An Analytic Framework to Advance Understanding of Power Sector Reforms in Sub-Saharan Africa

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Thesis Presented for the Degree of

Doctor of Philosophy

University of Cape Town

Faculty of Engineering and the Built Environment

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February 2023

Declaration

I, Brent Gary Hampton, hereby declare that this thesis is my own unaided work, both in concept and execution, and that apart from the normal guidance from my supervisor, I have received no assistance. Neither the substance nor any part of this thesis has been submitted in the past, or is being, or is to be submitted for a degree at this University or at any other university, except as stated below.

Signature: Signed by candidate

CONTENTS

List of Acronyms

ADB	Asian Development Bank
AfDB	African Development Bank
AER	Rural Electrification Agency (Cameroon)
AES SONEL	The Cameroon Electricity Concession under AES
ALUCAM	Aluminium Smelting Company of Cameroon
AMR	Automatic Meter Reading
ANEEL	Electricity Regulator (Brazil)
APUA	Association of Electricity Producers and Distributors of Africa
ARSEL	Electricity Regulator (Cameroon)
AT&C	Aggregate Technical and Commercial Losses
BECS	Bundibugyo Energy Co-operative Society (Uganda)
BPE	Bureau of Private Enterprise (Nigeria)
CAMWATER	State-owned Water Utility (Cameroon)
CAPEX	Capital Expenditure
CCEE	Electric Power Trading Chamber (Brazi)
CEGB	Central Electricity Generating Board
CEMIG	Power Company in Minas Gerais (Brazil)
CEO	Chief Executive Officer
CIE	Compagnie Ivoirienne d'électricité
COPPER	Committee for Planning and Programming of Rural Energy Projects (Cameroon)
CNE	National Energy Commission (Chile)
DC	Direct Current
DFI	Development Finance Institution
DG	Director General
DISCO	Distribution Company
ECB	Electricity Control Board (Namibia)
EDC	Electricity Development Corporation (Cameroon)
EDF	Electricité de France
ENEO	The Cameroon Distribution Concession under Actis
EPA	Energy Policy Act (USA)
EPE	Energy Research Company (Brazil)
EPRSA	Electricity Power Sector Reform Act (Nigeria)
ERA	Electricity Regulatory Authority (Uganda)
ESAF	Enhanced Structural Adjustment Facility
ESI	Electricity Supply Industry
ESKOM	Electricity Supply Commission (South Africa)
ESMAP	Energy Sector Management Assistance Program (World Bank and UN)
EU	European Union

FER	Rural Electrification Fund (Cameroon)
FERC	Federal Energy Regulatory Council (USA)
GDP	Gross Domestic Product
GENCO	Generation Company
GETFiT	Global Energy Transfer Feed-in Tariff
GM	General Manager
HFO	Heavy Fuel Oil
HPP	Hydroelectric Power Plant
HQI	Hydro Quebec International
IADB	Inter-American Development Bank
IFC	International Finance Corporation
IMF	International Monetary Fund
IPP	Independent Power Project/Producer
IT	Information Technology
JET	Just Energy Transition
JICA	Japan International Cooperation Agency
KETRACO	Kenya Transmission Company
KFW	German Development Bank
KIL	Kilembe Investment Ltd (Uganda)
kV	Kilovolt
KRECS	Kyogegwa Rural Electricity Co-operative Society (Uganda)
kW	kilowatt
kWh	kilowatt hour
LAC	Latin America and Caribbean Region
LIGHT	Electricity Company in Rio de Janeiro (Brazil)
LRMC	Long Run Marginal Cost
MAE	Wholesale Market (Brazil)
MC	Management Contract
MCC	Millennium Challenge Corporation
MEM	Ministry of Energy and Mines (Namibia)
MEMD	Ministry of Minerals and Energy Development (Uganda)
MIGA	Multilateral International Guarantee Association
MINEE	Ministry of Energy and Water (Cameroon)
MIS	Management Information System
MOE	Ministry of Energy
MOU	Memorandum of Understanding
MYTO	Multi Year Tariff Order
MW	Megawatt
NAMPOWER	State-owned National Electricity Utility (Namibia)
NBET	Nigeria Bulk Electricity Trading Company
NEC	National Energy Commission (Chile)
NELMCO	Nigerian Electricity Liability Management Company
NEMS	Nigerian Electricity Market Stabilization Fund

NEPA	National Electric Power Authority (Nigeria)
NERC	National Electricity Regulatory Commission (Nigeria)
NETA	New Electricity trading Arrangements (UK)
NETAP	Nigeria Electricity Transmission Project
NITEL	Nigeria Telecommunications Limited
NORDPOOL	Nordic Power Pool
NORED	Northern Namibia Regional Electricity Distributor
OECD	Organization for Economic Cooperation and Development
OFGEM	Office of Gas and Electricity Markets (UK)
ONS	National System Operator (Brazil)
OPEX	Operational Expenditure
PACMECS	Pader Abim Community Multipurpose Electric Cooperative Society
PACP	Presidential Action Committee on Power
PE	Political Economy
PHCN	Power Holding Company of Nigeria
PJM	Pennsylvania, New Jersey Maryland Interconnector (USA)
PPA	Power Purchase Agreement
PPP	Private Public Partnership
PRG	Partial Risk Guarantee
PRGF	Poverty Reduction and Growth Facility
PSP	Private Sector Participation
PTFP	Presidential Task Force on Power (Nigeria)
PURPA	Public Utility Regulatory Policies Act (USA)
R and D	Research and Development
RBV	Resource Based View of the Firm
REA	Rural Electrification Agency (Uganda)
REC	Regional Electricity Company (UK)
REFiT	Renewable Feed-in Tariff
RFP	Request for Proposal
ROI	Return on Investment
RTO	Regional Transmission Operator (USA)
SAC	Structural Adjustment Credit
SCADA	Supervisory Control and Data Acquisition System
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SAPP	Southern Africa Power Pool
SEC	Superintendency of Electricity and Fuels (Chile)
SENELEC	Electricity Utility (Senegal)
SOE	State-owned Enterprise
SOGEPE	Societe du Gestion du Patrimonie du Secteur de l'Electricite (Cote d'Ivoire)
SONATREL	Electricity Transmission Company (Cameroon)

SONEL	Former National Electricity Utility (Cameroon)
SSA	Sub-Saharan Africa
TANESCO	Electricity Supply Utility (Tanzania)
TCN	Transmission Company of Nigeria
TEM	Transition Electricity Market (Nigeria)
TMT	Top Management Team
TVA	Tennessee Valley Authority (USA)
UEB	Uganda Electricity Board
UEDCL	Uganda Electricity Distribution Limited
UEGCL	Uganda Electricity Distribution Limited
UETCL	Uganda Electricity Transmission Limited
UMEME	Privatized Distribution Company (Uganda)
UNEP	United Nations Environmental Projects Agency
USAID	United States Agency for International Development
VRIN	Valuable, Rare, Inimitable and Non-Substitutable Resources
WBG	World Bank Group
WDI	World Development Indicators
WW2	World War 2

Abstract

This thesis seeks to advance knowledge of electricity sector reform by providing a framework of critical elements of sector reform for analyzing the context of proposed reform and to provide a basis for preparing sustainable reform policy.

Modern market-based electricity sector reforms were first implemented in Chile in 1979 followed by the UK in 1990. This model of reform continued to be used globally as the basis for reform over a period of more than 30 years. While the approach has proved moderately successful in some developed countries, the outcomes in developing countries, and particularly in Sub-Saharan Africa, have been generally unsatisfactory. The expected improvements in utility efficiency, access and private sector financing have mostly not materialized. The direction regarding reform policy going forward is currently unclear and a return to the drawing board appears to be imminent.

The research involves a deep review of the origins and spread of market-based reforms and outcomes, with a focus on developing countries, and Sub-Saharan African countries in particular. A set of critical elements impacting sector reform outcomes was identified from analysis of the literature and field research and developed into a proposed framework of analysis with three tiers and a set of cross cutting elements. Verification of the plausibility of the analytic framework was carried out using a two-pronged approach. First, a set of three in depth Sub-Saharan Africa country case studies was undertaken, covering each element in the framework. Secondly a set of interviews was conducted with a spectrum of senior stakeholders from the sector to establish views on the importance and scope of each element of the framework. Both methods confirmed that the proposed framework was a valid, adequate and robust tool for analyzing the sector and likely reform outcomes, and that the proposed working hypothesis did not adequately cover the requirements for effective reform policy.

The research has implications for international development funding and the attainment of Sustainable Development Goal 7 (access to clean energy) and may be extended to other sectors.

Acknowledgements

This thesis explores electricity reform outcomes in detail with a particular emphasis on Sub-Saharan Africa. It offers a new framework to facilitate objective analysis of electricity sector reform performance and to provide a guide to future reform policy development. The concepts are based on the literature review as well as personal experience in the Sub-Saharan electricity sector of more than 30 years. Although I was deeply involved with work in various country sectors, at no time was I responsible for decisions on reform policy thus obviating any risk of conflicts of interest. The completion of this thesis would not have been possible without the support and kindness I have received from the following people:

- Trevor Gaunt, my supervisor, who went beyond the call of duty in his unfailing dedication, guidance and enthusiasm.

- All the stakeholders, respondents and interviewees, some past colleagues, who were prepared to forego personal time to answer complex questions during long and sometimes multiple interviews.

- Especially Kathy, my wife for her love, understanding and unwavering support.

Chapter 1

Introduction

1. 1 Context of the Research

Electricity sector reform has followed a complex and often tortuous path commencing with the introduction of market-based reforms in Chile and the UK. The market-based model was firmly anchored in a strong belief in markets and the ability of the private sector to develop and operate electricity infrastructure more efficiently and cost effectively than the state.

The Government of Chile under the dictator Pinochet, was the first to implement market-based sector reforms in 1978 (Raineri 2006), followed by the UK in 1982, where reforms were implemented by the conservative Thatcher government in England and Wales (Bacon 1995a). In both cases the reform models were underpinned by a strong belief in market-based economic principles, and by a desire to improve sector efficiencies. The rapid advance in gas-based generation technology, allowing for lower cost, modular generation plants also opened the way for private participants to enter the sector. In Bacon's view, however, the initial reforms were to be viewed as a series of experiments as insufficient time had elapsed to fully assess their outcomes, and countries needed to structure reforms based on the country context (Bacon 1995b).

The reforms in the UK were further reaching than those in Chile and took place in a more structured manner. Initial outcomes in these initial reforms were assessed as positive by several industry practitioners and academics (Hunt 2002, Bessant-Jones 2006). Littlechild (2000) further stated that the principles of the UK reform model with a few modifications could be effectively replicated in developing country environments with a few modifications. Encouraged by these assessments and in line with the worldwide swing towards neo-liberal economic principles, market-based reforms spread rapidly through both the developed and the developing world. The UK reform model was widely seen as the gold standard for global electricity sector reform (Newbery and Pollitt 1997, Heller and Victor 2003, Newbery 2006, Pollitt 2008).

The World Bank, followed by other Development Finance Institutions (DFI's) aligned with the new economic thinking and published a policy paper in 1993 (World Bank 1993b) defining the steps that developing countries needed to follow to reform their electricity sectors. Significantly, the policy paper did not specify competition as a necessary last step in the process, even though competition was widely seen as the final and necessary step of efficiency improvement. The UK reform model evolved into what came to be known as the "standard model of reform" with slightly different

versions being proffered by various authors (Hunt 2002, Joskow 2006, Bessant-Jones 2006, Kessides 2012). This model was used as the basis of reform globally, with most countries implementing the model according to their individual interpretation but mostly adhering to the basic principles of privatization and competition. In many cases reforms were only partly implemented with few countries reaching the final stage of introducing retail competition.

The World Bank took the lead in promoting the liberalization of the energy sector in developing countries across the world and introduced conditional lending that required countries to follow the prescribed reform approach to be eligible for funding. It should be noted that the World Bank intended to stop most infrastructure funding after countries had liberalized their sectors as it was believed that the private sector would fulfill this need. Funding would be mostly limited to assistance to reform using the standard model approach. This lead was followed by most DFI's. Developing countries were thus left with little choice other than to develop legal and regulatory frameworks to support sector liberalization, unbundle their Electricity Supply Industries (ESI's), establish regulators, and introduce privatization (Bacon and Bessant-Jones 2001). Although the World Bank never formally stated that privatization was a Bank policy, the evidence is clear that privatization was an important ingredient in their reform prescription (Manibog et al 2003).

The electricity crisis in California, resulting in rolling blackouts in 2000, was a clear example of market failure in the ESI. The event triggered doubts concerning the effectiveness of electricity market liberalization and effectively caused several states in the US to reconsider their envisaged reform programs (Glachant and Perez 2011). Despite the questions being asked, a senior official of the World Bank issued a statement reiterating Bank support for energy sector liberalization in developing countries and re-assuring client countries that the failures in California were not a reflection on the efficacy of the standard reform model and that the main cause of the crisis was linked to regulatory issues (Saghir 2003).

Prompted by the DFI's, Argentina made the most reform progress in Latin America, reaching the stage of implementing wholesale competition. The donor community hailed this reform as a great success and a good example of positive outcomes resulting from implementing market-based reforms (Littlechild 2008a). However, a prolonged drought followed by a monetary crisis in 2011/2 caused the government to intervene in the sector to prevent a total collapse of the ESI, thereby indicating that the market-based reform model was not sufficiently resilient to withstand severe exogenous shocks. Several Latin American and Caribbean (LAC) countries, including Bolivia, Peru Dominican Republic and Venezuela, re-nationalized their electricity industries after a failed liberalization process (Balza et al 2013).

The standard reform model has proved to be especially ineffective when implemented in Sub-Saharan African (SSA) countries (Eberhard and Godhino 2017). With few exceptions, reform outcomes in this region have been patchy with many stalled or partially implemented reforms. Some countries now have so-called hybrid markets where the state-owned utility has remained in place alongside the establishment of one or more Independent Power Producers (IPP's) (Malgas and Eberhard 2011). The only country in the Region to fully unbundle its electricity sector and to partially divest most generation and distribution assets has been Nigeria where the new sector framework made provision for the establishment of a competitive wholesale market. Since the reform implementation in 2013, outcomes in all respects have proved to be unsatisfactory, with power availability and reliability remaining at low levels and the majority of privatized companies being "unbankable". Other countries followed the paths of management contract, affermage or long term concession with only marginally better outcomes except for Cote d'Ivoire (affermage) and Uganda (concession) where outcomes have been more positive.

Despite the poor track record of market-based reforms, the Government of South Africa is considering following the steps of the standard model by unbundling the state-owned utility Eskom and privatizing assets. The utility was previously commercialized, a regulator established, and independent private sector power providers introduced but increasing utility debt, declining power supply capacity, and increased load interruptions have led to an intense open-ended debate on the way forward.

1.2. Electricity Sector Reform at the Cross-roads

Mainstream views concerning the applicability of the market-based model in developing countries are changing. Recent publications by former proponents of the standard model are now advocating against a standard approach to reform and advising caution when considering private sector involvement in distribution (Bacon 2018, Foster and Rana 2019). In addition, the view has been recently expressed that assessments of utility performance have been biased towards economic and financial factors with little attention being given to measurement of public service delivery and that this has provided an unbalanced picture of the benefits of reforms (Vagliasindi et al 2022).

Recently, the debate in the literature has largely shifted away from neo-liberal reforms towards mitigating climate change by implementing a fast track transition to renewable generation labelled in some quarters as the Just Energy Transition (JET) and countries appear to be left in a void regarding advice on how to move forward with electricity sector reforms, with little guidance available.

While multiple studies on reform outcomes have been published, the conclusions seem always to relate to a narrow group of factors. Recently, theory related to political economy of electricity reform has broadened the list of 'key success factors' without offering a well-defined framework for better understanding reform and guiding the decision-makers and processes towards improved future performance.

Based on a wide sweep of the literature and several bodies of theory coupled to practical experience of working in the electricity sectors of 20 countries in the region over a period several more than 30 years in the region, this thesis seeks to break new ground by increasing understanding of the factors explaining reform processes and outcomes through the development of an analytic model verified by both case studies and personal interviews. The model can then be utilized to better inform development of more sustainable reform policy as well as enable analysis of individual country reforms.

1.3. Hypothesis and Research Questions

Observations made during my work in the region had led me to believe that reforms could have been more successful if more attention had been paid to the following 3 factors: (i) judicious use of the private sector – using the standard model as a basis the private sector was simply deployed on a fast track basis without due consideration for the country context, (ii) availability of resources – this factor was most often ignored expecting the private sector would address it and, (iii) an enhanced regulatory environment – in most cases the regulator was ineffective and simply followed the lead of the government. I believed that due attention to these factors would fill in the gaps and result in better reform outcomes. On this basis I formulated the following working hypothesis:

> **"Successful outcomes of power sector reform initiatives depend on judicious use of the private sector partners combined with sufficient resourcing and an enhanced regulatory environment."**

A set of five research questions were formulated as a core around which to explore reform outcomes in more detail and hence test the plausibility of the hypothesis.

Research question 1: From a theoretical and analytical framework perspective, how do we view power sector reform initiatives in Africa?

Research question 2: What have been the performance outcomes of market-based reforms in the power sector in developing countries and particularly in SSA?

Research question 3: Are there key elements other than private sector participation, sufficient resources and enhanced regulation impacting reform outcomes?

Research question 4: Is privatization a necessary element in moving towards improvement of power sector performance?

Research Question 5: What is the role of the regulator in the Sub-Saharan context?

1.4. Research Methodology

The research methodology comprises three main parts.

The first involves an examination of the extensive literature related to electricity sector reform theory and evolution. The review will trace the rapid spread of market-based electricity reform to both developed and developing countries. The role of the World Bank and other DFI's will be examined in detail as these institutions were key in promoting this type of reform in developing countries. Strong emphasis will be placed on market-based reform since this was the sole approach adopted by the majority of the DFI's from the 1990's onwards. The literature review will also identify reform outcomes in both developed and developing countries as well as the purported reasons for successes and failures, and the empirical approaches and economic analysis related to outcome evaluation.

Based on the literature review, a set of critical elements impacting reform outcomes will be identified using a multiple case study approach to inductive theory building as described by Eisenhardt and Graebner (2007). These elements will be developed further into a proposed framework of analysis for assessing reform outcomes and developing future reform approaches.

The validity of the proposed framework will then be examined using two methods. The first method will utilize a case study method and will involve examining the outcomes of electricity reforms in three SSA countries where reforms have been in place for several years, allowing sufficient time for an objective review of outcomes. The case studies will be conducted by examining literature including academic papers, sector reports and press articles related to the reform in each country, as well as knowledge from my own experience. The second validation method will be to conduct a set of interviews with selected stakeholders including senior sector staff from SSA countries and DFI staff (current and recently retired) who are familiar with the reform process. Using a deductive theory-testing method Eisenhardt (1989), Eisenhardt and Graebner (2007) the outcomes of the case studies as well the answers to the interview questions will be used to check the relevance of the selected critical elements and the validity and sufficiency of proposed framework of analysis, answer the set of research questions, and prove or disprove the plausibility of the working hypothesis.

1.5. Outline of Thesis

Chapter 1 covers an introduction to the research, proposes a research hypothesis and a set of 5 research questions and explains the research methodology to be used.

Chapter 2 addresses the context of electricity sector reform and relevant applicable bodies of theory which are useful lenses when analysing outcomes.

Chapter 3 reviews reform outcomes over a period of about 30 years.

Chapter 4 identifies key themes in the literature relating to electricity sector reforms.

Chapter 5 identifies the critical elements related to reform outcomes and proposes a formal framework of analysis.

Chapter 6, 7 and 8 present case studies of the power sector reform in three SSA countries.

Chapter 9 describes the interviews with senior sector stakeholders related to the proposed framework of analysis.

Chapter 10 addresses the synthesis, final conclusions and implications of the research.

Chapter 2

The Context and Theory of Electricity Sector Reform

2.1 Introduction

Starting in the late 1980's market-based electricity sector reforms spread rapidly to both developed and developing countries. The drivers of this paradigm change were both economic and political. The evolution of the sector reform process has been thoroughly documented in the literature over an extended period. This chapter provides the context of electricity sector reform to provide a solid base for establishing the plausibility of the proposed working hypothesis. Secondly, the chapter examines key sections of theory that relate to the statement made by the hypothesis to further enhance the basis for further research and analysis. Following a discussion of the relevant theory, the chapter explores aspects of regulation, private sector participation and corruption as related to the theory discussed.

2.2 Trends in Electricity Policy till the Seventies

2.2.1 Early Electricity

The private sector was mostly responsible for funding electricity development in the early decades of electricity supply (Kessides 2004, Blumsack et al 2005). The birth of the US electric power sector came with the opening of Edison's Pearl St Power Plant in the New York financial district in 1882, operating on direct current (DC) and supplying sufficient power for 1200 light bulbs (Sulzberger 2013). During the following 25 years intense competition developed between private companies to the detriment of customers and prompting the New York Public Service Commission to write in 1908 that "competition cannot be depended on to protect the consumer from high prices and poor service has been fully demonstrated" (Maltbie 1908 through Blumsack et al 2005). By 1910 consensus was reached that to resolve the chaotic situation, vertically integrated utilities would be given monopoly rights over a certain geographic area and in return the utilities would allow their prices and profits to be regulated (Blumsack et al 2005).

Development in the UK was done by both municipalities and the private sector resulting in a patchwork of independent networks using different frequencies and technologies. At the time of the First World War there were around 600 separate electricity suppliers. Problems of interconnection remained until 1948 when the UK nationalized the industry (Beder 2003).

2.2.2 The Move to Nationalization

In the decades after the end of World War 2 (WW2) a strong move developed towards large scale nationalization of electricity supply. Socialism had developed a strong appeal in some countries since capitalism was widely seen as a failure due to the hardships resulting from the 1930's depression and fascism had been discredited during the war. In smaller countries there tended to be concern about the dangers of private monopoly in infrastructure services, while markets in developing countries were assessed to be too weak and entrepreneurs too inexperienced to make large risky investments in infrastructure. In addition, there was a strong reluctance to entrust such investments to foreigners, especially in countries which had recently won independence from colonial rule. Public enterprises were therefore an attractive option that combined business like efficiency with social responsibility (Gomez-Ibanez 2007). For more than half a century after the realization of long-distance electricity transmission, countries largely utilized state funding to develop national electricity infrastructure. The establishment of the Tennessee Valley Authority (TVA) and the construction of the Hoover Dam are examples of such funding in the USA (Garwood and Tuthill 1963 thru Gore et al 2018). In developing countries, the World Bank was the largest source of multilateral finance for energy assistance committing $31 billion to developing country governments between 1975 and 1990 (Vedavalli 2007).

Vertically integrated public utilities were in general associated with non-commercial objectives, required to act in the public interest while being subject to a break-even constraint eg state-owned utilities in Britain and Argentina (Willner and Gronblom, 2012). During this period electricity was considered a textbook natural monopoly (Teplitz – Sembitzky 1990, Joskow 2008) due to investment being large scale and long term involving sunk capital for construction of large hydro or thermal centralized generation plants while a long period was required to attain profitability. Second, since electricity was seen to be a key to industrialization and modernization and vital for health, education, food and water, governments largely took it over after the end of the second world war except in the US, Germany and Japan. Third, electricity is non-storable and consumption requires high level of coordination between generation and transmission (Byrne and Mun 2003, Yi-Chong X 2006).

Outside the industrialized world, rapid growth of the electricity industry only began after World War 2 (WW2) and in many cases after colonial rule ended in developing countries. The importance of energy to economic development in developing countries resulted in increased state involvement by post-war governments. The standard model of vertically integrated state-owned and centrally planned energy supply industries was replicated throughout the developing world (Newbery, 2002). Key roles for utilities included national industrialization, rural electrification, and technology indigenization. The model was promoted by the cold war powers as well as the DFI's and was largely successful as generation outside the OECD grew from 130

billion Kilowatt Hours (kWh in 1950 to 2.9 trillion kWh in 1980. During this period public ownership was supported by economic growth, development aid and expanding national budgets (Williams and Ghanadan 2006).

2.3 Winds of Change – the Rise of Neo-liberal thinking

By the 1970's however, it was becoming clear that the majority of the state-owned monopolies operated with weak supervision and soft-budget constraints that created economic inefficiencies. A first wave of reform in the 1970s and 1980s was attempted to improve the performance of the energy sector under public ownership but these initiatives were unsuccessful (Gomez-Ibanez 2007).

By the 1980's industry performance in many jurisdictions had deteriorated as a result of decades of politically motivated supply, pricing and employment practices. The reform model turned to by governments facing crisis conditions during the 1990s was based on the so-called Washington Consensus adopted by the World Bank in 1993. This model prescribed policies to liberalize state-owned infrastructure industries and to transfer existing government owned facilities to the private sector as well as depending on private sector finance to construct new infrastructure. It was envisaged that customers would then be supplied at contractually or spot determined prices (Williamson 2000, Henisz et al 2005, Zelner et al 2009).

The Washington Consensus originated in a series of policy reforms which started in the 70's when there was a move around the world to erode government control by downsizing the public service and cutting taxes while concurrently adopting market-oriented policies across the board (Lee and Strang 2006). During the last two decades of the 20th century, the concept of neo-liberalism developed into a broadly accepted policy framework for understanding and managing the economy (Fourcade-Gourinchas and Babb 2002). Thus, by the time that Chile and the UK initiated neo-liberal electricity reforms beginning a wave of such reforms around the world (Gilbert and Khan 1996 thru Zelner et al 2009), market-based policies were already broadly accepted as the best way to achieve economic growth (Fourcade-Gourinchas and Babb 2002).

Before these neo-liberal based reforms were initiated in the electricity sector, it was generally previously accepted that the transaction costs involved, and the technical requirements of electricity would render competition in the ESI impossible. (Dubash 2002). Those who drafted the White Paper on unbundling and privatizing the UK electricity sector have admitted that even as they promoted privatization and competition, they had no clear idea of how the separation of generation and transmission could be accomplished as most people at the time thought it impossible (Hunt and Shuttleworth 1999). It was in the context of the parallel evolution of global political and economic culture that many national governments in the last decade of

the 20th century implemented market-based infrastructure reforms (Henisz et al 2005).

During the decade of the 1990s, the WB shifted from macro-economic reform with Structural Adjustment Programs to Poverty Reduction strategies. Similarly, the IMF's Enhanced Reduction and Growth Facilities (ESAF's) were replaced by Poverty Reduction and Growth Facilities (PRGF's). Despite the shift in emphasis, the policies in each case are similar with the under-lying neo-liberal focus remaining unchanged. It would seem that the transition was made on the assumption that implementation of good macro-economic policy would also achieve the goal poverty reduction (Bayliss 2002).

2.4 Pioneers of Market-Based Reform

The first countries to liberalize their electricity markets were the USA, Chile, England and Wales and Norway. They are discussed on a case by case basis to enable an understanding of the economic and political drivers of reform related to each country context. This forms a useful base for understanding the evolution of reform thereafter. The reforms in Chile and the USA took place at almost the same time and were followed by England and Wales and Norway. The 1993 World Bank market reform policy for developing countries was developed using the market-based principles of these reforms as a foundation (Manibog et al 2003). The initial process of reform in the countries is covered below. Further development and outcomes of each case are described in Chapter 4.

2.4.1 USA

The Public Utilities Regulatory Act (PURPA) passed in 1978, enabled IPP's to enter the market for the first time. Utilities were forced to purchase power from the IPP's on long term contracts. The IPP's mostly generated electricity using less commercialized technologies that were more expensive than fossil fuels (Hirsh 1999). Notably PURPA was not established with any reform plans in mind. The subsequent reform process was an inadvertent consequence of the Act (Bacon 1995b). In 1992 the Electricity Policy Act (EPA) was passed which allowed for unregulated IPP's that did not have long term contracts.

Neither PURPA nor the EPA had the effect of lowering prices hence the Pennsylvania - New Jersey-Maryland Power Pool (PJM) (1997) and California (1998) decided to take more drastic measures to promote competition and established centralized spot markets for electricity. Both opened retail markets to competition allowing individual customers to choose their supplier. Those states which pursued restructuring aggressively were those with the highest prices whereas others chose not to do so. States, however, were not completely free to design their own reform programs. FERC

Order 888 passed in 1996, required that all transmission owners provide non-discriminatory access to their lines, while Federal Energy Regulatory Council (FERC) order 2000 issued in 2000, required all transmission owners to place their transmission facilities under the control of appropriate Regional Transmission Organizations (RTO) (Blumsack et al 2005). The US reforms can be viewed as a tentative step towards a more competitive structure for the ESI but enormously important because of the market size (Bacon 1995b).

2.4.2 Chile

It is generally accepted that Chile is the country where market-based electricity reform first started (Raineri 2006). By 1974 Chile's electricity utilities were in a mess. Inflation, high fuel prices and price controls on final prices had led to large losses and a lack of investment under public ownership (Pollitt 2004). A new military government, inspired by free market policies, decided to relinquish its role as a producer and distributor and instead committed itself only to regulation and planning activities (Raineri 2006). Economists in the Government, several of whom had studied at the University of Chicago, were charged with re-designing the regulatory and legal frameworks for the electricity sector but at the time there was not much experience to draw from. Visits were paid to the UK, Belgium and France. From these were born the idea of separate generation and distribution companies where power was paid for according to the cost (Basanes et al 1999).

Two institutions were created in 1978: a supervisory agency for electric activities, the Superintendency of Electricity and Fuels (SEC), and the National Energy Commission (CNE) that replaced Endesa in its role as strategic planner. In reality, Endesa retained operational regulatory responsibility until 1982 when CNE's role was expanded to include regulatory activities in line with the Electricity Act of 1982 which defined the regulatory and legal frameworks for the sector. This allowed for the vertical restructuring beginning in 1981 with large scale privatization of the electricity sector in 1986. The new regulatory framework was enacted which would provide the opportunity for private companies to enter the sector on equal legal ground as state-owned companies (Pollitt 2004). Customers above 2 Megawatts (MW) were free to contract directly with generators for power supply and those below the threshold remained customers of the local distribution company and paid the regulated tariff (Basanes et al 1999).

Three main features of this reform stand out. Firstly, regulation was introduced to prevent government interference in pricing, thereby allowing prices to reach cost reflective levels, secondly, there was a strong emphasis on privatizing the utilities and thirdly, transmission remained under the ownership of the dominant generation company thereby lessening the chances for competition (Bacon 1995b).

2.4.3 England and Wales

The United Kingdom (UK) reform is highly significant as together with Chile, it is the precursor to the development of market-based reform and therefore provides the context for the processes and expectations of this type of reform.

The miners' strike of 1974 was in direct response to the oil price rise and was a major factor contributing to the downfall of the Conservative led government. When the Conservatives were returned to power in 1979 one of its central objectives was to reduce the role of the state by means of privatization. This policy was one of the main drivers for the rapid and far-reaching reforms that were subsequently implemented (Newbery 1997).

Privatization of the ESI was seen as a way to improve industry efficiency and lower consumer costs while receipts from selling assets would be used for improving the government's public borrowing requirement and hence lower taxes. Subsidies to the coal mining industry would be reduced and the power of the coal mining union would be broken. Although there was some philosophical opposition to privatizing electricity, it was becoming increasingly popular with the electorate, especially small investors, who had proved willing to subscribe for shares and take a personal financial stake in British industry. The RPI-x formula of regulation for Telecommunications and Gas. was officially adopted. This methodology allows for the price to be automatically adjusted taking into account the previous year's retail price inflation (RPI) and expected efficiency improvements (x) during the time of the adjustment. This method was developed to effectively regulate privatized monopolies on an incentive basis, provided the way forward for the liberalization of the England and Wales ESI (Bacon 1995b, Littlechild 2000).

The ESI was operated for many years as a set of public sector monopolies – Generation and Transmission were run by the Central Electricity Generating Board (CEGB) and there were 11 area boards at a regional level for distribution. The restructuring began in 1990 with splitting the CEGB vertically and horizontally. Generation of around 60,000MW was divided into three companies – National Power (52%), PowerGen (33%) and Nuclear Electric (15%). The former two were to be privatized but the nuclear generation was retained under state control. Transmission was separated into a new company jointly owned by the 12 newly privatized distribution companies known as Regional Electricity Companies (REC's). Power was sold from generators into a competitive power pool. Transmission, distribution and retail charges were added to the wholesale price. Retail customers with demand less than 100 kilowatts (kW) had to buy from the designated REC but other customers could use any supplier. The reform was designed to introduce privatization and competition while the monopoly part of the industry continued under regulation. This

experiment generated great interest globally and many countries considered reform using this model as a blueprint (Bacon 1995b).

2.4.4 Norway

Norway was one of the later forerunner countries to initiate reforms. The reform did not attempt to further privatize the sector but instead introduced a market-based reform in a sector dominated by state-owned and a large number of municipal and county owned utilities. Norway had a history of success in maintaining state-owned enterprises that operate on a commercial basis at arms-length from political intervention. Regional and local communities are well organized as well as being politically influential and the government was not in a position to initiate a change in ownership of utilities owned by these authorities (Jamasb 2002).

The reform process commenced in 1991 after the passage of the Energy Act of 1990. The process involved functional unbundling and introduction of competition into the generation and supply segments of the sector. The sector consists of over 340 utilities of which 190 have generation facilities and over 200 are involved in distribution. In 1991, after the passage of the Energy Act in 1990, Statskraftverkene, the vertically integrated state-owned utility was split into two independent state-owned enterprises, Statnett SF and Statkraft SF. Statnett was given responsibility for the national high-voltage transmission power grid as a monopolist whilst Statkraft was given responsibility for generation of power in state-owned power plants, in competition with power plants owned by municipalities and private companies. Statkraft was also vertically unbundled in 2004, when it was changed from state-owned enterprise (Statkraft SF) to state-owned limited company (Statkraft AS). Limited private ownership is found in all segments of the Norwegian electricity industry (generation, transmission) and trading with varying market share between segments. Local and regional authorities own 52% of Norway's generating capacity. Central government, through Statkraft, owns 36% and private companies own 12%. The state, through state-owned Statkraft, is the dominant power generator with a 35% market share. Statkraft is also the largest energy trader in terms of supply to end-users. Central government is the dominating owner of the central power grid through Statnett, with 87% market share while local and regional authorities and private companies own the rest. In the 1990s a common, national market-based system for the trade of electricity was established, with an exchange house for trade in the wholesale market (Nord Pool) and free choice of supplier for every individual customer (Askim and Claes 2011).

Norway, Denmark, Sweden and Finland merged their electricity markets building on the success of the systems created by Norway during the period 1991- 2000 (Thomas 2004).

2.5. Drivers of Electricity Sector Reforms

Drivers for reform varied across countries and differed between developed and developing countries. Despite this difference a common market-based approach emerged to address these problems across the board (Bacon 2018). Jamasb et al (2004) note that there was general dissatisfaction with the traditional vertically integrated state led model and a general desire to improve efficiency and reduce fiscal drain. Economic ideology played a strong role in moving countries towards market-based reforms (Henisz et al 2005), including the view that the private sector generally outperforms the public sector and that privatization offers opportunities for enhancing environmental quality (Lovei & Gentry 2002) as well as the assumption that greater competition and less regulation will increase economic efficiency (Bacon & Besant-Jones 2001). Externally driven macro-economic structural adjustment programs driven by the IMF and World Bank were another factor driving reforms by calling for the elimination of state led paradigms in favor of open and free competitive market economies (Wamukonya 2003).

In Organization for Economic Cooperation and Development (OECD) countries the reform context was one of an excess of supply and relatively stable institutions with the main objective of improving the financial and economic performance of reliable systems and transferring investment risks to the private sector to reduce over-investment in infrastructure (Jamasb 2002, Erdogdu 2014, Jamasb et al 2014). In addition, consumers wished to see lower prices while governments saw the opportunity of improving their short run financial position through assets sales. The advent of new technologies in the form of combined cycle gas turbines opened the way for lower generation costs and did not require very large units to reap the benefits of economies of scale. This reduced the strength of the case for a vertically integrated monopoly and opened the way for multiple players and competition once private capital entered the industry (Bacon 2018).

The context in developing countries was very different. Deep operational and financial crises had occurred in many utilities resulting mainly from non cost-reflective tariffs. As a result, governments were burdened with having to contribute subsidies to the sector to compensate for the low tariffs giving rise to inability to finance maintenance or expanded infrastructure. There was also a desire to fund fiscal deficits by means of assets sales through privatization (Bacon and Bessant-Jones 2001) and to attract private investment from outside (Williams and Ghanadan 2006). Access for all classes of customers was shown to be inadequate by a 1990 survey revealing an approximate access rate across developing countries of 46% and only 16% in SSA. Utilities also suffered from lack of technical efficiency with T&D losses of around 20% against a world average of around 9% in 1990 (World Bank 1993b, Eberhard and Godinho 2017), while load factors were low, typically around 50% compared with the world average of around 70% (Adamantiades et al 1995). The advent of new lower cost

modular smaller generation technology in the form of CCGT's and more advanced metering technology also promoted reforms as smaller players could now participate in the industry in both developed and developing countries (Bacon and Besant-Jones 2001, Jamasb et al 2004, Dagdeviren 2009). Reform in developing countries was also promoted by the creation of new multinational energy companies looking for investment opportunities as a consequence of OECD energy deregulation (Bacon 2018).

During the 1980's and 90's SSA countries, similar to other developing countries, became increasingly unable to fund their electricity sectors. Decades of government investment had not resulted in increased performance, nor were there improvements in quality and reliability of services. Concurrently, macro-ecomomic conditions external to the sector, such as the deteriorating international business climate, fiscal constraints and structural adjustments programs imposed by the World Bank and the IMF, placed pressure on countries in the region to undertake structural and institutional reform of their electricity sectors (Hyland 2015).

2.6. Towards a Standard Model of Electricity Sector Reform

In a recent review of reforms over a thirty year period Bacon (2018) page 2 commented on the development of a standard reform approach as follows:

"The dissatisfaction with the performance of state-owned vertically integrated electricity utilities that emerged in the 1970s from several different contexts led to a policy agenda that rapidly became highly stylized. The overall approach adopted was similar when applied to highly industrialized countries, to transition countries of Eastern Europe and the former Soviet Union, and to developing countries, large and small."

The following section explores the process that led to the development of this standard model of electricity reform that came to be applied across differing contexts with varying degrees of success.

2.6.1 The World Bank Role in the Development of the Standard Model

Prior to 1993, World Bank lending in the power sector operated in the context of monopolistic state-owned electricity utilities. Historically the Bank had been a major supporter of the power sectors of developing countries and power was one of the primary sectors in the lending program, accounting for around $75 billion in 1990 prices through FY91 or around 15% of cumulative lending (World Bank 1993b).
In a World Bank discussion paper (World Bank 1990) it was argued that the main priority in developing countries was to improve regulation. This paper acknowledged the advent of a new market-based approach to reform in several countries but

cautioned against hasty adoption of this approach as it was not properly defined or proven in practice. A further caution was issued regarding privatization as the paper contends that privatization arguments tend to oversell the benefits of competition and underrate the benefits of improved regulation.

By 1993, Bank thinking had changed. In line with new global thinking on neo-liberal reforms, the institution published a policy paper on lending to the power sector and so announced a major policy shift away from lending to state-owned monopolies to a market-oriented approach with the requirement that client countries would need to adopt ownership, structural and regulatory reforms to enable future access to Bank loans. There were 5 main principles defining the new approach of the Bank towards the ESI in developing countries. The first lending requirement was that countries needed to demonstrate a movement towards the establishment of a legal framework and regulatory processes satisfactory to the Bank. Secondly, in cases where there were weak public and private sectors, an early step in reform would be to bring local or imported country electric power services into the country. Thirdly, the Bank would aggressively pursue the commercialization and corporatization of and private sector participation in developing country power sectors. In the fourth place the Bank would focus on lending only to those countries with a clear commitment to improving sector performance in accordance with Bank principles. Finally, the Bank would encourage private sector investment in the sector by using some of its own resources to facilitate the involvement of private investors (World Bank 1993b). The document contained no statement recommending privatization of electricity utilities.

Significantly there was opposition to this new reform policy prior to its publication. The only clearly documented evidence of significant institutional criticism that could be located was that provided by Electricité de France (EDF). Prior to a roundtable between the World Bank and senior Electricité de France (EDF) staff in 1992, EDF provided critical commentary on the 1992 draft version of the 1993 power sector policy paper (World Bank 1993a) summarized as follows:

- The approach of a standard model – EDF was of the opinion that each country needed to be thoroughly researched and a tailored solution developed using the measures in the World Bank policy as options rather than an ultimatum for general application.

- The need to separate utility management from the political establishment – EDF agreed with the need to do this but pointed out that the proposals did not address the process for achieving this goal.

- Electric Power can be governed by market forces – EDF challenged this notion stating that electric power is different from other commodities. Even if a competitive market were established, competition would need to be regulated

in order to ensure supply. Furthermore, distribution and transmission are network activities remain natural monopolies and require regulation. It is also not realistic to believe that competition can dictate as the political establishment retains the ability to limit or distort competition in the power sector.

- Independent regulation – For this to be effective, institutional maturity is required and a balance of power which is often not the situation in a developing country.

- Investment – The sector is highly capital intensive and requires substantial investment to meet demand. Therefore, very careful and integrated planning is required in order to avoid over investment and high operating costs. EDF questions whether the private sector and competition will result in the required investment, particularly in the case of distribution which does not fit the conventional market economic models.

EDF further concluded that:

- A meticulous evaluation needs to be undertaken concerning proposed solutions as they need to be explored beyond just a theoretical framework.
- The proposals show a general bias towards trendy solutions that have yet to prove themselves in the case of developing countries.
- It is with regret that they noted the absence of the notion of public service in the policy document.

It appears that little heed was taken of the concerns expressed by EDF on the draft policy as the 1993 policy document was duly published espousing the principle of a standard market-based approach to electricity sector reforms in developing countries. The World Bank viewed the standard package of reform as necessary for attracting private investment in the electricity sector and set about promoting it globally (Kessides 2004). After 25 years of this approach being applied by the Bank, concerns around the standard model similar to those expressed by EDF have been expressed in a World Bank publication (Foster and Rana 2019).

Some regional DFI's followed the lead of the World Bank on electricity reform. In a 2009 energy policy statement, the Asian Development Bank (ADB), in a review of their 1995 energy policy, re-stated the Bank's intention to promote market-based reform in the electricity sector going forward (ADB 2009). Likewise, the Inter-American Development Bank (IADB) also adopted the neo-liberal market-based reforms advocated by the World Bank and incorporated the approach in their strategy for the region from 1990 onwards (IADB 2000).

2.6.2 Further Evolution of the Model

Based on the principles set out in the 1993 paper, the reform model evolved over the ensuing period towards what was widely regarded as the standard prescription for power sector reform. As part of a project funded by the World Bank and the United Nations Environment Program Agency's (UNEP's) Energy Sector Management Assistance (ESMAP) program, the well known Bacon scorecard (Bacon 1999) assessed reform progress in a set of countries according to the following sequence of reform steps. First, the state-owned utility should be commercialized and corporatized. Next a legal framework defined the new industry structure, followed by the establishment of an independent regulator. The utility should then be restructured through vertical and horizontal separation followed by privatization. Finally private investment could be allowed.

The reform milestones conformed broadly to the principles of reform described in the 1993 World Bank policy paper except for asset privatization which was an addition to the list. Several authors have offered their versions of the reform process including the sequence of the reform elements that they believed would enable the best possible outcome.

Adding the dimension of competition to the reform process, Littlechild (2006) defined a normative methodology for electricity reform by spelling out the 10 components of the "Textbook Architecture", also referred to as the "Standard Model" for restructuring and competition:

- Privatization to enhance performance and reduce the ability of the state to use utilities to pursue costly political agendas.
- Vertical separation of competitive and regulated monopoly sectors to facilitate competition and regulation.
- Horizontal restructuring to create an adequate number of competing generators and suppliers.
- Designation of an independent system operator to maintain network stability and facilitate competition.
- Creation of voluntary energy and ancillary services markets and trading arrangements, including contract markets and real-time balancing of the system.
- Application of regulatory rules to promote access to the transmission network and incentivize efficient location and interconnection of new generation facilities.
- Unbundling of retail tariffs and rules to enable access to the distribution networks to promote competition at the retail level.

- Specification of independent regulatory agencies with adequate staff and powers and duties to implement incentive regulation and promote competition.
- Provision of transition mechanisms that anticipate and respond to problems to support the transition.

Littlechild further emphasized the need to avoid excessive government and regulatory involvement in the sector.

Hunt proposed a very similar normative "Standard Reform Prescription" although she did indicate that small countries or those with low demand and or inadequate electricity networks were possibly candidates for continued monopolies (Hunt S 2002). Other authors have proposed slight variations on the standard model eg Joskow (2006), Bessant-Jones (2006), Kessides (2012).

The standard prescription covered the entire spectrum of reform actions required to reach the desired goal of both wholesale and retail competition in the electricity market. Even in the earlier stages of reform it was acknowledged that some developing countries were not suitable candidates for the implementation of such competition. Jamasb (2002) advised that in the case of developing countries with smaller systems "competition in the market" should be replaced by "competition for the market" and the aim should be for simpler and more feasible solutions such as the single buyer model. While different countries had different drivers pointing to the need for a reform strategy, the core problems appeared to be similar, and the result was the emergence of a neo-liberal power reform strategy that was applied across the board (Bacon 2018).

2.7 The World Bank Promotes Privatization

The World Bank 1993 policy promoted commercialization and corporatization before privatization as a means to introduce competition and innovation. The model was based mainly on the reforms in Chile and England and Wales which were the only experiences to review at the time. The majority of the World Bank client countries showed little prospect of improving commercial performance through corporatization and commercialization because of the inefficiencies resulting from state ownership and poor governance. Subsequent to the 1993 policy paper and without any official announcement of a policy change, the World Bank therefore mostly advocated privatization including private participation through management contracts as a means to achieving commercialization (Manibog et al 2003).

2.8 Expectations of Reform

Reform expectations in developing countries have been widely articulated in the literature but in the main, have maintained a strong economic bias in line with the neo-liberal nature of the reform process.

Gains from the reform were also expected to exceed the higher transaction costs from breaking up vertically integrated systems, the higher risk premiums required by private investors and the cost of regulation. In addition, the privatization of existing assets would benefit cash strapped governments with foreign debts. Therefore, it was concluded that the success of market-oriented reforms is highly dependent on participation and functioning of private actors in the sector (Jamasb 2002). Further expectations included adequate investment and more efficient system operation (Newbery 2002).

As mentioned earlier in this chapter, towards the end of the 1990's the World Bank shifted focus from macro-economic reform via Structural Adjustment Programs to Poverty Reduction strategies. The strong bias towards good macro-economic reform in these strategies is reflected in the strong economic bias of the reforms and the lack of focus on social issues. Likewise environmental objectives were seldom mentioned. (Bayliss 2002).

2.9 Economic Theories Relevant to Reform

Based on the working hypothesis and the need to understand the political dimensions of reform the following broad bodies of literature have been considered. Firstly, Principal-Agency theory is useful in understanding the principles of incentive based regulation as well as multiple relationships within the sector. The Resource Based View of the Firm (RBV), and associated concept of Capability Gap Analysis, is related to the resource aspect of the hypothesis. This is a subset of the broader strategic management literature and addresses the importance of resource management. Thirdly, Upper-Echelon theory, part of the broader organizational body of literature, emphasizes the importance of senior management in a firm and hence relates directly to the resource aspect of the hypothesis. Finally, the more recent set of literature labelled the Political Economy of Power Sector reform has been reviewed to understand more recent research around the political aspects of reform.

2.9.1 Principal Agent Theory

Principal agent theory and the associated concepts of information asymmetry and moral hazard have been widely referred to in explaining the principle of regulation as well as other relationships and issues related to reform of the electricity sector. Jensen and Meckling (1976) have defined an agency relationship as a contract under which

one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent. If both parties to the relationship are utility maximizers there is good reason to believe that the agent will not always act in the best interests of the principal. The principal can limit divergences from his interest by establishing appropriate incentives for the agent.

Holmstrom (1979, p. 74) defines the associated problems of moral hazard and information assymtery as follows:

" a problem of moral hazard may arise when individuals engage in risk sharing under conditions such that their privately taken actions affect the probability distribution of the outcome. The source of this moral hazard or incentive problem is an asymmetry of information among individuals that results because individual actions cannot be observed and hence contracted upon. … A natural remedy to the problem is to invest resources into monitoring of actions …"

In the context of the electricity sector this principle has been used in the literature to analyze reform outcomes and to justify use of incentive based regulation to better manage moral hazard through reduction of information asymmetry and hence limit openings for opportunistic behavior on both sides (Worch et al 2013). Agency theory, moral hazard and information asymmetry are important theoretical concepts for this research as they both focus on explaining incentive behaviors in an environment of limited observability applicable to multiple aspects of the sector.

2.9.2 Resource Based View of the Firm

The central proposition of the Resource Based View is that if a firm is to achieve a sustainable competitive advantage it must acquire and control valuable rare, inimitable and non-substitutable resources (VRIN) and capabilities plus have the organization in place that can absorb and apply them (Barney 1995). The RBV has become a crucial logical consideration in firm strategy development. Consequently, accumulating resources to foster competitive advantage or economic rent has become fundamental to strategic thinking for numerous managers (Wu 2010). RBV is now widely acknowledged as one of the most prominent and powerful theories for describing, explaining and predicting organizational relationships (Barney, Ketchen and Wright, 2001). The RBV has been applied to a wide range of phenomena including information systems (Wade and Hulland, 2004) and organizational networks (Lavie, 2006) as well as analysis of electricity reform outcomes (Worch et al 2013).

Modern electricity utilities require strong engineering skills and competent management. Worch et al 2019 point out that there is a large body of literature focusing on infrastructure regulation but little emphasis on the management of utility

firms. Lack of organizational structures, skills and management expertise remains an important challenge for utilities worldwide (OECD 2006, Worch et al 2013). The authors argue that public policy and regulatory interventions tend to cause systematic changes to existing, as well as the required capabilities of utilities. The result can be a decline in performance or even complete failure of certain organizational tasks. This can have repercussions at the sector level especially if all firms are affected in a similar way or if a critical single firm is impacted. They propose that such strategic changes may: (i) increase uncertainty, (ii) separate organizational functions that are closely interdependent, (iii) add new objectives or change the priority of objectives which utilities need to pursue and, (iv) limit the options for adaptation and reorientation. The authors are of the view that the capability approach offers important insights for policy makers and regulators so as to avoid unintended consequences of reform initiatives. They refer to this sub set of the RBV literature as capability gap analysis and state that further research is needed in this area.

2.9.3 Upper Echelon Theory

Within the broader field of Organizational Theory, there is a subset referred to as Upper Echelon Theory related to the influence that the Top Management Team (TMT) has on firm performance. Scholars in strategic management have emphasized the role of executive leadership in strategy formation and organization performance (Finkelstein and Hambrick 1990). It is surprising that this body of literature has been largely ignored in the literature on reform outcomes.

The upper echelons perspective, as set forth by Hambrick and Mason (1984), attributes major influence to a firm's leaders. Organizational outcomes, such as strategies and performance, are expected to reflect the characteristics of these leaders. The logic of this view relies on early work by theorists of the Carnegie School, who argued that complex decisions are largely the result of behavioral factors rather than perfectly rational analysis based on complete information (March and Simon, 1958; Cyert and March, 1963 thru Finkelstein and Hambrick 1990).

Carmeli et al (2011) conducted research to examine how Chief Executive Officer (CEO) empowering leadership shapes top management team (TMT) behavioural integration and potency, thereby enhancing firm performance. Apart from finding a strong correlation between the CEO empowering TMT leadership, the study also found that the effect of TMT potency on firm performance is stronger when the TMT members perceive high environmental uncertainty. This is certainly the case when considering the utility environment in SSA, particularly when major structural changes have been implemented through the reform process.

This brief snapshot of the upper-echelon perspective points to the importance of the CEO and the TMT in the context of reform outcomes, given the complexities of utility management in a developing country context.

2.9.4 Political Economy of Sector Reform

A political economy (PE) perspective on reform outcomes has more recently been gaining popularity and has contributed towards new insights into reasons for the failure of market-based reforms in developing countries. The origins of the term can be found in the work of Adam Smith's Wealth of Nations. In this body of work the term referred to the conditions of production organization in nation-states or what is today understood as economics. The term today is defined as analysis that studies the linkages between politics and economics drawing on the theories of economics, law as well as political and social sciences. Economic theory traditionally focuses on market theory where voluntary exchange leads to Pareto efficient outcomes. The decisions which political economy focuses on are those where the market does not produce these desired outcomes as they are influenced by political and not economic considerations (World Bank 2008). Eberhard and Godinho (2017) have noted that the failure of the standard model across most developing countries has motivated a significant body of research across disciplines, a sizable portion of which focuses on identifying factors of PE that could explain the incomplete implementation and disappointing outcomes now widely associated with power sector reform in these contexts.

In summary the political economy approach seeks (i) to understand why plans and policies that are apparently socially and economically desirable are often so difficult to implement, and (ii) to find solutions that are feasible in the local political and institutional context though they may be technically second-best (Barnett et al 2016). This approach offers useful insights into reasons for reform outcomes given the highly political nature of the ESI.

2.10 Economic Regulation

A new theory of regulation emerged in the 80's emphasizing the role of asymmetric information between government, regulatory commissions, firms and interest groups based on the work done by Magat (1979) and Baron and Myerson (1982) applying incentive theory to regulation (Laffont 2005).

Historically the main mechanism used by regulators was to ensure that both consumers and producers were allotted fair tariffs and allowed increases to enable producers to achieve a fair rate of return in the case of private ownership. This approach had a welfare objective to secure a sufficient and reliable quantity of supply and consumption via a control of the price level (Ghertman M 2009). With the advent

of market-based reforms, this rate of return regulation model was seen as unsatisfactory for simulating competition in monopolistic parts of industry. The UK government requested Stephen Littlechild to advise on a more suitable basis for such regulation. Taking into account criticisms of the rate of return model he proposed the familiar RPI-x price cap formula where RPI is the retail price of inflation and x is the rate of productivity increase (Newbery 2002). It was envisaged that this model would simulate a competitive environment and so pressurize monopolistic sections of the industry to improve efficiencies and cut costs (Littlechild 2008b).

Estache and Wren-Lewis (2008) provided a succinct explanation of the drivers leading to the concept of independent regulation and in which ways the new approach was expected to improve governance in network industries. The regulation of network industries in developing countries had traditionally been modelled on corresponding practice in developed countries. Until the mid 1990's, politicized self-regulation tended to be the norm similar to many OECD countries. The drive towards improving efficiency combined with a desire for independence from political interference in regulatory decisions were the main drivers in moving to a new theory of independent economic regulation. No-one previously questioned the sincerity of monopolistic operators concerning their claims about their self-assessed costs and efforts to minimize these costs in the interests of consumers. It was believed that the new theory of regulation would change this situation as it would now be possible to identify various sources of moral hazard stemming from information asymmetry related to technologies and efforts and hence to costs.

Tenenbaum (1995) defined the respective roles of Ministry of Energy (MOE) and independent regulator under the new dispensation:

MOE:

- Translates general policy to sector policy
- Approves major expenditures when state-owned
- Manages fuel supplies for strategic reasons

Independent Regulator:

- Issues and enforces licenses and concessions
- Sets prices where there is no competition
- Monitors financial viability of operators
- Sets service standards and monitors compliance
- Arbitrates disputes between operators and consumers
- Provides information and advice to the ministry

Tenenbaum further provided further insight into the concept of an independent regulator and opined that the concept of independence is confusing. In reality

regulators cannot be completely independent. According to Tenenbaum independent implies that the regulator does not have to seek ministerial or other government approval to raise or lower tariffs. The accountability is not to the minister but to the tariff standard. The regulator does not have control over sector policies. They implement policies developed by the government. The reason for requiring independence is not an end in itself but depends if a particular government realistically can give credible commitments without an independent regulator. If they can, then there is no need for independence but in many cases, ministers are subject to political pressures to keep tariffs low. The idea of the independent regulator is to create an entity that investors can believe in. Furthermore, Tenenbaum stated that power reform can only be successful if the government reforms both the sector and the manner of regulation.

2.11 Privatization

Principal-Agency theory is key to the concept of privatization. Under state ownership of enterprises, the government is unable to provide the appropriate incentives to the agents (managers) to exert effort in monitoring the performance of employees. Under privatization owners have the incentive to monitor the performance of employees thereby improving performance levels (Tan 2010). As discussed in paragraph 2.7, the World Bank began to advocate privatization in place of commercialization and corporatization soon after the publication of the 1993 policy paper. Although not explicitly stated as official policy, privatization soon began to be considered as a necessary step in the standard model of reform (Bacon 1995b, Bacon and Besant-Jones 2001). Privatization in this context does not refer solely to full or partial or full divestiture of assets, but also covers management contracts, affermages (a form of lease) and concessions as well as options for consideration. The roles of private sector participants could therefore range from virtually no at-risk investments under management contracts through increased investment risk under long term concessions to accepting all investment risks under divestiture. The logic was that the more risk and responsibility that was passed to the contractor, the greater would be the incentive to improve services (Bessant-Jones 2006). The details of different forms are relevant to the hypothesis.

2.11.1 Management Contracts

Under this arrangement the local utility delegated part or all its operations to a private party. The contractor's staff fill senior management positions and ensure the quality of customer service while the government still owns the assets, makes investment decisions and remains accountable for financial results. The contracts are often quite complicated because of the need to specify who does what. The advantage is that these contracts do not have to depend on the performance of a regulatory regime to recoup costs of investment but the disadvantage is that the contractor's performance

will often depend on promised investments and other commitments by the government which can fail to materialize. The contract specifies the improvement objectives to be achieved while compensation is often tied to contractor's performance. If the government does not meet its obligations the contractor can face the risk of being penalized (Bessant-Jones 2006, Tenenbaum and Izaguire 2007).

2.11.2 Affermage

In this case, also referred to as a lease and operate contract (Guislain and Kerf 1995), the contractor retains responsibility for the operations including interface with the consumer but is not responsible for the investments. Thus, private firms do not need to raise capital at market related rates and this enables price levels to be contained. The model reduces both the risk as well as the potential return for the investor. If the government underinvests, the contractors' performance and return could be adversely affected. Furthermore, consumers deal with the operator and not the government who is responsible for the investments, complicating public perceptions regarding which partner is responsible for weak performance. The contractor is paid based on commercial performance, thereby introducing an incentive for good performance (Marques and Berg 2010).

2.11.3 Concession

Under this arrangement the state retains ownership of the assets and concedes the use of these assets to an outside party. The concessionaire is responsible for providing electricity service, operating and maintaining the assets and financing the required investments under the terms of a contract signed with the authority that oversees the utility. This contract stipulates minimum levels of service and sets standards for power quality. The concessionaire reimburses the state for the use of assets and often the state provides some form of guarantee for the concessionaire's investments. The concessionaire's compensation is tied to the results achieved in managing the utility (Bessant-Jones 2006).

2.11.4 Divestiture

In this case the government transfers ownership of the assets as well as the operating rights to a private party or a new semi-public organization or a joint venture of both types. The new organization is responsible for all operations as well as financing future investments at their own risk. Performance is controlled through competition or through general regulation rather than wholly or partially through contract terms as in the case of concessions (Bessant-Jones 2006).

2.12 Corruption – a Threat to the Reform Process

While corruption is not specifically addressed in the theory of market-based reforms, it does feature quite frequently in the literature reviewing reform outcomes and is viewed as a significant enough factor in the reform process to introduce as a concept. Economic corruption generally refers to the use of public office for private gains. An official (the agent) entrusted with carrying out a task by the public (the principal) engages in some type of malfeasance for private enrichment which is difficult to monitor for the principal. Corruption can be further be defined as favoritism, fraud, cronyism, patronage, regulatory capture, cash bribes and extortion (Bardhan 1997, Estache and Wren-Lewis 2010).

In general corruption is divided into two categories. Petty corruption refers to bribes in the delivery of services and is a huge challenge in many countries. Utility managers or their staff may restrict delivery to extort customers or offer illegal connections in return for payments. Grand corruption involves higher decision-making levels and is conceptually different from petty corruption. This type of corruption Includes cases where politicians or high-ranking civil servants manipulate a country's management of infrastructure or regulation of infrastructure industries to gain exclusive benefits. It can be a purely public sector phenomenon or involve both public and private agents.

Seen in terms of principal agency theory in the case of petty corruption the officials are the agents who benefit from making choices that deviate from the goals of the institution they represent because the managers of the institution (principals) have insufficient capacity or motivation to monitor the actions. In the case of grand corruption, the politicians/senior officials are the agents while the electorate are the principals who have insufficient information about their politicians and the choices they make. Petty corruption can be monitored more easily whereas in the case of grand corruption, elected politicians are often directly or indirectly controlling monitoring mechanisms including the judicial system and the media (Bardhan P 1997).

Anthropological studies provide a meaningful insight into the origins and nature of corruption particularly in African countries. African economies have been classified as largely pre-capitalist. National identity is weak, and societies tend to be organized along vertical lines based on kinship or ethnicity rather on horizontal interests (eg class). These structural features have two consequences for corruption. First this has led to the extractive capacity of a corrupted state apparatus being one of the reasons for holding political power and secondly personalism and clientelism being among the few effective political tools available to African elites (Eisenstadt 1973, Clapham 1982, Sandbrook 1985, Chabal and Daloz 1999), thru Kolstad et al (2008). This has meant that appropriation of state resources has not simply been a means of amassing personal wealth but is also crucial to the ability of elites to service the patronage networks which keep them in power (Tangri and Mwenda 2006). The main problem

with anthropological approaches to corruption is that they are long in description and short on prescription offering no guidelines on how solutions tailored to each context could reduce corruption levels (Kolstad et al 2008).

2.13 Synthesis

The swing from market-based electricity supply in the early years to mostly state-owned vertically integrated utilities from the end of WW2 to the early eighties and back to a market-based paradigm for the past 35 years has identified a trend in electricity supply policy over the years corresponding to the political and economic thinking as well as the macro-economic conditions of the time. Starting with market-based reforms in Chile and England and Wales, and in line with increasing globalism and the rise of neo-liberal economic thinking a standard model of reform evolved, defining the steps and sequence required to achieve liberalization of an electricity sector. Although the drivers to reform and the starting conditions differed substantially between developed and developing countries the same standard model of neo-liberal reform has been applied across the board with the support of the World Bank and other DFI's who often imposed conditional lending policies to ensure compliance of client countries with the new reform policy.

The literature survey revealed that Principal Agency theory underpinned formulation of a new philosophy of regulation leading to an emphasis on incentive-based rate setting aimed at simulating competition in non-competitive market segments of the industry. A further body of literature related to the resource based view of the firm was also examined. While reference has seldom been made to the latter theory in the power sector reform literature, it is suggested that these theories are intrinsically related to the reform process and hence will provide insights into better understanding outcomes. Thirdly, Upper-Echelon Theory has identified the necessity of a competent CEO and executive team to enable good utility performance. Finally, the evolving theory of the political economy of sector reform theory has been examined as this approach has been frequently utilized in the later literature to better understand poor reform outcomes in developing countries.

2.14 Onword

This chapter has established the contexts and theoretical approaches to the market-based reforms of the past 35 years and examined relevant theories pertaining to the reform process. Several aspects of reform related to these theories have been explored. The many different and sometimes inconsistent details in this part of the research, as illustrated by the comments of Eisenhardt and Graebner (2007), will need to be further examined to establish underlying patterns.

Before then, Chapter 3 will examine the spread of reforms and assessments of the outcomes of reform in some countries, again providing rich detail that will form the basis for further analysis.

Chapter 3

30 Years on - How has Market-based Reform Fared?

3.1 Overview of Reform Outcomes

This chapter provides an overview of sector reform outcomes in both developed countries and developing countries. The standard reform model has formed the basis of reform over the past 30 years and the outcomes are discussed in the context of time and geographical areas. Reports of implementation seldom refer to the underlying theories related to reform. The main purpose of this overview is to examine reform outcomes with reference to the working hypothesis to assess individual impact as well as to identify other aspects of reform that may have been missed. The overview revealed considerable variance related to reform outcomes, depending also on the method of assessment. Nevertheless, certain trends have emerged which form the basis for identifying key themes related to successful reforms in Chapter 4.

After considering the reasons for rapid spread of reform, the review provides insight into how the outcomes changed perceptions of the standard reform model over time. Much of the literature assessing reform outcomes is surprisingly outdated and does not reflect the changing global financial and global context (Bagnoli et al 2020). Many papers were published from the mid-1990's to around 2012, with relatively fewer until 2020.

3.1.1 Spread of Reform

Market-based reform based on the UK and Chile models spread rapidly across the world in developed and developing countries with the exception of most of Europe, Japan and large portions of the US (Joskow 2008). Many countries commenced their reform by the turn of the century with others still in the implementation phase (Bacon and Besant Jones 2001). The rapid spread reflected a broad paradigm shift from state ownership and centralized organization of infrastructure industries to private ownership, public regulation and market-oriented structures (Jamasb et al 2004). Bacon (1995b) warned that insufficient experience had been gained regarding the benefits of a market-oriented approach and that the early reforms should rather be viewed as experiments to be fully evaluated over a longer time period. Bacon further advised that reforms should be country specific and be related to the size of the system, degree of political willingness and the economic potential of the country. This advice went largely unheeded as the reform process based on the reforms in England Wales and Chile spread globally to developing countries.

Private sector participation in the power sector grew particularly rapidly in the 1990's. In the period to 1993 the private sector took on management operations, rehabilitation, or construction risk of 534 projects with a total investment of 131 MUSD (Izaguirre 1998). The Bacon scorecard (Bacon 1999) evaluated the progress of market-based electricity reforms in 115 developing countries and reported that 57% had contemplated some form of reform in less than a decade, 44% had commercialized their utilities, 40% had contracted IPP's, 33% had established regulatory bodies and 21% had privatized. The Latin American region (LAC) region led the field in this regard, Eastern Europe followed, while SSA lagged, associated with a lack of cost reflective tariffs and increased investor perception of country risk. With respect to privatization, 40% had occurred in the LAC countries and only 4% in Africa (Izaguirre 1998, Bacon 1999). By the end of the 90's most OECD countries had taken some steps to reform (Besant-Jones 2006). By 2010 private sector participation had reached 41% in generation, 42% in distribution and 25% in transmission in 18 different LAC countries indicating the significant spread of market-based reform in that region (Balza et al 2013). A noticeable slow-down in the spread of the reform model was however noted after the California power crisis (2000-2001) (Glachant and Perez 2011) while Kessides (2004) predicted that the crisis would likely de-rail future attempts at radical electricity market liberalization.

Varied reasons have been posited for this rapid global spread of the reform model although in reality the empirics of the reforms show a noticeable diversity as well as distance from the standard model in terms of implementation (Glachant and Perez 2011). Ideology played a significant role in some countries and the era of energy liberalization has been a significant manifestation of the general worldwide trend over the past decades towards economic liberalization(Pollitt 2012). Another significant contributing factor to the rapid spread of the reform is the strong support provided by the DFI's most of whom have been strong advocates of market-oriented reform in developing and transition countries since the World Bank took the lead by publishing a policy paper on sector reform in 1993. In some cases, countries rapidly implemented privatization before other critical reform steps, driven by the need to top up government coffers as happened in the case of Chile (Jamsab et al 2004).

DFI's have tended to employ a carrot and stick approach in order to ensure countries adopt market reform measures and failure to meet certain reform targets resulted in refusal to disburse tranches required for critical infrastructure as well as jeopardizing future loans (Bacon and Bessant-Jones 2001). This approach has been criticized as being inflexible by some (Stiglitz 2002). Others argued that countries simply acceded to the World Bank's requirements to receive financial support (Thomas 2006).

Another key perspective on understanding the rapid spread of reform is that as more countries liberalized their electricity sectors it would appear that reform was no longer seen as a choice to be made by governments and utilities but rather as being

inevitable and public officials' room to maneuver narrowed down to questions when and under what terms they will liberalize rather than deciding whether liberalization is the optimal solution (Wamukonya 2003). In this way a new convention about the best way to govern the sector was shaped. This phenomenon has been referred to as "herding" (Levi-Faur 2002).

3.1.2 Perceptions of the Efficacy of the Standard Model

Over the initial 10 to 15 year period it is possible to see a gradual trend over time of changing perceptions of investors, consumers/public, donor agencies and governments of the success or failure of market-based power sector reform. The general trend is from highly optimistic and expectant at the start all the way to more recent World Bank based publications expressing disappointment with neo-liberal reforms and advocating a re-look at reform measures (Foster and Rana 2019).

While the perceptions generally changed over time, some proponents remained staunchly defensive of neo-liberal reforms even in the face of disappointing outcomes. The following review illustrates the trend of assessment.

Supportive

In 2001 the statement was made that the standard reform model was suitable for application for all environments, including developing countries (Bacon and Besant Jones 2001). This was only six years after one of the authors issued a word of caution warning that there were dangers in simply replicating the standard model as it was largely untested (Bacon 1995b).

Initial successful reform outcomes in the UK in terms of lower prices and better service quality formed the basis for a statement that the same principles of public policy should be applied to developing countries with a few modifications (Littlechild 2000). Even after some 20 years the view remained in some quarters that the England and Wales model stood firm as the gold standard in reform and that the standard model was still a sound guide to success. Reform failures in Japan, Netherlands, Spain and parts of the USA as well as other countries were explained away as being due to the model not being implemented strictly according to the standard prescription Joskow (2008). As recently as 2012 Kessides expressed the view that the standard model can be successful in a number of settings. The reform failures in Argentina during the 2000/2001 macro-economic crisis have been attributed by some authors to government interference in the market rather than any deficiencies in the market-based model that had been implemented almost to the letter in that country (Pollitt 2008).

Supportive but with qualifications

In a more qualified assessment of the standard model, Williams and Ghanadan (2015) state that the standard model has been broadly successful but only in the context of OECD countries. Others acknowledged that implementation is difficult in developing countries, more complicated than initially anticipated and remains a work in progress and recommended that a gradual approach to reform in developing countries may be a good approach given the time required to develop the required human skills (Jamasb 2002). A further recommendation was that more use should be made of alternative forms of regulation such as regulation by contract to solve reform implementation problems (Bakovic et al 2003).

After a comprehensive re-assessment of the policy the World Bank concluded that a "cook book" approach wasn't working in developing countries but that the essential reform recipe was still relevant and should continue to be applied in a more flexible manner (World Bank 2004). At the same time the Wall St Journal reported that World Bank officials had stated that it doesn't matter so much whether infrastructure is in public or private hands and that the World Bank must pay greater attention to the politics of privatization and the effects of rising prices on the poor and disaffected. (Wall St Journal 21 July 2003 thru Hall 2005). A recent World Bank publication providing an overview of power sector reform outcomes over 30 years stated that reform efforts need to be shaped by both the political and economic context of the host country. The 1990's reform model was most successful in countries that had reached certain minimum conditions of power sector development and offered a supportive political environment (Foster and Rana 2019).

Rejecting the standard model as a solution

Mixed outcomes, failed reforms, and policy uncertainty have resulted in a number of voices emerging to reject the validity of the standard model. Dubash (2003) argued that the market led changes will not automatically ensure the public interest and that electricity reforms should be based on careful consideration of not only economic and technical considerations, but also the likely social and environmental outcomes. Application of so-called best practice has resulted in blind spots which have blocked consideration of other models which could in fact have worked far better (Rodrik 2008). The idea of a uniform prescription has lost credibility (Williams and Ghanadan 2006). Jamasb et al (2004) observe that the strong emphasis on privatization had given way to accepted roles for both public and private ownership giving rise to so called "hybrid markets." Thompson and Bazilian (2014) page 2 point to the doubtful benefits of liberalizing fragile markets:

"The benefits of liberalizing fragile markets are unclear and when it is pushed on to them based on ideology, can be to their detriment."

After more than 20 years of reform and ample amounts being spent, no clear theoretical and empirical consensus exists regarding economic gains brought about from reforms except some improvements in technical and operational efficiency and it is not clear if this due to reform or technology advances (Nepal and Jamasb 2013). Other authors are of the view that the standard model as applied to electricity is fundamentally flawed and in reality, benefits no one except certain stakeholders such as certain individuals, organizations and industries (Clark 2017). Yi-chong (2006) has the view that the standard model was a failure due to the disconnect between economic ideals and political reality, an over emphasis on economic performance at the expense of the physical and engineering aspects, and the neglect of differences between developed, transition and developing economies. Another strong view was expressed by Rozenveig et al (2004) page 17:

"The fundamental aspiration that private investors could magically ensure that utility prices could fall while the quality of service improved and profits flowed back to the parent was doomed to failure."

3.2 Review of Outcomes as Assessed by Empirical Studies

The empirical literature proffers divergent and sometimes conflicting assessments of general reform outcomes in both developed and developing countries implying limited usefulness of such studies in developing reform policy going forward.

Jamasb et al (2004), in reviewing the usefulness of empirical studies until that time, concluded that the existing body of evidence from rigorous analysis is rather limited, given the wide range of issues and the many questions that arise in connection with the success or failure of reform. They posit that this is due to the small sample size used and that much useful information embodied in lesser-known reforms (or even non-reforming countries) representing counter-factual alternatives, is not utilized. Use of a wide variety of data and methods also frustrate attempts to develop a consistent picture of reform outcomes. The authors have further noted that empirical assessments of reforms have tended to focus on OECD countries, or use mixed panels of developed and developing countries, which limit the usefulness of the outcomes as they obscure the differing contexts against which the reforms have been implemented.

3.2.1 A Broad Overview of Various Studies

This overview seeks to illustrate the diversity of samples, study methodologies and assessed success factors and how these diverse results have only contributed marginally to a better understanding of reform success factors. The overview is mostly focused on relatively recent studies on reform results. As stated above it is important

to note that authors have expressed caution related to the conclusions of these studies as energy reform and performance data tend to suffer from endogeneity and simultaneity bias.

Bacon (2018) offers a recent and comprehensive overview of the literature focused on evaluating the effects of reform on sector performance. The review identified 26 studies that utilized a formal model to estimate the effects of reform on some aspect of firm or sector performance in developing countries. Bacon noted that the LAC region is highly represented in some studies while SSA tended to be under-represented. Findings therefore may not be particularly relevant to the latter region. The following represents a summary of the study findings:

- Private sector participation is often associated with improvements in sector performance (Andres et al 2006, Ba and Gasmi 2011, Gassner et al 2009, Vagliasindi 2012).

- Effects of regulation and competition on performance are ambiguous (Ba and Gasmi 2011, Vagliasindi 2012, Balza et al 2013).

- Multiple studies conclude that performance indicators internal to firms are impacted by private sector participation but not by regulation.

- Privatization had a significant positive impact on levels of bill collection and supply interruptions. Only two studies addressed this variable (Andres et al 2006, Gassner et al 2009).

- The limited analysis carried out on differential reform effects by type of country supports the view that the gains will be less in countries with small system size and low income.

In a recent study on the effects of reforms in SSA, Imam et al (2018) reviewed reform outcomes in 47 Sub-Saharan countries from 2012 to 2013 with a view to analyzing the effects of corruption and two key aspects of reform – creation of independent regulatory agencies and private sector participation on three performance indicators. The authors concluded that corruption can significantly reduce technical efficiency, constrain efforts to increase access to electricity, and negatively impact the national income. The study further found that these adverse effects were countered when independent regulatory agencies are established, and privatization is implemented.

Using 27 World Bank commissioned Policy Research Papers as a research basis, Foster and Rana (2019) conducted research into reform outcomes over the period 1995 to 2015. They used data from two samples of developing countries, the first a smaller sample of 28 countries and the second a larger sample of 80 countries. The principal

finding was that private sector participation was the factor most strongly associated with improved sector outcomes in terms of security of supply, electrification, renewable energy penetration, cost recovery and to some extent distribution efficiency. However, the report also notes that some countries, taking a very cautious approach to reform, made significant gains such as Egypt and Morocco. The research also established that the concept of independent regulation remained elusive and that there was a significant difference between the regulatory framework and its implementation in many instances.

In another recent study, Urpelainen et al (2017) performed analysis on reform data over the period 1982-2011 in 184 developed, developing and transitional countries. The conclusion was that transmission and distribution losses decrease and generation capacity increases even when limited reform takes place, competition and privatization are not necessary to achieve positive outcomes, and simple hybrid reform models are sufficient to achieve positive outcomes.

The conclusions reached by Bacon (2018) and Foster and Rana (2019) indicate some concurrence in that private sector participation has positively impacted utility performance, but comparison of various individual reviews indicates differences in the conclusions. The Bacon review which synthesizes the conclusions of 26 individual studies concluded that privatization is most often associated with improvements in performance whereas the individual studies by Zhang et al (2008) concluded that regulation and competition play a prominent role in contributing to improvements. Zhang et al (2008) conclude that privatization and regulation separately do not have a significant effect on performance whereas in combination they do have a positive impact on labor productivity and electricity availability. In contrast, Urpeleinen et al (2017) reviewed a panel of developed, transitional and developing countries and concluded that privatization and competition are not necessary to improve utility performance, and limited reforms leading to a hybrid model are often sufficient to achieve improvements. The differences in context and conclusions of these sample studies highlight the challenge of utilizing empirical study results to inform appropriate reform policies. Vagliasindi et al (2022) have recently questioned whether the current assessment method comparing performance of privatized and state-owned utilities is realistic, and states that SOE's could be contributing to longer term socially oriented goals not currently within the assessment framework and most often neglected by privatized utilities. This is in line with the assessments by Bacon (2018) and Foster and Rana (2019) which indicate that a more critical and open approach in evaluating outcomes and charting the way forward needs to be adopted as it has become clear a unified best practice policy approach has been unsuccessful.

3.2.2 A Gap in the Empirical Literature

Bacon (2018) has pointed out a significant gap in the literature focused on evaluation of outcomes pertaining to reform of state-owned utilities. The literature primarily focusses on neo-liberal based reform outcomes and has largely omitted discussion of alternatives to that approach. There is therefore a dearth of studies related to outcomes of reforms not adopting a neo-liberal approach. Gomez-Ibanez (2007) highlights that, prior to the 1980's adoption of the neo-liberal approach, there had been two decades of attempts to improve performance of state-owned enterprises (SOE's) with limited success and that this fueled the strong focus on market-base reforms. A limited number of authors have identified options for governments not wishing to privatize electricity supply. Irwin and Yamamoto (2004), referring to the cases of Mexico, New Zealand, the Philippines and South Africa, discussed ways to improve performance of state-owned utilities by subjecting the utilities to commercial pressure, removing or reducing the government role as owner and policy maker and reducing the ability of politicians and officials to use utilities to achieve political goals. Reinforcing this view, Bagnoli et al (2020) advocates a new research agenda that informs policy makers in developing countries on how to improve performance of their SOE's.

3.3 Regional and Country Review of Outcomes

This overview aims to assess the reform progress of key regions and countries including the front runner countries with a view to better understanding the specific outcomes.

3.3.1 Latin America

The reform model adopted in Chile became the inspiration for design and implementation of reforms in several Latin American countries in the 1990's including Argentina, Bolivia, Brazil, Columbia, Dominican Republic, El Salvador, Guatemala, Panama and Peru. The standard model was used as a reform basis in all cases although the scope of privatization differed from country to country. Divestiture was the preferred approach in most cases as a result of the influence of the Chilean model (Antmann 2013).

Within the region the reforms in Chile and Argentina were the deepest and most radical whereas reforms in Brazil were more cautious and gradual. In Bolivia and Columbia the electricity markets were also restructured and opened for competition (Gabriele 2004).

Authors have proposed various possible reasons for the rapid and endemic deployment of electricity sector reform in Latin American and Caribbean (LAC)

countries, some suggesting that the region was used as a large scale laboratory for privatization Checchi et al (2008), and others that privatization was a form of policy substitution, a response to the slowdown and fiscal deficits in the region during the 1990's Manzetti (2000) through Checchi et al (2008). While ideology played an important part in the motivation to reform the sector in Chile during the Pinoche regime, other countries acted out of pure financial necessity (Murillo 2001 through Checchi et al 2008).

A cross country study of 18 countries in the region over the period 1971-2010 was conducted by Balza et al 2013 showing a strong relationship between regulatory quality, generation capacity, coverage and end user prices and concluding that sound regulatory and institutional framework design is key to achieving sound reform outcomes. Liberalization efforts were not always successful however. Re-nationalization of the sectors in Bolivia, Venezuela and the Dominican Republic underscores the ongoing changing role of the state in electricity sector reforms. (Balza et al 2013, Jamasb et al 2015).

3.3.1.1 Chile

The performance of the Chilean electricity utilities before 1978 had been disappointing with the two largest utilities, Endesa and Chilectra, making losses but following the reform in 1982 the sector made significant gains as investments in generation and transmission grew, average industrial and residential prices for electricity fell, efficiencies improved and access to electricity as well as quality of supply improved. Macro-ecomomic conditions were favorable during the privatization as Gross Domestic Product (GDP) grew by 7% per annum while inflation declined steadily.

While the reforms resulted in large performance gains, in practice there was less restructuring and competition and more regulation than is immediately obvious (Gabrielle 2004, Joskow 2008). Regulatory bodies, however, did not have sufficient powers to exert control over powerful private companies and this led to frequent disputes and court cases (Gabriele 2004).

In 1998-99 the country experienced one of the worst droughts on record resulting in the collapse of the pricing system and rolling three-hour blackouts. Authors have opined that this situation was due to: (i) ineffective regulatory governance and (ii) rigid pricing structures in place at this time which inhibited investment causing firms to postpone or cancel installation of additional generation capacity (Galetovic and Fisher 2001, Gabriele 2004).

During the past decade there has been a change of approach around the role of the Government in the sector as well as greater emphasis on development of renewable

energy sources. The formation of the Ministry of Energy in 2010, along with significant dependence on imports for domestic energy supply, the significant transformation in the international energy market, global concerns about climate change, and the availability and competitiveness of renewable energy technologies have moved the government of Chile to intervene in the sector to implement sustainable long-term energy planning and policies. Chile is one of the few countries in the region that have successfully promoted a renewable energy program without fiscal incentives or by using the Renewable Feed in Tariff (REFiT) mechanism, but new policies need to be developed to ensure that larger scale variable renewable energy can be successfully coupled with other flexible resources. Chile currently still depends on approximately 65% of energy imports to meet domestic needs and so the government has a strong incentive to build self-sufficiency and sustainability by increasing use of renewable resources. Five strategic axes and actions for the new Chilean energy policy were defined in the Road Map 2050 leading to the publication of the Energy 2050 policy statement. In order to realize the new vision, the policy was built on four main pillars: quality and security of supply, energy as a driver of development, environmentally friendly energy, and energy efficiency and energy education (Simsek et al 2019).

3.3.1.2 Argentina

The reforms carried out in Argentina in the 1990's were implemented quickly and under favorable conditions, as well as being the most far reaching in the region. Argentina was recognized as one of the world's leading countries in terms of comprehensive electricity reform (Pollitt 2008). The speed of reform can be attributed to the poor state of the utilities, the high levels of corruption and loss of public support for state-owned utilities, the politically motivated artificially low tariffs, and mounting pressure from DFI's (Gabriele 2004). Argentina followed the standard textbook model in reform almost to the letter (Joskow 2008), except IPP's were introduced before privatization of state-owned utilities commenced (Nepal and Jamasb 2013).

Negative consequences of the reform included still-evident corruption (Margheritis 1998 thru Gabriele 2004), the social impact of significant job loss, concentration of private property ownership in the hands of a few Argentinian and foreign agents, over-investment in generation and under-investment in transmission and distribution. By the end of the decade long energy outages raised questions around the essential public service function of electricity utilities (Gabriele 2004).

Outcomes were viewed as being highly successful in the initial years (Pollitt 2008). The reform outcomes included the lowest prices in the region by 2002, 63% fall in employment and corresponding increase in labor productivity in generation by 2000, improved quality of supply, significant improvement in levels of billing and revenue collection by 2002, and increased grid access for poor households (Pollitt 2008). Pollitt

identified that key elements of success of reform include the need for a single independent regulator responsible for economic regulation of the sector and a stable institutional environment to foster long term investment protected from arbitrary changes in government policy.

The collapse of the Argentinian Peso in 2002 forced the government to intervene, including renegotiating contracts with privatized utility companies, defining price formation according to different parameters, establishing more generating capacity through fifty-fifty public private partnership (Dagdevirin 2011) (Hall 2013), and linking dividends by distribution and transmission companies to certain investments (Dagdevirin 2011). Haselip and Potter (2010) suggest the electricity policies after the crisis were against the spirit of neo-liberalism but were in fact instrumental in preventing re-nationalization and maintaining private sector participation in the long term. This view contrasts with the view of certain authors who strongly criticized the government for curtailing the role of markets over this period and for reversing the positive results achieved by the reform (Pollitt 2007, Antmann 2013, Jamasb, et al 2015).

Over recent decades, Argentina has become highly dependent on hydrocarbons. According to the Ministry of Energy and Mines, hydrocarbons accounted for 87% of total primary energy sources in 2015. Over dependence on thermal generation and the global move towards emissions reduction has prompted the Government to sanction a new law which set a new renewable penetration target of 20% to be reached by 2025. In mid 2016, the Government introduced a new purchase scheme: the Program for the Purchase of Electric Power from Sources of Renewable Energy (RenovAr Program) drawing considerable levels of interest from the private sector. By mid-2017, 59 renewable energy projects had been approved amounting to 2423 MW of installed capacity (Schaube et al 2018).

3.3.1.3 Brazil

While not a front runner, the reform in Brazil is significant because of its scale and manner of implementation. Brazil is the largest economy in Latin America and is the 10th largest electrical power consumer in the world.

The policy of using federal and state-owned companies as the main operators worked up till the mid 1980's with low prices and adequate fuel supply. However, a number of poorly judged actions led to a deterioration in the sector. The government set artificially low tariffs to counter inflation while political misuse of electricity utilities involving corrupt practices and incompetent staff exacerbated the situation (Bajay 2006).

During the 1990's in line with DFI recommendations, market-based reforms were introduced in Brazil to increase investment and reduce state involvement (De Almeida et al 2004). The main drivers were poor performance of state-owned utilities as well as the lure of the perceived success of the reforms in Chile and Argentina (Jamasb et al 2015).

In 1995 President Cardosa instructed the sale of federally owned utilities to private investors while applying pressure to state governments to do the same. The move to privatize the sector was opposed by both the main opposition party and several government officials. Around 70% of the distribution utilities were privatized but only around 30% of generation capacity ended up in private hands. The largest generation and transmission companies, Furnas, Chesf, Eletronorte, Cemig and Copel remained under state ownership. The reform was structured according to the standard prescription although privatization was implemented before the regulator was established. Competition was introduced along with open network access and a new institutional framework with an independent sector regulator (ANEEL) was established. In addition, a national system operator (ONS) and a wholesale market (MAE) were created (Bajay 2006).

A severe drought in 2001/2 stressed the sector and the Government intervened, reducing the regulatory power of ANEEL. A power shortage developed in 2002/3 as demand had overtaken supply due to the reform not managing to attract the required private investment. This resulted in the public turning against the reforms as they did not deliver promised guaranteed supply security (De Almeida et al 2004). The system planning process was weak while private investors were unable to manage large scale macro-economic risks. The currency crisis of 2002/3 resulted in a sharp increase in domestic rates and the Government lost credibility. CCGT was no longer financially viable. In 2002 the new left wing Da Silva government changed the sector strategy from market-based to privately owned but state managed enterprises and commenced a second phase of reform. Privatizations were halted while full unbundling was implemented, and the State resumed its original planning role. A new market structure was established with a free market component and a regulated component (De Almeida 2004, Bajay 2006). The first market is regulated with contracts established via auctions and the second a free balancing market (Martelli et al 2020). Long term contracts therefore replaced the previous wholesale market (MAE) and are coordinated by the Electric Power Trading Chamber (CCEE). Central system planning was implemented by establishing an SOE company, the energy research company (EPE). Distribution companies were to procure power from CCEE (De Almeida 2004, Bajay 2006).

During the period 2003 to 2013 the demand and energy consumption grew at approximately 4.4% per annum. To cater for this expansion the transmission system was extended using competitive procurement based on investors financing,

constructing and maintaining infrastructure. Tied to a five year expansion plan developed by EPE and approved by the Ministry of Mines and Energy, the regulator manages the competitive procurement of the transmission infrastructure. This method of managing investment in transmission infrastructure has been assessed as successful (Antmann 2013).

A recent "public consultation" called for opinions on the state of the sector and it is widely believed and expected that deep regulatory change is required to give new impetus to the sector (Martelli et al 2020). A third phase of reform would thus appear to be imminent in the Brazilian electricity sector.

3.3.1.4 England and Wales

Initially the reform model produced significant benefits. At the onset there was excess capacity on the network due to over-investment in the 80's and 90's so little investment was required initially. The task in hand was to maximize asset use and not to invest (Helm 2009). During the initial period it was observed that companies were making huge profits and that the benefits of higher productivity were not shared with customers (Bacon 1995a, Price and Young 2003). Over time prices were driven down to below the European average (Helm 2009) and by 2000 this perceived success resulted in statements by reform advocates that the principles of private ownership, competitive markets and independent regulation had worked well (Bessant-Jones 2006). Customers benefitted from lower prices and better service quality and measures were taken to protect disadvantaged people and deal with social issues. This led to the recommendation by Littlechild that despite the differences between the UK and developing countries, the principles of the standard model still applied and hence was the right policy for those environments (Littlechild 2000).

It is significant that as early as 1995, Bacon noted that there was an important shift back to re-integration in the UK market. Market forces were pushing distributors to merge with one another to ward off takeovers from outside the industry and to take advantage of economies of scale. Vertical re-integration also started re-occurring as distributors started purchasing their own generation capacity (Bacon 1995a).

Some have doubted the improvements resulting from the reform and claimed that the initial price reductions were possible because the industry was sold for a fraction of its accounting value, effectively writing off most of the cost of the network and power plants. The privatized companies also benefitted by having strong infrastructure in place at handover (Thomas 2004). The first major cracks in the reform appeared when the gross pool mechanism was deemed a failure in 2001 and replaced by bilateral contracts and a balancing market with no capacity payments, known as the New Trading Arrangements (NETA). This was seen as a way to curb the alleged abuse of market power of the new main generation companies National Power and PowerGen

(Green 2002, Newbery 2006). However, despite the initial successes, rising electricity prices since 2000 have been a source of great dissatisfaction in the UK. As margins tightened and the gas in the North Sea began to be depleted, prices proved to be volatile and high and by 2005 sharp price spikes and supply scares resulted in the market no longer being perceived as being able to ensure secure supply at reasonable prices. Between 2000 and 2016 the real price of electricity rose by 67% (Hall 2016). While incentive based regulation initially resulted in efficiency improvements, implementation of the RPI-x model has become more complex over time and has been criticized for stifling investment in critical infrastructure (Lodge and Stern 2014).

In 2011 the UK government signaled its intention to implement a higher level of government intervention in the sector to meet climate change objectives (DECC 2011, Jamasb and Nepal 2013). The role of the Office of Gas and Electricity Markets (OFGEM) has declined since 2010 with central government playing a greater role in active planning and financing in the sector (Thomas 2016). In particular, the Energy Act of 2013 which defines the role of government in achieving climate change objectives provides little scope for OFGEM participation. Despite OFGEM being portrayed as an independent regulator the House of Lords have concluded that its formal status is a government department without minister (Hall 2016). Lack of investment in infrastructure remains a crucial problem. As the infrastructure replacement cycle bites, doubts were expressed some time ago as to whether the privatized industry structure is up to the task particularly in the area of developing and supplying renewable power in the future resulting in an almost inevitable return to more state intervention (Helm 2009).

During the 2020's there will be an urgent need to replace aging elements of the UK generation fleet while following a pathway to achieving 2050 emission targets implies the need to sustain elevated levels of new plant investment. The UK Government signaled its intention to scale up nuclear generation by publishing Policy EN-6 in 2011. This policy spelt out the need for including nuclear in the energy mix. The World Energy Association reported in 2022 that the Government has plans to develop 24GW of nuclear generation by 2050 to provide approximately 25% of capacity. However, the UK has privatized generation and liberalized its energy markets which together make major capital investments problematic (World Energy Association 2022). The problem of raising sufficient capital for nuclear and other renewable generation would seem to point to the need for a new and innovative reform model. Politically this could be problematic, but the UK government appears to have few alternatives beyond resurrecting the state ownership of energy assets, a concept to which successive UK governments over the last 30 years have constantly opposed (Li et al 2017).

3.3.1.5 Norway and the Nordic Market

The case of the liberalization of the market in Norway is significant as it has been largely successful in the longer term without substantial privatization (Amundsen et al 2006, Bye and Hope 2006, Newbery 2006, Joskow 2008, Pollitt 2012). Today, Norway is part of the Nordic Power Pool (Nordpool) and has competitive and transparent wholesale and retail markets for electricity. The six years after deregulation also witnessed production capacity in Norwegian hydro plants exceeding demand. The incentive regulation of the network companies had led to efficient outcomes (Askim and Claes 2011).

This market is viewed as one of the most successful competitive markets in the world. During the severe hydro shortage of 2002/3, the market held together, without mandatory rationing, blackouts, price manipulation, or major financial ruin of any of the players. This is significant considering the effect of severe hydro shortages on electricity markets in other countries (Amundsen et al 2006). Several reasons have been posited for the success of the Nordic market; (i) fuel sources in the countries are complimentary; Norway is predominantly hydro based, Sweden is fossil fuel based and the other two countries have a mix of the two; (ii) all the countries had mature networks not requiring substantial investment; (iii) public ownership dominates in the Norwegian market shielding from excessive profiteering, (iv) demand growth was low until 2004 although excess capacity was being gradually eroded, (v) the market design is simple in part made possible by the pre-dominance of hydro power, (vi) dilution of market power, (vii) significant transmission capacity, (viii) standby thermal available, (ix) excess capacity built up before the reform, (vi) strong political support by the governments concerned and, (ix) a strong voluntary commitment to public service in all the countries (Thomas 2004, Hope 2005, Amundsen and Bergman 2005, Amundsen et al 2006).

3.3.1.6 USA

During the mid 1990's it was widely expected that market-led transformation would eventually result in a lightly regulated and more market-based structure for the entire industry. There was however a severe backlash in the years following the electricity crisis in California's restructured market and while there was discussion on rolling back de-regulation, a more accurate description of public policy was a "cessation of any further restructuring" (Borenstein and Bushnell 2015). Significantly, California abandoned the market model and returned to central planning after the crisis had subsided (Littlechild 2013). As an indication of the current level of implementation of market-based reform, it was recently reported that about 40 percent of electricity in the United States continues to be generated by plants in areas where dispatch is based on the decision-making of a local balancing authority (Circala 2022).

Despite good progress being made in many states in removing costly price and entry regulation over a period of almost 4 decades, reforms have not performed well (Nepal and Jamasb 2013). In the opinion of Blumsack et al (2005), some non-reformed utilities have in fact performed better as they are highly regulated and carefully managed. They conclude that the concept of a power market for electricity is a myth and that two thirds of the states did not in fact restructure. In the case of those who did reform, the process has been messy with little understanding of the realities.

A set of 12 studies assessing the outcomes of the market liberalization were reviewed by Kwoka (2008). The various studies offered widely differing outcome assessments and the author states that the methodologies employed fell short of standards for sound economic research and that this calls into question the validity of the assessments. He concludes that:

"despite much advocacy there is *no reliable and convincing evidence that consumers are better off as a result of restructuring the ESI in the USA*" (Kwoka 2008 page 165).

This view is contradicted in a recent paper by Circala (2022) who conducted a study on market-based dispatch areas in the US and finding that these areas had benefitted from a 16 percent reduction in out of merit costs, while increasing gains from trade by 55 percent resulting in a reduction in production costs of between $3 and $5 billion per year. These savings are worth roughly 5 percent of the total variable cost of generating electricity in market areas. Circala concludes that these findings suggest the benefits realized by more efficient allocation of output through market-based dispatch have far outweighed losses in areas that have adopted wholesale markets to determine production.

The greatest change occurring in electricity markets recently is the increasing recognition of environmental costs of electricity generation. These concerns together with the continuing evolution of technology are likely to disrupt the industry for many years in the future (Borenstein and Bushnell 2015).

3.2.1.8 Sub-Saharan Africa

In much of SSA liberalization policies were buoyed by the fact that most African state-owned companies had largely failed to provide affordable access to citizens. By 1990 only 23% of Sub-Saharan Africans had access to electricity with 28 countries having an access rate lower than 25% (IEA 2011). Despite the implementation of reforms over almost three decades, utilities are still not able to provide firms with a reliable power supply and people with affordable access to power (Haffner et al 2018).

Reform in SSA was largely based on the standard model of reform as implemented in Chile, the UK and Argentina. While the standard model was broadly endorsed across

the region, the timing, pace and extent of reform adoption and implementation varied significantly (Gore et al 2018). Eberhard and Godhino (2017) have concluded that the 'standard model' has been particularly inefficacious in the case of Sub-Saharan Africa. Few countries have unbundled their power utilities, and wholesale and retail competition are entirely absent. In cases where countries have unbundled their utilities such as Nigeria, Uganda and Ghana with an intention to develop a wholesale market, the markets have not yet been established.

The patchwork of reforms has seemingly been driven by the unique circumstances of each country combined with national priorities. The most common reform steps followed were the corporatization and commercialization of state-owned utilities combined with establishment of regulatory bodies (Kapika and Eberhard 2013). This partial implementation of the standard model has resulted in hybrid markets in most countries with the state-owned utility in the dominant role serving as the single buyer from IPP's and maintaining its own generation plants (Gratwick and Eberhard 2008, Eberhard and Gratwick 2011, Eberhard et al 2016, Eberhard and Godhino 2017). Hybrid public private power markets have faced new challenges such as being able to attract sufficient investment and ensuring security of supply (Malgas and Eberhard 2011). In additional inexperienced and nominally independent regulators have been left attempting to regulate power sectors which were not structured in the way envisaged by the standard model (Kapika and Eberhard 2013).

The paucity of good data on African private sector participation has resulted in less robust studies, using less sophisticated analysis methodologies (Nellis 2005). Two examples of such studies are provided.

Gboney et al (2008) conducted an empirical study of 29 African countries over the period 1988 to 2005 regarding the effect the establishment of a regulatory body has on operations in generation, transmission and distribution. In the case of generation, it would appear that it takes many years before there is any meaningful impact on output. In the case of transmission, regulation appears to reduce losses by 5 to 9% after 3 years. In the case of distribution, the presence of a regulator did not incentivize loss reduction. Private Sector Participation (PSP) in distribution appeared to be the main driver in reducing losses between 6 and 9%. The main conclusion is that the results are not definitive in any way and that competition in generation and PSP in the other sub sectors is required to achieve any significant result.

Estache et al (2008) documented efficiency levels in Africa's electricity firms based on a sample of 12 operators providing services in the 12 country members of the Southern Africa Power Pool (SAPP). The results showed comparable levels of efficiency and performance levels in the region while finding no clear correlation of efficiency improvements with the adoption of reforms. The authors concluded that due to lack

of quality data in the countries, there was little opportunity for incentive based regulation and that cost plus regulatory regimes were likely to continue for some time although the potential for performance improvement remains high.

The most common reform in the region was in the form of (PSP) in IPP's with 34 in 11 countries by 2006 (Besant Jones 2006). Due to the shortage of generation, the situation would have been far worse without these reforms. Unfortunately, low transparency in transactions has translated to high costs. Reasons for this include hasty conclusion of deals in times of crisis, non-competitive procurement, and corruption (Vagliasindi and Nellis 2010).

Management contracts (MC's) were the second most popular form of PSP applied in the region with 17 in operation in 15 countries as of 2010. In general MC's achieved significant labor productivity gains and improved financial performance but this was insufficient to overcome broader institutional and broader policy deficiencies in the sector. Technicians and donors have often recommended contract renewals, but African governments have chosen to re-establish public management for socio-political reasons (Vagliasindi and Nellis 2010). The eventual disengagement of management contractors from most SSA countries means that state-owned utilities managed by government appointees are once again becoming the most dominant players in the sector (Imam and Jamasb 2018).

In looking to the future, Shirley and Attia (2020) point to new opportunities for SSA to leverage decentralized renewable technology to ramp up access in rural areas and reduce costs. They identified three new distributed models: utility concessions, distribution franchising, and rural electric cooperatives. By leveraging modern, creative, customer-centric solutions, the authors are of the opinion that SSA's chronically undercapitalized state utilities can immediately grow their rate base and provide electricity to millions of off-the-grid customers. Despite the challenges, they expect that the advent of distributed renewable energy resources provides a new opportunity to improve the situation of SSA utilities.

Three examples of reforms in the regions are briefly discussed below.

Failed Power Sector Reform: the case of SENELEC

The case of the failed reforms in Senegal is one of the few well documented case studies on reform outcomes in SSA and offers insight on factors impacting reform in this region. This write-up is based on a paper compiled by Gökgür and James (2006). In an attempt to transform its ailing electricity utility SENELEC, the Government of Senegal embarked on a privatization based electricity sector reform process in 1996. The Government sold 34% of SENELEC shares to a joint consortium of Hydro-Quebec International (HQI) and Elyo. HQI and Elyo had a 50/50 relationship. Investment and

electrification goals were absent from the contract. As a result, considerable conflict ensued between the Government and the consortium, especially over required investment levels and tariff setting.

SENELEC's partial privatization lasted only eighteen months. In September 2000, the new government announced that it would re-purchase HQI/Elyo's shares, much to the surprise of the consortium and the World Bank. In 2001, the Government made a second attempt to privatize SENELEC, using a new model designed to address flaws that caused the demise of the first initiative. The model was changed from divestiture to a lease while the procurement was more focused on technical and business plans. Investment and electrification goals were clearly defined.

Two consortia ended up bidding but despite active negotiations with both, a deal could not be struck with either and the privatization attempt was abandoned. SENELEC remains fully state-owned, albeit operating in a new regulatory environment and significantly using the same terms of the concession agreement that had been offered to the potential private partners.

The short-lived privatization effort failed in every respect and consumers saw no benefit from increased coverage, lower prices or improvement in customer service. The enterprise itself neither benefited from an increase in technical and commercial efficiency nor from any improvement in financial performance. The private partners and the international community lost both financially and politically. The Government failed to escape from the fiscal burden of subsidizing the utility while the reform design and failed implementation entailed significant expense to the government. The only benefit is that the sector reform attempts may have resulted in making the public service operation more efficient than before. Gökgür and James (2006) hypothesized that reasons for failure were: (i) the reform model was imposed on the Government without being fully embraced by the stakeholders, (ii) the model was based directly on the standard model without taking into account country context and, (iii) key technical preparation work was done in haste over two 4-month periods which may have been insufficient to deal with the complexities.

Tanzania Management Contract: Mixed Outcomes

This section is based on a paper by Ghanadan and Eberhard (2007). An MC was implemented at the state-owned vertically integrated electricity utility Tanesco commencing in 2002 and terminating in December 2006. In 2002, the utility served approximately 400,000 customers with average consumption of around 84kWh/annum. The system was characterized by poor revenue collection, high system losses and high levels of debt.

The MC was conceived as a first step towards privatization but due to changes in the broader agenda in Africa, shifted away from being a route to privatization around the middle of the contract term. The contract had many positive aspects. The contractor managed to gain the support of key stakeholders including the government, donors and the supervising consultant. There was a high level of cooperation between stakeholders which is a rare occurrence in the case of MC's in Africa. Progress was made in improving revenue collection, in particular from public institutions. However various exogenous factors took their toll on the contract. A severe drought resulted in increased generation costs that were beyond what the utility or the customers could absorb, emphasizing the need to conduct thorough long term system planning and to procure IPP's in a transparent manner. The contractor made attempts to improve technical service and expand electrification but was hindered by the failure of Tanesco to invest in infrastructure due to delays in debt restructuring. While MC's may improve conditions for investment, they cannot themselves resolve the question of where finance for new investments will come from.

There is a complex private public interface in the case of MC's and all contingencies cannot be specified in the contract, so success depends on the ability of stakeholders to manage day to day challenges. In the case of Tanzania, in addition to planning and investment issues and exogenous factors, the complicated governance structure and changing reform direction impacted operations and resulted in a less than successful outcome (Ghanadan and Eberhard 2008).

Private Provision of Rural Infrastructure in Northern Namibia: Successful Outcome Gone Wrong

This case study is based on a report by Econ One (2002) and represents a rare example of success in power sector reform in SSA. The success story came to an unfortunate end due to political factors and the absence of a sector framework defining private sector participation in the Namibian power sector. The study provides useful insights into factors impacting reform outcomes.

In November 1994, a request for proposals was issued by the Namibian Government for a private company to provide electricity supply to approximately 200 rural villages and three towns in central northern Namibia, just south of the Angolan border. NamPower, the state-owned national electricity utility, had declined the opportunity to take on the responsibility based on an assessment that it did not present an attractive commercial proposition. The town of Oshakati, which had obtained municipal status, was omitted from the concession. Other towns in the area protested their own inclusion. The only complete response to the Request for Proposals (RFP's) came from a Namibian entrepreneur proposing to take over electricity supply in the region as required. The bidder formed a company called Northern Electricity. The company was granted an electricity distribution trading license to distribute and

supply electricity within the geographically defined area for a period of 5 years and commenced operations in December 1996. Franchise and lease agreements were signed. The allocated area is predominantly rural with small settlements, villages and a few urban centers.

The company was able to completely transform system performance through its skill as an operator and within one year of operation had established effective technical and commercial management and substantially improved customers service levels. This reflected Northern Electricity's customer service focus with a strong drive to understand and accommodate customer needs. Hence the company managed to sustain a high customer approval rating at the same time it was implementing a very strict disconnection policy. Under the auspices of Northern Electricity, the broader rural electrification program continued with funding provided by donors and the national government. A serious funding gap existed however, as the funding enabled increased access in rural areas only and not within urban boundaries. Local authorities were required to provide this funding without any hopes of return on investment as per the contract with Northern Electricity. The focus of this contract had been squarely on improving the very poor level of commercial and technical performance of the system and not on ensuring any return on new infrastructure investment.

In the interim the management at the Ministry of Local Government and Housing had changed and the focus shifted from improving fiscal discipline in the towns to the cause of local empowerment. This combination of factors led to a difficult political environment and one which the managers of Northern Electricity, being resolutely non-political, were not equipped to deal with. In an attempt to ease the tensions, they contributed beyond their contractual obligations to infrastructure expansions and community development, but to no avail. The state-owned national utility (NamPower) had also aligned itself against Northern Electricity, feeling threatened by its success and having recently developed aspirations of its own to distribute electricity in the northern part of the country. These political forces were set to determine the company's fate although they were still supported by the Ministry of Energy and Mines (MEM) whose primary interest was to assure industry performance as well as the newly established Electricity Control Board (ECB). However there was no policy or sector framework in place to provide a firm basis for the role of the private sector in the industry, leaving Northern Electricity highly exposed to political interests.

On 13 February 2002 the Electricity Control Board (ECB) issued a decision not to renew Northern Electricity's license. Instead, a license was awarded to NORED a new firm to operate in Northern Electricity's service area. NORED is a joint venture company with ownership shared between NamPower and several local and regional governments. This change has not resulted in a positive outcome. It was reported in 2021 that the company is currently incurring huge losses caused by illegal connections and

customers not honoring their bills on time. NORED at that stage owed NamPower an accumulated debt of N$200 million (All Africa Stories 21 September 2021).

Importance of Planning and Procurement – the cases of Ghana and Cote d'Ivoire

When the sector in Ghana was unbundled the Government allocated the function of "indicative" planning to the newly established Energy Commission. The scope of planning responsibility was not clearly defined and the Commission did not have the necessary expertise to execute the function. As a result the planning timelines were unrealistic and there was no indication about how the projects were to be financed. This led to chaos in the sector including project delays and a series of unsolicited bids. Cote d'Ivoire on the other hand, on restructuring the sector, allocated planning to a state-owned company Societe de Gestion du Patrimone du Secteur de l'Electricite (SOGEPE) to manage the state's assets in electricity, to oversee and manage sector finances and to raise capital for investments. The planning and procurement roles were clearly defined while the company staff was knowledgeable and competent. Consequently, IPP's were commissioned on time and in line with the projected demand (Malgas and Eberhard 2011). This case study identifies the ill effects of poor planning and generation capacity procurement practices.

3.4 Some Lessons Learned

England and Wales – The reform was stated to be the gold standard in electricity sector reform and was perceived as successful initially with significant increases in productivity but after some time issues began to arise as the pool mechanism was replaced by NETA in 2001 giving OFGEM more influence over trading. Prices rose considerably over the period 2000 to 2016 giving rise to customer dissatisfaction. OFGEM's role has diminished over time as the Government has exerted more influence on planning and financing infrastructure.

Lessons learnt – The market-based model that was used as the basis for the standard prescription and reform around the world proved to have significant flaws. Even in the context of a highly developed country, the market-based model needed significant modification to overcome challenges. Increasing government involvement in the sector has proven necessary to ensure long term sustainability.

Nordic Market – Initially Norway commenced market-based reforms independently of other countries in the region. Significantly this was done without privatizing utilities in the sector. The reform was highly successful and improved efficiencies in the sector. Likewise, when Nordpool was later formed, the outcome was regarded as successful. The market even proved resilient in the face of adverse weather conditions resulting in significant hydro shortages. Key factors contributing to success included fuel

diversity, cheap hydro resources and a strong public service ethic across all the member countries of the pool.

Lessons learnt – Country context is a key factor that determines whether a particular model will work. In Norway reform success was achieved without privatization and the Nordic market proved resilient despite serious weather challenges. All the member countries are endowed with strong institutional capacity and macro-economic stability as well as access to diverse fuel sources. Equally importantly the public service ethic ensures that customer interests are adequately addressed.

In **Latin America** – Argentina was hailed as a significant success and was the only developing country where the standard prescription was fully implemented. Initial gains were impressive – investment increased, the network expanded and access improved while prices fell. This was used to justify the effectiveness of the standard prescription. The success ended with the collapse of the peso and the government intervened to stabilize the situation. This was viewed by some as threatening to obscure the gains of the reform while providing lessons in how not to manage energy policy. However, at the end of the day the government interventions assured the continued participation of the private sector in the industry.

Lessons learnt – While initial gains were impressive the standard model was not sustainable in the face of an adverse weather event and severe currency depreciation and needed significant adjustment. This illustrates the strong potential impact of macro-economic and extreme weather events on reform outcomes.

Reform failures – Reform failures are numerous, as illustrated by the following few examples. Reforms failed in Bolivia, Dominican Republic and Venezuela where the ESI's were re-nationalized**.** The California debacle of 1999/2000 shook worldwide political confidence in liberalization of the electricity sector. In Germany a large proportion of distribution companies have returned to municipal/state ownership. In Senegal a new government terminated a concession agreement which failed to reduce the frequency and duration of black outs, and a second reform attempt using divestiture failed from the onset.

Lessons learnt – Public resistance to reform was a significant factor in many reform failures particularly in cases which saw a return to nationalization. In the case of Senegal, lack of government support for the reforms was a clearly a significant contributing factor. These cases highlight two key areas needing to be addressed in the design and implementation of reforms: (i) need for broad consultation and, (ii) need for strong government support.

3.6 Onword

The literature review has provided insight into reform outcomes in both developed and developing countries over an extended time period. The standard prescription formed the basis for reform taking a market-based approach in the sector but implementation has been uneven and non-uniform throughout. Reforms have essentially run out of steam during the past 10 years. Further reform is clearly needed but the process has been at the crossroads for some time. This review has opened the door for the identification of a set of themes related to reform outcomes in Chapter 4. These themes will subsequently be used as the basis for identifying a set of key elements impacting reform outcomes.

Chapter 4

Identification of Key Themes in the Literature

4.1 Introduction

The literature review in chapters 2 and 3 examined reform theory and outcomes in developed and developing countries since the first market-based reform commenced in Chile in 1982. Four sections of literature were identified as being relevant to examination of the stated (or working) hypothesis. These related to regulation, resources, executive management and political economy. The review in Chapter 3 focused on reform outcomes based on the standard model including the impacts of private sector participation. The latter review identified additional factors which were not included in the working hypothesis and established that conclusions on reform outcomes in the empirical literature are often ambiguous and contradictory. The limited number of studies pertaining to SSA reflects the paucity of data available from the region. Despite these challenges, several key themes related to reform outcomes have emerged from the management and reform theories and the empirical reviews of reform implementation. This chapter seeks to further explore these themes to better identify and bring together information that will later form the basis of the definition of critical elements impacting reform outcomes. Some additional literature sources provide further insight.

4.2 The Role of Government in Reform Outcomes

In line with the Washington Consensus, the move to worldwide liberalization of electricity sectors was anchored in a strong belief in the ability of markets to efficiently regulate the electricity sector and to provide the correct signals regarding infrastructure investments and tariffs. One of the main goals of this philosophy was to remove as far as possible Government influence in the sector (Williamson 2000, Zelner et al 2009).

Experience has shown that the goal of removing government influence in the sector has proved illusory. Even in developed countries where the sector has been privatized and competitive markets are in place, such as the UK, the government has needed to pay an increasing role in the unfolding reform process, particularly in respect of ensuring sustainability and meeting environmental and capacity objectives.

Strong and consistent government support would therefore seem to be an important factor in ensuring reform initiation and progress. The United States Agency for International Development (USAID) Handbook on improving performance of distribution utilities by PA consulting (2005) page 7 provides the following guideline:

"*The Government and the Utility must generate impetus for reform. Both must believe in the process of change, own it and internalize it to make reform successful.*"

The literature review provided several examples of the role of government in supporting the sustainability of reforms. The first example of such intervention in the England and Wales case was when the Government intervened in 2001 to replace the failed pool mechanism with the New Trading Arrangements (Green 2002, Newbery 2006). More recently in 2022, the World Nuclear Association reported on the Government's plans and intervention to ramp up nuclear generation to 24GW of capacity by 2050 (World Nuclear Organization 2022).

In Argentina the fall of the Peso in 2002 forced the Government to intervene to maintain stability and sustainability of the sector, renegotiating private supplier contracts and defining price formation according to a new set of parameters (Dagdeviren 2011. In Germany, public opposition to privatization on the grounds of excessively high pricing and environmental concerns promoted a strong move towards remunicipalization of electricity utilities (Hall et al 2013).

Considering how reforms have unfolded in many developing countries, particularly in SSA, it is apparent from outcomes that the governments have not always lent full support to the programs. The examples of Senegal and Namibia referred to in Chapter 3, bear testimony to this observation. Further references to the importance of government support include Nepal and Jamasb (2013) who stated that the lack of government commitment can easily negate expected reform benefits and Wamukonya (2003) who emphasized the importance of governments needing to meet their financial obligations towards reformed utilities.

More recent literature on electricity sector policy focuses on the regulatory and sector structure challenges associated with ramping up of renewable power sources into the energy mix. The 2015 Paris Agreement on Climate Change commits signatories from 175 states to limiting global warming below $2^{o}C$ above pre-industrial levels. This will require individual countries to undertake actions to de-carbonize the global energy system, emphasizing the need for strong government intervention in the energy sector in the future as renewable technologies take a prominent role in the energy mix (Li et al 2017).

In spite of the original objective to reduce government influence in the sector, the literature review clearly indicates that governments still play a vital and multi-faceted role in affecting outcomes in the power sector regardless of the ownership. Strong consistent political will and ongoing policy guidance is clearly crucial to maintaining stability and sustainability in reform.

Bacon and Bessant-Jones (2001) refer to the carrot and stick approach that was applied by the DFI's to market-based reforms: refusal to adopt market-based reforms based on the standard prescription would result in disbursements being halted and approval of future loans blocked. Significantly, many countries simply accepted the World Bank conditionality simply to have access to funding (Thomas 2006). This coercive approach has mitigated against building the required support required from governments to actively support reforms to ensure successful outcomes – as evidenced by the outcome in Senegal. Chapter 3 also notes that as time progressed and more countries liberalized their sectors, it appears governments began to view such reform as being inevitable and the debate centered around when and under what terms they should liberalize rather than whether they should liberalize (Wamukonya 2003). A more consultative approach by DFI's opening the doors to various policy options would clearly have gone a long way to fostering the government support needed for positive outcomes.

The motivation for reducing Government's responsibilities in the electricity sector in favor of the private sector assumed that public funds could be used for more important social needs. This strategy has not worked however and expected savings have hardly made a dent in most developing countries' foreign debt. In reality, the private sector still depends on government support for operations (Wamukonya 2003).

To enable success, governments need to sustain their support of reforms on an ongoing basis even in the face of considerable political risk. Maintaining the momentum for reform involves political costs and thus requires political commitment over more than one electoral cycle. One of the most critical aspects of effective electricity reform is the political will to support price increases on the path towards achieving full cost recovery. Lack of commitment in this area will significantly handicap reform progress. Design of reforms in the past has simply taken for granted the existence of the necessary political support to convince customers to accept higher prices and to curtail inconsistent or corrupt behavior by customers or employees (Rosenzweig et al 2004, Besant-Jones 2006).

The literature often mentions institutional weakness when assessing the outcomes of electricity sector reforms. The institutional environment of a country has been defined as comprising five elements: (i) legislative and executive system, (ii) judicial system, (iii) administrative system, (iv) informal rules, and (v) ideological character of the nation (Levy and Spiller 1994). The institutional environment is concerned with macro-economic rules which can be formal or informal while the institutional arrangements focus on micro-level governance mechanisms (Jamasb and Nepal 2013). Desirable institutions provide security of property rights, enforce contracts, stimulate entrepreneurship, foster integration in the world economy, maintain macro-economic

stability, enable risk management by investors and enhance accountability (Rodrik 2008).

It is worth noting that reform in OECD countries was founded on robust legal and institutional frameworks of highly functional political systems paving the way for reasonably successful outcomes in most cases (Williams and Ghanadan 2006). It has also been posited that the path followed by the reform process as well as the outcome is strongly dependent on the starting point of the reform with respect to institutional and infrastructure endowment, especially adequate transmission networks (Jamasb 2008). This perspective is particularly pertinent in the context of assessing reform outcomes in developing countries which have diverse starting points from the viewpoint of institutional strength and existing infrastructure.

Adding a further dimension, authors have pointed out that in all societies the formal rules enacted by the state are filtered through layers of formal and informal institutions, social institutions, patterns, and practices and hence only indirectly influence behavior of stakeholders (Piciotto 1999, Parker and Kirkpatrick 2005). This dimension partly explains the significant gaps in developing countries between decisions and the requirements of the law in some instances. Limiting attention to developing the purely formal aspects of institutional strength, important as they may be, may therefore not be the new silver bullet that will set reforms on the right path (Kenny 2007). Due attention needs to be paid to the informal institutions, social institutions and patterns of behavior influencing government actions described by Piciota.

4.3 Development of Fit for Purpose Reform Policies

As discussed in chapter 3, failure to develop and implement consistent reform policy tailored to the specific country needs has been often quoted as one of the main reasons for suboptimal reform outcomes in developing countries (Nepal and Jamasb 2013). The standard prescription formed and to a certain extent still does form the basis for reform in developing countries. As an example, Kessides (2020) largely bases analysis on the standard model when considering reform approaches for Eskom, the government utility in South Africa. While the approach to applying the model became more flexible after some years (World Bank 2004), the standard prescription in one form or another remained at the heart of policy advice metered out to client countries by DFI's and advisors. The poor outcomes observed in the SSA region are testament to the fact that the standard prescription was a particularly poor fit for this region as per Eberhard and Gratwick (2008).

Only in some recent literature has it been suggested that further research is required into policies centered around reform of state-owned utilities and other possible solutions not based on neo-liberal theories (Bacon 2018, Foster and Rana 2019).

The rapid advent of a set of so called disruptive renewable energy technologies has sparked a new wave of debate over the structure of the electricity sector, with a focus this time being on the role of distribution network owners and operators as well as end consumers, retailers, aggregators, and other new business models (Perez Ariaga et al 2017). This change of emphasis is expressed also by Schaube et al (2018), Simsek et al (2019), and Martelli et al (2020). The new emphasis on renewable energy policies seems to have resulted in dwindling debate on overall reform of the electricity sector, leaving many unanswered questions.

In view of the need to explore flexible policy options, two key pillars of the standard prescription, unbundling and privatization, are re-visited with a view to their relevance in developing countries specifically, with a note on the effect of disruptive technologies on the reform debate.

4.3.1 Unbundling

Originally economists understood that vertical integration had desirable effects on economic efficiency because it reduced the costs of technical and commercial coordination. In the 80's and 90's the case was made for vertical unbundling of utilities by assuming that vertical integration served no useful purpose. If this were true, the unbundling process would then bring the benefits of competition at no cost in efficiency.

Unbundling of sector segments became one of the de facto steps in the path to reform as per the standard prescription. Bessant Jones (2006) provides arguments for and against unbundling as follows: Traditional arguments in favor of unbundling include: (i) increases transparency in costs and transfer prices, (ii) helps protect public interest, (iii) controls different elements of the value chain via regulatory benchmarking, (iv) relieves need for an overall business plan, (v) introduces competitive pressures in the supply chain and (vi) provides easier access for non-traditional service providers to enter the market. However, the advantages of retaining vertical integration are: (i) benefit of service reliability and uniform standards and procedures among interconnecting segments of the grid, (ii) avoids duplication of R&D activities, (iii) tight coordination of investment and operation, (iv) economy of metering, billing, and transaction costs and, (v) better financial risk management.

Various authors have cautioned against unbundling small-scale systems, especially those in difficult political and weak institutional contexts (Bacon 1995c) because of loss of economies of scale and high integration costs. Unfortunately, little heed was taken and consultants continued to advocate unbundling (Bacon 1994, Kessides 2004, Nepal and Jamasb 2012). In Sierra Leone distribution was separated from transmission and generation. In Kenya the system was unbundled before the system capacity

reached even 1000MW, and the transmission company, KETRACO, remains to this day simply a project office for transmission extensions while the distribution utility retains the responsibility of operations and maintenance of all transmission infrastructure (own experience). In Malawi the 520 MW system was unbundled as recently as 2018 with the support of the Millennium Challenge Corporation (MCC 2017), based on MCC's claim that the reform would promote efficiency in the sector and attract private sector investment (MCC 2017), but the outcome has been the contrary. It would seem that decades of scholarship on reform have largely been ignored in ongoing sector restructuring and market design (Michaels 2006).

4.3.2 Private Sector Participation – One of the Mainstays of the Standard Prescription

Privatization has been viewed as a critical element of reform, especially for solving the problem of shortage of capital for electricity infrastructure without burdening the government. The policy did result in capital injection in many countries and the initial fiscal payoffs and efficiency gains were positive. By the late 2000's however, the evidence showed that neither the fiscal nor the efficiency gains could always be sustained (Andres et al 2008, Gassner et al 2009, Estache 2020). As time progressed even senior officials of the World Bank began to admit that there was some irrational exuberance in recent years on the potential benefits of privatization in the power sector (Hall 2005).

The results from empirical studies are contradictory. A study covering 160 electricity distribution companies under private management and 90 SOE counterparts over more than a decade of operation showed that the private companies outperformed state-owned companies by a large margin (Gassner et al 2009). In other studies, even in the best cases, privatization has not had a sustainable positive impact on utility performance (Mota 2004, Jamasb et al 2005).

It is notable that in some cases successful reforms have been achieved without privatization. The case of the Norwegian reform in the 1990's is a case in point. Florio (2014) notes the European Union (EU)has never endorsed privatization as a necessary ingredient of reform and that there are still numerous government-owned entities. The paper concludes that this neutrality about the ownership issue is wise and that in the case of the EU there is no correlation between government ownership and liberalization.

The LAC region also provides contradictory examples of successful reform. Antman (2013) compares two reform initiatives in Brazil – the successful the successful reform of CEMIG the state-owned electricity utility in the state of Minas Gerais, and the unsuccessful reform of LIGHT, the private utility serving Rio de Janeiro.

Growing global dissatisfaction with privatization of network industries is an important factor to consider as discussed in chapter 3. This dissatisfaction relates mainly to distributional factors around the perceived benefit of privatization of network industries to the public along with the expectation that the transactions are handled in a corrupt manner with the proceeds lost or stolen. This public dissatisfaction reflects the overselling of privatization as a panacea for all economic problems (Kikeri and Nellis 2004).

4.4 Regulation

Regulation is a key element of the standard model. Principal agency theory and the related concepts of moral hazard and information asymmetry from the basis for the necessity of effective regulation of the sector. As discussed in chapter 2 the original reform concept as applied in the UK was crafted around de-regulation of competitive subsectors such as generation and retail and incentive based regulation of monopoly elements of distribution and transmission. This model of regulation spread rapidly and "seemed" right for application in developing countries (Littlechild 2000). In 2014 Gassner and Pushak reported that over 200 regulatory agencies had been established across the world using the UK model as a basis but that the model had only proved partially successful.

In my review of 40 papers on reform it was found that 27 authors emphasized the importance of regulation in ensuring successful reform outcomes. Kessides (2004) stated that effective regulation is the most critical enabling condition for infrastructure reform and that crafting proper regulation is the greatest challenge facing policy makers in developing and transitional economies. Estache (2020) posited that regulatory and institutional quality had a greater influence on reform than ownership. The failure of reforms has often been attributed to regulatory failure, including in California, Brazil, Nepal and Namibia. The main reasons given for regulatory failure are: low levels of institutional environment including limited accountability, limited commitment and limited fiscal capacity Laffont (2005) through Jamasb and Nepal (2013).

Lack of skilled human resources have been highlighted as the greatest obstacle to effective regulation in developing countries in a study by Tremolet and Shah (2005). Many agencies are not able to pay market driven competitive salaries and hence lose staff to the private sector. Insufficient training has also been cited as a significant constraint. The study also points to financial constraints as an obstacle but note that they are less of an issue than skills constraints. The authors suggest lack of financial independence from government has compromised the overall independence of regulatory agencies. The concept of independence in regulation has also been shown to be largely illusory (Stern 2007, Eberhard 2007, Foster and Rana 2019).

In 2004 the World Bank slightly modified its recommended policy approach to regulation, based on poor outcomes observed in developing countries. The concession made is that client countries may consider transitional arrangements limiting the discretion that regulatory bodies have in setting prices and key parameters, en route to reaching the goal of effective independent regulation. The menu of alternative regulatory options on offer includes: (i) regulation by contract, (ii) contracting out of regulatory functions and, (iii) appointing advisory regulators – this may be in the form of an expert advisory panel (World Bank 2004). In practice however, the establishment of separate regulators has continued even in fragile environments such as Liberia and Sierra Leone (own experience). The literature search revealed that the extent of regulatory discretion delegated to regulators can result in arbitrary behavior negatively impacting the sector unless the agency in question has sufficient capacity to enable useful regulatory discretion and this can negatively impact outcomes from private sector participation. Agency theory and the associated concepts of Moral Hazard and Information Asymmetry are useful tools to better understand this behavior. The possibility of using a hybrid regulatory arrangement with hardwired arrangements and supported by either consultants or an expert panel would seem to be an attractive option to consider in this context. This would also be a way of avoiding the high cost associated with establishing and maintaining an agency in a developing country context.

The political economy approach discussed in chapters 2 and 3 provides a further lens to better understand this problem and to facilitate development of effective solutions. The approach involves examination of the power bases within the government and identifying who wields the power and in which way. While this may seem obvious to political science specialists, donors have in the past made significant effort to shield themselves from political realities in designing regulatory frameworks and this has not served the cause well (Thompson and Bazilian 2014).

There is a growing consensus of the need for a regulatory model to be designed with a deep understanding of the institutional context of the country taking into account deficiencies such as shortage of skills and resources, limited commitment to enforce contracts, problems of collusion and regulatory capture (Estache and Wren-Lewis 2008). It has become clear that the so called “best practice” approach to regulation has not worked and that there is rather a need for a tailor made solution for each context. Best practice institutions are by definition non contextual and narrow the menu of institutional choices available to reformers (Rodrik 2008).

4.5 Ensuring Adequate Supply and Transmission Capacity

The concept of the standard market-based model placed emphasis on the ability of the competitive market to provide signals to sector stakeholders as to when investment was required in generation capacity or network expansion. It was

expected to replace the central system planning previously undertaken by the vertically integrated state-owned utility from where there was a bird's eye view of the entire operation. With the trend to liberalization the emphasis was on the unbundling of state-owned utilities and the devolution of functions to privately owned sub sectors. The expectation was that either market forces or the regulator would identify the need for investment, but no single component had responsibility for system wide planning.

The case study on Ghana and Cote d'ivoire in chapter 3 well illustrates the need for effective generation capacity and system planning, and how inadequate practices in these areas lead to sub optimal outcomes even where hybrid markets have been established. Indicative planning by an energy commission in Ghana was ineffectual, but clear definition and allocation to state agencies of responsibility for planning and capacity procurement, as in Cote d'Ivoire, resulted in positive outcomes (Malgas and Eberhard 2011).

The issues of inadequate planning procurement and contracting with respect to IPP's appear to have a strong link to the risk of higher levels of corruption and collusion. The absence of coherent system planning in conjunction with non-competitive bidding clearly open the doors for rent seeking activities and other corrupt practices. There are multiple references to projects that have been tainted by accusations of corruption. Inadequate contracting can also result in higher tariffs which can constitute long term risks for both the sector as well as the investors as the latter may be called to re-negotiate tariffs during the Power Purchase Agreement (PPA) term. Given the recent challenges related to management of climate change some are of the view that all developing countries should revert to government based planning and procurement since the market model does not address the issue of climate change or attract sufficient investment to implement green generation (Sen 2014). Even in countries where competitive markets are in operation, effective planning remains a challenge. Joskow (2008) emphasizes the importance of system reliability and supply security which are both dependent on effective planning and procurement.

4.6 Finance – the Lifeblood of the Industry

Huenteler et al (2020) page 2 highlight the crucial importance of financial sustainability in the sector:

"*The financial viability of the power sector has long been considered a prerequisite for ensuring universal access to affordable, reliable and sustainable electricity and to enable the transition to clean energy.*"

Even after reforms financial viability has remained elusive in developing countries where underpricing, excessive losses, and revenue collection failure are pervasive.

This has in turn impacted investment resulting in under-maintenance of infrastructure, power shortages and poor quality of supply. Low income countries face ongoing challenges in achieving cost recovery, even for operating costs.

The situation in SSA is particularly dire. In 2016 it was reported that only two utilities in SSA, Seychelles and Uganda, came closest to achieving full cost recovery in terms of both operational and capital expenditure. All other utilities run in quasi-deficit and are thus in need of state subsidies despite Africa's power tariffs being amongst the highest in the world. Hence it is clear that the drive should be towards lowering the cost of power rather than increasing tariffs (Trimble et al 2016).

Recently consideration has been given to what extent prevalent electricity pricing structures are compatible with the adoption of new technologies such as roof top solar. The current wave of new disruptive technologies makes it even more critical that countries adopt tariff structures that truly reflect the cost of providing grid electricity and also communicate clear economic price signals to consumers concerning decisions to install roof top solar or battery storage or to take part in demand response schemes. The Region needs to overcome significant investment hurdles. A recent IEA Special Report on energy in Africa states that to achieve the continent's energy and climate goals means that energy investment will need to be doubled over the period 2026 to 2030. This would take the required investment to over 190 billion USD each year over this period. The share of energy in Africa's GDP then rises to 6.1%, slightly above the average for developing and transition economies (IEA 2022).

To counter the perception of country risk by would be investors, the DFI's have introduced instruments such as partial risk guarantees (PRG's) to safeguard investments in risky environments. Although promoting private sector involvement is still touted as a solution for debt burdened countries in some quarters, the provision of these instruments has in fact resulted in additional foreign debt assumed by governments. Furthermore, macro-economic instability and devaluation of currencies can reduce the earnings of foreign investors as well as the value of the potential proceeds from asset divestiture.

Given the shortage of infrastructure funding in liberalized sectors in developed countries, it has become clear that liberalized developing country sectors have even less chance of attracting sufficient funding. Moving away from the concept of private sector funding it should be noted that there has been a significant increase in donor funding for electrification in SSA. In 2018 it was reported that there are at least 60 international financing initiatives targeting this area (Quitzow et al 2016, Tagliapietra and Bazilian 2017, Trotter and Abdullah 2018). Foreign capital investments in the sector appear to have risen significantly during the past decade and the most recent data from the Infrastructure Consortium for Africa suggest that capital commitments

have come largely from outside Africa (Trotter and Abdullah 2018). Launched in 2019 by the African Development Bank (AfDB) and its partners, the Desert to Power initiative aims to increase solar generation capacity to provide 250 million people with electricity access across Africa's Sahel region for socio-economic development and continues to attract financial support from around the world (North Africa Post 2022).

4.7 Factors Enabling Utility Performance Improvement

There is a very limited focus in the reform literature on the topic of what drives efficiency at the utility level. The overall impression is that sector reforms would automatically solve utility operation and management issues.

The effectiveness of the utility executive team has largely been ignored in the literature covering reform theory and outcomes. In the complex environment of an electricity utility, competence of the CEO and the executive team is of prime importance. This is supported by the results of studies presented in Chapter 2 on upper echelon management theory (Finkelstein and Hambrick 1990, Carmeli et al 2011).

One of the few papers on this topic refers to the importance of effective functioning of metering, billing and revenue collection activities as these are critical to the financial health of a utility (Antman 2009). The author further states that metering-billing and revenue collection are separate functions which require specific management functions. The paper describes the high level of losses in many developing countries and emphasizes the importance of loss reduction by utilizing appropriate technology such as Automatic Meter Reading (AMR) and Management Information Systems (MIS) coupled with adequate management processes for effective commercial management.

The case of CEMIG in Brazil (Antmann 2013), referred to previously in the context of privatization, provides useful insights on performance improvement. Driven by a goal to improve customer service, this public utility, owned by the state of Mina Gerais, achieved huge gains in commercial and technical efficiency as well as customer service at the distribution level by undertaking complete re-engineering of the distribution and retail functions and incorporation of Information Technology (IT) tools for management. In the case of LIGHT, the private utility serving Rio de Janeiro and owned by EDF from 1996 to 2005, no such efforts were undertaken resulting in a poor outcome with no reduction in the extremely high (30%) losses during 10 years. Antmann (2013) expresses the view that well thought out, dynamic and adaptive strategies and plans are necessary to achieve improved performance, while failure to address this area is certain to result in ongoing poor utility performance.

The literature search revealed two case studies related to the decline of performance of Eskom, the South African electricity utility over dual time periods. The first covered the depletion of technical skills due to the commercialization of Eskom in the 1980's. The South African government was dissatisfied with Eskom's performance and initiated a commercialization process to move the organization away from a strong technical focus to a commercial orientation. The study focuses on assessing evolving capabilities as the reform process related to the commercialization unfolded. Prior research had already indicated that such strategic renewal may potentially have a capability destroying effect (Tushman and Anderson 1986 through Worch et al 2012). The commercialization resulted in the appointment of accountants in managerial positions of power plants and distribution areas, positions formerly occupied by engineers. Despite attempts at broad consultation, Eskom technical staff began to lose their sense of identity and worth to the company. As a mindset shift was required away from technical excellence toward more commercial thinking, many experienced engineers and executive level managers decided to leave the company as they could easily find employment elsewhere. Appointing more accountants and other managerial professionals rather than engineers changed the composition of competences. Insights from interviews indicated that Eskom's loss of engineering capabilities and the long-term implications can hardly be underestimated (Worch et al 2012).

The second case study by the same set of authors analyzed the further decline in Eskom performance resulting in rolling black outs over the period 2006 to 2008. The authors found that changes in the regulatory environment as well as the evolving socio-political environment in the country significantly contributed to the loss of technical and operation related skills in the company. The authors concluded that the reform processes have a fundamental impact on the capability structure of utility firms and therefore influence the level of service delivery. They further recommend that more attention be paid to this aspect when planning reforms to ensure that performance does not decline after implementation (Worch et al 2019). It is noted that since this paper was published, the load shedding in South Africa has become more severe.

In the context of private sector participation in the sector and as part of ensuring successful reform, investors are required to transfer skills and "know how" to local staff who are most often retained in employment from the previous state-owned entity for their technical skills and knowledge of the system. Consultants working on reform initiatives over the years have however noted that this most often does not happen and that expatriates are rarely found focusing on this activity. Behaviors are not automatically changed with reforms. Success requires more than an external environment of a stable regulatory framework, clear rules of the game, and an opportunity to earn an adequate return. Efforts should also focus on the internal environment including the changing the mentality and building capacity of its

personnel. Reform efforts will surely fail if this change in mindset does not materialize (Rosenzweig et al 2004).

Research and Development (R and D) initiatives are another important ingredient in ensuring that utilities maintain adequate long term technical capacity. It has been noted that expenditure in this area by electricity utilities has fallen dramatically since 1990. This has been particularly evident amongst newly privatized companies whereas those under state ownership did not reduce expenditure. Private utilities are thus in a better position to increase short term profits and dividends for shareholders at the expense of building long term technical capacity. This reduction in R and D has been viewed as a significant market failure (Sterlacchini 2010).

4.8 Corruption – Cutting Across the Sector

Corruption remains a pervasive problem in electricity sectors, particularly in developing countries, ranging from grand corruption at the highest levels of government down to petty corruption at junior levels in the utility. Theories on corruption are centered on principal-agency theory and information asymmetry. Regulatory economic theory assumes that corruption will be reduced through reduction in information asymmetry which can be achieved by competition brought about by implementing a market-based reform model (Estache and Wren-Lewis 2010). Despite expectations that reforms would address corruption issues, they have had a rather disappointing effect on levels of corruption. The result has been that if the reforms are not in the interests of the local elites, progress will be limited and frequently circumvented. It remains a challenge for donors to address the patronage and informal dimensions associated with the reform process.

Corruption not only stifles growth but also perpetuates inequality. The energy sector is particularly vulnerable to corruption as a result of its complex structure and large amount of cash generated from the sector (Lovei and McKechnie 2000). Dal Bo and Rossi (2007), using data from 80 electricity distribution firms across 13 Latin American countries, concluded that corruption is strongly correlated with inefficiency at the firm on the sense that in more corrupt countries more labor is used to produce a certain level of output. Another empirical study of utilities across 21 utilities mainly in Eastern Europe indicated that petty corruption levels were lower in countries with greater capacity, where competition had been implemented and where utilities had been privatized (Clarke and Xu 2004). Corruption can cripple the economic performance of a country by inhibiting performance of the electricity sector (Imam and Jamasb 2018).

Rents can be extracted through decisions on investments, employment individual levels, service quality, pricing and avoidance of environmental requirements. It is difficult to assess the full impact of corruption on utilities because of the multiple channels through which it can affect outcomes. Grand corruption in utilities, despite

potentially very severe consequences, is an under-researched phenomenon. Considerable anecdotal evidence links poor governance to higher corruption levels, and poor performance with respect to pricing, quality and access. However, such analysis requires data which agents involved have every incentive to conceal (Kenny and Soreide (2008).

Four main factors underlie corruption: a distorted policy environment that creates opportunities for officials to manipulate the rules for personal gain, a weak judiciary that does not provide a credible threat of punishment when official misconduct is discovered, weak civil service management, and low public sector remuneration. Evidence also shows that a more complex regulatory environment can breed corruption which in part reflects the fact that more complex regulations increase the level of corrupt behavior (World Development Report 1997, World Development Report 2002).

A further significant dimension in that corruption often has its roots in traditional society in some regions and characterized by patron-client relationships reinforced by traditional hierarchy and deference. This does not infer that the traditional cultures are inherently corrupt, but that social organization provides incentives for rent seeking (Lovei and McKechnie 2000). In many countries, for social and cultural reasons, the real business of politics is conducted outside the official political realm. The notion of corruption as defined in Western politics has little relevance in such a political order in which there is little meaningful institutionalization (Chabal et al 1999).

Although not documented in the corruption literature, the associated concept of sabotage, both external and internal to the firm, has become significant in both the Nigerian and South African contexts. In Nigeria ongoing sabotage of gas pipelines has disrupted supplied while in South Africa various media interviews with the outgoing CEO of Eskom in South Africa have testified to the fact that sabotage is closely linked to corruption and that both are key reasons for the current downward spiral of utility performance.

4.10 Macro-economic Shocks, Pandemics and Extreme Weather Events

In countries with a significant proportion of hydro generation, severe droughts have the potential to de-stabilize a reform process. The cases of drought in Tanzania reviewed in Chapter 3, illustrated the need to conduct thorough long term system planning and to procure IPP's in a transparent manner (Ghanadan and Eberhard 2008). The case of Argentina is well documented and discussed in in Chapter 3 and clearly illustrates the effect of a severe drought coupled with a macro-economic collapse on reform outcomes. The reform model proved to be insufficiently robust and required a fast track revamp to stabilize the sector and to enable continued sustainable private sector participation in the sector (Haselip and Potter 2010). The

effects of the Covid pandemic appears not to have been addressed in the literature to date but the impact on utility operations and finances has been clear (personal experience).

4.11 Onword

The analysis in this chapter has identified various themes and factors impacting reform outcomes. In the next chapter, these complex issues are distilled into a set of critical elements and developed into a framework of relationships that assists analysis.

Chapter 5

Towards a Framework of Analysis

5.1 Introduction

This chapter draws from the literature reviews in Chapters 2 and 3 and further distils out the themes identified in Chapter 4 into a set of 9 discrete well defined elements which impact reform success. These elements form the basis for the development of an analytic framework in three tiers. The analysis also identifies 3 cross cutting elements cutting elements which impact all three tiers of the sector. Tying the analysis back to the working hypothesis, it is clear that the picture of reform outcomes is a lot more complex than originally thought.

The literature review has shown that implementation of the standard reform model has been problematic in many developing countries. In the SSA region implementation has been limited, with only Uganda, Cameroon and Nigeria making significant progress. Outcomes in these countries have been less than successful.

Some recent papers have acknowledged that the standard reform model will not meet the needs of the power sector in the 21st century and proposed adopting a more flexible approach where elements of the standard model may or may not be applicable while strongly emphasizing context in reform design. They also point to the necessity of developing a new reform paradigm which will incorporate new "disruptive" technologies in the generation mix as well as address crucial social issues (Foster and Rana 2019, Bacon 2020). This indicates the thinking is moving away from purely market-based reforms to include social and environmental aspects.

Academic views on sector reform aside, it is clear that many SSA countries are no better off than they were in the early 1990's. Some may be in a relatively worse situations due to the dearth of concessional funding from the DIFI's over decades, premised on the empty expectation of private sector funding becoming available.

This chapter distills critical elements impacting reform outcomes and further develops a framework that goes beyond individual theories to provide a guide for situation and context analysis that can lead to better reform strategies for the future.

5.2 A New Look at Critical Elements Impacting Reform Outcomes

The various trends and management theories of chapter 2 identify and model many different relationships between the participants in electricity supply and the outcome

review in Chapter 3 reveals both good and bad aspects of the experience of sector reform as well as revealing important aspects of reform not addressed by the proposed working hypothesis. These rich information resources have been distilled by comparisons of processes, contexts, and outcomes in chapter 4. Clustering and mind-mapping of the data and relationships reveals associations of process and responsibility at three different levels – government, industry and utility with a set of cross cutting elements impacting the entire sector.

At Tier 1, the base level, government policy and function underpin the reform and strongly impact the outcome. The elements in this tier related are purely government related. At Tier 2, the industry level, the institutions and functions of the electricity industry as a whole impact performance of the sector and individual utilities. These elements relate to the effective functioning of industry. Regulation has been placed at this level and not at the government level as some measure of independence from government is required for effectiveness to be achieved. The other two elements firmly relate to operations at the sector level assuming more than one utility exists in the country. At Tier 3, the utility level, elements common to each utility impact the outcome at the operational level. If any element is significantly deficient in the two bottom tiers, it is posited that the reform will have an unsatisfactory outcome. If an element in the third tier is significantly deficient, only one utility outcome will be negatively impacted.

The three tier framework of three elements on each tier and three cross-cutting elements, represents a minimum set of 12 critical elements of power sector reform. Figure 5.1 shows a diagrammatic representation of the proposed framework of analysis. It is important to view the diagram from bottom up starting with the government level and working upwards to the utility level and finally the reform outcome. Cross-cutting elements impact all three tiers.

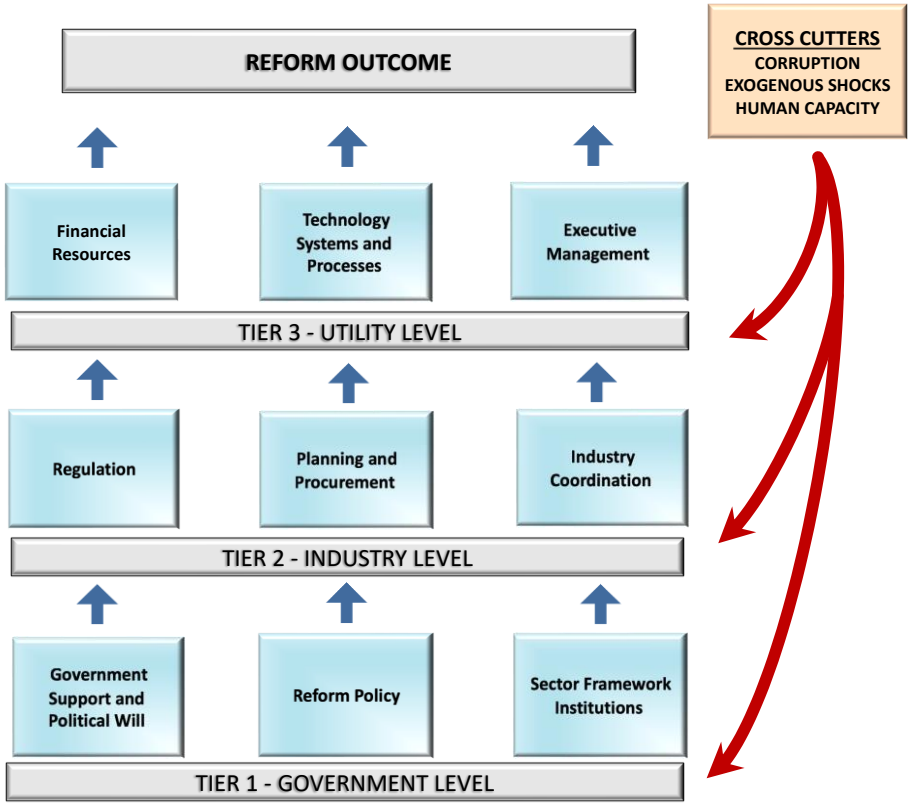

Figure 5.1: Proposed Analytic Framework of 12 critical elements of power sector reform

5.3 Government Remains at the Heart of Power Sector Reform - Tier 1 (Government Level)

These elements relate to issues requiring the involvement of the government in the reform process starting with inception through to implementation and operations.

5.3.1 Government Support and Political Will

There are numerous references to the need for government support in reform. The Foster and Rana (2019) paper makes the case strongly by stating that reforms are more successful when there is a set of reform champions in the government supporting the reform measures and managing any political dissent. The analysis in the previous chapters indicate that consistent government support in the following aspects is a key element impacting reform outcomes:

- Ensure tariffs move towards cost recovery

- Refrain from political meddling related to tariffs, rural electrification procurement and recruitment
- Manage the informal political network to ensure reforms are not derailed
- Provide financial support for rural electrification and lifeline tariffs and for preserving financial standing of utility until full cost recovery achieved

The reform failures in Senegal and Namibia described in the literature survey illustrate the need for strong and consistent government support for reforms that transcends electoral cycles. Lack of government support leads to failure or at best sub optimal outcomes. The political economy approach has provided fresh insight into the political nature of power sector reform and in so doing highlighted the essential nature of sustainable political support for reforms.

> **Definition**: The extent of political will within the Government to consistently support the sector and its reform.
>
> **Scope:** This element highlights the importance of political support within Government for the reform from design and inception through the initial phases to full implementation and including support for changes in the reform model if required, as time progresses. This support is required from successive governments across election cycles. Disagreement on the reform model within the government, normally evident if there are competing factions within the ruling party, will detract from this support and negatively impact the reform outcomes.

5.3.2 Reform Policy

To date reform policy in developing countries has largely been tailored around the market-based model. The sequence of steps and degree of progress achieved differed considerably, but the same formula was applied. There are now indications that some DIFI's will no longer be advising on this basis going forward and that future reform policies should no longer be based on any particular model but tailored specifically to the needs of the country. Elements of the standard model such as unbundling or private sector participation may or may not be applicable, depending on the country context. The reform approaches of the 70's and 80's need to be re-framed and applied when appropriate.

In view of the necessity to engender sufficient political as well as public support for the reform, the approach to successful reform will of necessity be different to approaches in the past, which often resulted in standard designs being developed in haste with little or no consultation. Governments need to play an active role in the development of the policy which of necessity needs to be integrated with broader development and economic policy of the country with DFI's as advisors in some cases.

Wider consultation with consumer associations and civil society will assist in democratizing the process and building public support. The concept of international best practice needs to be de-emphasized in developing appropriate policies as the economic and political context of each country is substantially different.

The drive towards cleaner and more sustainable energy sources necessitates that the policy design allows for efficient and fast track incorporation of both renewable and nuclear energy into the mix. It has become clear that robust government involvement is required in the financing, development and implementation of these technologies.

> **Definition:** The appropriateness of reform policies and models in the context of the country.
>
> **Scope:** This critical element considers the appropriateness of the match between the reform policy and model with the country context. In terms of an existing reform the shortcomings of the model will be analyzed while in the case of a new or revised reform, various options need to be analyzed the most appropriate choice made.

5.3.3 Sector Framework and Institutions

The existence of a well defined sector framework is important for ensuring effective sector operation and encouraging investment by the private sector. The framework refers to primary and secondary legislation including amendments and related documentation that define the structure of the electricity sector. The lack of a suitably robust framework limits interest from the private sector while creating confusion around assignment of responsibilities and resulting in key activities being neglected. The framework needs to clearly define roles and responsibilities as well as the manner in which agencies and utilities should coordinate. Opportunities for corruption and collusion are increased when the sector framework is ill-defined while the risk of confusion and chaos escalates. Governments and sector institutions and agencies further need to respect the framework and guard against the malign influence of informal structures and interest groups to ensure progress in the sector.

Many assessments of reform outcomes have identified weak institutions including the judiciary as a key reason for reform failure. Legal practitioners have little knowledge of the sector while government ministries are often staffed with political appointees with little knowledge of the sector, thereby exacerbating the problem. This situation is almost a given in most countries in SSA and institutions need considerable time to evolve, hence reform designs need to find work arounds and focus on developing a well defined sector framework to ensure the success of the reform.

Definition: The appropriateness and clarity of the sector framework which defines the structure and workings of the industry and the strength of key institutions

Scope: This critical element refers to the clarity as well as the appropriateness of the sector framework taking into account the specific country environment. An assessment of strength of key institutions including the judiciary completes the scope of this critical element. In the case of assessing an existing reform, the extent to which the sector framework was consistently applied by stakeholders also needs to be considered.

5.4 Essential Industry Building Blocks for Successful Reform – Tier 2 (Industry Level)

The following three industry related elements are viewed as critical in ensuring efficient operation at the sector level (and pertain purely to it).

5.4.1 Regulation

Regulation has been referred to as the fulcrum of the electricity industry and remains a critical function. Principal Agency theory underpins the importance of this function. The independent regulatory model has been shown to be ineffective in many developing countries and problems have even been experienced in developed countries. Most countries in SSA have established so called independent regulators but in most cases, they are still largely controlled by the government. Uganda and Kenya are notable exceptions in this regard. Other countries have resorted to hybrid regimes with a mix of regulatory agency and regulation by contract.

In the literature, reform failures have often been narrowly attributed to failures in regulation – ignoring many other factors. This conclusion is related to market-based reform thinking where the regulator was seen to have the function of simulating a competitive market in a monopoly part of the industry. The incentive based model has proven difficult to implement even in developed countries such as the UK due to the challenge of accurately measuring performance improvement, and is impossible to implement in developing countries given the degree of information asymmetry, absence of IT systems and frequent disconnect between the regulator and the utility. In most cases, regulation has reverted to a rate of return approach, but this on its own is insufficient as some degree of incentive is required to encourage certain activities such as reducing loss and emissions. Clearly more work is required to develop hybrid type tariff model options appropriate for developing countries in SSA.

Developing appropriate tariff structures while moving towards cost reflective levels is key to the health of the sector and the government needs to work closely with the regulator to ensure the utility remains financially viable and in so doing create an

investor friendly environment. Ensuring that utilities comply with environmental and social goals set by the government is another essential regulatory function which is gaining prominence as the thinking around reform evolves.

Many challenges remain regarding regulation such as lack of human capital, shortage of finances and political meddling. Ongoing capacity building and a concerted drive to improve governance are required to gradually bring about improvements. The question also needs to be asked whether the independent regulator model is applicable to some developing country context, especially those with high levels of political interference in the sector and a disregard for adhering to the sector framework. In such instances regulation by contract should be considered.

> **Definition:** The appropriateness of the choice of institutional model as well as the selection of regulatory model measured in terms of the country context.
>
> **Scope:** This critical element addresses the way regulation is implemented, such as by contract, use of outsourcing or establishment of a regulatory body, the method of tariff determination, and the effects on sector financial sustainability and sector stability. In addition, the extent and nature of government intervention experienced if an existing reform is being evaluated.

5.4.2 Planning, Procurement and Contracting

These functions were largely forgotten in the reform initiatives of the nineties in the false belief that the market would take care of providing signals for capacity increases. While the integrated utility was formerly responsible for these functions, they fell by default to government ministries of energy when other players entered the market. The staff in these ministries were generally ill equipped for the task. Effective planning underpins any successful electricity industry. Under or over-capacity, generation plants in the wrong place, inappropriate technology, fuel insecurity, insufficient transmission capacity, excessively high prices, high distribution losses, and poor power quality can all be ascribed to poor planning.

Master plans compiled by consultants frequently form the basis for investment decisions around generation or transmission, but these rigid plans quickly become dated and political interests intervene to influence decision making. The cases of Cote d'Ivoire and Ghana (Malgas and Eberhard 2011), covered in the literature review, illustrate the benefit of establishing a centralized well resourced unit fully responsible for dynamic generation and network planning. Distribution planning hardly features in the literature and is often neglected in practice by distribution utilities leading to overloaded networks, high losses and poor customer service resulting further in poor revenue collection levels. Generation and network planning at the industry level needs to be given a high priority and needs to be done on a dynamic basis and in close

cooperation with the regulator and utilities. Errors in this aspect of planning can easily lead to situations of under or over supply.

Effective procurement and contracting have been identified as key ingredients for successful reforms. Non-competitive procurement combined with poor contracting open the way for a multitude of ills, including inflated pricing, corruption, inappropriate tariffs and inappropriate technology. A number of IPP developments in the SSA region have been tarnished by the effects of incompetent procurement and contracting driving up prices as well as the risk for public opposition to reforms. Transparent competitive bidding for IPP's and private sector contracts mitigate the risks of non-competitive procurement. Auction systems for renewable generation and transmission infrastructure have proven to be effective in this regard.

Full responsibility for the planning, procurement and contracting functions need to be designated to a specific unit or units. A high level of technical expertise is required for executing these core functions. While many countries may lack this expertise, ongoing capacity building and technical assistance from the DFI's is required for building self-sufficiency in these areas.

> **Definition:** The effectiveness of the system planning function and the ability to procure generation capacity in an efficient and cost-effective manner.
>
> **Scope:** This critical element addresses the integration of responsibilities, processes, and skills of all participants in the sector in respect of planning and procuring the capacity needed to deliver the sector's outputs. The element has two components: (a) the system planning to achieve technical adequacy in a financially sustainable way, and (b) the implementation of the plans through the transparent and competitive procurement and contracting of generation capacity consistent with a least-cost generation plan.

5.4.3 Industry Coordination

The market-based reforms introduced during the past 35 years have resulted in the creation of additional institutions as well as the establishment of various IPP's in many countries. Unbundling of utilities has resulted in at least 3 separate companies each with their own governance structures. Sector regulators have been set up in almost all countries in SSA. The intention was to develop independent regulators but in many countries the regulators still report to the Ministry of Energy with a very limited degree of independence. The establishment of rural electrification agencies reporting to the Ministry of Energy has been standard in most countries in SSA. These agencies were responsible for developing rural electrification infrastructure and handing it over to a distribution company for operation. In the case of Nigeria several additional agencies have been established including the Nigeria Bulk Electricity Trader (NBET)

and The Nigeria Electricity Liability Management Company (NELMCO). In the case of Cameroon, apart from IPP's the Government has established state-owned companies such as the Electricity Development Corporation of Cameroon (EDC) to develop and operate certain new hydro plants financed by donors or on a Public Private Partnership (PPP) basis. Recent reports concerning the reform in Malawi have highlighted the lack of coordination between sector agencies as the reason for the current chaos in the sector.

Poor coordination and in-fighting between sector agencies have significantly impacted reform outcomes. Even if the Tier 1 sector framework is clear, good coordination within the sector is not automatic. In certain highly charged political environments the tendency has been for these individual agencies to either build empires of their own driven by self-interest of senior staff or to do the bidding of powerful political figures or interest groups. In these cases, the agencies or companies have little interest in cooperating with each other, rather focusing on working on self-interest agendas. This has resulted in high levels of mistrust in the sector. The element of sector coordination is less of a factor in some countries but it has become clear that failure in this area can lead to a sub optimal reform outcome.

> **Definition:** The extent to which sector role players coordinate effectively with each other to ensure effective sector operations.
>
> **Scope:** This critical element addresses the coordination between sector stakeholders and participants (i) between government and other stakeholders, (ii) regulator and utilities, (iii) government and regulator, (iv) utilities and customers, and (v), between individual utilities. Respect for the sector framework is key in this regard, and poor coordination is a precursor to poor reform outcomes. When designing a new reform, the country socio-political culture can provide clues in predicting the expected extent of industry level coordination.

5.5 Utility Operation - Tier 3 (Utility Level)

Since commencement of neo-liberal reforms, scant attention was paid to the actual requirements of electricity utilities whether state-owned or private. The thinking has been that market forces and effective regulation would be able to ensure efficient operation of utilities. Efforts were centered on increasing private sector participation in the hope that the private sector would be able sufficiently resource the utility. Theories pertaining to resources and management of the firm covered earlier underpin the importance of the elements discussed below.

The following three utility related elements are viewed as critical in ensuring efficient operation at the operational level:

5.5.1 Financial Resources

Utilities are financed through a number of avenues including own revenue, government subsidies, government investment, DFI loans and private sector investment. Non cost reflective tariffs have been singled out as one of the most important aspects impacting reform outcomes. Achieving cost reflective tariffs can sometimes be a longer term goal but to make progress in this area the utility, regulator and government need to work closely together to develop and implement a strategy and action plan to achieve this goal accompanied by a government commitment to shore up the utility finances by means of timeous subsidy payment.

DFI direct investment in utility infrastructure in the region has diminished during the neo-liberal reform era as it was envisaged that the private sector would take over this responsibility. This did not happen in the SSA region. In countries where distribution concessions or divestitures have been implemented, the utility has no longer had access to concessional financing from the World Bank while private investors have often been reluctant to make the required investments resulting in sub optimal utility operations. In the majority of developed countries, the private sector was not responsible for funding the backbone of the electricity network in the past, so was unlikely that this approach would have succeeded in SSA. This is not to say that the private sector should not play a part in infrastructure investment where appropriate in the region. Investment in generation via IPP's or PPP's has proven to work in the past if correctly managed opening the way in the future for such investments given the lower risk profile and relative simplicity of such an investment.

> **Definition:** The availability of suitable financing to enable each utility to operate effectively.
>
> **Scope:** This critical element addresses the extent to which sufficient well priced financing from multiple sources is available to the utility to enable maintenance of financial stability while carrying out key functions such as operations and maintenance, system upgrade and extension, commercial operations, customer services, upscaling electricity access to low usage communities, and enabling affordability for less affluent customers. Sources of finance include equity, revenue from electricity sales, government subsidies, loans and donor grants, as well as cost reduction.

5.5.2 Technology, Systems and Processes

Technology, processes and systems, while being key elements in the reform process, have been largely ignored in the literature. A notable exception is the unpublished paper by Antmann (2009) which emphasizes the importance of technology and processes in reducing technical and non-technical losses in utilities.

Technology choice in generation is driven by multiple factors including lifetime equipment cost, fuel availability and cost, load requirement and decarbonization targets. These targets have been the main drivers towards incorporating solar and wind into the generation mix in developed countries and more recently in developing countries. Energy storage systems have been widely utilized to enable system stability and efficiency in developed countries and are just beginning to be implemented in SSA. Economies of scale have driven down the cost of these technologies while opening up opportunities for distributed generation and lower transmission infrastructure costs. The downside to these technologies is that sophisticated control systems are required to manage the effects of intermittent generation. System control is already weak in many countries in the region and special attention will need to be paid to employing technology to manage system stability and reliability to avoid worsening the situation noting that the distribution business in developing countries is usually a low margin if not loss-making operation. Choice of technology and design standards impact the Capital Expenditure (CAPEX) and Operational Expenditure (OPEX) of the utility as well as the level of customer service. Reactive power management is usually neglected leading to overloaded networks, unnecessary outages and wasted infrastructure investment. Metering, billing, revenue collection and customer management systems are key to the financial health of the utility.

Given the low level of human capital in many countries, detailed guidelines and processes need to be developed and maintained on a dynamic basis to ensure maximum utilization of systems and technology.

> **Definition:** The adequacy of technology and related processes and procedures in use to ensure efficient operations.
>
> **Scope:** This critical element addresses the adequacy of technology in place within each utility, including integrated IT systems covering multiple utility functions such as billing and revenue collection and loss reduction management. The state of SCADA and metering systems are similarly important in assessing technology adequacy and associated processes and procedures.

5.5.3 Executive Management

In the developing country context, the role of the CEO and executive management assumes even more importance than is the case in a developed country due to additional pressures from the country environment. Upper Echelon Theory presented in Chapter 2 provides firm evidence that the CEO and executive management team play a key role in enabling good firm performance enabling the executive team which in turn enables improved firm performance. Working in a context of weak institutions

and potential political interference, strong leadership and management skills combined with technical and commercial knowledge is required from senior executives to keep the utility on track. The CEO and his team also need to be in a position to work politically with government. The CEO should be able to resist the meddling of government but continue to maintain cordial relations with them. This rapid rotation of CEO's, some with questionable competence, limits the chances for successful reforms.

> **Definition:** The competence and political skill of CEOs and senior executive staff.
>
> **Scope:** This critical element addresses the level of competency as well as of the CEO and senior staff in the context of a developing country in the SSA Region. In this context apart from normal management skills, the CEO and executive team is required to have a strong technical and sector knowledge as well as being sufficiently politically connected to effectively manage the political economy factors inherent in the country. Utility CEO's working in developed countries are not required to have the same broad range of skills as they work in less complex political environments and generally have the benefit of qualified and well experienced staff. Similarly senior executive staff need to be technically and managerially competent with operational experience of working in similar environments.

5.6 Cross Cutting Elements

The analysis has identified three significant cross cutting elements affecting the entire industry and impacting reform outcomes.

5.6.1 Corruption – the Elephant in the Room

Corruption at various levels, theft of electricity, fuel and materials, internal and external sabotage and general vandalism disrupt the implementation of sound policies and reduce physical and financial efficiency. High levels of corruption have been attributed to significant information asymmetry in the sector. As mentioned previously, opportunities for corruption exist at all levels of the sector through privatization deals, IPP procurements, PPP regulatory decisions, to metering and billing. The political economy approach has shown informal institutions allied with tribal ties and patronage networks exist in parallel with formal ones in developing countries. Rent seeking activity is not negatively viewed within these informal institutions. This phenomenon compounds the difficulty of reducing corruption levels. While data is not readily available on the extent of corruption for obvious reasons, there is sufficient evidence that corruption remains an impediment to reform progress at all levels of the sector from government through to junior level utility staff in many

countries. Simply having a better understanding of reasons for the corruption is insufficient and improving governance and policing remains a key imperative in a revised reform paradigm.

> **Definition:** The level of corruption including theft, vandalism, and sabotage impacting the sector.
>
> **Scope:** This critical element refers to the level of illegal activity, including petty corruption at the utility level, grand corruption throughout the Government, industry sector, and utility levels, theft and vandalism affecting the electricity infrastructure and finances, and sabotage or terrorism impacting utility infrastructure, operations or inputs.

5.6.2 Level of Human Capacity

Lack of human capacity has long been highlighted as a major contributor to poor reform outcomes. This has mostly been with reference to government and regulatory institutions but with very little regard for building technical and managerial capacity at the utility level since it was assumed that the private sector would become involved and provide the required input. The shortage of skilled artisans, engineering analysts, and managers with deep understanding of the sector is a major factor in the region. This capacity has generally remained low at all levels of the sector despite the reforms. The current swing away from the neo-liberal reform paradigm provides an opportunity for a re-think in terms of capacity building. Previous capacity building exercises in the 60's and 70's were not viewed as particularly effective but they were narrowly geared towards "international best managerial practice" of the time or allied to infrastructure investments by the DFI's. Capacity building designed to meet specific country needs is clearly required across the sector to give reforms a chance at success. This capacity building in the main needs to be highly relevant to the needs of each country sector and offered in a sustainable manner.

> **Definition:** The level of human skills and competency throughout the sector
>
> **Scope:** This critical cross cutting element addresses the level of human skills across the sector including the judiciary, government - especially at relevant ministries, regulatory authorities, sector agencies and utility. The skills level is a key input to decisions about balancing the sophistication of reform with the available skills in the country.

5.6.3 Exogenous Shocks

Argentina has provided a good example of the market-based model not being sufficiently resilient to macro-economic shocks and leading to a partial reversal of the

reform. With the increase of macro-economic instability including rapid local currency depreciation in many countries, this factor needs to be seriously considered when evaluating reforms or designing new initiatives. Severe weather events as a result of climate change and impacts of serious pandemics are further elements to consider. In California the problems were triggered by high temperatures and in Texas, low temperatures. In many cases the stress leads to high and volatile pricing during periods of constrained capacity of power plant or the energy source, and to various forms of load shedding. The Covid pandemic had a serious economic impact on countries but also impacted levels of electricity service as supply chains were delayed, staff were locked down and maintenance was delayed. Countries with simpler, vertically integrated electricity sectors are not immune from such shocks, but it seems that integration may confer greater resilience because fewer interfaces need to be coordinated.

It should also be noted that the impacts of climate change pose a greater risk to the operation of renewable energy sources compared to conventional enclosed power plants.

> **Definition:** The projected macro-economic stability of the country as well as the probability of severe climate shocks and pandemics.
>
> **Scope:** This critical element addresses the macro-economic stability of a country over the medium to long term and the risk of severe currency fluctuations. Severe shocks such as pandemics and climate events resulting in hydropower shortages, or fire and flood damage to infrastructure, also impact reform outcomes.

5.7 Onword

A tiered framework of critical elements has been proposed to synthesize and give a manageable structure to the complex characteristics and relationships of the several management theories, DFIs' reform policies, and reported theories and outcomes of electricity sector reform that were identified in chapters 2 to 4. The intention of the framework is to increase understanding of the impact of the critical elements on reform outcomes, and to aid analysis and the formulation of more sustainable reform in the SSA region in the future. The framework covers a set of elements far beyond those adopted in the original working hypothesis.

To test the validity and sufficiency of the proposed framework, a deductive theory testing approach (Eisenhardt and Graebner 2007) will use a two-pronged approach. First, reforms in three countries will be evaluated in terms of the framework elements using detailed case studies. In each case study the context, reform process, and outcomes are described, and then reviewed in terms of the 12 critical elements of the

framework. No attempt is made to link back to individual theories, policies, or outcomes in other countries, since they are now embedded in the elements of the framework. Secondly, a wide range of sector stakeholders will be interviewed to gauge their views on the importance and scope of each element and to check if any significant aspects are missing from the framework.

Chapter 6

Case Study – Nigeria

6.1 Introduction

The Nigerian power sector reform has been the most ambitious undertaken in the region to date. This case study discusses the reform and the multiple factors impacting the outcome with the purpose of testing the validity and sufficiency of the analytic framework proposed in Chapter 5. Sources of information for the case study include academic papers, media articles and interviews with sector stakeholders familiar with the sector.

6.2 Context

Nigeria is the largest oil producer and the most populous country in Sub-Saharan Africa. Through rebasing of the GDP, Nigeria was declared the largest economy in the Region in 2014 (KPMG 2016) and has alternated with South Africa in holding this title. Despite the size of the economy, Nigeria has been dipping in and out of recession in recent years.

Government involvement in the power sector dates back to 1896, with a 20 MW diesel fired plant. In 1951, the Electricity Corporation of Nigeria was established as a national agency to supervise and coordinate electricity distribution in the country through the use of captive or embedded generators. In 1961, the Niger Dams Authority was established to assist in meeting the increasing demand for electricity in the country. The agency also had the responsibility of exploring, building, and managing hydroelectric dams and other sources of power generation (gas, oil, and coal) and build, maintain, and operate the transmission grid. The decision was taken in 1972 to bundle the Electricity Corporation of Nigeria and Niger Dams Authority into an agency known as the National Electric Power Authority (NEPA) resulting in a vertically integrated state-owned power sector monopoly. The rationale for the bundling policy included the strategic importance of the sector, economies of scale, and effective coordination and standardization (Ogunleye 2016).

Electricity access levels remain low in the country. The World Bank estimated in 2018 that around 80 million people had no access to grid electricity. They estimated the average access rate to be around 55% while rural access was around 39% and that Nigeria has the second largest deficit in electricity access in the world after India (World Bank 2018a).

6.3 Market-based Reform

By the late 1990's it had become clear that NEPA was failing to meet Nigeria's power needs. In 2001, the publication of the National Electric Power Policy document signaled the commencement of the sector reform in Nigeria (KPMG 2016). Generation had been plagued by a prolonged period of neglect and inadequate funding for investment in new power plants and maintenance of existing ones. There were also serious fluctuations in gas supply because of social volatility and underdeveloped infrastructure. Transmission losses were at a high level and the system was unstable due to poor planning, low levels of investment and lack of maintenance resulting in multiple power system collapses. Distribution suffered from unacceptable levels of technical and commercial inefficiency resulting from poor maintenance, insufficient funding, and inadequate planning. Institutional issues, including an inappropriate tariff regime, lack of Government support and a confusing policy environment contributed to the general malaise in the sector (Nwofia 2017).

The reform design of 2001 was based on the standard model of reform which was being strongly advocated by DFI's at the time. After some time the Government decided to implement the reform using a "big bang" approach with all the distribution companies and the majority of generation companies being privatized at once. A further significant and unique feature is that the Government decided to partly divest asset ownership to the new private owners rather than award a fixed time concession sending the message that there was no going back on the privatization process.

6.4 Evolution of the Reform Process

The evolution of the reform process is largely sourced from the World Bank based paper (Eberhard et al 2016) unless otherwise specified.

6.4.1 Enabling Legislation

The 2001 National Electric Power Policy statement called for the transformation of the electricity supply industry through fundamental changes in its ownership, control, and regulation. The Electric Power Sector Reform Act (EPSRA), compiled with World Bank assistance and enacted in 2005, still serves as the legal basis and regulatory framework for the reform of the industry. It provided for: (i) the creation of the Power Holding Company of Nigeria (PHCN) to take over NEPA's assets and liabilities, (ii) the unbundling of PHCN by establishing several companies to take over the assets, liabilities, functions, and staff of the holding company, (iii) the new Nigerian Electricity Regulatory Commission (NERC), (iv) a competitive electricity market and, (v) the basis for determining tariffs, customer rights and obligations, and other related matters. The 2005 Act follows the prescription of the standard reform model.

6.4.2 Sector Framework and Unbundling NEPA

Following the enactment of the 2005 ESPRA law, a regulator the Nigerian Electricity Regulatory Commission (NERC) was established in October 2007.

The new Nigerian Electricity Liability Management Company, NELMCO was designated to assume responsibility for all the PHCN liabilities leading up to the November 2013 handover of the companies, as well as the management of the non-core assets of the companies.

The Nigerian Bulk Electricity Trader (NBET) was established in July 2010 to act as the credible off-taker and aggregator to guarantee liquidity in the market. NBET was to purchase electricity from successor generation companies and from IPP's through PPA's and sell to distribution companies and eligible customers. In the future it was envisaged that the bulk trader need not be the only off-taker of power; any creditworthy distribution company or eligible customer would be able to negotiate a PPA directly with a generation company or IPP. The bulk trader was required to be in place only until the distribution companies managed to establish creditworthiness, and until the accounting, managerial, and governance systems developed sufficiently to underpin a fully competitive market.

By 2010 NEPA was unbundled into 18 companies: six Generation Companies, one Transmission Company (TCN) and Eleven Distribution Companies under the umbrella of the Power Holding Company of Nigeria (PHCN). All were issued llicenses for operation.

The market rules developed by NERC envisaged that the competitive electricity market would evolve through four stages: (i) pre-transition, (ii) transition, (iii) medium term, and (iv) long term. In addition, NERC published rules for procurement of new power in 2014 for application in the early stages of the market development. The objective of the regulations was to establish a systematic, transparent, and competitive process to procure new capacity at the least cost to the consumer. The system operator is required to publish a five-year demand forecast and an annual generation report. The market rules govern contracting through the transitional and medium term stages of the market.

A Multi Year Tariff Order (MYTO) was designed by consultants to form the basis for determining tariffs. The MYTO framework is a building block model which adopts the Long Run Marginal Cost (LRMC) method in determining the unit price of an efficient plant. The MYTO formula is fundamentally an economic model and pays greater

attention to business motives than social service provisioning (Bello 2013, Ikeanyibe 2020).

6.4.3 Next Steps in Privatization

Progress was slow on the divestiture of the successor companies and the development of a competitive electricity market. Five years after the enactment of the ESPRA no further progress had been made. In a bid to speed things up, in 2010, a Presidential Action Committee on Power (PACP) was set up under the Head of State to accelerate progress toward reform objectives by (i) removing obstacles to private sector involvement, (ii) clarifying the government's strategy on divestiture, and (iii) reforming the fuel-to-power market. A Roadmap for Power Sector Reform elaborating these policy objectives and setting detailed implementation milestones and targets was published in August 2010. A Presidential Task Force on Power (PTFP) was also established to carry out administrative work for the PACP and to monitor and facilitate the achievement of the targets.

These targets were ambitious. The process was largely driven by the Bureau of Public Enterprises (BPE), responsible for the national privatization program, and, to a limited extent NERC, which developed market rules and tariff regulations. BPE was the main driver of the program, although it had no specific knowledge or experience of electricity sector reform. It simply followed Government instructions to deliver full privatization in the shortest possible time.

The World Bank cautioned the Government against such a rapid roll out of the privatization program. They advised that a step process be adopted with a limited number of the more profitable Distribution Companies (Disco's) being privatized as a first step (Telecon World Bank staff). The Nigerian authorities did not heed the caution and proceeded to implement the full scope of the privatization process in one sweep using the Canadian consulting company, CPCS as the main transaction advisors. It has been reported that CPCS promotes the idea that Government institutions do not have the capacity or capability to build, operate or manage public services. Driven by neo-liberal based ideology as well as the desire for profits, the company strongly advocates Public-Private partnerships as the solution to infrastructure development and management (Canadian Foreign Policy Institute 2020).

6.4.4 TCN Management Contract

In 2012, as part of the privatization initiative, the Government awarded a management contract to Manitoba Hydro International (MHI), a subsidiary of the state-owned power utility of Manitoba in Canada. The objective was to improve the performance of transmission network in Nigeria (Poplack, 2017). Surprisingly little has been written about this contract but it is clear that the contract was not highly

successful despite a conciliatory statement from TCN at the closure thanking MHI for their contribution. According to one analysis based on interviews, the delays in rehabilitating the transmission network were due to “lack of leadership on transmission infrastructure planning and lack of funds” (Edomah et al 2021). Little evidence of the cause of failure is provided in this limited literature although through personal observation, it was clear that the management contract was not popular with TCN staff and little support was provided.

6.4.5 Bid and Award Process – Generation and Distribution

In 2011 BPE released a request for proposals, in response to which 25 bids for the 6 generation companies and 54 bids for the 11 distribution companies were received. A Reuters report (22 October 2012) noted that no credible international power companies had shown interest in the bids and further alleged that, given the poor track record of previous Nigerian privatizations such as that of Nigerian Telecommunications Limited (NITEL), the chances were good for the government connected oligarchs with no power sector experience to take over majority ownership of the companies with resultant failure of the exercise. Nwofia (2017) further asserts that the evaluation process was far from transparent and was rigged to ensure the benefit of Nigerian elites. The awards went ahead despite the criticism. Transaction and industry documents were signed in February 2013, alongside an initial payment of 25 percent while bidders then had until August 21, 2013, to pay the remaining 75 percent for the companies (BPE 2013). A debt equity ratio of 70:30 was permitted for the payment finance. Ikeanyibe (2021) reports that up to 90% of the purchase price was actually financed by means of high interest loans. Therefore, apart from over-priced assets, the financing was leveraged to the point of posing a significant threat to financial viability from the start. Five generation companies and 10 distribution companies were sold for a total value of approximately $3 billion. Ownership of the assets was handed over to the selected companies on 1 November 2013. Some transactions were concluded outside the main process namely the privatization of Egbin power plant and Kaduna Disco.

The Federal Government retained 40 percent ownership stakes in the distribution companies and 49 percent in the Geregu I successor generation company while the remaining thermal successor generation companies were fully privatized. The state signed long term concessions while retaining full ownership of the hydropower assets (Kainji and Shiroro.) Two further state-owned plants were sold via debt equity swaps with the Chinese contractors who built them: the state-owned plants Omotosho Phase I and Olorunsogo Phase I were then sold to the contractors who built them in 2013 and 2014 respectively (This Day Live 2013).

6.5 A Chaotic Start

The reform went ahead even though (i) the Transition Electricity Market (TEM) had not been implemented due to certain pre-conditions not being fulfilled (ii) Disco vesting contracts had not been activated due to the absence of the TEM and, (iii) envisaged PRG's from the World Bank had not materialized. NERC hastily introduced a set of interim market rules as a step towards implementing the TEM. The Market Operator, a division of TCN, was responsible for executing NBET's duties during this interim phase. The TEM was finally declared in February 2015 with no clear guidance on how certain aspects could be implemented. Surprise was expressed that private investors reached financial close without critical components being in place and posit that investors were depending on support at the highest political level and the success of the liberalization of Nigeria's mobile telecommunications industry (Eberhard et al 2016). These events did not bode well for the future financial stability of the privatized entities.

The Financial Times of Nigeria (21 Oct 2014) reported that owners discovered a significant difference between what was advertised in the privatization procurement and what they actually received. For example, on takeover they discovered that they had no ownership of utility buildings. Gas supply agreements for the Generation Companies (Genco's) were still in the draft stage and they were informed they would receive less than a third of the gas they needed to generate at full capacity. Capacity Payments to plants were capped at 45 per cent of the pre-contracted amounts, with payment of the balance put off to an unspecified date. Investors found that their financial projections, the basis for borrowing the money they used to buy their assets, were meaningless. These unexpected discoveries point to the lack of transparency as well as the failure of Government to commit fully to the reform as well as to inadequate implementation of the agreed sector agreements.

6.6 Reform Outcomes

6.6.1 Outcomes as Reported by Sector Agencies

An investigation of websites of the various sector agencies revealed a paucity of annual reports and general data related to performance of sector agencies. The last NERC quarterly report on the discos was published in mid-2020 while the reports for several previous quarters are missing. The NBET site has no annual reports on the agency and only shows some limited data on disco remittances and payments to Genco's from 2016 to September 2020. The TCN site contains no annual reports or financial statements. It was confirmed by one of the auditing companies that the Disco's produce audited financial statements and that these are submitted to NERC. These documents are not authorized for public disclosure. The quality of the available

reports on the websites was sub-standard. Formats varied over time and data was missing in some cases.

The NERC website has provided quarterly reports on sector performance over the period 2017 to 2020. Table 7.1 has been compiled from the available reports and compares KPI's pertaining to the third quarter 2017 compared to the third quarter 2019, thus eliminating any effects due not seasonal variation.

Quarter	Generation Availability MW	Generation Utilized	Transmission losses %	System Collapses	System stability Voltage and Frequency	ATC&C Losses	% metering	No Customer complaints/day
3rd Q 2017	7014	55%	8.42	5	Considerably beyond statutory limits	54%	46%	1185
3rd Q 2019	6709	54%	8.12	1	Considerably beyond statutory limits	44%	40%	1879

Table 6.1: ***Sector KPI Summary of Q3 2017 and Q3 2019***
Source: NERC website

The small sample of data illustrates the precarious state of the Nigerian electricity sector several years after privatization. While generation availability did not improve over the two year period, the percentage utilized also fell over the same period, implying there was no improvement in end user delivery over the period. Aggregate Technical and Commercial (ATC and C) losses appear to have fallen over the period although the veracity of data needs to be called into question given the vastly fluctuating loss figures provided by NERC in individual Disco reports. System voltage and frequency upper and lower levels are far beyond statutory limits explain some of the ongoing system collapses being experienced. Premium Times Nigeria (20 July 2022) reported the sixth national grid failure in 7 months in 2022.

The NBET website contains some data pertaining to payments from NBET to Genco's and from Disco's to NBET. Table 7.2 summarizes NBET payments to Genco's over the period 2006 to 2020 as well as average payments from Disco's to NBET. NBET ceased publishing reports on their website from October 2020 onwards. The higher percentage payments to Genco's from 2017 to 2019 reflect the Government subsidies that were paid to NBET to shore up the sector and to relieve pressure on the gas suppliers. Apart from years benefitting from Government subsidies, the level of payments and hence onward to the gas suppliers is abysmally low. These low payment levels reflect the low levels of payment of Disco's over the same period.

	2016	2017	2018	2019	2020
NBET Av % Payment	18.12	80.00	78.83	100.00	22.77
Disco Av % Payment	22.42	26.56	23.72	28.00	22.78

Table 6.2: ***Average Payments to Genco's by NBET and from Disco's to NBET: 2016-2020***
Source: NBET Website

6.6.2 Published Viewpoints

Many authors have assessed the reform outcome as a dismal failure. Ikeanyibe (2020) noted the glaring inability of the reformed sector to supply the needs of the expanding population and that while prices have increased, quality of supply has remained stagnant. Nwofia (2017) stated that stable power supply may remain a fleeting illusion for the foreseeable future and that the entire reform process has been an abysmal waste of public resources. Arowolo and Perez (2020) stated that the majority of stakeholders view the Nigerian reform as a complete failure. A more optimistic view was stated in the Eberhard et al (2016) report stating that there had been good progress on the reform to date. The report does however qualify the statement by listing a number of challenges facing the sector including poor levels of revenue collection, sector illiquidity requiring the establishment of the Nigerian Electricity Market Stabilization (NEMS) facility to enable government to inject liquidity into the sector, removal of assumptions of Disco assumed losses in the tariff calculation thereby threatening sector viability and shortage of gas supply exacerbated by vandalism of gas infrastructure in the Niger Delta region. In addition, transmission infrastructure proved inadequate to evacuate power from the Genco plants. These challenges are echoed by both Nwofia (2017) and Ikeanyibe (2020) while Ikeanyibe added rejection of supply by distribution companies, insufficient funding of TCN, poor system management, lack of confidence in the regulatory environment, inadequate design and project management, ineffective metering, inefficient coordination between subsectors and agencies and ineffective contracting to the list.

In a study of the post privatization performance of Ibadan and Ikeja Disco's over the period 2014 to 2018, Idowu et al (2020) used critical success indicators of load shedding, pricing, metering extent, response to customers, and coverage area. The authors found that both Disco's failed as private firms to meaningfully improve performance in the sector by bringing their technical, management and financial capacities to bear towards ensuring quality service delivery to custumers. This failure of the Disco's to achieve meaningful improvements points to the lack of effective

executive management and sufficient technical skills as well as the absence of or inadequate implementation of appropriate systems and technology.

In a newspaper article (Premium Times 6 July 2019) a previous Chairman of NERC, Sam Amadi stated that the reform has been a serious failure and the Government needs to conduct an urgent in-depth enquiry to determine the causes of the failure. He further states the entire design and implementation process was deeply flawed and needs to be "re-jigged" if there is to be any hope of performance improvement. Causes of the poor outcome in his view were: (i) failure to develop and implement a governance structure and, (ii) failure to evaluate the technical and financial capacity of the private companies before selling the assets. Amadi's criticisms point to a flawed implementation of an already inappropriate reform model coupled with poor governance and a non transparent bidding and award process, pointing to the absence of a suitable enabling environment for such a complex model.

KPMG provides regular updates on the sector via their quarterly reports. The following two reports cast light on progress in the generation area. A Q1 2019 report reported that there had been slow progress in actualizing of the projects of the 14 companies that signed Solar Power Purchase Agreements (PPAs) with the government to build 1,125 MW capacity of renewable power in the country. The report emphasized the importance of creating an enabling environment to accelerate on-grid renewable energy development. In a Q1 2021 article, KPMG reported that although there had been investments leading to an increase of generation capacity over the past seven years, bottlenecks in transmission and distribution had prevented full evacuation of the power leaving the Genco's with stranded capacity. These references indicate that lack of enabling environment, deficient planning and poor industry coordination has resulted in a situation of stranded generation capacity.

Calls for the Government to re-model the electricity industry in Nigeria have been growing more strident over time. Some have called for re-nationalisation of the sector and outright declaration of failure of the privatisation option (Alike 2015; Adewale 2014; Basah 2014 thru Ikeanyibe 2020). Others, including the government and the country's foremost businessman Aliko Dangote, the President of Dangote Group, propose re-privatisation (Sadiq 2016). The urgency to take a re-look at the industry has been recognized by the upper echelons of the Government. In 2019 the Senate noted that there is an urgent need for the Federal Government of Nigeria (FGN) to consider an in-depth review of the power privatisation program with a view to revamping the current arrangement. The Senate argues that there is a likely risk that Nigerians may not enjoy stable power supply in the next 10 years if there is no review and restructuring of the Discos' current operations (Premium Times Nigeria 6 July 2019).

The general published consensus is that the reform has failed to meet the objectives of the exercise on all levels.

The latest development in the sector as reported by LEGIST (2022) reflects the Government's acknowledgement of the reform failure. The Electricity Bill, 2022 was passed on 20th July 2022 and seeks to repeal the Electricity and Power Sector Reform Act, 2005. The primary aim of the bill is to create a comprehensive legal and institutional framework to guide the Nigerian ESI and aims to de-monopolize the generation, transmission and distribution of electricity at the national level and to empower states, companies and individuals to generate, transmit and distribute electricity. States would also be able to issue licenses to private investors who have the ability to operate mini-grids and power plants within the State. However, these state licenses are not to extend to inter-state or transnational distribution of electricity.

At this stage no clarity is provided as to how such a drastically revised framework would be implemented.

6.7 How Critical Elements Impacted the Reform Outcomes

The facts presented in the preceding paragraphs paint a confusing and complex picture. The case study will now be analyzed using the proposed framework to test its validity and sufficiency.

6.7.1 Tier 1 - Government Level

6.7.1.1 Government Support and Political Will

Initially the Government provided strong support in terms of ensuring that the reform was implemented on a fast-track basis. The evidence indicates however that the conceptualization, planning and implementation of the reform on the part of the Government was extremely weak, contributing significantly to a poor outcome. BPE, the Government appointed agency for reform implementation lacked detailed knowledge of power sector reform while the main transaction advisors, CPCS were strong advocates of the neo-liberal based approach. A fast track approach to the reform was adopted without considering contextual factors in spite of the disastrous experience with the telecommunications company privatization in the late 90s and advice from the World Bank to adopt a pilot project approach.

The Government did not wait for all the steps on the roadmap to be finalized before triggering the implementation creating the climate for chaos and poor governance. The main reason given for the rapid implementation was that it was necessary to maintain momentum and prevent political interference. This rapid-fire approach,

referred to as the “Nigerian Way” (Eberhard et al 2016), did not bode well for ensuring a sustainable reform process. The general impression is that the Government simply wanted to demonstrate to voters that they had taken definitive steps to improve the power situation in the country. Short term political goals therefore took precedence over ensuring a sustainable reform process.

Further illustrations relate to the procurement and contracting process. It has been reported that the Government permitted the sale of the dilapidated power infrastructure at prices considerably higher than the actual value while allowing the new owners to finance up to 90% of the selling price with high interest loans. Several have criticized the Government for the failure to properly assess the capacity of the potential owners and conduct the selection on a transparent and merit assessment basis.

While the Government prevented NERC from implementing tariff increases according to the agreed tariff orders, they proceeded to finance top ups to compensate for the low tariffs. While this may be perceived by some as supporting the reform, these subsidies mostly benefitted Genco’s and gas suppliers and in the end had no overall positive effect as evidenced by the trend in KPI’s since 2013. Other Government induced challenges included bottlenecks in transmission due to inadequate planning and insufficient investment and inadequate management of security of gas supply infrastructure (Eberhard et al 2016).

The evidence strongly supports the proposal that consistent ongoing Government support is a fundamental pre-requisite in ensuring positive reform outcomes. Initial strong political support for reform is insufficient and needs to be accompanied by consistent support on all levels of reform implementation.

6.7.1.2 Reform Policy

The basis of the Nigerian reform was the standard neo-liberal model being advocated across the board by the Bretton-Woods institutions without any regard for the particular context of the country. The reform concept did not take into account the intractable problems of the sector and has been described as inappropriate for the context. The Nigerian Government simply accepted this model on the advice of the World Bank and consultants without undertaking their own analysis. Despite lofty ambitions of achieving a competitive electricity market the country is no closer to the goal than it was at the commencement of the reform, illustrating the inappropriateness of the model. It has been posited that that the blind choice of the model is one of the key causes for the reform failure (Nwofia 2016). Stakeholder calls for re-consideration of the reform have been growing more strident over time including a previous chairman of NERC, the Senate President and the Chairman of the Senate Committee on Power.

These calls point to a renewed awareness around the importance of the choice of an appropriate reform model and the dangers of adopting a cut and paste approach in the hope that it will work. This newfound insight on the part of the Senate leadership and key stakeholders may provide new hope for finding a sustainable reform solution for the Nigerian electricity sector, even if it means a return to the drawing board.

6.7.1.3 Institutions and Sector Framework

The weakly embedded rule of law in the public sector has resulted in general ineffectiveness of the institutions of accountability. This failure has negatively impacted the reform outcome in Nigeria (Nwofia 2016). Interviews with stakeholders have further confirmed that the judicial system is weak, and that bribery of senior officers is a common practice. The weak judicial system not only keeps credible foreign investors away from the country but also leaves the way open for general flaunting of rules forming the basis of sector operations).

Confirming current deficiencies in the sector structure, the Chairman Senate Committee on Power, Senator Gabriel Suswan reinforces this point by noting that the provisions of the current Reform Sector Act 2005, which enabled the government to privatise the electricity entity, are no longer enough to drive sustainability and scalability of the sector. He argues that, beyond privatisation, there is a need to have an Electricity Act, which will address specific issues affecting the power sector, prescribe penalties for issues relating to energy theft, and create an environment that gives current and potential investors assurance that their investments are protected (Premium Times Nigeria 6 July 2019).

The current legal and regulatory framework is complicated and designed with a view to enabling competition in the market as soon as possible. Provision was made for interim steps along the way to a competitive market leading to a complex sector structure of multiple agencies and utilities. This overly complicated framework has resulted in poor coordination and confusion while opening the way for poor governance. In the case of Nigeria the complex framework, coupled with inappropriate policy, lack of a suitable enabling environment and a botched implementation, has been detrimental to achieving reform objectives.

6.7.2 Tier 2 – Industry Level

6.7.2.1 Regulation

Evidence points to compromise of the effectiveness of the regulatory function due to political influence. The political environment surrounding the reform has been highlighted by Ogunleye (2016) as having a negative effect on regulatory strength,

implying that political interference in regulation impedes the function. In particular, the Government has compromised the independence of NERC by not permitting the agency to adjust tariffs in line with the agreed tariff orders which formed an integral component of the sector privatization. The Government would have risked sparking social unrest if the tariffs had been raised according to the formula as the quality of power being supplied had not improved and, in many cases, consumers had not been provided with meters and were complaining of over billing. The failure to raise tariffs has in turn perpetuated the sector liquidity issue and stalled investment in infrastructure.

The absence of a formal governance structure for NERC to properly regulate the sector, and in particular the Disco's, has impacted the effectiveness of sector oversight. There was no basis for imposing penalties for poor performance in any event due to the liquidity issue brought about by the Government not complying with their part of the deal and effectively paralyzing the regulator.

The inability of NERC to ensure that all customers are metered or billed accurately has been highlighted by Ikeanyibe (2020). Oyewunmi et al (2016) have opined that this situation portrays NERC as being permissive in allowing companies to recover costs of their business activities including a reasonable return on capital investors by means of estimated billing.

6.7.2.2 Planning and Procurement

System planning is the responsibility of the System Operator (SO) which is incorporated in TCN. While the 330 Kilovolt (kV) network in Nigeria has been assessed to be adequate (World Bank 2018) the 132 kV network needs extensive refurbishment, upgrading and extension to enable full evacuation of available generation capacity. Despite injection of considerable levels of donor funding the network remains constrained. At this stage TCN relies largely on consultants to prepare system development plans. The SO also has its own internal planning department which has been assessed by stakeholders as being lean in technical capacity. Clearly this function needs to be bolstered if optimal use is to be made of the considerable levels of donor funding currently available.

Several power plants in Nigeria are currently unable to operate to full capacity due to insufficient gas supply and lack of demand/inability of the network to evacuate the power as a result of mismatching generation planning with transmission system planning. Until recently generation procurement has mostly taken place on an unsolicited basis. Prospective developers signed Memoranda of Understanding (MOU's) with NBET and applied for licenses from NERC. Once the license was approved the developer was given the go ahead to proceed with the project. Projects

were not selected according to a least cost development plan and developers who managed to secure a gas supply agreement were able to move forward.

In recent years the approach has changed. Projects are supposed to be selected by NBET according to the least cost development prepared by the SO and procured by means of competitive tender. However, NBET placed a moratorium on new generation until the transmission system is able to fully evacuate power and the Disco's able to accept their full quota. The revised procurement methodology therefore remains a purely paper exercise for now.

At the distribution level, individual Disco's are required to carry out planning and prepare investment plans for approval by NERC. Planning capacity in the discos remains at a low level and there is currently no incentive to build this function as there is no finance available for network upgrades and extensions leading to a catch 22 situation.

6.7.2.3 Industry Coordination

The 2019 JICA funded Master Plan Study for Power System Development (page 5) stated that:

"In the power sector, many institutions are involved in policy formulation and their implementation. However, there are signs of a lack of coordination among the ministries during policy formulation. Information sharing is not carried out sufficiently enough for demand forecasting and determining of the target values, and there are often cases in which some policies are not consistent with others".

This report sheds light on an important deficit in the Nigerian power sector. The poor coordination between ministries and lack of strategic direction has a direct impact on the planning process preventing consultants from making accurate demand forecasts and developing plans consistent with sector needs. Apart from planning considerations the situation points to a serious lack of coordination in the sector regarding fuel supply, transmission capacity and capacity of discos to accept power. Ikeanyibe (2021) highlights the importance of efficient coordination by arguing that that the nature of most of the post-privatisation challenges point to a lack of coordination between the private owners and the Government.

Hamza et al (2020) reinforce the point by stating that the direct involvement in the sector of five separate agencies as well as the Federal Ministry of Power, Works and Housing (responsible for policy in the electricity sector) and the Federal Ministry of Solid Minerals, Water Resources and Petroleum Resources (responsible for gas and water supply for electricity generation) provide disparate and uncoordinated inputs to the operation and development of the electricity sector.

6.7.3 Tier 3 – Utility Level

6.7.3.1 Financial Resources

Illiquidity in the sector has been identified as one of the key factors undermining successful outcomes (Eberhard et al 2016, various NERC reports). The Nigerian electricity sector is mired in a situation of circular debt with the Government needing to provide bail outs or loans when the sector debt levels become too high. This situation can be compared with that occurring in Pakistan (Bacon 2019) where insufficient investment and poor governance has led to ongoing poor quality of supply, low levels of revenue collection and ever increasing debt levels necessitating periodic government bail outs. High local interest rates, non-bankability of the discos, non-cost reflective tariffs and high loss levels have all contributed significantly to the current malaise. Ikeanyibe (2020) has identified over-priced assets and the high debt component of the associated financing as further contributing factors.

Since TCN remains an SOE, the sub-sector has benefitted from concessionary loans provided by DFI's. In the case of distribution, the new owners inherited dilapidated and overloaded networks in urgent need of upgrading and refurbishment. The privately owned Discos have no access to this concessionary financing and need to depend on internally generated income and private finance sources, both of which are in short supply. The local banks have ceased granting further loans until the disco owners honor repayment of previous loans. Ogunleye (2016) has cited non availability of low cost finance to the private companies as a significant factor impacting reform success. Until such finance becomes readily available, the idea of improved power supply in Nigeria remains an illusion.

6.7.3.2 Technology, Systems and Processes

The Disco's and TCN are making some efforts to implement new technology to better manage their networks. The World Bank sponsored Nigeria Electricity Transmission Project (NETAP) makes provision for the rehabilitation of the TCN SCADA system including the establishment of two national control centers and six regional control centers. The request for proposals was scheduled to be issued at the time of writing. Given the scope of this intervention there is a considerable way to go before TCN has a fully functional automated control system for the HV network. A complex national monthly financial settlement system has been implemented but it has been established via interviews that the associated processes are inadequate, opening up the way for confusion and irregularities in the monthly settlements. Moreover, the servers housing the settlement system are more than 10 years old and urgently need upgrading.

Eko Disco became the first to implement a SCADA system for managing the 33kV network. Given the dilapidated state of the infrastructure it is doubtful however, that such a system would materially contribute to improving network operations. Various discos have also upgraded billing and pre-payment management systems including associated processes as well as enabling a variety of payment methods including mobile options. Stakeholders report that associated processes have been developed and implemented and capacity building provided by system suppliers. Despite these upgrades most Discos have been reluctant to increase the percentage of metered customers despite funds being available. The reason would seem to be the intention to continue with the practice of estimated billing on a large scale thereby effectively bypassing tariff structures and enabling the practice of over-billing.

6.7.3.3 Executive Management

A critical analysis was done in 2016 concerning the importance of effective management of TCN and the Discos (Igwemeze 2016). Drawing from the various secondary data collected from the internet, books, government gazettes, published articles, newspapers and journals, this study examined transmission and distribution in Nigeria from the management perspective. The results obtained indicated multiple shortcomings related to management competence and the negative impact effectiveness and efficiency of the distribution of electricity in Nigeria. In particular, they posit that appropriateness of policies developed by management as well as the quality of leadership play a role in determining performance. The study concludes that senior management need to be critically aware of the implications of policies that they are thinking of implementing and adjust their decisions accordingly. The study also points to the low level of technical competence of staff further reinforcing the need for competent technical and managerial leadership in the Nigerian sector.

Given the political environment of Nigeria, apart from having the required level of technical expertise, senior management clearly need to understand the dynamics of dealing with the Government and other stakeholders as well as be able to build strong relationships while ensuring the utility remains insulated from political interference of any type. Interviews with stakeholders revealed that the requirement for political connections is especially important in locations with a high number of Government institutions such as Abuja where political connections are required to ensure that payment obligations are met as well as to withstand the inevitable number of favors being requested by high profile consumers. A further complicating issue in the Nigerian case is that owners in some cases play an active role in daily management of the utility in the name of protecting their investment and sometimes overriding decisions made by the executive management. The owners have little knowledge of the sector, and their often aggressive involvement undermines the authority of the executive management, weakens governance and sows confusion and sometimes fear amongst staff.

6.7.4 Cross-cutting Elements

6.7.4.1 Corruption

Nigeria has a poor reputation in terms of corruption levels. In terms of the Transparency International Corruption Perception Index, Nigeria currently ranks no 154 compared to the lowest score of 179 (Somalia). Nwofia (2016) highlights the clear lack of commitment of national leaders to combat corruption as well as the ineffectiveness of institutions responsible for accountability as key reasons for the failure of the reform. He further contends that the weakly embedded rule of law in the country is the key cause of this poor governance and asserts that some Government leaders are unable to rise above private interests to protect the broader public interest. Nwofia emphasizes the importance of creating a conducive investment to promote foreign investment and proposes that the only way to achieve this is for Government to adopt a zero tolerance attitude to corrupt activities and sleazy deals. Abu and Staniewski (2019) have emphasized the major impact of large scale corruption in the public sector on all aspects of the Nigeria economy. They have submitted that corruption is deep rooted is in almost every segment of the economy including the various arms of government. Idowu et al (2019) assessed the performance of two Disco's Ibadan and Ikeja over the period of 2005 to 2017 and concluded that privatization had done very little to improve efficiency. The authors conclude that the sources of private electricity sector firms' profit in Nigeria are inflated procurement contracts, patronage and corruption.

A recent newspaper article on the Nigerian power sector (The Guardian 2021) has succinctly described the effects of corruption on the sector:

"Ultimately, corruption is the power sector demon. It heavily bleeds government investments in energy and stifles efforts that are designed to boost the availability of electricity in the country. Until this monster is vanquished – regardless of how much cash & expertise are infused into the sector – many Nigerians will remain in 'darkness' with sporadic voltage supply."

The clear takeaway is that corruption is a national endemic problem negatively impacting the electricity sector at all levels and including the full spectrum from grand corruption to petty corruption. This strongly validates the assertion in the proposed theoretical framework that corruption is indeed a cross cutting element seriously impacting performance of all levels of the electricity sector in Nigeria.

6.7.4.2 Exogenous Factors

Nigeria has experienced rapid economic deterioration during the current president's 8 years in office. Production of oil has almost halved while inflation has almost

doubled. Economic growth has slowed, averaging just 1.1% annually from 2015 to 2021 (Bloomberg 2023). Multinational companies have been scaling down their operations (eg Procter and Gamble, a major employer, closed their doors at their $300M plant in Agbara in 2018 – the plant had been operating for scarcely one year). The US Dollar Nigerian Naira parallel exchange rate has plumetted from around 160 N/1USD in 2013 when the privatization was launched, to the current parallel rate of around 750N/1USD. This rapid currency depreciation has seriously impacted Genco's and Disco's ability to operate due to (i) the utilities requirement to repay foreign denominated loans, (ii) majority of equipment required by the utilities being priced in foreign currency and, (iii) the Government not permitting NERC to raise tariffs in accordance with exchange rate variations as specified in the MYTO. Coupled with high levels of loss and foreign loan commitments, the privatized utilities have therefore not been able to make the required investments that would contribute towards improved power availability and quality.

It is clear that in the case of Nigeria, macro-economic factors and particularly currency depreciation have been a significant factor contributing to the crippling illiquidity of the sector. This finding confirms the proposition that macro-economic stability is a cross cutting element that has impacted the Nigerian electricity sector across the board.

6.7.4.3 Human Capacity

The theme of inadequate human capacity is woven through the sector starting with the initial design of the sector structure. Ogunleye (2016) emphasizes the importance of adequate human capacity for successful reform. The failure of the Government to properly prepare the sector for handover to the private sector points to a lack of technical and administrative capacity in the Government. Lack of capacity has also led to poor coordination between Government ministries and agencies and resulted in mixed messages being sent to operational utilities. The lack of dynamic system planning has been identified as a serious deficit in the sector. While TCN/System Operator is responsible for system planning, there is a lack of technical expertise in the company to fulfill this important function. Effective oversight of the Discos by NERC has also been identified as a critical failing, calling into question the capacity of the agency staff to develop regulations and processes to enable such oversight. At the Disco level a number of serious failings point to a lack of technical and administrative capacity among staff. The majority of new Disco owners had no knowledge of the sector when they took over operations and yet insist on playing a leading role in management in some instances leading to a lack of consistent long term strategy and planning, and an unproductive fire-fighting mentality. The expectation that privatization would build capacity in the sector has not materialized. Many experienced staff left the utilities when they were privatized and little has been done to build up capacity in the interim.

6.8 Conclusions

The failure of the reform in Nigeria highlights in dramatic fashion the critical elements required to achieve sustainable outcomes in the process of reform. The evidence presented by the Nigerian case strongly supports the proposal that Governments need to play a key role in reform efforts. The lack of Government support in the reform contributed significantly to the failure. Likewise, the inappropriate and over complicated sector framework resulted in lack of coordination between sector entities. Weakness of the judiciary resulted in protracted legal disputes in the sector.

On the industry level, effective sector planning and judicious generation capacity procurement are conspicuously absent while regulation remains unbalanced and skewed towards interests of the private investors. Coordination between Government ministries and sector agencies is disjointed sending confusing messages to operational utilities.

On the utility level many operations were sold to investors with no knowledge of the sector. Development of processes to ensure effective financial technical and commercial management has largely been neglected. Sector illiquidity has prevented access to sufficient finance for most utilities as well as threatening the viability of existing Genco investments. While limited progress has been made in terms of installing SCADA and improved billing and pre-payment platforms, insufficient metering remains a pervasive problem.

Significant corruption is endemic throughout the country. High corruption levels weaken governance in the electricity sector and reduce transparency and effective NERC oversight– to the extent that credible international investors, aware of the poor governance in the country, did not even bid for the privatized entities. Sabotage of gas infrastructure has severely impacted power production. Theft of electricity by customers is a pervasive problem. Macro-economic factors, including depreciating local currency, fluctuating oil prices and poor fiscal management by the Government, have all contributed to the poor reform outcome. Lack of human capacity has been a common theme through the sector affecting the Government, sector agencies and utilities. Many experienced staff either retired or left the sector at the time of privatization and insufficient attention has been paid to building capacity amongst younger staff joining the sector.

Analysis of this complex outcome using the proposed framework has brought clarity to a confusing and complex picture. In terms of the material presented in the case study, the framework has been shown to be both valid and sufficient in the case of assessing the Nigerian reform.

Chapter 7

Case Study: Cameroon

7.1 Introduction

The power sector reform in Cameroon was one of the first reforms to be implemented in SSA. It is unique as it is the only reform in SSA where a fully integrated state-owned utility, SONEL, was successfully concessioned out to a private company. Other important points of interest are the background macro-economic factors which were ultimately the main drivers for the reform. Since reform implementation in 2001, progress has been mediocre, and the many obstacles encountered along the way constitute valuable lessons related to reform outcomes. There is a limited amount of published literature on the Cameroon reform while annual reports are only available after the investment firm Actis took over the concession in 2014. Sources of information include limited academic papers, media articles and interviews with sector stakeholders.

7.2 The Lead Up to the Reform

Pineau (2004) provided a succinct summary of the events leading to the privatization of the state-owned electricity utility SONEL in 1998. The recent economic history of Cameroon can be divided into four periods (Ghura 1997): the pre-oil periods (1963-77), the oil boom period (1978-86), the recession period (1987- 93) and the post-devaluation period (post 1994). During the oil boom period, the state had the financial means to start launching ambitious economic policies, which resulted in them becoming a powerful player in the economy. State companies became involved in all sectors and state revenues kept rising until 1984. Decreasing world prices for oil, cocoa and coffee created a budgetary crisis that peaked in 1987 with a deficit of approximately 13% of the GDP. However, the state-owned companies were not able to adapt to new market conditions and the government did not adjust expenditures to reflect its lower income. This inaction resulted in the catastrophic fiscal situation of Cameroon at the end of the 1980s which gave rise to the first structural adjustment program set up in 1989 by the World Bank and the International Monetary Fund (IMF) and followed by two others similar programs. The first two loans focused on price reforms, new legislation and creation of institutions to implement privatization of state-owned entities. The third loan, Structural Adjustment Credit SAC III (US$180million), starting in 1998, focused inter alia on implementing privatization programs (World Bank 1998). Reducing corruption was also an objective, by increasing transparency (World Bank 1998).

There is strong evidence therefore, that the main driver for the privatization of the state-owned electricity utility, SONEL, was to meet a commitment to comply with

requirements of the SAC III credit and not a decision based on the specific situation of the company. This view is further supported by the statement in World Bank 2004(c) that the primary objectives of SAC III were to help improve Cameroon's competitiveness through support for completing the privatization program, with an emphasis on public utilities. In a 1996 document the World Bank identified the following general problem areas related to SONEL: (a) state interference in the day-to day management, (b) lack of transparency, (c) lack of competition, (d) weak ministerial oversight and, (e) high costs of production and delivery World Bank (1996). These correspond to the standard reasons for neo-liberal reform quoted in multiple World Bank papers. The Cameroonian government developed a similar list of reform drivers: (a) to use private sector investment and to benefit from its expertise, (b) to improve service quality, (c) to increase access to electricity up to 31% in 1999 and 49% in 2019, (d) to improve efficiency in production, transmission and distribution, (e) to supply electricity at a competitive price, (f) to take advantage of the national hydraulic resources and, (g) to involve the national private sector in the electricity sector and in Sonel's capital (Republic of Cameroon 1998) (per translation in Pineau 2004). There is no further evidence that the Government, the World Bank and its transaction advisor, the International Finance Corporation (IFC), explored any alternative strategies alternative strategies to achieve the same goals.

Two important areas not considered by the DFI's have been highlighted (Pineau 2006): (i) growing financial costs due to high interest rates and depreciating currency and, (ii) Government diversion of SONEL funds for purposes other than electricity sector operations and maintenance and investment expenditures. These omissions contributed to the adoption of an inappropriate reform model. The Government, in order to have access to the SAC III loan, did not have any choice but to move ahead with the privatization as prescribed by the World Bank. As the solution was to a large degree imposed on the Government, the approach did not bode well for long term unwavering Government support for the reform.

7.3 Procurement of the Concessionaire, Change of Ownership and Contract Extension

The privatization of SONEL was enabled through a World Bank Credit of 20.9MUSD – the Public/Private Partnership for Growth and Poverty Reduction Project under which the IFC was appointed by the World Bank as the transaction advisor. Five international companies initially expressed interest for SONEL (Bagui Kari 2001, through Pineau (2004): the state-owned French company EDF, the state-owned Canadian company HQI, the publicly traded American company AES Corporation, the state-owned South African company Eskom and the publicly traded Spanish company Union Fenosa. AES Corporation was the only company to actually bid in November 2000 and was designated as successful bidder in February 2001. No comment on the lack of competition in the bidding process was made. The fact that two traditional Sonel

partners, EDF and Hydro Québec, chose not to bid is a good indication that they assessed the project as being too risky and challenging to enable a successful outcome. It seems likely that the Government of Cameroon accepted the sole bid merely to make progress with privatization, a condition to access the SAC III credit. Despite the warning signs around the perceived risk of the project, the World Bank along with the IFC continued to support the concession award (Pineau 2004).

On July 18, 2001, a 20 year concession contract defining the terms, conditions and obligations of the concessionaire was signed between the Government and the AES Corporation. The privatized company was renamed AES SONEL with a shareholding of 56% by AES with the remainder being held by the Government. Despite requirements for transparency as per article 3 no 2 of decree no 2000/464/PM, the concession and subsequent amendments, have remained entirely unavailable for private scrutiny (Pineau 2004). This approach did not permit accountability and public scrutiny of the operation. Over the years there have been several re-negotiations of the contract with AES SONEL related to revision of original targets and requirements.

In 2014, AES sold its stake in the SONEL to Actis and divested from the Dibamba and Kribi IPP's which were taken over by Globeleq. The distribution company was renamed ENEO. The official reason given by AES Corporation for exiting the contract was that the company was streamlining its activities and no longer wished to remain in the African market. Clearly the company viewed the profit margins in the distribution operation as inadequate for the intensive work involved in operating a small concession in a challenging country environment.

After taking over in 2015, ENEO submitted an infrastructure investment program (FCFA 900 billion) to the Government requiring long term loans. The remaining six years of the contract were insufficient to cover the loan repayment term, hence Actis requested the Government for an extension. After months of negotiation, ENEO was finally granted a ten year extension on its concession in 2017. The aim was to align the concession duration with the loan terms.

7.4 Sector Context

7.4.1 Electricity Law 1998

In 1998 within the context of requirements for structural adjustment credits, the Government of Cameroon passed the Electricity Law (Law no.98-22 dated 24 December 1998) followed by a Decree in 2000 (Decree no. 2000/464 PM dated 30 June 2000) governing the electricity sector. On the basis of this framework AES SONEL was granted the monopoly concession over transmission and distribution and the right to own up to 1,000MW of generation capacity including existing power plants and the right to develop further capacity. Notably the reform model did not involve

unbundling of the sector in any way. The private sector was therefore allocated the responsibility for financing operations and expansion of the entire value chain from generation to retail in the context of a country with dilapidated infrastructure, low levels of grid access and high corruption levels. The consequences of adopting this approach were to play out over time.

The structure of the sector is complex, comprising several entities with overlapping roles in some cases. The Ministry of Energy and Water (Ministère de l'Eau et de l'Energie, MINEE) is responsible for developing sector policy, system planning, generation procurement and monitoring energy sector activities. Other entities established through the reform include the Electricity Regulator ARSEL (Agence de Régulation du Secteur de l'Electricité), established through the 1998 Electricity Law, the Rural Electrification Agency (Agence d'Electrification Rurale - AER), responsible for promoting and developing electrification projects across the country and established by decree in 1999, the Rural Energy Fund (FER), managed by the AER to subsidize electrification projects and established by decree in 2009, the Committee for Planning and Programming of Rural Energy Projects (Comité de Planification et Programmation de l'Energie Rurale – Copper) responsible for ensuring the proper allocation of resources administered by the FER and finally the Electricity Development Corporation (EDC), a state-owned company responsible for supervising selected hydro projects. Given that the current number of electrical customers remains quite low at around 1.3 million, the following questions needs to be posed (i) whether such a limited customer base justifies the significant operational cost to the Government of these entities and, (ii) what the impact is on sector efficiency resulting from a high likelihood of poor coordination and communication between agencies?

7.4.2 The Road to Reform Restructuring

In 2011 a revised Electricity law was enacted (Law N ° 2011/022 of 14 December 2011). This law introduced several key changes to the sector structure:

7.4.2.1 Transmission

Significantly, the 2011 Law introduced substantial changes in the transmission sub sector in the form of a requirement to vertically unbundle the utility and to re-nationalize the function by means of establishing a state-owned entity. Over time it had become clear that AES SONEL did not have the capacity to meet the high level of investment required in the transmission network. The only solution therefore was to take a step back and to unbundle transmission from distribution and re-nationalize it. In this way the new entity would have access to low cost donor financing to enable the connection of the northern and southern grids and further rehabilitation and extension of the network to meet increased demand. The new transmission utility was named SONATREL. ENEO's historic role in the electricity market therefore changed

from being a vertically integrated company to a distribution company with some generation capacity. This is a typical hybrid arrangement seen in many countries in the region. This case of Cameroon is unique in the region, being firstly fully privatized and subsequently partly unbundled with transmission reverting to being an SOE.

7.4.2.2 Water Management and Storage

Previously managed under concession agreements, the Law delegated this function to the state-owned entity EDC who is now in charge of water storage facilities on the Sanaga River. The law defines the main two management principles: optimising water resources and granting non-discriminatory access to users. The management of water resources is of utmost importance on large rivers like the Sanaga, where the main historical hydroelectric facilities operate (the 264 MW Edéa plant and the 384MW Songloulou plant, the largest in the country) and where at least three major hydroelectric projects are being developed including the 420MW Nachtigal project, developed by a consortium including EDF, IFC and the state. Both current and future power producers need to have security and visibility of the upstream and downstream water levels, both of which can have effects on the performance of their plants.

7.4.2.3 Competitive Procurement

The 2011 Law clarifies the procurement processes for production, transmission and distribution projects. The previous law and decree did not include a clear general obligation to use competitive procurement for new production, transmission and distribution capacities. As such, IPPs were not subject to a bidding procedure. The Government was in the habit of signing multiple MOU's with prospective developers with no regard to a least cost development plan. This has now changed and the 2011 Law and an implementing decree dated September 24, 2012, enacted the principle of competitive bidding and generalised it to all segments of the electricity market (including IPPs). By exception, direct procurement without public tender is permitted if necessary and in conditions set out in the decree of September 24, 2012: (i) emergency, or commitments of the state prior to the decree publication, (ii) for strategic industrial projects, subject to certain conditions and, (iii) for rural electrification projects. Hence there are still openings available for non-competitive procurement to take place while the definition of roles and responsibilities related to procurement of additional capacity as well as system planning remain vague.

7.4.3 Implementation of the 2011 Modification

The implementation of the modification has been lengthy and complex. Numerous issues needed to be addressed including the following:

- Execution of an agreement between SONATREL and ENEO regulating the transmission activities and addressing issues such as an allocation of liabilities in case of transmission failure or force majeure
- Transfer of ENEO personnel to SONATREL and addressing the consequences for the status and remuneration of the employees
- Ensuring that SONATREL will have the management capabilities and technical knowledge to enable the network to ensure network planning, construction and network operations and maintenance are efficiently carried out
- Reaching agreement on the transmission fee and the impact on the customer
- Developing an appropriate grid code

The transmission system was finally handed over to Sonatrel in 2019 with many items on the above list remaining outstanding. Due to a lack of capacity in SONATREL, ENEO has been providing technical assistance to the company when required. It is important to note that ENEO was prevented from making investments in transmission from 2012 onwards resulting in a decline in system reliability.

The first significant DFI investment in transmission (Electricity Transmission and Reform Project in the amount of US$325M) was launched by the World Bank in 2017. The main objectives of the project were to: (i) provide support to the operationalization of SONATREL's transmission portfolio, (ii) strengthen the transmission network by improving capacity and reliability and, (iii) project management support and technical capacity building among key stakeholders including MINEE, ARSEL and AER to ensure clarity of roles and to bolster sector governance (World Bank 2016b).

The latest Implementation and Status Report (World Bank 2021a) indicates that the implementation of the project has been extremely slow with only 5% of funds disbursed after the effectiveness date of October 2017. The report states that this is mainly due to slow procurement processes. The report further states that SONATREL is operational but still faces financial difficulties linked to the overall situation of the energy sector. The Market Code and Connection Code were signed but there is still a risk of non-collection of transmission tariff revenues as contracts with SONATREL's clients remain unsigned.

7.5 Reform Outcomes

The following paragraph references a report prepared for the World Bank in 2015 on the topic of Performance of Rural Electrification Concessions (Castalia 2015) as well as data extracted from the 2014 and 2019 ENEO Annual Reports. The Castalia report focused mainly on degree of success related to new connections although an opinion was also provided on network performance and long term sustainability of the concession.

7.5.1 New Connections

Between 2001 and 2015 the concession was assessed moderately successful by Castalia in terms of – approximately 570 000 additional connections were made, 190,000 of these connections are to rural households. When AES SONEL took over SONEL in 2001, the company only had 427,000 customers. The initial concession agreement with AES SONEL required the concession to add at least 50,000 new connections annually but for the first five years the concession fell far short of this target adding only around 20,000 connections annually on average. In 2006 the connection rate improved and in 2012 AES SONEL reported having 780,000 customers. Most new connections were the result of grid densification rather than grid extension. Approximately 45% of these customers live in the main cities of Yaounde and Douala according to the report. Between 2014 and 2019 ENEO annual reports indicate that the customer based increased from 783,000 to 1.36 million. Annual reports also indicate a recent slowdown in the rate of new connections from 3.49% in 2014 to 1.02% in 2019 but provide no particular reason for this trend.

7.5.2 Quality of Service and Loss Reduction

The results around improvement of quality of service was assessed by Castalia to be mixed. In the first 10 years, there was no significant improvement. This was partly attributed to a lack of capacity at the sector regulator ARSEL. The ENEO annual reports show an improvement in distribution network performance between 2014 and 2019 as follows: SAIFI decreased from 45.9 to 26.8 while SAIDI decreased from 157.1 to 90.5. Over the same period however, overall losses increased from 30.9 to 32.0%. Neither AES SONEL nor ENEO have managed to achieve a sustainable reduction in losses.

7.5.3 Financial Sustainability

Castalia assessed the concession to be relatively financially sustainable, premising their view on the fact that the 56 percent equity stake in the company increased in value from US$71 million to US$220 million between 2001 and 2014. The 2019 Annual report of ENEO however, paints a more recent picture indicating a negative net income figure of XAF23.8 billion and demonstrating that financial sustainability was not being maintained.

The financial situation appears not to have improved in the interim. It was reported in June 2021 that generation from ENEO owned thermal facilities had decreased by 32.6% compared with the same period in 2019. This was caused by generation rationing at some plants brought about by ENEO's inability to pay fuel suppliers due to enormous cash constraints. ENEO was unable to pay suppliers that provide gas for ENEO Gas to Power plants as well as Agrekko and Globeleq which supply power to

ENEO. Altaaqa which operates and maintains the generator at Logbaba in Douala, has shut down operations completely due to non-payment. ENEO reported that production at the Agrekko plants situated at Bertoua and Maroua as well as the Globeleq plants, Kribi and Dibamba fell drastically as a result of the situation.

A recent report in the local publication Business in Cameroon (27 January 2023) provides further insight into the financial situation of ENEO. It is reported that as of May 31, 2021, the State of Cameroon was the client with the largest share (XAF 163.078 billion) of the Eneo debt portfolio estimated at XAF207 billion as that time. ENEO owes over XAF60 billion to its state-owned suppliers. It still owes electricity transport company SONATREL and electricity development corporation EDC but the amount of this debt is yet to be published. While it was reported that the Government was gradually repaying the debt, in reality the debt was increasing due to the accumulation of ALUCAM and CAMWATER bills.

7.6 Analysis of Reform Outcomes Using Analytic Framework

The first part of the chapter provided the context reform and presented an overview of outcomes while the second part focuses on analysis of the factors contributing to reform outcomes using the proposed analytic framework as a basis.

7.6.1 Tier 1 – Government Level

7.6.1.1 Government Support and Political Will

Given that the Government was given no choice in accepting the privatization of SONEL as part of complying with the requirements of the SAC III loan, the probability for long term consistent support of the privatization of SONEL was compromised. Even though the procurement process amounted to a sole source bid in the end, the contract negotiation and award was finalized on a fast track basis with minimal Government contribution to the process.

ENEO, as at the time of writing is experiencing a serious debt issue which is severely impacting operations and damaging the credibility of the company as well as Cameroon as a whole. The main reason for this unfortunate situation is the failure of the Government to make payment for its electricity bills as explained in the earlier part of the chapter. While an agreement has been made for the Government to repay the debt, only partial payment has been made and the debt level is increasing again. Another contributing factor to the situation is the refusal of the Government to increase tariffs according to the concession agreement. Tariffs have remained frozen since 2012 for political reasons and the Government has been responsible for making up the shortfall in revenue. These payments have been made over the years but there has almost always been a delay in remittance, The consequent erratic cash flow has

impacted the operations of the concession since 2012 and limited ability to raise additional financing from the lenders.

While the Government initially appeared to support the reform, their actions have indicated a waning support level over the years. Failure to meet financial obligations, refusal to raise tariffs as originally agreed and general lack of responsiveness have resulted in the present chaos. The sector has been seriously impacted by the situation while the reputation of the country as an investment destination has been damaged. The evidence is clear that the lack of focused and consistent support from the side of the Government of Cameroon has been a significant factor contributing to the poor reform outcome.

7.6.1.2 Reform Policy

The literature revealed that the application of a long-term concession model to a small vertically integrated utility in a fragile country environment is inappropriate. Over the initial ten year of the concession term it became clear that AES SONEL did not have the required financial capacity to upgrade and extend the dilapidated distribution and transmission networks in the country. Progress in network investment was effectively stalled as concessionary funding from DFI's was no longer available due to the utility being in private hands. In particular, transmission urgently required funding as at the time of takeover there was no interconnection between the North, South and Eastern networks. After a [protracted period the World Bank and the Government finally concluded that the only way to adequately fund the transmission network was to unbundle and re-nationalize the transmission sub sector. The Electricity Law of 2011 provided for this major restructuring of the sector. SONATREL finally took over transmission in 2019 after an 8 year period during which no investment was made in the network.

The establishment of the AER paved the way for concessionary finance to be applied to rural electrification given that a private company would not be willing to support. Once commissioned, the newly electrified networks are handed over to ENEO for operation. Initially the World Bank was advocating a private sector approach to rural electrification but when this model proved unworkable, the restructuring of the Energy Sector Development Project in 2012 (World Bank 2012) allowed for conventional grid electrification to be done, opening the way for the progress in rural electrification achieved to date.

The transaction costs to implement the reform have been considerable not to mention current operational costs which are certainly higher than they would have been for a state-owned vertically integrated utility. It is clear that the hasty implementation of an inappropriate model is a major contributing factor to the poor outcome of the Cameroonian electricity reform.

7.6.1.3 Sector Framework and Institutions

The sector framework is defined in the Electricity Law and associated legislation. The framework is highly complex for a country with a small system. The framework does not adequately address the key issues issue of system planning and capacity procurement. When considering the limitations of the country enabling environment, the sector framework can be assessed as having key omissions as well as being overly complex with little chance of being implemented successfully.

As a result of the political culture in Cameroon there is a strict top down approach to decision making in Cameroon. The President has been in power for almost 40 years while the Presidency carries more authority than the Ministries and in consultation with the President, is responsible for many key decisions across the board. There is a high turnover of ministers and deputy ministers with an associated turnover in senior staff. Respondents report that this situation has promoted the cultivation of a culture of mistrust and confusion which permeates all aspects of society. This situation is not conducive to the promotion of strong sector institutions. In particular, the judiciary is not generally viewed as impartial and independent from the Government. MINEE plays a key role in the electricity sector but does not carry sole authority with respect to policy making although they are officially responsible for this function. MINEE is also responsible for system planning and renewable energy planning, generation procurement and supervision of ENEO, but their capacity remains limited. The political climate in Cameroon will need to improve before there can be meaningful progress towards establishing strong and credible institutions.

7.6.2 Tier 2 – Industry Level

7.6.2.1 Regulation

Given the current complex sector structure, strong regulation is required to oversee the distribution concession and IPP's and oversee the sector in general. The following factors mitigate against effective regulation in Cameroon: (i) the relative weakness of ARSEL weighed against the capacity and political leverage of both the concession owners, Actis Private Equity Fund and the IPP owners Globeleq and, (ii) the direct communication between the Presidency, MINEE and the privately owned companies, effectively leaving ARSEL out of the picture in many cases and with limited independence, (iii) the Director General (DG) and the commissioners are government appointees, and the DG reports directly to the Minister of Water and Energy, (iv) the institution has limited funding and a low level of technical expertise and, (v) ARSEL is responsible for calculating tariff increases but the Government has not permitted a tariff increase since 2012 and instead choses to top up the finances of the distribution utility with state subsidies.

ARSEL is responsible for overseeing the operations and finances of ENEO and the IPP's. Oversight has been weak as the privately owned companies have been reticent to provide the required data while ARSEL has neither sufficient leverage nor the required skills and systems to conduct the required in depth analysis. Reporting standards are inadequate and the last publicly published ARSEL annual report was in 2017. The absence of subsequent reports combined with the mediocre quality of reporting in available reports point to the lack of capacity in the agency.

7.6.2.2 Planning and Procurement

The 2011 legislation forming the basis for the second round of reforms did not allocate specific responsibilities related to system planning and generation capacity procurement to defined sector agencies. Mention was made that the transmission company will be responsible for system planning and demand side forecasting, but no further details were provided. Since the privatization of SONEL, planning has been the responsibility of MINEE who appointed consultants using donor finances to prepare medium term least cost development plans when donor funding is available. By default, the concession was left the responsibility to do detailed network planning while the AER was responsible for developing rural electrification plans. There is insufficient provision to ensure efficient coordination between these various planning activities. SONATREL is now responsible for network planning but lacks the required skills to perform the function.

Although the legislation now specifies competitive bidding is required procuring generation capacity, the private sector has in the past frequently submitted unsolicited proposals to the Government for developing generation capacity. In most cases the Government signed MOU's with the companies concerned without due regard for long term planning and without consultation with the distribution company. This did little to encourage procurement of least cost generation capacity. While the 2011 law states that competitive procurement is required, sole sourcing can still be done under certain circumstances, leaving the door open for uneconomic politically driven projects.

7.6.2.3 Industry Coordination

The plethora of sector agencies poses a challenge for effective sector coordination in the Cameroon context. Generation projects are sometimes implemented by the Government without proper planning and procurement leading to (i) delays in implementation and commissioning, (ii) poor plant performance due to absence of proper hydrology studies, (iii) absence of transmission infrastructure at commissioning time and, (iv) lack of transparency around financial arrangements and tariff negotiations. The Memve'ele and Mekin hydro power plants are cases in point.

At the Government level both the Presidency and MINEE issue instructions on policy and operational issues, leading to confusion in the sector. ARSEL is frequently bypassed in the process and so is left in a weak position and unable to play a meaningful role. AER is responsible for rural electrification planning and implementation of projects, but this is frequently not done in close consultation with ENEO leading to planning deficiencies, delays in commissioning and poor power supply quality for the newly electrified areas. The long period required to operationalize SONATREL further points to a lack of efficient coordination and accountability between sector stakeholders. At the time of writing ENEO had not been compensated by the Government for the value of investments made in transmission infrastructure from 2001 to 2012. The recent and current political environment in Cameroon has impacted effective coordination between power sector stakeholders, effectively blocking progress towards positive reform outcomes.

7.6.3 Tier 3 – Utility Level

The analysis is based on the situation in ENEO. As SONATREL has only been in operation for a short period, information is as yet unavailable.

7.6.3.1 Financial Resources

The current financial situation facing ENEO and the reasons resulting in the crisis have been described in the above paragraphs. As stated previously the company has not been able to fully meet commitments to suppliers of fuel and power. ENEO is unable to deliver effective services given the debt levels and cash flow issues. The failure of Government to meet obligations has largely resulted in this situation. One of the main objectives of privatization is to remove the fiscal load of the sector on the Government but in the case of Cameroon the Government, for political reasons, is still subsidizing ENEO after 20 years of privatization. The financial outcome of the reform is far from satisfactory and has resulted in sector progress being stalled for an extended period. The current financial position of ENEO echoes the situation of state-owned utilities in the nineties when bankruptcy was the order of the day.

7.6.3.2 Technology, Systems and Processes

The loss level in Cameroon has remained stubbornly high at around 30% for the duration of the concession, even increasing by 2% between 2018 and 2019. Ongoing losses are strongly indicative of inadequate systems, processes and skills levels. With respect to technical loss reduction, little progress has been made in implementing an online grid metering system which is an essential tool to control losses. Effective reduction of non-technical losses likewise requires appropriate systems and processes as well as skilled human capacity. It has been reported that ENEO is in the process of procuring a modern information management system (IMS) with multiple

functionalities which will assist in enabling control of energy balance. Implementation of pre-payment systems metering has only commenced recently and the existing billing system will be upgraded to service large customers. It is a mystery why it took the private sector 20 years to finally decide to procure appropriate technology to enable efficient commercial management when the benefits clearly outweigh the cost of such systems. Once the systems are in place, ENEO will need to allocate resources to ensure that effective processes are implemented, and staff effectively trained to ensure sustainable performance improvement. If this important aspect is overlooked, the investment will not result in measurable improvements.

7.6.3.3 Executive Management

The management of the state-owned SONEL had been relatively stable with one general manager (GM) from 1989 to 2001. Between 2001 and 2012 AES SONEL appointed 3 general managers – Mark Miller (2001-2002), Helen Tarnoy (2002-2004) and Jean David Bille (2004 to 2014). The first two GM's were expatriates and only the second spoke limited French, the predominant language in Cameroon. Jean David Bille had been working for SONEL since 1977 and no reason was given for his appointment as GM in 2004. It has been assumed that after the difficult start to the concession, AES decided it was necessary for the GM to be Cameroonian to facilitate effective liaison with the Government and other sector stakeholders. Bille remained in the position for ten years and despite general acceptance by both AES and the local staff, failed to effectively manage key issues during his tenure. While the concession made good progress in terms of additional connections and improvement of network performance, there was no progress in reducing loss levels and improving finances. The Actis buy out of the utility signaled a new direction for the utility which is now gradually on the path to upgrade key systems and technology. This progress has been offset by ENEO's precarious financial situation brought about by the Government's unwillingness to meet financial commitments. Although the executive team has engaged intensively, the issue seems only to be partially resolved. The current situation in ENEO points to the importance of having a competent and politically connected executive team in place. While technical issues are now more effectively addressed, the executive team has failed to make meaningful progress in resolving the current financial crisis, even though the Secretary General of the Prime Minister's Office remains the appointed chairman of ENEO.

7.6.4 Cross-cutting Elements

7.6.4 1 Corruption

Little mention is made of corruption in reports related to Cameroon. Transparency International currently rates Cameroon as 144 out of 180 countries, indicating a significant level of corruption.

While not explicitly stated in any publication or report there are a number of characteristics of the Cameroon power sector that point to high levels of corruption. The first is a lack of transparency – the concession agreement with ENEO and previously with AES SONEL has never been publicly disclosed. Secondly the annual reports issued by ARSEL are sporadic and poorly presented with no emphasis on key points such as power quality and ENEO performance. Thirdly the Government has consistently refused to apply a cost of service-based tariff to be applied to ALUCAM or other large industrial users, leaving the residential and commercial sectors to subsidize the industry. These factors are indicators of corruption that, despite the reform, continue to exist at all levels in the sector. Until effective accountability is required across the board, poor governance will in all likelihood prevail and sector performance will be mediocre at best.

7.6.4.2 Exogenous Factors

During the period 1987 to 1994 Cameroon experienced negative growth (World Development Indicators 2020). This situation severely impacted the financial position of state-owned utilities and resulted in the privatization of SONEL in 2001. The country has experienced positive growth in the subsequent 19 years while the currency has remained pegged to the Euro. Significantly the growth indicators show a downward trend in national growth to 0.73% in 2020 due to the political strife as well as external factors such as fluctuating oil and commodity prices and the COVID pandemic. The current reluctance of the Government to meet financial obligations to ENEO would seem to be linked to the weakening fiscal situation, indicating a link between reform outcomes and macro-economic factors.

7.6.4.3 Human Capacity

There are multiple indications that lack of skilled human capacity has impacted the reform outcome in Cameroon. The lack of progress in implementing DFI funded projects points to a serious lack of technical skill in the counterpart agencies. The World Bank funded Electricity Transmission and Reform Project was launched in 2017 and has disbursed at a glacial rate reaching 5% by 2021 and delaying upgrade and extension of critical infrastructure. Rural Electrification projects implemented by AER have disbursed at similarly low rates. The poor quality of reporting by the Regulator ARSEL indicates a low level of technical capacity in that agency. The turnover of energy ministers and their senior staff have not contributed either towards formulation and application of consistent policies or to ensuring efficient planning or generation procurement. The privately owned distribution utility has been unable to substantially reduce technical losses over a period of 20 years showing a lack of adequate skills in the commercial area. Shortage of human capacity remains an endemic problem in

Cameroon and until there is a change in the political dispensation this is unlikely to change.

7.7 Conclusions

The reform in Cameroon was implemented over 20 years ago but has not delivered significant improvements in utility performance. The analysis has provided insight into the lacklustre performance of the reform in Cameroon.

The inadequate Government support for the reform has been a key contributing factor to the poor performance. The complicated sector framework has been a further factor leading to poor sector coordination in a politically charged environment. The Regulator has been largely sidelined and the government has maintained a stranglehold on the privatized utility by not disbursing subsidies on time and not paying their electricity bills. Planning and procurement have been inadequate resulting in high tariffs. Losses remain unacceptably high at the distribution utility due to a lack of executive guidance, inadequate technical capacity and outdated IT and metering systems. Lenders have been generally reluctant to extend significant loans due to the unsatisfactory performance of the distribution concession. The newly established transmission company has been extremely slow in implementing donor funded projects due to low levels of technical expertise in the company. The currency has remained stable due to the peg with the Euro but corruption remains a pervasive problem at all levels of the sector although the privatized utility has managed to address this issue to an extent.

The analysis of the reform outcome indicates that the market-based reform model was unsuitable for the Cameroonian environment and that thought should have been given to more viable options taking into account the key elements discussed in this chapter. The proposed analytic framework has enabled a comprehensive analysis of the reform outcomes in Cameroon, and in terms of the case study material has been proven to be both valid and sufficient.

Chapter 8

Case Study: Uganda

8.1 Introduction

The Uganda reform was implemented relatively early and adhered closely to the standard prescription. While there have been several positive outcomes, several deficiencies have recently emerged increasing the risk of reversing the good progress that has been made to date. The Uganda reform narrative provides an excellent opportunity for a structured analysis of the outcomes using the proposed analytic framework.

8.2 Country and Sector Context

When political stability was restored in Uganda in 1986 following the end of the Idi Amin era, the Uganda Electricity Board (UEB), a vertically integrated state-owned utility, was responsible for electricity supply throughout the country. At the time UEB faced serious operational and financial challenges along with other state-owned enterprises, including only 60MW of generation being available from the Nalubaale power plant (formerly Owen Falls Dam). During the 1990's Uganda earned a reputation as one of Africa's leading economic reformers. The IMF and the World Bank held up Uganda as a paradigm of economic recovery on the continent and provided generous financial support to privatize state-owned companies. President Museveni threw his political weight behind the privatization drive to preserve relationships with the DFI's (Tangri and Mwenda 2001).

During the 1980's frequent load shedding occurred due to increased electricity demand and limited generation and network capacity. A program to rehabilitate, upgrade and expand the power system was initiated. Despite these actions the problems remained unresolved, and the Government of Uganda decided to formulate a strategic plan for a far reaching reform which would transform the electricity sector into a financially viable industry. The stated objectives aligned closely with the objectives defined in the original 1993 World Bank reform policy paper.

The strategic plan emphasized the future role of competition in improving sector efficiencies and viewed private sector participation as a means of promoting sectoral growth. The envisaged reform was based on unbundling of the sub sectors with the support of an adequate ownership structure, regulation, and implementation program (Mercados 2012). The reform process was supported by a credit from the World Bank. A supplementary contingent credit of $5.5 million was made to support a liquidity facility for the distribution concession, Umeme. In addition, the World Bank Group's

(WBG's) Multilateral Investment Guarantee Agency (MIGA) extended insurance coverage for up to $45 million in equity and shareholder loans to cover transfer restrictions, expropriation, war and civil disturbances, and breach of contract (Eberhard et al 2016). The DFI's therefore provided considerable financial bolstering of the reform to promote success.

In 1999, the government adopted the Ugandan Power Sector Restructuring and Privatization Strategy and implemented the Electricity Act (Van der Ven 2020). The Act allowed for the unbundling of Generation, Transmission and Distribution from the state-owned monopoly the Uganda Electricity Board (UEB). The sector is currently regulated under the Electricity Act, chapter 145, the Energy Policy, the National Environment Act, Chapter 153 and Statutory Instruments and guidelines issued by the Electricity Regulatory Authority (ERA) website.

The Ministry of Energy and Mineral Development (MEMD) is the policy head of Uganda's Electricity Supply Industry. Their mandate is to establish and promote the development of Energy and Mineral Resources for Social and Economic Development. The Ministry provides policy guidance in the development and exploitation of the energy resources and works with the industry regulator to create an enabling environment to attract investment in the development, provision, and utilization of energy resources. The Regulator is the legal overseer of the industry in Uganda and was established in 2000 as a body corporate which reports directly to MEMD. It consists of 5 board members appointed by the Minister responsible for energy, with the approval of the Cabinet. ERA also has a secretariat that comprises of technical staff who operationalize the decisions made by the Board.

Based on the legal framework, UEB was unbundled into three successor state-owned companies: Uganda Electricity Generation Limited (UEGCL), Uganda Electricity Transmission Limited (transmission) and Uganda Electricity Distribution Limited (UEDCL). The operation and maintenance of the Nalubaale and Kiira Hydro Power Plants (HPP's) was concessioned out to Eskom for a period of 20 years in 2001 while ownership of the assets was held by UEGCL. UETCL is responsible for the operation of the high voltage transmission grid, the export and import of power and bulk supply to designated customers. The majority of the distribution network was concessioned in 2005 on a 20 year term to UMEME, a consortium belonging to Globeleq (56%) and Eskom of South Africa (44%) while 9 small rural concessions were awarded to local companies. UEDCL remained as a state-owned entity holding the distribution assets (Eberhard et al 2016).

8.3 The Path of the Reform and Performance Outcomes

The generation segment has evolved into a combination of the Government of Uganda owned power plants, IPPs, and Public-Private Partnerships (PPPs). From 3

plants and 400MW in December 2001 the available capacity had grown to 1346MW. Generation is dominated by hydro (>80%) while the remainder is provided by thermal, co-generation and solar.

8.3.1 Generation

Due to a large supply demand gap resulting from a prolonged drought, increased demand and delays around procurement and construction of the Bujagali (250MW) IPP HPP, the Government was forced to make use of expensive rental generation using diesel and heavy fuel oil (HFO). This resulted in two significant tariff increases in 2006.

The Government then banned all further tariff increases until 2012 resulting in a considerable drain in state financial resources. The Government responded by initiating a REFit program to encourage private investment in renewable small scale IPP's, but the project was not completely successful due to constraints around cost reflective end use tariffs. Bujagali was finally commissioned in 2012 but the capital cost (USD 3.44M/MW) and the resulting tariff (12c/kWh) was deemed too high (Mercados 2012). The drawn out process around the financing and bidding for the Bujagali HPP and the resultant high tariff left a lasting impression on Ugandan government officials who still see private investment as more costly and time consuming than government procured projects (Meyer et al 2018). With the risk of increasing subsidies looming, the Government responded in two ways. Firstly, deals with Chinese contractors Sinohydro and CWE with finance from the China Exim Bank, were negotiated for 783MW of hydro power capacity (Meyer et al 2018). Secondly, a restructured investor friendly small scale renewable IPP scheme known based around the Global Energy Transfer Feed-in tariff (GETFit) tariff structure was initiated in conjunction with KfW, the German Development Bank. The GETFit program yielded 150MW of additional generation as of 2020 (Umeme Annual Report). The Chinese financed 183 MW Isimba HPP was commissioned in 2019 while the 600MW Karuma HPP was due for commissioning in 2022 but has been delayed. Another Chinese firm, PowerChina International Group Limited (PIGL), has applied to Ugandan authorities for a licence to develop a $1.4 billion HPP in the country. The Ayago power plant on the River Nile will have a capacity of 840 megawatts (MW) and, when fully developed, would be Uganda's largest power project (Reuters 2020).

8.3.2 Transmission

At the end of 2019, Uganda's transmission network comprised 2,890 km of line length at voltages ranging from 66 kV to 220 kV. The majority of the network, or about 64 per cent of the total line length, comprises 132 kV transmission lines, while 35 per cent is at 220 kV and 1 per cent is at 66 kV. UETCL more than doubled the length of the transmission network over the past decade, but the expansions have not been sufficient and lead to underutilization of power plants. More expansions of the grid

are necessary to evacuate the additional capacity from newly developed plants as stated in the National Development Plan III (National Planning Authority 2020). Furthermore, large rural areas of the country are still not connected to the grid. Therefore, UETCL has proposed several additional large-scale grid extensions. These proposals are outlined in UETCL's Grid Development Plan 2018-2040. According to the plan, UETCL must make major investments if the electricity supply targets of NDP II and Vision 2040 are to be reached, especially in the early years of the plan until 2025. In addition, investments in the maintenance and upgrading of the current infrastructure are necessary, because UETCL has recently faced large-scale transmission outages (Van der Ven 2020).

8.3.3 Distribution

The distribution segment has been liberalized and has private players, as well as the government owned UEDCL. Umeme, the privately owned concession, remains the dominant player in distribution. The other distribution companies are, Ferdsult Engineering Services, Pader Abim Community Multipurpose Electric Cooperative Society Limited (PACMECS), Bundibugyo Energy Co-Operative Society (BECS), Kilembe Investment Limited (KIL) and Kyegegwa Rural Electricity Cooperative Society Ltd (KRECS). These concessions operate mainly in rural areas.

The initial period of the Umeme concession was marked by a number of challenges. The implementation of two tariff increases in 2006 due to the use of costly emergency generation resulted in a conflict between the government and Umeme fueled by anti-fraud investigations, allegedly targeting inflated power prices, leading to raids on nearly all power sector institutions (Kapika and Eberhard 2013). One of the main concerns was that Umeme had not managed to reduce the distribution loss level to any measurable extent. In fact, the losses increased from 2005 to 2007. These losses were allowed for in the tariff determinations and so customers were bearing the brunt with high tariffs due to Umeme's inability to perform. The GM of Umeme was placed under house arrest for a period during the investigations in 2009. A report was finally issued to parliament recommending that the Umeme license be cancelled but this was not accepted. The direction the reform was taking was unclear at this stage. In 2009 Umeme replaced the GM and embarked on a process to transform the company.

There has been an improvement in distribution loss reduction and electricity access over the past 20 years. Umeme has managed to reduce losses from over 30% at liberalization to 16% in 2020 by implementing pre-paid metering and improved revenue protection processes. The legally connected customer base has grown from approximately 180,000 Customers in 2001 to 1,506,920 in 2020). New connections in 2020 stood at 59,623 down from 178,152 in 2019 mainly due to Covid. Profit after tax has fallen from 105,857 MUSh in 2015 to 43,081 MUSh in 2020. Despite these improvements access to grid electricity remains low. In 2019 it was reported that only

26% of households have grid access indicating the need for substantial additional investment in the transmission and distribution networks to utilize the current available supply in the country (Umeme Annual Reports).

8.3.4 Potential Crisis in the Sector

Despite the success of the reforms so far, there appears to be a looming crisis in the Ugandan electricity sector. National demand has not been increasing at the rate initially envisaged due to inter alia slow industrialization of the country, the absence of expected large-demand consumers from the oil industry, the limited ability of the network to absorb the capacity as well as lagging progress in electrification and change in consumer demand patterns in off-peak hours (Meyer et al 2018). It is estimated that by the time Karuma is commissioned, total capacity will be around 2000 MW which is more than twice the current demand of 608 MW and 730 MW pre-Covid (Umeme 2020) The policy of Uganda being developed as the "battery of the region" is also showing signs of cracks as exports of electricity significantly declined between the year ended August 2019 (USD 50M) and the year ended August 2020 (USD 25.64M), further decreasing demand. This is mainly due to Kenya, Tanzania and Rwanda all aiming to become net exporters of power by the time Uganda's excess capacity reaches its peak. The availability of cheaper hydro based electricity from the East Africa Power Pool (EAPP) may prove to be the final blow to the export policy (Meyer et al 2018).

8.3.5 Change in Strategic Direction Looming

Events of the recent past have clearly indicated that the Government is wanting to alter course regarding the role of the private sector and the structure of the sector going forward. Following the press statement on cabinet decisions taken during the meeting held on 10th September 2018 at State House, Entebbe, it was revealed that a decision had been made approving the recommendations and implementation plan for the rationalization of Agencies, Commissions and Authorities. This statement made mention of the merging of UEGCL, UETCL, UEDCL and the REA under the Ministry of Energy and Mineral Development (Baguma 2018). Baguma further states whereas the reasons for the proposed move may be understandable, a delicate balance needs to be struck between pushing through the reform and guarding against the risks. The Government would need to implement measures to mitigate against the so called "ghosts of the former state-owned utility UEB" and questions whether the potential benefits of bundling the three companies outweigh the benefits that have been achieved since the reform. Van der Ven (2020) confirms the envisaged changes by noting that in the first two national development plans the private sector was seen as the main engine for driving economic growth but the third plan NDP III specifies that the role of the state in guiding and facilitating development will be strengthened.

An interview with a senior sector stakeholder has confirmed that key revisions have already been made to the Public Enterprises Reform and Divesture Act requiring UEGCL, UETCL, UEDCL and the REA to report directly to the Minister of Energy rather than having the status as sector agencies. This marks a distinct change in direction on the part of the government. It was further revealed that the Government's intention is to discontinue the Eskom generation concession for Nalubaale and Kiira hydro plants when it terminates in 2023 and revert operations and maintenance to UEGCL (ESI 2018). The Umeme concession contract which terminates in 2025 is also currently under review with particular concern being raised around the high level of return on investment (ROI) in place. It is reported that the DFI's have taken a step backwards and are closely monitoring these developments. The state procurement of the Isimba and Karuma plants using Chinese financing provide another strong indication of where the government is heading in terms of private sector participation in the sector. The general thinking in the country at present is that the cost of private concessions is simply too high to ensure sustainability in the sector.

8.3.6 Synthesis of Outcomes

The sector is undoubtedly in better standing than at the commencement of reforms. However, progress has been slow and erratic with several major challenges restricting fast track progress. The Bujagali plant was much needed but the high tariff and transactional cost have blotted the copybook for this kind of development going forward. The Government has focused on investing in new excess generation capacity rather than providing much needed investment for transmission. Supply capacity is currently almost twice the national demand and exports are declining as neighboring countries develop their own generation. This is threatening sector sustainability as the Government still needs to meet the capacity payments of privately owned plants even if they are not dispatched. Umeme has made progress towards improving performance but the progress has been unacceptably slow. The company does not have the financial capacity required to scale up operations and improve electricity access on a fast track basis. UETCL has performed poorly, restricted by lack of capital and impacting power availability and quality in areas outside the Kampala metro area. In addition the new reform direction being pursued by the Government points to a period of uncertainty for the sector.

8.4 Analysis of the Ugandan reform using the proposed analytic framework

Uganda followed a markedly different path in reform to those in the previous case studies and has achieved measurable progress in many respects. Generation capacity is now more than adequate while grid access has improved. Tariffs are close to being cost reflective and the regulator ERA plays an active role in monitoring the sector and calculating tariffs. However, cracks have started to show in the reform and the Government is looking to diminish the role of the private sector going forward.

Analysis using the proposed analytic framework enables a comprehensive and structured assessment of the Ugandan electricity reform.

8.4.1 Tier 1 – Government Level

8.4.1.1 Government Support and Political Will

It is clear from the literature and other publications that Government support for the reform has been mostly strong and consistent since the inception. Even when Umeme was performing poorly in the initial period and there were demands from some quarters for their contract to be cancelled, the Government held firm and enabled the concession to continue while making adjustments to ensure that performance improved. The Government has enabled the Regulator to exercise their function in a relatively independent manner, including implementation of increasingly cost reflective tariffs. This has benefitted the sector greatly. In accordance with the target of industrialization, the Government has sought to lower tariffs by procuring additional hydro capacity on a negotiated basis and using a majority of Chinese finance to implement the projects. Loan repayments will be made through electricity payments under a PPA. The Chinese PPAs for Karuma and Isimba have uniquely involved UMEME, as a contractual signatory to safeguard the repayment mechanism. The bulk sales tariff has been stated to be in the region of USc 4–6/kWh although this has not been confirmed and apparently do not take account of out-of-pocket investment the government carried for Karuma and Isimiba nor the contingent liabilities through sovereign guarantees issued to back the loans (Meyer et al 2018).

In a bid to promote the attractiveness of Uganda as an industrial investment destination, the President has repeatedly made claims that retail power will made available at 5USc/kWh to large scale industries in the near future. Given the investment requirements of the sector, this would appear to be a pipe dream. Some Industrialists however seem to have been convinced by this promise and delayed contracting private IPP's to provide much needed power in remote areas of the country (own experience). The Government has also neglected to implement a thorough system planning process and to procure capacity based according to an approved least cost development resulting in a situation of costly over supply. In addition, they have neglected investment in UETCL, resulting in bottlenecks in the system. In summary the Government has been vastly more supportive of the reform compared to the other cases analysed in the case studies and this has enabled steady progress in the sector. However, they have made several key strategic errors and this is threatening the viability of the sector going forward.

8.4.1.2 Institutions and Sector Framework

Little has been written in the literature on the strength of Ugandan institutions. Evidence points to the fact that the rule of law is generally respected by both the Government and the citizenry. Despite this, the general impression though is that the judicial system in Uganda is relatively weak. This weakness has been countered by a consistent and well defined sector framework which has promoted favourable outcomes. The sector framework is generally respected by most sector stakeholders. Meyer et al (2017) have rated this factor as higher in priority compared to institutional factors. The framework has enabled the entrance of much needed private sector investment in both generation and distribution. Apart from the large scale Bujagali IPP, the private sector has invested in several mini hydro and solar projects. Private sector investment through Umeme has greatly facilitated the performance improvements and increased access levels. It should be noted however, that the smaller rural concessions have not been able to attract the required investments, despite sector framework clarity, resulting in some of the operations being handed back to UEDCL. While the sector framework has been praised by many, deficiencies still exist. The 2017 World Bank commissioned Mercados report emphasizes the framework's lack of clarity related to system planning responsibility, stating that the framework should clearly define the role of the Government with regard to least cost planning and procurement of generation capacity according to the plan. As the Government moves to a further stage of reform the development and implementation of a clear revised sector framework remains critical for the achievement of satisfactory performance outcomes.

8.4.1.3 Reform Policy

The only choice on table at the end of the nineties was the neo-liberal model of reform being strongly advocated by most major DFI's. The Ugandan government, struggling to improve performance in the ailing electricity sector embraced this model and proceeded to implement the reform on a fast track basis. In the case of Uganda, the systematic implementation of this model has resulted in slow but significant improvements in performance and access levels. In implementing the reform, the Government has not been afraid to allow the regulator to administer strong medicine along the way in the form of steep tariff increases and the implementation of an ongoing tariff review process making allowance for inter alia changes in currency exchange rate and fuel prices, thereby keeping the sector financially sustainable. Given the state of the sector in the late 90's and the failed efforts to improve performance, it is doubtful if the utility in the original vertically integrated form as UEB, would have been able to achieve the same level of improvements as observed today. Nothing is static however, and global thinking on reform has now moved on from the standard model of reform with latest research suggesting that privatization is not always in the answer. It is in the light of this thinking that the new political

leadership is currently designing and implementing a sector policy makeover with an increased role for the state. The first signs of this change in direction was the procurement and financing of Isimba and Karuma HPP's and more recently the decision to change the status of UEGCL, UETCL and UEDCL from state agencies to entities reporting directly to MEMD. While the Government may have sound reasons to move in this direction, great care needs to be taken to avoid the mistakes of the past undoing the good work that has been achieved to date.

8.4.2 Tier 2 – Industry Level

8.4.2.1 Regulation

For the fourth consecutive year, ERA has been judged as Africa's best regulator across a number of key metrics, according to the African Development Bank's 2021 Electricity Regulatory Index. The agency surpassed other strong contenders including Kenya, Namibia and Egypt. The regulator has played a key role in overseeing the Ugandan sector in accordance with the provisions of the well defined sector framework. This consistency has contributed towards stable operation of the sector, improvement in performance and rates of electricity access and providing comfort for foreign investors.

The agency has been able to establish itself as a relatively independent agency permitted by the Government to fulfil much of its mandate. The Government has supported and even encouraged the implementation of steep tariff increases to build sector sustainability and to remove the need for government subsidies. ERA played a key role in the confirmation of Uganda's fully cost reflective REFiT thus underscoring the agency's commitment to maintain momentum in IPP development despite the Government taking another route for procurement of large scale hydro generation. The recent confirmation of Uganda's first fully cost-reflective REFiT underscores the regulators commitment to maintain momentum for IPP development. Various new projects have been proposed and approved by ERA although the need for such projects has been questioned given the current over supply situation. In overall terms however, the evidence is clear that ERA has played a key role in enabling the sector to achieve the main objectives of the reform exercise.

8.4.2.2 Planning and Procurement

A deficiency in sector planning has clearly emerged as one of the key areas requiring further work as the sector moves forward. The lack of synchronisation between demand requirements and development of new capacity is the most glaring example of this deficiency. Uganda is currently saddled with generation capacity around twice that of the current demand while power exports are diminishing, pointing to a failure to develop least cost development plans based on realistic demand side studies. The

Mercados report indicated that no formal planning system is currently implemented as a regulation or law with clearly identified responsibilities, criteria, and procedures. The report also highlights the lack of definition of roles and responsibilities related to rural electrification planning.

The disregard for a formal planning process has largely contributed to the current over supply situation which was premised on a least cost development plan developed by consultants in 2010. The projected demand has not materialized while the least cost development plan has not been updated. The evolution of the overcapacity situation may well result in the bankruptcy of UETCL within a short time period, placing an increasing financial burden on the Government (Meyer et al 2018). In the case of Uganda the long term sustainability of the reform is being threatened by a lack of planning and coordinated generation procurement.

8.4.2.3 Industry Coordination

While coordination between the Regulator, MEMD and UMEME appears to be satisfactory, it may be inferred however that there is a lack of coordination between UETCL and MEMD regarding planning. UETCL produces a long term (15 year) grid development plan but the link with the procurement activities of MEMD is unclear. Lack of coordination on this important topic is clearly another contributing factor to the current oversupply situation. The Mercados (2012) report highlights a lack of coordination between the REA and the ERA with respect to licensing rural concessions which is threatening the long term sustainability of rural electrification.

General coordination between the regulator and the subsectors by all accounts however appears to be good. This can be attributed to effective communication from the regulator side as well the largely well defined sector framework which is understood and respected by the sector stakeholders. ERA reports annually in detail on UETCL and Umeme indicating that there is good information flow between the agencies. This strong level of coordination at this level has undoubtedly contributed towards the positive outcomes observed. Uganda would therefore appear to stand in stark contrast to the other countries in the case studies where sector coordination remains a serious challenge.

8.4.3 Tier 3 - Utility Level

8.4.3.1 Financial Resources

The sector has made considerable advances in improving access and reducing losses over the past decade. The enabling environment displays many positive features which have enabled this progress. Generation capacity is now far more than adequate but transmission and distribution network development are lagging far behind. It is

clear that there needs to be a quantum step up in financing of network development to enable the sector to reach the next level.

UETCL is in the process of undertaking multiple projects to upgrade and extend the transmission network. These projects have been financed by a variety of donors as well as China-Exim Bank. Despite these ongoing improvements, considerable additional investment is required to develop the network to a point where power quality requirements are complied with in remote areas of the country. In addition, the network needs to be expanded considerably to enable greater coverage. The Government is currently considering the possibility of promoting private sector investment in transmission lines. If this were to materialize it would be a first for the region.

Due to relative financial health Umeme has been able to use its own funds as well as raise finance to extend and upgrade the distribution network. Analysis of financing requirements in the Mercados report shows that the sector by itself cannot produce enough income to pay for system expansion in a manner that meets access objectives and enables private capital remuneration at reasonable levels (10%). The analysis estimates that to meet sectoral targets payment for capital investment in generation and transmission would be around 580 M US$ per year and for distribution a further 76 M US$ per year, plus the cost of OPEX of all assets. According to calculations, revenue would be insufficient to fund this requirement unless a CAPEX subsidy from sources outside the sector (government, grants, donations, etc.) is received, or very soft credits are obtained.

An additional point to note is that allowed revenues of UEB successor companies do not cater for the recovery of depreciation of assets because, according to ERA, all facilities are funded by grant or concessional funding from the Government of Uganda. In the case of rural electrification projects, the O&M is concessioned and there are no provisions related to rehabilitation and upgrades. The report further recommends that reduction of costs could be the only solution to enabling greater financing capacity. The Government would appear to be considering a greater role for the state going forward as a way to reduce costs in the long term.

8.4.3.2 Technology, Systems and Processes

The published literature and media reports do not comment directly on this aspect. The material below is based on interviews with key stakeholders and my own experience working as a consultant for Umeme. Umeme was not able to reduce losses over the initial 5 year period of the concession. Part of the issue was related to the incorrect initial baselining of loss levels but the lack of progress was largely related to a lack of appropriate processes, systems and technology. Senior management and in particular the GM did not believe in the effectiveness of pre-payment metering as a

tool to control commercial losses and rather continued with credit metering coupled to inadequate processes and an outdated billing system with a corrupted customer data base. In addition, metering routes were not sequenced properly, and many bills were estimated as meters were faulty. Some customers took their meters along when they moved or sold the meters on markets. The utility took drastic action against non-paying customers and even went as far as removing entire metering installations and service connections requiring a hefty re-connection fee and payment of arears before making re-connection. This did little to solve the problem as the customers simply had themselves re-connected unofficially to the network, sometimes by Umeme staff.

From 2010 onwards, as part of the turnaround strategy, Umeme started to implement pre-payment metering on domestic and small commercial customers and AMR metering on larger customers while implementing a new billing system and revised processes. Losses have dropped from around 28% to 17% so there is still some way to go. A state of the art SCADA system was only implemented in July 2020. This will facilitate more efficient distribution system management. Umeme has been generally slow in implementing appropriate technology and systems and this is reflected in the reform outcomes. At the transmission level UETCL has also been operating without the benefits of a state of the art SCADA system. An upgraded system is currently being implemented under donor financing and this will facilitate more efficient overall system operations.

8.4.3.3 Executive Management

The importance of having appropriate executive management in place is reflected in the events leading up to the appointment of a new GM in 2010 after the controversy around the former GM had subsided. The former GM was opposed to using appropriate technology and processes to address the poor commercial performance of the utility. Failure to direct staff to apply basic techniques in order to sanitize the customer data base and to effectively manage the meter population contributed towards the investigation of Umeme for fraudulent activities in 2009 and the threats to cancel the concession. No solid evidence of fraudulent activities could be established but the situation could largely have been avoided if a systematic approach to the loss issue had been adopted coupled to effective communication with key stakeholders. Once the new GM had been appointed in 2010, the concession began to stabilize and commercial performance gradually began to improve. The unfolding of events leading up to the change in executive management illustrates the necessity of employing a competent and politically well connected executive management knowledgeable on appropriate technologies with strong managerial abilities.

8.4.4 Cross Cutting Elements

8.4.4.1 Corruption

According to Transparency International Uganda currently rates at 144, the same as Cameroon and marginally better than Nigeria. Analysis by the Uganda Debt network led to the following statement:

"*The entrenched corruption the government is faced with is not only bad for service delivery but also steadily rendering the country unattractive for quality investment" (All Africa Stories 2019).*

The most obvious case of grand corruption related to the procurement of the Bujagali IPP. The procurement was cancelled as a result of the exposure of corruption and the project was re-bid leading to considerable delays in project progress. The non-competitive and non-transparent procurement of the Isimba and Karuma EPC contracts has also been criticized and the degree of good governance associated with these transactions is unclear. (Meyer et al 2017). Petty corruption amongst junior commercial officials is generally widespread in most utilities in the region and can only be controlled by means of processes and systems. Umeme has made some progress in this regard as commercial losses have been reducing over recent years.

8.4.4.2 Exogenous Factors

Uganda has enjoyed a strong GDP growth rate over the period 2000 to 2019, reaching a high of around 10.875% in 2006 but this slowed to a low of 2.951% in 2020 mainly due to the Covid pandemic lockdowns imposed during the year. A growth rate of 5.3% is expected in 2022 and 6% in 2023. The inflation rate has varied between 5.5% and 2.9% over the period 2015 to 2019. External Government debt has been relatively constant between 2015 and 2015, standing at 36.6% of GGDP in that year. (Focus Economics 2021). However, the level of Government debt is expected to rise to around 50% of GDP by 2022/2023. This rise can be partially attributed to Government infrastructure investments in the Electricity Sector. The USD UGX exchange rate has been relatively steady varying between around 3500 and 3800 UGX to the USD over the past 5 years. The overall environment has thus been relatively stable in recent years and no doubt contributed towards the positive outcomes of the reform.

8.4.4.3 Human Capacity

Interviews indicated that a high level of emphasis is placed on human skills development across the sector to counteract this situation. Umeme in particular has employed skilled expatriates to develop processes as well as transfer skills to local staff. This is still a work in progress as Umeme strives to further reduce losses and

introduce state of the art integrated ICT infrastructure. The detailed annual reports produced by Umeme also reflect well on the level of human capacity in the utility. The ability of ERA to effectively calculate tariffs and oversee the sector is an indication of the agency's policy to recruit competent staff. The annual ERA reports further reflect the high level of human capacity in the agency. UETCL last posted an annual report in 2014 on its website although Financial Statements for 2017 were also posted, reflecting a lack of consistency in reporting. A recent World Bank review report (World Bank 2020) on progress in implementation of the Electricity Sector Development Project attributed the slow progress in implementation to lack of capacity in both counterpart agencies, UETCL and MEMD.

8.5 Conclusions

The outcome in Uganda has been considerably more positive than in the other case study countries. Apart from a slow start the distribution concession has performed relatively well, increasing customer numbers and slowly reducing losses. The state-owned transmission sub sector has performed less well, mainly due to a shortage of funding. The Government has provided consistent political support for the reform and respected the function of the Regulator. The judiciary is relatively weak in Uganda but the strong sector framework has enabled outside investment as well as effective sector coordination. The rule of law is generally respected in Uganda and this has contributed to the success. Planning and procurement of generation capacity remains a weak point and is reflected by the non-transparent procurement of excessive capacity leading to a situation of over-capacity which threatens to bankrupt the Government.

The Government is currently re-thinking the reform and plans to return the hydro plants Nalubaale and Kiira HPP's to state operation when the contract with Eskom expires. In addition, UEGCL, UETCL, UEDCL and the REA are now required to report directly to the Minister of Energy instead of having the status of independent sector agencies. The UMEME concession is also under review and may not be renewed in 2025. While there are sound reasons for considering a re-set of the reform, it is hoped that the mistakes of the past are not repeated in the case of Uganda. The proposed analytic framework has proven to be a sound basis for a comprehensive analysis of the Ugandan reform and could be a useful tool in considering a new reform model.

Chapter 9

Reform analysis by sector stakeholders

9.1 Interview Methodology

Interviews were conducted with 18 senior knowledgeable stakeholders in the region to establish their personal views on sector reform and to test the validity of the proposed framework of analysis. Most people interviewed were associated with the three case study countries and one person had specific knowledge of Liberia. The individuals interviewed could be categorized into two groups. Those in the first group are expatriates or local citizens with experience in only one country. Those in the second group included expatriates and citizens of various countries in the Region with wider experience of sector reform across more than one country, mostly from working for DFI's, international organizations or consulting firms.

Interviews were mostly carried out telephonically while adhering to the scope and process approved by the Faculty Ethics Committee. Participants were from a wide set of backgrounds, including government, utilities and regulators, contractors, funders and advisors, and often had experience in more than one organization. The questions tested views on the 9 tier elements and 3 cross-cutting elements of the model. Most questions were open-ended. Opportunities were given for a person to suggest other important factors. Part of the discussion was directed to confirming some details in the three country case studies – the responses were used to supplement as well as verify facts in the case studies and are not discussed here. Interviews lasted between one and three hours, with the longer interviews mostly with persons with wider experience. The interviews were recorded with permission and personally transcribed. The set of questions on which interviews were based is included in Appendix 1.

In summary, the results of the interviews consistently confirmed the validity and adequacy of the framework and the definitions and scope of the 12 critical elements. No critical element was considered irrelevant to reform success. Except where noted as coming from only one respondent, contributions and responses were confirmed by two or more respondents. In a few instances, the weight of the different components of the scope of a critical element differed between the respondents. In assessing performance in respect of every critical element, diverse reasons given for an opinion, but all reasons were consistent with the definition and scope of the element. No additional elements were proposed by the respondents. The details of the responses in the interviews are discussed in detail in the rest of the chapter.

9.2 Tier 1 - Government Level

9.2.1 Government Support and Political Will

Consistent long term government support and strong political will emerged as the key element for achieving positive reform outcomes. All respondents were of the view that politicians need to have the correct motivation for supporting the reform and that in many cases politicians and senior officials simply support reform because they realize that there are possible huge personal financial gains to be made. A further point raised by more than 50% of respondents was that DFI's often previously required acceptance of market-based reforms as conditions for loans and grants – eg SAC III Cameroon in 1998. The governments needed the resources and so simply accepted the reforms without considering the long-term implications.

With the exception of one, respondents familiar with the restructuring in Nigeria described the outcome of the sector reform as unsatisfactory, although different justifications were given for the opinion. Responses relevant to government support included:

- Failure of Government support on multiple fronts had seriously undermined the chances of reform success.
- The Government did not fully understand the reform structure as the process was handed over to BPE for design and implementation with minimal involvement by the Government and NERC. BPE handed over the reins to NERC and the Government once the reform became operational with both parties not fully understanding the details of the process.
- The Government had unrealistically high expectations for the reform, reflecting a lack of understanding of the reform process and country context (from one respondent).
- Without considering the consequences the Government had allowed excessively high gearing of asset financing while at the same time turning a blind eye to sale of dilapidated assets at highly inflated prices. Given the local cost of borrowing, the financial viability of the reform was questioned by some people from the outset.
- Potential investors were barred from doing their own due diligence due to concerns about union action against the privatization while unrealistic data on company performance were handed to the investors. This resulted in investors discovering on takeover that operational costs largely exceeded revenues.
- The Jonathan government initially showed strong support for the reform but failed to follow through on executing its commitments. The Government did not adhere to their side of the agreements resulting in some private companies refusing to sign contracts. The way in which the Government implemented the process resulted in a deterioration of trust on the part of the investors.

- Given the shortfall in tariff and the on the ongoing refusal to increase tariffs in line with the agreed mechanism, the Government should have provided regular well structured subsidies to keep the sector afloat but they simply allowed the reform to flounder.
- The subsequent Buhari regime was only partially supportive of the reform but made no attempt to reverse/change the reform. This further exacerbated the situation.
- Some parts of the government do not support the reform and in particular privatization. There are issues of disagreement and power seeking within the government. As a result, various arms of Government send out conflicting messages on policy compounding the confusion.
- Failure to implement the TEM on a timely and sustainable basis – respondents raised questions around the ability of the Government to fully capitalize NBET so the institution could fulfill its intended role as an intermediary between the private companies in the value chain.

These and many other similar comments convey that the main reason for failure of reform in Nigeria appears to be a lack of consistent, well-informed commitment and strong political will to achieve success.

All respondents familiar with the Cameroon case confirmed the outcomes to be generally unsatisfactory in the line with the case study. In 1998, the Government was obliged to accept a proposal to privatize SONEL, the state-owned electricity utility, in the form of a long-term concession, to have access to the SAC III loan. This was a shaky basis for strong and consistent government support for the reform. As in Nigeria, the Government failed to meaningfully support the reform. Various senior politicians and officials opposed the reform over the years. One of the major issues is that the Government refuses to abide by the tariff increase agreement for political reasons, instead preferring to subsidize the concession. The payments are often made late and sometimes not in full, thereby affecting the financial health of the concession. It was reported that MINEE has taken over the function of licensing thereby side-lining ARSEL and diminishing its standing in the sector. MINEE and The Ministry of Economy, Planning and Land Panning (MINEPAT) also undertake rural electrification projects without consulting either ENEO or the AER leading to confusion in the sector. The agencies compete for project funding from the Government. Both the Presidency and MINEE are closely involved with supervising the operations of ENEO, requiring the presence of the CEO on multiple days of the week, and detracting from efficient management of the utility. The Government often sends out conflicting policy messages to the sector causing general confusion. Respondents confirmed that the Government ensures that an extremely low tariff is applied to ALUCAM, an outdated, inefficient aluminium smelter consuming around 15% of supplied power and impacting the finances of ENEO. More recently, both the Government and ALUCAM have fallen behind on the payment of electricity bills. The Government has

undertaken to pay the ALUCAM electricity arears as well as the arears on its own consumption but at the time of writing had not yet done so.

In contrast to Nigeria and Cameroon, Uganda has made relatively good progress since the inception of the reform. There is still a long way to go but the difference in progress between the three countries is clearly evident.

In line with the case study, respondents confirmed that the Ugandan Government, particularly the Ministries of Finance and Energy had been supportive over the years in the following respects:

- The Government fully supported the process from the outset having unsuccessfully attempted to improve the performance of the SOE, UEB, in the previous period.
- Despite calls for re-nationalization of UMEME in 2010 from some factions, the Government continued supporting the concession.
- The combination of Government's general respect for the sector framework and a somewhat stable political environment, has led to a significant degree of private investment in the sector.

Local respondents were broadly accepting of the Government's initiatives to boost generation capacity by adopting a PPP approach using sole sourced contractors combined with Chinese funding in developing the Karuma and Isimba HPP's. While this had resulted in an over-supply situation, local respondents surprisingly did not comment on increased financial risk to the sector. The presidential initiative to introduce a tariff of 5c/kWh for industrial customers was however seen as a risk to sector credibility. Concern was expressed by one local respondent around the recent decision by the Government to bring UEGCL, UETCL and UEDCL directly under the control of the Ministry of Energy and recent statements about possibly not renewing existing generation and distribution concessions when they terminate.

Based on all the responses, it is clear that insufficient Government support for reforms in Nigeria and Cameroon has resulted in unsatisfactory outcomes while in the case of Uganda, strong and consistent support contributed to more positive outcomes. The role of Government support is ensuring positive sector reform outcomes, or the lack of it, is clearly of paramount importance.

9.2.2 Reform Policy

Interviews with stakeholders confirmed that not only appropriate policy but also the manner of implementation is a crucial ingredient to reform success. With the exception of keeping SONEL vertically integrated, the standard model reform model principles were applied across the three case study countries and views differed

concerning the appropriateness of the model to each country context. In the case of Nigeria respondents were not highly critical of the model but rather blamed the poor outcome on the way in which it was implemented. The view was expressed that there should have been a well designed roadmap and implementation plan taking the sector context into account thereby enabling the sector to gradually transition to the new model over a period of time.

In the case of Cameroon, respondents were highly critical of the reform model stating it played a significant part in the failure of the reform process. They stated that the model was not possible to implement in the Cameroonian context and that the Government had only accepted the reform to have access to the SAC III loan in 1998.

Respondents in Uganda were generally positive about the reform model, saying it was appropriate for the time and contributed significantly to the relatively successful outcomes. However, the view was also expressed that the current reform had run out of steam and that the Government needed to "re-jig" the reform model in order to move the sector forward. There were mixed views concerning the current moves made by the Government to re-nationalise the entire sector with respondents from the private sector expressing fears that this move could be detrimental to the sector. International respondents, including current and former DFI staff, agree that appropriate policy is non-negotiable for achieving reform success. They expressed the unequivocal view that the standard model of reform advocated by the DFI's for many years is inappropriate for the region and hence contributed to unsatisfactory reform outcomes.

The takeaways from the interviews included: (i) policy not only needed to be appropriate for the sector but the implementation needs to be well planned and executed to achieve success, (ii) reform policy should evolve over time in line with the changing country and sector context to enable consistent progress and, (iii) reform models need to be developed in close conjunction with country governments and that extreme caution should be exercised before deciding to privatize existing network assets.

9.2.3 Institutions and Sector Framework

Respondents viewed clarity of sector framework along with systematic implementation as being more important for success than institutional strength. In the case of Nigeria the framework was clearly defined but never implemented leaving the door open for failure. In Cameroon it is reported by respondents that the framework is ambiguous and open to abuse by the Government and other stakeholders leading to sub optimal sector performance. Furthermore, there is little respect for the framework by the Government and this attitude filters through to other parts of the sector. In Uganda on the other hand, the sector framework is reported as well defined

and relatively unambiguous. Respondents believe that this has contributed greatly to the outcome of the reform. A culture of discipline in the country has contributed towards a high level of respect for the sector framework and relatively efficient level of sector operation.

The takeaways from the interviews are that to achieve reform success: (i) reform models need to work around institutional weakness, (ii) sector frameworks need to be clear and fully implemented and, (iii) government and stakeholders need to respect the sector framework. Interestingly two senior international respondents expressed the view that success is achieved more easily achieved in countries where there is a national culture of respecting rules and regulations and that sectoral discipline is difficult to achieve in countries where this culture is absent.

Institutional weakness was perceived by the majority of respondents to be an obstacle to success but secondary to the sector framework. Institutional weakness of the presidency and ministries of energy and finance were perceived to be the most important obstacles to success. Political appointments of senior ministry staff with little sectoral knowledge are seen as particularly detrimental to reform success. The judiciary mostly does not understand the sector and is usually subject to varying levels of corruption. The conclusion in most cases that improving institutional strength in the region is a long term initiative and that reform models should aim to work around this weakness. In the words of one respondent – “In the Nigerian case the reform model has shown up institutional weakness instead of being designed to work around this obstacle.”

9.3 Tier 2 - Industry Level

9.3.1 Regulation

All respondents agreed that effective regulation is critical for achieving reform success. While there is general agreement that regulatory independence remains an illusion, there was agreement that successful reforms do require a substantial degree of regulatory independence and respect from the government. In the case of Nigeria, respondents generally regarded the regulator as an impediment to success, especially during the early years of the reform. There were aggressive attempts to impose first world level regulations on the newly privatized companies without any appreciation for sector context constraints. It is reported that the situation has improved more recently as regulatory staff have developed more realistic expectations. The overarching view is that regulation has failed in its most important functions as the Government, for political reasons, has not permitted the regulator to implement tariff increases according to sector agreements resulting in an ongoing liquidity shortage. Continued political interference in regulatory matters has damaged the credibility of the agency. The regulator has failed to effectively monitor the performance of the

privatized Genco's and Disco's resulting in suspicions of bribery and corruption but has overregulated on minor issues, blocking progress.

In the case of Cameroon it was reported that the regulator has been sidelined by the Government. The GM is a direct government appointment and is required to tow the Government line. While staff calculate tariff increases as required, the Government, for political reasons, refuses to implement the tariffs, choosing instead to subsidize the distribution company. MINEE has recently taken over the functioning of licensing, further weakening the influence of the regulator. Furthermore, ENEO and the IPP's tend to ignore the regulator's data requests, rendering the agency unable to monitor sector performance.

In a contrasting case, respondents made it clear that the regulator in Uganda has been able to play a significant role in the success of the sector. The Government limits interference and the regulator determines tariff levels on a largely independent basis. The sector institutions respect the role of the regulator and abide by regulatory requirements. It was reported that the regulator monitors the sector with respect to power quality and other parameters and over the years has promoted sector performance. Investors have demonstrated their confidence in the regulator by investing on a relatively large scale. Respondents further report that the regulator communicates clearly and engages closely with stakeholders thereby preventing unexpected shocks to the sector. In addition, the regulator conducts checks on procurements to ensure value for money is being achieved although it is unclear whether this was done for the procurements related to Isimba and Karuma IPP's.

Senior international respondents were largely skeptical of regulators in the region describing the majority as 'straw' regulators playing to the whims of the Government and making little to no contribution to improving sector performance. While this may be the case in many countries, the case of Uganda clearly proves that effective regulation goes a long way to ensure positive reform outcomes.

9.3.2 Planning and Procurement

Interviews confirmed the necessity of efficient planning and competitive capacity procurement but also showed that these functions are generally poorly coordinated with little to no oversight in place. In the case of Nigeria, it was reported that there is no coherent least cost and system planning process in place. TCN is responsible for overall system planning but lacks technical capacity. One respondent noted that multiple donors fund various projects and add further confusion to the planning function as there is minimal coordination between donors on priorities. The respondent further expressed the view that ongoing bottlenecks in the network are the result of inadequate planning. The Disco's place little emphasis on planning as their resources are allocated to more pressing needs. The limited finance available is

used to operate and maintain the current network rather than expand it. Processes are in place for competitive procurement of additional capacity but these remain untested as capacity procurement has ground to a halt due to the inability of the transmission grid to evacuate the full capacity available.

Planning in Cameroon is similarly inadequate. All respondents confirmed that there is no coordinated planning system in place and that this is impeding sustainable progress in the sector. The newly established entity SONATREL is responsible for transmission system planning but does not have capacity to do so effectively. MINEE is responsible for least cost generation planning but also lacks technical capacity. From time to time donors fund the compilation of a least cost development plan but these plans are never adhered to. For example neither the Mekin nor the Memve'ele projects formed part of a least cost development plan. Moreover, power could not initially be evacuated from the Memve'ele plant due to the absence of a transmission line to Yaounde. This has since been rectified.

It is reported that distribution planning is being carried out by ENEO. This has not resulted in a measurable improvement in quality of power, particularly in rural areas, indicating there is still some way to go. AER is responsible for rural electrification planning but staff have little technical capacity. Instead, the planning is associated with projects funded by diverse donors resulting in a non- coordinated approach. ENEO is responsible for taking over all rural networks for operation after commissioning but there is often a gap in communication on planning issues. MINEE also undertakes rural electrification projects from time to time without consulting either ENEO or AER on planning issues, leading to further confusion. It was confirmed that the Government procures additional capacity by negotiation rather than competitive procurement and the view expressed that this practice leads to unacceptably high generation prices, thereby impacting sector financial health.

It was reported that planning processes in Uganda are defined in the regulations. UEGCL is responsible for generation planning, UETCL for transmission and Umeme for Distribution while the Government manages rural electrification planning. UETCL is the chair of a planning committee that oversees the entire process. Despite this structured approach, one respondent was of the view that UETCL needs improved technical capacity to be able to oversee the process effectively.

The Government procured the Bujagali HPP on a competitive basis in line with DFI requirements but became disillusioned with the long development time and high tariff. More recently they have adopted a PPP approach, partnering with the Chinese to build the Isimba and Karuma HPP's. Due to inadequate load forecasting and planning, this additional capacity has now resulted in an oversupply situation with supply being almost twice demand and threatening the financial viability of the sector. Local respondents did not seem to believe that the oversupply was an issue and

seemed to align with the Government objectives of being self sufficient and being in a position to export to neighboring countries despite these countries no longer needing imported power. It would therefore seem that political and national ambitions have overridden pragmatic power system planning and in so doing pose a threat to the long term financial viability of the sector.

9.3.3 Industry Coordination

Respondents reported that sector coordination is poor in both Cameroon and Nigeria and that this has had an adverse effect on progress. In Nigeria a culture of mistrust prevails between sector stakeholders and between the government and the sector. Different agendas are pursued, often in the interest of self-gain. This leads to conflicting messaging in the sector while rumors often circulate. There is also a general lack of faith in the Government in general, resulting in a lack of respect for policy and regulations, contributing to a poor level of coordination.

In the case of Cameroon both the Presidency and MINEE play an active role in directing the sector resulting in mixed signals being sent to the sector agencies. One stakeholder pointed out that the Ministry itself sends out conflicting messages. MINEE competes with AER for government funds to execute rural electrification projects with no coordination between the two institutions. One respondent explained that this sometimes results in two contracts being awarded for electrification of the same locality. The recent MINEE takeover of the licensing function from the regulator without any legal basis for doing so, has created further confusion in the sector.

Coordination is further impacted by a culture of mistrust and lack of will to work together amongst the various sector utilities, companies and institutions. Respondents familiar with Cameroon all expressed the view that the lack of sector coordination has resulted in a chaotic sector with little chance of sustainable improvement in its current form.

Sector coordination in Uganda is reported to be at a satisfactory level. There is general respect for the clearly defined sector framework while sector agencies display a strong willingness to cooperate with each other. The Government generally permits the Regulator to fulfill its central role as an overseer of the sector and does not arbitrarily take over key functions. Communications from the regulator are normally unambiguous. Respondents in Uganda are of the view that efficient sector coordination has contributed substantially to successful reform outcomes.

9.4 Tier 3 - Utility level

9.4.1 Financial Resources

All respondents agreed that the inherited underdeveloped and dilapidated state infrastructure and the associated investment needs in most countries had constituted a major obstacle to progress. One person made the point that similar privatizations in developed countries were done in the context of networks that had sufficient capacity, were in good condition and covered the entire country. The general feeling was that the expectation of the reform that the private sector would provide sufficient finance to rehabilitate and extend such networks was highly unrealistic.

The Nigerian sector has suffered from ongoing liquidity shortages since commencement of the reform. Respondents have confirmed that this has largely prevented the privatized companies from making meaningful progress in turning the sector around. A number of factors were reported to have contributed to the ongoing sector illiquidity:

- The regulator did not implement the MYTO leading to decreasing cost reflectiveness as the Naira declined.
- Low levels of income have resulted in Disco owners not servicing debt that was used for financing the asset acquisition resulting in banks not being prepared to provide further loans for upgrading and extending infrastructure.
- Discos attempted to source foreign funding but were declined due to perceptions of corruption, unstable currency and high country risk.
- Since the Disco's were not in a position to upgrade networks and improve quality of power, they failed to attract lucrative high usage customers currently operating off grid on expensive captive generation.
- Government departments and state agencies often refuse to pay for electricity.
- Former senior staff interviewed admitted that Disco's did not pay sufficient attention to reducing losses and improving metering and billing systems.

These factors resulted in Disco's only paying a limited proportion of their monthly bulk bills to the Market Operator. This set off a chain reaction as the Genco's were only partially paid for power generated. Gas supply companies suffered a similar fate. The Government is currently making efforts to rectify the situation but unless fundamental financial issues are addressed, the reform will continue to underperform.

The Cameroonian sector suffers from a similar lack of liquidity. This has stymied progress in the reformed sector. The following factors were reported as contributing to this situation:

- Government delays payment of electricity bills.
- Government has not permitted tariffs to be adjusted in line with the agreements, instead making subsidy payments to ENEO – these payments are often late and less than what was agreed.
- The largest consumer ALUCAM absorbs around 15% of power generated but are allocated a tariff which is a small percentage of the official tariff – of late ALUCAM has failed to pay monthly bills.
- ENEO has been unable to reduce losses since inception.
- ENEO lenders have declined further loans due to poor performance and require Actis, the concession holder, to inject more equity – they have declined to do so.
- ENEO have not been compensated for investments they made in transmission before the formation of SONATREL.
- ENEO, as a private concession, did not have access to concessionary finance from DFI's, necessary to upgrade and extend the dilapidated network.

Respondents report that the lack of finance availability has been a major contributor to the poor performance of the sector. ENEO has not been able to maintain and upgrade the network and invest in state of the art IT systems.

The situation pertaining to finance availability in Uganda is reported as more positive than in Nigeria and Cameroon but still far from ideal. Respondents state that there have been substantial injections of capital from various sources into the sector over the years since the reform was implemented and this reflects in the current performance levels. The Government has been able to access foreign capital for generation capacity expansion. It was reported that Umeme has been able to utilize its own revenue as well as have access to foreign capital for expansion and operations and that the floating of Umeme shares on the local stock market helped strengthen the company. Dividends are being paid to shareholders but the share price has dropped in recent years. There was consensus that UETCL is under-funded and that this is restricting progress.

Despite the success achieved so far, respondents are uniformly of the opinion that the return on investment required from Umeme is too high and that the Government needs to implement a more cost effective solution. The unanimous opinion was expressed that a new model needs to be developed that will enable increased access to low cost DFI funding.

9.4.2 Technology, Systems and Processes

Respondents differed in their assessment concerning the importance of technology as a requirement for reform success. Many were of the opinion that costly state of the art technology served no useful purpose if not backed by the appropriate manpower

and set of processes and procedures. These respondents felt that upskilling staff and structuring the utility correctly were the first actions required. Others emphasized the importance of deploying appropriate technology to enable effective network management and commercial operation. There was a greater extent of agreement around the importance of effective and well-defined processes.

In Nigeria correspondents stated that lack of liquidity had limited procurement of IT and network management systems although some Disco's have managed to install SCADA at 33kV. Billing and prepayment systems have been replaced in some Disco's. TCN is in the process of upgrading the transmission control system using donor funding while the majority of Genco's have struggled to invest in upgraded station control and instrumentation systems. Some companies have improved operations by focusing on re-engineering processes and business systems, but others have not managed to achieve much in this area. The IT system supporting the financial settlement system is outdated resulting in ongoing disputes in this area.

In Cameroon IT systems and associated systems are similarly deficient. Respondents attribute this to lack of funding although it was also stated that insufficient emphasis had been placed on improving processes in the commercial management area. Good progress has been made in Uganda with respect to systems and processes. Business re-engineering and related capacity building were reported as being ongoing priorities for the company Umeme which has invested in modern IT systems and has been improving processes steadily. There is still a way to go, and systems are not fully integrated. This is reflected in the persistently high loss level and the unsatisfactory level of service around faults and new connections. Control systems funded by donors are being upgraded in UETCL but this has been a slow process. The structure and the term of the Eskom generation concession has resulted in a lack of investment in new systems which will have to be addressed when the term ends in 2023.

9.4.3 Executive Management

Discussions with respondents highlighted different assessments of the importance of this element. Expatriate stakeholders with single country experience emphasized the absolute importance of having a suitable management team in place to be able to deliver on reform progress. Local stakeholders for unexplained reasons did not place the same level of emphasis on the importance of utility management.

Discussions with Nigerian respondents concerning the CEO and executive management of two high profile Disco's revealed the following observations. In the case of Disco 1 the CEO and executive management were largely expatriate during the first five years of operation. The CEO was highly experienced, having previously held two similar positions in other countries but having no knowledge of the priority actions required to turn around a poorly functioning utility. The decision was taken to

pursue a purely non-political approach to managing the utility. Consequently, no substantive relationships were developed between the executive management and key Government stakeholders for fear that this would complicate matters. The strategy was ultimately unsuccessful as confrontation escalated between the Disco and the Government over time, and key issues such as payment of Government bills remained unresolved. Improvements were made in some areas but the overall commercial performance only improved marginally.

In the case of Disco 2, the board and executive team were local and had very little knowledge of and experience in the power sector. It was reported that they immediately went into fire-firefighting mode and omitted to develop term strategies and action plans. The Board became involved in the day to day operations of the company and took little heed of the advice provided by expert expatriates. Political fighting between board members took place reportedly sparked by conflicting self-interest in the business. Contrary to the management of Disco 1, the Board and CEO adopted a highly political approach towards operating the business as some members had close relationships with the Jonathan government. These political connections were ultimately of limited value as the dysfunctional nature of the reform implementation overrode any potential benefits.

When Actis took over the Cameroonian concession in 2014 they appointed an existing utility staff member as the CEO, believing that this person would have the necessary expertise and political connections to turn the company around. An international correspondent highly knowledgeable on the sector reported that this strategy was unsuccessful as the Government were able to exert undue influence over the management of ENEO through this individual. The CEO also did not have specific expertise in turning around poorly performing utilities. Consequently, Actis appointed an expatriate as CEO in 2017 in the hope that this would break the Government level of influence in the utility. This strategy has also presented challenges as the utility has experienced serious financial issues during the past two years down to the Government not meeting its financial obligations to the utility. These developments would seem to suggest that the Cameroon government intends to maintain a strong hand in the management of the private concession going forward. This government action negates the intention of the privatization ie to remove the utility from the government control and reduce the level of corruption.

Respondents in Uganda emphasized the importance of a competent and politically well connected executive team as a critical ingredient of reform success. The initial CEO lacked the required international expertise to improve the performance of UMEME and simply attempted to replicate the business model from his previous employer. This CEO's relationship with politicians and government officials tended to be confrontational and this negatively impacted progress. The main shareholder then replaced the CEO with a well experienced expatriate who laid a strong foundation for

a turnaround in performance. The most recent CEO, an experienced Ugandan national, took the helm in 2015 and has successfully overseen a significant improvement in performance levels. The Government has not interfered significantly in the operation of the company enabling the executive management to concentrate on managing effectively.

In all the above cases, problems occurred when the executive management showed inadequacies in the areas of understanding political, financial, interpersonal, legal, technical and other aspects of the firm and sector even if having specialist knowledge in only a few of these aspects, thereby validating the importance of a competent and politically connected executive team to achieve reform success.

9.5 Cross Cutting Factors

9.5.1 Corruption

Only some country nationals mentioned corruption as an issue. All expatriates and internationally experienced respondents however, highlighted corruption as a key deterrent to success in the sector. It would seem that some country nationals either accept that corruption is a normal part of business or class it as a taboo subject.

In the case of Nigeria, all branches of Government including the regulator are perceived as corrupt by all expatriate and the majority of local respondents. The inflated asset prices raised suspicions about Government corruption at the start of the reform. The NBET negotiation of PPA's with Genco's was not transparent and it is reported that terms differ. The monthly settlement process is complex and non-transparent raising questions around accountability. Some Disco's have made efforts to reduce petty corruption by introducing cashless payment systems but it is reported that corruption persists at higher levels in the company. Local staff worked against expatriate management in some cases when attempts were made to counter corrupt practices.

Respondents in Cameroon, local and expatriate, were uniformly of the opinion that corruption is evident at all levels in the sector. One was of the view that personal gain was the reason behind the creation of multiple state-owned companies to manage development and operation of generation assets. It was reported that ENEO has introduced the concept of business units to increase levels of accountability. The company is also introducing pre-payment systems but this is often opposed by some officials as it limits possibility for rent extraction from consumers.

In the case of Uganda corruption was not highlighted as a major issue except for one statement by a country national that corruption is 'killing the country'. While

corruption is clearly alive and well in the country, it is apparent that levels with respect to the electricity sector are lower than in the cases of Nigeria and Cameroon.

International respondents offered further insightful views on the corruption issue. One respondent maintains that politicians are the main drivers of corruption in utilities rather than utility staff. In the case of privatized utilities, having a significant ownership of small investors via equity, increases the possibility of better governance and improved accountability. This is the case with both UMEME and the Compagnie Ivoirienne d'Electricité (CIE) in Cote d'Ivoire which both operate a sustainable business. Another respondent pointed out that senior managers are often required by politicians to procure generation or equipment in a non-competitive manner and with no regard for compliance with technical standards and requirements thereby opening the way for rent extraction. The view was also expressed that until governance improves, the chances of achieving sustainable improvements remain constrained.

9.5.2 Exogenous Factors

Exchange volatility was highlighted as the most important factor in this area impacting reform outcomes as most equipment and system imports are denominated in USD or Euro. In Nigeria it was reported that the declining value of the Naira – around 160N/1 USD at the commencement of the reform to around 740N/1 USD in December 2022 (parallel market rates) has had a significant impact on sector financial health and reform outcome. This could have been largely avoided if the Government had permitted tariffs to be adjusted in line with the exchange rate as per the MYTO but political considerations overrode any intended adjustments.

Currency volatility has not affected the Cameroonian sector due to the local XOF currency being pegged to the Euro. The sector may find itself in trouble if the currency peg is removed as it is not certain whether the Government would allow tariff changes in line with the fluctuating currency. In the case of Uganda, respondents reported that the Ugandan currency had remained largely stable and even appreciated against the USD at times. In addition, the tariff has been adjusted in line with any exchange fluctuations, protecting the sector from such negative impacts.

9.5.3 Human Capacity

In the case of both Nigeria and Cameroon shortage of human skills are reported to be a significant issue negatively impacting sector improvement. It is the view of respondents that significant skills were lost during the unbundling and privatization initiatives.

In Nigeria the new private owners were contractually required to partner with approved international companies to enable effective knowledge transfer. Most companies dispensed with these partners within a limited period due to financial constraints. A respondent also stated that tertiary education institutions are not geared up to prepare students for working in the power sector. The Government has omitted to allocate funding to specific programs aimed at building technical skills in the sector.

Cameroonian respondents similarly reported low levels of technical skill as a major challenge across the sector. Lack of human skills at MINEE, SONATREL and AER are causing delays in upgrading infrastructure in a sustainable manner. Respondents are of the view that recruitment is often done based on tribal affiliation and not on technical proficiency resulting in large numbers of unproductive staff in the sector.

The Ugandan case is somewhat different. It is reported that UMEME has allocated significant resources to technical capacity building of local staff. Teams of expatriates have been retained on a continuous basis and knowledge transfer is ongoing. The Regulator has been permitted to recruit professional staff with adequate expertise resulting in more effective sector oversight. Respondents did express the view that human capacity is currently lacking in the state-owned UETCL and that the Government needs to address this issue urgently.

Respondents mentioned that DFI's have been funding region wide programs to upgrade human capacity using the Association of Electricity Producers and Distributors of Africa (APUA) as an agent. While considerable resources have been allocated to these programs over a 10–15-year period, it is the general view that much more needs to be done to address this critical issue.

Chapter 10

Synthesis and Conclusions

10.1 Where to Next

The path to market-based electricity sector reform based on the standard model over the past thirty years has been both challenging and controversial. Positive outcomes were initially demonstrated in developed countries but as time progressed, cracks started to show around inadequate provision of new infrastructure and inability to sufficiently upscale renewable generation leading to greater government intervention in the sector in many cases. In Latin America, outcomes were initially positive but reforms in Argentina and Brazil were later unable to withstand macro-ecomomic and climate shocks leading to modifications in reform design and greater government intervention. With few exceptions, outcomes in SSA have not met expectations with reform initiatives stalling and patchy outcomes. Some countries have ended up with a hybrid structure comprising a state-owned utility together with a set of IPP's. Most countries where reform has been undertaken have fared poorly with little significant improvement to show with respect to financial health and access rates. The standard model of reform has been declared unsuitable for application in the region, yet, despite the evidence, South Africa is contemplating moving ahead to reform its electricity sector by following the initial steps prescribed by the standard model in the hope that the initiative will somehow turn around the ailing state-owned utility, Eskom.

It is clear that reform in developing countries is at a crossroads with no clear direction. In contrast to multiple previous publications, recent publications by DFI staff emphasize that care should be taken in applying privatization to the distribution and retail functions and that elements of the standard model should only be adopted if found to be applicable in a particular country context. It is against the current confusion in electricity sector reform that this thesis seeks to increase understanding around critical elements impacting reform outcomes and hence enable practitioners make better informed decisions on reform policy.

This chapter synthesizes the findings of the research on electricity sector reform by answering the research questions and evaluating the plausibility of the working hypothesis formulated in Chapter 1. The review of theoretical literature has proven useful in terms of providing pointers to various critical elements. Somewhat unexpectedly, the comprehensive empirical literature survey led to the identification of a set of critical elements far beyond those stated in the working hypothesis and the subsequent development of a novel analytic framework that offers a different model

for understanding the context of electricity reform and its likely outcomes. This framework was tested using country case studies and interviews.

10.2 The Research Questions

Research Question 1: From a theoretical and analytical framework perspective, how do we view power sector reform initiatives in Africa?

The theoretical basis for understanding electricity sector reform outcomes has been reviewed in Chapter 2. Four relevant bodies of theory were reviewed and found to be broadly applicable in analysis of sector reforms. Principal Agency Theory and the associated concepts of Moral Hazard and Information Asymmetry provide a basis for understanding the relationship between stakeholders in the industry. The relationship between the government and the regulator and between the regulator and utilities are particularly relevant in this context. The second body of theory covered the concepts of the Capability Perspective of the Firm. This theory is particularly applicable to analysis of individual utilities and as well as regulators and government departments overseeing the sector and is infrequently referred to in the reform literature. The third body of literature covers a niche part of the broader organizational literature referred to as Upper Echelon Theory. This addresses the importance of the CEO and executive team in ensuring efficient sector operations. The fourth set of literature, developed relatively recently, covers the concept of Political Economy as a lens to analyze the relationships affecting the outcomes of electricity sector reform. This body of theory has been developing as an approach to better understand reform outcomes in complex political economy environments. The theory is still under development but offers some insight into reasons for reform failures over and above the other two sets of theory described. The four sets of theory provided useful lenses to enable a better understanding of reform outcomes during the analysis.

The literature covering electricity sector reform evolution and outcomes is extensive and provided a basis to understand and analyze the context and of reform outcomes. This literature focusses almost exclusively on market-based reform as that has been the dominant theme over the past 30 years. This narrow focus has resulted in a tunnel vision of understanding around the concept of sector reforms. The literature provides a wide range of opinions on the outcomes of market-based reforms, but the numerous empirical studies differ significantly in findings and conclusions. This has been attributed to inadequate methodologies, lack of counter factual data as well as an overly complex environment. Political Economy Theory has been applied as a consequence of this failure to understand poor reform outcomes but more research is required to develop the concept fully.

10.3 Research Question 2: What have been the performance outcomes of market-based reforms in the power sector in developing countries and in particular SSA?

The body of literature on reform outcomes is extensive and findings and opinions on reform outcomes vary greatly. Earlier donor centered research has tended to conclude that market-based reform outcomes have been positive in developing countries whereas some independent authors have been more critical, stating that market-based reform outcomes in developing countries have been less than unsatisfactory in most instances. Reforms in Latin America showed impressive gains in the early years but failed to be sustainable in the longer term in Argentina and Brazil leading to a greater degree of government intervention. Some countries such as Bolivia and Venezuela re-nationalized the electricity sectors. Later reviews by DFI based authors have acknowledged that the market-based model has failed to result in meaningful outcomes in a number of developing countries.

Case studies revealed that reforms in SSA have generally been unsatisfactory. Reforms have stalled and many countries currently have a hybrid structure comprising a central state-owned electricity utility and a set of IPP's selling power to the utility. Competition in any form has not materialized in the region. Regulatory capacity has been shown to be weak, even proving a hindrance to sector development in some instances. Expected private sector investment has not materialized, especially in the distribution and retail areas. This has negatively impacted sector development as utilities would normally have received DFI financing for distribution infrastructure upgrades and expansion.

These conclusions were drawn from examination of utility performance as well as interviews with key stakeholders including DFI staff who were of the opinion that market-based reforms in SSA were a failure, contributing little to sector development over the past 20 years.

10.4 Research Question 3: Are there key elements other than private sector participation, sufficient resources and enhanced regulation impacting reform outcomes?

The empirical literature paints a confusing and contradictory picture related to factors impacting reform outcomes. Certain factors are deemed to be influential in contributing to a positive outcome in one study, yet another set of studies finds the same factors to be less significant. This finding is unsurprising given that the studies were conducted across vastly differing country contexts using different methodologies which have been criticized for being inadequate. While government support and adequate resources have been determined to be critical requirements for successful reform, the research has revealed a set of nine critical elements concerning policy, regulation, planning and procurement, executive utility management and human

capacity as well as three critical elements cutting across the industry. The importance of these factors emerged from the extensive literature survey. These factors formed the basis for the development of an analytic framework which advances knowledge on understanding of electricity sector reforms in developing countries and Sub Sharan Africa in particular.

10.5 Research Question 4: Is privatization a necessary element in moving towards improvement of power sector performance?

Privatization is an essential component of the standard model of reform and was promoted by the World Bank and other DFI's as a solution to counter poor utility performance. Case studies in SSA have clearly shown that privatization is neither necessary nor sufficient to achieve reform success.

The case study on the privatization of the Nigerian ESI illustrates the point well. There has been minimal improvement in sector performance since privatization was implemented in 2013. Reliability indices have not improved and the quality of supply remains at a dismal level. There has been minimal investment in distribution while initial loans taken to acquire ownership of the assets have largely remained unpaid.

The long term concession in Cameroon has shown marginally better outcomes. There has been minimal private sector investment in distribution, transmission and IT systems. The Government still exerts strong influence on utility finances and operations while sector coordination remains poor. Until the recent unbundling of transmission from the utility, there have been minimal resources allocated to the transmission network, effectively setting the country back by 20 years in terms of transmission development.

A 2019 publication by World Bank staff calls for caution when involving the private sector in distribution in developing countries, stating that solutions involving the private sector need to be carefully tailored taking the country context into account. This statement marks a turning point in World Bank thinking on reform policy although evidence on ongoing Bank advice in some countries shows that this thinking may take some time to filter down to the operational level. The research conducted for this thesis concludes that selection of the appropriate policy and reform model is a critical element. This could include private sector participation if determined to be beneficial in the particular country context.

10.6 Research Question 5: What is the role of the Regulator in the Sub-Saharan context?

The concept of regulatory independence has been largely illusory in the region. Governments maintain varying degrees of control over Regulators with respect to

tariff and other key sector issues. Exceptions are Uganda and Kenya where the regulators have managed to maintain some degree of independence from their respective governments and fulfil their duties to a large extent. In other countries such as Cameroon and Nigeria, the regulator is required to carry out Government dictates. In some instances, regulators actually hinder sector progress due to incompetence or regulatory over-reach arising from power struggles within the industry.

While the regulatory function is a critical ingredient in the reform process, it has become clear that the concept of economic regulation as envisaged in the standard model and being implemented by an independent regulatory body is not the appropriate solution for the SSA region in general. In many countries the political environment or human capacity levels do not support this level of sophistication. In such cases regulation could be outsourced or implemented via contract if applicable. Lack of regulatory skills remains a key deficit across the region and due attention needs to be paid to upskilling staff regardless of the regulatory structure in place.

10.7 Research Hypothesis: "Successful outcomes of power sector reform initiatives depend on judicious use of private sector partners combined with sufficient resourcing and an enhanced regulatory environment."

This hypothesis is not supported by the findings. The original hypothesis was too simple, and restricted to too few success elements, in a way similar to many of the analyses that have been reported in other studies.

Although the project started with this idea, the research undertaken indicates that the successful outcomes depend on a set of 12 critical elements that form the basis for the proposed analytic framework. While enhanced regulation is one of the factors identified, judicious use of the private sector was not found to be essential. The hypothesis is invalid as it does not fully address the complexity of the factors that shape reform in the electricity sector.

The framework developed in Chapter 5 comprises these multiple elements and has been found to be both valid and sufficient as a tool to better understand reform outcomes. The model therefore contributes to a new understanding of electricity sector reform by defining a nuanced and more complex view on factors that impact reform outcomes.

10.8 Implications of the Research

The findings of this research indicate that reform policy development and reform outcome analyses have paid insufficient attention to some key elements, particularly sector context and those related to utility performance. The research implies that the

wide spectrum of factors covered by the research needs to be considered both in reform policy development as well as reform outcome assessment. Governments, DFI's and other stakeholders should play an active role in the process to understand these factors to develop appropriate sector reforms. This should be done with the understanding that sector reform is a dynamic process requiring further consultation between stakeholders on a continual basis after implementation.

The framework for analysis and assessment delivered in this thesis can be utilized in two aspects. The first is to enable a more comprehensive understanding of existing reforms or past reforms. Analyses in the past have mostly concentrated on a narrow band of reform elements, leading to inaccurate conclusions. Secondly, the framework provides a useful basis for designing a revised or new reform policy for the sector. By assessing the elements comprising the framework, the likelihood of developing a policy that is fit for purpose and sustainable into the future is strengthened. While some elements are exogenous and some will take considerable time to address, such as corruption levels and weak institutions, there are sufficient elements for governments and their advisors to design and implement reforms in such a manner as to work around intractable issues to achieve an acceptable outcome.

The potential usefulness of the model is further enhanced by the observation that the global pendulum is gradually moving away from neo-liberalism, perhaps to a more neutral position where the strengths and weaknesses of both the private sector and the state are assessed and appropriate policies developed based on each country's context. In the context of electricity supply, we have seen signs of a shift in thinking by the DFI's away from the market-based standard model of reform approach to a more neutral stance. This opens the way for a more analytical approach to reform policy design going forward.

In addition, this novel framework also has potential applications for understanding the causes of poor performance of infrastructure utilities beyond the electricity sector and contributing broadly to the attainment of the UN's sustainable development goals.

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Appendix 1

List of Questions used for Interview of Stakeholders

The interviews were structured according to the 12 critical elements derived from the theoretical basis for the research described in chapter 2, the empirical literature in Chapter 3 and the subsequent analysis in Chapters 4 and 5. The questions were directedtowards establishing the validity and sufficiency of the proposed analytic framework. The final question was open-ended to allow any other issues to be identified by an interviewee.
My personal experience in the region also played an important part in the framing of the questions.

1. **Theme 1: Government support for reform and policy consistency:**

   Questions around the extent of ongoing government support for the particular reform. (i) Is it consistent or uncertain with the possibility of different approached being followed by different state departments?(ii) Has there been significant government interference in the sector reform and if so, in which way? (iii) Has Government supported the independence of the Regulatory authority?(iv) Has the policy framework including the legal and regulatory framework been developed and implemented in a consistent manner so as to avoid ambiguities both in the base framework and in the implementation? (v) Has the Government provided infrastructure funding as promised? (vi) Has the government respected the relevant contracts – concession/ management contract as applicable? (vii) status of broader socio economic reforms

2. **Theme 2: Stable Macro Economic Environment:**
   Questions around the macro economic environment. (i) Currency stability over past 15 years? (ii) Government monetary policy? (iii) Level of sovereign debt? (iv) IDA or IBRD country?

3. **Theme 3: Strength of national institutions**
   Questions revolve around perceived strength of national institutions. (i) judiciary and general rule of law, (ii) administrative arm of Government, (iii) treasury incl fiscal efficiency, (iv) financial institutions incl capital markets

4. **Theme 4: Regulation and Governance**
   Questions revolve around the effectiveness of the electricity regulator and general governance (i) Has legislation been passed and a regulator established? (ii) details on the regulator – date of establishment, staff employed, how is the regulator funded? (iii) how are the commissioners and CEO appointed? (iv) in their assessment how independent is the regulator from Government? (v) does the regulator have the final

say on tariff determination? (vi) How much regulatory discretion is allowed by the Government? (vii) Are regulatory decisions often overruled by the Government? (viii) Does the Regulator have access to suitably experienced and qualified staff? (ix) What is the perception of corruption in the sector – at which level and to what extent, and what is being done to manage this issue?

5. **Theme 5: System Planning and Generation Procurement and Contracting**

Questions revolve around the issue of adequacy of system expansion planning and procurement and contracting of additional generation. (i) Has the reform diminished the importance of effective central system planning? (ii) If yes how has such deficiency impacted reform outcomes? (iii) Has the contracting of private sector participants in the sector led to positive outcomes? (iv) if not, what are the perceived deficiencies in the contracting? (v) Have there been overlaps between regulatory discretion and regulation by contract?

6. **Theme 6: The Reform Model**

Questions revolve around the long term effectiveness of the reform model. (i) Has the reform model proven to be effective and sustainable over the longer term? (ii) If not which are the ways that the reform model could have been differently designed – did the design sufficiently take country context and political economic factors into account? (iii) Were social and environmental priorities effectively addressed in the model?

7. **Theme 7: Human capacity within the power company/ies**

Questions pertain to the adequacy of human capacity in the power company/ies. (i) To what extent does the power company have the necessary manpower skills to transition the sector to a sustainable future with respect to (a) managerial and strategic, (ii) technical, (iii) financial, commercial and administrative, (iv) social and environmental and, (v) health and safety?

8. **Theme 8: Finance adequacy incl tariffs and FDI**

Questions revolve around financial adequacy: (i) Are MYTO or other tariff provisions respected by the Regulator and/or the Government? (ii) Does the government provide promised subsidies on time? (iii) Does the Government meet investment obligations? (iv) Is the country environment conducive to FDI? (v) Is the power company/ies in a position to adequately fund infrastructure from revenue and loans/equity? (vi) does the company have the means to utilize financial resources in an efficient manner?

11. **Theme 9: Technology, processes and procedures**

Questions revolve around the adequacy of technology being utilized as well as processes and procedures relating to the power company operation in general. (i) to what extent has modern efficient technology and systems been utilized in company operations? (ii) have the applicable processes and procedures been implemented to

ensure maximum utilization of technology and systems? (iii) have staff been trained and retrained on applicable processes and procedures?

12. **Theme 10: Exogenous issues – Weather events**
Questions relate to occurrence of weather events and how these have related to reform outcomes. (i) have there been major adverse weather events during the reform process? (ii) If so, what has been the assessed impact and how long has it taken for the sector to normalize?

13. **Question stakeholders whether they propose any additional elements that impact successful sector reforms**