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„The Political Economy of Electricity
Supply – An Institutional Analysis
(South Africa from the End of Apartheid to BRICS)“

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Declaration

I, Conrad Kassier, with this declaration indicate that the contents of this document are my own. In all cases where sources have been consulted and the work of other authors has been used, the necessary references have been added by using footnotes and acknowledging the authors according to academic best practice and according to the rules and guidelines of the University of Vienna. I understand that plagiarism is an academic malpractice and to my knowledge have complied with all measures to avoid the occurrence of plagiarism in this Master's thesis.

Acronyms

ANC	African National Congress
ASGISA	Accelerated Shared Growth Initiative for South Africa
BRICS	Brazil, Russia, India, China, South Africa
COSATU	Congress of South African Trade Unions
DA	Democratic Alliance
DRC	Democratic Republic of Congo
ESCOM	Electricity Supply Commission
ESKOM	Elektrisiteitsvoorsieningskommissie
FDI	Foreign Direct Investment
FIFA	Fédération Internationale de Football Association
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution
IAEA	International Atomic Energy Agency
IFP	Inkatha Freedom Party
IPP	Independent power producers
IRP	Integrated Resource Plan(ning)
KW	Kilowatt

MW	Megawatt
NDRC	National Development and Reform Commission
NELF	National Electrification Forum
NERSA	National Energy Regulator of South Africa
NIE	New Institutional Economics
NIRP 2	National Integrated Resource Plan 2
NGO	Non-Governmental Organization
NP	National Party
PLC	Public Limited Company
PWR	Pressurized Water Reactor
Rosatom	Russian Nuclear Energy State Corporation
SACP	South African Communist Party
SAPP	Southern African Power Pool
SoE	State-owned Enterprise
TIPS	Trade and Industry Policy Strategies
TWh	Terawatt hour
UNIDO	United Nations Industrial Development Organization
UNSC	United Nations Security Council

English Abstract

This master thesis concerns itself with the political economy of electricity supply, considering institutional aspects to analyse the case study of South Africa. The recent book by Acemoglu and Robinson called *Why Nations Fail* forms a basis for this study. With the example of South Africa, this study considers the role of institutional change in the electricity sector since 1984 towards the end of Apartheid and to what extent institutional change led to an electricity supply crisis in 2008. Considering the state-owned Eskom since 1984, the analysis also encompasses the consumer base which changed alongside new institutional arrangements after 1994, when Mandela became President.

After 1994, South Africa focused on growth and global re-integration. This caused an ever-upward trend in electricity consumption. The adaptation to democracy meant inclusivity for all citizens, but their needs did not reflect the needs to maintain the electricity sector's supply capacity. Rising demand and stagnant supply caused a supply shortage in 2008. This thesis argues that a parallel development equilibrium is required to avoid such crises, whereby electricity supply capacity needs to match the economic

development aspirations according to the national development agenda. To ensure that the parallel development equilibrium is successfully maintained, institutional change is necessary to reflect regulations, rules, policies and guidelines that prevent a gap between electricity demand and electricity supply.

Since 2010, South Africa joined BRICS (Brazil, Russia, India, China, South Africa), evidence of globalization. Accelerated development plans to integrate South Africa further into the global economy as an emerging power will place further pressure on the electricity system. The research shows that by being a BRICS member, intra-BRICS cooperation can benefit South Africa to avert electricity crises, and to undergo more satisfactory institutional change.

Deutsche Zusammenfassung der Masterarbeit

Diese Masterarbeit behandelt die politische Ökonomie der Stromversorgung, und analysiert unter Berücksichtigung von institutionellen Aspekten den Fall Südafrika. Das kürzlich erschienene Buch von Acemoglu und Robinson mit dem Titel “Why Nations Fail” bildet die Basis dieser Arbeit.

Am Beispiel Südafrika befasst sich diese Masterarbeit mit der Frage, inwiefern institutioneller Wandel eine Rolle im Erfolg der Stromversorgung und der Energiepolitik seit 1984 bis zu den letzten Jahren der Apartheid gespielt hat, und inwiefern dieser Wandel zur Energieversorgungs Krise 2008 geführt hat. Unter Berücksichtigung der staatlichen Eskom seit 1984 umfasst diese Analyse auch die Konsumenten welche sich parallel zu den neuen Institutionellen Arrangements 1994 veränderte, als Nelson Mandela Präsident wurde.

Nach der Freilassung von Nelson Mandela änderte sich die politische und wirtschaftliche Lage und mit dem steigendem Wirtschaftswachstum nach dem Scheitern der Apartheid 1994 und dem Streben nach Globalisierung danach wuchs auch der Strombedarf rasant. Obwohl die Energiepolitik sich in Pretoria der

inklusive Demokratie anpasste, entsprach diese Umgestaltung nicht den Realitäten des Stromsektors wo im Laufe der Zeit ein zunehmender Strombedarf und ein wachsender Mangel an installierter Leistungen zu bundesweiten Stromausfällen im Jahr 2008 führten. Diese Arbeit argumentiert, dass es notwendig ist ein sogenanntes paralleles Entwicklungsgleichgewicht zwischen Wirtschaftswachstum und dem Stromsektor herzustellen, um solche Krisen zu verhindern. Desto mehr die Konjunktur wächst, desto mehr sind Strominfrastrukturinvestitionen und angepasste Grundregeln - institutioneller Wandel – notwendig, damit Wirtschaftswachstum unterstützt wird.

Seit 2010 ist Südafrika das fünfte BRICS-Mitglied (Brasilien, Russland, Indien, China, Südafrika), ein Beweis für Globalisierung. Bundesweite Infrastrukturinvestitionen und ausweitende Integration in die Weltwirtschaft sind geplant und werden weiterhin Druck auf den Stromsektor ausüben. Diese Forschungsarbeit zeigt die Vorteile die Südafrika als BRICS Mitglied hat, um Energiekrisen zu verhindern, und einen mehr befriedigenden institutionellen Wandel zu vollziehen.

Chapter 1

Introduction

Through the lens of theoretical approaches and through primary sources and additional secondary literature, this work will present a contemporary historical overview of the electricity sector in South Africa. The development and challenges in the sector until today will be assessed. The obstacles that developed out of pre-democratic institutions under the Apartheid government and the National Party (NP) have shaped the status quo. The realities of the 21st century South African power generation capabilities are affected by the institutional approaches from Apartheid. For the purposes of this work, an analysis of the developments within the power producing industry since 1984 will be conducted. Eskom, the state-owned enterprise (SoE) has functioned as a monopoly and continues to remain the only large-scale electricity supplier in the country to date.

The central research question of this work is to establish what the impact of a state-regulated electricity industry is in a globally emerging South Africa. This is deepened by considering the development of a sustainable electricity supply and institutional change. In answering this question, it is important to provide a brief overview of the history of the electricity industry. That will establish the path dependency that forms part of the current dynamics of the electricity industry. This thesis investigates the above question, in terms of an institutional economics perspective. The reasons for addressing the research question within such a context include that institutions and the institutionalization of political and economic realities have been a central theme within the South Africa. Historically, this paradigm has encompassed all segments of society, including the electricity sector. The history of the NP included policy-making decisions based upon embedded institutions and a crafted system with rules and policies that formed the electricity industry. These institutions made it a challenge for critics from within the country and abroad to attempt to undo these paths of development. Eskom developed its path dependency politically and economically within this paradigm, as this thesis aims to show. Additionally, the effects of strong,

exclusive institutions and the rules of the game, as North calls it are an underlying theme in order to understand the research question¹.

Additionally, this thesis will discuss the close relationship that was developed between the government of South Africa under the NP and currently under the African National Congress (ANC). Eskom's largest shareholder of the company is the South African government, therefore making Eskom a state-owned monopoly². This relationship is defined by the political benefits that a SoE espouses and economic gains which provide the state with a tool to assert its influence over the electricity consumers. It also achieves a mixed economy comprising the state and the free market. In this way, policies that determine the future of the electricity sector will be influenced by the government in Pretoria and Parliament in Cape Town. The electricity sector serves as the backbone for production and livelihood across all sectors, from agriculture to manufacturing and households.

¹ Douglass North. *Institutions, Institutional Change and Economic Performance* (Cambridge: Cambridge University Press, 1990), p. 3.

² Eskom Integrated Report. March 2012. p. 23.

This thesis addresses institutional elements within a three-sided global context. The first is the development of Eskom in the Apartheid regime, where the focus of the economy was to protect the political and economic interests of the governing minority. The expense fell upon the non-governing majority that was subject to minimal development and inclusivity. Eskom³ produced affordable electricity and expanded its grid to where it was economically feasible⁴. The institutionalization of what was commonly known as separate development brought about a system of electricity production where the privileged few had access to abundant supplies of power at very cheap rates. The electricity production costs were minimal, due to a wealth of coal existing in the central and northern parts of the country. Coal could be mined efficiently and easily utilised for electricity production, based on the already established mining sector for other precious metals. Eskom thus

³ Eskom was the acronym since 1923 for the Electricity Supply Commission for South Africa when the company was formed based on the Electricity Act (Act 42 of 1922). The company's name in Afrikaans was Elekrisiteitsvoorsieningskommissie – EVKOM. As of 1987, the acronyms were joined and under a new management structure ESKOM became the new name of the company.

Eskom Annual Report. 1987.

http://heritage.eskom.co.za/heritage/annualreports/1987/04_ChairmansReview.pdf, accessed 11 March 2013.

⁴ Eskom Annual Report. 1984.

http://heritage.eskom.co.za/heritage/annualreports/1984/07_ChairmansReview.pdf, accessed 11 March 2013. p. 15.

developed a coal reliance to produce electricity and an over-capitalisation process started in the 1980's to counter potential supply difficulties based on stringent economic conditions⁵.

As internal and global dynamics changed with an ever-increasing resistance against Apartheid, South Africa became increasingly indebted to foreign actors to maintain economic growth and sustainability. As the following chapters will help to illustrate, the electricity sector was subject to the political decisions of increased self-sufficiency and internal market mechanisms to secure the supply side of electricity. This would help secure the economic activities around the country that enabled South Africa to remain an economic actor within a constrained global environment. International condemnation of Apartheid policies and increasing negative media attention towards P. W. Botha and his predecessors caused economic concern. International economic sanctions pressured the NP to develop policies that would allow the circumvention of sanctions. Eskom played a key role in securing electricity supply and how the government could

⁵ Eskom Annual Report. 1984.
http://heritage.eskom.co.za/heritage/annualreports/1984/07_ChairmansReview.pdf, accessed 11 March 2013. p. 15.

be able to resist international pressure. In 1990 the NP under President F. W. de Klerk unbanned the ANC as a political movement, thus opening the political spectrum for reforms that would change South Africa's political and eventual economic reality. Equally, the new realities indicated that Eskom would experience new obstacles and a more encompassing role in an inclusive society.

The second global context concerns the transition from Apartheid to democracy, but exceeding the official transition period under de Klerk until 1996. This phase concerns the period from 1994 after the first democratic election until 2010. During this time South Africa became a democratic state where the entire population was given the right to political and economic freedoms. Consolidating democracy also meant access to services and resources such as electricity in line with the liberal constitution to achieve and maintain equality in South Africa. Eskom suddenly faced the challenge of providing electricity in an economy that would become vibrant and open. The need of servicing the majority of the population with electricity as economic policies

became inclusive became part of a new mandate. The generation capacity of Eskom would inevitably need to increase significantly, according to the ambitious projects that the government was planning for infrastructure, housing and business. The key aspect in this period was that Eskom faced a need to develop itself as a power provider, as well as adapt to the political and economic developments that defined the new South Africa. Parallel capacity building, institutional change and defining the role Eskom would be required to fulfil in a post-Apartheid context was a priority. However, the needs of the electricity sector were overshadowed by a plethora of other needs within a new, inclusive society.

The lack of prioritizing this parallel development of Eskom within a context of inclusivity created institutional stagnation. Effects thereof currently hamper economic growth and sustainable electricity supply. Eskom functioned as a vertically integrated utility throughout this period, and thus fell behind in the development objectives of the South African government. Such objectives aimed at foreign direct investment (FDI), Gross Domestic Product (GDP) growth and regional as well as

significant integration into the world economy⁶. This developmental disconnect starts to shape the gap that continues to widen between the South African development agenda and Eskom. The gap concerns the lack of guarantee for a sustainable electricity industry to accompany government and private sector objectives.

The third global context that exists, begins in the latter part of 2010 when South Africa officially joined the BRIC (Brazil, Russia, India China) countries. As a member of BRICS, South Africa adds to this inter-continental club a profile that promotes South Africa's economic abilities and international stature. Included in this profile is South Africa's role in being one of the world's most resource-rich countries, having sound fiscal and monetary systems that have withstood much of the global recession⁷. Additionally, the political stability and regional strength that South Africa asserts proves attractive for the peers in this grouping. The economic diversity that ranges from mining,

⁶ A. Eberhard. "Competition and Regulation in the Electricity Supply Industry in South Africa" in *Trade and Industrial Policy Secretariat, Working Paper 2*, 2002, p. 5.

⁷ World Economic Forum. *World Economic Forum's Global Competitiveness Report 2011/2012*, p. 39.

manufacturing, tourism and services makes South Africa an economic and political power on the continent. It is comparatively ambitious to prove its ability as a permanent actor on the world stage along with the fellow BRIC countries. The manner in which Eskom fits into this current global context is through the expectations of Eskom. The locals who are encouraged to grow their businesses and to maximise their economic activities, as well as foreign investors and companies rely on electricity security. These expectations are almost taken for granted in many globally competitive peer economies. Eskom needs to ensure that sufficient electricity and affordable electricity prices will be accommodating for new businesses, and to grow and expand already existing enterprises. Since 2008, South Africa has witnessed the gap between the demand for electricity and the supply thereof growing at significant rates. The imminent reality was that Eskom was not being able to supply all consumers with sufficient power, leading to power outages⁸. Electricity provision is an economic hindrance and electricity is regarded a need before it is regarded a commodity or basic guaranteed service. This draws a direct

⁸ B. Seokoma. *Power Crisis – A Reality Facing South Africa*. April 9, 2008. <http://www.ngopulse.org/article/power-crisis-reality-facing-south-africa> (Accessed: January 21, 2012).

contrast between electricity supply realities and the economic and political institutions that drive South Africa's development agenda.

Thus, the argument of this thesis is that the historically institutionalized monopoly that Eskom is, stands in contrast to the modern institutional framework of the South African government. The political rhetoric, economic growth programmes and ambitions communicated by South Africa on the global stage are not sufficiently reflected where Eskom is concerned. The institutional stagnation of Eskom and lack of timely reforms in the electricity industry are thus affecting the systems, policies and institutions that govern growth and development.

Theoretical Framework

This thesis is based upon the theories concerning institutional change, relating to the theories of new institutional economics (NIE). Brousseau and Glachant argue that institutional change involves more than the traditional theoretical inclinations such as a purely economic theory approach, or purely political

science approach⁹. Rather, when considering questions in an academic context, especially from a global perspective, it is important to recognize interdisciplinary approaches. Institutional theory forms a part of such an approach and serves as a useful tool from a global perspective. It is evident that aspects such as economics, political science, law and philosophy can provide a far more inclusive realm to understanding the questions at hand than a single approach. Combining the necessary approaches provides an opportunity to limit the assumptions that strict academic approaches such as realism or classic economic theories such as the Heckscher-Ohlin model rely on.

Comparative NIE thus assists in the understanding of the positive and negative aspects of the theory when applied to specific cases. Some cases may provide results that promote further research, especially in the case of a global comparison between states. Differences between advanced, developing and stagnated countries will prove starker than a local organizational comparison due to the exponential tendencies that develop once

⁹ E. Brousseau & J-M. Glachant. *New Institutional Economics – A Guidebook* (Cambridge: Cambridge University Press, 2008).

the research scope widens. Nonetheless, the theory enables degrees of flexibility without losing its academic legitimacy. NIE can also be applied to a specific case study, such as a firm without comparing it to a peer organization, or polity¹⁰.

NIE involves the study of the way in which the structures and rules are made that are applicable to the management and functioning of a system. A firm, an organization, or a polity acts within a system, and this in turn will provide detailed insights of how the actors whom the rules apply to interpret them. These rules may be informal or formal, depending on the context in which the actions of the firm, organization or polity take place¹¹. Equally, these institutions can be extractive or exclusive, meaning that only some associated with the decision-makers benefit. Alternatively, these institutions can be inclusive, meaning that the citizenry can influence the institutional framework and can exert pressure when the abuse of power by decision-makers becomes

¹⁰ D. North. *Institutions, Institutional Change and Economic Performance* (Cambridge: Cambridge University Press, 1990), p. 5.

¹¹ Ibid., p. 83.

evident¹². When the rules that apply are changed, an institutional change occurs and assists in understanding of how over time this affects the firm, organization or polity, and why. An example to illustrate this can be reference to a sports team as North notes: An inexperienced team will not play the game in the same manner as a professional team, since the experience and maturity, including the quality of the skills differs and affects the outcome¹³.

Also, if the interpretation of the rules is inconsistent, discrepancies and irregularities occur, which will affect the incentives the individuals have to act in one way or another. It will also affect the strategy and the rate of uncertainty experienced by the actors involved. Thus, institutional culture is created and evolves, depending on how the institutional structure is handled, respected or adapted. Path dependence is an integral part of an institutional status quo, or of institutional change and affects the incentives and economic performance of the case that is being studied. Therefore, it can be argued that institutions are the means which permit and limit how interactions between individuals or

¹² D. Acemoglu & J. Robinson. *Why Nations Fail* (London: Profile Books, 2012), p. 73.

¹³ D. North. *Institutions, Institutional Change and Economic*, p. 4.

larger entities take place. These institutions change alongside organizational evolution and can result in a reversal of progress, or preferably result in improvements.

Applying this theory to a state-owned enterprise such as Eskom, which is monopolistic, means that the actors involved in the daily functioning of the corporation need to be considered. These include the majority of the shareholders who in this case are the government and stakeholders who are directly affected, namely the wide range of consumers. The manner in which these stakeholders interact with each other will indicate the type of institutional culture that applies to Eskom. It will also indicate how effectively it is able to manage the costs of its exchange and production which relates to the arguments of North (1990) and Acemoglu and Robinson (2012). Equally, this will affect the levels of efficiency and service delivery of Eskom and the satisfaction with the products of the consumers who are the majority of South Africa. Disputes regarding economic performance include efficiency and institutional quality and are an inevitable consequence of institutions that operate within a market-based society. Acemoglu and Robinson discuss this in their arguments

that institutions create winners and losers¹⁴. In Eskom's case this point is important since millions of South Africans and citizens of neighbouring countries are affected by the institutional quality and the performance of Eskom's monopoly. Dependencies exist to be able to participate in daily economic activities and accompanying opportunities for gains of trade.

The publications of North are regarded as instrumental and ground-breaking in the development of institutional theory. His contributions have been central in the work of all major institutionalist scholars and political economists dealing with institutional matters. North is a respected scholar around the world and is also the recipient of awards such as the Nobel Memorial Prize in Economic Sciences¹⁵. Acemoglu and Robinson are regarded as key institutional experts of the 21st century in the economic and social sciences. They are widely published, cited and debated in academic and government circles around the world and have also included South Africa in their analyses and case studies.

¹⁴ D. Acemoglu & J. Robinson. *Why Nations Fail* (London: Profile Books, 2012), p. 79.

¹⁵ The Official Website of the Nobel Prize.
http://www.nobelprize.org/nobel_prizes/economics/laureates/1993/index.html (Accessed: February 12, 2013).

Their role as advisors to government departments and positive critiques set them apart from many of their peers in the field. For these reasons the theoretical foundation of this thesis consists of abovementioned authors' work.

Hall and Thelen (2007) continue to say that in the case of organizations, institutions go beyond the mere setting of rules, but that important actors within use these institutions as resources as a means to an end¹⁶. Hall and Thelen also argue that strategic interaction between actors is a determinant in which institutions are stable and which are not. Hence, institutions are economical, historical and political in nature and advance the interests of some over others. In Eskom's case, the strategic relationships between the company's leadership and the political elites in Cape Town used to be bring about stability in the Apartheid years when a robust, centralized relationship was required to address the increasing need for self-sufficiency. After a democratic transition, this relationship was no longer the same, due to changing socio-economic and political decisions that incentivised freedom, an

¹⁶ P. A. Hall & K. Thelen. Institutional Change in Varieties of Capitalism. *Socio-Economic Review*, 2008, 7(1): pp. 7-34.

open market and international competitiveness for national growth. It is evident that Eskom is functioning within an institutional framework that has allowed monopoly to be maintained. This means that institutional disincentives for competitors in the electricity sector have prevailed. Stagnation increases transaction costs for those relying on the company, due to the inefficiencies that develop out of imbalanced institutions. From a theoretical point, his thesis will thus explore the institutional status quo and the institutional stagnation that has allowed Eskom to fall behind in its mandate to provide a national grid that is able to service the needs of all South Africans.

Methodology and General Literature

In terms of a review on the literature outside the scope of theory, primary sources are an important factor in the success of the thesis. With primary sources, the assistance of researchers at the South African Parliament as well as the Parliamentary Library has been very useful. Media statements and reports were available on the role of Eskom during the electricity shortages and its attempts at remedying the lack of supply since 2008. One such

source over the period from January to May 2010 includes 539 pages of collected media reports on the political, economic and institutional aspects that involve Eskom's World Bank loan to upgrade its supply capacity. These reports will be a helpful tool in consolidating the discourse of what South African energy policy-makers should have taken into account prior to the demand exceeding the supply. This information was gathered from a wide range of independent newspapers¹⁷. Additional documents that have been discussed in portfolio meetings exist and will shed light on the political discourse of the electricity sector in South Africa. These documents include information on the pricing arrangements, which will be explored later in this work. These will also fulfil the purpose of highlighting institutional aspects from within political structures that relate to Eskom's coal and path dependency, as mentioned above.

Additional primary sources include the annual reports that Eskom publishes and places on its website. The Eskom archive is

¹⁷ Parliamentary Library of South Africa. Should the World Bank lend South Africa's electricity company Eskom \$3.75 billion to build the world's fourth-largest coal-fired power plant? Who wins and loses – Media statements, press coverage and commentary January – May 2010.

an almost complete source of comparative information ranging from the company profile to its capacity, output, financial statements and projects. It is thus possible to identify trends, patterns and differences when comparing data and information over the short and long-term. This will highlight the level of development of the electricity industry in a comparative manner, and will also be useful to consider the historical overview that will form part of chapter 2 of this work. Equally, the policy documents from the government, such as the Integrated Resource plan (IRP) that assist in the shaping of the electricity sector are insightful. The documented attempts at reforms and the details on electricity governance will remain important in the course of writing this document. These will provide insight into the institutional framework in which Eskom functions, and how the economy is affected by its contents. The institutional framework is essentially the platform that prescribes the rules of the electricity industry, the rules that apply to the consumers, and the system in which these rules take place, and how these systems can be altered or not. The effects of the above shape how consumers, foreign investors and close trading partners such as the BRIC peers are able to function with South Africa's economy. It also indicates how South Africa is

able to assert itself globally as an emerging economy. Therefore, the phrase of North mentioned above concerning ‘the rules of the game’ hereby becomes clear and shows how throughout this thesis the role of institutions will apply in the argument and in answering the research question.

Secondary literature that applies to the thesis concerns an edited book of David McDonald. This book deals with capitalism and electricity economics from a South African and African perspective, including historical developments within South Africa’s electricity policies¹⁸. Other publications include working papers from the Program on Energy and Sustainable Development (PESD) by Anton Eberhard, which includes policy aspects as well as issues pertaining to coal and Eskom’s role in the coal industry¹⁹. By the same author the electricity supply industry is discussed from an economic policy perspective including data analysis. This will be beneficial in the thesis to consolidate policy discussion with data from the industry to merge academic discussion and

¹⁸ D. McDonald. *Electric Capitalism* (Cape Town: Human Sciences Research Council, 2009).

¹⁹ A. Eberhard. “The future of South African coal: Market, investment and policy challenges” in *Program on Energy and Sustainable – Working Paper 100*, January 2011.

commentary with practical, real examples. The said document was received by the Trade and Industrial Policy Secretariat (TIPS). A general piece of literature that will provide insight into a model of how electricity markets can function from a best practice perspective is a book by Chris Harris. His work discusses the role of the market, policies, regulation versus deregulation, pricing and capacity structures and implementation aspects of electricity reforms amongst other industry-specific issues²⁰.

Furthermore, relevant publications by the African Development Bank (ADB) comprise information on Eskom and its expansion as well as discussions on the risks of development vis-à-vis a hampered electricity sector. This relates to the publications of Benjamin Sovacool and William Rafey about electricity sustainability and possible solutions to policy and market barriers and competing energy discourses. Scholars such as Ravendra Maharaj have written extensively on Eskom from a historical perspective, arguing the changes of its organizational composition between Apartheid and the new South Africa. Such

²⁰C. Harris. *Electricity Markets: Pricing, Structures and Economics*. (West Sussex: John Wiley & Sons, 2006).

publications provide a transitional perspective to Eskom as a power supplier and as a company itself. From an emerging economy and global perspective, literature that is relevant for best practice and solutions to South Africa's energy woes includes the work of Robert Taylor et al. The authors indicate lessons from countries within the BRICS on energy efficiency, as well as reforms and strategies to conduct reforms²¹. In this same context, publications that discuss solutions, best practice and governance issues based on global South-South cooperation exist from studies conducted by the Centre for Global Development, the BRICS Policy Centre and the United Nations Industrial Development Organization (UNIDO).

The literature therefore consists of a mixture of sources. Primary sources range from newspaper reports, company reports and policy documents to government publications. Secondary literature ranges from political, economic and socio-economic publications, working papers and commentaries. This literature will be used in relation to the theoretical framework of institutions, and

²¹ R. Taylor, C. Govindarajalu, J. Levin, A. Meyer & W. Ward. *Financing Energy Efficiency* (Washington D.C.: The World Bank, 2008).

will provide a sufficiently broad basis of qualitative and quantitative information. Statistical information and other records, such as graphical representations relating to Eskom's production capabilities, its output and its financial stability will be dealt with comparatively. The use of the literature in this way will ensure verification across sources. This allows for a continuous thread across the three time-frames that will shape this document.

Chapter 2

Overview of South Africa's Electricity Sector – 1984 Onwards

During the mid-1980's South Africa found itself in a political reality that was increasingly challenging. The leadership of P. W. Botha was different from his predecessors, mostly characterized by his short temper, aggression and political bullying that earned him the title of “Groot Krokodil”²². Political reforms introduced under his term included the Tri-cameral Parliament, which allowed the Coloured folk of South Africa to be represented in Parliament as of 1984. The international community recognized the efforts of inclusivity, yet the Black majority was still oppressed and international sanctions were not lifted against Botha's government. Consequences of international condemnation of Botha's policies meant that Escom was affected by political developments. The expected ending of the Apartheid regime's exclusive policies in 1985 at the National Party Congress in

²² This term in Afrikaans means “Big Crocodile” and was generally representative of the political leadership of Botha during his tenure. His interpersonal skills made him an intimidating man who was reluctant to compromise on his convictions and he thrived on being able to show that he was a reactionary.

Durban did not occur. Resultantly, the Rand²³ plunged into further weakness and international condemnation of Botha's policies was imminent. One of the failing statements that set the political tone was Botha's conviction that his policies are the only ones that are representative of the majority of the white population of South Africa²⁴.

This does not mean that Escom did not increase its sales around the country or cut its ties with neighbouring Bantustans²⁵ or countries that received electricity from South Africa. It is undisputed that Escom functioned within an exclusive institutional framework. However, growth under exclusive institutions is not impossible and investments into infrastructure as well as improvements in sales figures are common and will indicate growth²⁶. This growth is not sustainable though, since under exclusive institutions the growth curve will eventually scale

²³ The Rand is South Africa's currency and it is abbreviated locally with "R" or internationally with "ZAR".

²⁴ Address by State President P. W. Botha DMS at the Opening of the N P Natal Congress – Durban, 15 August 1985.
http://www.politicsweb.co.za/politicsweb/action/media/downloadFile?media_fileid=1065, Accessed 11 March 2013.

²⁵ Bantustans were condensed areas of land reserved for the Black majority for separate development.

²⁶ D. Acemoglu & J. Robinson. *Why Nations Fail* (London: Profile Books, 2012), p. 92.

towards negative territory. This is based on the political limitations that influence the economic activities and when considering Escom, the evidence supports the theory. The graph below shows this in figures.

Figure 1:

Operating Statistics			
	1983	1984	1985
Total Electricity sent out by Escom (mill. kW.h)	108321	117086	122494
Electricity available for distribution (mill. kW.h)	105404	113898	119229
Coal burnt in Escom power stations (Mt)	55.0	58.7	59.5
Water consumed in Escom power station (Mℓ)	255654	269868	275716
Peak demand on integrated Escom system (MW)	15639	17296	17852
	(10/08/'83)	(15/06/'84)	(12/07/'85)

Source: Compilation of data available from the Escom Annual Report of 1986²⁷.

Figure 1 shows that despite an unstable political institutional framework, and increasingly unstable economic conditions for South Africa, growth was evident. All five indicators show an upward trend of higher consumption, production and input factors. Escom believed this to be positive,

²⁷ Escom Annual Report. 1986.

http://heritage.eskom.co.za/heritage/annualreports/1986/01_Highlights.pdf, accessed 11 March 2013.

but longer-term forecasts indicated the need for financial repositioning and reconsidering capacity targets.

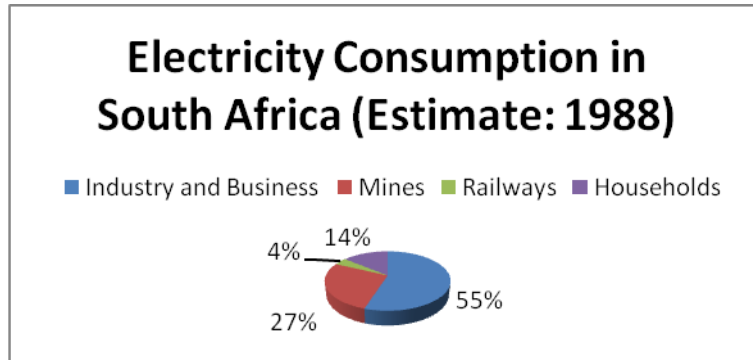
The De Villiers commission provided an in-depth analysis of Eskom's business model but it did not provide adequate answers to questions of economic concern. The data for the late 1980's shows this and is presented in Figure 2²⁸. The economic context in which the 1980's must be placed concerns the severe drought that pressured the economy, as well as a strong US dollar, weak Rand and above average inflation²⁹. The post-1985 political context made it difficult for Eskom to borrow easily on foreign markets and thus financial repositioning was the only viable option to consider.

²⁸ The data in the chart must be understood in terms of Apartheid electricity consumption. The governing minority voters had abundant access to electricity and the data concerns this white minority. The chart represents the four basic sectors of Apartheid's mainly exclusive electricity consumption categories. Eskom's rising capacity expansion costs based on ensuring higher degree of self-sufficiency in an increasingly isolated global environment, increasing losses and limited financial manoeuvrability were evident. The de Villiers Commission did not find sufficient answers to questions about these trends.

²⁹ Eskom Annual Report. 1984.

http://heritage.eskom.co.za/heritage/annualreports/1984/07_ChairmansReview.pdf, accessed 11 March 2013.

Figure 2:



A representation of the ratio between electricity consumption by sector.

The choices of the executives of Escom during the 1980's to build Majuba, a power station at a very high cost, proves the importance of how the 'rules of the game' are applied. The decision to build all units of Majuba against the advice of the majority of stakeholders meant that until the present day, this power station produces unreasonably expensive electricity³⁰. This indicates the institutional dominance over managers' reasoning or choices that facilitate long-term financially and economically low-profit outcomes. Escom operated 26 power stations in 1984,

³⁰ G. Steyn. *Eskom: History's Unheeded Lessons*.
http://www.gsb.uct.ac.za/files/BusinessDay_newspaper_article.pdf, accessed 11 March 2013.

which required sufficient revenues from sales. Tariff increases was also a reason that led to the De Villiers Commission³¹.

Throughout the 1980's and into the early 1990's, Eskom focused on capacity projects and cost savings to prevent supply instability. Interestingly, Eskom's supply side management was favourable, which led to the initial low price per kilo-Watt (kW) hour that the citizenry has been used to from the 1970's. There was no essential need to have even more excess power supply, based on the number of users that had access to electricity. The kW hours used by these consumers was easily furnished with grid capacity in the late 1980's and the early 1990's. However, with the capacity build projects that were pursued nonetheless, costs soared including borrowing costs and interest rates on loans. Revenues through increased tariffs and modest coal savings aimed at reducing the percentage requirement of annual tariff increases. It is

³¹ Tariff increases were not understood, taking into account the abundance of electricity under the Apartheid system. However, the costs of building Majuba meant that revenues had to be increased as well, since borrowings from foreign markets was limited due to high levels of isolation. Expansion had to be funded in multiple ways. To address protests against increased electricity tariffs, the de Villiers Commission was tasked with investigating this. Tariffs are discussed in greater detail in chapter 3.

safe to state that Eskom was undergoing unreasonable projects, since supply met demand and equilibrium existed.

In the mid 1980's, neither Eskom nor the government could have assumed what would occur in the following years when the end of exclusive Apartheid institutions was imminent. If concrete knowledge of this would have been available, it would have made sense to expand electricity infrastructure to accommodate the majority of the population that would inevitably and predictably become energy consumers. Because the end of Apartheid was not in direct sight, Eskom's expansion made little economic or political sense between 1984 and late 1986. The white minority was in no direct threat of an electricity shortage occurring during this time.

In 1986 capital expenditure and operating costs had to be limited in order to reduce the accumulated deficit of R287 million³². This amount was considerable, even in relation to economic terms of 2013. This amount indicates the level of

³² Eskom Annual Report. 1986.
http://heritage.eskom.co.za/heritage/annualreports/1986/06_ChiefExecutives.pdf, accessed 11 March 2013.

unprofitability caused by decisions made by managers in correlation with government decisions about electricity supply. Decision-making at Eskom's management level and decisions made by government departments thus have profound effects over the long-term. The losses made by Eskom could, however, not be a too limiting factor. The costs incurred into expansion projects range over many years and inevitably impact long-term profitability.

Institutionally, after 1986, a new structure for Eskom was envisaged. In 1987 Eskom became Eskom and a rebranding of the company occurred. After the De Villiers Commission in the mid-1980's, Eskom decided to become a less bureaucratic organization and to strive towards a professional business model. In the interest of the locals' faith in Eskom and for its image abroad, the new Eskom aimed to be an example of a major company with the ability to embrace change. The debt standstill which did not permit Eskom to borrow funds on international capital markets forced institutional change to occur³³. The international community, mainly Europe and the United States of America, waited for

³³ Eskom Annual Report. 1987.
http://heritage.eskom.co.za/heritage/annualreports/1987/04_ChairmansReview.pdf, accessed 11 March 2013.

Botha's government to embrace an institutional change in favour of inclusivity and democracy. Botha announced that Eskom would become more professional, focus on service delivery and financial integrity³⁴. The aim of this was to show signs of inclusivity and taking reforms of the industry seriously.

Institutional change did in fact occur and Eskom enforced a decentralised approach of decision-making which allowed the power provider to forge closer relationships with customers. However, new values and organizational restructuring that was agreed upon by Eskom and the government must be understood as institutional change only within the company framework. Declining trends of rising tariffs vis-à-vis inflation and equal pay for equal work³⁵ for employees indicated a willingness to face the challenges of internal company distortions³⁶. Institutional change within Eskom and especially towards its relation with Black

³⁴ Eskom Annual Report. 1987.

http://heritage.eskom.co.za/heritage/annualreports/1987/04_ChairmansReview.pdf, accessed 11 March 2013.

³⁵ Equal pay for equal work was part of a drive towards recognizing not only merit, but also fair wages for work completed. Creating better morale amongst employees and matching the workload of employees with more competitive wages was part of the drive to create a rebranded image of Eskom.

³⁶ Eskom Annual Report. 1987.

http://heritage.eskom.co.za/heritage/annualreports/1987/04_ChairmansReview.pdf, accessed 11 March 2013.

workers³⁷ was a politically supported move by Botha's government. This portrayed South Africa as being able to adapt to norms of social legitimacy as with the racially impartial wage and salary policy.

With wages being representative of labour, the individual and his/her abilities to contribute positively for Eskom's benefit showed a higher willingness by South Africa's employers to be socio-economically inclusive. These changes were symbolic and did not reflect the actual socio-economic realities of the late 1980's. The majority of Black South Africans did not enjoy the privileges of Eskom's changes and the beneficiaries remained the non-Black minority. The institutional change was economically more inclusive, yet, the political institutional aspect of Eskom's restructuring remained mostly exclusive. This is evident in the manner in which Eskom's interaction with the government during its organizational rebranding did not lead to the government

³⁷ Black workers made up the majority of the labour required to work on technical, mechanical and maintenance crews. The floods in the province of Natal in 1987 caused much damage to power infrastructure. Black workers were instrumental in helping to revitalize power supply. It also represents a typical trend in the Apartheid times, that Black labour was essential for the white minority to maintain their economic clout. Many of those workers had no electricity at home, but formed part of teams to ensure uninterrupted supply for the white minority.

providing more rights to Black citizens to access electricity. The hope was that as Eskom restructured itself, the political actors involved would ease the political blocking of providing electricity to all citizens, regardless if they resided in Bantustans or in the white-dominated urban areas. The political sensitivity of equal electricity access would have dented the ideology of Afrikaner governance, which rested upon notions of cultural and intellectual superiority. The Apartheid belief in separate development for Bantustans would have been contradicted if so-called universal energy access would have prevailed.

Figure 2 represents the sector consumption of electricity, but the information is only representative of the economically active in South Africa. The access to electricity in rural areas is not included in the graph, based on information collected in 1988. The institutional change of Eskom was insufficient and reflected only positively within the organization and the NP. The political and economic realities of the majority remained unchanged even where some electrification of rural Black households occurred³⁸. This is a

³⁸ Eskom Annual Report. 1988.
http://heritage.eskom.co.za/heritage/annualreports/1988/08_EskomInAction.pdf, accessed 11 March 2013.

case of minimal institutional development that hints at a willingness to adapt to systemic internal and political pressures in the most limited of ways.

In September 1989, F. W. de Klerk succeeded P. W. Botha and brought about a liberal doctrine for political and economic change, which included ending Apartheid. This political dispensation introduced changes that affected Eskom positively. Nelson Mandela was released from prison as of 2 February 1990 when de Klerk made a historic speech in parliament. This indicated inevitable political change towards an inclusive government. Eskom faced the seemingly manageable task of forging closer relations with the Southern African region³⁹ and to provide the needed distribution capacity for an environment conducive for economic growth. The recent changes within Eskom paved the way for a new direction and a new business model⁴⁰. In the late 1980's a global trend developed that embraced neo-liberal thinking and included the increase in privatization of

³⁹ This region consists of Lesotho, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe.

⁴⁰ Eskom Annual Report. 1990.

<http://heritage.eskom.co.za/heritage/annualreports/1990/8-9.pdf>, accessed 14 March 2013.

public enterprises. A later result from the De Villiers Commission included the establishment of the 1987 Eskom Act (Act 40 of 1987)⁴¹. It indicated gradual neo-liberal developments even under a reactionary government that was caught between upholding Afrikaner nationalism and heeding the call for inevitable politico-economic reforms. The 1987 Act made electricity a more business-orientated industry with room for profitability and increased service delivery. This nonetheless was racially skewed to benefit the White minority in the short-term⁴².

The commitment to achieve a position for Eskom within a politically and economically inclusive system existed. In 1990 the forecasts for electricity supply were moderate, since predictions about supply and demand could not be accurately determined. The inclusive election and discussion for a new institutional framework had to be completed first. This was done through two conferences,

⁴¹ L. Gentle. "Escom to Eskom: Racial Keynesian capitalism to neo-liberalism 1910 - 1994" in D. McDonald. (Ed.). *Electric Capitalism* (Cape Town: HSRC Press, 2009), p. 64.

⁴² Infrastructure developments in areas where mostly Black citizens resided were too limited, and Black citizens were not able to compete economically on the same level as whites, based on exclusion.

namely CODESA I and CODESA II⁴³. It was not possible to forecast the ratio between demand and supply for Eskom's production in 1990. It was clear that a politically equal South Africa would require significant changes concerning electricity production capacity and unmatched demand on the grid. However, evidently these ratio's were not contemplated thoroughly and contingency plans were not prioritised to ensure a perpetuated trend of surplus capacity. A need for parallel development was lacking in practice. The demand for electricity would inevitably increase exponentially and thus related institutional reforms that determined Eskom's ability to ensure supply would have had to match future demand patterns. Essentially, more electricity was required after the fall of Apartheid, and discussions of the unbundling of Eskom formed part of the new government. Such a process would be long-term and electrification programmes would be slow, based on the needs to increase the grid's reach.

⁴³ CODESA was the Convention for a Democratic South Africa and included constitutional negotiations.

McDonald also argues that even though electrification programmes for the Black, Coloured and Indian communities increased after the fall of Apartheid, electricity access was racially, politically and economically still reserved for the minority. His term refers to 'electric capitalism' which can be ascribed to the hierarchical and blatant exclusionary policies⁴⁴. The relationship between capital and electricity was institutionally limited to benefit Whites with cheap electricity until the early 1990's. This was achieved by directing capital investments to infrastructure where the access was mainly limited to Whites. The Black (including Coloureds and Indians) population of South Africa had the option to apply for electrification to rural and other areas, but based on their depressed economic circumstances, Eskom's electricity tariffs were unaffordable. The Indian and Coloured community benefited more from White electric capitalism after 1984 and boosted their economic agency. The Tri-cameral Parliament of 1984 paved the way for Coloured and Indians to be on the same political and economic level as Whites, but Blacks remained excluded. The

⁴⁴ D. McDonald. "Electric Capitalism: Conceptualising electricity and capital accumulation in (South) Africa" in *Electric Capitalism* (Cape Town: HSRC Press, 2009), p. 3.

energy poverty of Blacks and a limited electrification of their properties or residential areas perpetuated.

Sustainability is mentioned in the Eskom Annual Reports alongside the need for hard work to attain economic growth in an inclusive manner⁴⁵. The sustainability argument of Eskom is flawed in terms of its labour reduction requirements related to its financial position on international capital markets and national reduction in capacity extension projects. Sustainable energy development for all must be understood as being targeted at the economically empowered citizens. The selected few minority groups enjoying partial benefits was not representative of the economic whole, and the creative destruction typology of Schumpeter only benefited consumers who were already integrated into the national grid⁴⁶.

The sets of institutions thus illustrate that even after organizational restructuring of Eskom, disconnected parallel realities exist. For Blacks, the institutional structure still proved

⁴⁵ Eskom Annual Report. 1990.

<http://heritage.eskom.co.za/heritage/annualreports/1990/8-9.pdf>, accessed 14 March 2013.

⁴⁶ D. McDonald. (Ed.). "Electric Capitalism: Conceptualising electricity and capital accumulation in (South) Africa" in *Electric Capitalism* (Cape Town: HSRC Press, 2009), p. 4.

politically and economically exclusive, whereas for Coloureds and Indians the institutional realities were less severe since a higher degree of inclusion was possible towards inclusive political and economic institutions. Regarding Whites, the institutional framework remained politically and economically inclusive based on path dependency and institutional integration. Eberhard notes how the institutional reforms did not represent any urgency in unbundling Eskom, since until the present day it remains a parastatal with majority shares held by the government⁴⁷.

Eskom's attempts at rural electrification and improved consumer service formed part of the neo-liberal reforms. In the early 1990's and under the later leadership of Mandela, access to electricity occurred at unprecedented rates⁴⁸. Locally received revenues were to be used more effectively to accumulate income instead of depending on long-term foreign loans. The diversification included incentives for managing the electricity industry according to neo-liberal economic trends. These included

⁴⁷ A. Eberhard (2003: 2) in L. Gentle. "Escom to Eskom: Racial Keynesian capitalism to neo-liberalism 1910 - 1994" in D. McDonald. (Ed.). *Electric Capitalism*, p. 50.

⁴⁸ D. McDonald. (Ed.). "Electric Capitalism: Conceptualising electricity and capital accumulation in (South) Africa" in *Electric Capitalism* (Cape Town: HSRC Press, 2009), p. 1.

public-private partnerships, and outsourcing within a paradigm where the state is still dominant⁴⁹. The NELF as a regulator of the electricity industry was established in the transition years under de Klerk (1990 -1994) and new directions for electricity management were broadly discussed. This included attempts at privatization, yet, the ANC in exile rejected these.

In 1994, Nelson Mandela became the first democratically elected president. The interim constitution led to inclusivity in political, economic and social terms. It was regarded as a 180° turn-around and described as a political transitional miracle. With regards to restructuring, Nelson Mandela, Thabo Mbeki and the ANC made significant efforts to inform the world, future allies and trading partners about South Africa being 'open for business'. Eskom's role in this new dispensation was continuously being evaluated to ensure that it provided new consumers with grid access. Social equality was related to achieving some form of a common standard of living, where electricity access was fundamental.

⁴⁹ L. Gentle. "Eskom to Eskom: Racial Keynesian capitalism to neo-liberalism 1910 - 1994" in D. McDonald. (Ed.). *Electric Capitalism*, p. 68.

The NELF's successor was introduced in 1995 with the creation of NERSA as an overarching body to regulate energy implementation⁵⁰. NERSA was in charge of overseeing electricity developments by Eskom. Additionally, Eskom was mandated to apply for approval of electricity tariff increases from NERSA after its inception. NERSA serves the purpose of achieving checks and balances in the electricity industry when capacity expansion and related developments are announced. The outcomes from the repositioning included cost-reflective pricing structures and competitiveness in supply side management. A key intention in this repositioning was an inclusive institutional framework to prevent state-directed monopoly capitalism. Thus, after 1995, Eskom became a limited liability company with share capital⁵¹. The South African government remains the sole shareholder of Eskom, and is represented by the Minister of Public Enterprises from the ruling party and in this case, a member of the ANC⁵².

⁵⁰ S. Greenberg, "Market liberalisation and continental expansion: The repositioning of Eskom in post-Apartheid South Africa" in *Electric Capitalism*, p. 75.

⁵¹ Ibid., p. 76.

⁵² Eskom Integrated Report. March 2012, p. 37.

On a national level, institutional reforms included a new law that formalised Eskom's repositioning. The Eskom Conversion Act (No. 13 of 2001) paved the way for Eskom to become a company to pay tax and dividends to the state in 2002⁵³. By 2002, economic growth programmes had accelerated under the government's attempts to fight poverty and to provide a better life for all, the slogan that brought Mandela into Parliament. BEE policies were ANC reforms to undo the oppressed realities of the Black majority. Entrepreneurship and business programmes were strongly encouraged by government to empower the poor and economically inactive to be integrated into the new South Africa. These policies equally mandated Eskom to make reforms within the organization. Mandates included Eskom to incorporate new private companies and to ensure their competitiveness within the supply and distribution side. This was a further attempt to unbundle Eskom so that a higher level of competition existed.

In the same context on a global level, the first years of democracy in South Africa showed the country becoming

⁵³ S. Greenberg. "Market liberalisation and continental expansion: The repositioning of Eskom in post-Apartheid South Africa" in *Electric Capitalism*, p. 76.

increasingly involved in multilateral institutions. The economy showed great potential for being actively included in the global economy. This meant that foreign actors increasingly showed interest in conducting business in South Africa. Actors who showed interest in investing in South Africa needed reassurance that essential services such as electricity were available. Competing actively in the global economy means that those sectors within South Africa that are important to attract foreign investors must match global expectations. This means that Eskom as a company must be comparable in its business model and business practice to other electricity providers such as Eletrobras of Brazil or the State Grid Corporation of China.

The sale of Eskom's generation capacity assets was under continued debate with little agreement on why these assets should be privatised, considering Eskom's electricity prices being of the lowest worldwide. Privatization almost occurred in 1999, but the relationship between government and labour caused a backlash⁵⁴. This led to the agreement that Eskom's future power station

⁵⁴ R. Maharaj. Eskom: The making, unmaking and remaking of an institution - A case study (Unpublished Dissertation, University of Pretoria – Gordon Institute of Business Science, 2011), p. 50.

construction would involve IPP's in accordance with energy policies and neo-liberal practices in South Africa's mixed economy. However, even in an IPP-friendly environment, the relationship between private sector and public sector investment was not deeply established to ensure the viability of the privatization attempts. The alliance partners of the ANC who include COSATU and the SACP tinkered at this relationship to strike a balance between state expenditure on parastatal companies and ensuring that labour is represented inclusively. The stakeholders that formed part of the economic restructuring had increased significantly since the fall of the NP. Horizontal rather than vertical approaches to political economy were the new status quo and demanded the representation of all sectors in decision-making. Accommodativeness instead of instruction was a core element of how economic performance related to institutional structures and capital accumulation. Hence, Eskom remained a state-dominated entity but in such a context the political institutional framework demands robustness if its inclusive nature is to be beneficial to all involved stakeholders. A healthy balance between party-political goals of the ANC and the private sector (IPP's and investors) was required so that Eskom's needs of expansion could be financed

A political side-effect of rapid socio-economic change in South Africa was the need for the ANC to address multiple readjustment projects simultaneously. This meant that economic programs such as GEAR⁵⁵ of 1996 and ASGISA⁵⁶ of 2006 assisted in attaining the goals of parallel social and economic development. Eskom was central in these developments, as electricity security is fundamental for sustained economic growth trajectories. Jobs had to be created and economic incentives set in place to empower the marginalized majority and to be able to absorb FDI and growth targets. GEAR was a contentious issue since it made little commitment to increased state expenditure on parastatals like Eskom. Labour and political parties such as the IFP deemed GEAR as irritating and later welcomed ASGISA. It was seen as

⁵⁵ GEAR (Growth, Employment and Redistribution) was an economic program which aimed at decentralization, service delivery and addressing needs of the citizenry. These needs included the creation of jobs and encouraging provincial involvement in providing essential services like health and infrastructure. The programme was not deemed successful even though progress had been made.

⁵⁶ ASGISA (Accelerated Shared Growth Initiative for South Africa) was a national programme, encouraging the public sector, private sector and the government to attempt partnerships for growth. These included attempts to halve poverty and unemployment by 2014. The programme was regarded as being notably more successful in providing scope for reducing the rate of inequality (the Gini co-efficient), even though it was replaced by the New Growth Path during 2010.

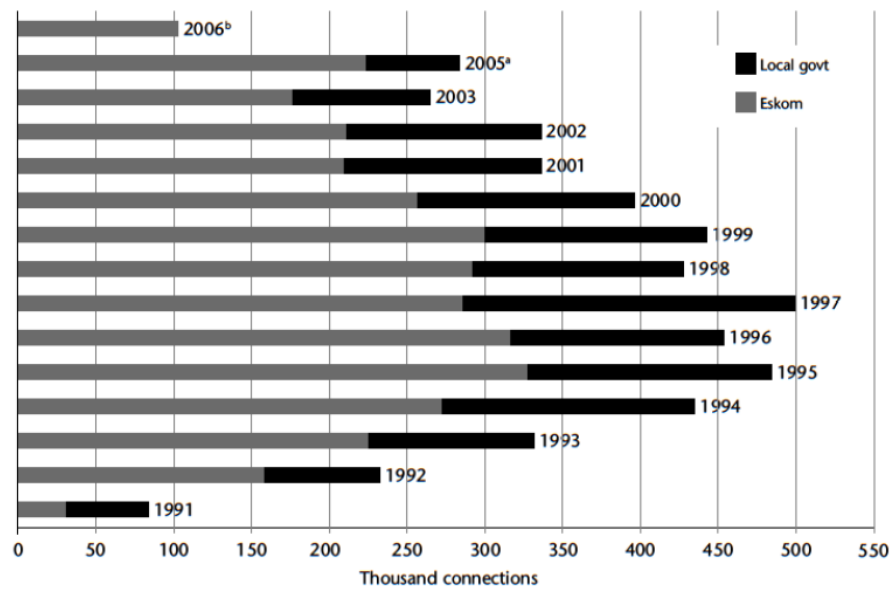
being a more nationally inclusive, neutral and technical tool to attain macroeconomic stability⁵⁷.

Political goals and economic needs clearly overlapped from the 1990's onwards. Issues such as poverty reduction, access to health care, basic services including education, transport, infrastructure and a reformed banking system demanded equal attention from the ANC. The decisive challenge was to address these issues in parallel terms without side-lining economically crucial factors. The energy sector is the backbone of any economy, since without it no integrated economic activity can reliably occur. Thus, the need to expand and upgrade the electricity infrastructure was a priority. With the benefit of hindsight, the commitment to sustainable electricity provision fell short of its targets and is visible in the bureaucratic nature of decision-making. GEAR and ASGISA indicate a time frame of a decade and during this time the political promises of the ANC had not matched the economic realities faced by the service providers like Eskom. Thus, Eskom

⁵⁷ R. Maharaj. Eskom: The making, unmaking and remaking of an institution - A case study (Unpublished Dissertation, University of Pretoria – Gordon Institute of Business Science, 2011), p. 67.

was facing increasingly large demand with little scope to maintain supply momentum.

Figure 3: Eskom and local government electricity connections: 1991 – 2006.



Sources: Eskom 1996, 1999 - 2005; NERSA 1995, 1998, 2000b, 2003b in S.

Greenberg. “Market liberalisation and continental expansion: The repositioning

of Eskom in post-Apartheid South Africa” in *Electric Capitalism* (Cape Town: HSRC Press, 2009), p. 86.

The above graph indicates the growth in new annual electrification connections since 1991. It illustrates the enlargement of the industry after the unbanning of the ANC in 1990. Eskom and municipalities worked under a common mandate to reach connection targets. 1997 was a peak year with almost 500000 new connections completed, but new connections slowed after Eskom slowly began to diversify its generation capacity model after the privatization attempts. Towards 2006 new connections had slowed significantly since demand by then started to burden the distribution capacity of the national grid.

The privatization efforts which did not materialize in 1999 brought about sluggish intervention into Eskom’s urgent need for expansion. The sluggishness was in part associated with low incentives due to the historically low price of electricity which will be discussed in the following chapters. The outcome was that by 2004 the government realized it had a responsibility to avoid a

power supply crisis⁵⁸. The construction of power stations by Eskom became an immediate need as per the instruction of the government. Insiders in Eskom had been in dialogue with the government about capacity expansion, and their calls were heeded as of 2004, but in hindsight this was too late to avoid the eventual power crisis that began in 2007.

Eskom began to increase its global reach when it developed new ties with countries such as India and China during the late 1990's. The purpose was to collaborate on energy projects and the inter-continental reach was broadened to the SAPP and beyond to countries including Libya, Mali, Nigeria and Zanzibar⁵⁹. Regional integration and the international relations that pertained to electricity projects were important factors to show regional interest in the SAPP. This was also an opportunity to prove that Eskom had capacity to export and import electricity from partners in the SAPP according to bilateral and regional power agreements. Such agreements had existed during Apartheid, but these

⁵⁸ Eskom Holdings Limited 2009a in R. Maharaj. Eskom: The making, unmaking and remaking of an institution - A case study (Unpublished Dissertation, University of Pretoria – Gordon Institute of Business Science, 2011), p. 53.

⁵⁹ Eskom Holdings Limited 2009a in R. Maharaj. Eskom: The making, unmaking and remaking of an institution - A case study (Unpublished Dissertation, University of Pretoria – Gordon Institute of Business Science, 2011), p. 52.

agreements were given greater attention as South Africa integrated itself further with its northern neighbours. By 2007 Thabo Mbeki apologized to South Africans and investors from the SAPP and globally about the poor quality of electricity supply.

Power outages, overdue maintenance and slow progress on upgrading reserve capacity became a new reality in the economy⁶⁰. This was coupled with the choice the government made about not heeding early calls by Eskom insiders and observers to avoid an imminent, crippling electricity crisis. The political choice was economically detrimental and long-term with effects on a national level. Industrialization suffered since large-scale enterprises such as aluminium smelters and mines are the largest consumers of electricity. For foreign investors the energy shortage highlighted a lack of political will to address fundamental pillars to achieve economic growth. Widespread concern ensued with signs that economic restructuring and weak political commitment led to an undermined institutional framework.

⁶⁰ Eskom Holdings Limited 2009a in R. Maharaj. Eskom: The making, unmaking and remaking of an institution - A case study (Unpublished Dissertation, University of Pretoria – Gordon Institute of Business Science, 2011), p. 54.

Hall and Thelen correctly indicate that institutional change may not always be beneficial to achieve national goals in an uncomplicated manner. Compromises by stakeholders on how to achieve common economic goals are unavoidable⁶¹. The greater the amount of stakeholders involved in trying to find solutions, the more difficult it becomes to tailor these solutions according to the preferences of all stakeholders. The tendency of institutional stagnation was the product of a well-intentioned unbundling of Eskom in an economically and politically inclusive context. The metaphorical cost of institutional stagnation was economic stability in the electricity sector.

Eskom's approach since 1994 had been one of managed liberalization⁶². The trade-off between economic growth through increased supply capacity and keeping electricity affordable remains a contested issue until today. This also precipitated the power crisis and its roots lie in the lack of implementing preventative measures in time. New power stations were commissioned and remain under construction. The capacity for

⁶¹ P. Hall & K. Thelen. 2009. Institutional Change in Varieties of Capitalism. *Socio-Economic Review* 7(1), p. 15.

⁶² M. Steele, N. Schulz & F. Musana. (Eds). *The Eskom Factor: Power Politics and the Electricity Sector in South Africa* (Johannesburg: Greenpeace Africa, 2012).

institutional coherence is limited due to the interconnectedness of various control-seeking stakeholders in the process of developing electricity security. The Departments of Energy, Trade, Finance, Environmental Affairs and Local Government are some of the entities involved in decision-making. The political discourse around energy security is dominated by government spokespersons emphasizing how these Departments are working collectively.

The reality remains that such institutional inclusion into national strategic goals lead to bureaucracy, increase transaction costs and prolong the process of showing actual improvements to electricity policy and improved practice in the demand and supply side management. South Africa embarked on an ambitious power station construction programme. Medupi and Kusile are the two new stations being constructed in Lephalale and eMalahleni in the Northwest province and Mpumalanga province of the country. After becoming operational, these stations will serve the main purpose of increasing grid capacity. Secondly, Eskom's public and international image will be re-legitimized to some extent. During the 2010 Fifa Soccer World Cup no power outages or load shedding was necessary, since the grid provided sufficient base

load and excess supply to meet increased demand during the competition. The expectation was that power outages would compromise the ability to compete in games that were scheduled in stadiums in Johannesburg, Durban and Cape Town. However, the contrary was the case and negative reports from FIFA and the media were avoided.

The electricity industry must be further discussed by mentioning key improvement projects. Medupi and Kusile are coal-fired power stations and will add 4788 MW to the national grid and Kusile will add 4800 MW⁶³. In 2008 the national grid provided capacity of 38744 MW, but reserve margins were dropping to 4.9%, causing a national electricity emergency⁶⁴. This affected all economic sectors and led to the closure of businesses that could not afford the lost revenue of load-shedding. The economy was hard hit with job losses and negative investor sentiments that drove down competitiveness, especially in the sectors of heavy industry such as mining.

⁶³ S. Patel. 2008. "Whistling in the Dark: Inside South Africa's Power Crisis" in *Power* (152): 11.

⁶⁴ Ibid.

In 2008, Eskom operated 27 power stations, including the nuclear power station of Koeberg in Cape Town⁶⁵. The nuclear capacity is minimal in terms of the national requirement, since Koeberg only provides 4.7% of Eskom's national supply. In addition to the national shortages of 2008, the government maintained its commitments to the SAPP. Lesotho, Swaziland and Zimbabwe are highly reliant on Eskom due to economic challenges that prohibit electricity independence in these countries. South Africa imports less than 4% of its capacity from Mozambique and the Democratic Republic of Congo (DRC)⁶⁶. Since the beginning of the construction of Medupi and Kusile, labour unrest and financial discrepancies have dominated in the media and in government. The cost overruns are estimated at R209.7 billion, excluding interest on these figures and Medupi is said to be operational towards December 2013⁶⁷. The projects are marred with inconsistent regulation and control over expenditure as well as delays of up to 20 months. The transaction costs of this

⁶⁵ Ibid.

⁶⁶ S. Patel. 2008. "Whistling in the Dark: Inside South Africa's Power Crisis" in *Power* (152): 11.

⁶⁷ T. Craemer. 2012. "Medupi, Kusile overruns should be probed, NPC commissioner asserts" <http://www.engineeringnews.co.za/article/medupi-kusile-overruns-should-be-probed-npc-commissioner-asserts-2012-08-21>, accessed 22 August 2012.

construction project are putting the image of Eskom at risk once again and highlight accusations of incremental incompetence. The government is being heavily criticized in the media. Electricity tariffs will be discussed later, but it is relevant to state the main difference between 1984 and 2013. This difference concerns the excess capacity and lack of demand after 1985 and the excess demand and lack of supply in 2013. In both cases the institutional frameworks form a common denominator.

Chapter 3:

Inside the Electricity Industry

Demand versus Supply in an Emerging Economy:

Chris Harris investigates the mechanics of how an electricity industry should be managed in order to achieve stability and consistency that compliments economic growth. Demand and supply of electricity involves its generation, transmission, distribution and metering⁶⁸. This relationship is economic in nature and even more importantly, it is defined by the delicate balance between consistently producing sufficient base load and matching demand⁶⁹. The demand for electricity varies as economic activities increase or decrease. Continuous grid regulation is essential to ensure that distribution occurs in a manner that supplies areas with higher usage with sufficient supply without overloading the grid. The risk of having too little electricity fed into the grid affects the base load and will distort supply, leading to outages. The

⁶⁸ C. Harris. *Electricity Markets – Pricing, Structures and Economics*. (West Sussex: John Wiley & Sons, Ltd., 2006), p. 21.

⁶⁹ Ibid., p. 13.

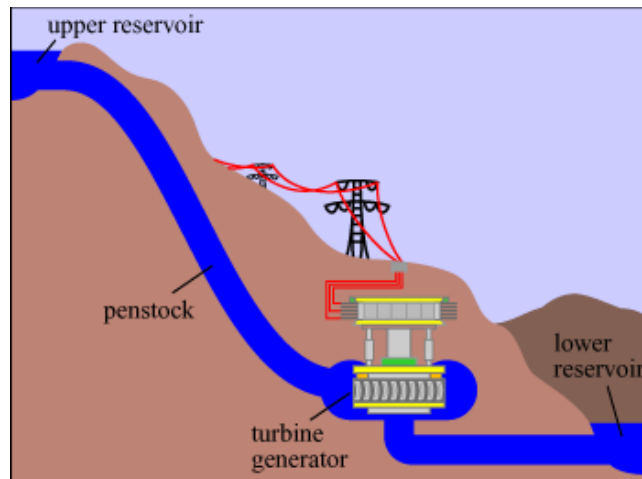
management of this ever-changing delicate relationship requires skills, knowledge, regular maintenance and strong institutional structures. The electricity supply chain cannot simply be turned off. It is a cornerstone of an economy where production knows no holidays.

This raises the point of how delicate balances in power generation and storage can be achieved. Storage can ease the pressure on electricity generation, yet it is no easy task to store electricity in the form of currents. Due to the nature of electricity, power can be stored in batteries for example, but this is limited to very small-scale use. Water is a key element that can be used to convert the pressure of its flow back into the form of an electric current through the use of turbines. Once demand is high enough to use the electricity from this, it is possible to use this source as an electricity reserve. Water flow will be released from dams which provide the water flow to create electricity. Pumped storage is thus a common feature which involves a conversion of hydropower into electrical power. The capital costs for this are very high, efficiency and sustainability of storage is low and transmission

losses are higher than expected in many cases⁷⁰. To be able to invest into a pumped storage system, geographical requirements must be met and access to land is essential. Two dams are required on a high and low elevation and sufficient water capacity is non-negotiable. The pumping of water from the higher elevation to the lower elevation is the key to creating electric currents. The water is released downwards when electricity current needs to be created. The flow of water in a downward manner is transformed into electrical energy through the turbines that are placed on a lower site between the two dams. The image below provides a graphic representation of how pumped storage works.

⁷⁰ C. Harris. *Electricity Markets – Pricing, Structures and Economics*. (West Sussex: John Wiley & Sons, Ltd., 2006), p. 28.

Image 1: Pumped storage design.



Source:

http://www.hkphy.org/energy/alternate/print/hydro_phy_print_e.html

South Africa is completing such a pumped storage project in the province of KwaZulu Natal in the Drakensberg, named Ingula. The dams have a combined water capacity of 44 million cubic metres that are driven by four underground pump turbines⁷¹. These will facilitate the conversion of the upper dam's water into electricity as the water is released into the lower dam. At night when most consumers are inactive, the water which has been pumped into the upper dam is potential electricity supply. The

⁷¹ Eskom. 2013. Ingula Pumped Storage Scheme.
<http://www.eskom.co.za/c/article/54/ingula-pumped-storage-scheme/>,
accessed 25 March 2013.

water can be released to the lower dam and in this process produces the current that is required through the turbines. When consumers become active and need higher volumes of current, this water-to-electricity current can be fed back into the grid. The site of the project had been earmarked in the 1980's but was only able to be pursued in the late 2000's. Considering Eskom's needs in the 21st century, compared to the demand and supply of the 1980's, the pumped storage initiative is deemed more viable at this stage. Reasons include that enough consumers exist and sufficient demand exists as well for the pumped storage scheme to be a feasible project. It also serves as cleaner energy, since carbon emissions are lower in comparison to coal-fired power stations. Hereby, the KwaZulu Natal provincial government can reduce its carbon emissions.

Flexibility in demand is inevitable and inflexibility of network capacity leads to inefficiency. Balancing these two is the fundamental challenge and therefore a complimentary energy supply system is integral to success. The complementarities that are required are that supply and demand match within a context of a diverse energy mix that encourages and sustains economic

growth. When this does not occur, the phenomenon of energy poverty cannot be overcome. Energy poverty is characterized by a lack of access to energy sources, due to missing infrastructure and money for individuals to be able to qualify as consumers.

Table 1: Electricity demand by sector in 2005.

Consumer Category	% Share of total electricity sales
Domestic	17.2
Mining	15.0
Agriculture	2.6
Manufacturing	37.7
Commercial	12.6
Transport	2.6
General	12.3

Source: NERSA: Energy Supply Statistics, 2005. Cited in Amusa *et al*, 2009, p. 4170.

According to the data above, manufacturing, mining and domestic use are the three sectors where demand and electricity consumption are the highest. The manufacturing and mining sectors are electricity-intensive and integral in South Africa's ability to compete in the global economy. Demand is linked to the increased electricity usage as production escalates (more availability of electricity leads to higher consumption) and in turn will affect production methods of energy-intensive companies. These methods will be technologically more advanced and will lead to an

upward trend in electricity demand as electricity dependence is entrenched for competitive reasons⁷². With more stable energy supply, manufacturers can produce more and become more competitive. Increased economic growth will produce already known spinoffs such as higher wages and salaries, which will encourage demand in electricity to increase as well. The ability to service the rising electricity demand alongside broad-based manufacturing and mineral extraction is a key determinant in the success of these sectors. South Africa's global economic competitiveness rests largely upon the exports of precious minerals. Based on the argumentation, electricity intensive users such as these large manufacturers and mines will be equally eager to use more electricity as supply is increased. This therefore means that matching electricity demand and supply is a phenomenon that is continuous and does not end. As the electricity sector becomes more sophisticated, the economic activities of its consumers will become comparatively sophisticated and will become more advanced. For example, technologies that are electricity-dependent will replace older, more inefficient technologies. This incentivizes

⁷² H. Amusa, K. Amusa & R. Mabugu. 2009. Aggregate demand for electricity in South Africa: An analysis using the bounds testing approach to cointegration. *Energy Policy*, p. 4172.

the expansion of businesses and the scope of manufacturing as the economy becomes more competitive, but thereby leads to an ever-increasing usage of electricity. This pattern is continuous as an economy develops and shows that power supply is a cornerstone for economic development.

In terms of electricity demand side management, symmetry of information between the actors involved in providing electricity to consumers is essential to a well-functioning electricity production and distribution system. Considering the proposals of the South African government to unbundle the electricity sector, the 30% mandate of IPP involvement in Eskom's production processes broadens the integration of smaller electricity providers into the supply process. Access to information about the internal workings of the national electricity production process is required for the mandate of integrating the 30% of smaller actors to be achieved.

The monopolistic tendencies of state-owned electricity providers lead to asymmetry of information, because only the single provider is involved in knowing what the dynamics of

electricity demand are at a specific point in time. Electricity usage varies throughout the day and in monopolistic industries the statistical information and exact consumption patterns are not shared. This entrenches path dependency of monopolistic behaviour, whereby barriers to market entry persist if smaller non-monopolistic electricity providers are not able to enter the industry freely. Imbalances in restructuring the electricity sector prevail, causing stagnation in reforming and unbundling the sector. Consumers become the victims of an information disconnect at the electricity production level, based on stagnation and inefficient supply. If smaller electricity providers were granted fair and equal access to the industry, they could provide electricity to consumers and to areas of the country where Eskom is facing difficulties. These difficulties may include ageing infrastructure, a lack of maintenance and the like that Eskom may not be able to address immediately. Smaller providers would be helpful in filling electricity provision gaps and thereby contributing to a more stable and reliable electricity production system.

To set an industrial comparative context the following example is relevant for recognizing patterns of why South Africa

has adopted pumped storage scheme in the 21st century. In terms of energy, Brazil and South Africa consider themselves peers. The Itaipu dam project in Brazil is a hallmark of what hydropower stations are able to achieve. 26% of Brazil's power needs are serviced by Itaipu at near zero emissions since 1984⁷³. This shows the clean nature of pumped storage schemes and serves as a positive example for an alternative energy mix where reliance on coal to produce electricity is not the mandatory.

Unlike Itaipu, Ingula is not a source of power that South Africa fully depends upon for national transmission, but it is important because it enhances the national energy mix. It helps move South Africa into a paradigm where the country is exploring diverse and more creative ways to fulfil its energy needs. Worthy to note is that with pumped storage, the weather plays a role that affects pumped storage directly. Rainfall patterns in Brazil vary and as in the past, have led to insufficient water supply for Itaipu to function at optimum efficiency. South Africa is also regularly subject to abnormal rainfall patterns and should take note of Brazil's experience. Electricity rationing and systematic outages

⁷³ S. Krauter, 1998. Itaipu. <http://www.solar.coppe.ufrj.br/itaipu.html>, accessed 26 March 2013.

that relate to South Africa's load shedding became commonplace. Brazil's electricity realities are similar to South Africa in terms of demand and show inflexibility in the energy mix. The country receives 80% of its electricity based on hydropower which shows an imbalance in its energy mix⁷⁴. South Africa on the other hand is very coal-dependent. These two examples indicate that both countries can learn lessons from each other to balance energy supply with reference to each other's obstacles and successes. Further reference to BRIC countries' electricity sectors will be made henceforth in this study, since commonalities are evident.

In developing markets like Brazil or South Africa, electricity providers such as Eskom dominate the flow of information about quality and quantity of production at selected points in time. This is common in electricity sectors where domination of one stakeholder persists. In South Africa IPP's are incorporated from a policy perspective with institutional mechanisms that make this provision, namely the 30% mandate that aims to help unbundle the electricity sector. The weakness of

⁷⁴ F. Woolf, V. Gambhir, I. Londres & L. Simpson. 2010. Brazil: Brazil's Electricity Market: A Successful Journey And An Interesting Destination, <http://www.mondaq.com/article.asp?articleid=93780> accessed 21 August 2012.

this institution leads to the stifling of mutually beneficial transactions since the entry barriers discussed earlier exist⁷⁵. Supply is thus at risk of being weakened during times when the dominant stakeholder (Eskom) is unable to service demand. In such a case, the IPP's implemented mandate would require them to service the gap in demand. Asymmetry of information accompanies institutional frameworks. Eskom is not legally forced to share all information with IPP's about the fluctuations in electricity usage and the relevant technical information. Such information would indicate how much electricity is provided by specific power stations during peak-and non-peak times and how Eskom balances the ever-changing electricity demand during the day.

The right to keep information internal comes at the expense of the stability of the electricity system and is counter-productive to being a reliable provider of an essential service. Related to this, supply side management depends upon a calculated balance and timeframes in which coordination of load changes

⁷⁵ C. Marowa. 2011. A review of energy efficiency (EE) market funding constraints and assessment of possible effective financing models for EE projects in the South African market, reflecting on lessons from other markets, p. 13. <http://wiredspace.wits.ac.za/jspui/bitstream/10539/10783/1/WITS-MMFI-Research%20Project%20Report-by-Cyprian-Marowa-500750-M.pdf>, accessed 26 March 2013.

occurs⁷⁶. This is especially important at peak times and during winter when peak times extend into non-business hours by residential consumers. Examples include the use of electrically powered heaters in homes between June and August which is the cold season in the southern hemisphere. Homes and recreational areas in Africa are rarely fitted with central heating due to the relatively short period of winter. In comparison to spring, summer and autumn, temperatures in South Africa are high enough that central heating is unnecessary.

Transmission operations monitoring⁷⁷ is a tool that is able to help strike the balance between the fluctuations of demand and accommodating these fluctuations with supply into the grid. The power outages in South Africa in the late 2000's illustrate selective institutional change, because the transmission operations monitoring was not taking place in a satisfactory way. As mentioned previously, when power infrastructure is under heavy

⁷⁶ C. Harris. *Electricity Markets – Pricing, Structures and Economics*. (West Sussex: John Wiley & Sons, Ltd., 2006), p. 54.

⁷⁷ This is a technical term that describes the process by which the transmission of electricity through the national grid is being monitored. The amount and efficiency in which the various power stations supply the national grid is taken into account as well. If this monitoring would not take place, the likelihood exists of having a particular power station supplying too much electricity into the grid, for example. This would lead to wasting electricity, whilst the under-supply of the grid on the other hand can cause an imbalance as well.

usage or not maintained with the necessary care, the risk exists of having the power infrastructure become vulnerable to failure. Knowing that some of the power infrastructure was under severe pressure due to the high demand did not lead to an adaptation of governing the electricity sector more responsibly. The status quo was maintained until power failures were imminent when the power infrastructure could not cope with the high demand. Furthermore, the electricity sector has not made provision for the reliable incorporation of IPP's that could assist with transmission fluctuations, and asymmetrical information hinders the implementation of electricity reforms when smaller providers have such limited access to contributing to the power supply on the grid. Economic ramifications of this come to light, since the consumers are those who are affected. Significant numbers of consumers are the businesses and manufacturers that provide employment and they are most negatively affected when they have no power. Less production due to power supply problems leads to less profit and business insecurity. Thus, the link between electricity supply and business profitability is emphasized through the above under the umbrella of institutional change difficulties.

Eskom's Coal Dependence:

South Africa is a country with abundant estimated 300-year coal reserves but much of the coal is not of very high quality, due to its ash contents⁷⁸. Export markets for such coal exist in China and India. Western markets prefer cleaner coal and have little interest in using South African coal for enterprises that they perceive to need cleaner coal. Therefore the country's unclean coal is most effective for the fuelling of power stations in South Africa, since the consumption is high in the internal market and the resource can easily be used due to its abundance. Historically, Eskom is the largest local consumer of coal and thus has strong ties with coal mines across the country. Coal usage is an industry-embedded phenomenon and has shaped the production techniques of the electricity sector. Institutionalization of coal-fired power stations leaves little room for changes in production methods because the cost of completely moving away from coal-fired power stations is too high. It would take too much time to restructure the entire power infrastructure system and since an

⁷⁸ M. Tsikata and M. Sebitosi. 2010. Struggling to wean a society away from a century-old legacy of coal based power: Challenges and possibilities for South African Electric supply future. *Energy*, 35: p. 1281.

abundance of coal exists, it makes sense in terms of resource access to remain coal dependent. Nonetheless, this has led to path-dependency and limits policy changes to unbundle the sector and to become greener.

IPP's still find themselves in a difficult position when they are faced with the question of coal purchases. The spot market for coal is applicable for IPP's without any special arrangement on pricing per tonne or other market adjustments. Additionally, market entry barriers as mentioned are based on the imbalance in the industry through the presence of Eskom as a monopoly. The small business sizes of IPP's when compared with Eskom sets them in a precarious position. IPP's have little incentive to compete in a system where their profit margins make their existence unfeasible⁷⁹. This dates to the history of Apartheid when South Africa was able to remain self-sufficient in electricity matters due to abundance of low-grade coal and Eskom's monopoly made sense to the regime of the time. The investments into coal have become a cornerstone of Eskom's practice to maintain the status

⁷⁹ M. Tsikata and M. Sebitosi. 2010. Struggling to wean a society away from a century-old legacy of coal based power: Challenges and possibilities for South African Electric supply future. *Energy*, 35: p. 1282.

quo of monopolistic behaviour. Due to this, new approaches to producing electric energy have been met with scepticism and albeit progress in some areas, significant change remains slow. This hinders the implementation of a more comprehensive energy mix in the near future and complicates policy changes.

In 2009, 70% of coal produced in South Africa was used by Eskom for electricity production⁸⁰. 93% of Eskom's national electricity output was linked to its coal-fired plants. The electricity sector is underpinned by the coal industry and there is no sign of serious implementation of renewable energy techniques in the future, since policy changes are slow and the introduction of IPP's still lagging. Considering the Medupi and Kusile projects, these will rank as the third and fourth largest coal-fired power stations in the world⁸¹. Institutional perpetuation of coal reliance therefore makes South Africa a continued global target for environmentalists. It hampers the possibility of government policies to change to

⁸⁰ A. Eberhard. 2011. The future of South African coal: Market, investment and policy challenges. *Program on Energy and Sustainable Development Working Paper #100*, p. 4.

⁸¹ T. Craemer. 2012. "Medupi, Kusile overruns should be probed, NPC commissioner asserts" <http://www.engineeringnews.co.za/article/medupi-kusile-overruns-should-be-probed-npc-commissioner-asserts-2012-08-21>, accessed 22 August 2012.

environmentally more appropriate electricity production techniques.

Coal was decisive in Eskom's success in the previous regime, albeit under different social conditions. The achievements based on coal reliance in the past are expected to be improved upon in the 21st century. South Africa cannot ignore the increasing interests of greener and cleaner energies that the private sector, Non-Governmental Organizations (NGO's) and academia are promoting. However, with the institutional change of slowly unbundling itself, Eskom did not consider that a common factor such as coal reliance may not lead to energy security as other political and economic factors change. In agreement with commentaries of Patel, the successes of past performance of Eskom will not guarantee success in the future under new politico-economic conditions⁸².

To accentuate this argument, stability in the coal industry relative to electricity production deserves attention. Coal reliance

⁸² S. Patel. 2008. Whistling in the Dark: Inside South Africa's Power Crisis. *Power* (152): 11.

means that Eskom is increasingly vulnerable to fluctuations in coal supply because when coal mines are facing production difficulties, strikes or have to halt their operations for other reasons, Eskom will be directly affected. The severity of fluctuations will determine the stability of electricity production, meaning that if too many fluctuations occur, this will translate into an equally imbalanced production of electricity for the national grid. Additionally, the load factor and limits of production capacity of power stations must be considered when demand is driven upwards. When the needed expansion and upgrading of electricity infrastructure is slower than electricity demand, imbalances in production occur. Power stations' output is consistently maximized to meet very high demand, but because of heavy usage the stations cannot be shut off for too long to carry out the necessary upgrades. When the power stations are under such heavy usage, the upgrading of the stations places the remaining power stations under even more pressure to meet the demand. This situation leads to system overloads and to electricity crises such as those of 2007. This argument is substantiated by the rising concern of Eskom's management about the deterioration of major utilities despite routine upgrades. Limited upgrades do not reduce the risk of

future power outages in a significant way. Above-average levels of maintenance were difficult to undertake since demand could not be postponed for maintenance to occur⁸³. Utilities were in continuous use which limited the much needed full-scale upgrades.

In such a context, fluctuations of coal supply inevitably worsen the intense electricity production requirements, because when some power stations are undergoing some form of maintenance, others have to compensate with higher electricity output to maintain demand. When under such conditions coal supply is fluctuating too much, it is cumbersome to produce the needed electricity when coal is the primary source for producing electricity. Coal procurement is thus a key to stabilize supply, but depends on institutional capacity of the client. The institutional capacity concerns the ability to have strategies and reserves of coal to accommodate such fluctuations so that when fluctuations occur, Eskom's own coal reserves suffice to continue producing electricity for as long as possible until the fluctuations have been stabilized. This requires a stable logistical process for the coal to be transported from the mines to the various production plants. To

⁸³S. Patel. 2008. Whistling in the Dark: Inside South Africa's Power Crisis. *Power*. (152): 11.

illustrate, South Africa bore witness to inefficiencies in coal transportation based on new policies between the government and Eskom for coal transport contractors. The terms under which contractors were obliged to supply the needed amounts of coal on time were unclear about the contractor's core responsibilities. The agreements were not enforced with accompanying punishments to contractors who breached their contract responsibilities. Some coal mines experienced underproduction of coal which caused electricity production fluctuations due to interrupted coal supply⁸⁴.

The reason for a broader inclusion of stakeholders such as contractors is rooted in industrial inclusivity. Greater levels of inclusion amount to institutional inclusivity since new rules for inclusion will underpin inclusivity in the coal industry and will assist Eskom in being able to produce electricity in a more stable manner. This inclusivity is based on new procurement policies and government mandates that relate to economic empowerment. This empowerment aims to level the playing field between Eskom and smaller companies that wish to contribute to the production

⁸⁴ J. Myburgh. 2008. Eskom: The real cause of the crisis. <http://www.politicsweb.co.za/politicsweb/view/politicsweb/en/page71619?oid=85789&sn=Detail>, accessed 21 January 2012.

process of electricity. With knowledge of the above, institutional problems such as the rules that apply to smaller stakeholders in the electricity production process were expected to be easily resolved due to inclusivity by not restricting decision-making processes to the elites of Eskom and the government. Additionally, the importance of avoiding an increasing gap between demand and supply was thought to be addressed by changing the rules that apply to smaller stakeholders. However, Eskom made it clear that it was only using the contractors who were already assigned to be middle men and would not change its contractors⁸⁵. Logistical barriers and institutional incapacity on company and governments levels are thus evident, based on the example of the unwillingness of Eskom to assign new contractors to fulfil the requirements of providing Eskom with coal. Such problems can be overcome through best practice coal management models from other countries that have faced and overcome such challenges. The coal procurement procedures of Eskom mentioned above give rise to unreliable coal supply which translates into unreliable electricity supply. Improvements in the purchasing and transportation of coal

⁸⁵ J. Myburgh. 2008. Eskom: The real cause of the crisis. <http://www.politicsweb.co.za/politicsweb/view/politicsweb/en/page71619?oid=85789&sn=Detail>, accessed 21 January 2012.

can lead to efficiency which the South African power sector is lacking as illustrated above⁸⁶.

The relationship between Eskom and the coal industry is burdened when the middle man mentioned above, such as the contractors hamper the reliability of electricity production through their inefficient business practices relating to coal supply services. Inefficiency in a country where the majority of new electricity consumers are low-income earners creates little hope for attempts of providing sustained low-cost electricity. Willingness to allow institutional weakness, such as not fully enforcing the rules that apply to the stakeholders involved in electricity production, is contradictory to government legislation. The outline that is found in the NIRP 2 which states that capacity expansion should remain at low cost is contradicted by the reality which shows that efficiency along the electricity production process hinders cost reductions⁸⁷. Coal-fired plants are unavoidable since renewable energy sources are not yet proven to be effective to address the

⁸⁶ C. Harris. *Electricity Markets: Pricing, Structures and Economics*. (West Sussex: John Wiley & Sons, 2006), p. 204.

⁸⁷ National Electricity Regulator. 2007. National Integrated Resource Plan 2: Appendix 14: National Integrated Resource Plan (NIRP), p. 26.
<http://www.nersa.org.za/documents/22%20Aprilaunch%20of%20NIRP%202.pdf>, accessed 28 March 2013.

country's needs. These renewable technologies are in a roll-out phase and are under scrutiny to determine whether they are in fact suitable for South Africa's energy needs within the context of economic growth and development plans. Since Eskom is under tremendous time pressure to complete expansion programmes and keep costs to a minimum, coal-fired power production is deemed appropriate. The practicalities of easy access to coal reserves and the scale of electricity needs leave little room to manoeuvre electricity policy away from the status quo. The coal industry thus becomes an institution in itself and hinders institutional change at the same time. Thus, the legacy of Apartheid coal dependence policy continues with higher coal usage today.

In South Africa a disconnect developed between the goals of improving factor supply in the industry and actual institutional change. The disconnect has led to slower reforms of the power sector. However, due to increased demand and rising needs for revenues for Eskom to address its expansion requirements and to remain financially healthy, costs per kilowatt hour are inevitably not going to remain as low as during Apartheid. The organizational and political will to introduce institutional changes to remedy

systemic shortcomings is dissuaded. The results lead to an increase in the costs of electricity production per kW hour, which impacts on the consumer if solutions to inefficiencies in the production process are not found.

The demand for electricity is related in parallel terms to the growth of GDP. This in turn will indicate the pace at which the coal industry functions, since Eskom depends on coal supply⁸⁸. Thus, the relationship between electricity demand and GDP growth is a push-factor for the coal industry to meet Eskom's coal demand to produce sufficient electricity. The higher the electricity demand, the higher the coal demand will be. The long established interconnectedness between the coal mines and Eskom has prescribed institutional frameworks in which the electricity industry is able to function. Economic performance depends on the sustainability and reliability of this relationship until IPP's are able to gain better access to the sector and have a tangible impact on power production. Until such a point is reached, institutional frameworks will be unlikely to change and new industrial practices

⁸⁸ M. Tsikata and M. Sebitosi. 2010. Struggling to wean a society away from a century-old legacy of coal based power: Challenges and possibilities for South African Electric supply future. *Energy*, 35: p. 1283.

will be minimal. Such realities also relate to electricity pricing mechanisms, which will be discussed below. Tariffs are important in how electricity supply affects the economy.

Electricity Pricing Structures:

Pricing models are abundant in electricity market research but are highly mathematical and based on economic modelling that go beyond the purposes of this thesis. The models are helpful to fully understand the mechanics behind pricing structures and provide policy makers and decision-makers within the power industry with the mathematical concepts that apply to matters of how to calculate power distribution costs, transmission losses, production costs and others by taking into account electricity usage fluctuations during various parts of the day. By laying out the details, this would digress from the main purpose of this chapter. Nonetheless, pricing practices are contentious on a worldwide scale, since clienteles differ in size and per kW price equality is an unlikely practice anywhere. Volatilities exist in pricing especially due to possible changes in market dynamics of the fuel provider for power stations. In countries such as China and South

Africa where coal fired power stations are dominant, price volatilities cannot be ignored. Power producers that are dependent on coal are thus dependent on commodity value, unlike power producers working with solar energy, since rays of sunlight, for example, have not been made a commodity. To counter volatilities, contracts are enforced and will shape the electricity sector's development and stability.

Contracts in the electricity industry vary according to the energy mix of the country in question. Globally, it is common to enforce contracts that address the price uncertainties, volatilities and fuel supply fluctuations of all stakeholders that form part of the electricity industry. Examples of such agreements include a set price tariff, especially for consumers of industrial size, namely electricity intensive enterprises⁸⁹. These contracts must thus be understood as an institutional mechanism that will determine long-term consumer relations with the electricity industry. These are commonly negotiated on such terms that a mutually beneficial deal can be established, since all parties involved have a common

⁸⁹ C. Harris. *Electricity Markets – Pricing, Structures and Economics*. (West Sussex: John Wiley & Sons, Ltd., 2006), p. 370.

interest in making a rewarding business transaction. The contracts form part of the formal rules that will guide perceptions of entrepreneurs about the possibilities of having made a profit in the financial records at the end of a financial year.

For smaller stakeholders where long-term price contracts are not applicable, contract enforcements that undermine their economic position in the industry are perceived as unfair by them. Tendencies exist that smaller stakeholders are the drivers for institutional change by directly addressing anti-competitive behaviour of larger stakeholders such as Eskom to the relevant authorities. Normally this is done through channels of the electricity industry bureaucracy but often the political arena becomes a lever for driving institutional change⁹⁰. Coal as a commodity thus becomes a political and economic tool for leverage. The larger the number of consumer of coal-produced products, the more powerful the leverage tool will be.

⁹⁰ D. North. Institutional Change: A Framework for Analysis (An essay based on the book titled *Institutions, Institutional Change and Economic Performance*. (Cambridge: Cambridge University Press, 1990), p. 10.

Coal dependence and uncertainty about electricity price structures are interlinked. To illustrate, the following example is relevant. In China coal dependence is similar to that of South Africa, with up to 70% of China's electricity being produced from coal as a fuel⁹¹. Institutional change in Chinese energy markets is related to South Africa's institutional status quo, since China is also rich in coal reserves and faces risks of rising electricity prices and needs to reform an even more energy-hungry economy. Chinese vertically integrated companies that are accountable to the state officials in Beijing dominate the electricity sector in the name of economic stability⁹². Institutional change in terms of reorganizing the electricity sector to allow nuclear power supply and renewable energy markets to be integrated has become an inevitable element in Chinese electricity policy. This is based on trends of electricity demand that is rising very sharply, relating to China's consistently very high economic growth rates of between 7-9% per annum.

⁹¹ KPMG. 2009. *Think BRIC!*, p. 17, www.kpmg.com/CN/en/.../Think-BRIC-China-O-201001.pdf, accessed 5 April 2013.

⁹² KPMG. 2009. *Think BRIC!*, p. 17, www.kpmg.com/CN/en/.../Think-BRIC-China-O-201001.pdf, p. 19, accessed 5 April 2013.

As NERSA reviews South African electricity reforms, China's NDRC⁹³ has reviewed pricing structures to accommodate coal supply fluctuations. Additionally, power tariffs are reviewed annually to ensure price stability exists, given a margin of a 5% tariff fluctuation⁹⁴. Such fluctuation occur since the sector is under very high pressure and Chinese pricing structures provide some leeway for tariffs, but within a 5% margin, aimed at limiting how drastically the tariffs rise. China is still reforming its electricity supply industry at times when economic growth was at 7.6% during 2012⁹⁵. This matches the notion of parallel development requirements discussed earlier, where GDP growth is linked to electricity supply security and the higher demand resulting out of higher economic growth. Increased growth rates of fast-growing economies lead to increasing electricity demand and in order to sustain this, institutional change is inevitable. Such changes include adapting laws on tariffs, laws on market entry barriers for smaller power providers and reforms to accommodate renewable

⁹³ NDRC stands for the National Development and Reform Commission which is in China and is comparable to South Africa's NERSA that regulates the energy sector.

⁹⁴ Z. Jianfeng. (Ed). 26. 12. 2012. CCTV. China sets guidelines on coal price reforms. <http://english.cntv.cn/program/bizasia/20121226/105005.shtml>, accessed 6 April 2013.

⁹⁵ James. (Ed). 10. 11. 2012. Xinhua. China coal prices fall on faltering demand, abundant supply. <http://english.cntv.cn/20121011/103907.shtml>, accessed 6 April 2013.

technologies in the electricity supply sector. The Chinese government and the South African government are thus dealing with a related development phenomenon. The concept applies to both economies, even though vast differences in comparative growth and size exist. The scale of China's growth and needs is larger than that of South Africa. Nonetheless, the concept of both countries facing similar development difficulties in energy demand and supply, as well institutional changes to governing economic growth is applicable.

Intensified consumption patterns of goods and services in all sectors are a phenomenon that results out of the above mentioned parallel economic growth and increased electricity demand relationship. The high growth rates of Brazil, South Africa and China are based on economically inclusive institutions, meaning that all citizens have the opportunity to be active in all spheres of the economy⁹⁶. Poverty reduction is a matter that these

⁹⁶ Economically inclusive institutions can prevail in all three countries by giving citizens equal opportunity to engage in economic activities. Such institutions can exist in democracies, such as South Africa and Brazil, as well as under politically exclusive or non-democratic governments like China. Acemoglu and Robinson's explanations underpin this argument of economic growth being possible under non-democratic governance. Their analysis also includes the example of China's rapid growth – see page 439.

countries face and by reforming the energy sector and providing stability in supply and demand of electricity, such poverty patterns can be reduced. Included in this are matters of reducing energy poverty, such as having little or no access to energy. When inclusive institutions are the norm and previously disadvantaged citizens are able to enjoy inclusive economic institutions, consumers will have more room to spend and contribute to growth. The ability to use electricity will inspire an increased usage of electrically powered items.

A cycle of increased income and access to energy sources indicates higher demand for energy intensive goods, thus alluding to a concept of supply creating demand. The more on-grid electricity is available, the more it shall be used. A consumption spiral develops which leads to increased pressure on the electricity industry to meet ever-increasing demand. Resultantly, all stakeholders in the industry will be required to expand production in order for equilibrium to be maintained. It is within this context that institutions which govern this electricity supply process must be adapted or changed according to the realities of the demand for electricity. Outdated institutional approaches and outdated

governance do not correspond satisfactorily with the energy challenges that develop over time. Contracts with stakeholders such as the coal industry thus need to be revised in order for the price of electricity and the stability of the industry to not be compromised.

Douglass North highlights contractual issues by indicating the degrees of complexity between economic agents consisting of a supplier and a consumer⁹⁷. Essentially, the ability to enforce contractual agreements provides the institutional integrity so that both parties involved in the contract are able to receive the gains associated with being engaged in a contract. Levels of specialization by both parties will enhance the degree of complexity of the contract since specialized skills and knowledge became part of the contractual agreement. Being able to rely on the institutional framework that allows the contract to be realized is linked with relying on uncertainty as well. The longer the contracts are valid for, the more uncertainty can arise, since political and economic changes may occur in the meantime. Economies become weaker and stronger, political leadership

⁹⁷ D. North. *Institutions, Institutional Change and Economic Performance*. (Cambridge: Cambridge University Press, 1990), p. 6.

changes which makes governments and their law enforcement policies equally weaker or stronger. In such a context long-term contracts carry an especially sizeable portion of risk, since they are subject to external factors to a greater extent than shorter terms contracts as time passes and as related institutions change over time. Longer time spans lead to higher chances of such changes occurring.

To set the tone for Eskom's challenges and newer realities, sufficient discussion will follow below about such contracts and their effects. In the South African example, heavy industry and Eskom developed such long-term contracts. The following background information will illustrate the institutional aspects relating to continued realities being faced by Eskom albeit institutional change. No so-called institutional revolution occurred. In the 1980's, excess capacity was deemed to be a worthwhile reason for Eskom to get involved with tariff deals with very large consumers to create mutual advantages. The purpose was to use excess generation capacity to provide jobs and to stabilize a volatile economy under Apartheid. The intentions included using the mining industry that provided coal to Eskom and heavy

industry such as the aluminium smelters to cooperate. It was thought that such industries would provide employment.

The discussion below is a worthwhile example to illustrate the relevance of the above. In 1980, Gencor was a company that acted as a coal supplier to Eskom and had its own mining interests⁹⁸. By 1993, Gencor had purchased the mining interests of Billiton, creating Billiton PLC (Public Limited Company), where former staff from Eskom during the 1980's had received high ranking positions due to vacancies that were filled by former Eskom staff. In 2001, a merger between the mining enterprise Australian Broken Hill Proprietary Company and Billiton PLC led to the creation of BHP Billiton as it is globally known⁹⁹. The link between Eskom and BHP Billiton has led to political controversy and has shed light on institutional matters dating back to contracts signed in the 1990's.

⁹⁸ Gencor was a merger between General Mining and Union Cooperation, thereby creating a coal supplier that was not merely interested in being a supplier, but maintaining interests in the mining business.

⁹⁹ C. Yelland. 21 February 2012. Against the MEC: 'Close the smelters' from a surprising source: EE Publishers, Mail and Guardian, lists.fahamu.org/pipermail/debate-list/2012-February/026951.html, accessed 13 April 2013.

These deals included pricing structures for aluminium smelters such as the “Hillside” smelter in Richard’s Bay in KwaZulu Natal, which are regarded as being one of the most electricity-intensive heavy industries in an economy. Taking note of previous arguments about GDP growth being linked to the demand of electricity, it is evident that economic success in the heavy industries would help South Africa’s economy to stabilize and remain competitive. Ultimately, demand leads to growth and based on that growth, more demand is created, thereby allowing for a development pattern to occur. In order to assist the heavy industries in being successful, pricing deals for electricity consumption were created, based on new formulae instead of traditional tariff mechanisms. These formulae were created by considering international stock market fluctuations of aluminium commodity prices and exchange rates of the South African Rand and the US dollar¹⁰⁰. Aluminium exports are linked to the dollar price since these exports are regarded as a safe commodity that retains international demand and stable profits, thereby making exchange rates a key factor in their business engagements. Since

¹⁰⁰ C. Yelland. 21 February 2012. Against the MEC: ‘Close the smelters’ from a surprising source: EE Publishers, Mail and Guardian, lists.fahamu.org/pipermail/debate-list/2012-February/026951.html, accessed 13 April 2013.

financial markets are likely to fluctuate and cause instability on a regular basis, securing a negotiated standard price for a kW hour of electricity for BHP Billiton was deemed reasonable to lessen export price uncertainties of aluminium products.

The price deals were not publically discussed and in the 1990's BHP Billiton linked the US dollar market price for aluminium with its electricity input costs. If the electricity costs for smelters were steady and tariffs low, the profitability of the aluminium sector would become more stable. Eskom's deals with BHP Billiton rested upon the notion that excess supply capacity at the time would ensure stability and confidence in the sector for years to come. No major improvements to infrastructure would be necessary based on the status quo in the 1990's, and the assumptions that the operating environment of the electricity industry would remain stable for the foreseeable future¹⁰¹.

The degrees of complexity that North discusses in his theory were not sufficiently considered and the reality was indeed

¹⁰¹ C. Yelland. 21 February 2012. Against the MEC: 'Close the smelters' from a surprising source: EE Publishers, Mail and Guardian, lists.fahamu.org/pipermail/debate-list/2012-February/026951.html, accessed 13 April 2013.

different. The aluminium sector underwent changes related to higher fluctuations in exchange rates, thereby affecting profitability. In the 1990's and approaching the millennium, South Africa's political and economic institutional structure went from being regarded as exclusive to inclusive due to political and economic change. As argued before, political inclusivity provides higher impetus for economic activity by the entire population. Over time more electricity was required than initially expected, some remaining management approaches of the Apartheid era led to Eskom's excess capacity model to fade. Instead, Eskom gradually found itself dealing with unstoppable pressure from higher usage of the national grid. Ageing infrastructure and a need to transform its business model according to new political and economic realities after the advent of democracy caused concern by selected Eskom insiders. At the same time, Eskom had an obligation towards contracts with BHP Billiton over the long-term whilst overall national economic change was negatively affecting Eskom supply capabilities. It is unsurprising to note that BHP Billiton was reluctant to re-negotiate¹⁰² contracts that would place

¹⁰² Eskom's ability to adapt to new realities meant that tariff increases per kW hour of electricity were unavoidable. Due to special long-term pricing contracts based on non-traditional formulae to calculate electricity tariffs, Eskom was

their own profitability at risk, when Eskom's need to increase tariffs for their own sake was not BHP Billiton's concern¹⁰³.

Based on data from 2013, three aluminium smelters of the mining giant BHP Billiton represent 9% of South Africa's electricity demand and are located in Mozambique and South Africa¹⁰⁴. Based on the special pricing agreements, BHP Billiton is exempt from paying higher tariffs charged by Eskom per unit of electricity consumed. The mining giant continues to operate on such a system, and from data on electricity tariffs of 2013, average consumers in households and businesses pay ZAR1.40¹⁰⁵ per kW hour. According to the special pricing agreement formula with BHP Billiton, the company only pays an average of ZAR0,22.65,

tasked with finding needed revenues elsewhere. Consumers that did not form part of the most electricity-intensive industry were thus facing continuous electricity price hikes. The economic effect of this was higher input costs, placing especially small businesses at risk that aimed at employing locals as economic inclusivity became embedded. Higher tariffs meant higher transaction costs and lower profits. This lowered incentives to increase the number of staff members in a business.

¹⁰³ C. Yelland. 21 February 2012. Against the MEC: 'Close the smelters' from a surprising source: EE Publishers, Mail and Guardian, lists.fahamu.org/pipermail/debate-list/2012-February/026951.html, accessed 13 April 2013.

¹⁰⁴ South African Press Association. Eskom: How consumers are milked, <http://www.fin24.com/Companies/Industrial/Eskom-How-consumers-are-milked-20130322>, accessed 13 April 2013.

¹⁰⁵ R (and in some cases ZAR) is the abbreviation for the South African Rand.

highlighting the vast difference in prices¹⁰⁶. The percentage difference between what the company pays and what the average consumer pays points to a difference of 518.1%.

Expressed mathematically in cents: $22.65 - 140.00 = -117.35$

$$117.35 / 22.65 = 5.181$$

$$5.181 \times 100 = \underline{518.1\%}$$

The above calculation sets the tone for what the differences are between average consumers and non-average heavy industries in the aluminium sector. The contracts that apply for this pricing structure were originally negotiated as far back as 1992. The contracts were revisited in 2001¹⁰⁷ prior to the electricity crisis of 2007. Yelland notes that the biggest of BHP Billiton's smelters is 'Hillside' in the province of KwaZulu Natal. The contract between this smelter and Eskom creates Eskom's most serious burden. The contracts for Hillside that were re-negotiated in 2001 did not specifically mention any price increases and were signed

¹⁰⁶ N. Lennox. 4 April 2013. Eskom's Billiton losses already R10.7bn, Fin24.com, <http://www.fin24.com/Companies/Industrial/Eskoms-Billiton-losses-already-R107bn-20130404>, accessed 13 April 2013.

¹⁰⁷ C. Yelland. 21 February 2012. Against the MEC: 'Close the smelters' from a surprising source: EE Publishers, Mail and Guardian, lists.fahamu.org/pipermail/debate-list/2012-February/026951.html, accessed 13 April 2013.

for a period extending to 2028¹⁰⁸. It can be safely assumed that if Eskom's negotiators and financial officers had the benefit of hindsight, these contracts would not have been renewed on such terms.

The fact that Eskom is bound by unfavourable contracts was not publicly discussed due to the expected political and media uproar until the dawn of the electricity crisis when financial losses were imminent. As of 2013, and with reference to the data mentioned above, the cost of producing electricity for Eskom stands at ZAR0.41 per kW hour. Considering that BHP Billiton pays below-cost of production tariffs at an average rounded ZAR0.23 per kW hour, Eskom is being subjected to annual losses since the income from the largest consumers is less than the cost of providing them with electricity. These losses became especially problematic since the advent of the power crisis in 2007. Losses in revenue based on these contracts have increased annually, and are estimated at ZAR10.7 billion as at 2013¹⁰⁹. These losses are carried by Eskom, but taking into account that the government is the main shareholder, indirectly the government is affected by these

¹⁰⁸ Ibid.

¹⁰⁹ N. Lennox. 4 April 2013. Fin24.com, Eskom's Billiton losses already R10.7bn, Fin24.com, <http://www.fin24.com/Companies/Industrial/Eskom-Billiton-losses-already-R107bn-20130404>, accessed 13 April 2013.

losses as well. Since the contract for Hillside is valid until 2028, only time will tell how Eskom will be affected in the future by the perpetual trend of financial losses stemming from its transactions with BHP Billiton

It is evident that transaction costs started out to be favourable in the early 1990's, when the contracts were finalized. The institutional framework with reference to the contracts and political status during the negotiations of the contracts benefitted Eskom and BHP Billiton at the time. However, as democracy dawned, a seemingly symbiotic relationship became imbalanced. BHP Billiton continued to profit from advantageous contracts which institutionalized cheap electricity in the long-term for the company. Institutional frameworks such as their legal rights that enable BHP Billiton to resist the dissolving of the contracts are an unforeseen side effect of strong institutions such as a reputable and independent judiciary. Weak institutions would bring about a situation where contractual enforcements could easily be side-stepped. However, as North highlights, losses are common in contractual terms based on imperfect monitoring and

information¹¹⁰. In this case, Eskom loses and cannot force BHP Billiton to change its position on the contracts, simply because Eskom is now in a financially compromising position. Both parties involved in a contract are thus bound by institutional frameworks such as the reassurance that the rule of law will protect both parties involved in the contract. Both parties shall be held accountable to the signed agreements that have been reached. Eskom has been disadvantaged at the cost of a more stable market in comparison with Apartheid.

This means that Eskom should have heeded the call by observers such as Prof. Anton Eberhard and the Minister of Finance, Trevor Manuel, who were concerned about a looming electricity crisis in the late 2000's and should have re-negotiated contracts in a more conventional sense according to best practice examples where public interests are taken into account, comparable with draft legislation that is subject to public hearings and criticism by parliamentary portfolio committees on the issue at hand. However, the concept of 'what-if history' is counter-

¹¹⁰ D. North. *Institutions, Institutional Change and Economic Performance*. (Cambridge: Cambridge University Press, 1990), p. 68.

productive to the attempt at finding solutions to problems such as the electricity contracts that are contrary to economic growth programmes, contrary to government ambitions and energy sector reforms. What these unfavourable contracts and unavoidable losses mean is that Eskom has increasingly limited abilities to borrow required capital for the new Medupi and Kusile power stations expansion projects. This also applies to future maintenance costs to maintain an even larger grid. The credit worthiness of Eskom has been unfortunately affected which limits Eskom's ability to attract investors who would be willing to service the debt. Resultantly, such setbacks require years to be overcome and trust and confidence in the sector has to be restored first¹¹¹. The institutional change on a national level after 1994 has thus raised questions about sustainability of Eskom in the 21st century as well as how energy policy will be able to develop as South Africa continues to grow.

¹¹¹ C. Yelland. 21 February 2012. Against the MEC: 'Close the smelters' from a surprising source: EE Publishers, Mail and Guardian, lists.fahamu.org/pipermail/debate-list/2012-February/026951.html, accessed 13 April 2013.

Chapter 4:

Energy Policy and Sustainability Matters

South Africa followed the example of other developing countries to address energy policy in a comprehensive way. The common process to achieve an encompassing result for policy development is to use integrated resource planning known as IRP. This tool is effective in attempting to combine increased demand for electricity and the more efficient use of electricity¹¹². By adopting such policy approaches in a policy context, institutional change on a national government level will be the result and will lead to new practices of supplying electricity with the aim of providing electricity in a sustainable way that makes it affordable to its consumers and is inclusive for the stakeholders who participate in electricity production. Improved electricity services can be met through policy mechanisms that guide lower real usage of electricity, thereby corresponding to the colloquial notions of ‘doing more with less’. Additionally and in the definition of D’sa,

¹¹² A. D’sa. 2004. Integrated resource planning (IRP) and power sector reform in developing countries, *Energy Policy*, p. 1. Exact volume and page numbers for this article are blocked.

IRP also includes refining energy policy to include equity, environmental protection, reliability and other country-specific goals¹¹³. Sustainability will depend on the structures that guide electricity policy and on how these can be adapted to provide more room for policies that include sustainability.

With relation to IRP, sustainability is a contentious notion. Economists and political scientists will argue over what this word means. To provide a brief overview, the term ‘sustainability’ in the context of energy policy must be discussed. Generally, sustainability is defined as the manner in which limited resources are used in ways that provide for the needs of the present time without infringing upon the ability of the same needs to be met in the future. Other definitions exist, but for the purposes of this research, this given definition is sufficient. To apply this definition to concrete examples the following discussion is appropriate.

Fuels needed to create electricity are essentially limited and considered finite resources, which need to be available in their

¹¹³ A. D’sa. 2004. Integrated resource planning (IRP) and power sector reform in developing countries, *Energy Policy*, p. 1.

natural forms. Examples include coal for coal-fired power stations, or uranium or thorium for nuclear-fired power stations. These are common fuels that can be extracted from beneath the earth's surface, but are not infinitely available for extraction. The time required for these fuels to be naturally reproduced is a process that takes longer than what it takes to be consumed. Thus, the amount available and the increasing demand for fuel to produce electricity is imbalanced. Due to capitalism, production methods and the striving for growth, development and equality among what citizens own in material terms, the human race extracts these natural fuels/fossil fuels faster than they can be naturally reproduced. This pattern over the long-term indicates that traditional fuels, most certainly coal, will become scarce and unreliable due to over-extraction. Once this occurs, coal will no longer be a fossil fuel that can be depended upon. To save the coal reserves for the longest possible time, environmentalists, academics, economists and politicians argue for less dependence on coal for the production of electricity in the name of sustainability or otherwise commonly referred to as sustainable development.

When alternative fuels can be used, a balance between traditional energy policy and a more diverse energy mix can be achieved. Sustainability in general terms thus concerns relationships of justice between humans over various generations and nature. This just relationship is set within the principles of achieving ‘more with less’, by using finite resources equitably, efficiently and without wastefulness so that future generations of humans will still be able to have access to the natural resources that human activity depends on in a global capitalistic economy . The future cannot be predicted and as such it is inherently uncertain, creating an even larger incentive to adopt this notion of sustainability to address the growing needs and wants of an ever-increasing global population that depends on energy. Developing nations are of particular relevance here and fall within the framework of needing programmes such as IRP to address concerns.

To broaden this definition, IRP must remain country-specific based on the unique circumstances in which a country’s electricity sector finds itself. It must also take into account global developments and best practices of IRP to initiate a policy

environment which addresses the national issues and taking into consideration successes from peer countries or global leaders in matters of energy policy. The integrated planning thus has a national and a global approach that must be balanced to ensure that a country's national policy is not an imitation of another country's policy entirely. Each country experiences development patterns based on internal political, economic and social conditions and developing countries cannot simply duplicate energy policy. A so-called policy recipe should be developed in which the policy components of peer countries' energy success stories are incorporated with the national policy needs of the country in question that must find solutions to its energy problems. In South Africa's case, it is relevant to consider peer countries from within the BRICS formation in the following pages, based on commonalities in sustainability reforms in these countries.

IRP provides an opportunity for developing countries to be able to comprehensively address demand and supply differences. Furthermore, electricity transmission losses and amongst other factors, rural electrification backlogs that perpetuate energy poverty in underdeveloped regions within a country are

included in IRP¹¹⁴. Importantly, the inclusion of a more diverse energy mix can be addressed as well under a framework of IRP. Instead of following practices where the various stakeholders of the electricity supply industry¹¹⁵ create their own operating environment and internal institutional structures such as their own production, safety and quality standards, IRP is in itself an inclusive framework that can consolidate the industry into a single workable unit without compromising diversity. Common challenges amongst stakeholders relating to diversification and financial manoeuvrability can be addressed under IRP. Within this context, sustainability and the concept of “doing more with less” is more easily entrenched. Developing countries like South Africa are obligated to do more with less. Other countries are facing similar challenges and thus the examples that will follow in this chapter will illustrate the manner in which South Africa can learn from its peers.

The financial requirements to improve the power sector in developing countries are generally found to be one of the most

¹¹⁴ A. D’sa. 2004. Integrated resource planning (IRP) and power sector reform in developing countries, *Energy Policy*, p. 2.

¹¹⁵ These include the power supply company, political actors, contractors, middle men such as fuel and coal suppliers as well as IPP’s.

significant challenges to achieve reforms and sustainability¹¹⁶. The lowering of costs to create a demand side and supply side equilibrium can be more effectively addressed with IRP based on the integrated policy approach. In countries where IRP has been set aside, a lack of longer-term planning has led to power shortages and in decreasing chances to attain the previously discussed notion of a ‘parallel development equilibrium’ of increasing power supply as economic growth increases¹¹⁷. This points to the aspects of future power supply plans which are part and parcel of IRP. With IRP, horizontal policy-making is a central theme, contrary to vertical policy-making which easily excludes alternative options for best practice energy policy. The horizontal feature becomes evident as alternative power supply options are compared for reliability, financial feasibility and lowering input costs whilst still attaining competitive output. The notion of a horizontal playing field is appropriate, provides scope for improvements for sustainability and is harmonious with D’sa notes in her discussion

¹¹⁶ A. D’sa. 2004. Integrated resource planning (IRP) and power sector reform in developing countries, *Energy Policy*, p. 2.

¹¹⁷ The USA has witnessed power shortages in California after setting aside IRP. This shows its importance. Source: L. Barber & A. Russell. 2007. *Interview with Trevor Manuel*.
<http://www.nelsonmandela.org/omalley/index.php/site/q/03lv03445/04lv04206/05lv04217/06lv04219.htm>, accessed 12 August 2013.

and corresponds with the term “unbundling’ the electricity sector¹¹⁸.

With regards to basic principles of energy policy, and especially electricity policies, coherence is essential. The electricity industry is a nation-wide integral element affecting households to industry, regardless of the individual profile of the consumer. There are political and economic forces that will help to determine electricity policy based on how the existing energy policies affect consumers and how the energy policy creates an image of the governing party in government. When electricity policy is incoherent and not matching the requirements of a parallel development equilibrium, sustainability is easily compromised. This increases the risk of energy inequality and can worsen energy poverty, especially in developing nations with high inequalities.

Politically, policy-making involves the ideological and party-specific goals of the party in power during a specific administration. The attention that is given to political forces in

¹¹⁸ A. D’sa. 2004. Integrated resource planning (IRP) and power sector reform in developing countries, *Energy Policy*, p. 4.

policy-making involves actors such as the media and civil society¹¹⁹. Where the media reports negatively on electricity reforms, or on frequent power outages and the economic effects thereof, pressure is exerted on political officials to address policy changes and to intervene to seek more acceptable solutions. Civil society and investors generally echo the sentiments of media analyses and drive the pressure on political officials forward to make corrections to energy policy. Commercially and economically, the national ability to be able to compete globally is essential, since this boosts economic growth within the country in question¹²⁰. Restructuring the electricity sector to improve facilities and infrastructure, introducing greener and cleaner technologies and addressing efficiency issues are all incentives on the policy agenda for economic and social benefit. When the policy agenda on a national scale has been determined, the links to the global economy can be strengthened and more satisfactorily maintained. Sustainability that is outlined within government policy will translate into sustainable business strategies because the economically active citizenry will be able to rely on the energy

¹¹⁹ C. Harris. *Electricity Markets: Pricing, Structures and Economics* (West Sussex: John Wiley & Sons, 2006), p. 108.

¹²⁰ *Ibid.*, p. 109.

infrastructure. This reliability is required for manufacturing, consuming the energy needed for manufacturing and for the economy as a whole to be stable and to expand further.

This agenda can only be implemented after political and economic push factors lead to action. Such action stems from the intention of the policy and is practiced when initiatives are set in place to apply policy to actual electricity-related projects¹²¹. The accompanying legal framework is required to ensure that actions and initiatives can be held to account which will be part of the institutions required for successful implementation of action. Policy outcomes must therefore be accompanied by institutions such as regulation of the electricity industry, unbundling the industry to allow for a more horizontal, rather than vertically integrated framework. Instruments to achieve such and other outcomes as well as structural changes include competition in supply side management, laws, regulations and market interventions¹²².

¹²¹ C. Harris. *Electricity Markets: Pricing, Structures and Economics* (West Sussex: John Wiley & Sons, 2006), p. 110.

¹²² Ibid.

It is imperative that sustainability does not lead to a situation where a trade-off occurs of ‘development versus sustainability’ or ‘sustainability versus development’. Complementarities instead of antagonisms are required to achieve success. This is not as easily achieved when developing countries face an economic condition where great needs for developing the economic output exist, and where great needs to act sustainably exists at the same time. Before addressing the South African case, brief insights into energy sustainability of selected BRIC countries will illustrate common challenges in attaining sustainable electricity policies and a parallel development equilibrium.

Considering Russia, it is important to note that its electricity market represents 5% of the world’s consumption¹²³. This figure indicates the large size of the electricity market. Internal electricity consumption has increased since the recovery of the financial crisis of the late 1990’s. Russian products and exports from the Russian economy in general have increased markedly in the past decade. Vladimir Putin’s government follows

¹²³ KPMG. 2009. Think BRIC!, p. 17, www.kpmg.com/CN/en/.../Think-BRIC-China-O-201001.pdf, accessed 5 April 2013.

economic development policies that aspire to building its own economy and by building Russian influence in Europe and Asia by using energy as a departure point. Russia thus requires sustainability planning of energy matters if energy is to remain a driver of Russian economic growth. Annual average electricity consumption is recorded at growth of 2.1%, but with the government aiming at improving economic growth rates, electricity consumption patterns will increase as the economy expands.

Russia has faced power shortages in the past twenty years after the country emerged from behind the iron curtain. Its transitional period from an oppressive regime to a more inclusive regime built on democratic principles occurred in the same time that South Africa emerged from Apartheid. Due to the growing economy, load shedding became imminent in Moscow in the early 2000's when demand outstripped supply¹²⁴. The ageing infrastructure of Russia's expansive electricity network could not be relied upon for servicing the needs of an increased electricity-

¹²⁴ KPMG. 2009. Think BRIC! Russia, p. 6, <http://www.kpmg.com/hu/en/issuesandinsights/articlespublications/pages/thinkbric-russia.aspx>, accessed 8 June 2013.

intensive economy of the 21st century. The governance of infrastructure and the planning for long-term electricity security was overshadowed in the past by years of conflict in the Caucasus, and a government focus on sectors such as aerospace and defence as drivers for Russian export markets.

Institutional stagnation in terms of how the private and public sector can invest into modern, more efficient electricity production methods remain from Soviet times. The government is lagging behind in addressing institutional changes of how the electricity sector can be better governed to ensure that demand is matched with sufficient supply to avoid load shedding or power outages. One primary problem in Russian electricity sector reform is the opaque regulatory system which is not friendly towards investors¹²⁵. This hampers the stakeholders that are currently involved in electricity production and hinders potential investors in entering the industry. Based on this synopsis, the manner in which the economy is growing and the manner in which the electricity sector is being regulated increases the gap between growing

¹²⁵ C. Harris. *Electricity Markets: Pricing, Structures and Economics* (West Sussex: John Wiley & Sons, 2006), p. 6.

demand and being able to supply the electricity to meet that demand. In this sense, the electricity industry is in need of being adequately reformed to close the widening gap, and to avoid further electricity shortages with adverse economic affects that reduce the ability to be economically active. Therefore, the rules and regulations that apply to how the actors within and outside the electricity industry are able to function within the existing system of energy governance are not sufficient anymore to address current electricity industry reform requirements. Resultantly, the sustainability of the industry in institutional terms is at risk.

Additionally, the economic growth rates that are expected between 2013 and 2020 are projected at 6.8% per annum¹²⁶. This economic growth is linked to the increase in electricity demand and will remain to be a prime reason why more electricity consumption will continue to increase. The notion of a parallel development equilibrium provides a manner in which to analyse the above. Institutional stagnation of outdated governance principles at government level, and the rising pressure on ageing

¹²⁶ KPMG. 2009. Think BRIC! Russia, p. 6, <http://www.kpmg.com/hu/en/issuesandinsights/articlespublications/pages/thinkbric-russia.aspx>, accessed 8 June 2013.

electricity infrastructure to meet ever-increasing electricity demand indicates that the Russian economy is developing too fast for the electricity industry to cope with this growth. Thus, the parallel development of the economy and the electricity sector is not yet a reality in Russia. Sustainability is therefore threatened and this can hamper economic growth forecasts until 2020. Policy development with regards to changing the system and ‘the rules of the game’ as Douglass North likes to call it, are necessary to revitalise confidence in the electricity sector.

Russia is making use of its vast deposits of natural gas to produce electricity, but also depends on other fossil fuels such as coal. In 2006, 18% of Russia’s electricity output was based on coal, and 46% was based on natural gas¹²⁷. This shows that Russia is using its abundant natural resources to produce electricity, but also to export the natural gas, mainly to Europe. Its reliance on fossil fuels to produce 64% of its total electricity shows a need to invest into cleaner, greener technologies, since a country of 17,098,242

¹²⁷ KPMG. 2009. Think BRIC! Russia, p. 26, <http://www.kpmg.com/hu/en/issuesandinsights/articlespublications/pages/thinkbric-russia.aspx>, accessed 8 June 2013.

km²¹²⁸ will not be able to sustain its reliance on fossil fuels based on present records and estimations if the economy is meant to grow at rates indicated above. Therefore, institutionally and from a natural resource perspective, Russia is not practicing sufficient sustainable energy policies and is not experiencing a parallel development equilibrium. The need to diversify its energy mix to improve more nuclear and renewable energy will serve as potential counterbalances to the imbalanced reliance on fossil fuels.

Continuing with India, a significant factor is population statistics. The economy must service the needs of more than 1,100,000,000 persons according to records submitted in mid-2011¹²⁹. The population numbers indicate a trend of economic growth and population growth that is expected to continue over the coming decades as well. In 1996, the Indian population stood at approximately 939,540,000 citizens and in comparison with the more recent figure above confirms the population boom that has caused India to become an energy-hungry nation, similar to

¹²⁸ Central Intelligence Agency. *CIA World Factbook*. 2013.
<https://www.cia.gov/library/publications/the-world-factbook/geos/rs.html>,
accessed 8 June 2013.

¹²⁹ KPMG. 2009. *Think BRIC! India*, p. 54
<http://www.kpmg.com/hu/en/issuesandinsights/articlespublications/pages/thinkbric-india.aspx>, accessed 8 June 2013.

China¹³⁰. With such high population figures, the dynamics of energy economics inevitably change because the government faces the marked challenge to provide ever-increasing energy supply and has no choice but to develop a coherent energy policy based on high population density and each one requiring electricity. Without sustainability in mind, the Indian government will face continued severe power shortages, as in the past, and in the future for the following reasons:

In 2003, significant reforms were undertaken in the electricity sector and rural electrification programmes brought about confidence in the Indian government's ability to implement changes that had been proposed. However, institutional dynamics show that reforms cannot be carried out with interruptions, but must be undertaken as a whole. What this means is that in India many rural electrification programmes indicated access to electricity by the poor. The political will to provide access to the poorer folk was evident.

¹³⁰ KPMG. 2009. *Think BRIC! India*, p. 54
<http://www.kpmg.com/hu/en/issuesandinsights/articlespublications/pages/thinkbric-india.aspx>, accessed 8 June 2013.

The national grid was being expanded, yet, the manner in which supply was managed proved to be inadequate and even though low-income earners in rural areas had access to the grid, the supply was highly irregular, thus minimizing the hopes of reliability in electricity supply¹³¹. Efforts to provide reliable electricity supply continue, but it is estimated that in 2009, a total of 500 million Indians were still living without access to electricity¹³². With population growth at record levels, the status of Indian energy policy shows that energy poverty is a significant national problem. Based on this current research, few signs exist of this problem being overcome in the near future. This can be substantiated by considering the exorbitant levels of investment required to reach a stage where the electricity sector will be well developed enough to service the needs of all the citizens within India's territory in a consistent manner.

With reference to the financial requirements mentioned above, India has experienced challenges with its energy sustainability programmes. This has led to slow and irregular

¹³¹ Central Statistics Office - National Statistical Organisation - Ministry of Statistics and Programme Implementation, Government of India, *Energy Statistics 2012*, p. 54.

¹³² Ibid.

implementation of coherent electricity policy. The institutionalization of free electricity rights for rural farmers in India has been a politically clever step, but practically and economically very difficult to implement. Considering that India is facing high levels of energy poverty, electricity shortages and lack of infrastructure, it is a contradiction to allow free electricity to farmers in rural areas. The example of having the rights to electricity guaranteed by the government and the lacking implementation by the Indian power providers shows that the regulations and oversight of the electricity industry do not work in tandem. This is thus an institutional problem, since coordination of production, transmission control monitoring and coherence in governance matters relating to electricity provision are disconnected from each other. This occurs to such an extent, that India's economy is being hindered from reaching its full economic output potential. What this means is that with energy poverty remaining such a stark reality, all those affected by the lack of access or supply of energy are not able to assist the Indian economy to grow or to become more stable.

In addition to institutional matters mentioned above, India's electricity sector is facing a reliance on fossil fuels, mainly coal. With very high population growth rates, an annual average GDP growth rate of 6.6% in 2008¹³³ (and this growth trend having existed before 2008 and having continued in to 2013 despite a global economic slowdown), it is evident that India's fast growth will lead to even higher pressure being exerted on the existing and mostly unreliable electricity infrastructure. Despite the electricity disorder, economic growth has occurred amidst a situation where electricity infrastructure is placed under severe pressure and the risk of overburdening it, which could lead to prolonged power failures. In this context, the needs to meet spiking electricity demand will hinder India from moving away from relying on fossil fuels faster than is generally expected. The reason for this is that India will likely tend to follow a pattern that South Africa has followed, by rather relying on the present realities of coal reliance until sufficient investment opportunities and confidence exists to be able to rely on renewable energy to meet ever-growing electricity demand. Nuclear energy is a consideration that the

¹³³ KPMG. 2009. *Think BRIC! India*, p. 12, <http://www.kpmg.com/hu/en/issuesandinsights/articlespublications/pages/thinkbric-india.aspx>, accessed 9 June 2013.

Indian government is debating and will be discussed in more detail in the following chapter's BRICS' countries nuclear energy section.

To expand on the above, India's coal dependence for electricity generation was measured in 1990 at 193 TWh,¹³⁴ and 420 TWh in 2000¹³⁵. The statistics for 2010/2011 indicate that total electricity consumption in India rose to 959.07 TWh and 704.32 TWh were produced by relying on fossil fuel for the production process¹³⁶. The generation capacity mentioned above also represents the consumed energy in India, since shortages still exist even beyond the increased generation capacity so far. Thus, the 959.07 TWh are only an indication of the demand for electricity that has been met. The trend confirms the hunger for electricity and the needs that Indian citizens have for electricity and shortages of electricity will thus persist as the economy grows and the electricity sector lags behind with its expansion regardless of progress made so far.

¹³⁴ TWh stands for Terawatt hour and is a metric measurement for electrical energy. 1 TWh represents 1,000,000 Megawatts (MW), or 1000 Gigawatts (GW).

¹³⁵ KPMG. 2009. *Think BRIC! India*, p. 12, <http://www.kpmg.com/hu/en/issuesandinsights/articlespublications/pages/thinkbric-india.aspx>, accessed 9 June 2013.

¹³⁶ Central Statistics Office - National Statistical Organisation - Ministry of Statistics and Programme Implementation, Government of India, *Energy Statistics 2012*, p. 32.

India is therefore a case where the electricity sector is attempting to constantly meet demand as the economy grows, but the sector is simply too small and inefficient from an infrastructure perspective as well as from a governance perspective. Institutionally, the Indian electricity sector is being hampered from growing more successfully as well. Reasons for this include the required regulatory approvals from the government authorities for local districts to make enhancements to infrastructure and to address supply capacity challenges. These approvals are part of the institutional mechanisms that is aimed at providing oversight for the Indian government on the management of the grid and to regulate any enhancements or changes made that will affect the amount of electricity being added to the grid. The approval regulations are thus a manner in which the government can maintain control of how the grid is managed. The evidence indicates that the approval regulations are undermining effective management of the grid, since power shortages and irregular supply remain a reality. Electricity reforms under such a system are very challenging to undertake and thus only little progress has been made.

Power theft that is not being actively addressed by the government perpetuates the lack of needed electricity reforms¹³⁷. Theft by illegally connecting to existing power connections undermines the ability of sufficient revenues to be collected with which the Indian government can address the needs to improve the quality of existing infrastructure and to stabilize supply. Theft also perpetuates the burden on secure power supply, since severe pressure placed on the electricity distribution levels further deteriorates existing infrastructure. In such an environment, the power provider faces significant challenges to carry out maintenance, since very little oversight of the connection network exists. The amount and type of homemade electricity connections changes frequently since citizens connect or cut the supply at a variety of locations as they see fit. This increases the level of difficulties for the maintenance crews in keeping pace with how the complex wiring system functions and undermines the quality of maintenance work that is able to be carried out.

¹³⁷ International Energy Agency. *World Energy Outlook*. (Paris: International Energy Agency, 2002).

The parallel development equilibrium between the economic growth and the growth of the electricity sector thus is attempted by the efforts of the power provider to keep sufficient oversight of the grid. Nonetheless, a disconnect between economic growth and the growth of the electricity sector prevails. Thus, electricity shortages, energy poverty and inequality of electricity access between the urban citizens and the rural poor remain and are likely to be perpetuated into the foreseeable future. The electricity sector in India is thus facing a dilemma of catching up with economic growth and also because of its inability to consolidate the electricity industry and manage the grid successfully.

Turning to South Africa, the country faces issues on sustainability which must be understood with regards to reliance on coal discussed in the previous chapter. The abundance of coal and fossil fuels in the country provides little incentive to invest into renewable energy infrastructure when it is far more practical and profitable to continue with coal-based electricity production for which the industry is already adapted. The economic growth curve of South Africa has shown that economic growth has forged

ahead, whilst the electricity sector has not kept pace. Reforms, such as developing an IRP strategy have had a positive effect in South Africa since an institutional and political will exists to address the electricity issues. Since 2010, the reforms based on the IRP document have come at a time when South Africa experiences the growing pains of an economy in transition and should be able to rely on its energy sector as a driving force for economic growth. The gap between electricity demand and supply continues to rise, and with the dependence on fossil fuels creates risks for sustainability of managing the electricity sector as is common at present.

Russia, India and South Africa are examples of economies with great potential for economic growth but they all face challenges of sustaining the status quo of their electricity sector. The evidence of China's growth is a case in point. It is important to recognize with the knowledge outlined above, that these three countries' management systems and institutional capacities hinders the steady growth that is required for the electricity sector to catch up with economy's development. Russia's territorial size and accompanied need for consistent electricity supply, India's total

population figures and economic growth which is underpinned by electricity security and South Africa's backlogs in addressing electricity needs are not a recipe for sustainability. Furthermore, the levels of reliance on fossil fuels to drive most of the growth that is envisaged for these nations threatens the efforts of the international community and the United Nations. These include global carbon emission reductions, achieving sustained use of limited resource with the aim of preserving natural resources for future generations and the international protection of the environment which especially growing economies rely on for food and water security. These factors in combination call for a revision of electricity policy which will better accommodate the ambitions set out by the leaders of these three countries.

Thus, based on the records and figures available, it becomes clear how these three countries cannot continue to pursue an electricity policy where a lack of coordination between all stakeholders in the electricity industry exists. Furthermore, the institutional irregularities such as lack of policy implementation, regulatory discrepancies, such as the challenges faced by local authorities to be able to make enhancements to the grid in India

for example, and waiting too long for measures to be taken to upgrade the electricity infrastructure have caused these countries noteworthy risks to sustainability of their electricity industries.

IRP is a good example of what needs to be implemented, as discussed at the beginning of the chapter. Such a consolidated approach provides the basis with which these countries can address their sustainability problems. The IRP approach is being pursued in South Africa but the relatively small size of the territory compared with that of Russia or India, makes the implementation of IRP easier. Russia and India have had a haphazard approach to addressing their electricity needs, due to the large size of these countries with vast and complex electricity networks that are difficult to oversee. Also, due to the much more difficult policy environment in which to find a way to consolidate their electricity industries, an extent of stagnation perpetuates itself. Even though all three countries are facing electricity supply problems, which hinder their economic output potential, it is clear that South Africa is in a more favourable position to adequately address its electricity difficulties. Russia's potential to become stable with electricity supply is far greater than that of India, since the Russian

population is not as high as that of India, meaning that fewer citizens are affected by backlogs in electricity supply upgrades. India faces serious challenges that indicate the need for a carefully constructed and integrated approach to stabilizing their electricity sector. The IRP approach is a way in which sustainability can be strived for since IRP aims to be an inclusive and longer-term institution that can assist countries such as the three mentioned in this chapter to address pressing electricity questions. Without sustainable electricity planning, the economic growth trends will fade due to lessened abilities to produce and manufacture.

Chapter 5

Electricity Policy and BRICS Cooperation

The BRICS Brand and its Influence

This chapter argues that South Africa's electricity policy is undergoing noteworthy changes since it joined the BRICS in 2010, posing opportunities and threats that require due analysis including nuclear power. The documentation on these developments at the time of writing is somewhat limited. The BRICS (Brazil, Russia, India, China and South Africa) are a formation of a new global middle class in the 21st century and South Africa is undergoing a global political and economic facelift. The status of being part of the third world no longer fully applies, and neither can any of these nations claim to be a first world country either. Even though poverty, disease and instabilities exist in all these countries, a global paradigm shift has occurred, where the traditional Western powers are seeing their leading roles deteriorate on a slow, but steady scale. The BRICS also represent a challenge to the post-Cold War world,

and show that non-traditional global players can become decisive actors in the game of global politics, economics and trade.

Multilateralism is a key instrument through which the BRICS exert influence over smaller powers and onto larger powers. Increased influence on global platforms such as the IAEA, UNIDO, the UNSC, the World Bank and in the G-20 show that the BRICS are successfully entrenching themselves as a the new global phenomenon aiming to contribute to a re-imagined 21st century. These commonalities and united efforts include political support for each other to assist each other in achieving elevated economic growth rates help to underpin the BRICS' role in the world. Examples include the political and economic support for a proposed BRICS Bank which would aim to fund projects that all five countries are in need of, and these include energy infrastructure¹³⁸. Industrial growth in the BRICS depends on secure supplies of energy. Aiming to provide their respective citizenry with the tools required to drive the economy forward through competitive manufacturing and services (thereby creating

¹³⁸ Institute for Development Studies. 2013. *What Next for the BRICS Bank?* www.ids.ac.uk/files/dmfile/Rapid3.pdf, accessed 9 October 2013.

a larger middle class) add to the list of achievements that the BRICS pursue.

Each of the BRICS aims to contribute a specific brand of globalization to the community of nations. When considering Brazil, it becomes evident that the country is emphasizing its leading role as an economic power in South America as the world's seventh largest economy. It also boasts itself as a host country for mega events such as the FIFA World Cup in 2014 and the 2016 Olympic Games. Russia under Vladimir Putin and Dmitry Medvedev is underpinning itself further as a global leader in energy production and a new Russian identity. This identity is based on nostalgic principles of an era gone by, commonly described as "siloviki"¹³⁹, which underlines that Russia in the 21st century still is neither East, not West, but unique. It is also tied to its own history and celebrating its attempts at being the world's dominant power. India projects itself as a technological power and knowledge

¹³⁹ Siloviki is a term that indicates a culture of being strong in leadership and political stature, an indication of law and order and of hierarchy that demands respect for the Russian national interest. Vladimir Putin's political image of driving forward Russia's development plans with a firm hand and showing that allies of Russia are rewarded with loyalty and support in common areas of interest (such as BRICS development projects) hint at the image that siloviki tries to portray.

economy that is driving forward the ideas that are revolutionizing the information economy (internet, software and data management) which the modern world embraces. It also describes itself as the world's biggest democracy and aims to rival nuclear energy research alongside Russia and China and is home to an untapped consumer market. The Chinese have carefully led their nation with strict policies that have driven economic growth over three decades to help it become the world's second largest economy, an unmatched global market place and the one country in the world with the largest foreign exchange reserves. It is universally known to be a global frontrunner in manufacturing and comprises one sixth of the world population.

South Africa reminds the world that it houses Africa's biggest economy, is strategically placed on maritime trade routes and the gateway to the next phase of global growth, which is expected to take place in Africa. It also showcased its ability to host the 2010 FIFA World Cup and is eager to participate in forums on global issues such as international security, climate change, UN reforms and an overhauled international financial system.

South Africa is the smallest member of the BRICS in terms of its territorial and population size. However, the role that South Africa is set out to play in the group, is based on its political stability, economic opportunity, economic growth rates (albeit repeated domestic economic difficulties such as labour unrest and the global financial crisis) and its mature, internationally competitive banking and legal services. Its overall infrastructure base and trade capacity counts in South Africa's favour. South Africa positions itself in Africa as a country that has the potential and ability to be the gateway to Africa's untapped development potential.

The status of being the gateway to Africa and being a BRICS member comes with increased expectations from its fellows in the bloc, and also from investors who care to benefit from existing opportunities. This relates to the role of a global identity that South Africa needs to maintain. The ANC is aware of the fact that it has to portray itself as being able to act in ways that match its new global status, and hereby the status of being a BRICS member refers. The idea of being a strong and able economy and state is deemed an attractive foreign policy tool and a

method to exert soft power. By announcing a very ambitious infrastructure programme, new political and economic thinking is required, especially regarding energy security.

South Africa's BRICS Membership and the Impact on Electricity Development

Two points that relate to electricity policy within a BRICS context come to light that deserve attention at this stage in the study. This will assist in the understanding of why South Africa is heading in a new direction to achieve electricity supply security in the coming years. This indicates a positive development for institutional change that aims to be inclusive and strong in its nature, unlike the realities of the past. However, such a new direction deserves fair scrutiny and contextualization.

Firstly, South Africa is considering the models of growth and development of its fellow BRICS, with very much attention being paid to China and how China became the global actor that it is today. South Africa strives to combine Chinese development strategies into its own. To expand on this, the Chinese model of

development is based on a finely crafted international relations and cooperation agenda. It is driven by values that aspire to friendship with other states instead of following traditional Western diplomacy models that rely on pre-conditions such as strong democratic institutions, constitutionalism and individual liberties. Linked to these values, the Chinese policies for growth were centred on manufacturing and creating a greater middle class through large-scale industrialization and infrastructure projects¹⁴⁰. These provided incentives for creating jobs, developing a greater skills base and to provide energy and electricity to many parts of China that were suffering from low living standards including energy poverty. The effect has been such that over the long-term China has managed to dominate global manufacturing. It has cemented itself as a global leader to challenge the USA, the European Union and Japan as traditional global trend-setters. South Africa finds this model of global interaction attractive and hopes to re-invent this 'recipe' locally.

¹⁴⁰ W. Morrison. 2013. China's Economic Rise: History, Trends, Challenges, and Implications for the United States. www.fas.org/sgp/crs/row/RL33534.pdf, accessed 9 October 2013.

Before referring to South Africa, brief insights into Chinese policies are warranted. To apply the notion of a parallel development equilibrium to China, the Chinese model of development has seen impressive growth rates, as summarized in the figure below. As argued above, the outcome of such high growth rates has been the reduction in poverty rates, and the achievement of broad-based improvements of living standards for a large part of the population. China is thus setting a national expectation over a longer trajectory of time that is proving to its own people the government's ability to govern successfully. This happens whereby the citizenry gets used to such trends and they become the norm. The country is energy-hungry and is successfully importing much of the oil, gas and other resources it requires to keep up with its development agenda. Coupled to this is a continuous programme of investing in electricity infrastructure.

Electricity usage in 2007 and early 2008 prior to effects of the global financial slowdown showed an increase in average electricity consumption of 10% per month, taken from data

collected by Indian authorities¹⁴¹. This trend has decreased momentarily but remains a strong real indicator, showing that as economic growth rates soar, related growth in electricity supply is required to help sustain those growth levels. The Chinese case also proves a point that has been argued in previous sections of this study: The more electricity supply is available, the more its consumers and new consumers will tend to use it. Thus, a cycle commences in which Chinese energy consumption is soaring as more infrastructure and capacity is required. As the middle class grows and as the economy develops further, this cycle only continues. It should be noted that even though some financial years may indicate a slump in economic growth, the demand for electricity in the longer-term does not diminish significantly.

Table 2¹⁴²:

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Economic Growth (Percent)	9.1	10.0	10.1	11.3	12.7	14.2	9.6	9.2	10.4	9.3	7.8

¹⁴¹ Ministry of Finance, Government of India. The BRICS Report. (New Delhi: Oxford University Press, 2012).

¹⁴² Compilation of growth rates from the following source: World Bank. 2013. GDP Growth (Annual %). <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>, accessed 8 August 2013.

Apart from the unmatched imports of energy into China that are heavily scrutinized as well, selected lessons can be learned of which South Africa could benefit¹⁴³. The Chinese parallel development equilibrium therefore is an example of what coordinated government policy is able to achieve when combined with stringent implementation efforts for the single goal of national development. The clearly defined development programme aims to grow the energy sector to be able to make the unprecedented strides in manufacturing and world trade. This brings into the equation the variable of institutionalization. As China broadens its frontiers in global trade and in energy consumption, updated rules and reformed policies are needed to address governance issues in trade and energy matters to maintain the speed at which this growth takes place. This means that with a trend of a clear development agenda set, the middle class of China is increasingly becoming wealthier, gains access to resources and services such as the internet, and is able to form its own opinion and analysis, albeit on a small scale. Through the ability to be able to form their own opinions on how China develops itself, the

¹⁴³ D. Ma. 2013. China's Search for A New Energy Strategy.
<http://www.foreignaffairs.com/articles/139425/damien-ma/chinas-search-for-a-new-energy-strategy>, accessed 10 October 2013.

Chinese government becomes even more aware of the need for reforms in the rules and regulations that govern economic, development and energy policies. Since not all Chinese have equal access to electricity, the needs for further energy development becomes clear.

It is for such reasons that in the BRICS counties the idea of having sufficient energy supply is unrealistic¹⁴⁴. Only once all citizens across all sectors have continued electricity supply without threats of power shortages, can the respective government claim to have met the energy needs of all. The BRICS countries' incentives to be able to proclaim that energy needs by all have been met, include reasons such as showing the traditional Western powers and sceptics that the so-called emerging market economies like the BRICS can rival first world nations in sectors such as energy. Such situations are only applicable to a small number of countries in the world where a balance between power consumption, economic growth and population growth exists. In the five BRICS countries, a need to supply more electricity remains and thus the cycle of

¹⁴⁴ This notion is certainly relevant to other developing (and underdeveloped countries) beyond BRICS.

power supply and power consumption does not subside until an ideal situation of a demand and supply equilibrium has been met. This ideal situation is very unlikely, taking into account the realities of underdevelopment, inequality and weak institutional arrangements (especially a lack of implemented, integrated energy planning and the unbundling of the energy market in the South African case) that still exist in each of the BRICS.

The figures below show an energy profile for each of the BRICS. It becomes clear that in the cases of Russia, India, China and South Africa, the energy profile does not reflect an environment that can sustain long-term development agendas that these countries aspire to. Explanations include an over-reliance on finite fossil fuels and accompanied climate change risks form part of the reasons why existing electricity policies in these countries are being internationally criticized. Comparatively, the country with the most varied power generation mix is Russia. South Africa clearly lags behind in this regard and needs to consider the policies of its peers. Electricity insecurity also helps to explain why in all the BRICS a drive towards energy security is evident, which will be elaborated on below. The Brazilian case indicates a contrary heavy

reliance on hydro power, which is laudable by 21st century international energy standards, yet, very dependent on topography, rainfall and a predictable climate. For those reasons the energy policy in Brazil is again under review. The overall BRICS trend nonetheless indicates a theme of electricity policies in transition. On the next page are charts which indicate this trend better.

Figure 1¹⁴⁵:

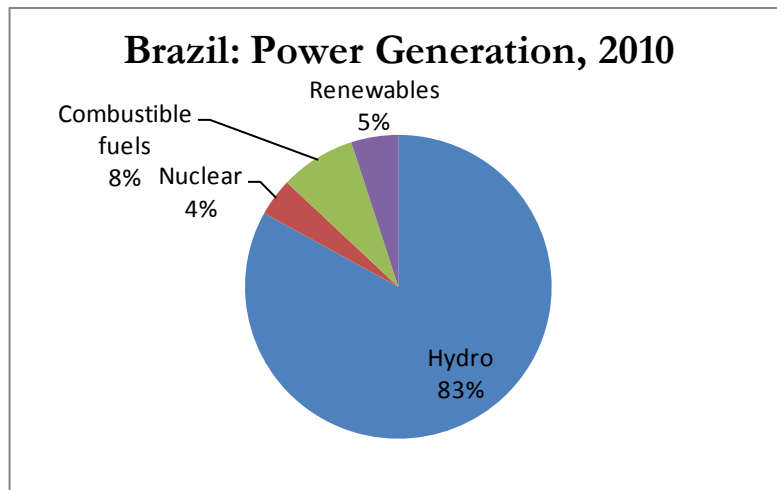
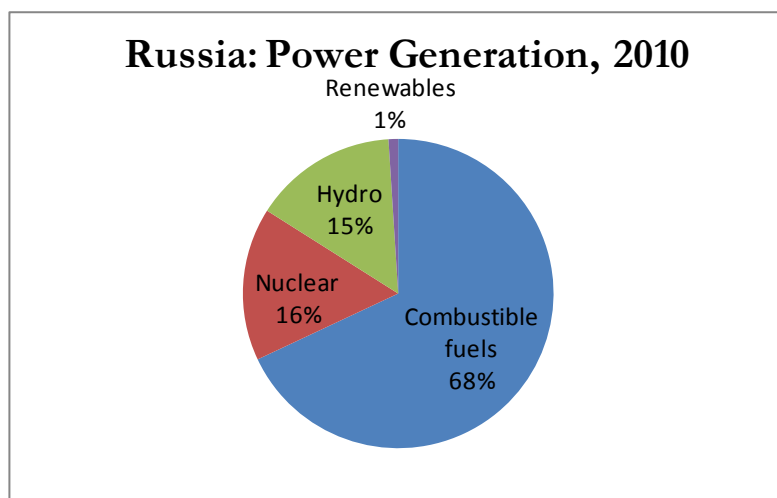


Figure 2¹⁴⁶:



¹⁴⁵ Compilation from: PSI Media Inc. 2009. *Brazil Energy Handbook*.
http://www.psimedia.info/handbooks/Brazil_Energy_Handbook.pdf, accessed
 8 August 2013.

¹⁴⁶ Ernst & Young. *Benchmarking the Global Nuclear Industry*. (United Kingdom:
 Global Power & Utilities Center, 2012).

Figure 3:¹⁴⁷

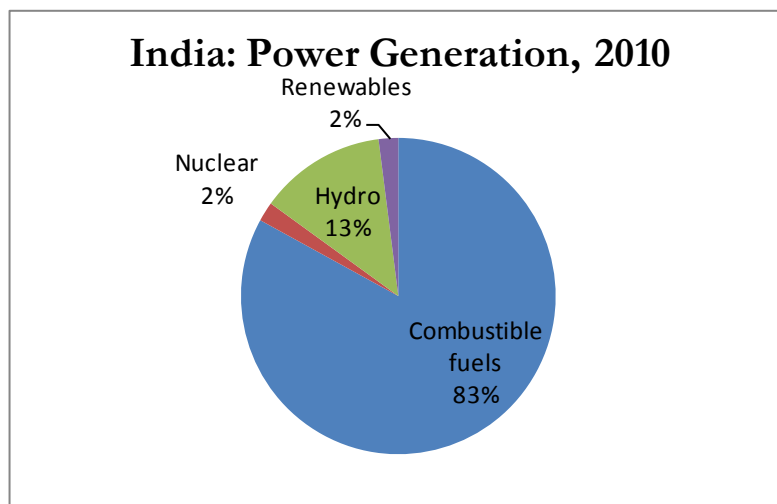
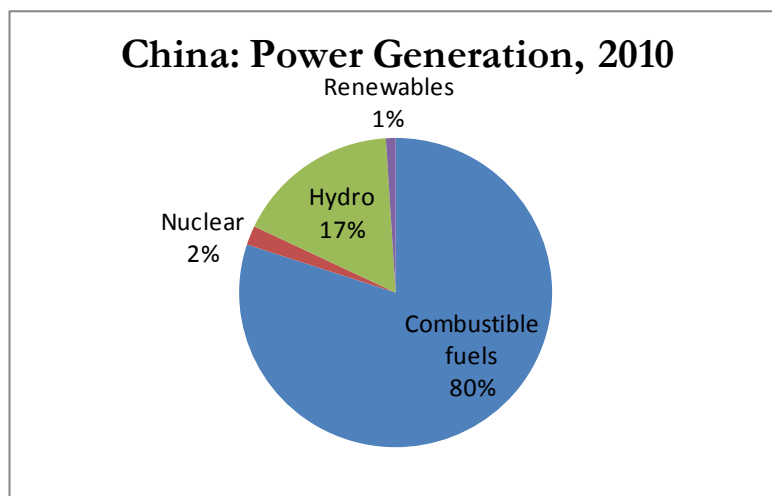


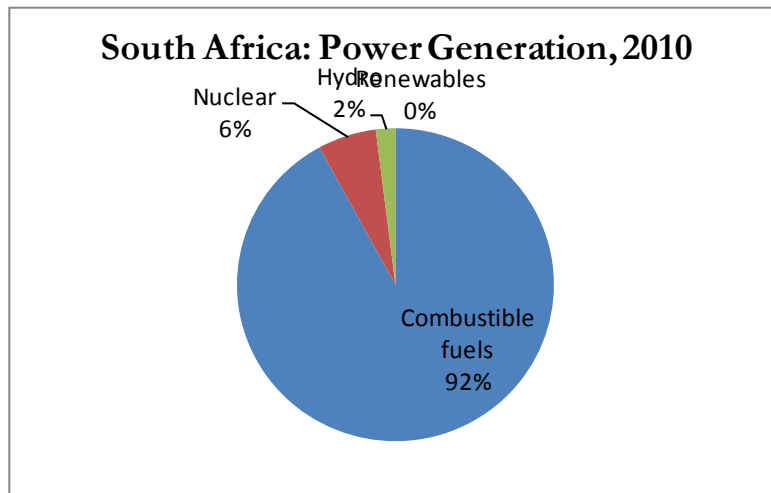
Figure 4:¹⁴⁸



¹⁴⁷ Ernst & Young, *Benchmarking the Global Nuclear Industry*. (United Kingdom: Global Power & Utilities Center, 2012).

¹⁴⁸ Ibid.

Figure 5:¹⁴⁹



Secondly, the political and economic identity is an integral part of an emerging economy since this helps to legitimise the manner in which development agendas are carried out and provides leverage which can help achieve political and economic goals. The South African economy is being driven forward by ambitious infrastructure projects announced by President Zuma during his presidency since 2009 and include the electricity sector. More electricity supply and energy security will be required in order to finalize these projects and to drive the development

¹⁴⁹ Ernst & Young. *Benchmarking the Global Nuclear Industry*. (United Kingdom: Global Power & Utilities Center, 2012).

This chart also indicates that in 2010 the data collectors were unable to include renewable energy sources in the power generation profile. The contrast between South Africa and the four other BRIC's is thereby strongly highlighted.

agenda forward that South Africa envisages for itself as well as for the continent. Government spending on infrastructure development is linked to a budget of ZAR827 billion in phases over three to five years¹⁵⁰. Such mega-industrialization projects reflect parallels with the Chinese case above.

This is also strategic for South Africa to become involved in “mega-build” projects with the commonly cited example being the construction of the Medupi and Kusile power stations. The symbolism of providing energy through mega projects is an additional aspect to infrastructure development, is well-timed and coincidental with the country urgently requiring these upgrades. The idea of a strong state with the capacity to raise and spend large amounts of capital on a globally important theme such as energy, is a type of constructed benchmark within the BRICS for other nations to observe. For South Africa, its evolving status in the world is influenced by its energy build programmes, providing the government with the desired attention. International media, analysts and suppliers of components for the projects are attracted

¹⁵⁰ South African Government Information. 2013. *National Infrastructure Plan*. <http://www.info.gov.za/issues/national-infrastructure-plan/>, accessed 5 August 2013.

to South Africa. This provides the government with an opportunity to communicate a message to its peers, (such as other advanced economies like Turkey, Indonesia, Malaysia and South Korea) to international critics (such as the traditional Western leaders and international financial institutions such as the International Monetary Fund and the World Bank) and to competing governments like Nigeria that South Africa should not be underestimated.

It is also a reflection that South Africa takes its role as the largest African economy and the status of being the gateway to Africa seriously. It is clear that the government aims to maintain this hybrid identity, consisting of its economic status, its BR. Energy sector expansion under the umbrella of the BRICS grouping only enhances South Africa's foreign policy objectives and it benefits from the support and solidarity that Brazil, Russia, India and China offer when the naysayers of South Africa's development agenda become seemingly too vocal. The other BRIC's offer their cooperation through the collective meetings of

the BRICS leaders, ministers and working groups. The solidarity shown by a BRICS team effort assists in the cooperation efforts¹⁵¹.

Through a collective approach, knowledge transfer occurs and increased trade with South Africa which explains to a great extent why South Africa follows and contribute to the trends set by the other group members, especially China in terms of infrastructure development; Brazil in terms of clean energy policy developments which relates to the IPP programme mentioned in previous chapters; and Russia in terms of developing nuclear power as a means to address electricity security. One of these trends is the alignment towards a nuclear power policy. Evidently the BRICS were not deterred by the Fukushima nuclear accident and its aftermath, since their nuclear power policies remain intact. More detailed analysis follows below, since such policy developments have profound impacts on the political economy of electricity and are generally controversial. The institutionalization of nuclear energy is a political and economic game changer in South Africa because of the costs and perceived safety risks

¹⁵¹ BRICS5. 2013. *Fifth BRICS Summit Declaration and Action Plan*. <http://www.brics5.co.za/fifth-brics-summit-declaration-and-action-plan/>, accessed 11 October 2013.

involved. The entrenchment of BRICS cooperation can be emphasized through nuclear build programmes, since a nuclear agenda is very unlikely to occur by the efforts of one country alone. Components for the reactors and the nuclear engineering skills required are generally sought from countries which are able to assist. Two countries that are increasingly eager to assist South Africa in their nuclear industries are Russia and China¹⁵².

Nuclear Power in the BRICS

South Africa's current nuclear capacity remains at the 2010 level indicated above, namely at approximately 6% of the national grid contribution, a level showing maximum output capacity. The government is no newcomer to nuclear power, since the Koeberg nuclear plant has been operational since 1984 – referred to in Chapter 2. The nuclear capacity of South Africa has not been increased since then, even though South Africa's own nuclear power programme began in the late 1990's, and is elaborated on below.

¹⁵² N. Volchkova & M. Ryabtseva. 2013. Russia–South Africa Relations: Collaboration in BRICS and the G-20. *SAILA Occasional Paper No 135*, p. 6.

An attempt at creating Pebble Bed Modular Reactor (PBMR) technology was envisaged, approved by government and technological developments commenced in 1999¹⁵³. The aims of the project included to increase nuclear power output by operating smaller reactors, reducing carbon emissions, reducing water consumption in the process of creating electricity¹⁵⁴ when compared with the process of generating power from coal, creating jobs, promoting research and technology, and to show the international community that South Africa was pursuing nuclear power for peaceful purposes in accordance with requirements from the IAEA. The nuclear industry would have been developed to an extent that would have made South Africa an exporter of nuclear reactors. The foreign investment climate and the high costs involved for such technology between 1999 and the early 2000's were however not conducive to successful implementation of the project. Resultantly the Zuma administration officially halted the

¹⁵³ R. Worthington. 2000. *Nuclear Energy Costs the Earth – An Introduction to the Pebble Bed Modular Reactor (PBMR)*.

<http://www.ratical.org/radiation/NECE.pdf>, accessed 12 October 2013.

¹⁵⁴ Fresh water is commonly used in coal-fired power stations to turn heat from the combusted coal in the boilers into steam. The steam that is created provides the force that turns the turbines. Without water turning into steam, electricity will not be created. Due to high levels of steam required to allow the boilers to function non-stop, a continuous water supply is needed. In South Africa where water reserves are decreasing, coal-fired technologies requiring much water are unsustainable and harm the country's water security.

project in 2010 but continued to develop alternative ideas to address nuclear energy instead at a later stage in South Africa's development agenda¹⁵⁵.

According to the most recent energy policy document, the IRP 2010¹⁵⁶ states that by 2030, South Africa requires an additional nuclear power supply of 9600 MW's¹⁵⁷. This translates into a fleet of six nuclear reactors to be built at three locations along the southern coast of the country. The IRP thus represents a new policy direction which means that the institutional change within the electricity sector to diversify itself away from coal reliance is being given due attention. The energy mix is thereby being adapted and progress is being made with regards to securing energy technologies that are conducive to a growing economy with a higher demand for more reliable, longer-term electricity supply. It should be noted that Eskom has been given the confidence by the government to be in control of the nuclear power plants once a

¹⁵⁵ Mail and Guardian. 2010. SA mothballs Pebble Bed Modular Reactor project. 17 September. Available at: <http://mg.co.za/article/2010-09-17-sa-mothballs-pebble-bed-modular-reactor-project>, accessed 6 August 2013.

¹⁵⁶ The IRP 2010 is the official plan for future electricity developments, but is being disputed over its inclusions on nuclear energy as a requirement for long-term energy security in South Africa. Further reference to the IRP is made in the previous chapter.

¹⁵⁷ Department of Energy. *Integrated Resource Plan for Electricity 2010 – 2030: Revision 2, Final Report*. (Pretoria: Department of Energy, 2012), p. 6.

supplier for the components and construction has been identified. This manner of dealing with the proposed nuclear upgrades is to be expected, considering that the government is Eskom's prime shareholder and currently no viable alternative body exists which could be given these management responsibilities.

The formulation of this policy was done by the ruling party's energy department for the most part, since it is a political prerogative and it highlights two points. Firstly, the electricity sector itself is being provided with a major attempt at becoming a cleaner, more environmentally acceptable sector through the planned nuclear programme. This is an indication which demonstrates that South Africa is following global trends to ensure that carbon emission reduction targets are met, in accordance with treaties signed at the United Nations Copenhagen climate change summit of 2009. It also proves the commitment of the government to addressing electricity security in a serious way with long-term electricity provision strategies in mind that have for many years been lacking.

Secondly, it shows partial institutional change, based on the notions that Acemoglu and Robinson argue about when they discuss the level of inclusivity and exclusivity in the political and economic sphere of a country. The partial institutional change becomes evident when considering that the electricity policy is evolving but the electricity sector itself is not being unbundled to include more private ownership. In realistic terms South Africa is faced with only this possibility, since Eskom is the only stakeholder representing the majority of the electricity sector. Taking into account the infancy of the IPP programme, it would not be possible to find a compromise between Eskom and the IPP's. This situation therefore allows for the continuation of monopolistic growth in the electricity sector. With Eskom being responsible for an additional 9600 MW's of power, the share of electricity provision by the IPP's becomes comparatively smaller. Due to institutional stagnation within Eskom in the past and a pressing need to install further electricity production capacity, Eskom's role in nuclear power generation must be regarded as best practice under the IRP. From an institutional change perspective, nuclear power represents a new path to energy security based on the policy which is the IRP. New nuclear energy will change the

manner in which energy policy functions in the country and thus will change the course South Africa takes in matters of energy, development and economic growth.

To show the nuclear trend in the BRICS, it is important to note that the World Nuclear Report's data show that in these five countries an appetite for nuclear expansion exists¹⁵⁸. South Africa's proposed nuclear expansion is in this context unsurprising. To briefly elaborate: In Brazil, two PWR nuclear reactors are operational, with plans to increase capacity existing to be able to diversify the current over-reliance on hydro power. A pressing need for nuclear power in Brazil is not substantial based on the World Nuclear Industry Status Report, since it is widely accepted that Brazil's power generation conforms to global aspirations of clean, low-carbon production. Russia operates 33 reactors and is expanding its national capacity in the near future. India's power generation capacity is supported by 20 nuclear reactors with a great need remaining for additional power supply. Finally, China is eagerly augmenting its nuclear capacity of 17 existing nuclear

¹⁵⁸ M. Schneider & A. Froggatt. *World Nuclear Industry Status Report*. (Paris: Mycle Schneider Consulting, 2013), p. 13.

power plants with its 28 new-build projects. South Africa's expansion is modest in comparison, yet confirms the pattern of all BRICS actively engaging in nuclear power developments. Evidently, South Africa is thus following the BRICS energy trend.

The IRP's proposed changes are being highly regarded due to the change this policy represents in comparison to the historically strictly coal-orientated policies. Through South Africa's BRICS membership a feasible opportunity exists to realize this nuclear expansion policy. The magnitude of the contract comprises up to ZAR1 trillion (or US\$100 billion) and will be awarded once the government has reached a point of completing the bidding process in due course. Fellow BRICS members Russia and China have taken note of the policy in the IRP and are eagerly lobbying to be given the contract for supplying nuclear power plants to South Africa. Even though the French company Areva built the Koeberg power plant, there is no guarantee that this European friendship that was emphasized by France's involvement in South Africa's nuclear power industry is going to determine the success of an expected French bid. As geopolitical alliances have been strengthened within the BRICS, it is expected that Russian

and Chinese bids will be given most attention. Reasons for this include the nature and collective or “group mentality” that the BRICS bloc portrays. Intra-BRICS relations have grown faster and are more easily maintained compared to relations with France, or other Western nations.

BRICS membership institutionalizes the consideration of intra-alliance partners over other competitors in matters of large contracts, especially nuclear power. Such a statement is substantiated by several observations. Firstly, Russia and China are showing great favour for nuclear expansion and Russia is regarded as a global leader in nuclear energy technology and reactor design. The Chinese are striving towards their own niche designs of nuclear power plants with promising signs of progress, but are still developing their sector through research and admit that more work is required to become a fully trusted nuclear developer compared to Russia, France or Canada¹⁵⁹. South Africa’s close ties with Russia and China influence how the government navigates towards the implementation of nuclear power plants with nuclear

¹⁵⁹ M. V. Ramana & E. Saikawa. Choosing a standard reactor: International competition and domestic politics in Chinese nuclear policy. *Energy*, 36: (2011), p. 6786.

expansion plans being discussed at much higher inter-governmental levels than with the other interested parties. Intra-BRICS cooperation is thus visible since 2011. The following examples indicate this.

China's three leading nuclear power companies (the Chinese National Nuclear Corporation (CNNC), the Chinese Guangdong Nuclear Power Company (CGNPC) and the State Nuclear Power Technology Corporation (SNPTC)) are pushing forward their drive to help South Africa implement the nuclear vision of the IRP. At the Energex energy conference in Midrand, Johannesburg in 2013 the Chinese showcased their nuclear technology with the specific aim to convince government representatives to purchase this technology. Political and economic factors cannot be ignored during this exhibition, since China is South Africa's largest trading partner since 2009¹⁶⁰. South Africa therefore has an obligation to pay special attention to Chinese interests in its nuclear industry. Furthermore, more peripheral aspects, such as the initial Chinese lobby that invited South Africa

¹⁶⁰ F. Y. April. 2012. Strategising China–South Africa relations. *Polity.org*. Available at: <http://www.polity.org.za/article/strategising-chinasouth-africa-relations-2013-03-26>. Accessed on 7 August 2013.

to join the BRICS grouping play a role in how South Africa is influenced by Chinese advice on how to proceed with electricity policy in the country. It becomes clear how political and economic relations with China can impact the type of nuclear procurement plan. If a Chinese bidder is awarded the contract for the nuclear power station construction and assembly, the institutions that govern the safety standards of the nuclear power plants need to be strong. These institutions and safety policies must effectively hinder underdeveloped technologies from being used that can pose risks for human life, the environment and the economic and energy security of the country.

Russia's state-owned Rosatom nuclear company has been guided by Vladimir Putin with strategic interests through the channel of BRICS development cooperation to assist Eskom in its plans to secure electricity supply. It should be noted that bilateral energy relations between Russia and South Africa have also been boosted through their cooperation within BRICS, since the common platform on which the two governments work has been significantly broadened. Through higher levels of interactions, areas of common interest have become evident and discussions

have led to working visits. One such example is the 5th BRICS Summit held in Durban in South Africa in March 2013. The group's 2013 eThekweni declaration specifies more clearly the goals and common stances on BRICS development issues and includes closer ties to intra-BRICS energy cooperation efforts^{161 162}. Informally and apart from the declaration, energy issues have been discussed nonetheless. The declaration provides intra-BRICS institutional legitimacy that set out the regulations by which they cooperate and define the nature of interaction with other global actors, their values and convictions. Examples of this include the bloc's affirmation to inclusive, equitable growth for all members to benefit, mainly by focusing in complementarities of the economies within BRICS¹⁶³. The energy discussions between Russia, China and South Africa are a concrete example of the above.

¹⁶¹ South Africa has undergone a range of name changes of municipal districts, towns, and streets to reflect indigenous culture, heritage and history that digresses from Apartheid legacies and perceptions. Politically, Durban has been associated with P. W. Botha's failed "Rubicon Speech" and colonial history dating back to the Portuguese and British. *For interest's sake, Vasco da Gama first named the place "Natal" on Christmas day in 1497, and British Lieutenant F. G. Farewell named it "Port Natal" in 1824 before it was named Durban in 1835 in honour of the Cape Colony Governor D'Urban.* It was recently decided that Durban should be named according to the rightful Zulu terminology, which is eThekweni. Nonetheless, both names are still used interchangeably locally and internationally.

¹⁶² BRICS5. 2013. *Fifth BRICS Summit Declaration and Action Plan*.

<http://www.brics5.co.za/fifth-brics-summit-declaration-and-action-plan/>, p. 13, accessed 9 August 2013.

¹⁶³ Ibid., p. 1.

The 2013 Summit also served as a platform for Vladimir Putin and Jacob Zuma to exchange ideas on nuclear power expansion, as was already expected based on the assumptions of insiders within the South African government. Russia's strong lobby for being involved in nuclear energy in South Africa has served as an incentive for government to more seriously consider speeding up the process to acquire nuclear power plants. Comments made by Kirill Komarov of Rosatom and also the public offers of Vladimir Putin towards South Africa are show that diplomatic efforts have had an effect on South Africa's decision makers¹⁶⁴. It has served as an incentive for institutional change to take place. Evidence of this is found in the increased interaction between Prof. Anton Eberhard of Cape Town (as a leading policy strategist for the South African government) and the government under what conditions to proceed with nuclear expansion. Prof. Eberhard's study which was commissioned by South Africa's National Planning Commission within the Presidency underwrites South Africa's will to change the institutional framework in which electricity expansion has previously occurred. New rules and new

¹⁶⁴ S. Mantshantsha. 2013. Nuclear project going ahead, bidder to be invited. *Mail and Guardian*. 27 September.
<http://www.bdlive.co.za/business/energy/2013/09/27/nuclear-project-going-ahead-bidders-to-be-invited>, accessed 12 October 2013.

guidelines are clearly being sought. A further development is the official cooperation between Rosatom and South Africa's North-West University in Potchefstroom that aims to assist South Africa to develop nuclear science and engineering so that electricity and nuclear policy changes can be coherently implemented¹⁶⁵. There is no official commentary about this from the Chinese, but such a step by Russia may be copied by the Chinese at a later stage with another University.

The institutional integrity of South Africa's electricity policy encompasses the assurance that safety requirements are met at all its facilities and are a primary focus¹⁶⁶. This applies to the nuclear facilities (as much as to the coal-fired power stations), based on the knowledge that nuclear accidents are detrimental with adverse effects such as radiation and severe health threats that last for many generations. The technology that was exhibited in Midrand by the Chinese has been met with some concern, since

¹⁶⁵ K. Campbell. 2013. Russian nuclear company and SA University sign MoU. 8 August. *Engineering News*. <http://www.engineeringnews.co.za/article/russian-nuclear-company-and-sa-university-sign-mou-2013-08-06>, accessed 9 August 2013.

¹⁶⁶ Eskom. 2013. *Eskom Integrated Report Presentation*. http://eskom.ensight-cdn.com/content/Results_presentation31March2013f.pdf, accessed 9 August 2013.

the technology has a short track record and a globally competitive safety design has yet to be created. This shows that the electricity sector institutions of South Africa correctly prescribe and influence the government very highly, since safety concerns and sustainability issues are evident based on the knowledge that Chinese designs are not matching all international nuclear industrial standards. Russia's nuclear track record is accompanied with the geopolitical clout of having constructed their version of PWR (Pressurised Water Reactor) nuclear power plants for over 50 years with plants operating abroad including Bulgaria, Finland and Germany¹⁶⁷. Russian designs are thus regarded as superior and their technologies make it easier for the South African government to establish trust in their discussions about the reactors and other nuclear components.

China and Russia have their own interests, but these are placed within the realm of BRICS cooperation. From the above elaboration on the role of Russia and China in the energy matters, it becomes clear how Russia and China as two BRICS partners are

¹⁶⁷ International Atomic Energy Agency, 2011. *Status Report 93*. [http://www.iaea.org/NuclearPower/Downloadable/aris/2013/34.VVER-1000\(V-466B\).pdf](http://www.iaea.org/NuclearPower/Downloadable/aris/2013/34.VVER-1000(V-466B).pdf), accessed 5 August 2013.

both lobbying for South Africa's nuclear contract. The value of this contract explains why each contender (including France) has such a vested interest in being awarded the rights to be a nuclear supplier. Rosatom has opened an office in Johannesburg which also serves as a lobby group for the government to help secure the contract by having the Russian lobbyists garner support at government level through meetings and a physical presence in South Africa. Vladimir Putin and Jacob Zuma met again in May 2013 in Sochi to discuss the future of their nuclear cooperation and energy developments within the BRICS countries as well¹⁶⁸. Putin likened the BRICS to the so-called Big Five of South Africa, indicating the strength that the bloc has when they work together, using a metaphor that South African decision-makers easily grasp¹⁶⁹. The metaphor hinges onto the BRICS brand which was discussed in the beginning of this chapter. Such approaches by fellow BRICS partners serve as examples of the incentives they give to each other for cooperation.

¹⁶⁸ D. Chernyshova. 2013. Putin, Zuma discuss BRICS in Sochi. 18 May. *The Brics Post*. <http://thebricspost.com/putin-zuma-discuss-brics-in-sochi/#.UgUg49JJP74>, accessed 9 August 2013.

¹⁶⁹ The Big Five are comprised of the African elephant, the Cape buffalo, the lion, the leopard and the rhinoceros and are usually referred to in the tourism and South African wildlife industry.

As already discussed, this cooperation has been an incentive for a reconstructed electricity plan for South Africa to include nuclear power based on the trend that all BRICS use some form of nuclear technology. A key difference compared to the traditional South African energy debates is that significant encouragement for a new energy plan is being received from partners in an intercontinental alliance, instead of coming from voices of the South African opposition parties, civil society and activists from within Eskom or the government alone. Consequently, the decision-making on these energy matters is taking place with many more observers than usual, since Brazil, Russia, India and China, as well as critics from the media, the UN and the IAEA await South Africa's stance and decision on nuclear expansion. This puts pressure on the South African government and also highlights the challenges of maintaining healthy relationships with its fellow BRIC's, and the UN and the IAEA whilst still convincing the South African citizenry that their economic, environmental and political interests are being considered in this process of energy reforms.

Financial implications for nuclear procurements are known to be exorbitant, and South Africa is unable to raise the capital through Eskom or otherwise to build nuclear power plants. The financial constraints caused by construction delays and labour unrest¹⁷⁰ and related burdens that have accompanied the construction of the Medupi and Kusile power stations have undermined Eskom's financial integrity and thus South Africa requires a unique funding model for its nuclear procurement plan. The Chinese are able to offer South Africa various forms of financial assistance in developing the nuclear industry based on their financial might and through their variety of banking institutions, which include the Industrial and Commercial Bank of China, the Exim Bank and others. South Africa is aware of the options but will be expected to follow international bidding processes for the contract as per usual best practice. Nonetheless, the Chinese financial offer is leverage that can be used to influence South Africa's supplier choice significantly. Russia offers a nuclear programme based on the principle of "Build-Own-Operate" which

¹⁷⁰ The budget was exceeded due to alleged fraud by a contractor and workers struck over salaries and worker's rights. Reference: S. Sole & S. Evans. 2013. "Medupi, the murder and the mega fraud". 2 August. *Mail and Guardian*. <http://mg.co.za/article/2013-08-02-00-deadly-fraud-forged-in-steel>, accessed 12 October 2013.

has attracted Bangladesh, Belarus and Turkey into the nuclear sector¹⁷¹. This programme allows a large-scale entry into the nuclear electricity sector whilst Russian nuclear specialists train and educate local staff in the host country so that after the plant is handed over at an agreed time for the host government to own, the necessary expertise exists to manage the power plants independently¹⁷². This serves as a model that assists in providing the host government with the ability to successfully implement its nuclear energy policies whilst Russia is able to develop long-term relations and economic opportunities in the host country. This is regarded as a mutually beneficial programme and is being offered to South Africa, with the ANC government showing great interest and motivation. Putin has regularly reaffirmed Russia's assistance to South Africa and other BRICS members.

Transparency of the contract details, the bidding process and public participations are very important in ensuring a strong

¹⁷¹ Y. Kadobnov. 2013. Nuclear Ambition on Display at Home and Abroad. 24 July. *The Moscow Times*.

<http://www.themoscowtimes.com/business/article/nuclear-ambition-on-display-at-home-and-abroad/483507.html>, accessed 30 July 2013.

¹⁷² World Nuclear Association. 2013. *Nuclear Power in Russia*. <http://world-nuclear.org/info/Country-Profiles/Countries-O-S/Russia--Nuclear-Power/#.UlmbFlCpXg8>, accessed 12 October 2013.

institutional element in the nuclear procurement plan. The level of openness about how and under what terms a nuclear procurement plan will proceed is integral to the institutional quality that prevails in the electricity sector, because when citizens and critics are included in discussions and the public hearings that are discussed in Parliament, chances are higher that the government's actions will be regarded as legitimate. This counts in the government and its nuclear technology supplier's favour as some form of political insurance against future criticism or legal implications. To avoid allegations of irregularities and improper conduct, the government is challenged to show that it is taking into account the concerns of those who are sceptical of nuclear power and those who have an interest in the accounting and book-keeping matters of the procurement. Eskom has suffered great damages with regards to its institutional framework and its handling of the long-term supply contracts with its large consumers. It has suffered noteworthy decreases in public confidence and trust as a public enterprise, which translates into a lack of confidence and trust in the government. Institutionally, South Africa is facing a test with regards to how the government will handle the institutional aspects of procuring nuclear technology. As the energy policy changes, a

chance exists for the country to prove that its institutions that govern energy matters will become stronger, and that errors from the past, such as the handling of the long-term agreements with BHP Billiton are not repeated in the process of securing nuclear reactors. Institutional change will occur in terms of how South Africa decides to manage and apply international best practice with regards to nuclear waste and fuel that cannot be used anymore (spent fuel) which is radioactive, and out of which plutonium can be produced, if it is reprocessed by chemical means. Plutonium can be used in nuclear weapons and poses security risks and is thus politically a very sensitive issue.

The nuclear procurement plan is a double-edged sword for the South African government. It provides the opportunity for institutional renewal by posing an opportunity for reforms in electricity supply methods within South Africa's energy sector. This is done by opting to pursue nuclear power which will provide longer-term solutions to electricity supply. A chance exists that University partnerships like in Potchefstroom, or knowledge transfer programmes from nuclear supply companies will influence how South Africa creates institutional frameworks that de-

monopolise the energy sector for the sake of inclusive energy management. The trade-off between the chances for creating new institutional frameworks and ensuring that South Africa can afford this nuclear procurement becomes clear when the costs of nuclear power development are important to consider.

The norm is that a price is determined, but as the construction continues over the stipulated years that are required to complete the project, prices for construction, wages and the like increase. This leads to the common nuclear cost overruns and examples of why this happens includes the complex installation and testing of computer systems, large components and laying thousands of kilometers of cables and connections¹⁷³. Others include structural support systems, fuel storage space and chemical systems that regulate temperature amongst many more intricate details¹⁷⁴. This in turn leads to the inevitable increase in tariffs per KWh, and undermining the public confidence of investing in

¹⁷³ Greenpeace. 2010. AREVA covers up extent of massive nuclear reactor cost overrun. 24. June.

<http://www.greenpeace.org/international/en/news/Blogs/nuclear-reaction/areva-covers-up-extent-of-massive-nuclear-rea/blog/12548/>, accessed 12 October 2013.

¹⁷⁴ B. Sovacool. 2008. Valuing the greenhouse gas emissions from nuclear power: A critical survey. *Energy Policy*. 36: p. 2942.

nuclear power. The consumer will be subject to increased electricity taxes in addition to increased tariffs, which places the burden on the lower middle class and those who are poor or unemployed. These citizens do not reap the rewards for many years and are prone to regard nuclear power as an example of another expensive mega-project of a state-owned enterprise with little trickle-down effect.

For the finance-related reasons above, the financial model that the South African government will choose to apply to its nuclear procurement will be a determining factor in whether nuclear power will ultimately economically benefit the citizenry to help eradicate energy poverty, or only those consumers who have sufficient financial means to afford elevated electricity tariffs. If the latter is the case, then two factors will remain largely unchanged. Firstly, the electricity market will not have been unbundled to allow for a more competitive, flatter consumer-price-friendly playing field. Secondly, the institutional change of having a more diverse and more effectively managed electricity supply system that will have resulted from acquiring nuclear power will likely be described by the consumers as being weak and only

partially inclusive if the advertised benefits of nuclear power do not pertain to the broad citizenry. Nonetheless, the BRICS cooperation on this matter is clearly a lifeline that South Africa must consider when the topic of nuclear energy is on the agenda. Russia and China's very willing assistance will have to be carefully assessed and in the event of the nuclear procurement becoming a reality, it has the potential to help transform South Africa's electricity sector into a more diverse one that makes explores a variety of energy sources for producing electricity. This shows that a new direction for a reconstructed energy policy is more likely in the BRICS framework than if South Africa would have remained a non-BRICS member. Since the bloc is only a young entity, time is needed to fully assess its effectiveness in the long-run.

Conclusion

This study has considered an analysis to a question concerning the political economy of electricity supply in a country in transition. South Africa as a case study has successfully allowed this analysis to develop from a paradigm where globalization was very limited (Apartheid) to a paradigm where a so-called globalization U-turn was made (democracy since 1994) and finally onto a paradigm where globalization prevails beyond democratic consolidation (BRICS since 2010). The analysis was founded on a theory of institutional change as per the interpretations of institutional economists. These included primarily the work of Acemoglu and Robinson, but also included the scholarship of Hall, Thelen, Coase and other selected scholars in the field. The argument that a “parallel development equilibrium” is necessary for institutional change to be successfully realized and for power supply security to be realized has been thoroughly addressed and substantiated as a continuing thread throughout this document. Upon completion of this study the following has become evident.

The political economy of electricity supply in South Africa was profoundly influenced by the nature and type of institutions

that prevailed within Eskom's and the government's elite and under which policies were able to be drafted. The stronger and more inclusive the political and economic institutions are that govern the energy policy environment, the greater the possibility of achieving successful policy implementation that reflect the realities and needs of the economy and the society. Such conditions are equally conducive to institutional change and to manoeuvre policy developments into a more sustainable direction once political and economic circumstances change over time. The evidence has shown that the politically and economically exclusive institutions in the Apartheid era had led South Africa onto a path where electricity supply was abundant for the minority population, but after the abolishment of Apartheid an electricity crisis ensued.

Furthermore, with reference to long-term contracts, the research suggests that at a time of institutional change or overhaul, long-term agreements that could prove detrimental to the financial health of an organization in its future should be critically renegotiated with sufficient political and legal insight. Institutional change in the energy environment is necessary to cushion the power provider against unforeseen ramifications of economic and

political risks that may occur and over which the power provider has no control.

Additionally, the study shows that in order for a country like South Africa to achieve a parallel development equilibrium, it indeed first requires a catch-up phase in terms of its electricity provision. This will aid the demand and supply gap to be closed. Hereafter, parallel investment into – and the maintenance of – electricity infrastructure and the national economy must be an on-going process as the economy emerges, grows and follows its own development agenda. South Africa's membership in BRICS and the increasing importance of the BRICS in the world economy provide the South African government with a unique and important opportunity to garner the assistance, cooperation and support from politically and economically willing alliance partners to address its electricity needs.

Therefore, the national cooperation between economic actors and the government is essential for effective power generation policies. An unresolved imbalance in the relationship between economic realities (founded on energy security) and

political leadership is a reason why authors such as Acemoglu and Robinson claim why nations fail. South Africa possesses the potential and the opportunity to successfully reverse its energy challenges but this all depends on institutional capacity, institutional change and institutional integrity.

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¹⁷⁵ Please note the titles of some sources are not in italics. In such cases, sources are unpublished.

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WORK EXPERIENCE:

Employer: **BRICS Policy Center**, R. Dona
Mariana, 63 – Botafogo, Rio de
Janeiro, 22280-020, Brazil.
Dates: 29 July 2013 – 27 August 2013
Position – Duties: Nuclear energy and policy analysis,
geopolitical reporting.

Employer: **United Nations Industrial
Development Organization
(PSM/OSS/PRS)**, Wagramerstr.
5, 1220, Vienna, Austria.
Dates: 22 April 2013 – 12 July 2013
Position - Duties: Supplier Relationship Management
(SRM), Procurement and SAP
support for procurement officers,
project managers, assistants and
SAP users; basic training and SAP
system testing.

Employer: **Democratic Alliance Research Office**, P.O. Box 15, Cape Town, 8000, Republic of South Africa.
Dates: 31 July 2012 – 31 August 2012
Position - Duties: Research Assistant - Research assistance for policy documents and analysis; general administration and data capturing.

Employer: **Institute for Accountability in Southern Africa (IFAISA)**, P.O. Box 33, Noordhoek, Cape Town, 7979, Republic of South Africa.
Dates: February 2011 – August 2011
Position - Duties: Researcher and panel member – Legal and historical research for a case in the Equality Court.

Employer: **Stellenbosch University Political Science Department**, Private Bag X1, Matieland, 7602, Republic of South Africa.
Dates: February 2010 – August 2011
Position - Duties: Tutor – teaching, grading, examination invigilation, staff support

Employer: **Opportunity Finance**, Suite 1, Dorchester House, 190 Jabu Ndlovu Street, Pietermaritzburg, 3201, Republic of South Africa.
Dates: November 2010 - December 2010
Position - Duties: Assistant - Compiling business plans, funding applications and consolidating financial forecasts.

Employer: **Ms. L. Koorts – Stellenbosch University History Department**, Private Bag X1, Matieland, 7602, Republic of South Africa.
Dates: September 2009 – October 2009

Position - Duties: Proof-reader – editing a dissertation/biography.

Employer: **Friedrich Ebert Foundation (Harare, Zimbabwe)**, 6 Ross Avenue, Belgravia, Harare, Zimbabwe.
Dates: May 2009 - October 2009
Position - Duties: Assistant Organizer: Constitution in Transition Conference, Harare: delegation lists, administrative work, editing the final publication.

Employer: **Stellenbosch University Students' Representative Council Student Development Portfolio**, Private Bag X1, Matieland, 7602, Republic of South Africa.
Dates: June 2007 – November 2008
Position – Duties: Portfolio Assistant, conference co-organizer – conceptualizing and organizing the Stellenbosch University Human Rights Conference.

NOTEWORTHY EXPERIENCES:

Project: University Partnership between Stellenbosch University & the University of Zimbabwe
Dates: May 2009
Purpose: Regional educational integration
Outcome: Successful international relations agreement and implementation.

Project: Human Rights research trip: India
Dates: February 2008
Purpose: Meeting and interviewing Indian Government Officials, the Dalai Lama

Outcome: Stellenbosch University Human Rights Conference.

- *Recipient of the Stellenbosch Chapter Award of the Golden Key International Honour Society.*
- *Holder of an Erasmus Mundus Global Studies (EU) scholarship: 2011-2013 (Poland & Austria).*

EDUCATION AND TRAINING:

Tertiary Institution: University of Wroclaw, Poland & University of Vienna, Austria
Dates: October 2011 – present
Qualification: Master's of the Arts in Global Studies
Subjects and skills: Political Economy, International Relations, Development Economics, Global History; Thesis: *"The Political Economy of Electricity Supply: An Institutional Analysis (South Africa from the End of Apartheid to BRICS)"*.

Tertiary Institution: Stellenbosch University, Republic of South Africa
Dates: February 2011 – June 2011
Qualification: Political Risk Analysis course
Subjects and skills: Political risk identification, investor confidence and regional threat analysis

Tertiary Institution: Stellenbosch University, Republic of South Africa
Dates: February 2010 – November 2010
Qualification: Honours in Political Science (cum laude)
Subjects and skills: Global Political Economy, South African Politics, Research Methods, International Relations Theory, European Union Integration

Tertiary Institution: Stellenbosch University, Republic of South Africa

Dates: February 2007 – November 2009

Qualification: Bachelor of the Arts in International Studies

Subjects and skills: Decision-Making and Value Studies, English, Economics, German, History, Information Skills, Political Economy, Political Science

PERSONAL SKILLS AND COMPETENCIES:

Mother-tongue: German

European level*:

English:

Afrikaans:

isiZulu:

Understanding		Speaking		Writing
Listening	Reading	Spoken interaction	Spoken production	
C2	C2	C2	C2	C2
C2	C2	C1	C1	C1
B1/2	B1/2	B1	B1	A2

*Common European Framework of Reference for Languages

Social Competencies:

I am an effective communicator with proven skills in public speaking, interviewing, event planning and interdisciplinary work. I function well within teams and independently.

Organizational Skills:

My academic experiences have reinforced my skills in writing and researching, alongside my activities outside the University halls, where I participated in conferences, political and social events. Work experience has bolstered my insights into the realities of a globalizing, interdependent world. Research

trips to India, Zimbabwe and Brazil provided me with relevant perspectives from the developing world.

Technical Skills/Competencies: I have successfully initiated dialogues and a University partnership for students from Zimbabwe to study in South Africa. Additionally, I have interviewed eminent persons and Nobel laureates and successfully assisted in organizing Human Rights and Constitutional conferences.

Computer Skills/Competencies: Proficient in Microsoft Office, SAP Procurement.

Additional Information: Participated at the Wroclaw Global Forum, 31 May to 2 June 2012, Wroclaw, Poland.

Speaker at the Twelfth International Conference on Current Issues of Sustainable Development - Governance and Institutional Change at the University of Opole, Poland, 18-20 March 2012.

Awarded the Erasmus Mundus full scholarship from the European Union for the European Master's Program in Global Studies.

Awarded the Stellenbosch Chapter award of the Golden Key International Honour Society in 2009.

Interviewed FW de Klerk, and the Dalai Lama in India, and collaborated with Desmond Tutu in preparation for a human rights conference in Stellenbosch.

References:

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