) the oil industry comprises three main components:

- upstream activities which include exploration and production;
- the midstream process in the form of pipelines and the tanker farms; and
- the downstream function, which comprises refining and retailing.

It is generally understood, that South Africa's energy sector is made up of four fuel components – oil, natural gas, electricity (nuclear and non-nuclear generated), and petroleum. However, Daniel and Lutchman (2006, p. 500) assert that the later acquisition of natural gas for processing into liquid fuels is another significant component of South Africa's energy strategy. South Africa generates downstream gas through producing synthetic or bituminous oil from coal rather than from crude oil (Daniel & Lutchman, 2006).

However, as South Africa's natural gas has been limited historically it has also played a very limited role in South Africa's economy (Merven, 2017, p. 13). The construction of the pipeline from Mozambique in the early 2000s was therefore vital for South Africa's energy industry, as South Africa's only natural gas resource was solely located on the offshore field south of Mossel Bay. The construction of the Mozambique-South Africa pipeline was meant to explore the production of liquid fuel. South Africa has only limited supplies of synthetic gas from its South African Oil Liquid (SASOL) power

plants (Secunda and Sasolburg power plants) where SASOL's synthetic gas is the by-product of the coal-to-liquid process (Merven, 2017).

4.2.3 History of SASOL, PetroSA and Egoli as the 'wedge' of gas energy

South Africa's SASOL company was commissioned in 1950 as a state-owned corporation and began its liquid fuel production in 1955 (Freund, 2019, p. 65). Freund (2019) explains that by 1948, the Smuts government had built the institutional foundation for a developmental state and SASOL was then instrumental in building the National Party's developmental state. However, according to Sparks (2012, p. 31) the formation of SASOL was due the pressure that the apartheid government received from the international community. For him, the SASOL process ensured that the apartheid government survived the international oil boycott. However. Freund (2019) argues that SASOL was formed well before South Africa faced any significant international boycott Hence, in later years, it was certainly seen as strategic in this sense, but much of the initial impetus was to build a local chemical industry by, essentially, processing coal.

Today, SASOL produces synthetic gas sourced from coal, and then liquid fuels and chemicals from gas (Sparks, 2012). SASOL then sells the gas they extract as pipeline gas, either hydrogen-rich gas or methane-rich gas. However, gas remains limited in the economy and its increased demand can presently be sourced from the potential gas fields offshore the West and East coasts, within South African territorial waters

(Merven,, 2017, p. 13). Daniel and Lutchman (2006, p. 500) regard SASOL as the world's leading it is oil from coal processing company with pipeline gas as a by-product and one of South Africa's natural gas ventures.

Furthermore, in 2004 the South African government, through SASOL, formed a joint venture with the Mozambican government to build an 865 km gas pipeline for the supply of the natural gas from the Pande and Temane onshore fields in Mozambique to SASOL's plant in Secunda (DoE, 2005). The aim of this gas pipeline is to pump about 120 million gigajoules a year of a gas to contribute to the South African natural gas energy supply (an increase from 1.5% to about 4% .

Two other companies have played significant roles in South Africa's history of gas: Metro Gas (now renamed Egoli Gas), and PetroSA, (previously known as Mossgas and Soekor).

Metro Gas has been distributing gas in Johannesburg since 1905 (DMR, 2005), whereas, PetroSA was formed in 2002 (by merging Mossgas and Soekor). PetroSA, now a state-owned company, was established through the Central Energy Fund (CEF) in 1992 (DMR, 2005; Marquard, 2006) after the merge with Mossgas (which had started off-shore gas-mining operations in the 1980s as an attempt to generate electricity from gas.[5][5]

In 1950s the Central Energy Fund was created to develop energy policy, in fact was supposed to assist the implementation of renewable energy via its operational support.

[5][5] In 1992, the gas-to-liquids production had begun, but the off-shore gas mining of what became Mossgas started in the 1980s.

Their initial task was to table the *White Paper on Energy Policy* (White Paper Renewable Energy, 2003; p 8).which was approved in 1998. Then the CEF reported directly to the Minister of Minerals and Energy. The CEF was tasked to deal directly with regulation and production of the entire energy industry which includes: nuclear energy, petroleum products, natural gas and electricity, sourcing of gas and generating liquid fuel.

The CEF developed the second policy preposition or White paper which was central to the renewable energy and approved by the cabinet (Daniel & Lutchman, 2006, p. 495). The mandate of the CEF is broad as it includes acquisition, exploration, generation, manufacturing, marketing, and distribution of any energy form and boosting of research related to energy. In pursuit of its mandate it formed the PetroSA to engage in the exploration and production of crude oil and harnessing of the natural gas.

As mentioned above, PetroSA was the result of a merger and a remake of two apartheid state gas firms, Mossgas and Soekor (Daniel & Lutchman, 2006, p. 495). The CEF also established the Petroleum Agency of South Africa whose primary role was to boost the exploration and exploitation of crude oil and natural gas (Daniel & Lutchman, 2006). The natural gas produced in Mossel Bay area was to be used as the feedstock for the PetroSA synthetic liquid fuels plant. In 2001, the government legislated the Gas Act with the following aims;

- To promote the orderly development of the piped gas industry;
- To establish a national regulatory framework;

- To establish a National Gas Regulator as the custodian and enforcer of the national regulatory framework; and
- To provide for matters connected therewith.

To date, coal has continued to be the most used fuel for energy production in South Africa. It is significant to note that the sourcing of energy from nuclear and natural gas was not in mitigation of the climate crisis, but rather the shift to oil and natural gas has been due to the high prices of oil and natural gas which has warranted coal to be established as dominant source of electricity generation.

However, in the 1970s, the United Nations World Meteorological Organisation (WMO) made a critical assessment to link CO_2 and climate change. This necessitated the WMO to establish the Intergovernmental Panel on Climate Change (IPCC). The IPCC has since converged global knowledge and political discourse on climate change (Guerrero, 2018, p. 35). The Third Assessment Report of the IPCC differentiates between climate and non-climate policies (Morita & Robison 2001; Winkler, 2009). However, a shortcoming of the IPCC's discussion of climate change is that an anthropocentric position is taken by attributing the large quantity of emissions produced by humans to societal material conditions of middle class and elites lifestyles in an emerging countries such as South Africa, Brazil, India and China as well as global north. instead of transnational capitalism through multi-national corporations.

Following the premise of the Copenhagen Accord, South Africa undertook to put Nationally Appropriate Mitigation Actions (NAMAs) in place to guarantee the reduction of Greenhouse Gas (GHG) emissions that diverge from its strategy of sustainable

development; namely, 34% by 2020 and 42% by 2025 (Boyd, 2014. p. 1). These climate policies, therefore, carry GHG emission mitigation as its primary goal, whereas non-climate change policies do not intend to lower Greenhouse Gases. Winkler (2009) contends that non-climate change policies, however, reduce emission. For instance, he has pointed out that sustainable development policies aimed at energy efficiency in a low-cost housing project may be inspired by sustainable development. In other words, non-climate change policies have ways of reducing the emissions compared to the baseline (Winkler 2009, p. 27). In the same vein, Winkler (2009) argues that a clear differentiation between climate change policies and non-climate policies is not always possible – as many policies have multiple aspirations.

4.3 Conclusion

This chapter highlights the history of coal, gas and nuclear energy development in South Africa in an attempt to discuss the historical development of South Africa's dominant source of energy. Since coal is central to South Africa's energy system and economic structure, industrialisation has been based on the premise of burning of fossil fuel both globally and in South Africa. South Africa uses a large quantity of coal in generating electricity. Most of this electricity generated returns back to industrial firms such as coal sector and gold to generate more coal. This process has resulted in South Africa's economic system being characterised as a Mineral-Energy Complex. This chapter suggests that the South African government has failed to shift as radically as it should have from the structure of the Mineral Energy Complex.

The historical development of nuclear and gas energy is also discussed in this chapter. It argues that South Africa has failed to take advantage of its own uranium mineral

resources to build a developmental state. Owing to the lack of technologies and expertise in uranium usage for nuclear energy, therefore, South Africa's nuclear energy has not contributed significantly to its energy system. Natural gas contributes the least to the energy system of South Africa, however, the country continues to expend its natural gas production to generate electricity.

5. CHAPTER 5: CONTRADICTIONS BETWEEN DIFFERENT STATE DEPARTMENT DOCUMENTS

5.1 Introduction

For South Africa to prosper, to build on all its citizens' skills and talents and provide hope for the vast of majority of its people, some vital and hard choices need to be made. A new direction is essential if the country is to move out of what is now increasingly a situation of policy paralysis and decline (Ann Bernstein, 2014, p. 21)

Ann Bernstein (2014) has aptly revealed South Africa's current socio-economic situation by the above suggestion that if South Africa wants to address socio-economic challenges, government needs to discard its policy paralysis. Kohli (2014) refers to policy paralysis as "government failure in timely project clearances, mostly related to infrastructure and stalled on land acquisition, environment and forest right issues". Dealing with government policy contradictions will necessitate showing South Africa's policy position insofar as energy policy is concerned. South Africa is confronted with the global climate crisis which requires government to impose its own adaptation and mitigation methods through its intervention policies for climate justice. However, the challenge is that South Africa's energy policy is contested amongst different departments, social movements and activists. This chapter examines these contradictions and their impact is outlined.

In this respect, the governing African National Congress party established the National Planning Commission (NPC) in 2010 with the intention of monitoring and driving the country's development strategy and policy. Another function of the NPC is to

coordinate the long-term development strategy and policy various departments. This chapter, therefore, discusses the input of policies from:

- Department of Energy and Mineral Resources with its Integrated Resource Plan (2010).
- Department of Trade, Industry and Economic Development and its Industrial Policy Action Plan (2019).
- Department of Environment, Forestry and Fisheries with its National Climate Change Response White Paper (2011) and its National Climate Change Response Strategy (2004).
- National Treasury and the Carbon Tax policy.
- National Planning Commission with its National Development Plan (2011).

In the new millennium South Africa's development policies, particularly energy policy, needs to be reflective of the world's climate change in the shortest possible timeframe. The global response to climate change is due to the impact of Greenhouse gases released by countries all over the world (significantly, the impact of GHG emissions does not depend on which country or region emitted more CO_2 as the consequences effect every country globally). Fine and Witt (2010) note that the international literature suggests that economic development under a capitalist mode of production will be affected by any transformation in the energy usage (particularly as rapid shift from a high carbon intensive to low carbon intensive energy strategy is needed in all countries across the world). Significantly, therefore, South Africa's energy policy cannot be delinked from the global response to climate change. However, Winkler (2009) has conceded that the United Nations Framework Convention on Climate

Change (UNFCC, 1992) and the Kyoto Protocol (UNFCC, 1997) pushed emission targets to the fore only for fully industrialised countries.

However, Winkler (2009) identifies the challenge of the multilateral framework on Climate Change and the Kyoto Protocol to be that climate change does not only confront industrialised countries, but it is also a world issue that requires participation by all countries. Here, Winkler (2009) believes that energy policies can both endorse local sustainable development and lower greenhouse gases which can then constitute a major contribution to climate change mitigation.

In addition, Winkler (2018, p. 7) acknowledges the fact that South Africa is confronted with poverty and inequality which might impede any efforts to address the climate crisis. Winkler (2018, p. 7) suggests, therefore, that there is a need for a new social contract (such as a just transition) which must acknowledge that the poor need alleviation from poverty, which can be done with little impact on carbon emissions.

Hence, under the UNFCC (1992) and its Kyoto Protocol (UNFCC, 1997) the persuasive argument for industrialised countries emerged that to target the reduction of their Green House Gases emissions it must assist developing countries by funding mitigation development initiatives. Agarwal and Narain (1991) have concurred with UNFCC argument that developing countries had only a qualitative obligation to implement mitigation development strategies on the basis that it should not limit their development. This argument arises from the contention that GHGs are largely emitted by the industrialised countries.

Therefore, the realisation for the developing countries that convened in Bali in 2007, was that they have to fully participate in addressing the climate crisis. They agreed to negotiate “measurable, reportable and verifiable” mitigation actions (Winkler, 2009, p. 16 citing UNFCCC, 2007). For developing countries such as South Africa, this meant a change in their original focus in development: that ways can be sought to generate energy production in South Africa in a sustainable way (as suggested by Winkler, 2009) without losing a sight of development.

The Bali Action Plan emphasised that quantifiable mitigation in developing countries must be “nationally appropriate” and that it should happen in the “context of sustainable development”. This included the transfer of technology and finance from developed countries (Winkler, 2009, p. 16). Particularly in the light of sustainable development that can be pursued without gauging in fossil fuel industrial development. Consequently, South Africa’s Reconstruction and Development Programme (RDP) policy proclamation seems appropriate: namely, to balance social goals by proposing that every household in South Africa must have access to electricity provided that the promotion of diverse energy sources and energy efficiency takes consideration of environmental concerns (ANC, 1994).

5.2 South Africa’s Energy Policy

The 1998 White Paper on Energy Policy from the Department of Minerals and Energy (DME, 1998) outlined significant objectives of government policy for the energy sector. The 1998 White Paper objectives are:

- to improve energy governance;
- stimulate economic development;

- increase access to affordable energy services;
- manage energy-related environmental impact; and
- secure supply through diversity.

Historically, owing to the previous colonial and apartheid spatial development strategies, electricity was only accessible in established towns and areas with economic activities. Winkler (2009, p. 34) has shown that by 1993, only about 36% of the total population had access to grid electricity in South Africa. Hence, in 1991, ESKOM initiated its slogan 'electricity for all' and just after the democratic breakthrough in 1994, the ANC used its RDP document to continue to call for the electrification of rural South Africa. However, rural South Africa – previously understood to be white towns and white commercial farmers – was already electrified although the gap still existed in terms of farm workers and farm dwellers and many other residents in the designated "Homelands" of the former apartheid state. A low electrification figure of 36% was reflected both for the black 'townships' and black rural areas of South Africa.

In the report known as the *National Electrification Programme 1994 -1999* commissioned by the Department of Minerals and Energy and the Development Bank of Southern Africa (Borcher et al., 2001) it was emphasised that the government's mandate is to increase access to electricity. The commission developed the National Electrification Programme, which was to be implemented by ESKOM and Municipalities with a budget of about R7 billion. Borcher et al. (2001, p. 1) have stated that the National Electrification Programme was intended to increase electricity access

to about 66% nationally by 1999, with an allocation of 46% for rural areas and 80% for urban households.

By 1999, the set target given to ESKOM and municipalities to distribute the electricity were met by a total of 2.75 million connections to households and business sectors (Borcher et al., 2001). By 2004 ESKOM completed approximately an additional 3.75 million connections (Borcher et al., 2001). This affirms that the post-apartheid government energy policy was driven by the objective of increasing electricity access among all South Africa's households. This also cemented ESKOM's early 1990s objective to expand electricity access to the majority of South Africans. It also suggests that people had been using unclean pollutants, toxic and less safe energy such as wood and paraffin.

The Intergovernmental Panel on Climate Change (IPCC) also intended to carry out the carbon emission across the globe, however, ESKOM's successful electrification programme increased its carbon emissions. Moreover, ESKOM had significant over-capacity in the 1990s and could add millions of households with very little need to increase generating capacity. According to Cock and Koch (1992) households then, as currently, only consume a very small part of South Africa's total electricity. Therefore, as the big drive for expanding ESKOM is economic growth, especially in mining and manufacturing, ESKOM had simply not kept up with demand. (Although the demand has declined in more recent years partly due to higher prices and erratic supply, and low growth and decline).

Another contention, made by Winkler (2009), is that affordable energy must not only be about access, but also about other aspects of fuel that play a crucial role as a source for energy for South African households. For instance, liquefied petroleum gas (LPG) is used for cooking and liquid fuel for transportation and only those largely without electricity need LPG. The advantage of LPG is that is a source of energy contained in a bottle or cylinder ; therefore, it is clean, portable and safe. This then increases accessibility of electricity without connecting to the grid.

Kotze (2001) also states that, in 1999, the RDP policy was partially implemented in terms of the government's launch of the off-grid rural concession programme to provide up to 50 000 solar home systems (SHSs) This was intended to improve rural electrification with a low-smoke coal programme, the regulation of liquid fuel and energy efficiency.

5.2.1 The Accelerated Share Growth Initiative for South Africa (ASGISA) and energy production

Electricity has been historically cheap in South Africa in terms of supporting local industries and transportation. Since the current electricity infrastructure was created with fossil fuel largely sourced from coal, the formerly low electricity prices had been a competitive advantage to South Africa in terms of attracting new investment. In addition, the relatively cheap energy was due to the prices being subsidised by ESKOM as the state (Visser et al. 1999).

Moreover, in 1997, the Accelerated and Share Growth Initiative for South Africa (ASGISA) initiated by the Office of the Presidency, attempted to respond to the failures

of Growth Employment and Redistribution (GEAR). This was intended to put a national accelerated share growth initiative to the fore (ANC, 1996; AGISA, 2007, p. 3) to oppose the exclusion from the formal economy of the bottom or poorest third of the population. Therefore, ASGISA's twofold proposal for a large-scale state-led infrastructure development programme; namely, a national skills development plan; and a sectoral development plan (Biofuels, outsourcing and tourism) was to eliminate the second economy in PetroSA and ESKOM. The ASGISA focus on building biofuel infrastructure suggests that the government acknowledged that road, air and shipping transport accounted for about a quarter of the global greenhouse gas emissions since such transportation largely depended on fossil fuels (Nunez, 2019). The reason for promoting biofuel was to substitute traditional fuels with fuels made from plant material, in other words, renewable energy.

The objective of ASGISA 2007, therefore, is to reduce the constant capital expenditure of certain South Africa entrepreneurs to make the cost of doing business in South Africa cheaper to attract investment for economic growth as opposed to sustainable development by burning of fossil fuel. The Intergovernmental Panel on Climate Change (IPCC, 2007) had noted that the consequences of maintaining the fossil fuel route of development is that it contributes to climate change with a projected impact that negatively affects water, food security, health and the eco-system.

After the adaptation of ASGISA (2007), the governing party of the ANC convened its National Elective Congress to elect new leaders and discuss the party policy which would consequently then become the policy of government. The guiding discussion document; 'Report of the ANC Commission on Strategy and Tactics' (ANC, 2007, p.

24) made a compelling argument that the party intended to build a developmental state premised on sustainable development. This was based on the current high growth rates and the restructuring of the economy and socio-economic transformation. The plan was therefore, to mobilise SA society towards defining a common national agenda for its implementation.

In addition, the same National Policy Conference of the ANC (ANC, 2007) proclaimed that its strategy to build a developmental state was also premised in the state's efforts:

- to establish a mining company to exploit South Africa's mineral resources and to identify strategic minerals and energy resources; and
- to develop specific strategies for local beneficiation (ANC, 2007, p. 24).

The ANC's 2019 manifesto for the national general election of that year claimed that when it had taken charge as a governing party in 1994 , only 36% of the population and 12% of people in rural communities had access to electricity. However, by 2019 some 84% South Africans now had electricity in their homes. The claim was based on the fact that accessibility to electricity is essential for South Africa's economy and that government's provision of the electricity to South Africans had improved the quality of life for the previously disadvantaged majority and had, therefore, boosted the support to the large industrial development. Industrial manufacturing are electricity-intensive industries that make the largest contribution to both economic growth and exports, and at the same time use more than 60% of national electricity sales (Berger, 2000; DME, 2000).

5.2.2 The National Planning Commission's effect on energy policy

In November 2011, the NPC published the National Development Plan (NDP) under the Presidency of Republic of South Africa to articulate government's plan of growing the GDP by 5% every year in an effort to drastically reduce unemployment until 2030 and to lessen the coal dependence for producing electricity. The NDP also served as the blueprint to eliminate poverty, unemployment and inequality at the behest of the economic growth. However, according to Freund (2019, p. 2020) the National Development Plan was an "indigestible wish list". Contrary to this view, Ann Bernstein (2014, p. 23) argued that the 2011 version of the NDP had identified that a strategic intervention was necessary to confront South Africa's challenges, and she acknowledged that it conflicted with many other government policy documents as it introduced a new policy discourse.

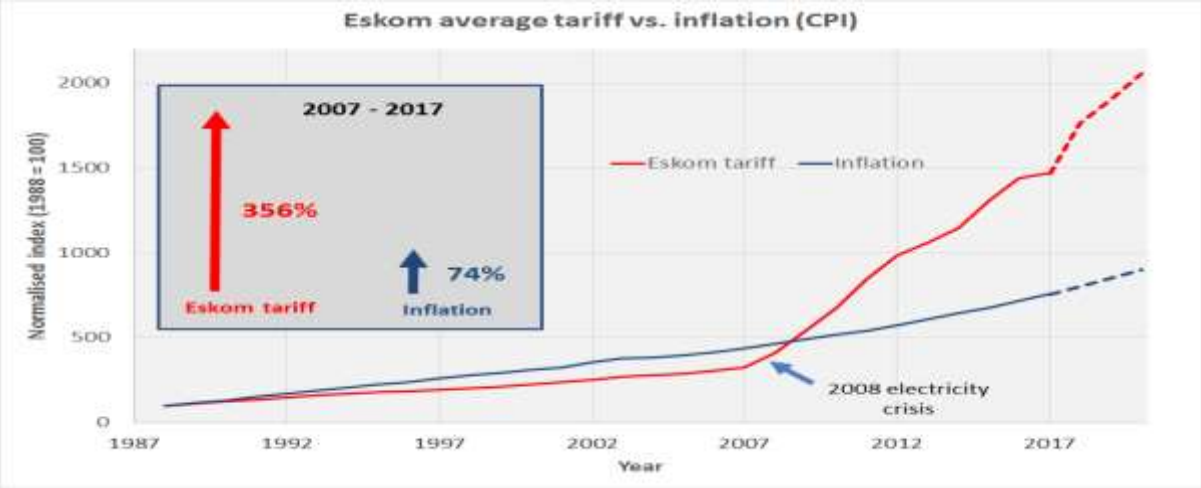
Moreover, the NDP 2011 had identified the energy sector as the driver of South Africa's economy. It further recognised that electricity was the main constraint, as most of the country's economic activities were energy intensive. Davidson and Winkler (2003) noted that the government's intention to widen household access of affordable electricity to the poor indicated that the energy sector remained at the centre of structural development of the economy. Furthermore, the energy sector supported significant investments in industries, such as mining, that had shaped the energy structure of the country.

The 2011 NDP's further contention was that:

> As long as energy is scarce, there will be a trade-off between beneficiation and other more labour-absorbing activities. In general, beneficiation is not a panacea because it is also usually capital-intensive, contributing little to overall job creation

(NDP, 2011, p. 146)

The 2011 NDP also predicted that, by 2030, South Africa would have energy security in which it would then usher in reliable and efficient energy at affordable tariffs. However, the Integrated Resource Plan (2019. p.8) of the Department of Minerals and Energy (2018), argued that the 2011 NDP had made a proposition that the government will provide socially equitable energy services. Such services would be via expanded access to environmentally sustainable energy by reducing emission and pollution. However, these projections of electricity price/tariffs from 2008 to 2017 from department of Energy and Mineral Resources as shown in Fig 5.1 below, The citation needs attention indicate a drastic increase in price in comparison with inflation (Consumer Price Index) ESKOM's Power Stations were confronted with challenges from 2008 to 2017.



(Source: *Power Optimal the Future Energy)*

Figure 5.1. ESKOM's average electricity tariffs in comparison to the inflation rate (2008 to 2017).

Moreover, as stated in the media (Ntuli, 2019 *Business Day*), the NDP 2011 had argued for an improvement of energy infrastructure to ensure sustainability and reduce carbon emissions in the proposal for a new energy mix to secure about 20GW of renewable energy by 2030. The energy infrastructure is at the heart of the IRP proposals. In terms of building environmentally friendly infrastructure for generation, transmission and distribution of electricity, the then Minister of Energy Jeff Radebe had argued that:

> [E]nergy infrastructure is a critical component that underpins economic activity and growth across the country; it needs to be robust and extensive enough to meet industrial, commercial and household needs (Radebe, 2018).

South Africa does not have efficient energy infrastructure prepared for the low-carbon intensive plan by 2030. However, the Department of Energy had argued that only two new power plants would be added to South Africa's energy system with the intent of meeting the projected IRP targets. Furthermore, these power plants were to be developed by independent power producers since the South African government also had to address the issue of energy infrastructure by considering green energy.

Valodia, Webster and Francis (2018) in refs have discussed the relevance of South Africa's serious economic inequalities in society in terms of the access and affordability of electricity in that the richest 10% own 95%. The NDP 2011 had sought to resolve such challenges by expanding accessibility of energy services in affordable tariffs and

to provide subsidies to needy households (NDP, 2011). The innovation of development pathways that shift countries from emissions-intensive to low-emissions development routes, therefore, requires a radical change of policy, technology, investment and political will if it is to lower social inequality in SA at the same time.

The NDP 2011 acknowledges the fact that South Africa is confronted with a climate crisis caused by the global emission of carbon dioxide and greenhouse gases. The same NDP also recognises the consequences of climate crisis such as rising temperatures, extreme weather event, droughts, flooding and excessive rainfall. It follows, for the NDP, therefore, that environmental sustainability will come from global efforts to reduce industrial pollution and mitigate the effects of climate change (NDP, 2011, p. 33). The NDP also points out that in addressing the climate crisis, there is also a need for households to reduce carbon emission.

As mentioned, the NDP seeks to grow the economy by an average of 5% through vast strategic interventions particularly via comparatively advantageous exports of mineral resources. The extraction of mineral resources requires large quantities of energy and if the NDP aspires to expand South Africa's mineral resource extraction and comparative advantage export to grow the economy it should focus on primary aspects. Firstly, by building a green economy through supporting the mining sector and infrastructure development in rail services and port expansion to increase the investment in South Africa.

Another inconsistency in the NDP 2011 attracting investment through infrastructure development and rail service is that it does not consider the Department of

Environmental Affairs, Forestry and Fisheries' commitment in its *National Climate Change Response White Paper* (2004). This has argued for the lower-carbon mobility in the small cities and opposed infrastructure development that would not avoid the lock-in of emissions-intensive technologies in the future. For example, the expansion of railroads can potentially reduce pollution by reducing car and truck freight transport. Furthermore, the NDP 2011 has also suggested that water, transportation and energy infrastructure must be improved to support the mining sector and economic activities which are closed to mining sector to create investor certainty.

The government had also planned to expand local infrastructure through its Strategic Investment Projects (SIPs) which received $75 billion from the national fiscus from 2013 until 2015 (Department of Environmental Affairs (DEA) 2012, p. 26). These infrastructure projects were meant to support mineral, oil and gas extraction. Therefore, the SIPs are in accord with the 2011 NDP's support of ESKOM's infrastructure; particularly electricity generation, transmission and distribution to provide access to electricity for all and boost economic development. The SIPs stipulate that they support infrastructure in the extractive-oriented industries of oil, gas, and mineral resources. However, this signifies a clear contradictory strategy to grow the economy without ecological limitations while advocating for the reduction of carbon emissions as the result of burning of coal. The 2011 NDP, therefore, suggests contradictory logic by proposing the reduction of carbon emissions by enhancing exploitation of the mining sector further to assure investment certainty.

Fine and Rustomjee (1996) have theorised on the link between South Africa's economic structure and its energy system. For them, the challenge is that the SA

economy is based on its Mineral Energy Complex. Swilling (2015, p. 11), expands on this point by the contention that the core structural problem of South Africa's economy is rather the "dominance of the socio-political regime" by the Mineral Energy Complex which has a combination of interests with a strong grip on energy production and mining industries together with "their up- and downstream partners in the manufacturing sector". Fine (2012. p. 128) also argues that the 2011 NDP's failure to recognise that the Mineral Energy Complex incorporates a very conglomerated power bloc that has been a significant beneficiary of apartheid governments which has also continued to dominate economic and social development since the democratic breakthrough in 1994.

For Fine (2012, p. 129) the NDP fossil fuel development strategy takes a route in which it seeks to continue to rest on a partnership between the state and private capital with the intention to promote capital intensive development around the core mineral and energy activities. Fine (2012) therefore, continues to argue while the 2011 NDP has good intentions of building a developmental state, their strategy of development also signifies the commitment to sustain a fossil fuel development path rather than depart from it. This was particularly symbolised by the construction of two mega coal-fired power stations (Medupi and Kusile) which were funded by World Bank aid in 2005. Also controversial, is that the final cost was vastly larger than the World Bank loan (of R39 billion) which is now less than 10% of the total cost. However, at the start the cost was to be no more than 50% of projected spending and as Hallowes (2010, p. 71) notes, in 2005, ESKOM planned invest R84 billion by 2009 with an intention of adding 29 000 megawatts (MW) to the "present generating capacity of 37 000 MW."

Part of ESKOM's strategy to expand its total generating capacity to 80 000 MW in the period of 20 years (Bond, 2014, p. 5). It has been explicitly highlighted by Bond & Ndlovu (2010) that the World Bank's R39 billion loan to ESKOM to expand the country's power through the Medupi and Kusile coal fired plants (with capacities of 4788 MW and 4 800 MW respectively) (Bond, 2014, p. 4) has been part of that strategy. In addition, South Africa has also planned to develop 40 new coal mines (Bond, 2014). Paradoxically, therefore, the expansion of the coal power stations and development of new 40 coal mines has served to boost the mineral energy complex core.

Fine and Rustomjee (1996) also state that South Africa's Vaal Triangle remains a dominant component of South Africa's economy. The area is central to its mineral energy complex as it was founded on the basis of cheap coal and energy-intensive mining and industry. Again, this poses another contradiction for a State that seeks to reduce carbon emissions if the country's concentration of economic power remains embedded in its former mineral energy complex. Hallowes (2010, p. 70) contends that South Africa's total primary energy supply reaches 4 629 petajoules (PJ) and that 64% primary energy was generated from coal.

Not only does coal help ESKOM to generate electricity but it is also used by SASOL to produce liquid fuels and chemicals. Both Fine (2012) and Kaplan (2013) contend that while there are no major differences in economic and development strategies from NDP 2011 and the New Growth Plan (NGP) that promote carbon-intensive development; there is a need for policy coherence in government. Therefore, options

will have to be made about which set of policies is most appropriate (Kaplan 2013). It has been noted further that:

> The NDP, deriving from the National Planning Commission, followed more or less immediately upon the New Growth Path, NGP, emanating from the 'rival' Economic Development Department.
> (Fine, 2012, p. 116).

Therefore, it appears that the NDP 2011 has lacked coherent and clear coordination in terms of the creation of jobs for a green economy and the further exploitation of mineral resources. This is despite the NGP's (2011, p. 12) contention that it would quicken exploitation of mineral reserves by:

- warranting an effective review of mineral regime; and by
- lessening the cost of critical inputs (encompassing the logistics of state-owned mining companies co-existing with the private mining sector to promote beneficiation and greater use of mineral resources).

In addition, the possibility of energy policy contradictions in the NDP 2011 was published by the NPC in its 2018 seminal paper: 'NPC Economy Series Energy, Vision 1.0' (2018). Here, the NPC suggests that since 2012 there had been rapid changes in the energy sector which might have disrupted achievement of the goals of the NDP within the given deadline. The first concern outlined was South Africa's commitment to its Nationally Determined Contribution (NDC) as the part of the "Paris Agreement at the 21st Conference of the Parties (COP21)" in 2015. The second concern was that the energy sector might contravene the NDP's achievement of its objectives by 2030 due to "unprecedented changes in the relative costs of power generation technologies in the electricity sector" (NPC, 2018, ii).

Fine (2012) had already pointed out that the shortfalls and contradictions of the NDP's aspirations and 'Wish list' (Freud, 2019) were gradually being perceived with scepticism because the vision of the future was centred on the prospect of social and economic infrastructure development. The NDP plan to address the poverty, unemployment and inequality were to be welcomed, but as Fine (2012) states, this aspiration was based on the "rhetoric of the time" (2012, p. 129) as the NDP proposed greening the South African economy while sourcing alternative energy sources.

5.2.3 Department of Energy and Mineral Resources: Integrated Resource Plan

In 2019, under the 6th government Administration, the Department of Energy (DoE) was combined with the Department of Mineral Resources (DMR). After the National election in May 2019, President Cyril Ramaphosa had made a commitment to reconfigure the 6th Administration cabinet to focus on promoting coherence, improving efficiency and enhancing better coordination of the government.[6][6] However, it is important to note that while the Department of Mineral Resources is now merged with the Department of Energy, the two Departments continue to function separately as two entities, each with a Director General (a DG responsible for Energy and a DG responsible for Mineral Resources).

However, the Department of Energy has more salient policy positions in terms of energy policy which appear seamless compared to the Department of Mineral

[6][6] http://www.thepresidency.gov.za/press-statements/president-ramaphosa-announces-reconfigured-departments

Resources. For example, the DoE's policy on energy planning and coordination seeks to:

> [e]nsure the integration of renewable energy into South Africa's mainstream energy supply by: – planning and coordinating initiatives and interventions focused on the development and improvement of the renewable energy market on an ongoing basis – improving generation capacity by implementing the integrated resource plan through determinations under section 34 of the Energy Regulation Act (2006), when applicable. (DoE, 2019, p. 533)

The Department of Energy (DoE) is mandated to ensure energy security, as the Integrated Energy Plan under the Department of Energy stipulates that energy is about ensuring the availability of energy resources and access to energy security. The IEP, in essence, ensures the availability of energy services in an affordable and sustainable way, in addition to the associated adverse environmental impact caused by the intensive carbon emissions. In sum, the DoE Annual Report (2019) articulates that the DoE policy mandate is:

- to support the long-term vision for South Africa to use renewable energy;
- create the conducive conditions to stimulate an efficient electricity market; and
- for South Africa to become internationally competitive in the energy system.

However, the parliamentary portfolio Committee of Energy in 2018 has stressed that, despite the consideration of environmental degradation in the Integrated Resource Plan, coal must remain the major energy contributor to South Africa's energy system. This undermines the DoE prospect of generating energy in a sustainable way. For the portfolio committee, this alludes to the fact that the IRP should:

> make it explicit that both coal and nuclear will remain important elements of South Africa's energy mix. In the case of coal, new clean coal technologies should be pursued.(Parliamentary Portfolio Committee on Energy, 2018).

For the Department of Minerals and Energy, however, the earlier *White Paper on the Renewable Energy Policy of the Republic of South Africa* (DME, 2003) identifies climate change as one of the foremost environmental threats facing the globe today. The White Paper on the Renewable Energy Policy of South Africa proposes the need to reduce fossil fuels for the implementation of renewable energy technologies. Consequently, it argues for the establishment of the Renewable Energy Independent Power Producers (REIPP) programme which includes bidding competitively "on tariffs for predetermined renewable energy technology over five bid windows" (DME, 2003).

The aim of 2003 White Paper on Renewable Energy, therefore, is to procure up to 3 725 MW bulk of renewable energy. Thereafter, the DOE would purchase the electricity from independent power producers (IPPs) and ESKOM would be a buyer through power purchase agreements (PPAs). Subsequently, this is contradicted by the IRP's (2011) objective to establish the energy mix, in which it is reluctant to decommission coal-fired power plants to reduce South Africa's dependence on coal for energy.

However, while different social groups have contested the SA government's proposal for renewable energy initiatives, others continue to argue for government to invest more in the infrastructure technologies for clean energy. These social groups have consistently lobbied government to consider renewable energy particularly in light of ESKOM's deteriorating power infrastructure and the failures of the new Medupi and

Kusile power stations which were not yet fully operational by then As a result, ESKOM has been losing about 6 000MW of generation power from the grid due to failure at the new power stations and the enormous backlogs in maintenance at the established power stations. Table 4.1 below illustrates ESKOM's Engineering data that show what and how many power stations were confronted with challenges from 2008 to 2019.

Table 5.1. ESKOM Power Stations confronted with challenges from 2008 to 2019

Power Stations	Challenges confronted
Camden	wet coal and high load losses because of water ingress on the turbine house (flooding);
Kendall	Units two (686MW) and six (686MW) were out, whereas another four units were running at low capacity because of wet coal;
Duvha	only two of its six units were running;
Kusile	zero units running;
Medupi	zero units running;
Matla	lost 1 183MW through one unit because of boiler tube leaks;
Arnot	lost 730MW through high load losses because of wet coal
Kriel	910MW through high load losses because of wet coal

(Source: https://mg.co.za/article/2019-12-13-00-coal-is-destroying-south-africa-renewables-are-the-future/).

According to section 6 of the National Energy Act 34 of 2008, the Minister of the Department of Energy must develop and, every year, assess and issue the Integrated Electricity Plan (IEP). However, to do so the IEP must address the issues relating to the supply, transformation, transportation, storing of and demand for energy in a manner that accounts for safety supply, economically obtainable energy resources, affordability, world-wide accessibility to free basic electricity, social equality, the environment, the international commitments, employment, contribution of energy supply for socio-economic development and consumer protection (IRP, 2019 as cited in National Energy Act). Furthermore, the Act stipulates that the IEP must serve as a guiding tool for energy infrastructure investments – given whatever energy supply is most viable, and then guide the selection of the appropriate technology to meet energy demand.

The Electricity Regulation Act 4 of 2006 is another significant piece of legislation from the Department of Energy. In the premise of this Act, the Minister of Energy may, in discussion with the regulator, determine new generation capacity. This is to ensure a constant supply of electricity is available, and to govern the mode of energy sources from which electricity must be generated. The fractions of electricity that must be generated from such sources further governs that the electricity generated may only be traded to the persons.

However, an amendment to schedule 2 of the Electricity Regulation Act 4 allows a person or independent power producer (IPP) to produce up to 10MW of their own electricity and gives permission to municipalities to purchase electricity directly from

IPPs to address any ESKOM load shedding (any more than 10MW is deemed to threaten ESKOM's monopolistic tendencies around electricity production). Also, any independent producer who wants to sell private electricity they have generated to the municipality or ESKOM (including businesses) must register with the National Energy Regulator of South Africa (Nersa).

However, the IRP Plan or Act later published in 2010 (Government Gazette 34263) for the Department of Energy, aimed to address energy problems by 2030. The main objectives were to ensure security of supply, reduce the cost of electricity, minimise negative environmental impact, and water usage (IRP, as cited in Act 2018, p. 10). As such, the government then anticipated decommissioning about 24 100MW of coal power plants from 2030 to 2050. However, this did not mean moving entirely away from coal (decarbonisation), as a number of power stations that have been considered at end-of-life were to be replaced by new power stations. In other words, this does not indicate a decline in coal power stations, but the replacement of some stations by new ones, such as the Kusile and Medupi mega power stations. The DOE Annual Performance Plan 2011/2012 further articulated the IRP outline by stating that South Africa requires new generation capacity for the period up to 2030:

> The IRP includes the different technologies required to ensure that power generation is cost effective, minimises water usage and mitigates adverse climate change.
> (DoE, 2011, p. 17).

In 2019, Gwede Mantashe, as new Minister of the merged Department of Energy and Mineral Resources, reiterated that in acknowledgement of the shifting energy-mix path it was necessary replace coal-fired power plants. The IRP 2011/2012 predicted

that electricity demand would grow by 2.8% a year between 2010 and 2030 (Bischof-Niemz & Creamer, 2019, p. 12). Satgar (2015) has also noted the government's response to climate change and that the call for climate justice is through the IRP process which aims to generate mixed-energy, that is, coal, nuclear, gas and renewable energy. Previously, the 2010 IRP had been designed for the period of 20 years, whereby mixed-energy was meant to provide a coal-fired energy path by simultaneously reducing coal-generated energy from 85% to 65% by 2030.

However, via the 2010 IRP the Department of Energy (before the merge with Mineral Resources) had stipulated a public participation process or stakeholder engagement before reaching logical conclusions for the reduction of carbon emission. The public participation process gave the opportunity for concerned parties and individuals to submit written comments. The DoE conducted presentations of three workshops: Durban on the 26 November 2010; Cape Town on the 29 November 2010; and Johannesburg on the 3 December 2010 (IRP, 2011). The second round of public participation on 3 December 2010 led to numerous alterations to the IRP model.

According to the IRP (2011, p. 9), the major alterations dimensioned the component split of renewable energy technologies: solar photovoltaic, solar power and wind options. However, the state considered investment costs for a nuclear component to increase by 40% based on recent construction experience. In December 2010, public participation gave birth to Independent Power Producers and a nuclear build programme as the future energy-mix proposition.

In 2018, the DoE published the revised IRP draft (DoE, 2018) in which the IRP's assumption was that ESKOM would decommission up to 75% of their conventional coal generation capacity between 2030 and 2040. Moreover, gas and renewables would comprise the biggest percentage of new installed capacity by 2050. Within the earlier period of 2021 to 2030 the IRP proposed the gradual shift towards renewable and gas, and from 2031 to 2040 doubling of capacity in renewables and gas. For the period between 2041 to 2050 the IRP 2018 articulated the following:

> [A] complete transition from the capacity and energy mix of today. Installed capacity will be mainly from renewables and gas with coal and nuclear making up less than 50% of the mix.(IRP, 2018, p49).

In terms of the above proposed energy transition up to 2050, therefore, the IRP 2018 draft looks different to substantially changed the previous energy mix by proposing a huge shift in policy. Table 4.2 below shows the IRP's commitment to reduce the use of coal for producing electricity by 2030.

Table 5.2. The IRP 2018 draft commitment to reduce the use of coal for producing electricity by 2030.

IRP 2019	**New generation capacity**	
Technology	**Year**	**Capacity**
Utility-scale wind	2022-2030	14400 MW
Utility-scale solar PV	2022-2030	6000 MW
Self generation (Solar PV)	2019-2022	Unallocated
Self generation (Solar PV)	2023-2030	4000 MW
Gas, diesel	2024, 2027	3000 MW
Battery energy storage	2022, 2029	2000 MW

Hydro	2030	2500 MW
Nuclear	2019-2030	0 MW
New Coal	2023, 2027	1500 MW
Decommissioned Coal	2019-2030	-11 000 MW

(Source: *The Daily Maverick* (2020) table of the generation capacity for 2030).

When the IRP (2011) draft was approved or tabled or passed, it noted that the plan to decommission coal power stations by 2030 included about -11 000 MW capacity from the coal power stations. This was to signify that by 2030 there would be significant decline in emissions. Moreover, another commitment was that by 2050 all coal power stations would have been decommissioned except for Kusile, Medupi, Majuba and Kendal power stations; some of which had been more recently constructed. However, the critique of this arose that the recent build of two massive power stations simply contradicted the IRP idea and that these mega-stations would simply replace many existing end-of-life older stations. Therefore, the paradox remains that the mega-stations did not necessarily imply the future shrinkage of coal-fired power – rather it could increase coal-fired energy generation.

Nevertheless, the IRP (2019) had proposed that by 2035 and 2050 all other power stations were to be decommissioned except for the recently built power stations; and more specifically, these coal power stations must be replaced with zero-carbon emission technology. It is unfathomable therefore, that the Minister of Energy and Mineral Resources defended the use of coal by arguing that:

> We must disabuse ourselves of the polemic to pit renewables against coal and nuclear, and vice versa. We should exploit our vast coal deposits through technological innovation.
> (Mantashe, 2020)[7[7]]

This represents a turnaround call to continue with current exploitation of the mineral resources in order to create employment and boost the economy. In this regard, one researcher has shown the implications for reducing carbon-intensive energy production remains a challenge since South Africa's economy is based on burning of coal and "abundant supply and low industrial pricing of electricity" (Satgar, 2015, p. 256). South Africa's carbon-intensive energy is one of the most carbon intensive middle-income countries in the world and this accounts for lagging behind to reach world targets for reducing carbon-intensity (Satgar 2015, p. 269).

However, the Portfolio Committee of Energy in 2019 argued that new technologies must be pursued. They have suggested the Department of Energy and Mineral Resources should take both routes in the IRP (2018). Firstly, by making it clear coal will remain central to South Africa's energy security, and secondly, that nuclear will also take central position in energy mix. Therefore, the Portfolio Committee of Energy contradicts the IRP (2018) draft by mandating the DoE pursue carbon-intensive energy instead of decarbonising electricity by reducing coal-fired energy production by 2050.

The suggestion that the IRP 2011 should reiterate that coal and nuclear remains significant in the energy mix realm is a clear contradiction that the Energy Portfolio Committee has embedded coal and nuclear as major players in the energy mix.

[7[7]] This article was abstracted from: https://www.iol.co.za/business-report/energy/gwede-mantashe-reassures-sa-coal-producers-34402593

Moreover, the current Minister of Mineral Resources and Energy, Gwede Mantashe, now appears uncertain about reaching the target set in the 2019 IRP policy proposition. Gwede Mantashe, in an interview (same on Daily Maverick, Print Media 2020) with Chris Yelland (EE Business Intelligence), was explicitly questioned whether South Africa could meet the date set in the IRP for reducing carbon emission in SA's energy mix. Minister Mantashe responded as follows:

> Let us say a state-owned company - no names mentioned - comes to us and says: 'Listen, we want to open a coal-fired power station with carbon capture and storage (CCS), and we can do it in the next two years'. And they propose to build it with their own money, operate it to recoup their money, and then transfer it to the state – the Build, Operate, Transfer approach. It is a very attractive proposition, although there has been no decision yet in this direction.
>
> Others are coming to us to say that in Mpumalanga they can open gas power stations, or convert old coal stations to gas, using gas from Mozambique. But you can't say you are going to develop Mpumalanga on the basis of Mozambican gas unless you have a proper arrangement with Mozambique. Yes, we could convert those steam turbines to gas. But let's slow down with the arrogance. Let's go and talk to the Mozambicans first to see if we can co-operate.
>
> In the IRP, nuclear and hydropower are presented as alternatives. While the emphasis is on the DRC's Inga hydro project, we put in nuclear as a failsafe option. The Koeberg nuclear power plant has served South Africa well, and I do not think we should write off the nuclear option yet. If we make energy an ideological matter and politicise the energy needed for economic growth and

> development, we will be left behind by countries like Egypt that were far behind us. (Yelland, C. *Daily Maverick Interview*, 25 February 2020).

Gwede Mantashe's response in the *Daily Maverick* interview with Chris Yelland shows scepticism in terms of the State's ability to achieve the IRP's set targets to reduce carbon emission. Significantly, he therefore presents contradictory logic with regard to reducing carbon emission and generating electricity simultaneously, as he concurs with the idea of converting coal to generate gas as a source of electricity.

Another factor that can be viewed as the current government contradicting NDP and IRP aspirations of energy security is the supply of electricity to countries such as Zimbabwe and Swaziland. As the main electricity supplier to these to foreign states this has led to the energy demand increasing intensely, therefore, placing further pressure on ESKOM. As a result, South Africans have experienced numerous power cuts since 2008. According to the Energy Information Administration (2009). ESKOM's inability to continue with the country's demand is due to ESKOM's inability to keep supplying electricity uninterrupted to South Africans.

5.2.4 Department of Mineral Resources: Mineral and Petroleum Resources Development Act (2004)

The Mineral and Petroleum Resources Development Act 28 of 2004 acknowledges that mineral and petroleum resources belong to nation and that the State is the custodian. Therefore, the mandate of Mineral and Petroleum Resources Development Act (MPRDA) (2004) from the Department of Mineral Resources is to protect the environment for the benefit of present and future generations; to ensure ecologically

sustainable development strategy of mineral and petroleum resources that promotes economic and social development.

The MPRD Act that came into effect on 1 May 2004 appeared to be the new cornerstone of the Department of Mineral Resources policy in terms of previous mineral rights policy since 1994. However, the Act contradicts the principle that sustainable and ecological development needs to be mitigated from the burning of fossil fuels. Instead it declares that the state must ensure ecologically sustainable development of mineral and petroleum for economic and social development (MPRDA, 2002).

Further, the Act promotes the centralisation of mineral resources to the state, in essence, the MPRDA advocates central statism. The Act's policy is, therefore, problematic due to its Stalinist approach to statism which promotes the repression of opposition and is therefore against all the processes of challenging the power relations of the state (Mabasa, 2020, p. 17). For instance, in rural Xolobeni, protests by some members of this community in Eastern Cape have rejected attempts at mining activity in order to preserve the ecology. The state, on the other hand, via the Department of Energy and Mineral Resources, is lobbying for international capital to enable mining to take place in Xolobeni.

The contradiction here is that the MPRDA (2002) has stated that South Africa's mineral resources beneath the soil belong to the state. In this regard, the MPRDA ended the existing dual system of public and private ownership of mineral rights and substituted it with a system of state custodianship of mineral resources for the benefit of all (Leon,

2009, p. 614). For some scholars, however, the principle of the state taking custodianship of the mineral resources and petroleum without ownership of the mining industry is flawed because mines are part and parcel of the mining mineral resources. It is a change that the MPRDA allows the state to lease the rights to mine the mineral resources and can set the terms of use, and the state can take the mineral resources without taking over the mines.

In essence, the MPRDA suggests that all privately-owned mineral rights should be returned to the state and the state (through the Department of Mineral Resources) becomes the chief custodian of the mineral resources and petroleum in South Africa. Individuals or companies that seek permission to establish any mining industry must apply for a mining licence from the Department of Mineral Resources and must satisfy its commitment of social, environmental, employment, equity and economic to the government. The Social and Labour Plan (SLP) is therefore a pre-requisite for acquiring mining licence as it is packages the State's socio-economic and labour commitments. At the same time, there is also technical and operational work plans and environmental rehabilitation plans which need to be submitted for application for mining licence.

Consequently, Leon (2009) contends that the MPRDA's (2004) advocacy for the return of privately held mineral rights is an action of "creeping expropriation" because it has, in principle, encroached on land ownership rights. For Leon (2009, p. 598) creeping expropriation entails "the slow and incremental encroachment on one or more of the ownership rights of [the] foreign investor that diminishes value of its investment". In other words, the MPRDA has encroached upon the ownership rights of private owners

of mineral resources and petroleum products because by being transferred to the state it does not result in fundamental changes insofar as the state taking charge of mineral resources and petroleum through Department of Mineral Resources.

In 2014, the National Assembly in Parliament amended the MPRDA.[8][8] The 2014 Amendment came as the result of the formation of Mining Industry Development and Employment Task Team (MIGDETT) to consider the environmental effects caused by mining sector. The configuration of the MPRDA to align with the objective of the NDP emerged because the DMR wanted to streamline the ecological issues to enable going 'green' for mining.

5.2.5 Department of Environmental Affairs, Forestry and Fisheries: National Climate Change Response Strategy (2004)

The Department of Environmental Affairs, Forestry and Fisheries has acknowledged the climate crisis and holds that ecological issues are peripheral to the imagination of development. Hence, in 2004 the Department of Environmental Affairs Forestry and Fisheries developed the National Climate Change Response Strategy (2004) to concentrate more on the dangers of climate change mediation than on climate change (Hallowes, 2009, p. 71). In this case, it contends that the South Africa's economy, particularly in the mining and energy sectors, is endangered by climate change mitigation measures under the Kyoto Protocol.

[8][8] In 12 March 2014, the National Assembly in parliament amended the MPRDA (2004) after consideration that significant transformation had been reached in the mining industry (Chamber of Mines of South Africa, 2014).

The paradox of the National Climate Change Response Strategy (2004) is the desire to mitigate the climate crisis in the development strategy of South Africa by the relocation of energy industries from developed countries to developing countries. Hallowes (2009) notes the dilemma is that the relocation of energy industries to developing countries may result in a negative environmental impact and fail to address the issue of unemployment.

In addition, the then Department of Environmental Affairs and Tourism (DEAT) argued that the National Climate Change Response Strategy (2004) suggests the increase of coal exports to other developing countries that are not subjected to carbon emission reductions (DEAT, 2004). The DEAT, further contends that the issue the country's reduction of emissions should not be at the expense of Southern or sub-Sahara's African coal exporters (DEAT, 2004, p. 7). Nevertheless, the National Climate Change Response Strategy was crafted before The Bali Action Plan (UNO 2007) at the United Nations conference which made a paradigm shift that countered South Africa's reaction to the exclusion of developing countries: climate justice cannot be the sole responsibility of developed countries but it is also a prerequisite for developing countries to centralise their policy for sustainable development around the mitigation forecast.

The DEAT climate change response policy: namely, *National Climate Change Response White Paper* (2011) made the proposition that there was a need for a fair contribution to global efforts to stabilise greenhouse gas concentrations. Their the suggestion was that South Africa should prepare for a long-term transition to a low carbon economy. It further argued the need for:

> Effective management of unavoidable impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity.
> (DEAT, 2011, p2).

The DEAT proposal in the 2011 *National Climate Change Response White Paper,* however*,* is in contradiction to ESKOM's aspiration to generate investment for extra coal-fired generation of electricity since new investment undermines the wishes of the DEAT for mitigating the climate crisis.

Eskom's misplaced focus on coal is based on the fact that South Africa functions in a single electricity grid and, therefore, all new electricity generated serves the national demand. However, ESKOM established a pump storage station at Ingula in the Drakensberg, priced at R9 billion and aimed at generating 1 332 MW from 2012 (Fig, 2010, p. 126). Furthermore, the carbon intensive energy production is being continued by ESKOM through recommissioning dormant coal-fired power stations at Camden, Grootvlei and Komati in Mpumalanga. These power stations were intended to start operating in 2011 (Fig, 2010, p. 127). Then again, the building of two new mega coal-fired power stations generating a total of 9 576MW, first at Medupi, and a second named Project Bravo in Limpopo Province were estimated to cost of R163 billion and both coal-fired power stations aimed to start operations in 2011.

It seems South Africa's method of mitigating climate change equates to its input as a responsible global citizen in terms of the international determination to restrain global greenhouse gas emissions with the country's own social and economy encounters, and chances presented by social and ecological just-transition process. The

Department of Environmental Affairs through its 2001 White Paper supports the use of a carbon budgeting method to recognise crucial mitigation measures for essential GHG-emitting sectors and subsectors. It also identifies the requirement for suitable levels of carbon pricing to assist South Africa's transition to a low-carbon social and economic relations (DEA, 2011).

5.2.6 Department of Trade and Industry: Industrial Policy Action Plan (2010)

In the introductory section of the Department of Trade and Industry's Industrial Policy Action Plan (IPAP) (DTI, 2010) the document's aim is described as an industrial policy "to increase the economy's ability to produce more and more complex and high value-added products with greater efficiency" (DTI, 2010, p. 8). The document further contends that the IPAP seeks to "support localisation, supplier development and black economic empowerment" (DTI 2010, p. 8). It recognises the achievement of the IPAP 2010-18 vision in terms of increasing the general rate of customs duty on the primary steel products to 10% and the fact that the government has boosted the steel industry.

In addition to that achievement, the IPAP (2010-18) acknowledges that 81 252 jobs have been retained and an estimated 9 700 jobs created new employment. Similarly, 28 new companies were established focusing on manufacturing in the leather and footwear subsector, which created around 2 200 jobs and showed growth in exports. All of which this resulted in a reduction of the trade deficit. Despite the increased amount of investment, the document identifies that unemployment remains a national crisis, and it also acknowledges that there is need to build local industrial production and nurture black industrialists (DTI, 2010, p. 4). A further acknowledgement is that:

> Weak growth and domestic demand and persistent unemployment – which has never fallen below 23% - … is inextricably linked with unsustainable race- and gender-based inequality and rural marginalisation.
> (DTI, 2010, IPAP vision 2010-2018, p. 4).

Consequently, the IPAP (2010-2018) vision seeks to boost the economy through the manufacturing sector which is contributing 15% to the gross domestic product (GDP). Manufacturing is at the heart of the IPAP vision and at the heart of the industrial development in South Africa. Furthermore, IPAP (2010-2018) focuses in growing South Africa's economic system through industrial development and incentives, concentrating in the developing many South African industries which include:

- the steel industry;
- manufacturing industries;
- agro-processing;
- the motor/automotive industry; and
- the textile, clothing, leather, and footwear (CTLF) industry.

This includes development of skills through workers' education and skills development to meet economic needs, and the regulation of technical infrastructure.

The IPAP's (2010-2018) vision is explained in the Radical Economic Transformation the policy action plan which promotes inclusive growth: that in effect means the transformation of the ownership and management control; and the creation of decent jobs in the labour-intensive environment. Furthermore, the vision promotes an alignment and intensification effort to secure interdepartmental cooperation with policy

and programmes for all departments, State-Owned Enterprises and agencies which are taking the same route and supporting the industrial action. It intends to achieve a well-regulated integrated development-friendly investment framework to raise levels of productivity and capital inflows. The vision also strongly urges black industrialists to contribute to transformation by supporting black-owned companies. The IPAP vision (2010-2018) has also succinctly highlighted that the intention is to build green energy driven to intervene in carbon mitigation for sustainable development.

The IPAP's 2010-2018 vision for an industrial policy plan is therefore a state-driven development project aimed at building a productive economy through industrialisation (2017). The IPAP programme is clearly targeted towards building sustainable growth and establishing greater quality and sustainability of job-creation in the manufacturing, service sector and small- medium enterprises (SMMEs). This is an important part of micro-economic transformation – by creating a sustainable labour-intensive as a consequence of the reindustrialisation of the economy.

The IPAP vision also recognises that the climate change mitigation will impact South Africa's economic landscape. It argues that, in the export market, "there is a growing threat of increasing 'eco-protectionism' from advanced industrial countries in the form of tariff and non-tariff measures" (DTI, 2010, p. 41). Furthermore, the IPAP recognises that traditional capital-intensive, resource-intensive and energy-intensive industrial route is not going to be sustainable in the future.

In terms of renewable energy industrial development, the IPAP vision also recognises these green growth possibilities should be explored. The green industrial growth seeks

to expand the manufacturing and installation of solar water heaters (SWHs). The automotive sector is also identified by the IPAP to be contributing to the climate crisis as it believes that the increasing demand for vehicles with lower GHG emission contribute to addressing climate crisis because electric vehicles and related components do not use carbon-intensive fuel. However , a contrary argument from a low CVP (2011) study shows that electric and hybrid cars produce more carbon emissions in the process of their production than do standard vehicles.[9][9]

5.2.7 National Treasury: Carbon Tax (2019)

South Africa's National Treasury introduced the Carbon Tax (2019) aimed to encourage investments in low carbon energy economic arena and to reduce Greenhouse Gas emission. The Carbon Tax imposes a price on releasing Greenhouse Gases which is largely from fuel combustion and coal sectors (*Business Day*, 2019). This tax was introduced as a way of addressing the climate crisis in attempt to meet the global climate change targets which was agreed upon in Paris in 2015 (COP21) (McGillis, 2019, p. 3).

The National Treasury introduced the Carbon Tax with the aim to reduce carbon emissions. Part of the intention of the Carbon Tax (2019) is for environmental rehabilitation; however, in this document the government does not firmly confront capitalist industries emitting high levels of toxic carbon. This is evidenced in the 2012 National Budget, whereby the SA government exempted highly trade-exposed and

[9][9] "LowCVP study demonstrates the increasing importance of measuring whole life carbon emissions to compare vehicle performance" file:///C:/Users/29134854/Downloads/MC-P-11-15a+Lifecycle+emissions+report.pdf.

energy-intensive industries (Alton, 2014, p. 345). The Carbon Tax (2019) also implies an attempt to attract new investment based on the need to shift production and employment towards low carbon-intensive activities.

According to National Treasury (2013, p. 10) the introduction of a carbon tax is a step towards addressing carbon emissions in South Africa. In other words, National Treasury's Carbon Tax entails that those responsible for harming the environment, pollution, and carbon-emission must pay for their deeds. This tax legislation from the National Treasury attempts to address the climate crisis. This is evidence in the statement from the National Treasury that:

> Government is of the view that imposing a tax on greenhouse gas emissions and concomitant measures such as providing tax incentives for rewarding the efficient use of energy will provide appropriate price signals to help nudge the economy towards a more sustainable growth path.
> (National Treasury of SA, 2019, p. 3-4).

Tyler et al (2011) concur with the National Treasury by arguing that carbon tax is a mitigation action against the climate crisis in terms of South Africa's Copenhagen Accord commitment (National Treasury of SA, 2013).The Carbon Tax affects multinational corporations, mining industry and petroleum sector and also imposes a carbon price to encourage the most cost-effective mitigation measures in sectors such as liquid fuel, transport and electricity generation. The Department of Environmental Affairs (DEA) paved the way for Carbon Tax in 2005 by introducing the Air Quality Act 2004. The DEA by introducing Air Quality Act no 39 2004 aimed at regulating air quality to protect the environment by ushering reasonable actions for prohibiting pollution and

ecological degradation and for achieving social development, at same time, promoting economic and social development (DEA, 2004, p. 20).

The introduction of the Carbon Tax should have been pursued by the Department's (DEA Air Quality Act in 2004). Another shortcoming for the DEA's introduction of the Air Quality Act (2004) was a lack of coordination with the National Treasury's later Carbon Tax (2019)as the instrument and regulatory framework of securing quality environment and preventing pollution. Consequently, itappears that the Carbon Tax attributes causalities of the climate change to human activities (National Treasury, 2019) and they believe that interventions are needed to manage the inevitable climate change impact. These are interventions that have the potential to build and sustain South Africa's economic and social relations.

Certainly, the Carbon Tax makes the coal-intensive coal energy products more expensive. Winkler (2009, citing EDRC, 2003a) notes that by making coal-intensive energy expensive it will favour a shift to less pollution-intensive production and energy consumption. On the other hand, another anxiety of a Carbon Tax in South Africa is also the fear of declining investment. South Africa's rapid growth of electricity tariffs is seen to be disincentive for investment – along with the erratic supply and policy uncertainty. This then contradicts the South African State's threefold model of growing investment by:

- the reduction of the costs of doing business through deregulation and providing cheap infrastructure;
- limiting inflation; and
- attempting generally to keep taxes down to limit tariff increases.

Another, impediment associated with a Carbon Tax is that it would impact subalterns or the poor (Nedergaad, 2002). The argument suggests this scenario will happen because the multinational corporations and local corporations that are forced to pay carbon tax can also increase their products prices. Hence, Winkler (2009) suggests that South African government must follow The Netherlands insofar as Carbon Tax is concerned; namely, by using a consumption threshold to protect low-income groups from proportionally higher tax burdens (Winkler, 2009, p. 76).

Finally, the lack of strategy in the Carbon Tax (2019) to protect the poor from multinational and local corporate price hikes, and the possibility of ESKOM increasing electricity prices undermines the policy objectives of NDP and IRP to promote affordable access to energy. However, the National Treasury argues that revenue will assist in creating a national Green Fund as suggested by the National Treasury with Department of Environmental Affairs. The Green Fund seeks to promote innovation, build a green economy and reinforce climate policy (National Treasury of SA, 2019). Another argument against Carbon Tax is that it would increase electricity prices as the externalities entailed in pollution are currently concealed. However, this is countered by the fact that South Africa does have Free Basic Electricity policy based on volume of use – which will be unaffected by the Carbon Tax.

6. CHAPTER 6: CONCLUSION

The aim of this research is to deepen the understanding of South Africa's energy policy by drawing on the notions of the developmental state from different scholars in the literature. Following Vishwas Satgar (2014, p. 126), this study aims to contribute to an understanding of the current South African government's aspiration to build a green developmental state. According to Satgar (2014, p. 126) the South African state declared itself to be a developmental state back as 1999 and attempted to "green state ideology through the concept of the green economy". This study demonstrates, therefore, how these attempts to build a green developmental state are coming to fruition through decarbonising the economy.

This study critically also discusses contradictions of South Africa's energy policy and examines the policy documents of different government departments and initiatives, namely:

- the National Planning Commission;
- Department of Energy and Mineral Resources;
- Department of Environment, Forestry and Fisheries;
- the National Treasury of SA; and the
- Department of Trade Industry and Economic Development.

However, it is significant that the findings of this study are not representative of all policy documents in the above-mentioned initiatives. Instead, they are based mainly on the following:

- The Integrated Resource Plan (2011);
- The National Development Plan (2011);

- The Carbon Tax (2019);
- The White Paper for the National Climate Change Response (2004); as well as
- The National Planning Commission discussion papers (NPC 2010).

It is argued that when the Department of Energy and Mineral Resources committed the to set out the energy mix and envisage the decarbonisation of the energy generation for South Africa between 2011 and 2030. However, South Africa has an abundance of coal, the majority of which is being put to use by ESKOM to generate electricity.

However, the shortcoming of the Integrated Resource Plan 2011 is that after this plan was first released (2011) it was meant to be updated regularly. However, instead the current South African government continued with the construction of the Medupi and Kusile coal-fired power stations as a response to the increase of electricity demand. However, the availability and stability of electricity supply in South Africa has since been severely constrained as a consequence of the construction delays by the projects both being overdue and over budget. This crisis at ESKOM now affects nearly every aspect of national life and has profound implications for the provision of essential services, economic growth, and employment.

Recently, ESKOM's ability to generate sufficient electricity to meet demand has been deeply compromised by, among other things, unplanned outages due to poor maintenance, unreliable and expensive coal supply, and flaws in the design and operation of the newly built Medupi and Kusile power stations. What is significant, therefore, is that ESKOM's commitment to constructing Medupi and Kusile coal-fired

power stations contradict the 'National Climate Change Response Policy'(2004) of the Department of Environment, Forestry and Fisheries – a policy which aims at reducing national greenhouse gas emissions. This, therefore, also impacts the establishment of a national greenhouse gas inventory and monitoring systems for significant greenhouse gas mitigation intervention by the Department of Environment, Forestry and Fisheries. This signifies the clear contradiction of IRP and National Climate Change Response Policy (2004) and it also makes the same response policy

Finally, the lack of coherence among policy propositions of different departments is a fault line most evident in terms of the National Treasury's legislation for Carbon Tax, since, the Department of Environment, Forestry and Fisheries has failed to hold SASOL and ESKOM accountable for carbon emissions through the National Environmental Management: Air Quality Act, Act 39 of 2004. In this regard, the call by the Minister of Energy and Mineral Resources Gwede Mantashe to ensure the coal industry will continue to remain a key player in South Africa's energy system clearly contradicts the commitment to decommission coal energy by 2020.

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