UNITED REPUBLIC OF TANZANIA

MINISTRY OF ENERGY AND MINERALS

THE DRAFT NATIONAL ENERGY POLICY 2015

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TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AU	African Union
BCF	Billion Standard Cubic Feet
BICO	Bureau for Industrial Cooperation
CCTs	Cleaner Coal Technologies
CBOs	Community Based Organizations
CNG	Compressed Natural Gas
CSOs	Civil Society Organizations
CSR	Corporate Social Responsibility
EAC	East Africa Community
EAPP	Eastern African Power Pool
EIA	Environmental Impact Assessment
EITI	Extractive Industry Transparency Initiative
ESI	Electricity Supply Industry
ESRF	Economic and Social Research Foundation
EWURA	Energy and Water Utilities Regulatory Authority
FIT	Feed in Tariff
GDP	Gross Domestic Product
GHG	Green House Gase
GoT	Government of Tanzania
GW	Gigawatt
HIV	Human Immune deficiency Virus
kV	kilo Volt
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MEM	Ministry of Energy and Minerals
MW	Megawatt
MWe	Megawatt energy
NEP	National Energy Policy
NEPC	Nuclear Electricity Project Committee
NGOs	Non Governmental Organizations
OTEC	Ocean Thermal Energy Conversion
PPA	Power Purchase Agreement
PPP	Private Public Partnership
PSMP	Power System Master Plan
PV	PhotoVoltaic
RD&D	Research and Development and Dissemination
REA	Rural Energy Agency
REF	Rural Energy Fund
REFIT	Renewable Energy Feed in Tariff
REPOA	Research on Poverty Alleviation
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SPPA	Standardized Power Purchase Agreement
SPPT	Standardized Power Purchase Tariff
TAEC	Tanzania Atomic Energy Commission

TANESCO	Tanzania Electric Supply Company
TANROADS	Tanzania National Roads Agency
TBS	Tanzania Bureau of Standards
TCF	Trillion Cubic Feet
TPA	Tanzania Ports Authority
TPDC	Tanzania Petroleum Development Corporation
W	Watt
WHO	World Health Organization
WMA	Weight and Measures Agency
Wp	Watt peak

MEASUREMENTS AND CONVERSION FACTORS

MEASUREMENTS

Gigawatt-hour (GWh)	=	1,000,000 kilowatt-hour (kWh)
Megawatt-hour (MWh)	=	1,000 kilowatt-hour (kWh)
Megawatt (MW)	=	1,000 kilowatt (kW)

CONVERSION FACTORS

1 Watt-hour	=	3,600 Joules (J)
1 Tonne of Oil Equivalent (TOE)	=	42.7 Giga Joules (GJ)
1 Trillion Cubic Feet (TCF) of Natural Gas	=	172.5 million Barrels of Oil Equivalent

FOREWORD

Development is about increasing access to basic needs to allow people, the freedom of self-development hence eradicate poverty, ignorance and disease. Without the opportunity for all citizens to participate in the mainstream energy economy, the national and personal development is limited. The policy set a platform for promotion of equal development opportunities between urban and rural areas. At the present approximately 24 percent of households are electrified. Through an integrated programme incorporating inter alia grid and off-grid technologies, electrification programme has been sustained. Notwithstanding successes of the rural electrification campaign rolled out by Rural Energy Agency since 2007, more efforts are required to ensure many people have access to modern energy services.

The National Development Vision 2025 aims at transforming Tanzania into a globally competitive, newly industrialized, middle income and prosperous country. The Vision seeks to ensure a high quality of life to all citizens in a clean and secure environment by 2025. This vision is reflected in the country's long-term development strategy, Tanzania National Development Vision 2025, which identifies increased access to modern energy as one of the important pillars for socio-economic transformation. This is achieved on the fact that, adequate, affordable and reliable energy supply is a prerequisite for proper functioning of the economy and other social settings.

To achieve the desired objectives enshrined in Vision 2025 and marshal the people centred development, it is incumbent on the Government to present the National Energy Policy that will deliver adequate, reliable and affordable modern energy to all Tanzanians in a sustainable manner. The National Energy Policy, 2015 (the NEP, 2015) provides a comprehensive legal and regulatory framework and institutional set up aimed at improving the sector governance and performance.

The Ministry as in charge of energy sector will provide overall leadership, oversight guidance and policy directions in the implementation of this Policy. To achieve the desired targets, the Ministry will ensure that institutions in the sector are prudently managed. The private sector is currently involved in various economic activities in the energy sector. The Ministry shall continue to improve the investment environment to encourage more involvement of the private sector.

This policy is the product of an intense process in which a large number of dedicated people participated including Development Partners. I would like to convey my thanks for the hard work that you have put into this important project. I trust that your reward will be to see that the NEP 2015 that we implement in the future is the best one for our country's present and future generations. We want it to achieve the main goal of accelerating the socio- economic transformation of our country. I call upon all energy sector players both in public and private sectors to work together to ensure that the desired goals of this policy are achieved.

George B. Simbachawene (MP.)
MINISTER FOR ENERGY AND MINERALS

1.0 INTRODUCTION

1.1. Background

Tanzania is endowed with abundant energy resources including natural gas, hydro, coal, uranium, and renewable energies. To enhance energy security, mitigate climate change, generate income and create employment, energy resources have to be explored in a diversified manner. To exploit these resources efficiently and sustainably, the energy sector requires robust legal and regulatory framework as well as sound institutional set up.

The first National Energy Policy was formulated in 1992 as part of the overall socio-economic reforms the Government had embarked on in 1990s. To cope with changes in political, social and economical changes both nationally and internationally, in 2003 the National Energy Policy of 1992 was revised. The review aimed at liberalising the energy sector to respond to new challenges in the energy sector. The overall long-term objective of the policy was to establish an efficient energy production, procurement, transportation storage, distribution, and end-user systems in an environmentally sound manner with due regard to gender issues for sustainable socio-economic transformation.

Since 2003, the Government implemented several reforms that aimed at improving sector governance and performance. As a result the sector has registered an unprecedented demand for modern energy, change in technologies and priority shift in the use of energy resources. Despite the policies revision and reforms, the performance of the energy sector remained relatively below the desired levels. The NEP, 2015 has been formulated to among other things, unlock challenges prevalent in the energy sector, improve performance and spur prudent and optimal use of the energy resources for the benefit of the present and future generations.

1.2. Energy Situation in Tanzania

Energy sector play a critical role in the socio-economic development of a country. All productive sectors of the economy are driven by an adequate, reliable, affordable and sustainable energy supply. At the present, affordable, reliable and accessible electricity is identified consistently as a major constraint in achieving desired socio-economic transformation in Tanzania.

1.2.1 The Energy Resource potential

The energy resources base in Tanzania includes: oil and gas, coal, hydro, wind, geothermal, biomass and uranium.

The country has natural gas reserve of about 53.28 TCF (November, 2014) equivalent to 9.2 billion barrels of oil. This resource has not been fully developed because major discoveries have been made in recent years.

Tanzania has a sizeable coal reserve of about 1.9 billion tones of which 25% is proven. Geological information indicates that the potential could be to the tune of 5 billion tones. At the present, the small amount exploited is used for other industrial applications and not for electricity generation.

Only 12% of the hydro potential of about 4.7GW has been delivered. Tanzania has abundant solar insolation of about 200Wp/m² as it lies astride the equator. Tanzania has several sites with wind speed ranging from 5 to 9 m/s. Preliminary wind resource assessment shows that wind regimes in certain parts of Tanzania support commercial electricity generation.

Despite enormous energy resources, the traditional biomass mainly in the form of wood-fuel and agricultural and animal waste remained rampantly used for cooking. At the present, biomass resources potential for power generation is estimated at above 500 MW. Tanzania has also the longest Eastern African Rift Valley Systems with high geothermal potential. About fifty (50) sites have been identified with crude estimated potential of above 5000 MWe.

Tanzania has confirmed uranium deposits discovery in its various sites which in future can be used for power generation. To champion development of nuclear technologies, particularly for nuclear power generation, the Government has established the National Nuclear Power Strategy.

1.2.2 The Energy Demand and Supply

At the present, the energy balance in Tanzania is dominated by traditional use of biomass in the form of charcoal and firewood. About 70 percent of the Tanzanian population lives in rural areas and depends on agriculture activities[1]. The Agricultural sector contributes about 50 percent of the national GDP. At the present 24 percent of the Tanzanian population are connected with electricity. Only about 11 percent of the rural population is connected with electricity services. The government plans to increase the connectivity level to 30 percent by 2015; 50 percent by 2025 and at least 75 percent by 2033.

On average demand for electricity is growing at 10-15 percent per annum. To foster the desired socio-economic transformation, universal access to modern energy services in an affordable, reliable, sustainable and environmentally-friendly manner is inevitable.

1.2.3 The Electricity Supply Industry Strategy and Roadmap

To supplement previous reform strategies, the Electricity Supply Industry (ESI) Strategy and Roadmap 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. The 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 details activities that are necessary for reforms to be smoothly implemented.

[1] Tanzania Population and Housing Census, 2012

The ESI Reform Strategy and Roadmap provides an overview of Tanzania's electricity market structure in the next eleven years, 2014 – 2025. The Roadmap translates the ESI Reform Strategy into a plan for implementation of the proposed reforms. It serves as a straight-point to guide implementation of the reform process in the immediate, short and long term horizons. The Roadmap aims to: Increase investment from both private and public sector; Enhance private sector participation; Increase connection and access levels to electricity; Diversify sources of energy for electricity generation and supply; Enhance affordability and reliability of electricity supply; Reduce system losses; and Establish a competitive wholesale and retail electricity market.

NEP, 2015 seek to create a vibrant energy sector through improved legal and regulatory framework and appropriate institutional set up that will improve the sector governance and performance. In future for prudent management of energy resources, subsector specific policies, legal and regulation will be established.

2.0 JUSTIFICATION FOR THE POLICY REVIEW

2.1 Key Drivers of the Policy review

The NEP 2003 played an important role in guiding the development in the energy sector. One of its aims was to align itself with the overall macro–economic policy objectives and promote private sector participation in the sector. Some of the achievements registered during implementation of this policy include: the enactment of the Electricity Act (2008), the Petroleum Act (2008), the Rural Energy Act, 2005; the revision of the Model Production Sharing Agreement; the establishment of Standardised Power Purchase Agreement and Tariffs (2008); establishment of the Rural Energy Agency and Rural Energy Fund (2007); the establishment of Energy and Water Utilities Regulatory Authority - EWURA (2006); the establishment of Petroleum Importation Coordinator Ltd (2012). Other achievements include: increase electricity access from 10 percent in 2003 to 36.4 percent in 2014 and increased rural electricity connection from 2 percent in 2005 to 11 percent in 2014, and increase of Independent Power Producers and Small Power Producers; and major discovery of natural gas.

Despite these achievements, the sector still face a number of challenges which include: increasing access to modern energies, security of supply, reducing the cost of supply, environmental protection, research and development of appropriate energy technologies; increasing private sector participation in the energy sector, expanding energy sector infrastructure; raising necessary financing for energy projects and inadequate awareness of the benefits and methods of energy conservation and efficiency. Other challenges include inadequate legal and regulatory frameworks and institutional set up to govern the sector; data and information on energy resources; need for improved functional clarity on the planning, procurement and contracting of the energy sector projects, the need to recognise the cross cutting nature of energy sector and gender inequality in energy sector planning and decision making process.

These challenges define a nation's energy crisis and policy gaps in terms of legal and regulatory frameworks and institutional set up to spearhead the development of the sector. While it is clear that the essences of the 2003 policy objectives still remain valid, the social, political, environmental and economic situation has significantly changed both locally and internationally. Even more significantly, the government has formulated several policies and enacted legislation in other sectors which require addressing. The key drivers that for the policy review include other factors that necessitated the revision of the NEP 2003 include: the government desires to promote alternative energy sources to improve energy mix; global growing environmental concerns; creating easier entry for private sector participation; meeting growing demand for modern energies; improving governance and performance of the energy sector; accommodating National Vision 2025 goals, harmonising the NEP 2003 with other national, sectoral plans, policies and legislation; addressing challenges facing the energy sector; expanding energy infrastructure; and attracting private capital in the energy sector; promotion of universal access to modern energy services, and adapting technological progress in the energy sector.

The NEP 2015 spells-out government's intentions to improve the sector performance and governance to propel economic growth and reduce poverty. It communicates the

government's intended actions and the desirable future conditions of the energy sector in Tanzania. It seeks to actively mobilize the people and other resources towards improving sector performance and governance.

2.2 Expected Outcomes

The NEP 2015 reflects the vision of the government and the society in transforming the economy. Particular attention being given to the overall structure and mechanisms of the economy, the socio-economic development ambitions, priorities of the Tanzanian people, prudent use of scarce national resources. The formulation and implementation of this policy is expected to:

a) Increase access to modern energy services, particularly in rural areas;
b) Promote Security of supply of energy;
c) Encourage efficient production and utilization of energy resources;
d) Minimizes the negative environmental and health effects from energy production, conversion, transportation and use;
e) Reduce dependence on imported petroleum and switch to locally available energy supplies;
f) Promote cost reflective pricing mechanisms;
a) Increase sustainable production and utilization of renewable energies;
g) Develop mutually beneficial co-operation in the energy sector with other countries and international organizations; and
h) Promote cross-sectoral linkages.

2.3 Vision and Mission

2.3.1 Vision

Effective contribution of the energy sector in transforming the national economy from low to middle income country by 2025.

2.3.2 Mission

To create conditions for provision of secure, reliable, affordable, safe, efficient, cost-effective and environment friendly modern energy services to all.

2.4 OBJECTIVES OF THE NATIONAL ENERGY POLICY

2.4.1 The Main Objective

The main objective of the policy is to ensure availability of sufficient, reliable and affordable modern energy supplies and their use in a rational and sustainable manner.

2.4.2 The Specific Objectives

The specific objectives to realize the main objective are:

(i) Improving the security of supply through effective use of energy resources;
(ii) Promotion of energy efficiency and conservation in industries, transport, agricultural, residential and commercial building;
(iii) Promote private sector participation in the development and supply of modern energy services;
(iv) Promote rural electrification programmes to foster socio-economic transformations in rural areas;
(v) Ensuring the Government strategically participate in the up, mid and downstreams in the petroleum sub-sector;
(vi) Facilitate adoption of renewable energies technologies to increase its contribution to electricity generation mix;
(vii) Promotion of the cross-border electricity trading and regional interconnectors;
(viii) Improving energy sector planning through integrated plans;
(ix) Ensure that prices for energy services reflect costs of efficient operations in providing such services;
(x) Ensure that prudent environmental, social, health and safety considerations are factored in energy sector developments;
(xi) Promote energy research, development, training and local manufacture of energy plant, equipment, appliances and materials; and
(xii) Supporting efforts of combating HIV/AIDS and other infectious disease.

3.0 POLICY ISSUES AND STATEMENTS

3.1 ELECTRICITY

For many years electricity generation was depending on hydro. However, the generation mix has significantly changed following discovery and commercialisation of natural gas. The total installed electricity generation capacity is 1,591 MW (April, 2014). It is composed of hydro 562 MW (or 36 percent), natural gas 527 MW (or 33 percent) and liquid fuel 495 MW (or 31 percent). Independent and Emergency Power Producers (IPPs) own and operate power plants with a total installed capacity of about 417 MW.

Tanzania also imports electricity from Uganda 8 MW, Zambia 5 MW, and Kenya 0.85MW. To further reduce the cost of supply and minimise environmental impacts, Tanzania also plans to develop coal and uranium resources for electricity generation along with renewable energies. Major challenges facing the energy sector include improving the quantity, quality, reliability and security of energy supply; high initial capital outlay and the long lead times from feasibility studies to development of energy infrastructure; mobilizing adequate financial resources to undertake massive investments in the power sector; relatively high energy cost; low per capita incomes; and low levels of industrialization.

The annual demand growth for electricity averages 10-15 percent per annum. This growth has been propelled by increased socio-economic activities. By 2025, the peak demand is projected to be around 8,000 MW. Therefore, to meet such demand, the installed capacity must increase to at least 10,000 MW.

3.1.1 Generation

Issue: Meeting Growing Demand for Electricity Generation

Electricity generation in Tanzania is liberalized with several licensed private electricity power producers. For about two decades now, hydro systems supplied about 80 percent of electricity needs in the country. The discovery and commercialisation of natural gas in 2004 coupled with persistent poor hydrology significantly changed the generation mix. Several natural gas power generation projects are under development and their completion will add about 1,500 MW by 2017. This is likely to endanger the security of supply as it will mean shifting from hydro dominance to natural gas.

The Power System Master Plan (PSMP) 2012 Update shows improved generation mix in the order of priority using natural gas, coal, hydro, renewable energies and regional grid Interconnector projects. The nuclear energy will also be considered in future.

Objective: To enhance security of supply through effective use of available energy resources.

Policy Statements:

The Government shall:

i) Ensure cost reflective tariff for electricity services to attract both public and private sector investments;

ii) Ensure use of modern and efficient technologies in electricity generation;
iii) Ensure diversification of energy resources in electricity generation; and
iv) Ensure enabling environment for development of renewable energy, natural gas, coal and uranium resources for electricity generation;

3.1.2 Transmission Networks

Issue: The reliability and coverage of transmission networks.

The existing Transmission System comprises grid substations interconnected by transmission lines, utilizing system voltages of 220 kV; 132 kV; and 66 kV. The existing transmission system capacity is severely constrained particularly during peak hours due to aged infrastructure, high power technical losses, lack of proper rehabilitation and maintenance and system overload. Challenges for enhancing transmission networks include vandalism on transmission network; land and way-leaves acquisition.

Currently new high voltage transmission lines of 400 kV are being constructed to improve quality and reliability of electricity supply throughout the country by ensuring adequate evacuation capacity; reduce the cost of electricity to the consumer by absorbing the capital cost of transmission lines; provide interconnection links with the neighbouring countries in order to facilitate electricity trade in the region; reduce transmission losses; open up off-grid areas to link them to the national grid.

Policy Objective: To expand transmission networks for improved reliability and coverage.

Policy Statements:

The Government shall:

i) Ensure timely investments in construction, rehabilitation and expansion of the transmission infrastructure systems;
ii) Strengthen mechanisms for protection of transmission infrastructures;
iii) Support interconnection with neighbouring countries; and
iv) Establish appropriate legal and regulatory framework for an independent system operator;

3.1.3 Electricity Distribution Network

Issue: reliability and coverage of electricity distribution network

The distribution systems include 33kV, 11kV and 0.4kV lines, which entails receipt of bulk supply of electrical energy from generation and transmission networks for distribution to consumers. Achievement of national connectivity and access targets require expansion of power distribution networks. However, sharp increase in vandalism has considerably contributed in worsening the situation of electricity distribution infrastructure leading to a number of transformer failures and consequential power outages. . Efforts need to be done to enhance capacity, reliability, and quality of supply and reduce power losses. Such efforts

include refurbishment of existing distribution network, establishment of new substations, installations of new distribution transformer, construction of new lines, implementation of pilot distribution automation project; implementation of customer service improvement programs including installation of Automatic Meter Reading (AMR) for large customers and pre-paid meters for small to medium customers.

Policy Objective: To enhance reliability and coverage of distribution networks.

Policy Statements:

The Government shall:

i) Promote timely investment in expansion of power distribution networks
ii) Ensure efficiency in power distribution networks
iii) Emphasize use of licensed contractors in construction and maintenance of electrical distribution infrastructures;
iv) Promote acquisition and adoption of modern technologies in distribution networks;
v) Ensure reliability and reduction of power losses in the distribution networks; and
vi) Establish a framework to support open access to the distribution network.

3.2 Hydro Electric Power

Issue: The reliability of hydroelectric power generation

Despite huge potentials of hydro, at present it contributes only about 36 percent of the existing installed capacity. Challenges in developing hydro systems include vulnerability to hydrology and climate change; capital intensive; relocation and resettlement of affected persons; long lead time; inadequate hydrological data; and conflicting and competing land and water uses between various sub-sectors of the economy.

Policy Objective: To improve the reliability of hydro power generation.

Policy Statements:

The Government shall:

i) Encourage the private sector to develop hydro potential sites; and

ii) Enhance management systems in water catchment areas to improve hydro generation capacity.

3.3 Coal Resource

Issue: Utilization of coal resource for electricity generation.

Coal is one of the major energy resources of Tanzania. Exploitation for electricity generation has been minimal due to environmental concerns. At present industries marginally use coal for thermal applications, particularly in cement factories and agro-processing industries and coal briquettes for cooking are being promoted. However, application of coal briquettes in homes has been constrained by high heat content and gaseous emissions which unfortunately do not meet acceptable WHO indoor emission standards.

Other challenges include limited local expertise in coal exploration and mining; inadequate coal reserve data due to limited exploration; poor access routes to coal mining sites; inadequate legal, fiscal and regulatory frameworks for coal exploration, exploitation and development.

Policy Objective: To facilitate exploitation and development of coal resource for electricity generation and other thermal applications.

Policy Statements:

The Government shall:

i) Promote investments in exploitation of coal resources for electricity generation and other thermal applications;
ii) Promote development of appropriate infrastructure to support exploitation and development of coal;
iii) Encourage coordinated research in production of coal briquettes to meet acceptable standards;

iv) Enhance human and technical capacity for coal exploitation, mining and development;
v) Formulate appropriate legal, fiscal and regulatory framework for coal exploration, exploitation and development;
vi) Encourage market adaptation of efficient clean coal technology; and
vii) Encourage private sector participation in coal exploitation, mining and development through PPP.

3.4 Uranium Resource

Issue: Utilizing Uranium Resource for Electricity Generation.

The availability of uranium, which could be processed to provide fuel for nuclear power plants, suggests that uranium could become an option source for electricity generation. To develop nuclear electricity, Tanzania shall be guided by the International Atomic Energy Agency (IAEA) milestones. The critical need for nuclear energy is premised on the fact that, with the rising demand for power in the country due to the accelerated investment in the economy, it is one of the forms of energy that can produce enormous amounts of electricity at a relatively economical cost and in environmentally friendly manner.

Development of nuclear power plants is however limited by high upfront investment cost; concerns over proliferation of atomic weapons; high operation and maintenance costs as fuel waste is highly radioactive and attract global safety concerns; absence of requisite indigenous capacity, legal and regulatory frameworks for safeguarding safety and proliferation; waste management; and decommissioning of nuclear plants.

Policy Objective: To create an enabling environment for uranium resource exploitation and development for electricity generation.

Policy Statements:

The Government shall:

i) Strengthen expertise and skills of local personnel;
ii) Promote investments in exploitation of uranium resources for electricity generation;
iii) Promote research and development on nuclear power technologies and applications; and

iv) Facilitate establishment of nuclear power legal and regulatory frameworks.

3.5 OIL AND GAS

Ownership of oil and gas resources is vested to the people of Tanzania mainland, and must be managed in way that benefits the entire society.

The oil and gas industry in Tanzania is segmented into upstream, midstream and downstream which covers activities from exploration, appraisal, development, production, processing, transportation, distribution, marketing and utilization.

Despite registered developments, the industry requires effective institutional and legal frameworks to properly administer its operations. This requirement must be complemented by the following:- human resource with the requisite skills, attitude, discipline and knowledge; mechanism for creation of an environment to attract local and foreign investment; adequate and reliable infrastructure; secure and safe operations; trusted and a transparent mechanism for the sound management of respective revenue; instituting required health, safety and environmental standards; and management of expectations and conflicting views of stakeholders.

3.5.1 Management of Oil and Gas Resources and Operations

Issue: Managing revenue generated from oil and gas.

Tanzania commenced exploring for oil and gas in 1952. At present significant amount of natural gas has been discovered. Large areas of sedimentary basins in the rift basins, onshore

and offshore remain under-explored due the high cost of obtaining preliminary data necessary for setting clear plans for licensing open acreages. It therefore important to put in place clear programmes for data acquisition, mechanisms for licensing and development of discovered gas and oil resources.

The Government recognizes the importance of promoting effective revenue management to ensure that petroleum support socio-economic transformation in a balanced growth and sustainable manner. The Policy promotes openness and transparency and dissemination of information to stakeholders to aid decision making process.

Objective: To manage oil and gas resources transparently and effectively.

Policy statements

The Government shall:

(i) Ensure efficient, competitive and transparent licensing mechanism;

(ii) Ensure efficient exploitation of oil and gas resources;

(iii) Develop mechanisms for sharing and managing petroleum revenues;and

(iv) Ensure good governance, transparency and accountability in the oil and gas industry.

3.5.2 Oil and Gas Infrastructure Development

Issue: Investing in gas and oil.

Oil and gas infrastructure include wells, flow lines, processing and refinery facilities, liquefaction, regasification, offloading platforms, transportation, distribution pipelines and storage facilities.

At present Tanzania imports all refined petroleum products for domestic consumption. The existing infrastructure is geared towards receiving the imported products. However, in case of oil discovery, petroleum midstream and downstream infrastructure will be required. Construction and ownership of major infrastructure requires substantial amount of capital and appropriate planning.

The Government envisages participating strategically in developing all major infrastructures in the mid- and down-stream to ensure maximization of revenue and reliability of services to the domestic market.

Objective: To participate strategically in oil and gas infrastructure investment.

Policy statements

The Government shall:

(i) Ensure timely and coordinated investments in oil and gas infrastructure; and

(ii) Provide incentives for private investors to develop oil and gas infrastructures.

3.5.3 Domestic Market Obligation

Issue: Having sufficient resources for local consumption.

Oil and gas are country's potential natural resources with various uses including thermal applications in industries, transportation, institutions, and households; electric power generation; and as a raw material for production of various products.

Despite huge discoveries of natural gas, Tanzania is striving to undertake further exploration activities in search of oil. In this regard, there is a need to promote domestic utilization of oil and gas based products which include, Liquefied Petroleum Gas (LPG), gasoil, gasoline, kerosene, Liquefied Natural Gas (LNG), Compressed Natural Gas (CNG) and petrochemicals.

Therefore, there is a need to put in place a mechanism for ensuring that domestic market is prioritized over export market.

Objective: To enhance reliability of supply and utilization of oil and gas products for domestic market.

Policy statements

The Government shall:

(i) Ensure development of a competitive domestic market for oil and gas products; and

(ii) Ensure security of supply to meet domestic demand.

3.5.4 Local Content and National Participation

Issue: Benefiting from investment along the oil and gas resources value-chain.

Local content and national participation in the oil and gas value chain include investment in operation, provision of goods and services, capacity building, local engagement, skills development, local authorities awareness and investors' corporate social responsibilities.

The risks associated with oil and gas exploration and development together with inadequate financial, human and technological resources in the country are constrains in attaining national participation. A balance between these issues is therefore needed in order to promote the right kind, timing and level of national participation.

As the oil and gas resource base and its operations continue to expand, building local capacities and competencies reduces costs of operations and enhance technological and operational efficiency within the sub- sector.It is important to develop and maintain a sound and trustworthy relations between business and the community. It is in the interest of all parties to address or mitigate the negative perceptions and maximize the positive effects.

The companies implementing projects and activities in the oil and gas industry are therefore expected to contribute positively to the development process of the local communities by focusing their Corporate Social Responsibility activities to address the most pressing needs of the neighboring communities.

Objective: To increase local participation to maximize benefit from oil and gas value-chain.

Policy statements

The Government shall:

(i)	Ensure Tanzanians participate strategically in the oil and gas value chain;
(ii)	Ensure priority is given to Tanzanians towards procurement of goods and services;
(iii)	Ensure capacity building and skills development for Tanzanians in the oil and gas industry; and
(iv)	Ensure implementation of Corporate Social Responsibility initiatives have significant impacts to prioritized needs of local communities.

3.6 RENEWABLE ENERGIES

Tanzania has a huge resource base of renewable energies which include wind, solar, biomass, mini-hydro, geothermal, tidal waves, and ocean thermal conversion. Renewable energy technologies currently in use in the country include solar thermal, solar photovoltaic (PV), wind, bio-gas, liquid-biofuels, biomass based cogeneration and gasification.

3.6.1 Solar Energy

Issue: Scaling-up application and utilisation of solar energy technologies.

Solar energy can be used for lighting, heating, drying and generating electricity. Tanzania's geographical location astride the equator gives it unique opportunity for a vibrant solar energy market. The country receives good solar insolation all year round estimated at 200Wp/m².

Solar utilisation is constrained by insignificant use of solar energy for commercial and domestic applications relative to the potential; high solar systems cost despite tax incentives; erosion of consumer confidence because of inappropriate system standards, faulty

installations, importation of sub-standard systems and poor after sales service; rampant theft of solar photovoltaic panels, which discourages their installation; lack of awareness on the potential, opportunities and economic benefits offered by solar technologies, and appropriate credit and financing mechanisms .

Policy Objective: To facilitate scaling-up of application and utilisation of solar energy technologies

Policy Statements:

The Government shall:

i) Promote electricity generation from solar energy for grid connections and off-grid application;
ii) Provide a framework for connection of electricity generated from solar energy to national and off-grid;
iii) Create awareness on potential opportunities and economic benefits offered by solar energy technologies;
iv) Provide incentives to promote production and use of efficient solar systems;
v) Develop local SMEs for solar equipment production and installation
vi) Establish standards for solar energy technologies; and
vii) Promote integration of solar energy technologies in building and industrial designs

3.6.2 Wind Energy

Issue: Utilization of wind for energy generation

Wind energy uses naturally occurring energy of the wind for social and economic purposes like generating electricity and mechanical works such as milling and water pumping. Tanzania has some proven wind regime sites for commercial electricity generation.

Assessment and confirmation of potential suitable sites for wind electricity generation in the country has attracted more investment interests. However, inadequate wind regime data is still a bottleneck for investment in wind power generation. High costs of investments in wind electricity generation remains high and its integration and compatibility to the grid system is challenging given its intermittence nature. Most potential areas for wind electricity generation are far away from the grid and load centers hence requiring high capital investment for transmission and distribution lines.

Policy Objective: To enhance wind utilization for electricity generation.

Policy Statements:

The Government shall:

i) Provide a framework for connection of electricity generated from wind energy to national and isolated grids;
ii) Enhance capacity building on wind technologies to provide support services;

iii) promote wide spread use of wind energy ;
iv) Promote technology transfer and development of wind technology standards ; and
v) Promote the use of hybrid power generation systems involving wind and other energy sources.

3.6.3 Small Scale-Hydro Power

Issue: Utilizing small hydro potential for electricity generation

Tanzania has considerable potential of small hydropower (capacity of less than 10MW). Utilisation of small hydro power has not been optimally realized due to inadequate hydrological data; competing interests between developing the sites and usage of land and water resources by the affected communities and institutions; inadequate technical capacity to design, construct, operate and maintain the projects; lack of transmission infrastructure; and lack of facilities to match load demand with the electrical output.

Other challenges are vandalism of electric power infrastructure; tariffs charged do not generate sufficient revenues to cover capital as well as operation and maintenance costs of the projects; inappropriate standards, legal and regulatory regime, destruction of catchment areas threatens long term viability of small hydro power projects and inadequate financial resources and technical personnel for carrying out feasibility studies and development of sites.

Policy Objective: To enhance small hydro resource contribution to generation mix.

Policy Statements:

The Government shall:

i) Promote development of small hydro for power generation and mechanical uses.;
ii) Provide incentives for public and private investments;
iii) Facilitate mapping of potential small scale hydro power sites; and
iv) Promote development of local capacity on development of small hydro projects.

3.6.4 Geothermal Resource

Issue: Geothermal exploration and development risk

Tanzania is transacted by East African Rift Valley Systems with high geothermal potential. Whilst the potential of most of the springs has not been examined in great detail, analysis of available data points to good prospects for exploiting geothermal in most parts of the country. At present there is no geothermal power generation.

The challenges in developing geothermal resource are high upfront investment costs; long lead time from conception to production of electricity; capital intensive and high exploration

risky inadequate human and capital resource to undertake necessary studies; remote location and limited infrastructures.

Policy Objective: To enhance geothermal resources governance and mitigate exploration and development risks.

Policy Statements:

The Government shall:

i) Establish institutional, legal and regulatory framework for geothermal development;
ii) Establish mechanism for risk mitigation in geothermal exploration
iii) Encourage private sector investment in geothermal development;
iv) Facilitate capacity building in exploration and development of geothermal resources;
v) Facilitate the availability of infrastructure for deployment of geothermal;

vi) Develop a mechanism for public private partnership in geothermal exploration production (development).

3.6.5 Biomass Energy

Biomass is organic material of biological origin constituting a renewable energy source such as energy derived from plants and animals. Biomass exists in three forms:- liquid, gaseous and solid. Liquid biomass covers waste oil, straight vegetable oil, biodiesel and bioethanol. Gaseous biomass includes biogas, landfill gas and producer gas. Solid biomass covers firewood and charcoal, agricultural residues and animal waste.

Tanzania has considerable sources of biomass including agricultural and forest bio-residues which in combination with the woodlands, meet the majority of household energy needs. Biomass is by far the most important source of energy in Tanzania accounting for about 90 percent of the total energy consumption.

Modern use of biomass entails generation of electricity through biochemical and thermochemical technologies. So far a number of sugar factories and wood industries are employing co-generation (combined heat and power) to produce electricity for own use and export excess to the national grid.

Biogas has potential of being used as fuel in combustion engines, which convert it to mechanical energy, powering an electric generator to produce electricity. Only few of the plants installed in Tanzania are destined for electricity production. Power generation from biogas has become the focus of support of development partners in recent years in Tanzania. There are some inconsistent efforts from different organisations of generating electricity from agricultural wastes such as sisal wastes and rice husks. The initial efforts for electricity generation from biomass should be further promoted as a new and diversified electricity sources.

Objective: promote and scale up efforts of bio-electricity generation.

Policy Statements

The government shall;

i) Promote the development of biomass for power generation.;
ii) Provide incentives for public and private investments;
iii) Facilitate R&D in conventional of biomass to be used as modern energy in households, industries and transport; and
iv) Promote development of local capacity on development of biomass energy

3.6.6 Solid Biomass

Issue: Reliance on traditional use of solid biomass fuels sources

Increasing demand for solid biomass fuels for cooking coupled with traditional cooking methods, use of inefficient stoves and dwindling supply have led to environmental degradation and created energy scarcity to the majority, both in rural and urban areas.

The annual per capita consumption of biomass fuels in Tanzania is about 1.0 m^3. To meet current solid biomass demand people are forced to over harvest existing natural resources leading to estimated annual deforestation rate of about 110,000 hectares.

Objective: To enhance production and rational use of solid biomass resources.

Policy statements

The Government shall:

(i) Promote efficient conversion and use of solid biomass;
(ii) Encourage sustainable production of solid biomass;
(iii) Promote and enhance fuel-switch from wood fuel to other sources for cooking;
(iv) Promote modern use of solid biomass for generation of electricity;
(v) Create awareness and develop capacity for bio-electricity generation; and
(vi) Provide incentives for private investment in bio-electricity generation

3.6.7 Liquid Biomass

Issue: Sustainable development and exploitation of liquid biomass potentials

Unlike other renewable sources, biomass can be converted directly into liquid fuels (bio-fuels) to meet transportation needs. Use of bio-fuels would reduce vehicle emissions and save on foreign exchange required for importing petroleum products while improving the balance of trade and creating employment. However, commercial extraction of bio-fuel will require large land to be set aside for the production of energy crops as feedstock for bio-fuels. This calls for formulation of strategies to optimize and harmonize land-use policy with the energy policy.

Challenges associated with bio-fuels development include: insufficient feed-stocks to produce bio-fuels, limited research information on feed-stock production; insufficient legal and institutional framework to support sustainable generation, production, distribution, supply and use of liquid bio-fuels; insufficient supply of bio-fuels for blending due to competing uses. Other challenges include threat of competition over land use; food insecurity; reliance on slow maturing crops and dependence on rain fed agriculture; and lack of knowledge among the public on the economic viability of growing crops for bio-fuel.

Development of a liquid bio-fuel industry will have both potential negative and positive impacts on environment. In order to minimize negative impacts to environment and biodiversity, production of liquid bio-fuel feedstock has be excluded in ecologically sensitive areas, wetlands of ecological importance, forests and protected areas.

Objective: To enhance sustainable production and use of liquid bio-fuels.

Policy statements:

The Government shall:

(i) Create awareness on importance and viability of bio-fuel potential;

(ii) Promote feedstock production in mapped and zoned areas in the country;

(iii) Ensure food security by balancing food production over liquid bio-fuel production;

(iv) Promote security over land to avoid land use conflicts related to bio-fuels development;

(v) Promote value addition in liquid bio-fuels value chain for domestic and export markets;

(vi) Encourage small scale initiatives on the production and use of bio-fuels;

(vii) Promote modern use of liquid biomass for generation of electricity;

(viii) Create awareness and develop capacity for bio-electricity generation; and

(ix) Provide incentives for private investment in bio-electricity generation

3.6.8 Gaseous Biomass

Issue: Production and utilization of gaseous biomass for provision of energy services.

Gaseous biomass from bio-wastes which include: animals, agricultural residues and municipal wastes have potential to contribute to provision of energy services. Tanzania is estimated to have 44 million livestock potential for providing feedstock for biogas and other bio-products. Conversion of the bio-wastes into gaseous biomass, if efficiently exploited, can enhance availability of energy for cooking; lighting and other energy uses while mitigating waste management problems, environmental conservation and production of manure for agricultural use.

Wider dissemination of the biogas technology has not been adequately implemented due to high initial costs and lack of awareness in the communities. There have been no development of biogas standalone generation of electricity which could spark development in the areas that are not connected the national grid network.

Objective: To promote production and utilization of gaseous biomass

Policy statements:

The Government shall:

(i) Promote proper management of bio-waste feed-stocks for power generation and waste management;

(ii) Create awareness on the importance of gaseous biomass as an alternative fuel;

(iii) Promote use of innovative technologies for production and utilization of gaseous biomass;

(iv) Ensure enabled environment for production and utilization of gaseous biomass;

(x) Promote modern use of gaseous biomass for generation of electricity;

(xi) Create awareness and develop capacity for bio-electricity generation; and

(xii) Provide incentives for private investment in bio-electricity generation

3.6.9 Municipal Waste

Issue: Utilisation of municipal waste as a source of energy.

Municipal waste consists of solid waste including biodegradable and non-degradable wastes such as containers food scraps, yard waste and inorganic waste from households,, institutions and businesses, wastes generated by manufacturing, agriculture, mining and construction and demolition debris, as well as sludge and liquid waste from water and wastewater treatment facilities, septic tanks, sewerage systems and slaughter houses.

In order of preference, municipal waste can be managed by reduction of its production at source; reuse and/or recycling; treatment to destroy or reprocess waste to recover energy or other beneficial resources if the treatment does not threaten public health, safety, or the environment; or dumping and disposal. Most of municipal wastes and sewerage in Tanzania are disposed in poorly managed locations and dump sites. With appropriate waste-to-energy conversion technologies, municipal wastes and sewage can be used to provide energy while helping to clean the environment. Challenges of using municipal wastes and sewage as source of energy include inadequate legal, regulatory and institutional framework for exploitation; inadequate data and information on potential of municipal wastes and sewage to energy; and lack of incentives for its exploitation. If full exploitation of wastes is to be realized, further investment will be required in technology development and effective waste collection management systems.

Policy Objective: To promote efficient use of municipal wastes and sewage as alternative energy sources.

Policy Statements:

The Government shall:

i) Create awareness on benefits of using municipal wastes and sewage as alternative energy sources;
ii) Promote development of effective waste collection management systems.;
iii) Promote technology and capacity development for exploitation of municipal wastes and sewage for electricity generation; and
iv) ;
v) Ensure enabling environment for municipals and private sector to invest in electricity generation from municipal wastes and sewage.

3.7 Rural Energy and Access to Modern Energy Services

Issue: Availability, accessibility, and reliability of modern energy services in rural areas.

The Government established the Rural Energy Agency to accelerate the pace of rural electrification in the country. The implementation of REA Programme increased rural connectivity levels to 7 percent in 2013 from 2 percent in 2007. At the present 36.4 percent of the Tanzanian population have access to electricity services with overall national connectivity rate of 24 percent. The government plans to increase the connectivity level to 30 percent in

2015; 50 percent in 2025; and 75 percent 2033. The major barriers toward improving rural electricity connectivity include: absence of national grid in large part of the country, high cost of delivering electricity to rural areas, high upfront investment costs; scattered settlements in the rural areas leading to long and costly distribution lines.

Other challenges are harsh terrains and inaccessibility due to underdeveloped infrastructure leading to high cost of rural electrification projects; high operating costs of grids in rural areas due to low population density; acquisition of way-leaves due to high land compensation demands and vandalism of power infrastructure; underdeveloped markets due to low purchasing power, limited technical and financial capacity of indigenous entrepreneurs; and low awareness among key stakeholders on opportunities of investing in rural areas.

Policy Objective: To facilitate availability of reliable modern energy services for social and economic transformation in rural areas.

Policy Statements:

The Government shall:

i) Establish Rural Electrification Master Plan;
ii) Strengthen the institutional capacity for effective facilitation, administration and monitoring of the modern energy services;
iii) Facilitate private sector participation including self-help groups in provision of modern energy services by providing fiscal incentives to both producers and users;
iv) Promote and facilitate adoption of appropriate modern energy technologies and enforce compliance with set standards;
v) Collaborate with development partners for specific programmes especially in areas less attractive to the private sector;
vi) Promote participation of financial institutions in provision of funds for development of rural energy projects;
vii) Build appropriate local capacity for manufacture, installation, maintenance and operation of appropriate energy technologies in rural areas; and
viii) Reduce connection charges by providing connection subsidy to make electricity connection more affordable.

3.8 Energy Efficiency and Conservation

Energy efficiency and conservation refers to measures aimed at reducing energy consumption without sacrificing productivity, level of service or increasing costs. Thus energy efficiency and conservation have the potential to scale down capital investments needed to provide additional supplies and reduce overall resource use as well as reducing cost of production at the end user level. There is a tendency for consumers not to embrace energy efficiency and conservation best practices as long as there is good supply of energy for current use. There is also limited technical capacity, training and expertise in energy management and conservation. Inadequate financing owing to challenges in sourcing funds and credit mobilization for energy efficiency and conservation projects are impediments to investment in this area.

Present challenges as far as rational use of energy is concerned are related to inadequate awareness of the potential benefits from efficient use and utilization of energy efficiency and conservation practices, technology and appliances as well as non-existence of legislation and regulatory framework for energy efficiency and conservation.

3.9 Energy Efficiency in Industries

Issue: Massive energy wastage in Industries

Industrial sector is one of the major consumers of energy, particularly electricity and petroleum. In most industries, energy is used inefficiently due to old equipment and outdated technologies as well as lack of awareness and capacity. Most industries in Tanzania have neither energy management policies nor structured continuous energy management systems in place. Therefore, implementation of energy efficiency initiatives is on a sporadic or ad hoc basis only when an opportunity is targeted or when equipment needs replacement or renovation.

Due to significant energy losses in the industrial sector, there is a necessity to promote energy management and encourage energy efficiency and conservation measures. National energy management system standards need to be in place to guide energy management in industries particularly for intensive energy users.

Based on technology, benchmarking energy consumption needs to be undertaken for industries and used as a tool for rewarding efficient or penalizing inefficient energy uses. Energy audits should be integrated in energy management system and made mandatory for intensive energy users including cost effective implementation of level of audit recommendations in certain period and could possibly become part of the corporate reporting to licensing authorities.

Policy Objective: To promote energy efficiency and conservation practices in industries

Policy Statements

The Government shall:

i) Facilitate awareness raising and capacity building to promote industrial energy efficiency;
ii) Develop energy management systems and promote energy management in industries;
iii) Ensure that energy audits are mandatory and inefficiency areas identified in the audits are addressed;
iv) Promote establishment of energy advisory services;

v) Ensure provision of appropriate fiscal and other incentives to exploit energy efficiency and conservation opportunities; Ensure energy uses in industries are benchmarked to international best practices; and
vi) Introduce time-of-use tariff for industries.

3.10 Energy Efficiency in Residential and Commercial Sectors

Issue: Thermal efficiency and wasteful energy

Energy used for cooling, heating and lighting is directly related to the building design and materials; efficient level of appliances in use; the occupants' needs and behaviours; and the surrounding micro-climate. However, buildings are characterized by low thermal efficiencies and wasteful heating and cooling systems. Majority of appliances used are below average international energy efficiency standards.

New buildings are also being built without consideration for efficient energy use at design stages. Majority of modern buildings in Tanzania are replicas of buildings designed for the western world which has different climatic condition. As a result, buildings are reliant on artificial means for indoor comfort accompanied by increasing energy use, particularly electricity consumption.

If energy efficiency in buildings is therefore not addressed, efforts to provide enough and reliable energy particularly electricity will continue to be undermined by rapid increase in uncontrolled demand from building sector. To address this, energy efficiency measure need to be mainstreamed into housing policies, building codes and building practices in the country. Minimum energy performance standards need to be established and promoted. Awareness, capacity building and integration of renewable energy into buildings are important elements.

Policy Objectives: To promote energy efficiency and conservation measures in residential and commercial sectors.

Policy Statements

The Government shall:

i) Ensure integration of renewable energy and energy efficiency aspects in housing policies and building codes;
ii) Ensure establishment and promotion of minimum energy performance standards for appliances;
iii) Ensure awareness and capacity building to stakeholders;
iv) Promote energy audit in commercial buildings; and
v) Establish mechanisms for monitoring energy use in commercial buildings.

3.11 Energy Efficiency in Transport Sector

Issue: Efficient use of energy in the transport sector.

The transport sector consumes a large share of total volume of petroleum products imported in the country. Increased petroleum use in the sector, has both direct and indirect implications for the total energy consumption and social-economic growth. The existing challenge in the sector is how to ensure efficient use of petroleum products which is determined by driving

behaviors, standard of vehicles and age, the quality of the transport systems and the mode of transport. Presently, urban public transport systems are unreliable which prompt people to prefer use of private transport. It is therefore, necessary to improve mass transport systems and promote mode shift from private to mass transit mode of transport.

Poor transport infrastructure causes traffic congestions which results in high fuel consumption and air pollution. Good infrastructure is vital for the efficient use of energy. It is also important to explore for possibilities of fuel switch to other forms of energy such as electricity, ethanol and compressed natural gas.

Objective: To promote energy efficiency and conservation in the transport sector

Policy Statements

The Government shall:

(i) Promote fuel switch from petroleum to other alternative fuels;

(ii) Promote transport mode shift from private to mass transit;

(iii) Promote energy efficiency awareness to transport stakeholders;

(iv) Encourage development of energy efficient transport infrastructure; and

(v) Ensure regulatory frameworks for application of energy efficient transport equipment and machineries.

4.0 CROSS CUTTING POLICY ISSUES

4.1 Transparency and Accountability

Issue: Increasing Transparency and Accountability in the Management of Energy Sector.

To achieve the desired level of transparency and accountability in the energy sector, collaboration among stakeholders is important particularly with respect to information sharing and dissemination. To further promote transparency and accountability, the Government has joined the Extractive Industry Transparency Initiative (EITI) to among others, enhancing accountability and transparency in planning, procurement and contracting of goods and services in the energy sector.

Policy Objective: To promote and monitor transparency and accountability in the energy sector.

Policy statements:

The Government shall:

i) Encourage competitive least cost procurement of goods and services in the energy sector; and
ii) Develop transparency and accountability framework in the energy sector.

4.2 Health, Safety and Environment

Issue: Sound practices in environmental, health and safety management.

The production and consumption of energy, if not well managed endangers the quality of life of the present and future generations. Energy activities such as uncontrolled use of wood fuel, combustion of fossil fuels; construction of hydropower dams and marine pipeline can negatively impact on the ecological and environmental systems. Application of cleaner production technologies and environmental friendly technologies that reduces greenhouse gas emissions is encouraged.

Subjecting the energy projects to Environmental Impact Assessments (EIAs) and enforcing regulations based on the Polluter Pays Principle are promoted. Adherence to good industry standards and practices will contribute significantly to mitigating the adverse effects of energy activities on environment. Regulations of these operations are necessary to ensure that energy activities are conducted taking into account environment, health and safety issues.

Policy Objective: To promote environmental protection, health and safety management in the energy sector.

Policy Statements:

The Government shall:

i) Ensure that health, safety, environmental and biodiversity issues are

mainstreamed into all operations of the energy industry;
ii) Ensure compliance to health, safety and environmental protection in the energy industry;
iii) Promote disaster prevention and response plans in the energy sector.

4.3 Research and Development and Capacity Building

Issue: Coordinated researches for energy sector development

Research, Development and Dissemination (RD&D) as well as human resource capacity development enhancement are important to the development of the energy sector. Sustainable energy resources management is largely dependent on maintaining and developing capability in the field of energy research.

It is through researches that new ideas and technologies are developed to shape the energy sector. To achieve this objective there is need to build capacity in the energy sector in order to support the legal and institutional frame work as provided in this policy. Challenges in energy sector development includes lack of institutions research coordination and appreciation of research findings, absence of a National Energy Institute for research and human resource development; inadequate funding for RD&D; limited research activities; inadequate promotion of local content in energy technologies and inadequate linkage between local industries and academic institutions.

Policy Objective: To enhance research based decision making and capacity building in the energy sector

Policy statements:

The Government shall:

i) Establish a National Energy Research Centre;
ii) Facilitate interdisciplinary and participatory research approaches;
iii) Promote regional and international energy technologies research;
iv) Create an enabling environment to attract private sector funding in research and human resource development; Enhance coordination between RD &D institutions and energy industries ; and

v) Facilitate capacity building programmes for the energy sector development.

4.4 Energy Financing, Pricing and Subsidy regime

4.4.1 Energy Financing

Issue: Mobilization of financial resources for implementation of energy programmes and projects

Energy sector programmes and projects are capital intensive. This has made traditional financing methods inadequate to meet the unprecedented demands for capital to finance energy sector expansion. In recognition, many countries are opening up their energy sector to

private investment; and undertaking sectoral reorganizations and tariff reforms. An augmented role of private finance requires a continuing collaboration of public sector, private sector and development partners.

Challenges in energy projects development include inadequate funding for the energy sector; lack of continuity in the funding of projects in the energy sector; low foreign investment from a highly competitive international finance market; partial adoption of the most cost- effective energy supply options for the country; low foreign exchange earnings through export of energy products and inadequate local development of energy technologies. However, the Government shall set up a consolidated Energy Fund and continue to encourage private sector investments in the energy sector by attracting foreign direct investment and promoting long-term domestic financing arrangement.

Policy objective: To enhance mobilization of financial resources

Policy statements:

The Government shall:

i) Establishing a favorable investment climate to attract private investments in the energy sector;

ii) Ensure a fair and reasonable return on investments through cost-effective energy pricing; and
iii) Strengthern collaboration with development partners
iv) Establish a consolidated energy fund to pool financial resources to provide capital funding for energy projects.

4.4.2 Energy Pricing

Issue: Efficient and effective energy pricing

A fair and equitable pricing regime is important for the sustainability of the energy sector. Tanzania has adopted cost-recovery method for energy pricing. Challenges in energy pricing include: affordability from consumers side, fluctuations of exchange rates, inflation, efficient operations of service providers and authentication of energy pricing from Independent Power Producers. The Government need to ensure that energy charges are stable and support efficient business operations, allow licensees to recover a fair return on their investments and enhance efficiency in production and consumption.

Policy Objective: To ensure efficient and cost reflective energy pricing.

Policy statements:

The Government shall:

i) Ensure prudent and cost reflectiveenergy charges;

ii) Monitor and ensure timely implementation of energy projects in accordance with Power System Master Plan (PSMP);

iii) Create conducive and enabling environment towards achieving affordable prices for energy products and services; and
iv) Ensure prudent procurement of new energy projects, equipment, machineries and energy infrastructures through competitive bidding processes.

4.4.3 Renewable Energy Feed-In-Tariff

Issue: Technology based Feed-In-Tariffs for electricity generation from renewable energy sources

A Feed in Tariff (FIT) is an instrument of promoting electricity generation from renewable energy sources. It enables producers to generate and sell the electricity to a distributor at a pre-determined fixed tariff for a given period of time. The Standardized Power Purchase Agreement (SPPA) was formulated in 2008 based on avoided costs regime with no consideration to technologies specifics. Since then, submissions from potential investors point to generation tariffs higher than the Standardized Power Purchase Tariff (SPPT) due to high cost of generation equipment and financing particularly from connection to the National Grid.

To attract private sector investment, a realistic Feed in Tariff and technology has to be undertaken. The FIT aims at facilitating resource mobilization by providing investment security and market stability for investors in electricity generation from renewable energy sources; reducing transaction and administrative costs and delays by eliminating the conventional bidding process and encouraging private sector investors to operate their plants prudently and efficiently so as to maximize returns. Challenges associated with feed in tariff include: insufficient data to inform the level of tariffs for different technologies; and lack of clear technology based guidelines for pricing and tariff structures.

Policy Objective: To attract investments in electricity generation from renewable energy sources

Policy Statements

The Government shall:

i) Develop technology based instruments and guidelines for pricing and tariff structures to support the integration of renewable energy into the grid systems;
ii) Ensure extension of existing financial support systems;
iii) Create awareness on renewable energy Feed-in-Tariff; and
iv) Establish a mechanism to acquire relevant data and information for determination of renewable energy Feed-in-Tariffs.

4.4.4 Energy Subsidy Regime

Issue: Sustainable subsidy regime for buying down capital costs and enhancing affordability of energy products and services.

Subsidies are designed to overcome distortions and failures in the energy market or to positively direct resources to particular parts of the economy. Subsidies can also be used to support disadvantaged parts of society be redistributing income. In setting out the rules for decision making and action in respect of the use of subsidies in the energy sector it must be clear about the type of subsidies, the target or channel for the subsidies and especially of their intended effects.

Subsidies can be targeted either at producers or consumers, to alter their behaviour in the production or consumption of that good. A production subsidy encourages suppliers to increase the output of a particular good by partially offsetting the production costs. The subsidies will encourage the Government to pursue rural electrification, which is not a commercial activity and requires subsidies. A consumption subsidy lowers the price paid to increase affordability and/or encourage use of the good. For example, the Rural Energy Act 2005 promotes the role of the Rural Energy Fund in capital projects, which includes a significant role in subsidizing the costs of rural households connecting to the national electricity grid.

Energy is critical to economic development and poverty reduction. Subsidies are one of many policy instruments used by governments to attain economic, social and environmental objectives. In particular it is often used to alleviate energy poverty and promote economic development by enabling access to affordable modern energy services. Nevertheless, poorly implemented energy subsidies are economically costly to taxpayers.

To ensure effective subsidy use, strategies including keeping prices low; facilitating grants or guaranteeing loans provided by commercial banks to reduce capital cost; and granting tax exemptions. During transition period, while spearheading investment in the energy sector, the Government needs to temporarily maintain targeted subsidy regime in the energy sector.

Policy Objective: To promote effective and transparent subsidy regime.

Policy Statements:

The Government shall:

i) Promote targeted, objective based and transparent subsidy regime;
ii) Support capital subsidy to promote development of energy infrastructures; and
iii) Promote lifeline tariff for customers with less ability to pay cost reflective tariff through cross subsidy regime.

4.5 Integrated Energy Planning

Issue: Inter-sectoral, sectoral, regional and international integration of energy planning

Energy is a critical input in the social economic progress of any economy. The need to integrate energy planning with national economic, social and environmental policies is of paramount importance. Lack of integrated energy planning has led to occasional shortages or disruptions in supply of fossil fuels; power rationing as well as frequent power interruptions. Furthermore, lack of integrated planning has led to conflicting and competing interests between various sub-sectors of the economy with regard to development and utilization of energy resources. Robust integrated planning should take on board regional and international energy trends and other economical factors brought about by globalization and technological advancement.

The main challenges facing integrated energy planning are inadequate structures and systems for integrated energy planning and monitoring of the implementation of planned projects; inadequate capacity to carry out integrated energy planning; lack of petroleum and renewable energy master plans; lack of reliable databases for all energy forms; inadequate linkages with other sectors of the economy.

Issue: To improve energy sector planning through integrated plan

Policy Statements:

The Government shall:

i) Establish structures and systems for integrated energy planning and monitoring of the implementation of planned projects;
ii) Develop adequate capacity to carry out integrated energy planning;
iii) Develop energy master plans; and
iv) Create linkages with other sectors of the economy and establish reliable energy database.

4.6 GENDER MAINSTREAMING IN THE ENERGY SECTOR

Issues: Mainstreaming gender issues in the energy sector.

The management and development of energy resources at the grass-root level requires the effective participation of both gender in the decision-making process. Furthermore, women play a vital role in the provision and management of energy resources in the rural areas.The Government provides equal opportunities to all citizens of the country.

Despite the effort, most opportunities and planning and decision making process in the energy sector are habitually dominated by men. Access to modern energy for cooking particularly in rural areas is promoted to relieve women from wasting time to fetch firewood which could otherwise be spent on other economic activities. Stakeholders in energy sector need to cooperate and in sensitisation efforts to promote equity and equality in energy related programmes and projects, planning and decision-making processes. Challenges in gender mainstreaming include gender imbalances in various positions in institutions; inadequate

implementation of policy on gender mainstreaming; inadequate public awareness on the adverse health effects of use of wood fuel and kerosene on women and children.

Objective: To promote and support gender related activities in the energy sector.

Policy Statements:

The Government shall:

i) Promote gender equality and equity within energy sub-sectors both on demand and supply sides;
ii) Ensure equitable gender participation in formulation and implementation of energy interventions;
iii) Promote awareness on gender issues pertaining to men and women's social roles in the energy sector, including training on appropriate technologies;
iv) Undertake public education and awareness creation on cultural structures and practices hindering access by both men and women to alternative sources of energy; and
v) Enhance gender and environmental considerations in energy planning and development.

4.7 HIV and AIDS

Issue: Addressing and controlling HIV and AIDS.

HIV and AIDS pandemic has impacted negatively on the energy sector and has contributed to low human resource capacity and productivity in the energy sector. There is need to maintain and strengthen existing programmes to minimize negative impacts of HIV and AIDS in the energy sector.

Objective: To support activities targeted in addressing and controlling HIV and AIDS.

Policy Statements

The Government shall:

i) Facilitate implementation of HIV/AIDS policy; and

ii) Facilitate provision of preventive, curative and promotional education on HIV and AIDS.

4.8 Public Private Partnership (PPP)

Issue: Exploitation of Public Private Partnership potentials in development of the energy sector.

The Government recognizes the role of private sector in bringing about socio-economic development through capital investment, managerial skills and technology. The Government therefore, promotes cooperation between public and private sectors to achieve required rapid

growth in the energy sector. However, implementation of PPP energy projects has experienced some challenges including risks sharing mechanisms between parties. To address the challenge, proper mechanism for risk sharing in the energy sector needs to be put in place to ensure mutual benefits for both parties.

Objective: To maximize the benefits accruing from PPP projects in the energy sector.

Policy Statements:

The Government shall:

i) Promote and facilitate PPPs arrangements to enhance investments in the energy sector; and
ii) Work with private sector entities to ensure the speedy structuring and financing of PPP projects in the energy sector.

4.9 Regional and International Cooperation

Issue: Seizing opportunities from regional and international cooperation.

Countries in the region are endowed with natural different resources. Therefore collaboration with regional partners is important for development of the energy sector. Tanzania stands to benefit from such engagement especially regional blocks such as EAC and SADC by optimising usage of its resources. Tanzania needs to participate in the regional power trading such East Africa Power Pool (EAPP) and Southern Africa Power Pool (SAPP) and in developing regional energy infrastructures.

The benefits of regional interconnectivity include security of supply and system stability due to increased generation mix; increasing national economic efficiency by operating on lower reserve margins; expanded power market sizes and reduced country specific risks; capital saving as the country need not invest in new stations; increases competition by providing options for cheaper power; electricity access to remote areas; shared reserve margin and the transmission infrastructure acts as a catalyst for investment in non-conventional renewable energy sources.

There is also a need to strengthen cooperation with international partners to share best practice and experiences in the managing the energy sector, and take advantage of the facilities, resources, experience and information they have.

Objective: To ensure that the development of energy sector regionally and internationally benefits Tanzania.

Policy Statements:

The Government shall:

(i) Support cross border projects and investments within EAC, SADC and AU Partner States to maximize benefits accruing from regional cooperation; and
(ii) Facilitate international collaboration in education, research, exchange of data and information in the energy sector.

5 LEGAL AND REGULATORY FRAMEWORK

Government's liberalization of various sectors of the economy at the beginning of the 1990s was the driving force behind reforms and current institutional, regulatory and legal frameworks in the energy sector that started with the NEP 2003. New laws were enacted to facilitate liberalization and ensure consistency of practices in the energy sector with other sectors. In addition new institutions were also created through various laws and statutory instruments.

5.1 Legal Framework

The current legal framework for energy resource management and development is governed by various Acts of Parliament including: The Constitution; The Electricity Act; Petroleum Act; the Petroleum (Exploration and Production) Act, The Rural Energy Act; The Energy and Water Utilities Regulatory Authority, Environmental Management Act; The Local Government Act; the Public Procurement Act, the Atomic Energy Act, the Fair Competition Act, the Water Resources Management Act, the Land Act; the Public Private Partnership Policy and Act; and the Natural Gas Policy.

5.2 Regulatory Framework

The Petroleum (Exploration and Production) Act confers upstream regulation of the petroleum segment to the Minister and the Commissioner responsible for petroleum affairs. Conversely the Energy and Water Utilities Regulatory Authority Act, 2001 and the Petroleum Act, 2008 vests with EWURA the responsibilities to regulate the downstream petroleum and natural gas subsector, as well as electricity and water sub-sectors.

Challenges in legal and regulatory framework include outdated and fragmented sectoral laws governing the energy sector; overlap of roles and functions of institutions in the energy sector; lack of legal and regulatory framework in coal and geothermal exploration and development; revenue sharing and management of energy resources; inadequate penalties to energy related offences; disjointed legal and regulatory frameworks governing operation of government institutions that impact the operations of institutions within the energy sector; inadequate legal and regulatory provisions in the energy sector governing land acquisition and access; lack of a designated lead agency to spearhead promotion and development of renewable energy resources and fragmented regulatory functions.

However, effective energy resources management requires an adequate legal and regulatory framework which promotes efficient, effective, sustainable and participatory management of the national energy resources. Therefore, for effective implementation of objectives and strategies outlined in this Policy, the following measures shall be undertaken:

a) Harmonization of energy related legislation;
b) Reviewing and aligning the energy sector's legal and regulatory framework;
c) Strengthening and ensuring an effective regulatory framework that provides guidance to all actors in the energy sector;
d) Develop and establish a clear mechanism for the enforcement of the legal framework including penalties;
e) Build capacity for the enforcement of the legal and regulatory provisions;

f) Formulates sub-sectors policies and enact relevant legislation and
g) Ensure compliance with generally accepted international standards for energy sector.

6 INSTITUTIONAL FRAMEWORK

The effective execution of the policy depends on the presence of a robust institutional set up to galvanize stakeholders' efforts. The institutional framework expresses major roles of the key institutions under which objective of creating wealth and improving the quality of life of the Tanzania people will fulfilled. Challenges in the Institutional Arrangements include governance issues, lack of a research institute, funding constraints and inadequate human resource capacity. Operational challenges including lack of synergy overlap of mandates of the various institutions. This leads to duplication of roles and suboptimal utilization of available resources.

6.1 Ministry of Energy and Minerals

It is responsible for formulation and articulation of energy policies through which it provides an enabling environment for all stakeholders. Its tasks include national energy planning; facilitate capacity development of manpower and mobilization of financial resources.

6.2 Energy Water Utilities Regulatory Authority (EWURA)

It was established in 2001 with responsibility for economic and technical regulation of water utilities, electricity and downstream petroleum and natural gas sub-sectors. Its functions also include tariff setting, review, licensing, enforcement, dispute settlement and approval of power purchase and network service contracts.

6.3 Fair Competition Tribunal

This quasi-judicial body was established in 2003 to primarily hear appeals against the decisions of regulatory bodies including EWURA. It also has jurisdiction to hear and determine all matters referred to it relating to the energy sector. Any person aggrieved by the decision of the Tribunal may appeal to the Court of Appeal.

6.4 Tanzania Petroleum Development Corporation

Tanzania Petroleum Development Corporation (TPDC) was established in 1969 and is responsible for overseeing, participating and promoting oil and gas explorations as well as representing the government in the oil and/or gas undertakings. To improve performance and governance, its institution set up shall be reviewed.

6.5 Tanzania Electric Supply Company Limited

Tanzania Electric Supply Company Limited (TANESCO) is a vertically integrated company responsible for generation, transmission and distribution of electricity. It was established in 1964 and is wholly owned by GoT. The overall oversight and corporate policy setting for the Company is vested with the Board of Directors. To improve performance and governance, its institution set up shall be reviewed.

6.6 Rural Energy Agency (REA)

REA was established in 2007 with the principal mandate of promoting access to modern energy in the rural areas, managing the rural Energy fund, and mobilizing resources for rural electrification.

6.7 Oil Marketing Companies (OMCs)

OMCs are local and international companies licensed to undertake the importation, storage, wholesale, export and retail of petroleum products.

6.8 International Oil Companies (IOCs)

These are international companies licensed to undertake exploration and production of petroleum products.

6.9 Private Sector

Private sector players are important in providing substantial capital investment and technologies needed for exploration and development of the natural gas resource. The Private Sector will continue to work with the Government to promote, build capacity and facilitate PPP projects or other arrangements in the energy sector. The sector is also expected to implement credible Corporate Social Responsibility programmes.

6.10 Academic and Research Institutions

Academic and Research Institutions are important for development of the energy sector. Development of the sector demands for increased knowledge and skills. In order to meet the demand, the Government has taken measures to introduce and expand training in relevant fields in the Energy sector. These institutions will work with Government to promote education, training and research in the natural gas industry, recruitment and retention of the human resources required in the industry.

6.11 NGOs and Civil Societies

This Policy recognizes the role of NGOs and other civil society organisations in enhancing advocacy, mobilization and dialogue with communities, investors and the Government. These entities will contribute to energy sector activities and collaborate with Government in designing, monitoring and implementation of socio-economic programmes.

6.12 Media

The role of the media in providing accurate and balanced information on the energy sector issues to the public is important. In this regard, the media need to strengthen their capacity in understanding energy sector activities in order to deliver information accurately and timely. This will increase public awareness, transparency and accountability on matters pertaining to the sector.

6.13 The Community

Local communities have a big role to safeguard the integrity of natural gas infrastructure since are meant to benefit them. Hence, the communities have the responsibility to maintain security and safety of the project facilities to ensure their sustainability.

The policy seeks rationalizes the mandates, roles, functions and relationships of energy sector institutions and creating a clear separation of the functions of policy making and coordination of energy activities and operations. To improve the performance and the governance of the sector the Government shall:

a) Review the institutional mandates of the various public institutions under the energy sector to streamline their respective mandates, businesses and operations including EWURA, REA, TPDC and TANESCO.

b) Establish the National Energy Institute to undertake training, research, development, dissemination, nurture talent, innovation and to enhance capacity building in the sector

c) Establish the Nuclear Electricity Project Committee (NEPC) to be responsible charged with the mandate of spearheading and fast tracking development of nuclear electricity generation in order to enhance the production of affordable and reliable electricity.

7 MONITORING AND EVALUATION FRAMEWORK

In order to ensure that the policy measures and strategies stipulated in this document are implemented, an effective monitoring and evaluating system will be established. In addition, the Ministry responsible for energy shall develop verifiable indicators for the purpose of ensuring achievement of the objectives of this Policy. The efficient management and development of energy resources will depend on accurate and reliable information systems that facilitate optimal decision making.

To achieve this government shall establish a mechanism for energy data collection, management and dissemination under an integrated energy sector management system covering the Ministry in charge of energy and the parastatal organisations under it to facilitate online transmission of data and information. The government shall also regularly undertake an assessment of energy resources; and establish and regularly update information systems and disseminate information on energy resources to enable exchange of information with players in other relevant sectors

8 WAY FORWARD

The country need to establish a Strategy for implementation of the energy policy directives. The policy shall be reviewed periodically when need arises to take into account major changes and developments in the national economy. In additional an appropriate mechanism to monitor and evaluate the implementation process so as to ensure that the gains in this policy benefit all Tanzanians shall be sustained.