



## Module 4

# The reform of the power sector in Africa



## CONTENTS

1. MODULE OBJECTIVES	4.1
1.1. Module overview	4.1
1.2. Module aims	4.1
1.3. Module learning outcomes	4.2
2. INTRODUCTION	4.3
3. REFORMS IN THE AFRICAN ENERGY SECTOR	4.7
3.1. Rationale for power sector reform in Africa	4.7
3.2. Typical restructuring and privatization paths followed by most African countries	4.8
3.3. Status of power sector reform in Africa	4.9
4. POSSIBLE REFORM OPTIONS – EXPERIENCES IN AFRICA	4.13
4.1. Corporatization	4.13
4.2. Management contract	4.15
4.3. Unbundling	4.16
4.4. Independent power producers	4.19
4.5. Electricity law amendment	4.23
5. CONCLUSION	4.25
LEARNING RESOURCES	4.27
Key points covered	4.27
Answers to review questions	4.28
Exercises	4.29
Presentation/suggested discussion topics	4.29
Relevant case study	4.29
REFERENCES	4.29
INTERNET RESOURCES	4.31
GLOSSARY/DEFINITION OF KEY CONCEPTS	4.32
CASE STUDY 1. Power sector reform in Zimbabwe	4.39
CASE STUDY 2. Electricity regulation in the United Republic of Tanzania: moving from government regulation to an independent regulatory body	4.53

CASE STUDY 3. Power sector reform and regulatory institutions of Ghana	4.59
PowerPoint presentation: ENERGY REGULATION—Module 4: The reform of the power sector in Africa	4.65

## 1. MODULE OBJECTIVES

### 1.1. Module overview

The overall objective of this module is to provide a broad overview of power sector reform and highlight the drivers of reforms in Africa. In addition, the module discusses the implementation process of power sector reforms in Africa. Though there is a wide spectrum of reform options implemented in the region this module and other relevant modules in the training package focus on five of the most common reform options which include: unbundling (also referred to as restructuring); management contracts; corporatization/commercialization; independent power producers; and electricity law amendment.

The module provides an overview of power sector reform by describing its genesis, key characteristics and the pace of implementation in Africa. It highlights that power sector reforms were primarily designed to bridge short-term generation shortfalls and improve the financial health of state-owned power utilities. Although descriptions of the power sector are provided, the module does not include an analysis of the impact of power sector reform on sustainable energy—an issue that is addressed in two separate modules (modules 9 and 16) available in this training package.

The module is organized into three sections with the first providing the rationale and the status of power sector reform in Africa and the second describing the five main reform options implemented in Africa. The final section of the module presents key overall conclusions about the principal characteristics and trends of power sector reforms in Africa.

### 1.2. Module aims

The aims of the present module are listed below:

- Provide an overview of power sector reform in Africa;
- Highlight the drivers of power sector reform in Africa;
- Review power sector reform options implemented in sub-Saharan Africa. Specifically, this module focuses on the following reform options:

Corporatization

Management contract

Unbundling (vertical and horizontal)

Independent power producers

Electricity law amendment

- Provide examples, where relevant, of countries that have implemented the aforementioned reform options.

### **1.3. Module learning outcomes**

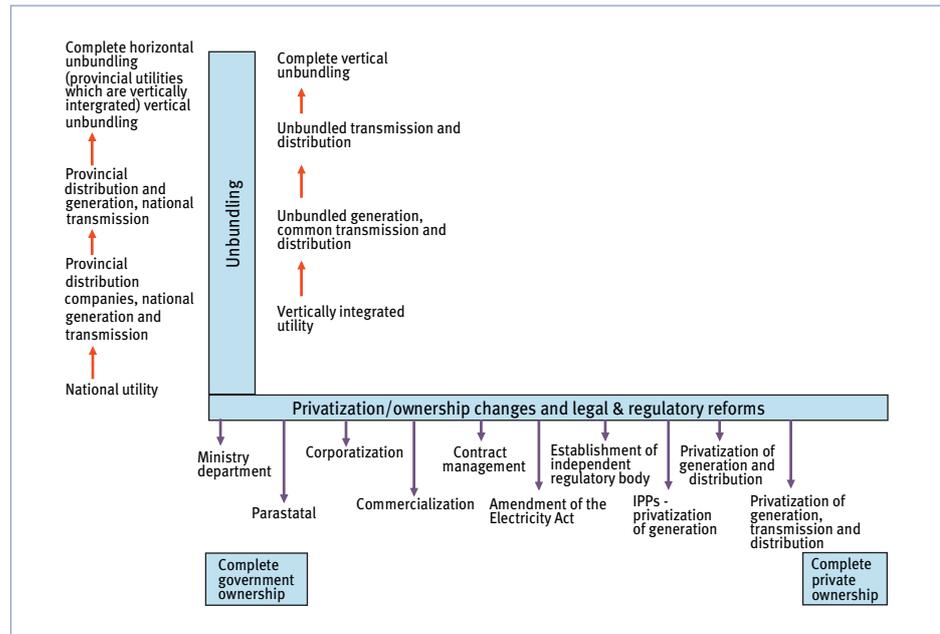
The present module attempts to achieve the following learning outcomes:

- Understanding power sector reforms in Africa;
- Being informed of the current status of power sector reform in Africa;
- Gaining appreciation of the key drivers of power sector reform in Africa.

## 2. INTRODUCTION

Although power sector reform has a wider meaning, the bulk of the existing literature, particularly from multilateral development banks, often equate reform with deregulation or, more specifically, the drastic reduction of government participation in the electricity subsector. To provide a clear understanding of power sector reform in Africa, this module offers a broad overview of power sector reforms and discusses the different reform options implemented in the region.

Figure I. Power sector reform options



There is a wide spectrum of power sector reform options as is shown in figure I. For the purpose of this module however, five major reform options implemented in Africa have been selected. They include:

- Unbundling, also referred to as restructuring
- Management contracts
- Corporatization/commercialization
- Independent power producers (IPPs)
- Electricity law amendment

The rationale for the selection of the aforementioned reform options for this module and for the training package in general is such:

- They are common reform options that have been widely implemented in Africa.
- They appear to have the most significant impact on renewable energy and energy efficiency in the region.

Comparing the reform process in Africa to the rest of the world, it appears that sub-Saharan Africa has been the slowest to implement power sector reforms. This is according to the latest and most comprehensive global survey of the status of power sector reforms in developing countries conducted in 1998 by ESMAP (Bacon and Besant-Jones, 2002). The survey included 48 sub-Saharan African countries and revealed that, in contrast to other regions in the developing world, in overall terms, sub-Saharan Africa's power sector was the least reformed (see table 1 and 2 below).

**Table 1.** Status of power sector reforms in the developing world (1998)<sup>a</sup>

Key Step	Region (number of countries)					
	SSA (48)	MNA (8)	EAP (9)	ECA(27)	SAR (5)	LCC (18)
Corporatization/ commercialization	15 (31%)	2 (25%)	4 (44%)	17 (63%)	2 (40%)	11 (61%)
Independent power producers	9 (19%)	1 (13%)	7 (78%)	9 (33%)	5 (100%)	15 (83%)
New electricity act	7 (15%)	1 (13%)	3 (33%)	11 (41%)	2 (40%)	14 (78%)
Establishment of regulator	4 (8%)	0 (0%)	1 (11%)	11 (41%)	2 (40%)	15 (83%)
Unbundling	4 (8%)	3 (38%)	4 (44%)	14 (52%)	2 (40%)	13 (72%)
Privatization of distribution	1 (2%)	1 (13%)	1 (11%)	8 (30%)	1 (20%)	8 (44%)
Privatization of generation	0 (0%)	1 (13%)	2 (22%)	10 (37%)	2 (40%)	7 (39%)
Reform indicator	0.83 (12%)	1.13 (19%)	2.44 (41%)	2.96 (49%)	3.20 (53%)	4.61 (77%)

<sup>a</sup>It is, however, important to note that the current status of reforms might have changed significantly from the 1998 situation

Note 1: SSA = Sub-Saharan Africa; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LCC = Latin America and Caribbean; MNA = Middle East and North Africa; SAR = South Asia.

Note 2: Reform indicator = average number of reform options implemented per country (see key reform steps in table 3).

Note 3: Data on SSA slightly differs from the ESMAP data provided in Bacon 2001, due to the difference in the implied meaning of privatization of generation and distribution.

Source: Adopted from Bacon and Besant-Jones, 2002.

More recently, information indicates that the trends in SSA reforms depicted in the above table have not significantly changed, with the exception of the development of IPPs becoming the predominant reform option as well as corporatization. Table 3 presents a summary of the prevailing status of reforms in sub-Saharan Africa.

**Table 2.** Summary of status of power sector reforms in sub-Saharan Africa (2002)

Key step	Number of countries (%)
Corporatization/commercialization	17 (35%)
Independent power producers	17 (35%)
New electricity act	12 (25%)
Establishment of regulator	9 (19%)
Unbundling	6 (13%)
Privatization of distribution	3 (6%)
Privatization of generation	1 (2%)

*Sources:* AFREPREN, 2003; Marks, 2000:b; Bacon, 2001; Engorait, 2003a; Daniel, 1998e:9; Daniel, 1998d:14; Daniel 1997:33; Daniel, 1998a:40,42; Daniel, 2001a: 17; Daniel, 2001b: 16; Daniel, 2001c: 17, 18; Daniel, 1999: 44-55; Daniel, 2000a; Daniel, 2000b:14-15; Government of Kenya, 1997:31; Marks, 2001b; Marks, 2002b; Marks, 2002c; Marks, 2002d; Marks, 2002h; Marks, 2002l; Marks, 2003; Marks; 2001l; Nyoike, 2003; Republic of Kenya, 1997; Teferra, 2002; WENRECO, 2003; World Bank, 1996:96, 96.

The majority of the countries reforming their power sector have mainly corporatized their utilities and invited IPPs to offset the generation shortfall experienced by the state-owned utilities. There appears to be much slower progress with respect to reforms aimed at minimizing or withdrawing government control of the power sector, such as, establishment of independent regulatory agencies, amendment of the electricity law, unbundling and privatization of the generation and distribution subsectors.

The following section provides a broad overview of power sector reforms in Africa and a detailed discussion of the selected reform options.



## 3. REFORMS IN THE AFRICAN ENERGY SECTOR

### 3.1. Rationale for power sector reform in Africa

As mentioned earlier, the bulk of the existing literature on reform in the electricity sector often equates the drastic reduction of government participation. This view has been bolstered by numerous studies that appear to equate poor performance in the subsector with high levels of state intervention.

The need for embarking on comprehensive power sector reform arose from two primary concerns: firstly, the dissatisfaction over the poor technical, financial, and managerial performance of the state-owned electricity utilities. Secondly, the inability of utilities and the government to mobilize sufficient investment capital for the electricity subsector's development and expansion.

Other reasons for power sector reforms include the following:

- Introducing competition: increasing the number of players in the market to ensure increased quality of service as well as lower tariffs.
- Tariff reform: adjusting tariffs in order to remove subsidies thus ensuring they become cost-reflective.
- Minimizing government's regulatory role: shifting the regulatory mandate from the Ministry/Department of Energy to an "independent" regulatory agency to ensure a level playing field.
- Amending electricity acts: reviewing electricity acts to establish a sound legal basis for power sector reforms.

It is also worth mentioning that other macroeconomic factors external to the power sector played a major role in the reform process. These factors include power sector investment constraints, national government fiscal constraints, limited options for raising capital, international investment climate, multilateral structural adjustment/commitment lending policies particularly by World Bank and IMF, and national economic reform—economy-wide liberalization and reform programmes initiated as a result of fiscal crises and structural adjustment policies.

It is, however, imperative to note that none of the reform efforts in the sector were specifically aimed at the increased use of renewable energy and energy efficiency options nor did they explicitly mention improving access to electricity—especially among the poor, which is a major concern.

### 3.2. Typical restructuring and privatization paths followed by most African countries

The major reforms that have been taking place in Africa are structural changes and privatization of power utilities. Structural changes refer to the process of unpackaging vertically integrated utilities into separate generation, transmission and distribution companies (vertical unbundling) and conversely unpackaging national utilities into smaller district or provincial utilities (horizontal unbundling). Horizontal unbundling appears to be feasible in very large economies such as in the United States of America. In Africa, only Nigeria appears to be considering this option.

The privatization process is essentially an issue of changing ownership of assets. It commences with bringing the assets of the state-owned utilities under a parastatal. The parastatal is thereafter commercialized (also referred to as corporatized) and it ultimately goes through several other steps to become a fully privately owned entity. The most common privatization path undertaken by the majority of African countries has been the corporatization, commercialization, issuing of management contracts and stop at allowing the entry of independent power producers (IPPs).

The following figure (figure II) for Kenya's electricity industry illustrates the typical restructuring and privatization paths followed by the majority of the African countries including Ghana, Namibia, South Africa, Uganda, Zambia and Zimbabwe. However, not all countries strictly follow the path nor do they adopt all reform options.

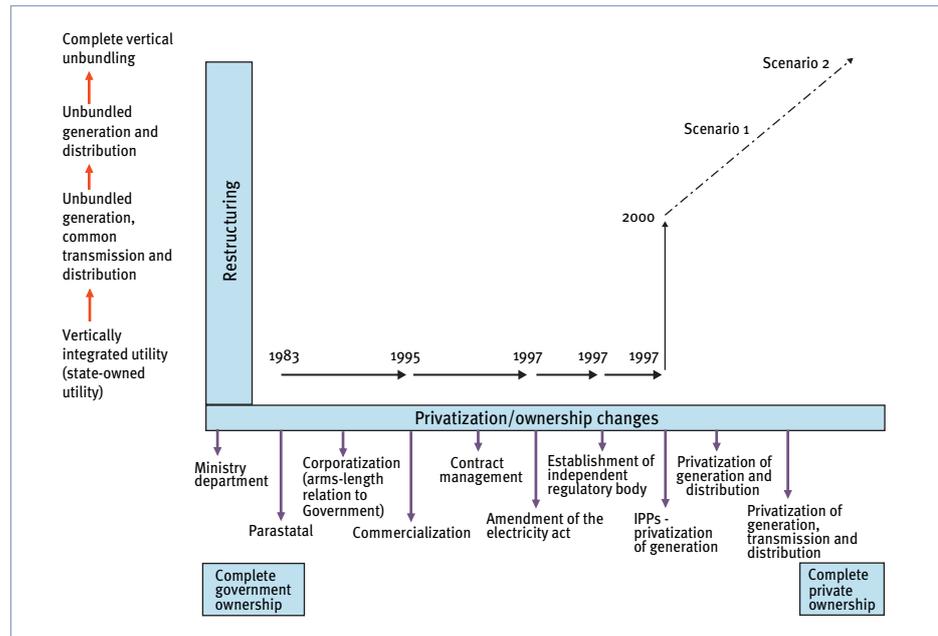
Figure II, which is representative of trends in sub-Saharan African countries, appears to indicate that a lot more privatization has been undertaken than unbundling. In addition, in most countries unbundling is implemented well after the advent of privatization.

Furthermore, figure II illustrates the long time lag between implementation of the different reform options. For example, there is often a bigger lag between commercialization and the amendment of the Electricity Act. However, as soon as the Act is amended several other developments take place almost at the same time. For example, it is not uncommon to have the electricity regulatory agency and IPPs established in the same year as the Act. As mentioned earlier, unbundling takes place much later, this being mainly due to the legal changes to the utility that are required, such as including asset transfers procedures. The long time lag is also partly due to lengthy appointment procedures for the newly established institutions.

In terms of unbundling, some countries such as Kenya have opted to only unbundle the generation segment. Others such as Uganda and Zimbabwe have taken

the option of completely unbundling the entire formerly integrated utility into separate generation, transmission and distribution entities.

Figure II. Reform options in Kenya



Scenario 1 and 2 = Possible future reform and possibly extreme options complete privatization and unbundling.

In the case of West Africa, the reforms of the electricity sector were implemented at different time intervals in different countries: Côte d’Ivoire was the first to implement reforms in the early 1990s, followed by Senegal (1998), Mali, Gambia, and finally in 2003, Benin. In all of these cases, the key reform objectives were to enhance technical efficiency (renovation and extension of the grid, improvement of the quality of electricity) as well as improved financial and managerial performance.

### 3.3. Status of power sector reform in Africa

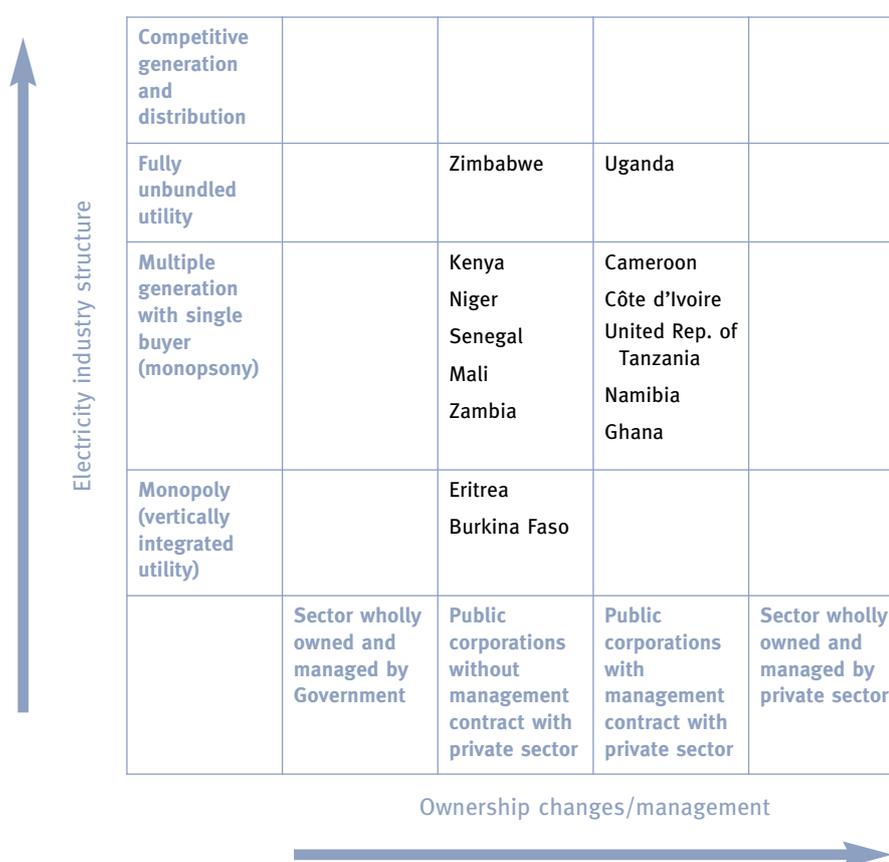
The following table (table 3) summarizes the implementation status of the various power sector reform options for selected African countries. It includes the status of legal, regulatory and institutional reforms in the countries covered in the study.

Table 3. Status of reform implementation

Country	Reform policy	Commercialization/corporatization	Regulation agency	New/amended electricity act	Private sector participation			Management contract
					Independent power producers (IPPs)	Independent power distributors (IPDs)	Unbundling	
Kenya	Implemented	Implemented	Implemented	Implemented	Implemented	Not implemented	Implemented	Pending
Namibia	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Not implemented
United Rep. of Tanzania	Implemented	Implemented	Pending	Pending	Implemented	Implemented	Pending	Implemented
Uganda	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented
Zambia	Implemented	Implemented	Implemented	Implemented	Implemented	Not implemented	Implemented	Implemented
Zimbabwe	Implemented	Implemented	Implemented	Implemented	Pending	Pending	Implemented	Implemented
Côte d'Ivoire	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Not implemented	Not implemented
Niger	Implemented	Implemented	Implemented	Implemented	Pending	Not implemented	Not implemented	Pending
Mali	Implemented	Implemented	Implemented	Implemented	Implemented	Not implemented	Not implemented	Implemented
Ghana	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Not implemented
Eritrea	Implemented	Implemented	Implemented	Implemented	Pending	Pending	Not implemented	Pending
Cameroon	Implemented	Implemented	Implemented	Implemented	Pending	Pending	Not implemented	Implemented
Ethiopia	Implemented	Implemented	Implemented	Implemented	Not implemented	Not implemented	Not implemented	Not implemented
Malawi	Implemented	Implemented	Implemented	Implemented	Pending	Not implemented	Implemented	Implemented
Mauritius	Implemented	Implemented	Not implemented	Implemented	Implemented	Not implemented	Not implemented	Not implemented
Mozambique	Implemented	Implemented	Pending	Implemented	Implemented	Not implemented	Not implemented	Not implemented
South Africa	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented	Implemented
Sudan	Implemented	Implemented	Not implemented	Implemented	Implemented	Implemented	Not implemented	Not implemented
Swaziland	Implemented	Implemented	Pending	Pending	Not implemented	Not implemented	Not implemented	Not implemented
Burundi	Implemented	Implemented	Pending	Implemented	Not implemented	Not implemented	Not implemented	Not implemented
Rwanda	Implemented	Implemented	Implemented	Pending	Implemented	Pending	Implemented	Implemented
Burkina Faso	Implemented	Implemented	Implemented	Implemented	Pending	Not implemented	Not implemented	Implemented
Senegal	Implemented	Implemented	Implemented	Implemented	Pending	Pending	Not implemented	Implemented

One important aspect of power sector reform in Africa is that full privatization of generation and distribution has not taken place, implying that all generation and distribution entities in the country are not wholly owned by public or private sector. Instead, privatization of generation and distribution has mainly taken the form of partial private ownership of utility assets through equity, the awarding of concessions and management contracts.

Figure III. Summary of the status of reforms in various countries



Source: Karekezi et al., 2005.

While a significant number of countries are planning the sell off government shares in power utilities in the future, some countries such as Senegal and Mali<sup>1</sup> have reverted back to state ownership from fully privatized electricity utilities. There are important lessons that can be drawn from these developments. First and foremost, it appears that privatization of distribution appears to be more difficult to implement than privatization at generation. Secondly, by examining well

<sup>1</sup>Mali's EDM, is essentially a public-private partnership between the Government of Mali and IPS of the Aga Khan Group with share holding of 66 per cent and 34 per cent, respectively.

performing utilities in the region such as those in Mauritius, South Africa and Zimbabwe, it can be concluded that privatization appears not to be the ultimate solution to sustained good performance of the utility. The utilities in the aforementioned countries appear to have performed relatively well without privatization.



## Review questions

### Discussion questions

1. List the key drivers of power sector reform in your country.
2. List some of the power sector reform options implemented in your country.

### Revision question

1. Explain the common drivers of power sector reforms in Africa.

## 4. POSSIBLE REFORM OPTIONS—EXPERIENCES IN AFRICA

The following sections discuss the status of selected key reform options, and the status of their implementation in selected African countries.

### 4.1. Corporatization

Corporatization (sometimes simply referred to as commercialization<sup>2</sup>), is the act of transforming a state-owned utility into a limited liability corporate body often with the government as the main shareholder. Most African countries have implemented corporatization as a reform option (as depicted in table 4). This is because it is normally the first step in the reform of state-owned utilities. The key objective of this option in the reform process is to ensure that the utility runs its operations based on the business principle of profit maximization.

**Table 4.** Commercialization/corporatization in Africa—case examples

Country	Status
Egypt	Egyptian Electricity Authority (EEA)—corporatized in 1997
Ethiopia	Ethiopian Electric Light and Power Authority (EELPA) was corporatized in 1997 and renamed Ethiopian Electric Power Corporation (EEPCO).
Kenya	Kenya Power and Lighting Company (KPLC)—commercialized in 1995
Nigeria	National Electric Power Authority (NEPA)—corporatized in 1997 to become NEP Plc
Malawi	The Electricity Supply Commission of Malawi (ESCOM), was corporatized in July 1998, following repeal of the 1965 Electricity Act. The utility was renamed Electricity Supply Corporation of Malawi Ltd.
Zimbabwe	Zimbabwe Electricity Supply Authority (ZESA)—corporatized in July 2002

*Sources:* Financial Times, July 1997:33; Republic of Kenya, 1995:27-28 & GOK, 1996:31 and Teferra, 1998:8; Marks, 2002h.

*Note:* The information in the table above is from currently available sources and may have changed with time.

Power sector reforms, involving corporatization/commercialization of power utilities, have significantly improved the financial performance of the state-owned utilities. This is attributed to the regulation aspect where an incorporated entity

<sup>2</sup>This is the transformation of a state-owned utility from one that depends on state funding for its operation to one that operates on commercial principles, thereby ensuring that its revenue fully covers its costs. This process is, in most cases, taken further to transform the state-owned utility into a corporate entity—a process referred to as corporatization.

is required to be profit making. Some of the principal sub-objectives of corporatization include:

- Separating utility from the ministry;
- Creating clear accounting framework;
- Cost recovery in pricing;
- Reducing or eliminating subsidies;
- Enforcing revenue collection.

Corporatization appears to go hand-in-hand with tariff reforms. Prior to the advent of electricity regulatory agencies and power sector reforms in general, electricity tariffs were approved and, in some cases, determined by government. This was during the period when provision of electricity was perceived as a social welfare service rather than a commercial service. Governments, therefore, strived to ensure that electricity was affordable to all by keeping the tariffs low and, to a large extent, subsidized.

Corporatization has, therefore, led to, among other developments, increases in the tariff levels in line with the following objectives:

- To recover the cost of electricity generation, transmission and distribution;
- To fairly and equitably spread the above costs to consumers based on the true cost of service delivery, consumption levels and patterns, and affordability to pay;
- To promote the efficient use of electricity.

Table 5 shows recent tariff increases in selected countries in the region.

**Table 5.** Recent tariff increases

Country	Average tariff increase	Year of tariff review	Reason for tariff review
Ghana	326 %	1998	General tariff review
Zimbabwe	70 %	2000	Annual tariff review
Uganda	56 %	2001	General tariff review
Malawi	35 %	2000	Effect of foreign exchange adjustment
Kenya	25 %	1999	General tariff review
Ethiopia	26 %	1998	General tariff review
Eritrea	18 %	2003	Annual tariff review
Namibia	10 %	2001	Annual tariff review
Cameroon	7.5 %	2004	Annual tariff review
Niger	6.0 %	2002	Annual tariff review
S. Africa	5.5 %	2001	Annual tariff review

*Sources:* Pineau, 2005; Dube, 2005; Kayo, 2005; Habtetsion, 2005; Mamadou, 2005; Gboney, 2001; AFREPREN/FWD, 2001a; 2000c; Nyoike and Okech, 2001; Teferra, 2001; UEDCL, 2001; NER, 2000; NER, 2001.

## 4.2. Management contract

A management contract describes a situation where the management of the utility is contracted out to a private entity. The utility, however, remains the owner of the assets. A management contract, to a large extent, is usually part of the wider commercialization process.

Management contracts are increasingly becoming a common feature in state-owned power utilities, particularly in West African countries. A number of countries have attempted to introduce management contracts to improve efficiency and profitability of their utilities. Countries in the study that have incorporated this option include Uganda, the United Republic of Tanzania and Ghana. Other countries include Guinea Bissau, Malawi, Morocco and Togo. Most of these contracts involve an agreement through which operational management of the utility or part of it is delegated to a firm of management consultants, but major assets and investment decisions remain under the government.

### Box 1. Management contract experiences in Africa

The foreign firms involved in management contracts in Africa have mainly been dominated by French entities. More recently, South African firms (Net Group Solutions and Eskom Enterprises—a subsidiary of the South African utility, Eskom) have begun showing interest in the African power utility management contract market. South African-led management contract initiatives are now under way in Malawi, Uganda and the United Republic of Tanzania.

Management contracts in Africa have not been without controversies. For example, a review of the management contracts instituted in Mali, Senegal, Cameroon, and, to a lesser extent, in Côte d'Ivoire, indicates a significant degree of dissatisfaction in their performance. In Mali and Senegal, for example, management contracts have been prematurely terminated.

The table below provides case examples of management contracts implemented in selected African countries.

Table 6. Management contracts in Africa—case examples

Country	Status
Côte d' Ivoire	A management contract was first signed in 1990 between Énergie Électricité de la Côte d'Ivoire (EECI) and Compagnie Ivoirienne d'Électricité (CIE). The major shareholders of CIE are French utilities, SAUR and Électricité de France (EDF). The management contract was reviewed in 2005 for another 15 years.
Guinea Bissau	In 1997, Société Guinéenne d'Électricité (SOGEL) a private concession-holder was given a ten-year renewable contract to run all technical, administrative, financial and commercial power supply services. It bills customers according to tariffs set by the supervisory authority.
Morocco	A consortium including the Portuguese companies Electricidade de Portugal and Pleidade was awarded a 30-year contract in May 1998 to manage water, electricity and sewerage works in the greater Rabat region.
United Rep. of Tanzania	The Tanzanian Government contracted out the running of the gas turbines at Ubongo to a Swedish/Swiss company, Asea Brown Boveri (ABB).  The Tanzanian Government contracted a South African firm, Net Group Solutions, to manage Tanzania Electric Service Company (TANESCO) for two years from July 2002.
Ghana	In 1997, Electricity Corporation of Ghana (ECG) signed a management contract with EdF/SAUR consortium to handle the firm's customer services.
Togo	In 2000, a consortium comprising France's Elyo and Canada's Hydro Québec International won a five-year renewable management contract to run the integrated utility Compagnie d'Énergie Électrique du Togo (CEET).
Nigeria	South Africa's Eskom is to jointly manage with Nigeria's Electric Power Authority (NEPA) areas of Nigeria's power supply. This shall be under a rehabilitate-operate-transfer (ROT) scheme.
Uganda	In 1999, the board of directors of the Uganda Electricity Board "contracted" Mr. Paul Mare as the utility's new managing director. There are indications that the new managing director remained on the payroll of his previous employer, Eskom, and UEB simply tops up his salary to provide a sufficiently attractive remuneration package. This is a unique form of management contract where an individual, rather than an organization, is contracted.
Malawi	In mid-2001, ESCOM signed a management contract with South Africa's Technology Services International, a division of Eskom Enterprises.
Rwanda	Electrogaz is to be placed under management contract. A prequalification tender for the management contract was issued in 2001.

Sources: Bacon and Gutierrez, 1996:105; Coopers and Lybrand, 1996:157; Marandu 1998:9; ESMAP & World Bank, 1996:31; Financial times, Apr 1997:16; African review, Mar 1997:27; ECA, 1995:5 and Financial times, June 1998:4; African Energy, Issue 30, September 2000: 9; African Energy, Issue 28, July 2000; Marks, 2003; Marks, 2002l; Marks, 2002j. The Guardian, 2003.

Note: The information in the table above is from currently available sources and may have changed with time.

### 4.3. Unbundling

Unbundling plays three important roles within a power reform context. Firstly, unbundling allows management to gain a clearer understanding of the technical and financial performance of the previously integrated components of a vertically integrated utility. Secondly, it also increases opportunities for competition. For example, an unbundled generation entity is expected to compete with private sector-led IPPs. Thirdly, it is expected that by ensuring that the unbundled entities

are managed independently, unbundling would lead to improved technical and financial performance.

Unbundling of power utilities can be undertaken in two forms namely; horizontal unbundling and vertical unbundling. The latter unbundling option appears to be the preferred choice and has been implemented in many African countries. The various forms of unbundling options are described in the following sections.

### Vertical unbundling

Vertical unbundling refers to the process of separating vertically integrated utilities into independent generation, transmission and distribution companies. This process often follows the following procedure:

*Vertically integrated utility:* the power utility undertakes electricity generation, transmission and distribution.

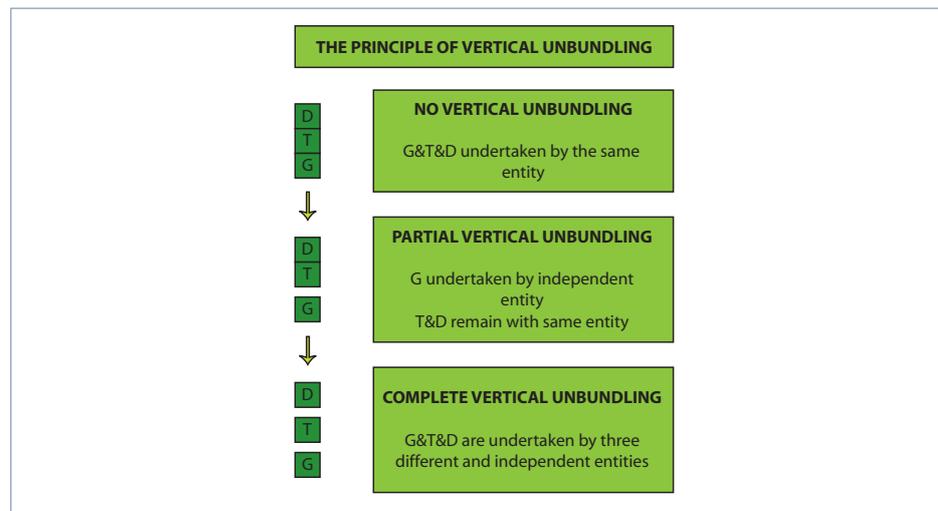
*Unbundled generation, common transmission and distribution:* the generation component of the utility becomes an independent entity while transmission and distribution remains a single entity.

*Unbundled transmission and distribution:* in addition to the unbundled generation, the distribution entity is separated from transmission.

*Complete vertical unbundling:* this is a state where three entities, i.e. generation, transmission and distribution are independent.

This principle is schematically presented in figure IV.

Figure IV. The principle of vertical unbundling



G: Generation; T: Transmission; D: Distribution  
Sources: IT Power

The following table discusses case examples of the unbundling of national utilities implemented in selected African countries

**Table 7.** Vertical unbundling of national utilities—case examples

Country	Details	Status
Kenya	In 1998, the national utility was unbundled into Kenya Electricity Generating Company (Generation) and Kenya Power & Lighting Company (Transmission & Distribution).	Implemented
Uganda	In March 2001, UEB was unbundled and three companies created and registered.	Implemented
Malawi	In 2002 the Electricity Supply Commission of Malawi was split into generation, transmission and distribution.	Implemented
South Africa	Regional Electricity Distributors responsible for electricity and electrification programmes have been established in Johannesburg.	Implemented
Zimbabwe	In 2002, Zimbabwe Electricity Supply Authority (ZESA) was into generation, transmission and distribution companies.	Implemented
United Rep. of Tanzania	State utility to be split into generation, transmission and distribution companies.	Forthcoming

*Sources:* Marks, 2002h; Marks, 2001b; Marks, 2003; Enguirat, 2003. Nyoike, 2003.

Note: The information in the table above is from currently available sources and may have changed with time.

## Horizontal unbundling

Horizontal unbundling refers to the process whereby generation, transmission and distribution are undertaken by a national monopoly utility are separated in order to have each province with its own generation, transmission and distribution entity/entities. This is undertaken as follows:

*National utility:* the power utility undertakes electricity generation, transmission and distribution nation-wide.

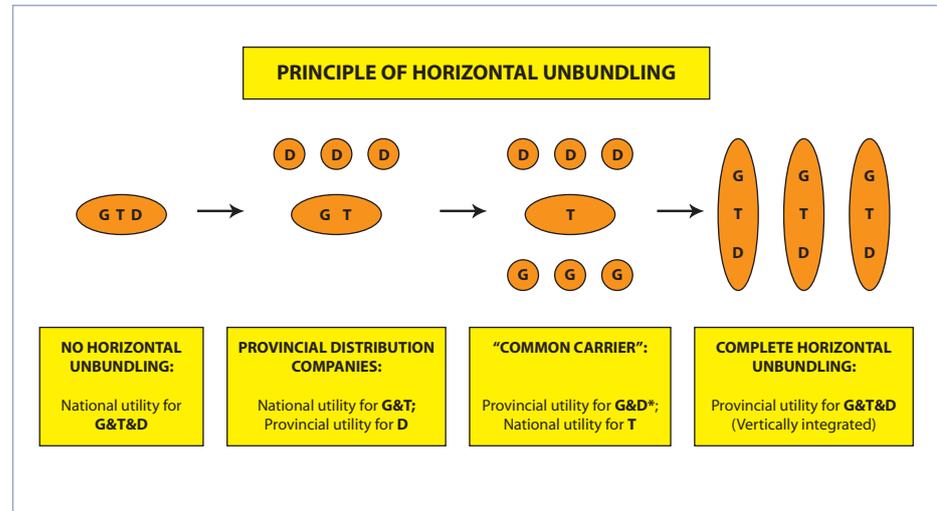
*Provincial distribution companies, national generation and transmission:* the national distribution component of the utility is reduced to entities at provincial level. Generation and transmission components remain at national level.

*Provincial distribution and generation and national transmission (common carrier):* in addition to provincial distribution entities, generation entities are also established at the provincial level. Transmission, however, remains at a national level.

*Complete horizontal unbundling (vertically integrated provincial utilities):* this is a state whereby each province has a utility undertaking electricity generation, transmission and distribution.

This principle is presented in figure V below.

Figure V. The principle of vertical unbundling



#### 4.4. Independent power producers

Independent power producers (IPPs) constitute an important form of private sector participation in Africa’s power sector. With demand outstripping supply in many African countries, independent power projects are becoming a major source of new power generation capacity in these countries. By the end of 2002, about 35 per cent of the planned IPPs were operational. The balances were either in progress or their dates of implementation were not yet due. The status of more recent IPPs in selected sub-Saharan African countries is provided in table 8.

Overall, the growth of independent power projects in Africa in the late 1990s (figure IV) was very rapid. Only a few projects in Côte d’Ivoire and Egypt were implemented by 1991. However, there was a major increase in the number of IPPs in Africa during 1996 and 1997, a period when the majority of legislative and structural changes took place in the region. As figure IV demonstrates, it appears that the rapid growth of IPPs experienced in 1996-1998 is beginning to slow, a trend that has accelerated in 2000 and 2001. The available data however, are not conclusive.

Table 8. Summary of the status of recent IPPs in selected African countries<sup>a</sup>

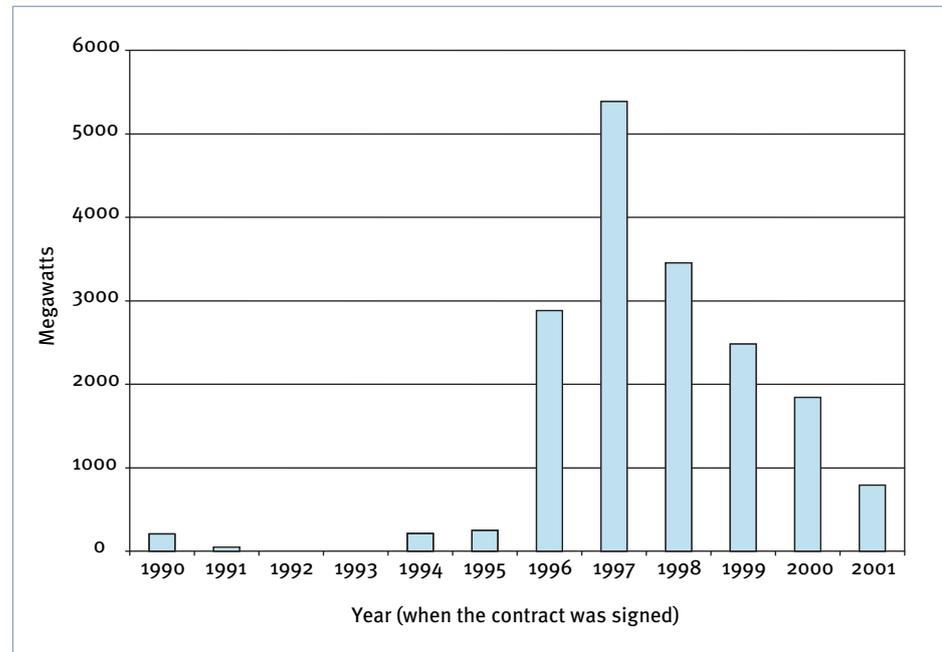
Country	Name	Size	Investment	Fuel	Companies	Status*
Ghana	Takoradi II	330 MW	\$414 m (90% share holding by private sector)	Oil	CMS and VRA	Complete
	Tema	220 MW	\$200 m	Oil/gas	KMR, Marubeni	Planned
Kenya	Tsavo, Kipevu II	74 MW	\$ 86 m (100% shareholding by private)	Oil	Tsavo Power Company (Cinergy of the US, IPS of Kenya, Wartsila of Finland, the CDC of the UK, and the IFC)	Complete
	Nairobi South Plant	56 MW	\$ 50 m (100% shareholding by private)	Oil	Iberafrika (Spain)	Complete
Côte d'Ivoire	Olkaria III (Phase I)	12 MW	\$ 17.5 m (100% shareholding by private)	Geothermal	Ormat Turbines Ltd.	Complete
	Mombasa Barge-Mounted Power Project	43 MW	\$ 20 m (100% shareholding by private)	Oil	Westmont Ltd.	Complete
Senegal	Sondu Miriu	60 MW	\$ 52 m	Hydro	JBIC, Kengen	Ongoing
	Olkaria III	64 MW	\$ 172 m	Geothermal	Ormat	Complete
Tanzania (United Republic of)	Lanet and Eldoret	2 x 55 MW	\$ 135 m	Oil	BSWC	Planned
	Azito	450 MW	\$ 225 m (100% shareholding by private)	Gas	Cinergy (IPS, ABB, EdF)	Complete
Zambia	Vridi	210 MW	\$ 97.5 m (98% shareholding by private)	Gas	CIPREL (EDF and SAUR)	Complete
	IPTL power project	100 MW	\$ 100 m (100% shareholding by private)	Oil	Independent Power, Tanwart: venture between Tanzanians and a Malaysian company	Complete
Uganda	Ubungo, Songo Songo	110 MW	\$ 340 m	Gas	CDC, AES	Complete
	GTI-Dakar	50 MW	\$ 62 m (100% shareholding by private)	Oil	General Electric's structured finance group subsidiary, IFC and the Italian utility Sondel	Complete
Senegal	Lusemfiwa Hydro Power Company	36 MW	- 51% shareholding by private	Hydro	Eskom Enterprises	Complete
	Itezhi-tezhi	120 MW	\$ 122 m	Hydro	OPPI	RFP complete
Uganda	Kafue Gorge Lower	600 MW	\$ 435.7m	Hydro	OPPI	RFP completed
	Bujagali	250 MW	\$ 550 m	Hydro	AES	Postponed
Sudan	Kakira Sugar Works	12 MW	\$ 11.3 m	Bagasse	Kakira Sugar Works	Ongoing
	Khartoum North	200 MW	\$ 267 m	Hydro	Chinese power company, Harpen Wang Chen	Planned

<sup>a</sup>At the time of writing this module there are no IPPs in Botswana, Burkina Faso, Eritrea, Ethiopia, Lesotho, Malawi, Namibia or Niger. IPPs are, however, envisaged in the future in these countries.

\* Status as of May, 2004.

Source: Ferreira, 2004; AFREPREN, 2004; Nakhooda, 2005.

Figure VI. Growth of independent power projects in Africa



Sources: Karekezi and Mutiso, 1999; Daniel, 2000a; Daniel, 2000b; Daniel, 2001a; Daniel, 2001b; Daniel, 2001c; Marks, 2001a, Marks, 2001b; Marks, 2001c.

Except for a few countries such as Mauritius, reforms appear to favour large and centralized power projects thereby precluding small and medium-scale renewable energy technologies. In spite of significant potential, IPP developments have not considered small to medium-scale renewable energy technologies such as mini-grids, cogeneration, small hydro, geothermal and wind.

In many African countries, power sector reform appears to have involved limited local private participation in IPP development. Current trends seem to indicate that, in the medium term, the exit of the state from electricity generation (and eventually from the entire electricity industry), would effectively hand over the industry to non-national operators. In political terms, this may be an unsustainable arrangement. Without significant local involvement, it is possible that reforms may be reversed in the future mainly because there would be no significant local stakeholder group.

Local private participation in IPP development and use of renewables and energy efficiency options has mainly been hampered by the emphasis on large-scale investment. In most African countries, the size of IPPs (both implemented and proposed) is greater than the prevailing installed capacity (largely from the state-owned utilities), which is an indication of a heavy emphasis on large-scale investments. Large-scale IPP developments may have several drawbacks with regard to local private participation in the region.

Firstly, large-scale IPP development is generally a high-tech, capital-intensive endeavour that requires heavy capital investment which dissuades local investors. Small-scale IPP development, for example, small hydro and cogeneration plants, involve technology that can easily be locally managed. In addition, the capital requirements of these small and medium-scale renewables are modest and can be sourced locally.

**Box 2. Local participation and cogeneration development in Mauritius**

Mauritius provides a model case example of the potential of local private participation and renewables development in the power sector. Due to private investment in the sector, the Mauritian sugar industry, which had been churning out bagasse as residues from its sugar processing activity, is now using these residues as fuel in highly efficient cogeneration systems. Currently, about 40 per cent of annual electricity generation comes from local privately-owned and operated bagasse-based cogeneration plants within the sugar industry (Veragoo, 2003). Over time, the local bagasse-based cogeneration industry has made steady progress in technology development, starting with modest investments of about \$US 4 million in bagasse-based cogeneration power plants comprising of conventional low-pressure boilers with installed capacity in the range of about 10-15 MW. After steady growth, local private investors in partnership with foreign investors have recently made an investment of about \$US 100 million in a hi-tech high-pressure bagasse-based cogeneration power plant with an installed capacity of 70 MW (Quevauvilliers, 2001, Deepchand, 2006).

The success of the cogeneration industry in Mauritius stems from the investments in, and use of, high pressure boiler systems (up to 82 bar pressure) and highly efficient condensing/extraction-condensing turbo-generators which allow the project owners to implement much higher capacities than what the mills need, thereby giving them the opportunity to sell excess power to the grid. The sale to the grid has been facilitated and encouraged by the favourable buyback tariffs and terms reflected in a transparent and long-term Standard Power Purchase Agreement (PPA).

In some years, the revenues coming from the use of bagasse in power generation represent more than half of the total revenues of the sugar mills. In Mauritius, revenues earned by the sugar mills from the sale of electricity to the grid are shared with the farmers using an agreed sharing mechanism. This effectively increases the earnings of the farmers from the same amount of sugar cane produced because bagasse, which had been traditionally considered as waste, is now being purchased as a biofuel. The impact of this development on the economic situation of the farmers is not negligible.

Because of these experiences, Mauritius has recently started to provide expertise in developing and implementing cogeneration systems in other African countries through consultancy work and management contracts within the sugar industry.

Secondly, large-scale, capital-intensive IPP developments invariably attract the politically connected rent-seeking class. The controversial IPP projects in

Zimbabwe involving YTL (a Malaysian company), in the United Republic of Tanzania involving IPTL (another Malaysian company) and Kenya are classic examples of the disarray that the rent-seeking class can cause. There could therefore be a case to examine smaller IPPs which may be less capital intensive and would not attract the interests of the local rent-seeking class. One of these case examples, which demonstrates both the use of renewable energy and local participation in the power sector, is cogeneration in Mauritius as described above in box 2.

The Mauritian example demonstrates the potential financial and technical capability and viability of local private investors in IPP development. Appropriate policy and financial incentives could encourage the development of locally owned IPPs. The ideal entry point, as in the case of Mauritius and applicable to most African countries, is likely to be renewable energy options such as bagasse-based cogeneration and small hydro that can be developed by IPPs and local agro-based agencies in a decentralized manner.

#### 4.5. Electricity law amendment

The amendment of the electricity law usually involves the National Assembly or Parliament of a country passing an amendment to the existing Act to establish new legislation governing the electricity subsector and/or other energy subsectors. This can, for instance, remove the monopoly of the national utility—a major barrier to private sector participation. It also often provides for the establishment of an independent regulatory body for the electricity subsector and defines its role. In some instances, the Act provides some independence to the Regulator. The Electricity Act could also create a provision for a rural electrification programme and/or fund.

In most African countries, the Electricity Act is the principal instrument that defines the legal and regulatory framework. In the past, the legal and regulatory framework was originally designed for state-owned or government-regulated power utilities, with little or no provision for private sector participation. Recently, with the exception of Tanzania, all other countries covered in this study have amended their Electricity Acts, leading to a number of important regulatory changes presented in the following table (table 9).

Table 9. Changes in the legal and regulatory framework

Provision in the electricity act	Previous legal and regulatory framework	New legal and regulatory framework
Regulatory agency	Regulation by the ministry in conjunction with the public utility	Regulation by an independent regulatory body
Rural electrification agency	Rural electrification programme administered by ministry and/or utility	Rural electrification administered by an independent body
Licensing of IPPs: - For own use	Application to ministry through the public utility.	In most countries by the electricity regulatory board (ERB). Others (e.g. Kenya) by minister on advice from ERB.
- For sale to public utility	Non-existent. Generation sole responsibility of utility.	Power purchase agreement approved by ERB.
Licensing of IPDs	Non-existent. Distribution sole responsibility of utility.	By the regulatory body.
Gazette of licence application and licence granted	Not mandatory since private power generation was licensed for applicant's own use.	A requirement for the regulatory body (and in some countries the applicant) for applications and in some countries for licence granted.
Tariff setting	Proposed by public utility and approved by ministry.	Proposed by utility and approved by the regulatory body. In some countries (e.g. Kenya) the regulatory body can also review tariff without request by utility.
Appeals and dispute resolution	On a point of law, the law courts.	The regulatory body, minister, arbitration tribunals and law courts.

*Sources:* Pineau 2005b; Habtetsion, 2005b; Dube, 2005b; Kalumiana, 2005b; Nyang, 2005b; Diarra, 2005a; Bassirou, 2005b; Sarr & Sokona, 2003, Kayo 2005b; Kahyoza 2005a; Tse, 2005b; NARUC, 2003; Government of Ghana, 1997; Government of Kenya, 1997; Government of Uganda, 1999; Government of Zambia, 1995; Federal Government of Ethiopia, 1997; Federal Government of Ethiopia, 1999.

IPPs – Independent power producers

IPDs – Independent power distributors

Note: In countries where there is no regulatory body established, the Minister concerned continues to be the main regulator.



## Review questions

### Discussion question

1. Compare and contrast reforms implemented in your country and those of your neighbouring countries.

### Review questions

1. Name and define the two forms of utility unbundling.
2. What is the role of unbundling?

## 5. CONCLUSION

Most African countries are still at the initial stages of power sector privatization and restructuring. Countries such as Egypt, Mauritius and South Africa have had state-owned and vertically integrated power sectors for a long time and have recorded impressive performances. These countries are now contemplating the introduction of private participation in the power sector.

Corporatization/commercialization of the power utilities in Africa have, to a certain extent, improved the financial performance of the state-owned utilities. This is attributed to the regulatory condition that an incorporated entity is required to be profit making. This often involves the introduction of commercial objectives into the management and operation of a state-owned (public) utility.

In most cases, management contracts involve contracting a private management firm to take charge of day-to-day operations of the utility. The utility, however, remains the owner of the assets. Management contracting is, to a large extent, usually part of a wider commercialization process and appears to be gradually gaining ground in sub-Saharan Africa.

With regard to unbundling, a vertically integrated utility is separated into legally and functionally distinct companies providing generation, transmission and distribution. Unbundling is important as it allows management to gain a clearer understanding of the technical and financial performance of the previously integrated components of a vertically integrated utility and also increases opportunities for competition. Vertical unbundling is becoming increasingly common in much of sub-Saharan Africa.

Independent power producers (IPPs) constitute an important form of private sector participation in Africa's power sector. With demand outstripping supply in many African countries, independent power projects constitute a major source of new power generation capacity in Africa. However, to date, not many IPPs are renewables-based.

Amendments to the national electricity laws have contributed to the removal of the monopoly of the national utility—a major barrier to private sector participation—and at times provide for the establishment of an independent regulatory body for the electricity subsector.



## LEARNING RESOURCES

### Key points covered

The key points covered in the module are as follows:

- Although power sector reform has a wider meaning, the bulk of the existing literature, particularly from multilateral development banks, often equate reform with deregulation or, more specifically, the drastic reduction of government participation in the electricity subsector.
- In Africa, it is generally agreed that the need for embarking on power sector reforms arose from poor technical and financial performance of the state-owned electricity utilities and the inability of utilities and the government to mobilize sufficient investment capital for the electricity subsector's development and expansion.
- Reforms were not explicitly designed to promote renewables and energy efficiency but were rather primarily designed to bridge short-term generation shortfalls and improve the financial health of state-owned power utilities.
- Major reform options implemented in Africa include:
  - Unbundling, also referred to as restructuring;
  - Management contracts;
  - Corporatization/commercialization;
  - Independent power producers (IPPs);
  - Electricity law amendment.
- Compared to the rest of the world, it appears that sub-Saharan Africa has been the slowest to implement power sector reforms.
- The majority of the countries reforming their power sector have mainly corporatized their utilities and invited IPPs to address the generation shortfall experienced by many state-owned utilities.
- Corporatization (sometimes simply referred to as commercialization) appears to be the first reform option executed in most African countries. Corporatization appears to go hand-in-hand with tariff reforms.
- The most common power sector privatization path undertaken by the majority of African countries has been the corporatization, commercialization, issuing of management contracts and allowing the entry of independent power projects (IPPs).
- In Africa, full privatization of generation and distribution, implying that all generation and distribution entities in the country are wholly private owned, has not taken place in most countries. Instead, privatization of generation and

distribution has mainly taken the form of partial private ownership of utility assets through equity, the awarding of concessions and management contracts.

- With demand outstripping supply in many African countries, independent power projects are becoming a major source of new power generation capacity in these countries. By the end of 2002, about 35 per cent of the planned IPPs were operational.
- In most African countries, the Electricity Act is the principal instrument that defines the legal and regulatory framework.



### Answers to review questions

**Question:** Discuss the common drivers of power sector reforms in Africa?

**Answer:**

The main drivers for reforms in the power sector are:

**Poor technical, financial, and managerial performance:** Dissatisfaction over the poor technical, financial, and managerial performance of the state-owned electricity utilities.

**Insufficient investment capital:** Inability of utilities and the government to mobilize sufficient investment capital for the electricity subsector's development and expansion.

**Introducing competition:** Increasing the number of players in the market to ensure increased quality of service as well as lower tariffs.

**Tariff reform:** Adjusting tariffs in order to remove subsidies thus ensuring they become cost-reflective.

**Question:** What are the two forms of utility unbundling?

**Answer:**

**Vertical unbundling:** refers to the process of separating vertically integrated utilities into independent generation, transmission and distribution companies.

**Horizontal unbundling:** refers to the process whereby generation or distribution undertaken by a national monopoly utility, are separated in order to have each province with its own generation, transmission and distribution entity/entities.

**Question:** What is the key role of unbundling?

**Answer:**

Unbundling plays two important roles within a power reform context. Firstly, unbundling allows management to gain a clearer understanding of the technical and financial performance of the previously integrated components of a vertically integrated utility. Secondly, it also increases opportunities for competition.



### Exercises

1. Should power sector reforms be a priority for Africa? Using relevant data and information to support your arguments, write 2-3 page essay.
2. Discuss the status of past and on-going power sector reforms in your country? Write a 2-3 page essay.



### Presentation/suggested discussion topics

Presentation:  
ENERGY REGULATION—Module 4: The Reform of the Power Sector in Africa

Suggested discussion topic:  
What are the key power sector reform drivers in your country?

## Relevant case study

1. Power sector reforms in Zimbabwe

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## INTERNET RESOURCES

AFREPREN/FWD: [www.afrepren.org](http://www.afrepren.org)

UNIDO: [www.unido.org](http://www.unido.org)

REEEP: [www.reeep.org](http://www.reeep.org)

IT-Power: [www.itpower.co.uk](http://www.itpower.co.uk)

UNDP: [www.ke.undp.org/Energy%20and%20Industry.htm](http://www.ke.undp.org/Energy%20and%20Industry.htm)

KAM: [kenyamanufacturers.org](http://kenyamanufacturers.org)

ADB: [www.undp.org/seed/eap/projects/FINESSE](http://www.undp.org/seed/eap/projects/FINESSE)

UNFCCC on Climate Change: [www.climatenetwork.org/eco](http://www.climatenetwork.org/eco) or <http://unfccc.int>

World Bank: [www.weea.org/Newsletter/o2/o2.htm](http://www.weea.org/Newsletter/o2/o2.htm)

Energy management training (India): [www.energymanagertraining.com/new\\_index.php](http://www.energymanagertraining.com/new_index.php)

GTZ: [www.gtz.de/wind](http://www.gtz.de/wind)

Small hydro: [www.small-hydro.com](http://www.small-hydro.com)

“Cogen for Africa” Project: [cogen.unep.org](http://cogen.unep.org)

Greening the Tea Industry in East Africa Project: [greeningtea.unep.org](http://greeningtea.unep.org)

[www.reeep.org](http://www.reeep.org)

African Forum for Utility Regulation: [www.afurnet.org](http://www.afurnet.org)

Regional Electricity Regulators Association of Southern Africa: [www.rerasadc.com](http://www.rerasadc.com)

International Energy Initiative: [www.ieiglobal.org](http://www.ieiglobal.org)

World Resources Institute: [www.wri.org](http://www.wri.org)

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[www.risoe.dk](http://www.risoe.dk)

[www.sei.se](http://www.sei.se)

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[www.nrel.gov/learning/ee\\_basics.html](http://www.nrel.gov/learning/ee_basics.html)

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## GLOSSARY/DEFINITION OF KEY CONCEPTS

<i>Bagasse</i>	The fibrous residue of sugar cane left after the extraction of juice and often used as a fuel in cogeneration installation.
<i>Blackout (also referred to as outage)</i>	An interruption of electricity service or power loss that affects electricity consumers in an area.
<i>Billing</i>	The process of issuing statements indicating electricity consumption of and charges to consumers.
<i>Biofuels</i>	Liquid fuels and blending components produced from biomass (plant) feedstocks, used primarily for transportation.
<i>Clarity (in licensing)</i>	This refers to how easily understood the licensing process and requirements are.
<i>Cogeneration</i>	Simultaneous production of electricity and heat energy.
<i>Complete government ownership</i>	When the government owns all the generation, transmission and distribution assets within a national utility.
<i>Complete horizontal unbundling (provincial utilities which are vertically integrated)</i>	When each province owns a utility that undertakes electricity generation, transmission and distribution in vertically integrated operations.
<i>Complete private ownership</i>	When all generation, transmission and distribution entities in the country are wholly owned by the private sector.
<i>Complete vertically unbundling</i>	When the generation, transmission and distribution entities are independent companies.
<i>Corporatization</i>	This is the act of transforming a state-owned utility into a limited liability corporate body often with the Government as the main shareholder.

<i>Demand-side management</i>	Planning, implementation, and evaluation of utility-sponsored programmes to influence the amount or timing of customers' energy use.
<i>Deregulation</i>	Drastic reduction of government's participation in the electricity subsector by opening up the sector to the private investors
<i>Developing countries</i>	Countries which fall within a given range of GNP per capita, as defined by the World Bank.
<i>Distribution</i>	Delivery of electricity to the customer's home or business through low voltage distribution lines.
<i>Direct access</i>	The ability of a customer to purchase electricity or other energy sources directly from a supplier other than their traditional supplier.
<i>Efficiency (in licensing)</i>	The ability of the licensing agency to process applications within the shortest possible time and in the least number of stages the application needs to go through.
<i>Electricity/power sector reforms</i>	Deliberate changes in the structure and ownership of the electricity sector aimed at improving performance, efficiency and investment.
<i>Electricity regulator</i>	The agency in charge of monitoring the electricity sector.
<i>Electrification</i>	This is the process of connecting additional households, institutions and enterprises to the national grid.
<i>Energy ministry/department</i>	The government body that provides policy directives with regard to the energy sector.
<i>Energy services</i>	The end use ultimately provided by energy.
<i>Energy sources</i>	Any substance or natural phenomenon that can be consumed or transformed to supply heat or power.
<i>Energy supply</i>	Amount of energy available for use by the various sectors in a country.
<i>Energy demand (millions toe)</i>	The amount of modern energy required by various sectors of a country.
<i>Energy production (million toe)</i>	The amount of modern energy produced within the country.
<i>Financial capability</i>	Ability to raise financial resources required to establish an electricity generation/distribution enterprise.
<i>Forced outage</i>	The shutdown of a generating unit, transmission line, or other facility for emergency reasons or a condition in which the generating equipment is unavailable for load due to unanticipated breakdown.
<i>Fossil fuel</i>	An energy source formed in the earth's crust from decayed organic material e.g. petroleum, coal, and natural gas.

<i>Geothermal energy</i>	Natural heat from within the earth, captured for production of electric power, space heating or industrial steam.
<i>Geothermal plant</i>	A plant in which the prime mover is a steam turbine that is driven either by steam produced from hot water or by natural steam that derives its energy from heat found in rocks or fluids at various depths beneath the surface of the Earth. The fluids are extracted by drilling and/or pumping.
<i>Greenfield power development</i>	Development of new power projects.
<i>Household</i>	A group of people who share a common means of livelihood, such as meals regardless of source of income and family ties. Members who are temporarily absent are included and temporary visitors are excluded.
<i>Independent power distributors (IPDs)</i>	Privately-owned power companies that purchase electricity from the national grid or from other independent sources and distribute it to consumers for a profit.
<i>Independent power producers (IPPs)</i>	Privately-owned power companies that produce electricity and sell it for a profit to the national grid or to a distribution utility.
<i>Interconnected system</i>	An integrated electricity generation, transmission and distribution network.
<i>Isolated/self-contained system</i>	A stand-alone electricity generation, transmission and distribution network serving a confined part of a country or region.
<i>Legal and regulatory framework (LRF)</i>	Combination of the laws, institutions, rules and regulations governing the operations of the electricity industry.
<i>Liberalization</i>	The removal of restrictions on entry and exit of the electricity industry making it open to any prospective and interested players. Often implies reduced state intervention.
<i>Licensing</i>	The act of issuing licences allowing investors to operate legitimately within the electricity sector, usually as IPPs or IPDs.
<i>Load limiter</i>	A gadget that limits the maximum power demand and is designed to cut off power when the rated demand is exceeded.
<i>Load shedding/power rationing</i>	Scheduled electricity supply and interruptions when power demand exceeds supply.
<i>Local participation</i>	The involvement of local inhabitants of a country in the investment in private electricity generation/distribution enterprises.
<i>Management capability</i>	Having adequate skills to efficiently and profitably run an electricity generation/distribution enterprise.
<i>Modern energy</i>	Refers to high quality energy sources e.g. electricity and petroleum products, as opposed to traditional energy sources such as unprocessed biofuels.

<i>Management contract</i>	The outsourcing of managerial functions of the utility to a private entity, with the government after remaining the owner of the assets.
<i>Micro hydro</i>	Small-scale power generating systems that harness the power of falling water (above 100 kW but below 1 MW).
<i>Multi-sector regulator</i>	A regulatory agency which monitors the electricity sector and other sector(s), such as petroleum, water, telecommunications, etc.
<i>National grid</i>	The network of electricity transmission and distribution cables used in the conveyance of electricity within a country.
<i>National utility</i>	An entity which undertakes electricity generation, transmission and distribution nation-wide. It is usually wholly or partially state-owned.
<i>Outage</i>	See black out.
<i>Open access</i>	A regulatory mandate to allow others to use a utility's transmission and distribution facilities to move bulk power from one point to another on a non-discriminatory basis for a cost-based fee.
<i>Parastatal</i>	A Government body with its own management and powers to decide and implement investments in line with the parent ministry/department policy directives.
<i>Performance-based appraisal</i>	An evaluation approach that allows the regulator to reward the utility for meeting or surpassing the predetermined performance standards or penalizes it when the standards are not met.
<i>Pilfers/Illegal connections</i>	Consumers of electricity who use illegal means of connections and have no formal contract with the utility.
<i>Population (millions)</i>	The total number of people living within the borders of a country, whether citizens or not.
<i>Primary energy</i>	Energy sources in their crude or raw state before processing into a form suitable for use by consumers.
<i>Privatization/asset sales</i>	Involvement of private sector investment in a predominantly state-owned company, through the sale of part or all of the shares owned by the government.
<i>Regulatory capture</i>	Term used to describe a situation whereby the utility or private power companies control the regulatory agency either through heavy representation in the regulator's board or by being the sole financier.
<i>Ring fencing</i>	Defining the function of an entity in the electricity industry through legal and regulatory instruments.

<i>Small and micro enterprises</i>	An enterprise that generates income up to a certain predefined limit.
<i>Small hydro</i>	Small-scale power generating systems that harness the power of falling water (1-15 MW).
<i>Small power producer (SPP)</i>	This is a power producer according to the Public Utility Regulatory Policies Act (PURPA), who generates electricity using renewable energy (wood, waste, conventional hydroelectric, wind, solar and geothermal) as a primary energy source. Fossil fuels can be used, but renewable resources must provide at least 75 per cent of the total energy input.
<i>Single sector regulator</i>	A regulatory agency that monitors only the electricity sector.
<i>Solar photovoltaic (PV) technologies</i>	Devices that convert the sun's energy into electricity for use in lighting, refrigeration, telecommunications, etc.
<i>Solar thermal technologies</i>	Devices that use the sun as the primary source of energy for heat appliances, e.g. solar water heaters, solar dryers.
<i>Southern African power pool (SAPP)</i>	An integrated network of electricity transmission lines linking several eastern and southern African countries.
<i>Steam turbine</i>	A device that converts high-pressure steam, produced in a boiler, into mechanical energy that can then be used to produce electricity by forcing blades in a cylinder to rotate and turn a generator shaft.
<i>Structural change</i>	This is the process of unbundling vertically integrated utilities into separate generation, transmission and distribution companies. It also involves increasing the number of utilities in the country.
<i>Tariff bands</i>	The classification of electricity consumption into progressive clusters, e.g. 0-50 kWh; 51-100 kWh; 101-150 kWh, etc.
<i>Tariff setting mechanism</i>	A predetermined methodology adopted to arrive at electricity tariffs.
<i>Tariff structure</i>	The composition of the different elements that determine the tariff.
<i>Technical capability</i>	Having adequate skills to operate and maintain equipment used in a power utility.
<i>Transparency (in licensing)</i>	The extent to which the licensing authority appears to be open and fair in its review, approval and rejection of licence applications.
<i>Tidal power</i>	Energy obtained by using the motion of the tides to run water turbines that drive electric generators.
<i>Unbundling</i>	The process of breaking-up a vertically integrated public utility into either different entities of generation, transmission and distribution, or into regional companies within the country.

<i>Utility</i>	An entity partially or wholly involved in electricity generation, transmission, and/or distribution.
<i>Vertically integrated utility</i>	An entity that undertakes electricity generation, transmission and distribution.
<i>Weir</i>	A dam in a waterway over which water flows and that serves to raise the water level or to direct or regulate flow.



## Case study 1.

# POWER SECTOR REFORM IN ZIMBABWE

## CONTENTS

1. Introduction	4.41
2. Background and the main description of the power sector reform process	4.42
2.1. Pre-masterplan electrification for the urban and rural poor since independence	4.42
2.2. Rural electrification masterplan	4.43
3. Impact of the reform process	4.45
3.1. Impact on electrification access	4.45
3.2. Impact on financial performance	4.46
4. Analysis of key success/failures	4.49
5. Lessons learned	4.51
6. Recommendations/the way forward	4.52



## 1. INTRODUCTION

The power sector in Zimbabwe has been under reform since 1980 when the country became independent. At independence the country inherited a power sector comprising of six utilities—Central African Power Corporation (CAPC), a statutory corporation jointly owned by the Governments of Zimbabwe and Zambia and responsible for generation and transmission, Electricity Supply Commission (ESC), a statutory corporation owned by the Government of Zimbabwe responsible for transmission and distribution of electricity in the country except for the four largest cities of Harare, Bulawayo, Gweru and Mutare that had their own electricity departments responsible for transmission and distribution of power within the cities.

This institutional arrangement created a complex management structure for the power sector. The Ministry responsible for energy only had direct control over the ESC. It had to share control over CAPC with the Government of Zambia. The Minister responsible for local government was also involved in the management of the municipal electricity departments, in particular in the setting of electricity prices within the licensed areas for the cities. Further, although the ESC, Harare and Bulawayo owned coal-fired power stations, their operations were managed and paid for by the CAPC that then recovered its costs by selling the power to the three utilities.

In order to streamline the management of the power sector an Electricity Act (Chapter 13:05) was passed in 1985 that provided for the amalgamation of the six utilities into the Zimbabwe Electricity Supply Authority (ZESA). Although the creation of ZESA simplified the Government's administration of the power sector and facilitated the introduction of a uniform national tariff structure, reducing the number of tariff categories from over sixty to less than ten, the expected economies of scale and rapid expansion of supply did not immediately materialize. Instead the amalgamation process resulted in an exodus of managerial and technical skills leading to operational inefficiencies and financial losses, a slow down in the generation and transmission expansion programme and the virtual suspension of the rural electrification programme.

To address the post-amalgamation challenges, the Government adopted a new power sector reform strategy in 1991 as part of a World Bank-driven Economic Structural Adjustment Programme (ESAP). A two-pronged reform strategy was introduced—a performance improvement programme (PIP) and a review of the legal and regulatory framework (LRF). As reflected in the statistical highlights in the next section, the PIP was a major success in terms of turning around the operational and financial performance of the utility between 1991 and 2000. The LRF review progressed at a relatively slow pace with the new Electricity Act

(Chapter 13:19) and Rural Electrification Fund Act (Chapter 13:20) only being enacted in January 2002. Under the new acts, Zesa is at an advanced stage of being unbundled into a Rural Electrification Agency and separate companies for Generation (Zimbabwe Power Company, ZPC), Transmission (Zimbabwe Electricity Transmission Company, ZETCO), Distribution (Zimbabwe Electricity Distribution Company, ZEDC), Telecommunications (POWERTEL), and support services (Zesa Enterprises, ZE). A new regulatory body, the Zimbabwe Electricity Regulatory Commission, ZERC, was only established in June 2005 and is still to make a significant impact in the power sector.

## 2. BACKGROUND AND THE MAIN DESCRIPTION OF THE POWER SECTOR REFORM PROCESS

The legislation that governs the electricity supply industry in Zimbabwe is the Electricity Act (*Chapter 13:19*) and Rural Electrification Fund Act (*Chapter 13:20*) of 2002. The Electricity Act created the Zimbabwe Electricity Regulatory Commission (ZERC) and provided the legal framework for the on-going unbundling of the state-owned utility, the Zimbabwe Electricity Supply Authority (ZESA), into five companies responsible for generation, transmission, distribution, telecommunications and support services.

The Rural Electrification Fund Act created a Rural Electrification Agency that has the mandate for the total electrification of all rural areas. The main functions of the Agency are the planning of projects, raising and accounting of rural electrification funds and monitoring of project implementation.

### 2.1. Pre-masterplan electrification for the urban and rural poor since independence

At independence in 1980 the distribution and supply of electricity in Zimbabwe was the responsibility of the municipalities based in the four major cities of Harare, Bulawayo, Gweru and Mutare, with the Electricity Supply Commission (ESC) supplying and distributing in the rest of the country. At that time there was almost 100 per cent electrification of the areas where the white and black urban elite lived while the bulk of the poor black population had little or no access to electricity. This deficiency influenced the national energy policy of the Government to give priority to the electrification of the urban and rural poor.

It was relatively easier to connect the urban poor as most of their residential areas were close to the existing grid. Not many rural poor were in that fortunate position except those peasant-farming areas that were adjacent to electrified white commercial farms. Rural electrification also presented another major challenge because rural Zimbabweans do not live in compact villages but in scattered homesteads, where each family lives next to their farming plot. The cost of building a distribution network to serve such isolated homesteads was beyond the financial capability of the utility and the Government. Even if such capacity was there the income levels of the rural poor were too low for them to afford the electricity.

In an effort to accelerate rural electrification a new Electricity Act (*Chapter 13:05*) was enacted in 1985. This created the national utility, ZESA, from an amalgamation of the ESC and the municipal electricity departments. One of the principal objectives of creating ZESA was to increase financial resources for the electrification of the rural areas by enhancing the financial viability of the industry through the removal of duplication of functions among the utilities and improving efficiencies through economies of scale.

The problem of scattered homesteads was avoided by a Government decision to focus rural electrification on rural business or government administration centres that were designated as growth points. Tax and other incentives were given to promote investment at these points. The idea was to create nuclei of rural towns that would generate employment and reduce the drift to established urban areas. The growth points were also planned with provision for residential stands to cater for those who could afford to pay for household electricity.

## 2.2. Rural electrification masterplan

In 1993 ZESA adopted a performance improvement programme as part of the Government's macroeconomic structural adjustment programme. The programme was based on explicit performance contracts that the Government established for the utility and its board and executive management.

One of the major areas of performance improvement was the adoption of explicit economic and financial viability criteria in project selection. This approach had a profound impact on rural electrification that was suspended pending review of its financial and economic impact. The review concluded that priority needed to be given to the electrification of those rural centres that had potential for increased agricultural production and had a good road network for easy market access. Such centres would be able to quickly benefit by using electricity to increase agricultural productivity and for agro-processing industries. The resultant increase in income levels would then encourage the electrification of households. Using these criteria a rural electrification masterplan study was launched in 1994.

The study identified 415 rural service centres, business centres and growth points to be given priority attention for electrification. To finance the programme, the study recommended the introduction of a levy of 1 per cent of every customer's bill. The purpose of the levy was to provide capital subsidies only. As explained in more detail in the next section, consumption subsidies were to be provided by the utility through cross-subsidies.

Collection of the rural electrification (RE) levy started in 1996 and the rural electrification programme was relaunched in 1997. To get additional funds for the programme, a scheme was introduced for mobilizing community contributions. The masterplan was publicized so that communities would be able to plan ahead to raise funding for projects that would productively use electricity soon after the connection of a centre to the grid. To promote household electrification at centres already electrified, the RE levy was used to provide a 50 per cent to 60 per cent subsidy to villagers who could raise the balance of the capital costs for electrifying their households.

To ensure the financial sustainability of projects, the level of subsidies was established through financial and economic feasibility studies. The studies assumed that completed projects financed by the RE levy would be handed over to the distribution utility. The utility would then assume responsibility for operation and maintenance and establish tariff levels that ensured breakeven financial performance at a minimum.

The implementation of the masterplan study recommendations involved an extensive stakeholder consultation programme that included the potential beneficiaries as well as government and political leaders. These consultations confirmed the soundness of the strategy of focusing on grid extension for productive activities and to improve service delivery by rural health and educational institutions. Consultations also established that off-grid options such as PV were not popular especially with women because these installations did not lessen the domestic burden of fetching water and firewood.

The programme was a great success. In contrast to the pre-masterplan phase that failed to meet its target, the masterplan phase exceeded expectations. The response from the rural communities was so overwhelming that, within three years, the number of community initiated projects exceeded the number of masterplan projects. A total of 768 centres had been electrified by the beginning of 2001 compared to 415 centres that had been planned. In contrast the pre-masterplan phase completed the electrification of only 28 out of 48 growth points that had been planned.

Because of the overwhelming demand the utility's construction crews could not cope. It was therefore decided to hire private contractors. Many of the contrac-

tors were former utility employees who had taken early retirement as a consequence of the manpower rationalization undertaken as part of the performance improvement programme. Not only did this improve the project implementation rate but the competitive tendering also reduced construction costs by as much as 50 per cent. This was achieved by the bulk purchasing of materials by the utility and the contractors providing the labour, transport and construction equipment.

The success of the masterplan programme attracted a lot of political interest. Every Member of Parliament wanted an electrification project in their constituency before the next parliamentary elections scheduled for 2005. This interest had both positive and negative consequences. While the pace of rural electrification has increased significantly, this has been done at the expense of the financial viability of the utility.

### 3. IMPACT OF THE REFORM PROCESS

#### 3.1. Impact on electrification access

The positive result of the increased political interest was the approval to increase the rural electrification levy from 1 per cent to 6 per cent, the enactment of the Rural Electrification Fund Act and establishment of a dedicated Rural Electrification Agency (REA) in 2002.

Electrification targets were raised. An expanded electrification programme was launched in which a total of 9,906 rural institutions, irrigation and village schemes were identified for electrification by the end of 2005. A unique feature of the expanded programme was the financing of both electricity and end-use infrastructure, mainly irrigation equipment, by the REA. Although the ambitious 2005 target was not achieved, the rate of connection of rural institutions has increased dramatically. As shown in table 2 below, by the end of June 2005 a total of 3,992 had been electrified.

Table 1. Electrified rural institutions as at 30 June 2005

Institution	Average installed capacity kVA	Total number completed	%
Business and government administration centres	100-200	901	22
Rural health centres	50	331	8
Primary schools	25	944	24
Secondary schools	50	589	15
Small farms/irrigation schemes	25-300	593	15
Villages/other schemes	10-300	634	16
TOTAL		3992	100

Source: Mangwengwende, 2005.

The positive impact on electrification access rates is evident in the statistics in table 2 below. The electrification access statistics are based on the proportion of the population who are connected to the grid. Surveys have established that the average number of people who benefit from each domestic connection is at least 10 to 12. This gives the number of people who have the benefit of an electricity connection. This figure is then expressed as a percentage of the population estimated from official census figures.

Table 2. Electrification access statistics

	Year													
	91	92	93	94	95	96	97	98	99	00	01	02	03	04
Urban %	66	66	67	69	70	72	74	78	80	81	82	84	84	85
Rural %	10	11	11	12	12	12	14	16	17	18	20	22	23	25
National %	20	22	22	24	25	27	29	31	34	36	37	39	41	41

Source: Mangwengwende, 2005.

If account is taken of people who are not connected but have a direct and indirect benefit by living within 10 to 20 kilometres of an electrified centre, it is reasonable to assume that three quarters of the population are enjoying the benefits of grid electrification. For example, where electric motors have replaced diesel engines for grinding mills, the costs of milling maize that forms the staple diet have been reduced by 50 per cent. Rural health and educational institutions are now able to improve the quality and range of their services because they are able to attract and retain qualified staff.

### 3.2. Impact on financial performance

An indication of the financial performance of ZESA during the different electrification phases is given in table 3 and figure 1 below:

Table 3. Revenue, profit, debt collection and system losses

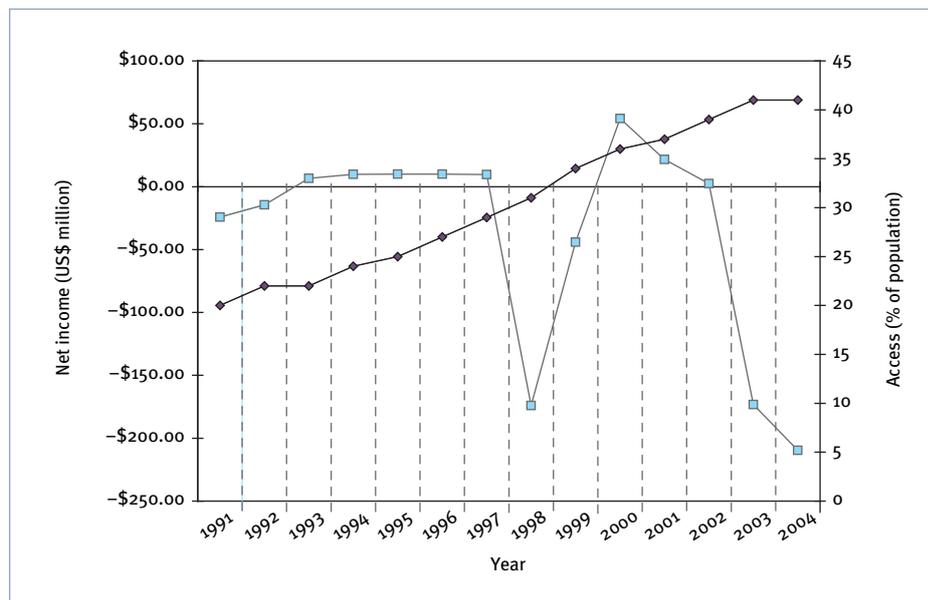
Year	Revenue (\$US million)	Operating profit (\$US million)	Net profit (\$US million)	Debtors (days)	Losses %
1990	223.6	64.1	(0.8)	70	8.7
1991	184.9	62.6	(24.1)	74	10.7
1992	279.2	67.8	(14.5)	85	9.9
1993	305.7	101.8	6.7	99	11.0
1994	234.1	101.3	9.9	61	11.9
1995	265.2	104.3	10.0	50	10.7
1996	303.5	105.7	10.0	56	10.8
1997	331.7	100.3	9.6	32	10.8
1998	260.3	(2.0)	(174.1)	25	11.3
1999	230.9	40.4	(44.1)	32	12.8
2000	428.3	124.6	54.2	33	13.3
2001	521.1	120.8	33.0	39	14.6
2002	349.8	76.2	3.1	52	15.2
2003	178.4	(24)	(173)	52	N/A
2004	176.3	(25)	(210)	56	N/A

Source: Mangwengwende, 2005.

Note: \$US equivalent based on official exchange rates. From 2002 to 2004 parallel rates have been used to give more realistic equivalent figures.

Figure 1 gives a clearer picture of the financial viability in terms of the net profit (purple line) and electrification access (blue line) as a percentage of the population living in houses connected to the grid. The graph shows a steady growth in access from 20 per cent in 1991 to 41 per cent in 2004. During the same period the financial performance has been mixed depending on the electrification phase. With the exception of one year the utility had positive operating profits until 2002. The operating profit represents the financial viability without taking account of how the utility is financed. Taking account of the utility's heavy debt financing, the net profit was negative in the early 1990s, in 1998 and 1999 and since 2003.

Figure 1. Net profit (light blue) and electricity access (purple)



Source: Mangwengwende, 2005.

The pre-masterplan programme had limited success because the utility's profits were insufficient to meet the requirements. In addition, the projects targeted were selected on the basis of political decisions that did not take account of economic and financial viability. While some of the growth points grew rapidly following electrification, some failed to take off and were a heavy drain on the utility's finances.

The masterplan electrification phase was not only effective in increasing access but was also accompanied by the best financial performance of the utility. The net losses recorded in 1998 and 1999 were unrelated to the electrification programme but were due to the revaluation of the foreign currency denominated liabilities following the massive devaluation of the Zimbabwe dollar between November 1997 and early 2000. The adverse effects of the devaluation were reversed within 16 months through a series of quarterly tariff adjustments.

The positive trend in financial performance was reversed in 2002 when political pressure forced ZESA to incur heavy short-term debt to finance the expanded rural electrification programme. Many of the projects were also selected for political expediency rather than on economic and financial viability criteria as recommended in the masterplan. The cost of the expanded programme was estimated at Z\$ 25 billion which was equivalent to \$US 450 million at the official exchange rates at the time. Although there was a six-fold increase in the RE levy, the REA was still only able to raise about \$US 18 to 30 million per year. The REA did not have the borrowing capacity to bridge the financing gap.

To go around this constraint the REA continued to operate as a subsidiary of the utility, which was then directed by Government to borrow on behalf of the REA. This was a contravention of the RE Fund Act which states that “*The Board (of the Fund) shall ensure that in any financial year expenditures and commitments from the Fund shall not exceed the annual income of the Fund*” (section 36). This provision was made to maintain the financial viability of the REA.

By the end of 2004 ZESA had borrowed more than Z\$55 billion on the domestic market and \$US110 million on the international market to finance the expanded rural electrification programme. These were all high interest short-term facilities with maturities ranging from 90 days to five years. Debt service on the loans exceeded the utility’s capacity forcing Government to assume the responsibility of direct financial subsidies to keep the utility from bankruptcy.

## 4. ANALYSIS OF KEY SUCCESS/FAILURES

The rural electrification experience in Zimbabwe shows that electrification access is ultimately a pricing and financing problem. In summary, the success in balancing access and financial viability during the masterplan phase was achieved due to the following factors:

- Successful marketing of the project selection based on economic and financial criteria;
- Efficient revenue collection ensured that funds were available for rural electrification;
- Increased use of private contractors helped in reducing the cost of grid extension;
- Explicit capital subsidies for rural electrification supplemented by the mobilization of community contributions removed the burden of financing from the utility;
- Cross subsidies to support lifeline tariffs for the poor helped to encourage use of electricity as an energy source for the poor households.

The masterplan was an effective tool for depoliticizing the rural electrification programme. Publicizing the masterplan was an important strategy to prevent politically motivated changes in project priorities. A transparent queue-jumping mechanism through community contributions provided a way to harness political involvement in a constructive way.

The issue of affordability is so important that it requires further elaboration. The grid can be extended and connections made but the poor would still not have access if they were unable to afford to pay for a meaningful amount to make a difference to their lives. It is for this reason that cross subsidies have been used as an integral part of increasing access to the poor.

The creation of a national utility made it possible to adopt a uniform national electricity tariff. Consequently the urban customers subsidized the rural customers. Within the domestic tariff category an inverted block tariff was adopted to ensure that poor customers were subsidized by the richer customers, consumption bands being used to differentiate the rich from the poor.

The domestic tariff structure that has been used successfully for many years is illustrated in table 4.

Based on observed consumption patterns of the different groups this block structure is to be revised into three blocks of 0 to 250 kWh, 251 to 500 kWh and above 500 kWh. The lifeline amount of 50kWh is too small to justify the expense of a grid connection and 250 kWh is adequate to meet basic subsistence requirements for an average low-income household. The middle and upper classes have also been receiving an unnecessary subsidy and have not had sufficient incentives for energy conservation.

In order to encourage the poor to use electricity for cooking, low consumption domestic customers are subsidized by the industrial and commercial customers as well as the higher consumption domestic customers. The rationale for placing the subsidy burden on the industrial and commercial customers is the benefit that these customers derive from increased consumption of electricity by the poor. Their benefit from the increased sale of electrical appliances and demand for other electricity-related services far outweigh the cost of the consumption subsidy.

Table 4. Domestic tariff structure

Block of monthly consumption	Relative tariff level	Comment
First 50 kWh	1.000	Lifeline block for lighting and small power applications
51-300 kWh	1.125	Lighting, small power and basic heating (one to two plate stove). The bulk of the poor
301-1000 kWh	2.500	Single middle class home or several poor families sharing single connection
Above 1000 kWh	3.000	Single upper class home or several poor families sharing single connection

Source: Mangwengwende, 2005.

Note: All charges are in Zimbabwean dollar.

However the affordability levels of the customer groups carrying the subsidies place an upper limit on the level of sustainable subsidies. Each customer category has to bear a significant proportion of the cost of providing supply to the group. To sustain electrification access while avoiding the problem of electricity thefts and other non-technical losses, there is no alternative but to enhance the payment capability of the poor. In other words, electrification access has to be planned jointly with a poverty reduction programme.

Affordability can be defined in terms of the percentage of net income used to pay for a product or service. If 10 per cent of net income is taken as an upper limit for a household to afford electricity, it becomes easy to determine the income threshold for viable electrification access.

Using this affordability test in Zimbabwe there is no electrification of urban informal settlements. Rural households are only connected on the basis of affordability. By promoting the use of grid electricity on productive activities, income levels near electrified centres have been increasing to the point where the villagers are able to raise sufficient money to qualify for the 50 per cent to 60 per cent capital subsidy from the RE Fund.

## 5. LESSONS LEARNED

The key lessons that can be drawn from the electrification experience in Zimbabwe are:

- Electrification access levels for the poor can be increased without adversely affecting the financial performance of the electricity supply industry provided the necessary capital and consumption subsidies are financed in a sustainable manner.
- There is an income threshold level below which electrification for the poor does not make business sense. It is therefore necessary to use electrification access as a tool for poverty reduction in order to enhance affordability through an increase in income levels of the poor.
- Grid extension is the most cost-effective option for the simultaneous achievement of the multiple challenges of increasing electrification access, lessening the domestic burdens of women, reducing poverty through increased economic productivity and sustaining the financial viability of the electricity supply industry.
- Rural electrification is of immense political interest. This interest can have both positive and negative impacts on access and financial viability. Political support is essential in order to have the necessary policy, legal and institutional support for electrification. The major negative impact of politics is on financial viability. Explicit performance contracts based on a transparent strategic plan and performance improvement programme can be an effective tool to minimize adverse political interference.

## 6. RECOMMENDATIONS/THE WAY FORWARD

The following conclusions and recommendations can be drawn from the Zimbabwe power sector reform process:

- Given the critical role and importance of an independent regulatory body it was an error to establish the ZERC at the end instead of at the start of the reform process. The absence of the regulatory body has been the major reason for the major shortfalls in achieving reform objectives.
- Although it was possible to achieve significant performance improvements without privatization and independent regulation, such improvements were not sustainable as long as there was no protective legal and regulatory framework as well as a body to enforce the laws and regulations.
- Although the protection of the environment is now a legal requirement under the new Electricity Act, the absence of an independent regulatory body to enforce the law has kept this important issue in the background during the reform process.
- Provided there is efficient revenue collection, a small levy for rural electrification is a very effective financing mechanism for significantly increasing electricity access for the rural areas.

## Case study 2.

# ELECTRICITY REGULATION IN THE UNITED REPUBLIC OF TANZANIA: MOVING FROM GOVERNMENT REGULATION TO AN INDEPENDENT REGULATORY BODY

## CONTENTS

1. Electricity transmission and distribution network	4.55
2. Institutional structure of the energy sector	4.55
3. Legal and regulatory framework	4.56
4. Power sector reforms	4.56
5. The way forward	4.57



## 1. ELECTRICITY TRANSMISSION AND DISTRIBUTION NETWORK

Electricity supply in the United Republic of Tanzania consists of both a national interconnected grid and isolated distribution systems. The electricity subsector is still dominated by the state-owned utility, Tanzania Electric Supply Company Ltd. (TANESCO).

TANESCO distribution network serves about 400,000 customers most of whom are supplied by the national grid.<sup>1</sup> As such, the electrification level is still marginal, leading to low per capita electricity consumption of about 84 kWh per year (2002). Extension of the distribution network is hampered by the historically poor financial performance of TANESCO partly in terms of unpaid bills, debt and interests accrued from long-term loans. Other reasons for the poor performance are reported to include weak management and operational performance. The insufficient delivery service of TANESCO is also characterized by high system losses, which are estimated to be in the order of 28 per cent.<sup>2</sup>

## 2. INSTITUTIONAL STRUCTURE OF THE ENERGY SECTOR

The Government of the United Republic of Tanzania through the Ministry of Energy and Minerals is the policymaker and regulator of electricity generation and distribution in the country. The Government utility, TANESCO, is responsible for about 70 per cent of electricity generation and owns about 98 per cent of Tanzania's distribution network.

TANESCO has a monopoly on the interconnected electricity transmission grid and therefore, all independent power producers (IPPs) have to sell their power under special power purchase agreements (PPAs) to TANESCO. Since there are no standard PPAs set out by the government, each agreement is usually concluded after prolonged negotiations.

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<sup>1</sup>Mwihava, 2005

<sup>2</sup>Ngeleja, 2003.

### 3. LEGAL AND REGULATORY FRAMEWORK

The Government's long-term plan (Vision 2025) and sectoral policies such as the National Environmental Policy (1997), the National Science and Technology Policy for Tanzania (1996), and the National Energy Policy (2003) widely support energy conservation and efficiency, and the use of locally available energy streams to meet the challenging development process. The Government now needs to go further by providing regulatory and appropriate standardization for achieving policy objectives.

For instance, the Energy Policy needs be put into operation by the provision of a regulatory framework. The government must also ensure mandatory compliance to energy conservation and efficiency, and ensure minimum renewable energy streams into commercial energy. This should be done by regulating the energy sector and by providing appropriate incentives.

The Government being the regulator and policymaker needs to implement these kinds of actions by creating an enabling environment and by empowering appropriate institutions. The ongoing reforms in the power sector of Tanzania are steps in the right direction.

### 4. POWER SECTOR REFORMS

Tanzania's power sector reforms are important in accelerating its capacity to meet the challenge of electrification. Rural electrification currently stands at 2 per cent, while urban electrification is at 37 per cent. The reforms are expected to bring about:

- Regulation and control;
- Modernization;
- Meeting energy conservation and efficiency policies, including the emerging environmental legislations;
- Addressing barriers to electrification and investments in the electricity sector.

In order to prepare TANESCO for privatization, in 2002 the Government approved an arrangement to contract M/S Net Group Solutions Limited to manage TANESCO. This South African company was contracted to undertake the top management of the power utility. The decision to have a management contract was prompted by the poor performance of TANESCO.

In the forthcoming reforms, the government will remain the owner and policy-maker where as regulatory issues will be transferred to the Energy and Water Utilities Regulatory Authority (EWURA). EWURA was established by an Act of Parliament in 2003 and arrangements are under way to make it operational. Amongst others, the functions of EWURA will include the establishment of standards for goods and energy services and ensuring the efficiency of production and distribution of energy services.

TANESCO will be unbundled into separate segments responsible for power generation, transmission and distribution (Mwihava and Mbise, 2003). Generation and distribution activities will further be divided into a number of companies to allow private sector participation in a competitive manner. Besides competitiveness in the energy sector, the reforms in the corporate structure of TANESCO are expected to promote energy conservation and energy efficiency and to attract the utilization of alternative energy streams.

## 5. THE WAY FORWARD

The following are therefore some recommendations for improving the country's energy demand and supply, which take on board sustainable energy issues:

- Remove monopoly in the electricity sector by privatizing the national utility, TANESCO;
- Energy policy and power systems master plans should promote IPPs by creating appropriate incentives (such as low interest loans) for achieving specific mandates for renewable energy streams to the commercial energy sector;
- Institute more regulation to the power sector by enabling the functions and activities of relevant authorities such as EWURA;
- Increase capacity-building programmes to decision-makers and technical personnel in the power sector;
- Demonstrate further the advantages of energy conservation and efficiency by utilizing proven techniques and technologies. This should also include publicity and awareness programmes;
- Institute energy efficiency standards including energy star programmes and building code standards.



## **Case study 3.**

# **POWER SECTOR REFORM AND REGULATORY INSTITUTIONS OF GHANA**

## **CONTENTS**

1. Introduction	4.61
2. Electricity reform programme	4.61
3. Status of implementation of reform	4.61



## 1. INTRODUCTION

The power sector reforms in Ghana were driven by a shortage of financing for much-needed capacity expansion in 1995. Sector reform was a condition of the World Bank lending for new electricity generation capacity. Since then, the reform has been extended to other subsectors in energy including petroleum.

## 2. ELECTRICITY REFORM PROGRAMME

The main objectives of Ghana's electricity reform programme are as follows:

- Ensuring proper policies and incentives to expand electricity access to spur growth, improve productivity, service delivery and the quality of life, and institute programmes to enhance energy efficiency;
- Regulating the sector to make each part of the sector operate with economic efficiency;
- Delivering electricity and electricity-related services to customers in an efficient and cost effective manner, while ensuring the sector's financial viability;
- Harnessing Ghana's as well as the region's rich energy resources for development and making the necessary policy and institutional changes to pass on the economic benefits equitably to the people of Ghana;
- Increasing efficiency of asset utilization and thereby determining a realistic level of investments needed to meet energy demand created by growth.

## 3. STATUS OF IMPLEMENTATION OF REFORM

Under the first round of sector reforms initiated in 1995, initiatives implemented include: Enactment of the Public Utilities Regulatory Commission (PURC) Act of 1997 (Act 538) and Energy Commission (EC) Act of 1997 (Act 541).

The PURC vets and approves tariff proposals from the utilities and develops consumer protection guidelines. The PURC has effected several tariff adjustments resulting in cost-reflective tariffs. In addition, an automatic price adjustment mechanism to effect quarterly adjustments for changes in foreign exchange fluctuations was introduced in 2003.

The EC's mandate is to put in place several pieces of subsidiary legislation ("Legislative Instruments") that are the key to more transparent regulation of the

electricity supply industry. These include the “Technical and Operational Rules for Delivery of Electricity Services” and the “Electricity Supply (Standards of Performance) Rules” for the distribution segment. After extensive consultation with stakeholders, the EC expects to shortly complete drafting the “Technical and Operational Rules for the National Interconnected System” on “Wholesale Power Supply Market Rules”.

In 1998, the Electricity Corporation of Ghana was converted into a limited liability company, Electricity Company of Ghana Limited (ECG) under the Statutory Corporations (Conversions to Companies) Act 461 of 1993. Subsequently now, it is proposed to unbundle the Northern Electrification Department (NED), the distribution business unit of the Volta River Authority (VRA) and merge it with ECG to create one distribution company.

In 1998, the Government issued policy directives requiring VRA to functionally unbundle and transfer national transmission and load dispatch assets to an Electricity Transmission Utility (ETU). As an initial step towards compliance, VRA registered (in 1999) a wholly owned subsidiary company—the National Grid Company Ltd. (GRIDCO) and commissioned a number of studies to facilitate the functional unbundling of the ETU from its other generation and distribution business units, including: (a) a Transmission System Pricing Study; (b) a Transmission System Expansion Plan; and (c) a Transmission Assets Valuation Study. The above notwithstanding, the Government has recently decided to completely separate the ETU from VRA.

In September 2005, parliament passed the VRA Act Amendment Bill which effectively amended the VRA Act (Act 46), paving the way for the formal separation of the generation and transmission functions of VRA.

The “Status of Implementation of Ghana Power Sector Reform Programme,” a paper dated June 9, 2004, issued by the Ministry of Energy, states that the following actions were ongoing or were intended to be completed shortly:

- Establishment and operation of a Power Sector Reform Implementation Secretariat.
- Preparation of legislative instruments to underpin the corporate unbundling of VRA to create an autonomous state-owned electricity transmission utility and a joint venture thermal power generation company while retaining (through a new VRA Act) the reservoir management and hydropower generation functions in the streamlined VRA Hydro.
- Establishment of an autonomous state-owned entity to which the EC can grant the ETU licence, following notification by the Minister of the legislative instrument that empowers the ETU to take over from VRA all system operation and dispatch functions. Until such time that the Energy Commission completes the preparation, approval and notification of the “Technical and Operational Rules of Practice for the National Interconnected System”, the Government has

decided that VRA would continue to be responsible for the safe, reliable, economic dispatch of grid operations.

- Implementation of a proposed Aboadze Thermal Power Joint Venture: to complete development of the Takoradi Thermal Power Complex (consisting of T1 and T2). The Government plans to assign CMS Energy as the T1 plant operator under a performance based contract. VRA, however, believes that the selection of a plant operator for T1 should be made based on an international competitive bidding process and has indicated this to the Government.
- Merger of NED into ECG to form a single distribution company (the consolidated ECG”), and implementation of a performance-based “management support services agreement” as a means to improve financial management, commercial and technical operations at ECG.
- Parliamentary ratification of the full complement of EC legislation instruments to underpin EC technical regulation functions, especially technical and operational rules for the national interconnected system, and standards of performance for delivery of electricity supply services.

As can be deduced from the above and as per the government paper cited in the previous paragraph, several actions under the reform programme have been completed. These include the establishment of the Reform Secretariat and activation of various committees to lead the respective initiatives on restructuring, determination of joint venture arrangements; the amendment of Act 46, engagement of a consultant to carry out asset revaluation as a prelude to the separation of the books of accounts for the newly restructured companies; and the implementation of a performance-based contract to put in place the proposed management services provider for the consolidated ECG.

In addition, the Government has initiated actions on preparing a comprehensive public education and awareness strategy and the Energy Commission is working towards notification of a series of legislative instruments to prescribe technical and operational rules for the national interconnected system (“Wholesale Power Supply Market Rules”).

The Energy Commission has already developed the Licensing Manual for the Electricity Sector. The electricity supply and distribution (“Electricity Distribution Rules”), which has been laid down in parliament, will attain the mandatory 21 parliament sitting days becoming law when parliament resumes sitting in mid January 2006.

Action has also been taken towards restructuring and cleaning up the VRA and ECG balance sheets, including debt restructuring to settle all payables/receivables among government entities and reduce some of the debt burden of these companies. Debt relief to the extent of \$US 144.9 million equivalent of debt/government receivables for VRA and \$US 95.06 million equivalent for ECG has been provided.





**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Energy Regulation

### **Module 4: THE REFORM OF THE POWER SECTOR IN AFRICA**

Module 4



**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Module overview

- Overview of power sector reform in Africa (genesis, key characteristics and pace of implementation)
- Focus on five key reform options:
  - Unbundling (also referred to as restructuring)
  - Management contracts,
  - Corporatization/commercialization
  - Independent power producers
  - Electricity law amendment
- Rationale and description of the five key reform options implemented in Africa
- Power sector reforms designed to bridge short-term generation shortfalls and improve the financial health of state owned power utilities
- Overall conclusions about principal characteristics and trends of power sector reforms

Module 4



**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Module aims

- Provide an overview of power sector reform in Africa
- Highlight the drivers of the power sector reform in Africa
- Review reform options implemented in sub-Saharan Africa, in particular:
  - Corporatization
  - Management contract
  - Unbundling (vertical and horizontal)
  - Independent power producers
  - Electricity law amendment
- Provide examples, where relevant, of countries that have implemented the aforementioned reform options.
- Present some examples of regulation in Africa

Module 4



**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Module learning outcomes

- Understanding power sector reforms in Africa
- Be informed of the current status of power sector reform in Africa
- Gain appreciation of the key drivers of power sector reform in Africa

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Introduction

- Reforms are often equated with reduction of Government participation in electricity sector. However, there is a wide spectrum of power sector reforms
- The module provides a broad overview of power sector reforms and discusses different reform options implemented in the region
- In Africa, the need for power sector reforms arose from:
  - Poor technical and financial performance of state-owned electricity utilities
  - Inability of the government to mobilize resources sufficient investment capital for electricity sub-sector's development and expansion
- Reforms were not primarily designed to promote RE&EE but were rather designed to bridge short term generation shortfalls and improve financial performance of state owned utilities.

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Intro – Reform Options

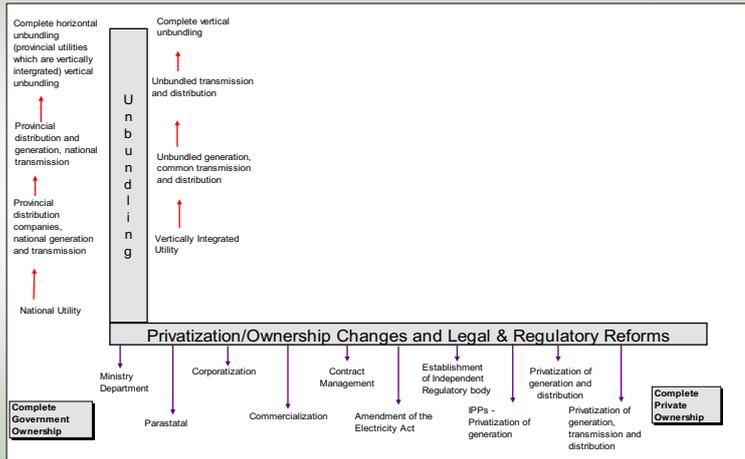
- Five major reform options implemented in Africa have been selected. They include:
  - Unbundling, also referred to as restructuring
  - Management contracts
  - Corporatization/commercialization
  - Independent power producers (IPPs)
  - Electricity law amendment.
- The rationale for the selection of the aforementioned reform options is:
  - They are common and have been widely implemented in Africa
  - They appear to have the most significant impact on RE&EE in the region.

Module 4



SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Intro – Reform Options (2)



SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Intro – Status of the Power Sector Reform in the Developing World

- It appears that sub-Saharan Africa has been the slowest to implement power sector reforms
- This is according to the latest and most comprehensive global survey of the status of power sector reforms in developing countries conducted in 1998 by ESMAP (Bacon and Besant-Jones, 2002).
- The survey included 48 sub-Saharan African countries and revealed that, in contrast to other regions in the developing world, in overall terms, sub-Saharan Africa's power sector was the least reformed



**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Intro – Status of the Power Sector Reform in the Developing World (2)

Key Step	Region (number of countries)					
	SSA (48)	MNA (8)	EAP (9)	ECA(27)	SAR (5)	LCC (18)
Corporatisation/ Commercialization	15 (31%)	2 (25%)	4 (44%)	17 (63%)	2 (40%)	11 (61%)
Independent Power Producers	9 (19%)	1 (13%)	7 (78%)	9 (33%)	5 (100%)	15 (83%)
New Electricity Act	7 (15%)	1 (13%)	3 (33%)	11 (41%)	2 (40%)	14 (78%)
Establishment of Regulator	4 (8%)	0 (0%)	1 (11%)	11 (41%)	2 (40%)	15 (83%)
Unbundling	4 (8%)	3 (38%)	4 (44%)	14 (52%)	2 (40%)	13 (72%)
Privatization of Distribution	1 (2%)	1 (13%)	1 (11%)	8 (30%)	1 (20%)	8 (44%)
Privatization of Generation	0 (0%)	1 (13%)	2 (22%)	10 (37%)	2 (40%)	7 (39%)
<b>Reform indicator</b>	<b>0.83</b> <i>(12%)</i>	<b>1.13</b> <i>(19%)</i>	<b>2.44</b> <i>(41%)</i>	<b>2.96</b> <i>(49%)</i>	<b>3.20</b> <i>(53%)</i>	<b>4.61</b> <i>(77%)</i>

Year 1998

Module 4



**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Intro – Status of the Power Sector Reform in the Developing World (3)

Key Step	No. of Countries (%)
Corporatization/ Commercialization	17 (35%)
Independent Power Producers	17 (35%)
New Electricity Act	12 (25%)
Establishment of Regulator	9 (19%)
Unbundling	6 (13%)
Privatization of Distribution	3 (6%)
Privatization of Generation	1 (2%)

Year 2002

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Reform in the African Power Sector - Rationale

- Comprehensive power sector reform arose from two primary concerns:
  - the dissatisfaction over the poor technical, financial, and managerial performance of the state-owned electricity utilities
  - the inability of utilities and the Government to mobilize sufficient investment capital for the electricity subsector's development and expansion

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Reform in the African Power Sector - Rationale (2)

- Other reasons for power sector reforms include:
  - *Introducing competition*: Increasing the number of players in the market to ensure increased quality of service as well as lower tariffs
  - *Tariff reform*: Adjusting tariffs in order to remove subsidies thus ensuring they become cost-reflective
  - *Minimizing Government's regulatory role*: Shifting the regulatory mandate from the Ministry/Department of Energy to an "independent" regulatory agency to ensure a level playing field
  - *Amending Electricity Acts*: Reviewing Electricity Acts to establish a sound legal basis for the power sector reforms

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Reform in the African Power Sector - Rationale (3)

- Other macroeconomic factors external to the power sector that played a major role in the reform process include:
  - power sector investment constraints
  - national government fiscal constraints
  - limited options for raising capital
  - international investment climate
  - multilateral structural adjustment/ commitment lending policies
  - economy-wide liberalization
  - reform programs initiated as a result of fiscal crises and structural adjustment policies
- None of the reform efforts in the sector were specifically aimed at increased use of RE/EE options nor made explicit mention of improving access to electricity – especially among the poor which is a major concern

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Reform in the African Power Sector – Restructuring and Privatization Path

- Major reforms that have been taking place in Africa are structural changes and privatization of power utilities
- Structural changes can occur in two ways;
  - Vertical unbundling: unpackaging national utilities into separate generation, transmission and distribution companies
  - Horizontal unbundling: unpackaging national utilities into smaller district or provincial utilities
- Horizontal unbundling appears to be feasible in very large economies such as in the United States of America
- In Africa, only Nigeria appears to be considering this option

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SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Reform in the African Power Sector – Restructuring and Privatization Path (2)

- The privatization process is essentially an issue of changing ownership of assets
- It commences with bringing the assets of the state-owned utilities under a parastatal. The parastatal is thereafter commercialized/ corporatized and it ultimately goes through several other steps to become a fully privately owned entity
- Common privatization paths undertaken by most African countries in power sector reforms have been the corporatization, commercialization, management contracts and stop at allowing the entry of independent power projects (IPPs)

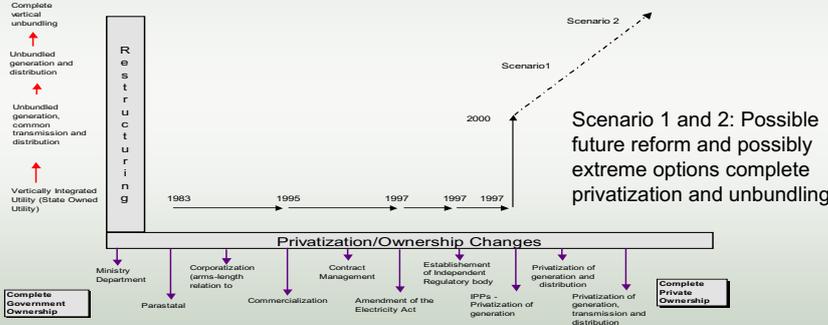
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SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Reform in the African Power Sector – Restructuring and Privatization Path (3)

### Reform Options in Kenya



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## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Reform in the African Power Sector – Restructuring and Privatization Path (4)

- The previous illustration is representative of trends in sub-Saharan African countries.
- The illustration indicates that a lot more privatization has been undertaken than restructuring.
- Restructuring is, in most countries implemented after the advent of privatization.
- The illustration indicates that there is a long timelag between the implementation of the different reform options.

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## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Reform in the African Power Sector – Restructuring and Privatization Path (5)

- In terms of restructuring, a country like Kenya has opted to only unbundle the generation segment
- Countries such as Uganda and Zimbabwe have completely unbundled the entire formerly integrated utility into separate generation, transmission and distribution entities.
- In the case of West Africa, reforms of electricity sector were implemented at different time intervals in different countries. In all the cases, the key objectives of the reforms were to enhance technical efficiency as well as financial and managerial performance

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**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Reform in the African Power Sector – Status

- Senegal and Mali utilities have reverted back to state ownership from privatization. Important lessons that can be drawn from these developments are:
  - Privatization of the distribution appears to be more difficult to implement than privatization at generation
  - For well performing utilities such as those in Zimbabwe, Mauritius and South Africa, it can be concluded that privatization appears not to be the ultimate solution for sustained good performance of the utility

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**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Questions/Activities

1. List some key drivers of power sector reforms in your country
2. List some of the power sector reform options implemented in your country

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**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Possible Reform Options - Corporatization

- Corporatization (commercialization) appears to be the first reform option executed in most African countries as the utilities in most countries have implemented the option
- The key objective of this option is to ensure that the utility runs its operations based on the business principle of profit-maximization
- Power sector reforms, involving corporatization/commercialization of the power utilities, have significantly improved the financial performance of the state-owned utilities
- Some of the principal sub-objectives of corporatization include:
  - Separating utility from the ministry
  - Creating clear accounting framework
  - Cost recovery in pricing
  - Reducing or eliminating subsidies
  - Enforcing revenue collection

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**SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA**

## Possible Reform Options (2) - Examples of Corporatization in Africa

Country	Status
Egypt	Egyptian Electricity Authority (EEA) - Corporatized in 1997
Ethiopia	Ethiopian Electric Light and Power Authority (EELPA) was corporatized in 1997 and renamed Ethiopian Electric Power Corporation (EELPA)
Kenya	Kenya Power and Lighting Company (KPLC) - Commercialized in 1995
Nigeria	National Electric Power Authority (NEPA) - Corporatized in 1997 to become NEP Plc
Malawi	The Electricity Supply Commission of Malawi (ESCOM), was corporatized in July 1998, following repeal of the 1965 Electricity Act. The utility was renamed Electricity Supply Corporation of Malawi Ltd.
Zimbabwe	Zimbabwe Electricity Supply Authority (ZESA) - Corporatized in July 2002.

Module 4



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## Possible Reform Options (3) - Corporatization and Tariff Reform

- Corporatization appears to go hand-in-hand with tariff reforms
- Prior to the advent of power sector reforms, electricity tariffs were approved and, in some cases, determined by Government
- Provision of electricity was perceived as a social welfare service rather than a commercial service
- Governments strived to ensure that electricity was affordable to all by keeping the tariffs low and, to a large extent, subsidized
- Corporatization has led to, among other developments, increases in the tariff levels in line with the following objectives:
  - To recover the cost of electricity generation, transmission and distribution
  - To fairly and equitably spread the above costs to consumers based on the true cost of service delivery, consumption levels and patterns, and affordability to pay
  - To promote the efficient use of electricity

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SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Possible Reform Options (4) – Recent Tariff Changes

Country	Average Tariff Increase	Year of Tariff Review	Reason for Tariff Review
Ghana	326 %	1998	General tariff review
Zimbabwe	70 %	2000	Annual tariff review
Uganda	56 %	2001	General tariff review
Malawi	35 %	2000	Effect of foreign exchange adjustment
Kenya	25 %	1999	General tariff review
Ethiopia	26 %	1998	General tariff review
Eritrea	18 %	2003	Annual tariff review
Namibia	10 %	2001	Annual tariff review
Cameroon	7.5 %	2004	Annual tariff review
Niger	6.0 %	2002	Annual tariff review
South Africa	5.5 %	2001	Annual tariff review

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Possible Reform Options (5) – Management Contract

- This describes a situation where the operational management of the utility, or part of it, is contracted out to a management consulting firm while investment decision-making and assets ownership remain under the utility or the government
- A management contract, to a large extent, is usually part of the wider commercialization process
- Management contracts are increasingly becoming a common feature in state-owned power utilities, particularly in West African countries
- A number of countries have attempted to introduce management contracts to improve efficiency and profitability of their utilities
- Countries in the study that have incorporated this option include Uganda, United Rep. of Tanzania, Ghana, Malawi, Guinea Bissau, Morocco and Togo

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Possible Reform Options (6) – Unbundling

- Due to continued inefficiency of state-owned power utilities and inability to increase access to electricity, most countries in Africa resorted to unbundling
- Unbundling plays two important roles within a power sector reform context:
  - Unbundling allows management to gain a clearer understanding of the technical and financial performance of the previously vertically integrated segments of the sector
  - It increases opportunities for competition
- Unbundling of power utilities can be undertaken in two forms namely:
  - Horizontal unbundling
  - Vertical unbundling
- Vertical unbundling option appears to be the preferred choice and has been implemented in many African countries

Module 4



SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Possible Reform Options (7) – Vertical Unbundling

- Vertical unbundling refers to the process of separating vertically integrated utilities into independent generation, transmission and distribution companies
- This process often follows the following procedure:
  - *Vertically integrated utility*: The power utility undertakes electricity generation, transmission and distribution
  - *Unbundled generation, common transmission and distribution*: The generation component of the utility becomes an independent entity while transmission and distribution remains a single entity
  - *Unbundled, transmission and distribution*: The distribution entity is separated from transmission
  - *Complete vertically unbundling*: This is a state where three entities, i.e. generation, transmission and distribution are independent

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SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Possible Reform Options (8) – Examples of Vertical Unbundling

Country	Details	Status
Kenya	In 1998, the national utility was unbundled into Kenya Electricity Generating Company (Generation) and Kenya Power & Lighting Company (Transmission & Distribution).	Implemented
Uganda	In March 2001, UEB was unbundled and three separate companies were created and registered.	Implemented
Malawi	In 2002 the Electricity Supply Commission of Malawi was split into generation, transmission and distribution.	Implemented
South Africa	Regional Electricity Distributors responsible for electricity distribution and electrification programmes have been established in Johannesburg.	Implemented
Zimbabwe	In 2002, Zimbabwe Electricity Supply Authority (ZESA) was unbundled into generation, transmission and distribution companies.	Implemented
United Rep. of Tanzania	State utility to be split into generation, transmission and distribution companies.	Forthcoming

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## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Possible Reform Options (9) – Horizontal Unbundling

- Horizontal unbundling is undertaken as follows:
  - *National utility*: The power utility undertakes electricity generation, transmission and distribution nation-wide
  - *Provincial distribution companies, national generation and transmission*: The national distribution segment of the utility is reduced to entities at provincial level. Generation and transmission components remain at national level
  - *Provincial distribution and generation and national transmission (common carrier)*: Generation entities are also established at the provincial level. Transmission, however, remains at a national level
  - *Complete horizontal unbundling (provincial utilities which are vertically integrated)*: This is a situation whereby each province has a utility undertaking electricity generation, transmission and distribution

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## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Possible Reform Options (10) – Independent Power Producer

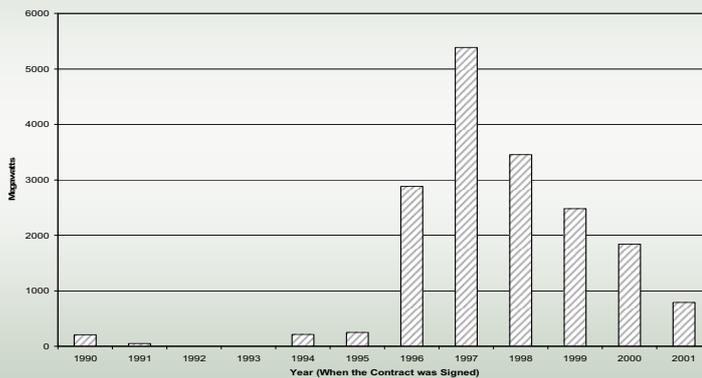
- Independent power producers (IPPs) are becoming a major source of new power generation capacity in the Africa
- There was a major increase in the number of IPPs in Africa during 1996 and 1997, a period when the majority of legislative and structural changes took place in the region
- The rapid growth of IPPs experienced in 1996-1998 is beginning to slow, a trend that has accelerated in 2000 and 2001
- Except for a few countries such as Mauritius, reforms appear to favour large and centralized power projects thereby precluding small and medium-scale renewables
- In spite of significant potential, IPP developments have not considered small to medium scale renewables such as mini-grids, cogeneration, small hydro, geothermal and wind

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Possible Reform Options (11) – Growth of IPPs in Africa



Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Possible Reform Options (12) – Independent Power Producer

- The exit of the state from electricity generation (and eventually from the entire electricity industry), would effectively hand over the industry to non-national operators. In political terms, this may be an unsustainable arrangement
- Without significant local involvement, it is possible that reforms may be reversed in the future mainly because there would be no significant local stakeholder group
- Local private participation in IPP development and use of renewables and energy efficiency options have mainly been hampered by the emphasis on large-scale investment

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Possible Reform Options (13) – Independent Power Producer

- Large-scale IPP developments may have several drawbacks with regard to local private participation in the region. These include:
  - Large-scale IPP development is generally a high-tech capital-intensive
  - Large-scale capital-intensive IPP developments invariably attract the politically connected rent-seeking class
- Mauritius demonstrates the potential financial and technical capability and viability of local private investors in IPP development
- Appropriate policy and financial incentives could encourage the development of locally owned IPPs

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### Possible Reform Options (14) – Electricity Law Amendment

- This involves the National Assembly or Parliament of a country passing an amendment to the existing Act to establish new legislation governing the electricity subsector and/or other energy subsectors
- This may remove the monopoly of the national utility – a major barrier to private sector participation
- It often provides for the establishment of an independent regulatory body for the electricity subsector and defines its role
- In some instances the Act provides some independence to the Regulator
- The Electricity Act could also create a provision for a rural electrification programme and/or fund
- In most African countries, the Electricity Act is the principal instrument that defines the legal and regulatory framework

Module 4



SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Changes in the Legal and Regulatory Framework in Africa

Provision in the Electricity Act	Previous Legal and Regulatory Framework	New Legal and Regulatory Framework
Regulatory agency	Regulation by the Ministry in conjunction with the public utility	Regulation by an independent regulatory body
Rural electrification agency	Rural electrification programme administered by Ministry and/or utility	Rural electrification administered by an independent body
Licensing of IPPs: - For own use  - For sale to public utility	Application to Ministry through the public utility.  Non-existent. Generation sole responsibility of utility.	In most countries by ERB. In other countries (e.g. Kenya) by Minister on advice from ERB.  Power purchase agreement approved by ERB (Energy Regulation Body).
Licensing of IPDs	Non-existent. Distribution sole responsibility of utility.	By the regulatory body.
Gazette of license application and license granted	Not mandatory since private power generation was licensed for applicant's own use.	A requirement for the regulatory body (and in some countries the applicant) for applications and in some countries for license granted.
Tariff setting	Proposed by public utility and approved by Ministry.	Proposed by utility and approved by the regulatory body. In some countries (e.g. Kenya) the regulatory body can also review tariff without request by utility.
Appeals and dispute resolution	On a point of law, the law courts.	The regulatory body, Minister, Arbitration tribunals and law courts.

Module 4



SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

## Questions/Activities

1. Compare and contrast power sector reforms implemented in your country and those of neighbouring countries

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### CONCLUSIONS

- Most African countries are still at the initial stages of power sector privatization and restructuring
- Corporatization/ commercialization of the power utilities in Africa have, to a certain extent, improved the financial performance of the state-owned utilities
- Management contracting, to a large extent, is usually part of the wider commercialization process and appears to be gradually gaining ground in sub-Saharan Africa
- Unbundling is important as it allows management to gain a clearer understanding of the technical and financial performance of the previously vertically integrated components of a utility and also increases opportunities for competition

Module 4



## SUSTAINABLE ENERGY REGULATION AND POLICYMAKING FOR AFRICA

### CONCLUSIONS (2)

- With demand outstripping supply in many African countries, independent power producer projects constitute a major source of new power generation capacity in Africa. However, to date, not many IPPs are renewable energy-based
- Amendment of the Electricity Act has contributed to the removal of the monopoly of the national utility, a major barrier to private sector participation. At times it has provided for the establishment of an independent regulatory body for the electricity subsector and defined its role

Module 4

