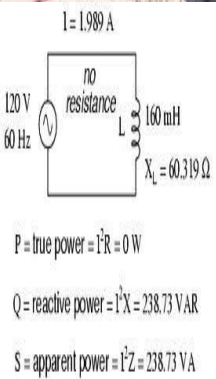


THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF ENERGY AND MINERALS

Electricity Supply Industry Reform Strategy and Roadmap 2014 - 2025

30th June 2014



FOREWORD

Tanzania has abundant energy resources such as natural gas, coal, uranium and renewable energies (hydro, solar, wind, geothermal, bio-energies, tidal waves). Despite these resources, there is yet insufficient supply of modern energy services. The energy sector in Tanzania faces considerable challenges which include: mobilising funds for investment; attracting private capital in the electricity sub-sector; increasing connection and access levels to electricity; diversifying energy resources for power generation; enhancing affordability and reliability of power supply; and reducing power system losses both technical and non-technical.

Tanzania's Development Vision (TDV) 2025 aims at making Tanzania to become a middle-income country by 2025. This implies that the income per capita has to increase from USD 640 to at least USD 3,000. To realise these targets, the country requires adequate, reliable, affordable and environmentally friendly electricity supply. As a result, the installed power capacity must increase from 1,583 MW (April 2014) to at least 10,000 MW by 2025 and transmission and distribution systems expanded. To address these challenges in the electricity sub-sector and attract the required capital, the Government of Tanzania (GoT) has embarked on reforming the Electricity Supply Industry (ESI).

This initiative is the biggest undertaking in electricity sub-sector in Tanzania since the de-specification of TANESCO from privatization in 2005. The ESI Reform Strategy and the Roadmap describe the intended reform initiatives and key actions covering the period from 2014 to 2025. They aim at meeting the current and future demand for electricity; reducing public expenditure on ESI for operational activities; attracting private capital; and increasing electricity connection and access levels. The ESI Reform Strategy and the Roadmap have been prepared by the GoT in consultation with various key stakeholders including the general public, academia, private sector, financial institutions and Development Partners.

The intended major outcomes of the ESI Reform Strategy and the Roadmap include: increased efficiency; quality services and goods; availability of affordable power; satisfaction of the client; satisfaction of the business partners and their shareholders; increased transparency and competition; and abolition of subsidies in the electricity sub-sector.

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MINISTER FOR ENERGY AND MINERALS

ABBREVIATION

BRN	Big Results Now
DSE	Dar es Salaam Stock Exchange
EIPC	Electricity Infrastructure Procurement Coordinator
EPPs	Emergency Power Producers
ESI	Electricity Supply Industry
EWURA	Energy and Water Utilities Regulatory Authority
GDP	Gross Domestic Product
GoT	The Government of the United Republic of Tanzania
GW	GigaWatt
IMO	Independent Market Operator
IPP	Independent Power Producer
ISO	Independent System Operator
kV	Kilovolt
kWh	kiloWatt hour
MEM	Ministry of Energy and Minerals
MW	MegaWatt
PPAs	Power Purchase Agreements
PPP	Public-Private Partnership
REA	Rural Energy Agency
SPPs	Small Power Producers
TANESCO	Tanzania Electric Supply Company Limited
TCMT	Transformation Change Management Team
TDV	Tanzania Development Vision
TPA	Third Party Access
TPDC	Tanzania Petroleum Development Corporation
TZS	Tanzanian Shilling
USD	United States Dollar

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EXECUTIVE SUMMARY

The ESI Reform Strategy and the Roadmap propose a rationale and a framework for the reform of Tanzania's electricity sub-sector. Pertinent issues include restructuring the market and electricity sub-sector, implementing risk and mitigation measures as well as the ESI reform timeline and fulfilling the human and financial resources requirement. The Reform Strategy also proposes the desired market structure and the Roadmap translates the Strategy into a plan for implementation.

This Strategy is aligned with Tanzania's Development Vision (TDV) 2025¹ which envisages Tanzania to become a middle income country with an annual per capita income of at least USD 3,000 by 2025. To achieve this target fast economic growth is needed which must be propelled by adequate, accessible, reliable affordable and environmentally friendly electricity supply. It is estimated that by 2025² the population of Tanzania will be at least 69.5 million requiring electricity supply capacity of at least 10,000 MW.

The ESI Strategy and the Roadmap (2014 - 2025) is based on previous studies, experience from other countries and existing policies and laws. The reforms aim at creating a financially sound ESI in Tanzania through increased investment from both private and public sector; increased electricity connection and access levels; use of various energy resources for electricity generation; and enhanced affordability and reliability of electricity supply.

The Roadmap is composed of detailed activities which will be implemented in the immediate, short, medium and long terms. In the immediate term, key activities involve ring-fencing TANESCO Strategic Business Units, valuation of assets and liabilities of TANESCO, and a human capital needs assessment. In the short term, TANESCO generation segment is expected to be unbundled with IPPs unconditionally allowed to sell electricity directly to bulk off-takers and pay wheeling charges only to the company responsible for transmission. In the medium term, the distribution segment will be unbundled from the transmission unit.

In the long term, there will be further unbundling of the distribution segment into several companies. To enhance efforts towards mobilizing capital investment for power infrastructure, generation and distribution companies will be considered for listing at the Dar es Salaam Stock Exchange (DSE). The role of the Rural Energy Agency (REA) will be maintained but will closely work with Zonal Offices in boosting access to modern energy services in rural areas of Tanzania Mainland by facilitating installation and maintenance of the distribution systems. Since reform is essentially a process rather than a onetime event, the Roadmap shall be subjected to review from time to time.

¹ Planning Commission (1995), The Tanzania Development Vision 2025

² De Wult, M. (2008), Population Pyramids of the World from 1950 to 2100

1.0 INTRODUCTION

1.1 Electricity Demand and Supply Situational Analysis

Tanzania is endowed with diverse forms of energy resources including natural gas, hydro, coal, biomass, geothermal, solar, wind and uranium which have not been optimally utilised. As of May 2014, Tanzania's total installed generation capacity was 1,583 MW composed of hydro 561 MW (35 percent), natural gas power plants of 527 MW (34 percent) and liquid fuel power plants of 495 MW (31 percent). TANESCO also imports power Uganda (10 MW), Zambia (5 MW) and Kenya (1MW). Due to traditional dependence on hydropower, the droughts that occurred in 2010 resulted in power supply shortages in the country. To bridge the electricity supply gap in the country, in 2011, TANESCO contracted Emergency Power Producers (EPP) which is relatively expensive.

About 24 percent of the Mainland Tanzanian population is connected with electricity services of which 7 percent is in rural areas. Demand for electricity is on average growing between 10 percent and 15 percent per annum. To achieve the desired socio-economic transformation, Tanzania aims to increase connection levels to 30 percent by 2015, 50 percent by 2025 and more than 75 percent by 2033. This requires significant investment in generation, transmission and distribution systems. The main objective of the reforms is to improve the ESI governance and performance for sustainable socio-economic transformation and environment protection anchored on active participation of the private sector.

1.2 Evolution of ESI Reform in Tanzania

Over the past two decades, the ESI in Tanzania faced enormous challenges including: capacity shortage and backlog investment, attracting private investment in the electricity sub-sector; increasing connection and access level to electricity; increasing security and reliability of the power supply; reducing technical and non-technical losses; diversifying power generation sources; and improving TANESCO's financial performance. Over the past two decades, the GoT has embarked in implementing various reforms to address the electricity sub-sector challenges.

In 1964, the GoT acquired shares in the Tanganyika Electricity Supply Company (TANESCO) and Dar es Salaam Electricity Supply Company (DARESCO). In 1975, the two companies were merged to form the current Tanzania Electric Supply Company Ltd (TANESCO) and the GoT became the sole shareholder. In the 1990's, Tanzania like many other developing countries undertook various socio-economic reforms, including the energy sector. In 1992 the National Energy Policy was formulated which opened the ESI to the private sector.

In 1997, TANESCO was specified for privatization but was later de-specified in 2005 for economic and technical reasons. Over the past two decades, several reform strategies were proposed. The strategies were contained in various reports, which include: Mercados Energeticos report, 2001; Stone and Webster report, 2003; Report of the Presidential Team on

Privatization Review of Utilities, 2005; the Electricity Sub - sector Reform Strategy, 2006; and the Electricity Sub-sector Reform Strategy, 2014 by PricewaterhouseCoopers (PwC).

1.2.1 Mercados Energeticos Company (2002)

The Mercados Energeticos report recommended TANESCO should be unbundled as a means and a crucial step to enable private sector participation in ESI. Private participation was considered a means to enhance competition, efficiency and reliability of power supply. TANESCO was to be vertically unbundled into generation, transmission and distribution companies. Horizontal integration in generation and distribution would allow private sector compete with state owned companies. Transmission, however, would remain a state monopoly. Mercados further proposed a power trading mechanism to facilitate sales and purchase of energy among market players.

1.2.2 Stone & Webster Consultants (2003)

The Stone & Webster (2003) report proposed vertical unbundling of TANESCO coupled with horizontal unbundling into three generation companies and two distribution companies. The distribution companies would be monopolies serving exclusive segments of the national market split into a northern and a southern half. Only one Transmission Company was envisaged under this model which was to remain a monopoly under full government ownership.

1.2.3 The Presidential Team on Privatization Review of Utilities (2005)

A Presidential Team led by Dr. Marcellina Chijoriga revealed the existence of a general consensus that vertical unbundling of the power sector into generation, transmission and distribution is necessary. The team further revealed that TANESCO had started making preparations for internal unbundling by ring fencing the generation, transmission and distribution as separate cost centres. Finally, the Presidential Team proposed formulation of two companies, one for generation and distribution, and the other responsible for transmission of electricity.

1.2.3 The PricewaterhouseCoopers (2014)

PwC proposed a phased process unbundling to initially create greater independence of the buyer of new generation from the generation business, while maintaining ownership and control of both by Government. At a later stage, further unbundling of the utility to separate transmission and distribution segments will take place with consideration of geographical unbundling to improve service delivery and projects implementation.

1.3 Electricity Supply Reform Strategy

To supplement previous reform strategies, the Strategy has been developed through comprehensive consultations with key stakeholders, review of existing institutional set up, relevant policies and laws, past studies and benchmarking experience against other countries. This Strategy recommends for gradual unbundling of the state owned utility company into independent generation, transmission and distribution companies with much emphasis of private sector participation in the entire supply chain with exception of transmission segment. To implement the ESI Reform Strategy, a Roadmap has been established which provides detailed activities that are necessary for reforms to be smoothly implemented.

The ESI Reform key activities include TANESCO operational and financial turnaround, strengthening the governance and performance of the sector and attracting private investment. This strategy aims to create an environment conducive to attracting investment in the ESI which will support the country's development goals. The Strategy is further explained in the Roadmap which among other things details individual sub-activities, time frames and funding requirements. BRN also supports this initiative by requiring the ESI Reform Roadmap to be published by June 2014.

2.0 PROPOSED ESI REFORM

2.1 Strengths, Weaknesses, Opportunities and Challenges Analysis

A SWOC analysis sums up an enterprise's strategic situation. It provides a quick overview of the enterprise's internal strengths and weaknesses, while taking into consideration of the environmental opportunities and challenges. Owing to the strategic importance of the ESI, particularly TANESCO, in the economy and national development, the restructuring of TANESCO needs to address the inherent weaknesses and challenges of the entire electricity sub-sector. It must aim to create a vibrant sub-sector in which institutions and structures will improve power supply in the country.

An analysis of the internal and external environment in which TANESCO operates reveals some strengths, weaknesses, opportunities and challenges listed in the table below:

Table No. 1: SWOC Analysis

S/N	STRENGTHS	DETAILS	STRATEGY
1.	Human Capital	Skilled and dedicated workforce	Utilise manpower to achieve goals
2.	Government support	There is interest and commitment by the GoT in ensuring sector performance.	<ul style="list-style-type: none"> Engage in structural reforms Obtain subsidies Solicit support on tariff reforms
3.	Existing infrastructure	Existing generation, transmission and distribution infrastructure to support business	Rehabilitate, reinforce and expand system to reach more customers
4.	Existence of engineering, accounting, financial regulations and other governance structures and operating manuals	Clear procedures and guidelines for performing work	Utilise to ensure control and compliance to best practices
WEAKNESSES			
1.	Inadequate generation, transmission and distribution capacity	The generation capacity does not meet demand; aged transmission and distribution infrastructure does not reach all intended customers	<ul style="list-style-type: none"> Ensure adequate and timely investment in generation and transmission infrastructure Rehabilitate, reinforce, upgrade and extend the distribution infrastructure Embark on transformation of the electricity sub-sector
2.	Limited financial resources	Inadequate funds for operational and development activities	<ul style="list-style-type: none"> Enhanced cost reflective tariff Develop low cost generation options

			<ul style="list-style-type: none"> • Release the expensive EPP's as they come for expiration • Expand customer base • Enhance cost management • Enhance debt collection • Listing of the operating companies at the stock exchange
3.	Inadequate asset utilization	Some company assets are not contributing adequately towards generating funds	<ul style="list-style-type: none"> • Adequate utilization of all assets by expanding the customer base.
4.	Industry monopoly	Absence of competition in the ESI	Unbundle the vertically integrated utility.
5.	System losses	Losses are above industry standards	<ul style="list-style-type: none"> • Upgrade infrastructure and monitor areas with high losses. • Adopt appropriate revenue assurance technologies.
6.	Power supply	Inadequate and unreliable power supply	<ul style="list-style-type: none"> • Increase investment in generation, transmission and distribution systems. • Rehabilitate and provide timely maintenance of the power system
7.	ICT systems	Absence of integrated ICT	Install integrate ICT systems
8.	Investment in power infrastructure	Inadequate and untimely investment in power system	<ul style="list-style-type: none"> • Enhance private participation in business. • Timely development of infrastructure projects in line with PSMP.
9.	Sustainability of power utility operations	Overdependence on GoT support	<ul style="list-style-type: none"> • Promote cost reflective tariff regime. • Institute targeted subsidy framework.
10.	Inadequate capacity in procurement	Ineffective management on procurement	<ul style="list-style-type: none"> • Appoint capable staff • Train various cadres in procurement related issues
11.	Power Purchase Agreements (PPAs)	Absence of Standardized PPAs	<ul style="list-style-type: none"> • Build capacity in PPAs negotiations skills • Prepare Standardized PPAs • Procure new projects competitively in line PSMP.
12.	Service delivery	Service delivery not meeting customer expectations	Review business processes and adopt appropriate service delivery technologies.
13.	Revenue collection	Inefficiency in revenue collection	<ul style="list-style-type: none"> • Install prepaid meters (LUKU) to all customers • Improve customer database
OPPORTUNITIES			

1.	Demand for electricity	<ul style="list-style-type: none"> • Low access to electricity • Installed capacity does not match with demand 	<ul style="list-style-type: none"> • Invest in expansion and rehabilitation of electricity infrastructure • Enhance demand side management
2.	Regional power trading	National grid is not interconnect with regional grids	Invest in generation and transmission infrastructure
3.	Development Partners	Willingness of development partners to support sector developments	Enhance financial management and governance
4.	Energy resources	Abundant energy resources such as hydro, gas, wind, solar, coal, geothermal, ocean waves and biomass	Diversify power generation to ensure security of supply
5.	Independent regulator	Existence of Independent regulator	Comply with rules and regulations
CHALLENGES			
1.	Non-cost reflective tariff	Income does not match production and operation costs due to high capacity and service charges from IPP's and EPP's	<ul style="list-style-type: none"> • Concentrate on cheaper generation sources of power • Ensure that expensive IPP and EPP's contracts are reviewed or retired
2.	Climate Change	Prolonged droughts that affect hydro power generation	<ul style="list-style-type: none"> • Diversify generation resources to include geothermal, wind, coal and other renewable energy sources • Enhance environmental management in the catchment and river basins
3.	Vandalism of power infrastructure	Disruption of power supply	<ul style="list-style-type: none"> • Involve community in infrastructure protection • Use of alternative technology • Increase penalties
4.	Cost of liquid fuels	High cost of power generation	Invest in cheaper sources of power
5.	Human capital	Aging work force which impacts technical and commercial operations.	<ul style="list-style-type: none"> • Recruit, train, develop and retain talented work force. • Implement proper succession plan
6.	Environmental concerns	Investment in power infrastructure may affect the environment	<ul style="list-style-type: none"> • Carry out Environmental and Social Impact Assessment (ESIA) studies. • Comply with the environmental laws

2.2 Drivers for the ESI Reforms

The ESI infrastructure is reported to be one of the major constraints in the GoT's efforts to achieve the desired socio-economic goals articulated in the Tanzania Development Vision 2025. The main drivers for reforming the ESI in Tanzania are provided below.

2.3 Policy, Legal and Regulatory Framework

The GoT's policy for the energy sector was set out in the first National Energy Policy of 1992. Revisions of the National Energy Policy in 2003 among other things aimed at promoting affordable energy supplies to support national developmental goals. In addition, Section 40 of the Electricity Act, 2008 sets a platform for the re-organization of ESI by providing that:

“the Minister may, in consultation with the Minister responsible for finance and the Authority, restructure the electricity supply industry in order to foster competition for increased efficiency, enhanced development of private capital investment and promote regional electricity trading”

2.4 Financing Requirement

The scope of investment required to implement plans and meet Government policy objectives is significant. The Power System Master Plan identifies short term financing requirements (2012 to 2017) as USD 11.4 billion – about USD 1.9 billion per annum of which 73.5 percent is for generation. At present, there are four primary sources of funding for investment in the power sector: GoT, TANESCO, Development Partners and Financial Institutions.

For decades, while the GoT and TANESCO have been the primary financiers with some forms of support from Development Partners, the projected growth exceeds existing resources. Therefore, the private capital investment becomes an important option to bridge the financing gap within the context of appropriate controls and balancing the interests of both investors and consumers.

2.5 Connection and Access Levels to Electricity

According to the National Census conducted in 2012, about 70 percent of Tanzanians reside in rural areas whereas only seven percent of the rural population is connected to electricity supply. Low connection and access levels to electricity coupled with low purchasing power have excluded rural households from participating effectively in income generating activities.

As of March 2014, 24 percent of the Tanzanian population was connected with electricity supply. The GoT plans to increase connection levels to 30 percent by 2015, 50 percent by 2025

and at least 75 percent by 2033. To achieve these targets, more funds will be required for generation, transmission and distribution systems expansion.

2.6 Diversification of Power Generation Resources

To improve the security of supply, the GoT is diversifying the sources of electricity generation to include natural gas, coal, hydro, uranium and renewable energies. Tanzania also intends to participate effectively in the Eastern Africa Power Pool (EAPP), East Africa Community Power Pool (EACPP) as well as the Southern Africa Power Pool (SAPP). The ESI reforms will spearhead investment in various generation sources to meet both present and future demand. Envisaged growth in generation is shown in the **Table 1** below.

Table 1: Present and Projected Installed Capacity by year 2025

Source	Current Capacity	Additional Capacity (2015 - 25)	Capacity by 2025
Hydro (MW)	561	1,529.00	2,090.84
Natural Gas (MW)	527	3,968.00	4,469.00
HFO/GO/Diesel (MW)	495	-	438.40
Coal (MW)	-	2,900.00	2,900.00
Wind (MW)	-	200.00	200.00
Solar (MW)	-	100.00	100.00
Geothermal (MW)	-	200.00	200.00
Interconnector (MW)	-	400.00	400.00
TOTAL (MW)	1,583	9,297.00	10,798.24

2.7 Demographics and Demand Projections

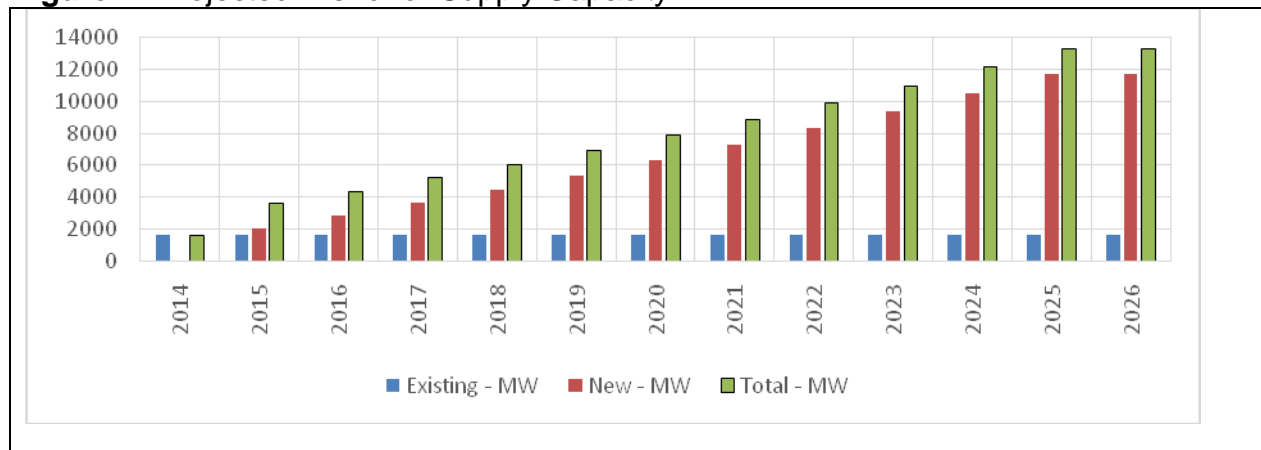
Tanzania aspires to raise the per capita income from USD 640 (April 2014) to at least USD 3,000 by 2025. Its population is expected to increase to at least 69.5 million by 2025³. To realize the per capita income target, the GDP must grow on average by 15 percent per annum to raise the country GDP from about USD 32 billion (April 2014) to USD 181 billion by 2025.

For Tanzania to become a semi-industrialized country and effectively participate in the global economy, growth in productive sector of the economy including manufacturing, mining, information and communication technologies, trade, tourism and agriculture is important. Such growth will require enormous investment in the power infrastructure. This will require about

³ De Wult, M. (2008), Population Pyramids of the World from 1950 to 2100

764.5 MW of new capacities to be added annually. **Figure 1** provides Projected Trend for Supply Capacity by 2025.

Figure 1: Projected Trend for Supply Capacity



2.8 Stakeholders' Expectations

The availability, reliability, affordability, accessibility and quality of electricity supply have been major concerns by stakeholders including the GoT, customers and business partners. Despite various efforts by TANESCO, the improvement of service delivery has not been fully met as expected in part due to financial constraint. Therefore, the rationale for ESI reforms includes:

- (a) Improving TANESCO's financial position;
- (b) Attracting private capital investment;
- (c) Reducing public expenditure on ESI;
- (d) Increasing availability, reliability, affordability and sustainable quality of electricity supply;
- (e) Increasing connection and access levels;
- (f) Diversifying sources of power generation;
- (g) Improving efficiency and electricity service delivery; and
- (h) Reducing system losses, both technical and non-technical.

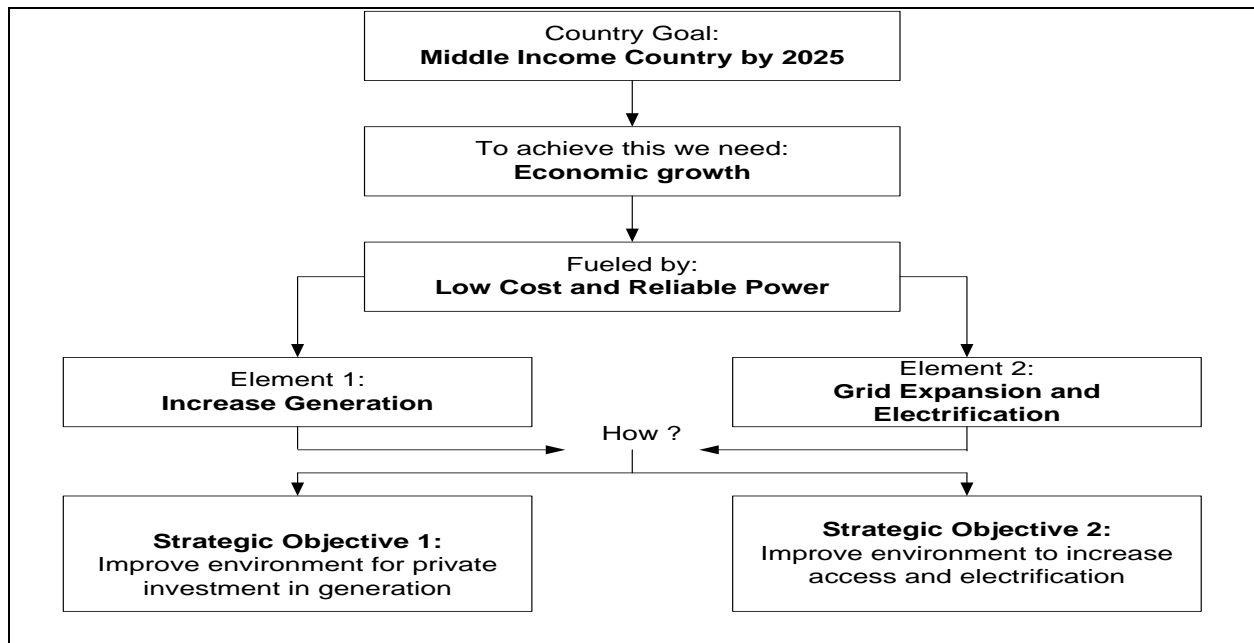
3.0 THE ELECTRICITY SUPPLY INDUSTRY REFORM OBJECTIVES

The main objective of reforms is to improve the Electricity Supply Industry governance and performance for sustainable socio-economic transformation and environment protection through quality service delivery.

The primary strategic objectives for reform are: improving environment for private investment in generation and distribution; and increasing electricity connection and access levels. The specific reform objectives are:

- (a) Creating ESI that supports the National Developmental Goals;
- (b) Establishing efficient ESI in an environmentally sound and sustainable manner;
- (c) Promoting financial and commercial viability of the sector;
- (d) Attracting private sector investments to the sector; and
- (e) Ensuring availability of adequate, reliable and affordable electricity supply.

Figure 2: ESI Primary Reform Objectives



4.0 EXPERIENCES FROM OTHER COUNTRIES

In the 1990s, many developing economies initiated ESI reforms by unbundling the vertically integrated state owned utilities into generation, transmission and distribution companies. The underlying reasons for reforms were to attract private investment and to improve the efficiency and reliability of power supply in the country. In developing Tanzania's ESI Reform Strategy and the Roadmap, industrial best practices from around the world were gathered. The analysis of the best practices from around the world is provided below.

4.1 Experiences from Kenya

The energy sector reform in Kenya commenced in 1996 by unbundling Kenya Power and Lighting Company (KPLC). This was achieved by assigning all generation assets operated by KPLC to Kenya Generation Company Plc. ("KenGen"). KPLC was left with distribution and transmission functions.

In 2009, the Government established a state owned transmission company, Kenya Transmission Company (KETRACO), to deal with development and improvement of the transmission system and projects. KPLC buys bulk power from the generation companies, including IPP's, and distributes and sells to consumers. In regards to rural electrification, in 2008 the Government of Kenya established the Rural Electrification Agency (REA).

The transformation in Kenya recorded positive developments including an increase in population access to electricity from 16.1 percent in 2009 to 29 percent in 2013 as well as improved generation capacity. The listing of KenGen and KPLC at the Nairobi Stock Exchange turned the previously loss-making companies into profit making institutions. The post-reform challenges that Kenya encountered include attracting private investors in some areas such as geothermal development, coordination of large investment projects, and physical separation and distribution of assets to established companies.

4.2 Experiences from Uganda

In 1999, the Uganda Electricity Board (UEB) was unbundled by the Government of Uganda creating three subsidiary independent companies:

- Uganda Electricity Generation Company Limited (UEGCL) to provide electricity generation services
- Uganda Electricity Transmission Company Limited (UETCL) to provide transmission of electricity to the distributor and
- Uganda Electricity Distribution Company Limited (UEDCL) to distribute electricity to end consumers.

These companies and the Electricity Regulatory Authority (ERA) are owned by the Government of Uganda and are mandated to preserve and protect public interest. The unbundling of UEB formally began on 1 April 2001. Successor companies were created and assets and liabilities of UEB/Government were transferred to them. UEGCL owns the two major hydropower plants at Nalubaale (180MW) and Kiira (200MW). UETCL owns and operates the transmission infrastructure above 33kV. UEDCL owns and operates the distribution network at 33kV and below.

On 26 March 2001, a private company called Umeme Ltd was formed under the Public Enterprises Restructuring & Divestiture (PERD) Statute 1993 and the Companies Act Cap 110. Umeme Ltd was one of the successor companies of Uganda Electricity Board (UEB) assigned with carrying out distribution and sales of electricity throughout Uganda.

A Consortium of Globeleq and Eskom Enterprises established Umeme Ltd. It has entered into a lease and assignment agreement with UEDCL, a support agreement with the Government of Uganda and a power sales agreement with UETCL. Umeme Ltd is licensed by the ERA for distribution, supply and embedded generation. In 2004, the company entered into a 20-year concession agreement to operate the business of electricity distribution.

The reform in Uganda led into increased investment in generation, improved customer service and a reduction in losses from 38 percent to 26 percent. Additionally, the reform increased new generation infrastructure and the single buyer model has attracted private investment in the sub-sector. Post-reform challenges addressed include increased access to electricity (15 percent), coordination of long-term investments, coping with change by some sector players and debt reduction.

4.3 Experiences from Namibia

The Namibian electricity subsector had been comprised of small municipally operated distribution utilities scattered all over the country. The national utility, NamPower, has continued to focus on generation, transmission and distribution. The municipal utilities, on the other hand, used to purchase power from generators owned and operated by the Ministry of Works. Namibia has a very low population that is sparsely distributed across the country making economies of scale difficult to achieve in a multiple utilities market. To date 35 percent of the country's population has access to electricity.

In 1991, rural access to electricity in Namibia was 5 percent. To achieve 50 percent electrification rate by 2010, in 1998, a Government established a White Paper. However, achieving this target was difficult as municipalities depended on electricity as a major source of income and therefore each municipality had a different tariff reflective of their income requirements. In addition to the fragmented market structure and low generation capacity, NamPower was also unreliable and unpredictable in its operations. To address these challenges and stimulate growth of electricity supply, in 2000 the Electricity Control Board in 2000 was established and small municipal utilities were amalgamated into five Regional Electricity Distribution (REDs) companies under a

Single Buyer Model. The single buyer purchases power from cross border countries including South Africa (Eskom), Zimbabwe (ZESA), and Zambia (ZESCO) as well as power generated internally by NamPower and IPPs.

The reform in Namibia created utilities' financial autonomy due to cost reflective tariff, establishment of an electricity trading arrangement and bilateral and cross border trading agreements. As a result there was an increase in access to electricity from 18 percent in 2002 to 35 percent in 2013 and NamPower was highly rated by credit rating agencies. Post reform challenges encountered include negative public perception of the introduction of IPPs that were considered as a return of white supremacy in Namibia and a shortage of skilled personnel for RED's.


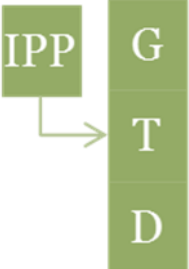
4.4 Experiences from Thailand


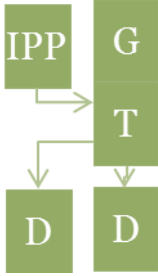
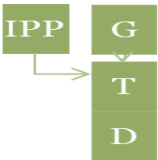
Electricity Generating Authority of Thailand (EGAT) was established on May 1, 1969 after merging the three previous state enterprises, namely Yanhee Electricity Authority (YEA), Lignite Authority (LA), and the North-East Electricity Authority (NEEA).

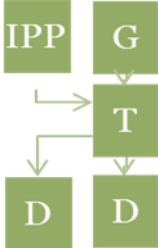
To recover from the Asian financial crisis of the 1990s and respond to the increasing demand for power, three companies were established namely the Electricity Generating Authority of Thailand (EGAT), Metropolitan Electricity Authority (MEA) and Provincial Electricity Authority (PEA). EGAT is responsible for power generation and transmission.

For the distribution and retailing sectors, the markets are dominated by PEA and MEA. PEA is the sole distributor and retailer of electricity to all provincial areas of Thailand beyond Bangkok whilst MEA is responsible for supplying the electricity for Great Bangkok Metropolis, Nonthaburi and Samut Prakarn. These entities played a significant role in transforming Thailand from an agricultural to an industrial based economy. At present, almost 100 percent of the population has access to electricity. **Table 2** summarizes market models implemented in selected countries.

Table 2: Reform Stages and Market Models

Market Model	Discussion
 <p>Chad, Niger, Malawi</p>	<p>Comments:</p> <ul style="list-style-type: none"> • Traditional electricity supply industry model, vertically integrated, state-owned, monopoly. • No private sector participation. • Mostly in smaller, poorer countries. <p>Benefit:</p> <ul style="list-style-type: none"> • State control in the supply chain. <p>Constraints:</p> <ul style="list-style-type: none"> • Utilities mostly perform poorly, and limited ability to grow. • Lack of investment in generation, transmission and distribution. <p>Applicability to Tanzania:</p> <ul style="list-style-type: none"> • Not applicable as Tanzania’s electricity market is more developed than this market model.
 <p>Angola, Ethiopia, Rwanda Swaziland and Tanzania</p>	<p>Comments:</p> <ul style="list-style-type: none"> • Private sector enters market in the form of IPPs. • Very often this model is used as a first stage of reform. • Usually single-buyer: such as fully integrated utility is off-taker. • In some countries, IPPs can also sell to large customers. <p>Benefits:</p> <ul style="list-style-type: none"> • Private sector enters market in the form of IPPs. • Encourages new investment in IPP generation when utility is unable to finance new investments, or seeks to diversify energy mix or introduce competition “for the market”. <p>Constraints:</p> <ul style="list-style-type: none"> • Fully integrated utility also invests in generation; there can be a conflict of interest at both policy and operational levels. • Entry of IPPs can be frustrated by utility in terms of grid access and choice of generation projects. <p>Applicability to Tanzania:</p> <ul style="list-style-type: none"> • This model reflects the existing electricity market in Tanzania although IPPs do not sell to large customers.
	<p>Comments:</p>

 <p>South Africa</p>	<ul style="list-style-type: none"> • Same as the above model, but in addition to incumbent utility there are other distributors. <p>Benefits:</p> <ul style="list-style-type: none"> • Regional distribution companies owned by municipalities paying dividends and contribute to fiscal budget (such as municipals in Brazil or US, franchisees in India). <p>Constraints:</p> <ul style="list-style-type: none"> • If there are too many distributors, economies of scale and scope are lost. • Too many distribution companies can lead to poor governance and wide diversity in performance in the sector. <p>Applicability to Tanzania:</p> <ul style="list-style-type: none"> • Distribution regions should be commercially viable before separation.
 <p>Thailand</p>	<p>Comments:</p> <ul style="list-style-type: none"> • IPPs contracted to enhance generation capacity to meet expansion of rural access. • Separation of rural and urban distribution areas of utilities with cross-subsidies managed through the differentiated bulk supply tariffs. <p>Benefits:</p> <ul style="list-style-type: none"> • Horizontally unbundled distribution companies can address specific local requirements in network planning and service delivery. • Rural segment is partially funded through tariff collection. • Local authorities are mandated to provide electricity services. <p>Constraints:</p> <ul style="list-style-type: none"> • Internal cross-subsidy between distribution areas will not be viable when all distribution companies are not financially sound. <p>Applicability to Tanzania:</p> <ul style="list-style-type: none"> • Generation unbundling and IPPs are necessary to increase generation capacity. • Efficient distribution system is important towards enhancing viability of the electricity sub-sector.
 <p>Kenya</p>	<p>Comments:</p> <ul style="list-style-type: none"> • Private sector permitted in the form of IPPs. • First step of gradual vertical unbundling. <p>Benefits:</p>

	<ul style="list-style-type: none"> • KENGEN is potentially competitive and can attract investment for further growth. • The independent buyer and system operator within transmission provides a neutral base to procure new generation capacities from either KENGEN or IPP on competitive basis (minimized risk to new generators). • KPLC is listed on the Nairobi Stock Exchange so KETRACO takes advantage of Government and concessionary funding from Development Partners. <p>Constraint:</p> <ul style="list-style-type: none"> • Management of transmission and distribution is integrated hence independence of the system operator is impaired. <p>Applicability to Tanzania:</p> <ul style="list-style-type: none"> • Generation segment is easier to unbundle from transmission and distribution. • Generation Company has a potential to be listed in Dar es Salaam Stock Exchange. • Gradual vertical unbundling.
 <p>Ghana, Nigeria and Uganda</p>	<p>Comments:</p> <ul style="list-style-type: none"> • Private sector participation in the form of IPPs. • Final stage of vertical unbundling. <p>Benefits:</p> <ul style="list-style-type: none"> • System Operator provides neutral base to procure and contract IPPs and state-owned generators on non-discriminatory basis. • Distribution companies can contract directly with generators or procure from the Power Exchange or Traders. • Cost and revenues within the value chain are transparent and each segment has incentive to improve efficiency. <p>Constraints:</p> <ul style="list-style-type: none"> • Not applicable to countries with small electricity markets. • Complete unbundling increases complexity in managing the electricity market. • Participation of private sector in the distribution segment is affected by limited opportunities to make profit. <p>Applicability to Tanzania:</p> <ul style="list-style-type: none"> • Unbundling of distribution will be at a later stage.

4.5 Lessons from Other Countries Experiences

Despite the recorded achievements, reforms in various countries are still in progress. However, experiences from these countries offer important insights to Tanzania's reform initiatives⁴ as described below:

- a) Reform processes in Kenya, Uganda, Namibia and Thailand were not a one-time event but an ongoing process, as it took more than five years to achieve complete unbundling,
- b) An effective legal and regulatory framework is required to guarantee independent market operations,
- c) Good governance principles including clarity of responsibilities; policy making under the domain of the Government; regulation under an independent regulator; and commercial operations under utilities are essential to successful restructuring,
- d) In order to ensure control of the electricity sub-sector and protection of the average electricity consumer, the four countries surveyed adopted the Single Buyer Model with a fully Government owned utility being given the role of a single buyer and system operator,
- e) The focus of unbundling has been to increase investment in the power infrastructure. As a result, in countries like Kenya and Uganda, utility companies are listed in the stock exchanges and have raised funds either through the issuance of shares to the public or issue of corporate bonds,
- f) Inventorying and assets valuation including material and human capital before splitting a utility is a key success factor for the reform. It is also crucial to demarcate ownership of assets and operation of the electricity business,
- g) The roles of Rural Electrification Agencies in Uganda and Kenya are clearly defined to specifically include the implementation of projects and contribution to operations of distribution networks. In this regard, the involvement of those agencies has also been used in tariff stabilization,
- h) Establishment of effective regulation (Kenya, Uganda and Namibia) is of paramount importance. Regulators participated effectively in the reforms process;
- i) ESI reforms improved operational efficiency by increasing labour productivity, reducing system losses and improving quality of services delivery;

⁴ Kessides, I (2004), Reforming Infrastructure: Privatization, Regulation and Competition, Chapter Three; The World Bank Group

- j) Most countries attracted considerable private capital investment in generation and distribution segments. In some countries, electricity prices have fallen considerably;
- k) Substantial risks are created when IPPs enter long term PPAs with the state owned single buyer utilities.
- l) The Government still participates in mobilizing funds for development of power infrastructure and
- m) Competition in the ESI is common in generation and distribution segments and the transmission segment remained a monopoly.

In the course of developing the ESI Strategy and the Roadmap, experience from other countries was pertinent to planning in Tanzania. The proposed reforms in this report do not reflect a specific path followed by a given country but rather drawing from the lessons learned from other nations the reforms in this report address the specific needs of Tanzania's ESI.

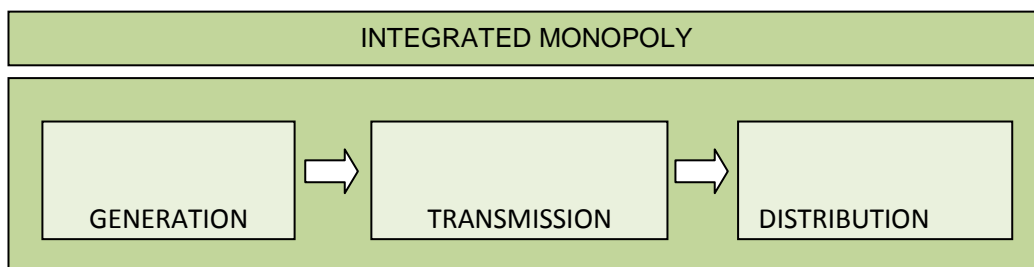
5.0 ELECTRICITY SUPPLY INDUSTRY RESTRUCTURING OPTIONS

There are four options for restructuring the electricity market:

5.1 Integrated Monopoly

Under this model, a single entity handles Generation and Transmission to Distribution companies who have a monopoly relationship with the final consumer. Therefore, no competition exists in service delivery and the supplier has no choice.

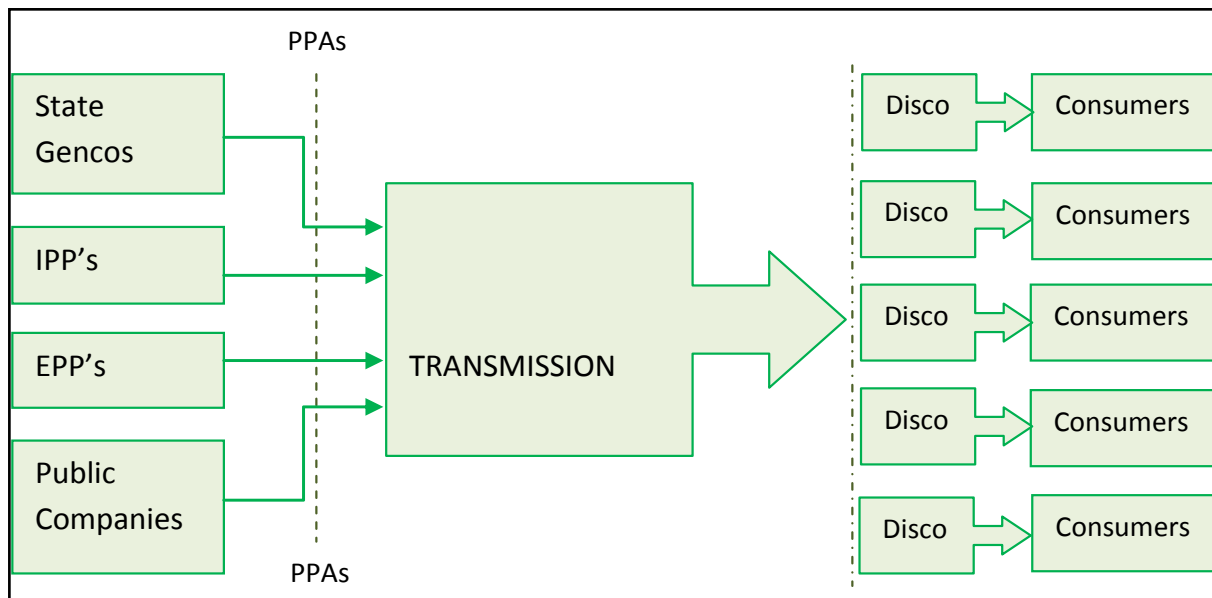
Figure 3: Integrated Monopoly Model



5.2 Single Buyer Model

Competition in generation is introduced but no choice of supplier exists. Independent Power Producers (IPPs) may sell only to a single purchasing agency based on the Power Purchase Agreement (PPA). The purchasing agency transmits to distribution companies who have a monopoly relationship with the final consumer.

Figure 4: Single buyer Model

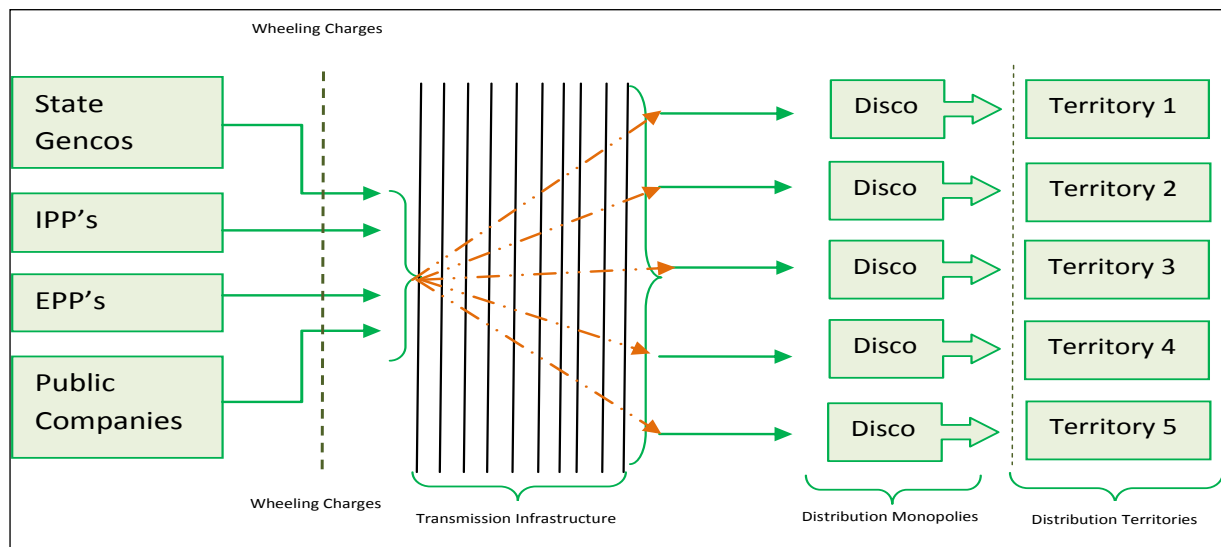


The main purpose of the single-buyer model is to attract investment to relieve capacity shortages while conserving public resources by authorizing private investors to construct power plants. These IPPs typically sell power through long-term contracts, usually including take-or-pay terms or capacity charges independent of output. The success of this model hinges on effective procurement of the new capacity and the creditworthiness of the off taker.

5.3 Wholesale Competition Model

Under this model, generators compete in selling directly to a variety of distribution companies. All generators have open access to a transmission network for the purpose of delivering power. Trading arrangements are devised to allow the exchange of power on a network to span differences between contractual arrangements and actual demand and supply. Distribution companies continue to have a monopoly over final consumers.

Figure 5: Wholesale Competition Model



Under the wholesale competition model, generators compete to supply the market and retailers have a choice of wholesale supplier. Early designs of this market type included a mandatory pool where suppliers were obliged to sell their power through a power pool. However, suppliers could hedge price risk through bilateral financial contracts. More recently, the trend has been towards a “multi-market model” as pioneered in the Nordic power market. In this model, generators have a choice of trading in a power pool, or through bilateral contracts. Generation companies make investment decisions.

In this model, the ability of the government to intervene in the sector diminishes. The pool provides a “spot price” that gives an indication of the supply and demand balance – when demand grows faster than supply; prices will start to increase which will give a signal to investors an emerging shortage. As in most commodity markets, spot prices can be volatile with price spikes.

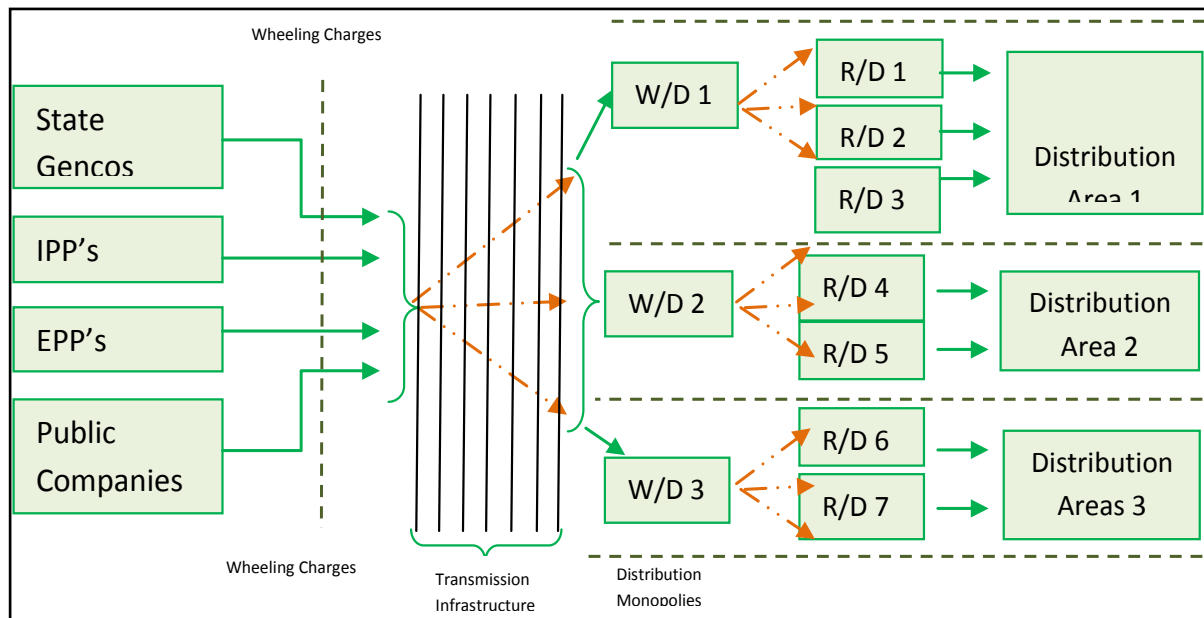
A wholesale market requires a sophisticated trading system to be established and puts pressure on the System Operator to manage the system. Information flows between generators, distributors, the Market Operator and the System Operator need to be well designed.

The main advantage of wholesale competition is that the generation market is two-sided, rather than a monopsony as in the case of a power purchasing authority. Being competitors in the purchase of electricity, utilities are more likely to pressure generating companies for efficiency than a power purchasing authority. The disadvantages of this model are that retailing is a monopoly, and therefore needs to be regulated. Additionally, the necessary unbundling of the transmission system operator (TSO) will make it more difficult to coordinate investment in generation and network capacity.

5.4 Retail Competition Model

Under this model, generators compete in selling directly to distributors, retailers and final customers; customers choose the supplier. Distribution may be separated from the retail of electricity, though some distributors may also be retailers. Generators have access to both transmission and distribution wires based on regulated prices. Trading rules and arrangements are required for both transmission and distribution. Final customers may purchase power from a retailer, a retailer/ distributor or directly from a generator.

Figure 6: Retail Competition Model



The transition between any two of these reform models requires the design of new and complex institutional arrangements. For example, from single buyer to wholesale competition requires a trading system and transmission access pricing. From wholesale to retail, competition requires further trading arrangements and distribution network access pricing.

In addition, the different models require different regulatory set-ups. Tanzania is already characterised by a market which includes IPPs (although this has not been a deliberate policy

choice), and hence the integrated monopoly solution is not appropriate. Likewise, the retail competition model is not a likely outcome for many years to come due to the limited market – both in terms of actors and consumers – and the complexity of retail competition.

The main advantage of retail competition is that the retail companies are subject to competition, and should therefore experience more pressure for being cost efficient and consumer friendly. Because the value that is added by retailing is limited in comparison to the entire value chain, the scope for cost savings from retail competition is also limited, while the cost may be significant. First, in order to create a playing level field for competition, the management of the distribution networks must be unbundled from retail and other competitive activities.

Tanzania ESI Market Structure Reform Path

At present, Tanzania ESI operates on the single buyer model. However, the reforms envision ESI in Tanzania to graduate from the single buyer model to retail competition market gradually.

6.0 ESI REFORM ROADMAP

The ESI Reform Strategy and the Roadmap provides an overview of Tanzania's electricity market structure in the next eleven years, 2014 – 2025. The Roadmap translates the Electricity Sub-sector Reform Strategy into a plan for implementation of the proposed reforms. It serves as a starting-point to guide implementation of the reform process in the immediate, short, medium and long term horizons. The Roadmap aims to:

- (a) Increase investment from both private and public sector;
- (b) Enhance private sector participation;
- (c) Increase connection and access levels to electricity;
- (d) Diversify sources of energy for electricity generation and supply;
- (e) Enhance affordability and reliability of electricity supply;
- (f) Reduce system losses; and
- (g) Establish a competitive wholesale and retail electricity market.

The strategy proposes a gradual four (4) stage process that will result in a fully competitive electricity market structure by 2025.

6.1 Market Structure in the Immediate Term (July 2014 – June 2015)

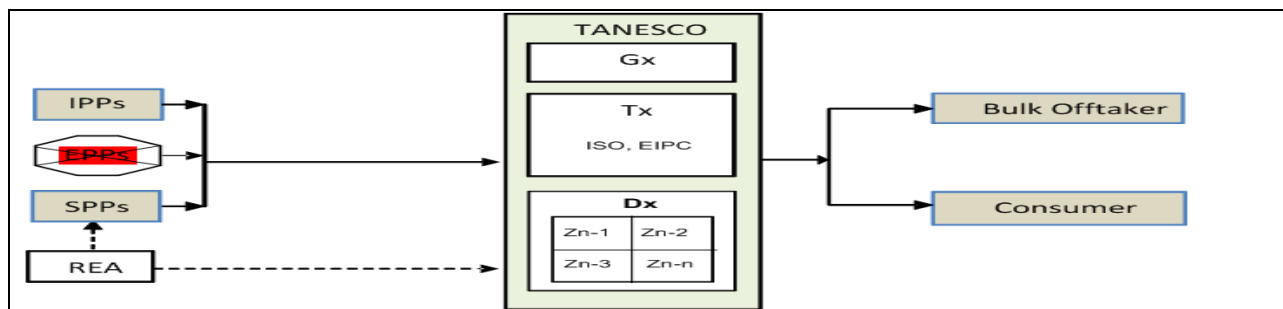
The immediate term will involve the following tasks:

- (a) Establish a Task Force with mandate to monitor the implementation of the Roadmap;
- (b) Establish a Transformation and Change Management Team (TCMT) at TANESCO to manage the reform process;
- (c) Initiate business processes review; and assets and liabilities valuation for TANESCO's generation, transmission and distribution segments;
- (d) Carry out a Management Information System audit to pave the way for effective ring fencing of TANESCO's Strategic Business Units;
- (e) Reducing system losses (technical and non-technical) from 19 percent to 18 percent by June 2015;

- (f) Establish separate accounting systems and management accountability for generation, transmission and distribution (ring fence);
- (g) Carry out a Human Capital Needs Assessment;
- (h) Improve TANESCO's financial performance by retiring EPPs immediately upon expiry of respective contracts and cleaning-up TANESCO's Balance Sheet;
- (i) Establish an Electricity Infrastructure Procurement Coordinator (EIPC) to manage competitive procurement of power infrastructure projects;
- (j) Ring fencing distribution segment into seven (7) semi-autonomous Zonal offices;
- (k) Review the Electricity Act, 2008 particularly Section 41(6) of, to allow private generators to supply power directly to bulk off takers;
- (l) Instituting Capacity Building Programme for MEM, TANESCO, REA and EWURA to support the new market;
- (m) Developing technology based Standard Power Purchase Agreement (PPA) model;
- (n) Developing Grid Codes to guide transmission and distribution system; and
- (o) Designate the Grid Control Centre (GCC) with TANESCO as an Independent System Operator (ISO).

In the immediate term, TANESCO will remain vertically integrated with ring fenced business units and ISO and EIPC embedded within transmission as shown in **Figure 7** below.

Figure 7: Market Structure in the Immediate Short Term



Note on Figure 7: Single-Buyer model for a vertically integrated national utility. Gx, Tx, Dx: Generation, Transmission and Distribution business units; IPP: Independent Power Producers; and SPP: Small Power Producers. EIPC: Electricity Infrastructure Procurement Coordinator. ISO: Independent System Operator.

6.2 Market Structure in the Short Term (July 2015 – June 2018)

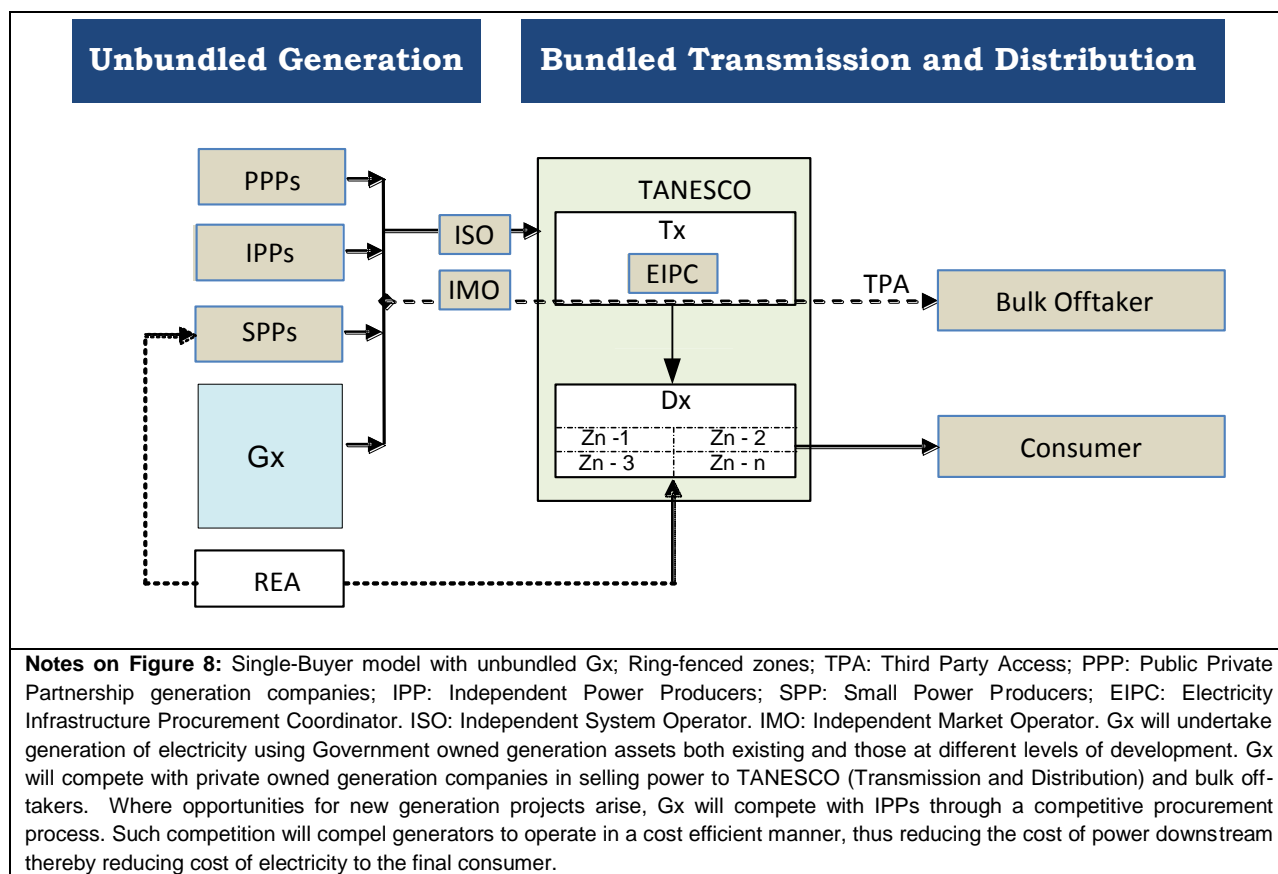
6.2.1 Tasks in the Short Term

The short term will involve the following tasks:

- (a) Unbundling of generation segment from transmission and distribution segments by December 2017;
- (b) Approving generators to sell electricity directly to Bulk Off takers while paying wheeling charges for the company responsible for transmission infrastructure;
- (c) Continue improving TANESCO's financial performance through decentralizing decision-making on procurement, budget implementation and business plans to Zonal offices;
- (d) Reducing system losses (technical and non-technical) from 18 percent to 16 percent by June 2018;
- (e) Developing management programme for senior and mid-level managers to handle existing and new roles;
- (f) Designating an Independent Market Operator (IMO) to manage wholesale and retail electricity trading;
- (g) Setting up a mechanism and rules for the operation of a retail market for electricity by the regulator; and
- (h) Establishing a desk to mobilize and disseminate market information in the electricity sub-sector including the preparation of an investment prospectus.

The existing TANESCO will continue to be responsible for transmission and distribution until when distribution is unbundled by June 2021. Based on tariff and wheeling charges approved by the regulator, bulk off takers would be able to buy power directly from generators by paying wheeling charges to the transmission company. However, monopoly characteristics will exist in the transmission and distribution. **Figure 8** is a display of the proposed market structure.

Figure 8: Market Structure in the Short Term



6.2.2 Key Features of the Market Structure in the Short Term

Reorganization of the market in the short term aims at creating an enabling environment for the entry of many players into the generation segment of the ESI. The key features in this stage of market development include the following:

- (a) Degree of integration: Unbundled generation from the transmission and distribution;
- (b) Number of sellers and buyers: IPPs, Small Power Producers (SPPs) and Public Private Partnership (PPP) companies shall participate in the wholesale market as sellers of power to existing TANESCO (Transmission and Distribution) and bulk off takers;
- (c) Ownership: Generation, transmission and distribution will continue to be owned by the Government, as a single shareholder;

- (d) Price determination: Wholesale prices of electricity are fixed by respective Power Purchase Agreement (PPA) entered between buyer and respective private generation companies;
- (e) Entry to the market: During this period, IPPs, SPPs and PPPs will be procured competitively;
- (f) Market information: Investment information will be provided by the Ministry responsible for Energy through the Information Management desk; and
- (g) Electricity trade mechanism: The market practice will be coordinated through the IMO in collaboration with the Regulator.

6.3 Market Structure in the Medium Term (July 2018 – June 2021)

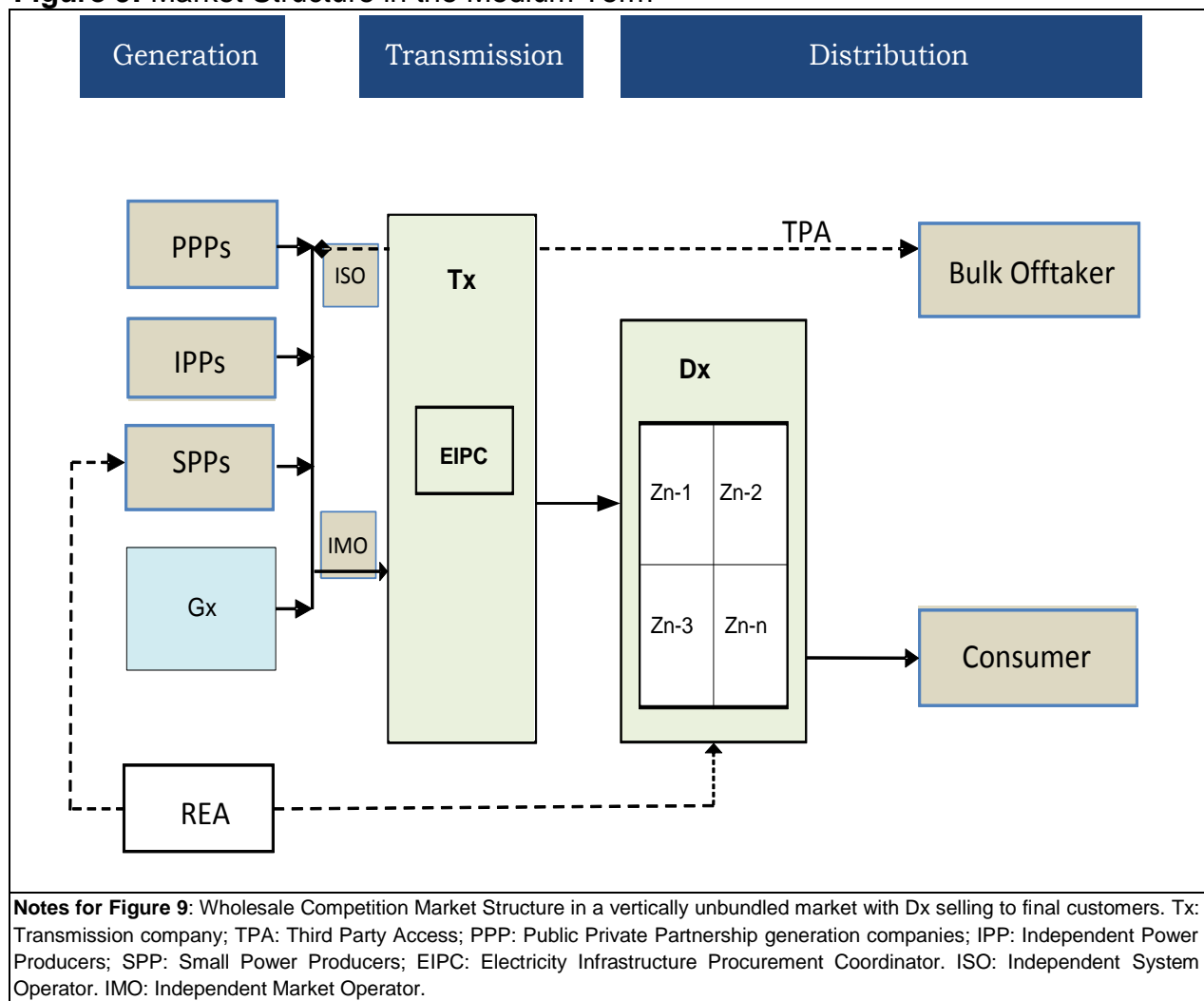
6.3.1 Tasks in the Medium Term

During the medium term, the key market change will involve **unbundling distribution** from the transmission segment based on the social, economic and financial realities in Tanzania. The medium term will involve the following tasks:

- (a) Unbundling of distribution from transmission segment;
- (b) Determining optimal number of zones to be incorporated as Zonal Distribution Companies;
- (c) Strengthening the designated IMO to manage wholesale and retail electricity trading;
- (d) Increasing electricity connection levels from 33 percent to 39 percent by June 2021;
- (e) Reducing system losses (technical and non-technical) from 16 percent to 14 percent by June 2021;
- (f) Setting up a mechanism and rules for the operation of a retail market for electricity by the Regulator; and
- (g) Providing oversight for the retail market while prices are determined by the market forces.

The market structure envisaged in the medium term comprises a competitive power generation segment. This market structure is displayed in **Figure 9** below.

Figure 9: Market Structure in the Medium Term



6.3.2 Key Features of the Market Structure in the Medium Term

During the medium term, competition in the generation segment will be enhanced and the electricity connectivity and access levels increased. The key features in this stage of market development include:

- (a) Degree of integration: The ESI is vertically unbundled into three chain segments: generation, transmission and distribution. A wholesale market exists and generation companies are competing for bulky supply of electricity. A transmission company undertakes the transmission role while EIPC facilitates procurement of strategic projects. The distribution and retailing of electricity to the final consumer is done by a government owned Distribution Company.

- (b) Roles of Zonal Office: The zonal offices become autonomous and carry out business planning, network expansion, operations management, procurement, recruitment and human capacity development.
- (c) Number of sellers and buyers: Power generation companies compete for the market to sell power to the distribution companies and bulk off takers;
- (d) Ownership: The incumbent generation, transmission and distribution companies are owned by the Government;
- (e) Price determination: The retail market is still under monopoly and electricity tariffs are regulated;
- (f) Entry to the market: New generation capacity will be procured competitively;
- (g) Third Party Access: The transmission infrastructure will be guaranteed to all players by relevant regulations issued by an independent regulatory authority; and
- (h) Electricity trade mechanism: Power trading is governed by PPAs entered into through a regulated bilateral agreement between the individual generator and distributor.

Transmission is involved with the system and market. The ISO will be more independent in making decisions pertaining to the dispatch of power, access to the national grid and power system updating. EIPC is responsible for the procurement of new generation and transmission projects.

6.4 Market Structure in the Long Term (July 2021 – June 2025)

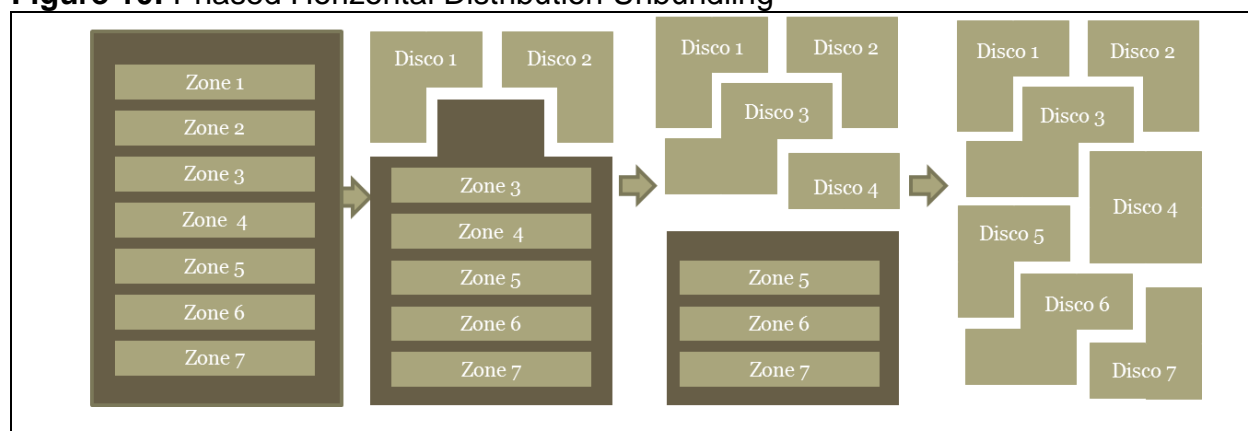
6.4.1 Tasks in the Long Term

In the long term, commercially viable zonal offices will be established as independent distribution companies. Establishment of such companies will be determined by future analyses to measure the market needs. Tariffs will vary by zone in contrast to the current model where one tariff is applicable for one customer group across the country. The long-term structure will involve the following tasks:

- (a) Unbundling distribution segment gradually into several Zonal distribution companies as shown in **Figure 10** below;
- (b) Preparing for the listing of the Generation Company and distribution companies at the DSE. The government will retain at least 51 percent of the equity shares in the generation company;

- (c) Establishing ESI standards: The independent regulatory authority will establish standards of customer service, corporate governance and environmental management in line with industry best practices;
- (d) Reducing system losses (technical and non-technical) from 14 percent to 12 percent by June 2025;
- (e) Increasing electricity connection levels from 39 percent to at least 50 percent by June 2025; and
- (f) Investing in human capital and trading systems in preparation for retail market operations.

Figure 10: Phased Horizontal Distribution Unbundling



It is proposed to have a wholesale competition market structure in the long term stage of ESI reforms. At this stage, the electricity market is fully split into four segments of generation, transmission, distribution and the retailing of electricity to the final consumer.

6.4.2 Key Features of the Market Structure in the Long Term

In the long term, the market reorganization aims at enhancing wholesale competition in the generation, transmission, distribution and retail segments. During this time, generation segment will be lightly regulated for environmental compliance, market control and the protection of consumers. The key features in this stage include:

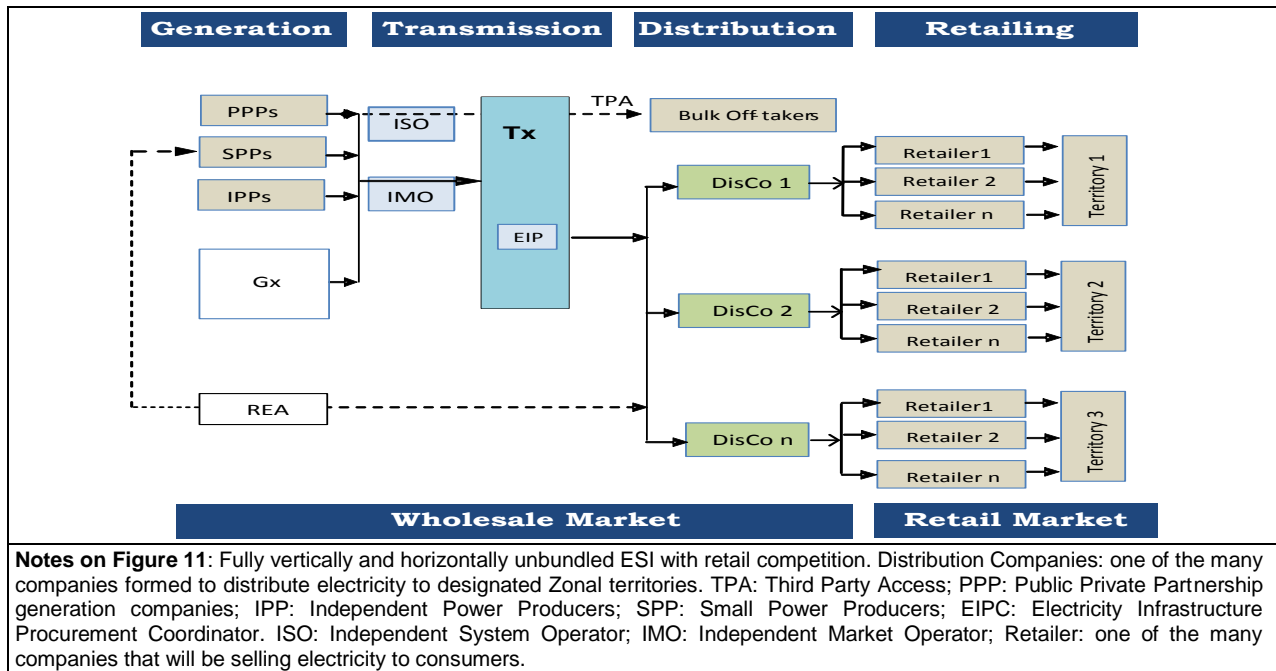
- (a) Degree of integration: The ESI is vertically unbundled into four chain segments: generation, transmission, distribution and retailing. The generation segment is comprised of a number of companies competing for wholesale supply of electricity to electricity retailers. The Transmission Company undertakes the transmission role and EIPC continues to coordinate procurement. ISO and IMO undertake system and market operation. Distribution is horizontally unbundled into a number of distribution companies each focusing on designated franchise

areas. In each designated area, many retailers will be licensed to sell electricity to customers in a competitive manner;

- (b) Number of Sellers and Buyers: The industry will be fully vertically unbundled. The generation segment will have many generation companies both private and state owned. The distribution segment will be horizontally unbundled into Zonal companies. Retail supply of electricity will be conducted by separate retail companies which will compete for the market and for the sale of electricity to the final consumer. The price of electricity is determined by market forces with many buyers and sellers;
- (c) Price determination: Wholesale prices of electricity will be fixed in bilateral PPA between generators and distribution companies and/or retail companies. The retail market will also be competitive with prices determined by market forces. The Regulator will only set the tariff for transmission and distribution companies, monitor rules for market price determination and ensure fair power trading;
- (d) Choice of customers: Customers will be free to choose electricity supply from a large number of retailers operating in the region. The electricity tariff will not only be cost effective but will also reflect the purchasing power of the buyer. The electricity retailers will buy electricity from the wholesale market, wheel it through the distribution network and sell it to the final consumer;
- (e) Ownership: Transmission will be fully owned by the Government. Retail companies can be formed by the local Governments and private investors in various forms to ensure efficient market operations;
- (f) Entry to the market: New generation capacity will be procured competitively. Entry to the retail market will be through licensing by the sector Regulator;
- (g) Third Party Access: Transmission infrastructure will be guaranteed by relevant rules issued by the Regulator; and
- (h) Electricity trade mechanism: Day to day sales to be done through spot trading in the electricity market.

The market structure envisaged in the long-term comprises of competitive power generation and retail segments. This market structure is displayed in **Figure 11** below.

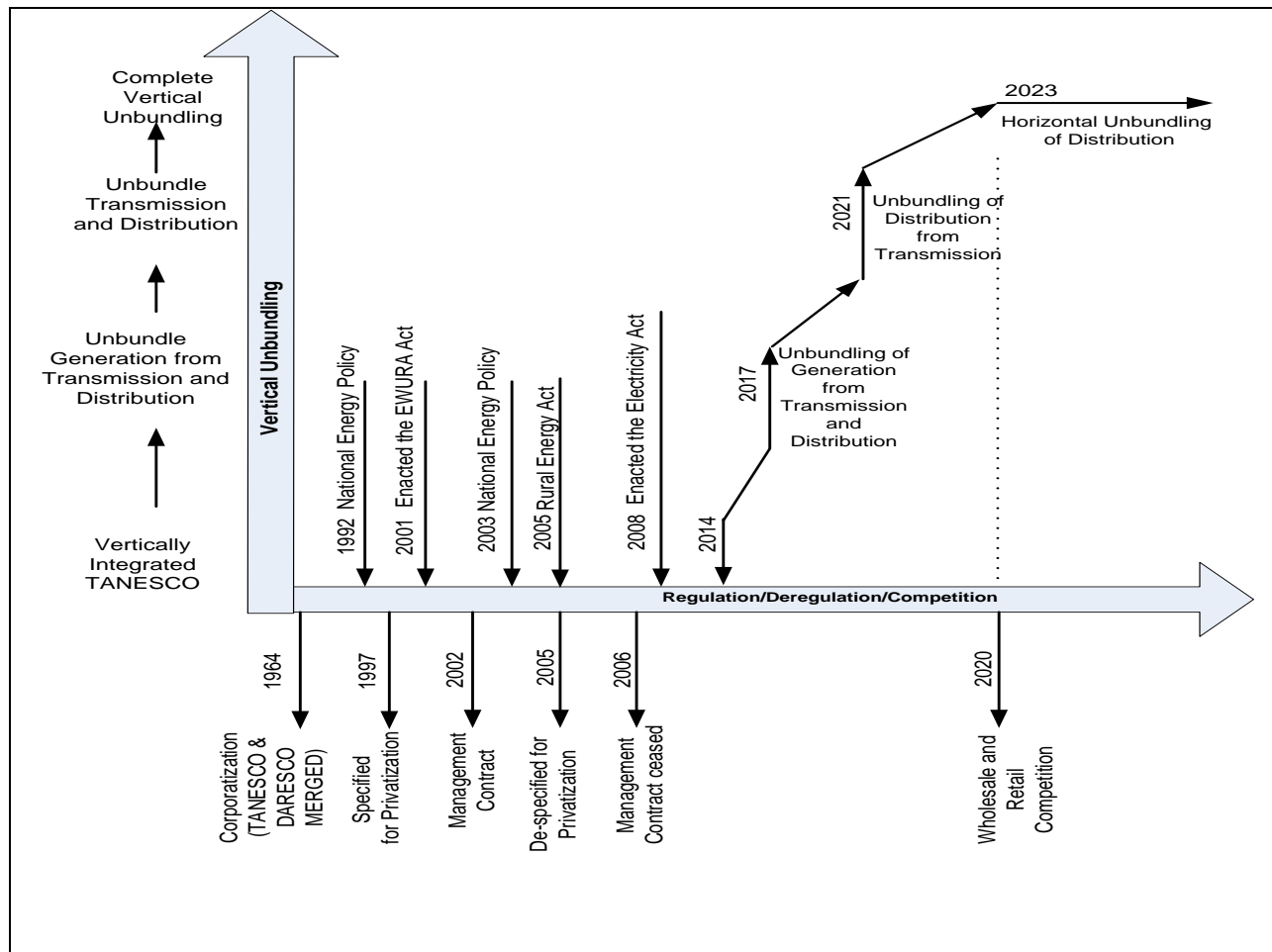
Figure 11: Market Structure in the Long Term



6.5 ESI Reform Path in Tanzania

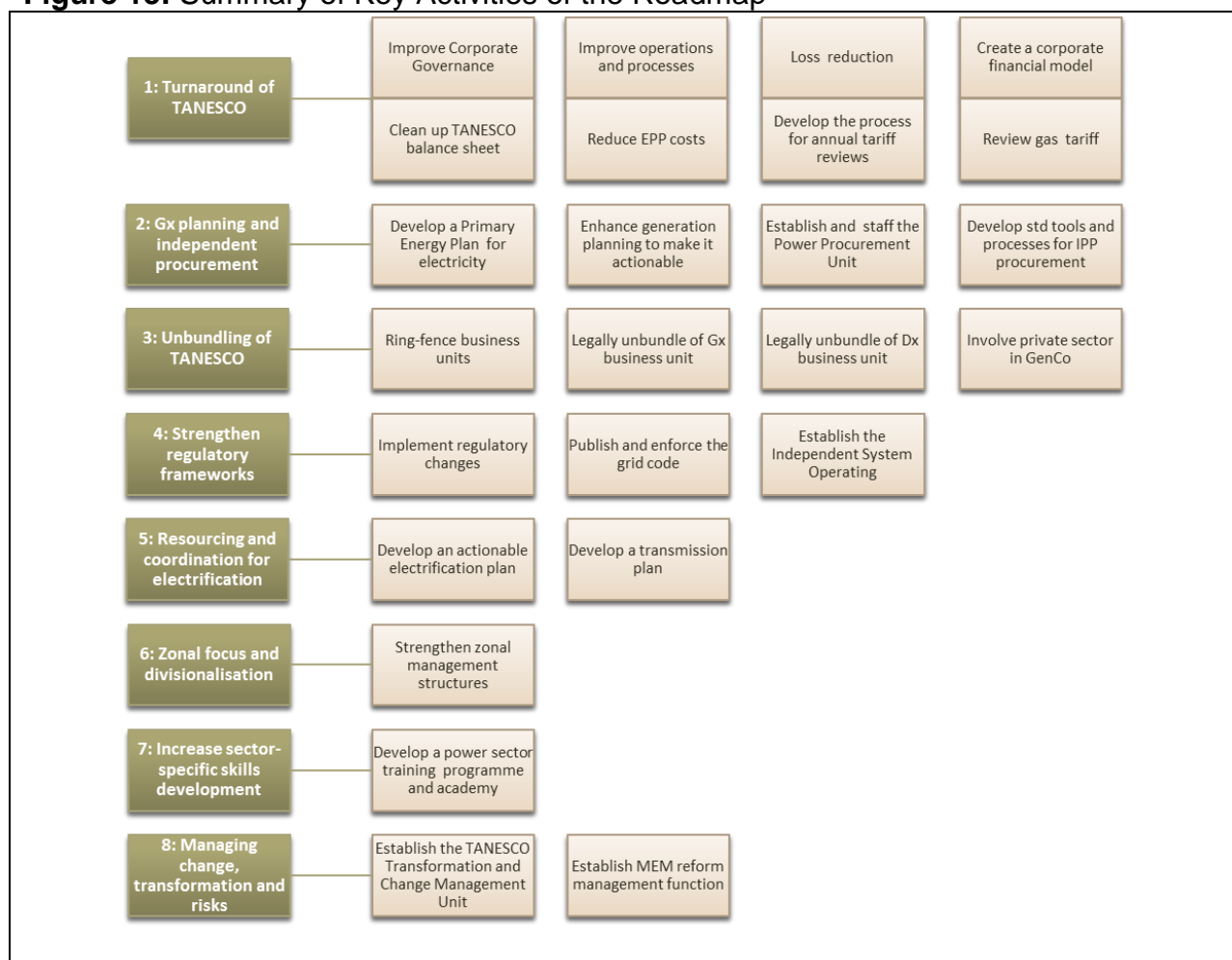
Systematic implementation of the reform measures is important to ensure that the envisioned long term benefits are met. The push for rapid implementation of substantial changes requires careful oversight, management, and ownership to mitigate the inherent risk of reform measures. The ESI reform path is depicted in **Figure 12** below.

Figure 12: ESI Reform Path for Tanzania



The Roadmap is a living document which shall be reviewed periodically to address prevailing challenges taking into account sector reform progress and market conditions. Summary of key activities is provided in **Figure 13** below.

Figure 13: Summary of Key Activities of the Roadmap



6.6 Institutional Set Up

Implementation of the ESI Strategy requires a well-structured and integrated management of the reform processes, engagement and commitment by stakeholders. To achieve the desired accountability and transparency, the redefinition of responsibilities among key stakeholders is of paramount importance.

The desired ESI will result in formation of a number of institutions, each with specific roles and tasks to enhance its efficient functioning. The key institutions and respective roles follow:

6.6.1 Ministry responsible for Energy

The Ministry responsible for energy provides policy guidance to various institutions including TANESCO, TPDC, REA, and EWURA, private companies, Development Partners and financiers. During the ESI reform, the Ministry will oversee the ESI reform processes.

6.6.2 The Regulator

The regulator will continue to regulate market access, investment promotion, licensing, tariff determinations, setting of standards for improved service delivery and market performance. The regulator will also designate ISO and IMO and regulate the natural monopoly segments.

6.6.3 The Rural Energy Agency

During the reform process, REA shall continue to play an instrumental role in promoting access to modern energy services. In this context, rural electrification activities will continue to be funded by the GoT and Development Partners through the Rural Energy Fund. To increase connection and access levels, REA will facilitate support installation and maintenance of rural distribution systems.

6.6.4 The State Power Utilities

Under the present set up, the power utility which is vertically integrated is responsible for generation, transmission, distribution and sale of electricity. To implement the recommended market structure, unbundling of TANESCO segments shall be done gradually.

The off-springs of TANESCO will be generation, transmission and distribution, Independent System Operator (ISO), Independent Market Operator (IMO) as well as Electricity Infrastructure Procurement Coordinator (EIPC).

6.6.5 Independent System Operator (ISO)

ISO shall be established in line with Section 20(1) of the Electricity Act, 2008 and will coordinate power supply system, dispatch power to transmission facilities and monitor cross-border electricity trading. The operator will operate the power system based on the Grid Codes developed by the Regulator.

6.6.6 Independent Market Operator (IMO)

In accordance with Section 20(2) of the Electricity Act, 2008 an Independent Market Operator (IMO) shall be established and regulated. IMO shall administer operations of the wholesale electricity market trading.

6.6.7 Electricity Infrastructure Procurement Coordinator (EIPC)

EIPC will be established under the transmission segment responsible for coordination of competitive procurement of power infrastructure (generation, transmission and distribution) projects. It will work closely with the Procurement Management Unit (PMU) under the transmission utility guided by PSMP.

6.6.8 Generation Companies

Power generation will be undertaken by both public and private companies. Small Power Projects will also be further promoted under the Standardized Small Power Purchase Agreement. Generation companies will be able to sell power to either bulk off-takers or distribution companies by paying wheeling charges to Transmission Company.

State Owned Generation Company will be established through unbundling from transmission and distribution segments by December 2017. This is expected to intensify competition in generation with enhanced private sector participation. The newly established state generation company shares will be listed in the Dar es Salaam Stock Exchange (DSE) with the GoT retaining at least 51 percent shareholding.

6.6.9 State Owned Transmission Company

The transmission company shall be owned by the GoT but regulated. It will facilitate the wheeling of electricity from generators to distributors and bulk off-takers. ISO, IMO and EIPC which are autonomous will be hosted by the transmission company for smooth operations of the power system.

6.6.10 Distribution Company and Retailers

Distribution companies will operate as separate entities. Commercially viable zones will be converted into Zonal Distribution Companies. These companies will sell power to retailers in their territories. The ownership of distribution companies will be either public or private. This arrangement will provide a wide choice to retailers resulting in the improved quality of service, competitive prices and increased electricity connection and access levels.

7.0 IMPLEMENTATION RISKS AND MITIGATION MEASURES

The ESI Strategy is exposed to a number of risks that may impair its implementation. Some of these risks are summarised below:

7.1 Implementation of the Strategy

Delay in implementing the ESI Strategy may not improve the ESI situation. The GoT is committed to ensuring the timely implementation of the ESI Strategy.

7.2 Non-responsiveness by Private Sector

ESI reforms will add value to the economy if the number of power companies increase. If unsuccessful, the situation will degenerate into a private monopoly that may be worse than public monopoly. To mitigate this risk, the GoT will review the existing legal and regulatory framework to create necessary conditions for the effective participation of the private sector.

7.3 Unbundling Small Power System

Unbundling small power systems may increase overhead costs without achieving a desired level of competition⁵. The rule of thumb for effective unbundling requires at least 1,000 MW in the power system. This risk is mitigated by increasing generation capacity to least 3,000 MW by 2017.

7.4 Human Capital Needs

To ensure smooth implementation of the ESI Strategy, availability of a well-trained and skilled workforce is of paramount importance in the management of the reform process. To address this risk, the GoT will implement a human capital development programme to bridge the expertise gap during reform process.

7.5 Resistance to Change

Successful implementation of the ESI Strategy depends on acceptance by stakeholders. To ensure smooth transition and implementation of the ESI Strategy, continuous consultative engagement with stakeholders is crucial to ensure ownership of the reform process.

7.6 TANESCO's Financial Performance

Delays in improving TANESCO's financial performance could adversely impact the timeliness associated with achieving reform objectives. The GoT will ensure that the new TANESCO off-springs start with clean balance sheet. This will be met through improving TANESCO's revenue collection and debts payment. The residual debt will be disposed in a manner considered appropriate by the GoT in order to ensure that new companies start on new balance sheets.

⁵ Bhagavan, M. R.(1999), Reforming the Power Sector in Africa, African Energy Policy Research (AFREPREN) Network Zed Books Ltd, London

8.0 COMMUNICATION STRATEGY OF THE ESI REFORM

Communicating the ESI Reform Strategy is critical to ensuring smooth implementation of the reforms. Key stakeholders such as Government institutions, civil societies, politicians, Development Partners, media and the public at large must be aware of the reform process.

Many stakeholders may be impacted by the reforms and therefore management of communication is required. The communications strategy of ESI reforms is tailored to specific stakeholders as summarized in **Table 3** below.

Table 3: Communication Strategy of the ESI Reform

Stakeholder	Goals and Message	Channel
Government Institutions	<ul style="list-style-type: none"> ▪ Communicating new roles and mandates in the sector especially with regard to new generation procurement and negotiation. ▪ Communications of expectations for progress during the reform process. ▪ Investment promotion and opportunities. ▪ Communication on timing of reforms and impact on the economy. ▪ Support for TANESCO turnaround and the proposed changes to the ownership and company structure. 	<ul style="list-style-type: none"> ▪ Direct communication and announcement to key stakeholders. ▪ Workshops or strategy review meetings for close collaboration.
Politicians	<ul style="list-style-type: none"> ▪ Communicating development of the reform Roadmap designed to meet identified needs. ▪ Actionable plans tied to reform strategy and dedicated functions to promote transformation. ▪ Focus on fair and competitive procurement. ▪ Long term planning to promote security of supply. ▪ Communication on impacts on rural electrification. 	Direct communication
Development Partners	Communication and involvement of the reforms process.	Meetings for close collaboration.
Private Sector	<ul style="list-style-type: none"> ▪ Communicating market changes to promote greater cooperation. ▪ Communication of new developments including the formation of a procurement cycle and development of new processes for procurement 	Cooperative investment promotion with TIC Announcements from MEM and TANESCO Participation in conferences
General Public	▪ Informing customers on the development of the ESI reform aimed at improving quality of service delivery	Newspaper, Radio and Television.

9.0 RESOURCE REQUIREMENTS FOR THE ESI STRATEGY

9.1 Human Resource Requirement

Successful implementation of the ESI Strategy depends on the availability of personnel with requisite knowledge and skills. The GoT will create conducive environment to attract necessary personnel both from within the country and the diaspora to manage the transformation.

The GoT will continue to consult key stakeholders including TANESCO's employees to ensure that their interests and rights are well protected. Since new opportunities will be created through establishment of multiple companies no retrenchment of existing employees is foreseen. The GoT will continue to implement human capital development programmes and a succession plan.

9.2 Financial Resource Requirement

The implementation of the ESI Strategy will be funded by the GoT, TANESCO, Development Partners and private sector. The ESI Strategy Financial Plan is divided into immediate, short, medium and long term.

Assumptions for the ESI Strategy Financial Plan

The preparation of the budget has taken into account the following assumptions:

- (a) ESI Reform Strategy implementation will commence in 2014/15;
- (b) Business processes review, Management Information System (MIS) review, assets and liabilities valuation and human resource needs assessment;
- (c) New units will be established – ISO, IMO and EIPC;
- (d) No staff retrenchment is envisaged during the process;
- (e) Existing IPPs will continue to operate under the present PPAs; and
- (f) TANESCO's turnaround will be facilitated.

9.3 Summary of Estimated Budget

It is estimated that the ESI Reform Strategy will be implemented over a period of 11 years and will require about **USD 1.15 billion** (equivalent to **TZS 1.9 trillion**). This amount would be used for paying TANESCO's debt (**USD 412 million**), capacity charges for existing IPPs (**USD 635 million**) and other expenses (**USD 101.2 million**).

Table 4: Summary of Estimated Budget

S/n	Time frame	Major Activity	Amount USD
	Immediate term	TANESCO turn-around and preparations for short term	344,982,317
	Short term	Unbundling of Generation from Transmission and Distribution segments	386,885,807
	Medium term	Unbundling of Distribution from Transmission segment	414,478,645
	Long term	Introduction of Retail Competition market and preparation for Listing Generation and Distribution Companies at DSE	344,946,328
TOTAL AMOUNT			1,491,293,097

10.0 THE TIMELINE FOR IMPLEMENTATION OF THE ESI REFORM STRATEGY

This section presents the initial set of priority actions to be implemented between years 2014 to 2025. The recommended ESI reform is expected to be implemented gradually in a phased manner focusing on immediate, short, medium and long term needs. This section also presents the practical stages to implement activities identified in the Roadmap.

10.1 High-level ESI Reform Strategy Timeline

BRN Initiative targets provide that the reform process should start in the 2014/15 financial year and gradually transform the sector to a desired set-up. Therefore, evolution of long term market structure is phased in immediate term, short term, medium term and long term. **Table 5** below shows high level reform activities and time lines across all phases.

Table 5: ESI Reform Strategy Phases and Timeline

Immediate Term (Jul 2014-Jun 2015)	Short Term (Jul 2015 – Jun 2018)	Medium Term (Jul 2018 – Jun 2021)	Long Term (Jul 2021- Jun 2025)
Internal Turnaround	Partial Vertical Unbundling	Complete Vertical Unbundling	Full Vertical and Horizontal Unbundling
<ul style="list-style-type: none"> a) Establish a Task Force with a mandate to monitor the implementation of the Roadmap b) Establish a Transformation and Change Management Team (TCMT) at TANESCO to manage the reform process c) Initiate business processes review d) Carry out Management Information System Audit e) Increase electricity connection level from 24% to 30% f) Reducing system losses from 19% to 18% g) Establish separate accounting system for ring fenced units h) Carry out human capital needs assessment i) Improve TANESCO's financial performance j) Review Electricity Act, 2008 including Section 41(6) k) Institute capacity building programme to key institutions to support the new market structure l) Develop technology based Standard Power Purchase Agreement (PPA) model m) Develop Grid Codes to 	<ul style="list-style-type: none"> a) Unbundling of generation segment from transmission and distribution segments b) Approving generators to sell electricity directly to bulk off-takers c) Continue improving TANESCO's financial performance d) Designate Independent Market Operator (IMO) e) Increase electricity connection level from 30% to 33% f) Reducing system losses from 18% to 16% g) Setting up a mechanism and rules for the operation of a retail market for electricity by the regulator h) Establish market information desk for mobilization and dissemination of information 	<ul style="list-style-type: none"> a) Unbundling of distribution from transmission b) Determine optimal number of zones to be incorporated c) Strengthen the designated IMO to manage wholesale and retail electricity trading d) Increase electricity connection level from 33% to 39% e) Set up a mechanism and rules for the operation of a retail market o) Reducing system losses from 16% to 14% f) Provide oversight role for the retail market while prices are determined by the market forces 	<ul style="list-style-type: none"> a) Unbundling distribution segment into several Zonal distribution companies b) Prepare for listing of generation and distribution companies at the Dar es Salaam Stock Exchange (DSE). c) Establish ESI standards d) Reducing system losses from 14% to 12% e) Increase electricity connection levels from 39% to 50% f) Invest in human capital and trading systems in preparation for retail market operations

Immediate Term (Jul 2014-Jun 2015)	Short Term (Jul 2015 – Jun 2018)	Medium Term (Jul 2018 – Jun 2021)	Long Term (Jul 2021- Jun 2025)
Internal Turnaround	Partial Vertical Unbundling	Complete Vertical Unbundling	Full Vertical and Horizontal Unbundling
guide transmission and distribution system n) Designate Grid Control Center as Independent System Operator (ISO);			

10.2 ESI Reform Strategy Timeline - Detailed Activities

Tables 6 to 9 show detailed activities to be undertaken in the immediate, short, medium and long term respectively.

Table 6: Immediate Term (July 2014 – June 2015)

Major Activities	Components	Completion Date	Lead Responsibility	Other Parties Involved	Indicator
a) Establish a Task Force with mandate to monitor the implementation of the Roadmap	Formation of Tanzania Electricity Supply Industry Reform Team;	Aug, 2014	MEM	TANESCO, REA, Regulator	Task Force formed
b) Establish a Transformation and Change Management Team (TCMT) at TANESCO to manage the reform process	Transformation and Change Management Unit (TCMT) at TANESCO	Aug, 2014	TANESCO	TANESCO, REA, Regulator	TCMT formed
c) Initiate valuation of TANESCO's generation, transmission and distribution assets	Prepare for verification and transfer of assets and liabilities for separation of generation, transmission and distribution assets	Dec, 2014	MEM	TANESCO, Regulator, Treasury Registrar	Consultant engaged
d) Carry out management information system audit	Integrate management information system for integrated resource planning	Jun, 2015	TANESCO	TANESCO, MEM	MIS Audit Report in place
e) Improve TANESCO financial performance	Retirement of EPPs	Dec, 2014	MEM	TANESCO, MEM, MoF	Retirement of 205 MW
	Cleaning-up of TANESCO Balance Sheet	Continuous	TANESCO	MoF, MEM, Regulator, DPs	Reduced outstanding arrears
	Establish an	Jun, 2015	TANESCO	MEM	

Major Activities	Components	Completion Date	Lead Responsibility	Other Parties Involved	Indicator
	Electricity Infrastructure Procurement Coordinator (EIPC)				EIPC established
	Ring fence the core functions into strategic business units (SBU)	Dec, 2015	TANESCO	MEM	Financial Statements and operating reports in place
	Ring fence Dx into several zones	Dec, 2015	TANESCO	MEM	Financial Statements and operating reports in place
	Developing technology based Standard Power Purchase Agreement (PPA) model and Grid Codes	Sept, 2014	Regulator	TANESCO, IPPs	Standard PPA and Grid code established
f) Designate Grid Control Center as Independent System Operator (ISO);	Designate GCC as ISO	Dec, 2015	Regulator	TANESCO	GCC designated as ISO
g) Reviewing of the Electricity Act, 2008, in particular, Section 41(6)	Prepare proposal to amend Section 41(6) of Electricity Act, 2008.	June, 2015	MEM	TANESCO	Miscellaneous amendment submitted to the Parliament
h) Capacity building to MEM, TANESCO, REA and EWURA	Carry out human capital needs assessment	March, 2015	MEM	MEM, TANESCO, REA and Regulator	Human needs assessment report in place
	Establish training to support the new market structure needs	Jan, 2015	MEM	MEM, TANESCO, REA and Regulator	Training program established
i) Review tariff structure and develop of Grid Codes to guide transmission and distribution operations	Establish rules for non-discriminatory access to transmission network (Grid code)	Dec, 2015	Regulator	MEM	Grid Code operationalized

Table 7: Short Term (July, 2015 – June, 2018)

Major Activities	Components	Timeframe	Lead Responsibility	Other Parties Involved	Indicator
a) Continue improving the state owned utilities financial performance	Improving operational and financial performance	Mar, 2015	TANESCO	MEM, Regulator	Reduced GoT subsidy and system losses
	Improving financial management and accountability for each zone	Jun, 2015	TANESCO	MEM, Regulator	Financial Statements and operating reports in place
	Improve business management in regions	Sept, 2015	TANESCO	MEM	Regional Business Plan established
	Demand side management (energy efficiency)	Oct, 2015	TANESCO	MEM	Smooth system profile established
	Losses reduction (technical and non-technical) from 18% to 14%	Dec, 2016	TANESCO	MEM	System losses reduced by 4%
	Development management programme for senior and mid-level managers	Dec, 2016	TANESCO	MEM	Human Capital Development Programme established
b) Introduce third party access	Develop wheeling charges mechanism	Jan, 2016	Regulator	MEM	Wheeling charges Pricing Framework established
c) Designate Independent Market Operator (IMO)	Establish Independent Market Operator (IMO)	Mar, 2016	Regulator	MEM, TANESCO	IMO Operational Framework established
d) Increase electricity connectivity from 26% to 33%	Implement Turnkey II Projects	Dec, 2016	TANESCO	MEM, REA	Connection level increased by 7%
	Implement Underline Distribution Project	Dec, 2016	TANESCO	MEM, REA	
	Implement urban electrification projects	Dec, 2016	TANESCO	MEM, REA	
e) Unbundle generation from transmission and distribution	Establish Generation Company as a new corporate entity	Dec, 2017	TANESCO	Regulator, MEM	Independent Generation Company established
f) Establish market information desk	Establish market information desk at MEM	Mar, 2015	MEM	TANESCO, REA, Regulator	Information Desk established.
g) Preparations for establishing electricity retail market	Build capacity for electricity retail market operations	Dec, 2017	Regulator	Dx, MEM	Human and financial resources mobilized for the market

Table 8: Medium Term (July,2018 – June,2021)

Major Activities	Components	Timeframe	Lead Responsibility	Other Parties Involved	Indicators
a) Determine optimal number of zones to be incorporated	Evaluate performance of each zone for incorporation	Sept, 2018	MEM	MEM, Government power utilities Company	Zonal Office Performance Report
b) Unbundling of Distribution company from Transmission as a separate legal entity	Establish Distribution and Transmission as a separate legal entities	May, 2021	MEM,	Transmission and Distribution Companies, Regulator	Distribution Company established
c) Strengthen the designated IMO	Enhance capacity of the IMO to manage wholesale and retail electricity trading	Jun, 2020	IMO	MEM, Regulator	Human Capital Development Programme implemented
d) Increase electricity connectivity from 33% to at least 40%	Implement Underline Distribution Project	Jun, 2021	Distribution Company	REA, MEM	Increased connection level by 7%
	Implement urban electrification projects	Jun, 2021	Distribution Company	MEM	
	Implement distribution densification as per Energy Investment Prospectus	Jun, 2021	Distribution Company	REA, MEM	
e) Setting up a mechanism and rules for the operation of a retail market	Prepare retail tariff for power trading	Jun, 2021	Regulator	MEM, Distribution Company	Rules for Retail Market operational established

Table 9: Long Term (July, 2021 – June, 2025)

Major Activities	Components	Timeframe	Lead Responsibility	Other Parties Involved	Indicators
a) Establish ESI service standards	Develop ESI service standards	Jul, 2021	Regulator	MEM, TBS	ESI Service Standards established
b) Invest in human capital and trading system in preparation to retail market operations	Identify human resource and infrastructure requirements and prepare implementation plan	Jul, 2021	MEM	Distribution Company, Regulator	Human Capital Development Programme implemented
	Identify skills development requirements and prepare capacity development plan	Sept, 2021	MEM	Distribution Company, Regulator	Skills Gap Analysis done
	Set rules and	Jan, 2022	MEM	Distribution	Retail market

Major Activities	Components	Timeframe	Lead	Other Parties	Indicators
			Responsibility	Involved	
	mechanism for operation of retail market for electricity			Company, Regulator	rules established
	Prepare for verification and transfer of assets and liabilities for initial separation of zonal distribution companies	Jan, 2022	MEM	Distribution Company, Regulator	Documentation for asset transfer in place
c) Distribution company is unbundled into several Zonal distribution companies	Evaluate the performance of each zone for incorporation	Jun, 2022	Distribution Company	MEM, Regulator	Zonal Performance Assessment Report published
	Unbundle distribution company	Jan, 2023	Distribution Company	MEM, Regulator	Zonal Distribution Companies established.
d) Prepare Generation Company and Distribution companies for listing	Preparation of Prospectus financial statement	Jan, 2024	Generation company and Distribution companies	MEM, Regulator	Prospectus for listing Generation and Distribution Companies prepared
	Identify underwriter and strategic investor	Jan, 2024	Generation and Distribution companies	MEM, Regulator	Underwriters procured
e) Reduce losses (technical and non-technical) from 15% to 12% by 2025	Rehabilitate transmission infrastructure	Jun, 2025	Transmission Company	MEM, Regulator	System losses reduced to 12%
	Rehabilitate distribution infrastructure	Jun, 2025	Distribution companies	MEM, Regulator	
	Conventional meters replaced with prepaid meters with massive use of automatic meter reading system	Jun, 2025	Distribution companies	MEM, Regulator	
	Upgrade overloaded substations	Jun, 2025	MEM	Regulator	

Major Activities	Components	Timeframe	Lead Responsibility	Other Parties Involved	Indicators
f) Continue with urban and rural electrification to Increase electricity connectivity from 39% to 50% by year 2025	Implement distribution densification as per Energy Investment Prospectus	Jun, 2025	Distribution companies	REA, MEM	Electricity Connection level increased to at least 50%

11.0 IMPLICATION AND OUTCOMES OF ESI REFORM

The Roadmap provides a gradual approach to reforms based on prevailing conditions in the country. The expected outcomes include:

- a) Improved governance and performance of the electricity sub-sector through independent generation, transmission and distribution companies;
- b) Improved operational efficiency resulting from increased competition;
- c) Increasing investment from both private and public sectors to meet current and future demand for electricity;
- d) Increasing financial sustainability of the Electricity sub-sector hence reducing public expenditure on ESI;
- e) Increasing electricity connection and access levels;
- f) Improving efficiency and quality of service; and
- g) Promoting regional electricity trading.

Implementation of the Strategy and the Roadmap will ultimately contribute towards achieving the goals outlined in the Tanzania Development Vision 2025.

Powering Vision 2025

Middle income country

