



Revolutionary Government of Zanzibar

Zanzibar Energy Policy

8 December, 2009

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Table of Content

ABBREVIATIONS.....	4
1.0 INTRODUCTION.....	5
2.0 ZANZIBAR ENERGY SITUATION ASSESSMENT	6
2.1 GENERAL INFORMATION	6
2.2 ZANZIBAR ENERGY BALANCE.....	7
2.2.1 DEMAND AND SUPPLY OF WOOD-FUEL.....	8
2.2.2 DEMAND AND SUPPLY OF FOSSIL FUELS.....	8
2.2.3 DEMAND AND SUPPLY OF ELECTRICITY	8
2.2.4 DEMAND AND SUPPLY OF SUSTAINABLE RENEWABLE ENERGY	9
3.0 LEGISLATIONS WITHIN THE ENERGY SECTOR.....	10
3.2 GOAL TO ATTAIN SUSTAINABLE ENERGY PRODUCTION	12
4. ZANZIBAR ENERGY POLICY	13
THE VISION, MISSION, OBJECTIVE AND OVERALL OBJECTIVES.....	13
4.1 THE MAIN OBJECTIVE	14
4.1.1 THE OVERALL OBJECTIVES.....	14
4.1.2 SPECIFIC OBJECTIVE	14
5.0 TRANSITION FROM UNSUSTAINABLE USE OF WOOD-FUEL TO	15
MODERN ENERGY	15
5.1 DETERMINED SUSTAINABLE EFFORTS ON LONG TERM IS NEEDED	15
5.2 FINANCIAL SUPPORT FOR INVESTMENT IN NEW TECHNOLOGY TO OVERCOME LACK OF CASH BY THE POOR	16
5.3 CHANGING WOOD-FUEL USE AND INTRODUCE STIMULI FOR BUSINESSES AND INSTITUTIONS	16
5.4 AWARENESS CREATION AND COOPERATION AMONG GOVERNMENT, BUSINESS AND CIVIL SOCIETY	17
6.0 RELIABILITY, AFFORDABILITY AND INDEPENDENCE OF ELECTRICAL POWER SUPPLY	18
6.2 LONG-TERM PREDICTABILITY OF PRICE.....	19
6.3 EFFICIENT AND PROGRESSIVE UTILITY	20
6.4 REDUCING DEPENDENCY	21
7.0 EXPLORING AND INCREASING THE USE OF INDIGENOUS SOURCES FOR ENERGY SUPPLY	21
7.1 EXPLORATION OF POTENTIAL FOSSIL RESERVES	22
7.2 INDIGENOUS RENEWABLE SOURCES OF ENERGY	23
8.0 SUPPORTING ENERGY DEMAND IN THE GROWTH SECTORS OF THE ECONOMY.....	25
8.1 ENERGY AND THE ZANZIBAR STRATEGY FOR GROWTH AND REDUCTION OF POVERTY.....	25
8.2 THE ENERGY INTENSIVE IN TRANSPORT SECTOR	26
9.0 COORDINATION AND REGULATION OF THE ENERGY SECTOR.....	27
10.0 ENERGY MARKETS AND MARKET INTERVENTIONS IN ZANZIBAR.....	28
10.1 INTERVENTIONS BY GOVERNMENT AND SOCIETY	29
10.2 REGIMES FOR LEVIES	29
10.3 SUBSIDIES AND INCENTIVES IN ENERGY MARKET	30
10.4 THE DANGER OF MARKET INTERVENTION AND PRICE CONTROL FOR MONOPOLIES.....	31
11.0 INCREASED ENERGY EFFICIENCY.....	32
11.1 ENERGY EFFICIENCY IN THE DOMESTIC SECTOR, BUSINESSES AND INSTITUTIONS.....	32
11.2 SUPPORT TO STANDARDISATION OF ENERGY EFFICIENT APPLIANCES	33

Zanzibar Energy Policy

11.3 INSTITUTIONAL SUPPORT TO ENERGY EFFICIENT TECHNOLOGY	34
12.0 DEVELOPMENT OF HUMAN RESOURCES FOR ADMINISTRATION, SERVICE AND MAINTENANCE IN THE ENERGY SECTOR	35
13.0 CROSS CUTTING ENERGY POLICY ISSUES REGARDING ENVIRONMENTAL SUSTAINABILITY, GENDER ISSUES, AND ENERGY INDUSTRY DEVELOPMENT	37
13.1 SPECIFIC ENVIRONMENTAL AND CLIMATE CONSIDERATIONS.....	37
13.2 GENDER ISSUES AND HIV/AIDS IN THE ENERGY SECTOR.....	39
13.3 PROMOTION OF ENERGY EQUIPMENT INDUSTRY, RESEARCH AND DEVELOPMENT BY REGIONAL AND GLOBAL COOPERATION	39
14.0 RESPONSIBILITIES OF THE VARIOUS SECTORS IN THE IMPLEMENTATION OF THE ENERGY POLICY	41
14.1 MINISTRY RESPONSIBLE FOR ENERGY THROUGH ITS RELEVANT DEPARTMENT	41
14.2 MINISTRY RESPONSIBLE FOR AGRICULTURE, FORESTRY AND ENVIRONMENT.....	41
14.3 MINISTRY RESPONSIBLE FOR TRANSPORT	41
14.4 MINISTRY RESPONSIBLE FOR EDUCATION	42
14.5 MINISTRY RESPONSIBLE FOR REGIONAL ADMINISTRATION	42
14.6 MINISTRY RESPONSIBLE FOR HEALTH	42
14.7 ROLE OF OTHER STAKEHOLDERS.....	42
15.0 MONITORING AND EVALUATION (M&E).....	43

Abbreviations

CDM	Clean Development Mechanisms
CO ₂	Carbon Dioxide
ewura	Energy and Water Utilities Regulatory Authority
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GHG	Greenhouse gases
Gwh	Giga Watt Hour
IPP	Independent Power Producer
ITC	Information and Telecommunication
LPG	Liquefied Petroleum Gas
MDG	Millennium Development Goal
MW	Mega Watt
MWCEL	Ministry of Water, Construction, Energy and Lands
NGO	Non Government Organisation
PV	Photovoltaic (solar cells)
RGZ	Revolutionary Government of Zanzibar
RME	Rape Methyl Ester (biodiesel)
Sida	The Swedish International Development Cooperation Agency
SIDS	Small Islands Development States
SF&PC	State Fuel &Power Corporation
SoER	State of Environmental Report
TANESCO	Tanzania Electric Supply Company Limited
TNA	Training Needs Assessment
TPDC	Tanzania Petroleum Development Corporation
TShs	Tanzanian Shillings
UNCCC	United Nations Conference on Climate Change
UNDP	United Nations Development Program
US \$	United States Dollar
ZECO	Zanzibar Electricity Corporation
ZSGRP	the Zanzibar Strategy for Growth and Reduction of Poverty

1.0 Introduction

The aim of the Zanzibar Energy Policy is to establish an all inclusive socio-political framework for development of the energy sector in short, medium and long term. The Zanzibar Energy Policy shall be the guiding instrument for the common actions by Government, private sector, civil society organisations and the general public. A substantial engagement from the private sector and the general public is an utmost necessity for realising the vision of the future energy conditions in Zanzibar.

All uses of energy have consequences on the surrounding society, irrespectively of being dealt with from an economic, social, political, or environmental perspective. The location of Zanzibar involves specific circumstances. The isolated position in the Indian Ocean; the increasing demand for energy through economic development and high population growth; and the large number of the population living below the basic needs poverty line; altogether creates specific claims on the supply of energy. On the other hand, the islands are endowed with conditions suitable for a development of local supply of energy; such as wind power, solar energy, and sustainable bio-fuel. Such renewable energy sources are not dependent on finite resources, and will reduce harmful impacts on the local as well as the global environment. In addition, the uses of indigenous renewable energy sources are likely to create local employment opportunities. Today Zanzibar is totally dependent on import of electricity and fossil fuels from other regions and on an unsustainable local production of wood-fuel.

This Energy Policy has been designed via a participatory process in dialogue with the main stakeholders in Zanzibar through activities such as; internal meetings at the Ministry of Water, Construction, Energy and Lands (MWCEL) and participatory workshops; meetings with priority stakeholders; and by identification of stakeholders and their main priorities through a questionnaire distributed to a large number of organisations. These activities have been followed by workshops in Unguja and Pemba regarding the Energy Situation Assessment, and additional workshops where Energy Policy and Strategy Options and Solutions have been discussed and debated. The result from the workshops and the preparatory activities is available in a printed version.

The Energy Policy consists of a synthesis based on discussions and conclusions derived during the above mentioned activities. In addition, the Energy Policy Team at the Department of Energy and Minerals has identified experiences and achievements of countries in the region and globally to be observed and learnt from the Zanzibar policy formulation process. This also includes visits to organisations and institutions on Mainland Tanzania.

2.0 Zanzibar Energy Situation Assessment

2.1 General Information

Globally, Zanzibar is categorised as a Small Island Developing State (SIDS) which consists of two major islands, Unguja and Pemba, with a group of about 50 small islets, surrounding them. Zanzibar and Tanganyika make up the United Republic of Tanzania. However, Zanzibar has autonomy in governance. The islands are approximately 30 kilometres east off the mainland coastline. Unguja Island covers an area of 1,666 square kilometres and Pemba Island covers an area of 988 square kilometres giving a total area of 2,654 square kilometres and the population is estimated to be 1,232,847 inhabitants of whom 40 % are living in Urban Areas (Trend of Zanzibar Population Census and Projection 2009). The population growth rate is estimated to 3.1 % annually, which exerts an increasing pressure on the island's energy supply and forest resources.

The majority of Zanzibar population are depending on farming for their livelihood and almost half of the population lives below the poverty line. Women together with children are the most underprivileged members of the society; the Zanzibar Gross Domestic Product (GDP) per capita has been estimated to be approximately TShs. 639,000 which is equivalent to 5.4% constant price growth rate (Zanzibar Economic Survey Report 2008).

Business Development in Zanzibar has passed through many stages since 1984, liberal opened market economies based on private ownership has been implemented as means to pursue economic growth. The Investment Act for Zanzibar was enacted in 1986 and revised in 2004 in order to attract foreign investors and give legal protection. After trade liberalisation and development of various cross-sector policies, Zanzibar has seen tremendous changes in terms of trades and business. The tourism industry has grown and Zanzibar is now one among the world's most attractive tourist destinations.

The global climate is undergoing a process of change mainly due to the significant rise in temperature of the earth over the last decades. There is a worldwide consensus that emissions of greenhouse gases (GHG) are causing this temperature rise. The main reason is the emission of carbon dioxide (CO₂) from the global combustion of fossil fuels. An increase in the mean temperature has consequences, for example; sea level rise and changes in rainfall patterns – with long, protracted periods of drought and severe floods. The countries that are most vulnerable to climate change are the least developed countries, low-lying island nations, countries with highly populated low-lying coastal areas, and regions with arid areas. Although the contribution from Zanzibar to these harmful activities is very limited, there is a potential risk that the country will be affected by the global climate changes.

2.2 Zanzibar Energy Balance

There is no thorough energy study or survey conducted to establish the energy balance of Zanzibar, and the energy situation has therefore been assessed based on literature review and information collected by the Department of Energy and Minerals in Zanzibar. The total energy input in Zanzibar was in 2007 estimated to be 4,200 GWh, with an estimated market value of approximately 134,000 million TShs (US\$ 112 million) by the year 2007¹, whereof import of fossil fuels constituted almost 60 % of the value. More than 80 % of the total energy uses on the islands are within the domestic sector, whereas approximately 20 % is used jointly by the industrial and commercial sectors.

The energy input of the main energy sources used is given below (Figure 1), and the energy uses in different sectors is given in Figure 2. Some of the charcoal is imported from outside Zanzibar Islands.

Energy Input of the Main Energy Sources

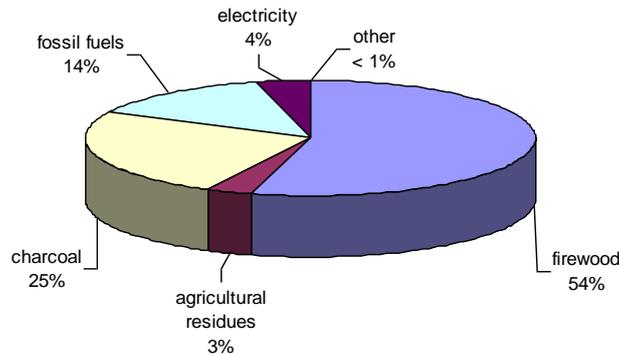


Figure 1. The Zanzibar Energy Balance, 2007 (Source: Zanzibar Energy Situation Assessment Report, 2008).

Energy Uses in Different Sectors

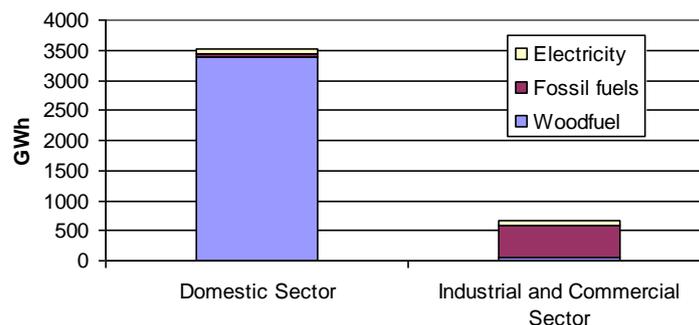


Figure 2. Uses of energy in the domestic sector compared to the uses within the industrial and commercial sector, year 2007 (Source: Zanzibar Energy Situation Assessment Report, 2008).

¹ The figures have been calculated based on the assumption that all products would have been sold at the Zanzibar market (average of urban and rural market prices).

2.2.1 Demand and Supply of Wood-fuel

About 96 % of the energy used in the domestic sector is estimated to consist of bio-fuel (firewood, charcoal and agricultural residues), which is mainly used for cooking. This high use of wood-fuel for cooking is recognised to create indoor pollution and health problems especially for women and children. In addition, the high use of wood-fuel in combination with a growing population exerts an increased pressure on the islands' forest resources. Various studies have indicated that the demand of biomass fuels exceeds the supply potential hence leading to over-harvesting and pronounced environmental degradation. Scarcity of wood-fuel in Zanzibar Town is evidenced by increasing import of charcoal mainly from mainland Tanzania. Import from Pemba has also been prevailing, although the import has been banned by the Revolutionary Government of Zanzibar.

The per capita demand for wood-fuels is substantially lower in Zanzibar Town than elsewhere on the islands. This is an indicator of the full commercialisation of energy supply in the urban areas, and the incentive that exists there for consumers to use wood-fuels more conservatively. It is estimated that 500 ha of coral rag forest is cleared each year due to wood-fuel uses. Of these, more than 41% is indigenous and 59 % is exotic (SoER, 2004).

2.2.2 Demand and Supply of Fossil Fuels

The uses of fossil fuels in Zanzibar have grown approximately 17 % between 2003 and 2007, with diesel representing the highest share. The main uses are within the transport sector (motor vehicles, marine vessels, and airplanes), and for electricity generation and lighting. The utilisation is within all user categories (industries, commercial, domestic). Kerosene is used especially by the people of low and medium income which comprises more than two third of the population of Zanzibar. LPG is a more convenient energy source and attains a better indoor health situation than charcoal. However, the demand of gas in Zanzibar is growing very slowly.

Compared to the estimated growth in population of 13 % during 2003-2007, the indication is that the per capita use of fossil fuels on Zanzibar has increased. The price of fossil fuels more than doubled during 2003 to 2008, mainly due to the escalating oil prices at the international market.

Natural gas findings are available in Mainland Tanzania, but there is no utilisation of these resources in Zanzibar. No natural gas or oil findings have yet been observed in Zanzibar, although there are studies conducted by Antrim Resources (Tanzania Limited) that indicate such existence.

2.2.3 Demand and Supply of Electricity

The demand of electricity has grown fast. From 2003 to 2008 the number of customers connected to electricity has increased by 45 %. In current years, almost 90 % of the billed electricity was used in Unguja and 10 % in Pemba. In both Unguja and Pemba, the demand is higher than the supply. Still, electricity represents only a minor part of the total energy in-put in Zanzibar (4 %). Approximately 80,000 clients are at present registered in Zanzibar.

Electricity in Zanzibar is supplied by autonomous power utility, Zanzibar Electricity Corporation (ZECO)² which came in force in 2006 under the new Electricity Act. Since 1986, **SF&PC** has been supported by a Norwegian rural electrification project, and electricity is now within access to the majority of the population in both Unguja and Pemba.

The electricity sector in Zanzibar has during a long period been characterised by high technical and non-technical losses, tariffs that do not fully reflect costs, non-payment by clients, low collection rates and low capacity of the utility organisation. This has been recognised by the Revolutionary Government of Zanzibar, and the organisation is subject to a Financial Turn Around Project during 2008-2010.

Currently there is no independent power producer in Zanzibar. Unguja is fully dependent on the supply of electricity from Mainland Tanzania through a 45 MW submarine transmission cable. The demand is at present exceeding the capacity of the cable. Pemba obtains its power from diesel generators with capacity of 4.5 MW. Due to uneven supply of diesel for power generation and low standard of the generators, electricity in Pemba cannot be stated as reliable, which is obvious through the frequent power cuts. Decisions have been taken to supply Unguja with an additional submarine cable of 100 MW, and Pemba with a submarine cable of 20 MW.

2.2.4 Demand and Supply of Sustainable Renewable Energy

Renewable energy sources such as solar, wind, energy from sea waves, biogas, ethanol production and energy from municipal solid waste, altogether constitutes a large potential for production of electricity and heat in Zanzibar. Energy from the sun can be obtained through different technologies such as the use of solar water heaters; photovoltaic (PV) systems to generate electricity; cookers for cooking and crop drying. It has been recorded that approximately 220 houses in Unguja and Pemba were using solar energy by the year 2008.

The electricity production from wind is now a commercialised product worldwide, however, at present there is no production of electricity from wind power stations in Zanzibar. No wind resource assessment or any detailed wind monitoring designated for wind power has so far been conducted. The production and use of biogas and ethanol is presently growing fast worldwide as fuels to substitute fossil fuels mainly for transport. This can also be seen as an option for Zanzibar.

Although the demand of these renewable sources is increasing, the development and utilisation is still in infant stages (UNDP, 2008), and is estimated to account for only 0.3 % of the total energy supply on the islands.

Due to the increase in the global temperature over the last decades, agreements have been made in 1997 at the United Nations Conference on Climate Change (UNCCC) in Kyoto to make common efforts to reduce the emissions of greenhouse gases caused by various human activities. The

² ZECO was formally known as the State Fuel and Power Corporation (SF&PC).

United Republic of Tanzania ratified the Kyoto Protocol on 26 August 2002 and it came into force on 16 February 2005. The United Republic of Tanzania is a Non-annex I Country and has no binding commitments to reduce emissions. However, the United Republic of Tanzania, on its part, wishes to apply CDM as a mean for attracting foreign investments to GHG-mitigation projects to support the sustainable development objectives of Tanzania and that leaves interesting possibilities for the energy development of Zanzibar.

3.0 Legislations within the Energy Sector

The Ministry of Water, Construction, Energy and Lands (MWCEL) and its Department of Energy and Minerals manage the national energy issues in Zanzibar. In addition, the Ministry Responsible for Finance has a large influence upon many topics, one example being the handling of the fossil fuel trading. The Ministry responsible for Finance also has a large regulatory role through the Public Investment Commissioner, acting under the regulations of the Public Investment Act of 2002.

The Department of Energy and Minerals is one of the divisions in the MWCEL. The Department currently consists of two sections, a) Minerals and b) Energy, each headed by Engineers. The Mineral Section works mostly with minerals, while the Energy Section handles all energy related issues. At present there is limited capacity to regulate energy supply and demand, and more efforts are needed to improve management and optimise the supply to demand chain.

With the exception of the Electricity Act and Mining (Mineral Oil), there is no specific energy legislation within the energy sector in Zanzibar. The only legislation which is enacted by the Zanzibar Revolutionary Government is the Petroleum Levy Act which only deals with petroleum levy; this legislation is under the Ministry responsible for Finance. The Ministry responsible for energy has no law which enforces energy issues (petroleum and renewable energy). However, the Ministry responsible for Energy has prepared a draft of legislation known as Zanzibar Petroleum Supply Bill which is concerned with the chain of supplier and role of Department of Energy and Minerals and the duties and obligation. The Act directs the establishment of a Board. The proposed Bill is awaiting further process, due to the absence of an Energy Policy in Zanzibar.

3.1 Coordination with other Government Policies

The Zanzibar Energy Policy is closely related to a number of existing policies and development directives in Zanzibar, such as the Zanzibar Investment Policy, Zanzibar Trade Policy, Zanzibar Environment Policy, Zanzibar Agriculture Policy, Zanzibar Land Policy (under preparation), Zanzibar Water Policy and Zanzibar Forest Policy. Coordination with these policies and adjustments for harmonisation is a key task for the Ministry responsible for energy.

The Zanzibar Investment Policy

The Zanzibar investment policy has implications on the energy sector as being one of the macro policy instrument intended to contribute to the realization of the vision of economic reform including financial services, business services, information technology and tourism. The policy is implemented through the Zanzibar Investment Promotion Agency (ZIPA). The Zanzibar investment policy is a major instrument in guiding the need for attracting investments in these sectors. Unfortunately it is not including specific issues concerning the energy sector.

Zanzibar Trade Policy

The Zanzibar trade policy raises the concern on availability of adequate energy for commercial as well as domestic purposes. The policy concludes that a rapid growth of the economy in Zanzibar depends upon energy availability, reliability, and reasonable cost for energy.

Zanzibar Environment Policy

The environment policy highlights the growing demand for wood-fuel which cannot be sustained by the diminishing sources. This environmental damage has resulted in severe soil erosion, catchments and groundwater deterioration as well as ecological degradation. All these have negative impact on the environmental and natural management and protection.

The policy further explains that Government emphasises on the development and efficient utilisation of Zanzibar's locally available energy resources to minimise dependency on imported energy and reduce pressure on natural resources. Also the policy recommends that there is an urgent need of an energy policy, in where environmental norms should be included.

Agricultural Sector Policy

In the agricultural sector policy, the policy emphasise the need of an energy policy, which can enhance reliable, affordable, and environmentally sound alternative energy supplies in order to reduce the usage of wood for energy.

In addition, the policy shows that the increasing demand for wood-fuel is destroying the environment. Wood-fuel, charcoal and agricultural residues account for 90 % of the final energy consumption. Due to growing demand for wood-fuel, which cannot be sustained by the diminishing sources, the environmental damage has resulted in severe soil erosion, watershed and ground water deterioration, as well as the ecological degradation of vulnerable areas. All of these have negative impacts on the agricultural sector.

Draft of Zanzibar Land Policy

In the land policy of Zanzibar nothing is stated concerning energy activities or the energy sector. The policy only touch on environmental aspect as wood is the source of energy in Zanzibar. The policy emphasise the need of protecting and preserving the environment.

Zanzibar National Forest Policy

Also in this policy the energy sector is not specifically mentioned. The policy has a goal to protect, conserve and develop forest resources for social, economical and environmental benefit. Its targets are increasing national revenues, alleviation of poverty, and environmental goals.

Zanzibar National Water Policy

In the water policy, the energy sector has not been recognised as a stakeholder, although the lack of energy heavily will affect the water related operations in Zanzibar. In reality no sector policy, national strategy or programme could be implemented successfully in absence of sustainable, affordable and efficient energy services.

3.2 Goal to attain sustainable energy production

The critical factors to enhance the success of Energy in Zanzibar include:

- A need of transition from unsustainable use of wood fuel to modern energy sources
- A need to have a reliable, affordable, and independent electricity power supply
- A need to explore and increase the use of indigenous sources for energy supply
- A support to the energy demand in the growth sectors of the Zanzibar economy
- A coordinated and regulated energy sector
- Sound and transparent energy markets and market interventions in Zanzibar
- Sustained efforts to increase the energy efficiency within the whole energy sector
- A development of human resources for administration, service and maintenance in the energy sector
- A focus on cross cutting energy policy issues regarding environmental sustainability, gender issues, and energy industry development.

A sustainable and evident change in demand and supply is a long-term gradual process, determined to a high degree by socio-economic and demographic factors. Therefore, an energy policy must be specific, depending on the unique conditions in every country.

The Energy Policy takes into consideration the visions, ambitions and strategies expressed in several main documents regarding future social and economic development and poverty reduction in Zanzibar.

4. Zanzibar Energy Policy

The Vision, Mission, Objective and Overall Objectives

Vision

The vision of the Zanzibar Energy Policy is to contribute to the sustainable development of a prosperous society with independent reliable and affordable energy for all.

Mission

The mission of the Zanzibar Energy Policy is to guide the stakeholders in the creation of an enabling environment in Zanzibar that will enhance the transformation of energy markets, facilitate the introduction of new and renewable sources of energy, and contribute to economic development and social equity while protecting the environment.

Access to reliable supply of energy is a prerequisite for development and prosperity of the people of Zanzibar. Over time, transformation takes place in every society from traditional energy; such as human, animal and wood-based energy, towards modern forms of energy such as electricity, petroleum, gas and renewable energy sources like wind, solar, and sustainable uses of biofuel. The main drivers behind the demand of energy are the population increase, economic growth, and demographic changes; in particular the urbanisation. Changes in the supply of energy depend on broader factors such as the global energy markets, technology development, the flow of domestic and foreign investments, and the development of trade. Satisfying the demand and managing the supply of energy is therefore a major challenge for the society.

The Zanzibar Energy Policy shall guide and direct the Government, private sector and civil society towards a sustainable energy development through the use of natural resources, provision of energy for economic development and social equity, and by protection of the environment.

Energy development however, involves more than the establishment of physical infrastructure for energy production and distribution to the market. Electrification will not by itself cause an area to develop unless other necessary infrastructure elements and the proper conditions for economic development are as well present. Therefore, energy development has to be in line with the development of other sectors of Zanzibar.

Energy development must provide energy services as inputs for economic growth and social development considering environmental resources and addressing poverty alleviation.

4.1 The Main Objective

The main objective of the Energy Policy is to meet the energy needs of the Zanzibar population for social and economic development in an environmentally sustainable manner.

4.1.1 The overall objectives

- increase the energy efficiency within the energy sector of Zanzibar
- increase the supply of energy from indigenous renewable energy sources
- increase the reliability, affordability and independence of modern energy supply in Zanzibar
- implement a regulatory regime for the energy sector in Zanzibar to act as a coherent and coordinated framework for all development efforts within the sector
- achieve free market principles within the energy sector, with only well founded transparent regulatory interventions
- involve all main stakeholders in coordinated actions while considering related documents regarding the future social and economic development and poverty reduction in Zanzibar.

4.1.2 Specific Objective

Support the energy demand within the growth sectors of the economy in Zanzibar in particular, as specified in the Zanzibar Strategy for Growth and Reduction of Poverty.

5.0 Transition from Unsustainable Use of Wood-fuel to Modern Energy

As the majority of the households in Zanzibar are dependent on charcoal and firewood for their cooking activities, the pressure on the islands forest resources has become unsustainable. In addition, the high use of wood-fuel for cooking is recognised to create in-door pollution and health problems, mainly for women and children. There is therefore an urgent need for a shift from traditional use of wood-fuel to cleaner and affordable cooking fuels.

The population living in **rural areas** of Unguja and Pemba depends mainly on firewood and agricultural residues for their cooking purposes, and kerosene for lighting. Also in **urban and semi-urban areas** the use of fuel for cooking is predominantly wood-based, mainly composed of charcoal.

Experiences shows that there are clear differences between the barriers encountered in urban and rural communities with regards to fuel switching from traditional uses of wood-fuel to cleaner cooking fuels. The total cost of conversion to clean cooking fuel is likely to be substantially lower for households in an urban setting. The Energy Policy of Zanzibar acknowledges these differences.

5.1 Determined Sustainable Efforts on Long Term is Needed

The prevailing situation with high use of wood-based fuel for cooking has to be addressed. Control of illegal harvesting, distribution of fuel effective stoves, forest plantations for firewood production, etc. have been insufficient with little effect on the energy situation. Sustainable and broad solutions are needed for the transition from an unsustainable use of wood-fuel to other methods of cooking in households. Traditions, poverty, and lack of adequate infrastructure require a long-term policy for changes.

While action in urban areas should be initiated as soon as possible, the policy perspective for solutions for the rural energy situation should be long-term, reaching beyond the year 2020. Government shall ensure the institutional framework for an integrated effort among authorities, the private sector, and civil society organisations.

Policy Issue 1: Determined Sustainable Efforts on Long Term is needed

Policy Statement:

Energy uses by households and institutions shall be changed gradually from traditional towards modern energy sources such as electricity, LPG and all other forms of sustainable renewable energy

Strategy Statements

- i. Undertake a comprehensive baseline study of energy uses in Zanzibar households, schools, hospitals, bakeries, restaurants, and other wood-fuel consuming premises.
- ii. Encourage import, storage, distribution, and sales facilities of modern sustainable energy sources like LPG as well as equipment, primarily in urban areas.
- iii. Discourage the traditional use of wood-fuel by the hoteliers and other investors (bakeries, Military camps).

5.2 Financial support for Investment in New Technology to Overcome Lack of Cash by the Poor

The running costs for modern energy alternatives for cooking and lighting are favourable to marketed firewood, charcoal and kerosene, provided reduction in power losses and efficient distributions systems. The compact geography of Zanzibar makes it possible to reach most of the households with such modern energy. In the long run, local, renewable energy solutions would be developed for areas not accessed by the grid or distribution systems. It is acknowledged by the Energy Policy that lack of cash for up-front investment costs is the main barrier that discourages fuel switching among poor households.

Policy Issue 2: Financial support for Investment in New Technology to Overcome Lack of Cash by the Poor

Policy Statement:

Economical and financial incentives for investment in household energy equipment have to be developed to overcome the lack of cash by the poor

Strategy Statements

- i. Revise current regulations and levies in the energy sector and establish efficient and coherent rules for fees, and restrictions, facilitating the transition from use of traditional energy sources to modern.
- ii. Provide opportunities for poor and/or rural households to invest in modern energy technology via a special energy investment line for micro-finance institutions, banks and other financial institutions.

5.3 Changing Wood-fuel use and Introduce Stimuli for Businesses and Institutions

Among businesses like; bakeries and restaurants as well as institutions such as schools, hospitals, and prisons, the utilisation of wood-fuel is substantial.

Therefore, these represent an important target group for the medium-term perspective of the energy policy. Changing their present unsustainable energy use of technology are however likely to meet similar resistance as among the households. The costs for investments in modern energy would be substantial and the Government needs to provide ways and means to overcome these obstacles through the banking system or other financial channels. Also from an operational point of view, equipment for modern energy technologies need a different type of operating skills and knowledge for installation and maintenance, that will emphasise the need of education and training.

Examples of successful modernisation of the small scale rural industry and institutions may also play an important role in promoting the transition of the rural households toward use of modern energy.

Policy Issue 3: Changing Wood-fuel use and Introduce Stimuli for Businesses and Institutions

Policy Statement:

Zanzibar shall encourage efficient end-use technologies and good practices by businesses and institutions.

Strategy Statements

- i. Increase the efficiency in use of wood-fuel by urban and rural businesses and institutions through improving charcoal preparation and utilisation of energy efficient stoves.
- ii. Establish economic incentive schemes for businesses and institutions for supporting transition from wood-fuel to other energy sources.

5.4 Awareness Creation and Cooperation among Government, Business and Civil Society

Effective dissemination of information of the advantages with modern energy sources is a crucial part of the implementation of any energy policy. The activities have to be directed towards all stakeholder groups within the society, and applied at every stage in the development. Mobilisation for creation of awareness of the advantages with modern energy sources, education of children and youngsters, and implementation of demonstration projects have to take place parallel with provision of alternatives for cooking and lighting. Starting in and around urban and semi-urban centres with electrical grid, distribution facilities for LPG and/or renewable bio-fuel, local government and energy authorities in cooperation with civil society organisations should gradually over-win the resistance of the households to use alternative sources.

Policy Issue 4: Awareness Creation and Cooperation among Government, Business and Civil Society

Policy Statement:

The transition of energy uses among institutions and businesses in a medium-term perspective will be addressed by awareness creation and motivation of managers of businesses and institutions, education and training of their personnel in new technology, and financial solutions for investments in new equipments.

Strategy Statements

- i. Set up an awareness raising programme for the general public to create understanding and willingness to use modern sustainable energy sources instead of traditional energy sources such as firewood and charcoal.
- ii. Government institutions, private sectors, civil society organisations and NGO's shall cooperate to develop and implement awareness and training programmes for managers and leaders of institutions and businesses to facilitate the change.

6.0 Reliability, Affordability and Independence of Electrical Power Supply

Electrical power supply in Zanzibar is dependent on the 45 MW submarine transmission cable from mainland Tanzania to Unguja and on electricity production through diesel generators of 4.5 MW in Pemba. Frequent disruption in electricity supply has for long created constraints, in particular in Pemba. At present there is no backup-generation capacity. The breakdown of the submarine transmission cable in 2008, illustrates the serious problem that the lack of back-up capacity implies for the entire society of Zanzibar. The plan for a new 100 MW cable from mainland Tanzania to Unguja, and a 20 MW cable from mainland Tanzania to Pemba, would only partially solve the dependency problems. A number of policy challenges related to this issue have to be addressed by the Energy Policy.

6.1 Supply Security

In a short-term policy perspective the capacity issue has to be addressed. The present transmission cable cannot provide the demanded power leaving businesses, institutions and the general public, suffering from non-availability or shortage of power, voltage falls, and disturbances with serious consequences for the users. Lack of reliable electricity services hinders development of all businesses and in particular the important and service sensitive tourism sector. The 2008 power crisis may not be an isolated event.

Policy Issue 5: Supply Security

Policy Statement:

Power utility shall proceed to make sustainable arrangements for installation of back-up generation facilities, and to maintain an emergency plan for the necessary actions and priorities

Strategy Statements

- i. Assign the power utility to develop and present to the Ministry responsible for energy for approval of an emergency plan for handling the electricity situation in case of failure of supply from Mainland Tanzania.
- ii. Determine the minimum electricity supply for priority activities and users.
- iii. Investigate different options for back-up and emergency electricity generation.

6.2 Long-term Predictability of Price

There is an obvious need for Zanzibar to secure its power supply in short, medium and long-term perspectives. At present, the sole supplier of electricity to Zanzibar is the Tanzania Electric Supply Company Limited (TANESCO). This state owned utility regulated by the Energy and Water Utilities Regulatory Authority (ewura), applies the principles of “commercial customers” in its relation with ZECO. It is most likely that Zanzibar, also in the longer perspective, will remain dependent on import of power from Mainland Tanzania. The Government of Zanzibar shall initiate negotiations with the Government of Tanzania, ewura and TANESCO itself for measures and methods for stabilising pricing of electricity import from Mainland Tanzania. Such pricing must take into consideration the long-term dependency of Zanzibar on power supply and should reach beyond the pure commercial interests and conditions of TANESCO and ZECO. The pricing and delivery principles agreed on, have to be based on the socio-economic context between the two countries constituting the Union, as partners in development rather than between the two utilities applying short-term commercial principles.

Policy Issue 6: Long-term Predictability of Price

Policy Statement:

Pricing and supply reliability shall be determined by a long-term agreement between the Revolutionary Government of Zanzibar and Mainland Tanzania, in collaboration with the major utilities.

Strategy Statements

- i. Facilitate and negotiate a long-term agreement between TANESCO and ZECO for the electricity supply and pricing, based on the composite of different energy sources such as hydro, gas and renewable.
- ii. Include the issue of long-term electricity price in the duties of the planned Independent Energy Regulatory Authority.

6.3 Efficient and Progressive Utility

Zanzibar's electricity utility has a monopoly of the electricity services in accordance with the Zanzibar Electricity Act. The State, as the owner of the utility is undertaking necessary efforts to make the utility become an efficient corporation by considering all available options for strengthening of management and operations.

Policy Issue 7: Efficient and Progressive Utility

Policy Statement:

Zanzibar shall stimulate and promote opening up of the electricity power markets for competition.

Independent Power Producers (IPP) shall have access to the network for distribution to customer if necessary. Decentralised forms for distribution and maintenance of the network by local actors shall be promoted.

Strategy Statements

- i. Continue the efforts to make the power utility become a well functioning, effective corporation managing to keep electricity availability high and prices low with the main aim to increase the attractiveness of electricity to substitute more inefficient energy forms.
- ii. Facilitate potential institutional changes in the electricity sector, for example possibilities and interest for IPPs in Zanzibar. Consider advantageous conditions for licensing, financing and access to the grid for electricity generation facilities by IPPs.
- iii. Implement electrification strategies and plan along charge of tariffs reflecting the cost of providing services and allowing the private capital to make return on the investment.
- iv. Investigate the options for strategic alliance and partnership for strengthening power utility's capacity and competence to cope with technology, service and market changes.
- v. Implement and monitor the power utility turn around program for efficiency, services quality and financial sustainability.
- vi. Introduce long-term price guarantee for independent power producers for delivery of electricity to the grid.

6.4 Reducing Dependency

Although Zanzibar, as described above, is likely to be continuously dependent on import of electricity from mainland Tanzania, Zanzibar shall, in the medium and long-term perspective, make itself less dependent on fluctuating energy supply and prices by development of indigenous energy sources.

Investments in large-scale power generation have to be based on long-term perspectives. Generation of power, based on imported energy sources such as fossil fuels, convey risks. The risks are both economical by dependency on volatile world market prices, and financial by the hesitance of investors for such environmentally inferior, fossil based solutions. Such solutions are justifiable only on limited scale as back-up facilities to renewable and environmentally justified energy sources and as security measures to the existing import of electricity.

Generation of electricity based on other sources of energy such as sustainable production of bio-fuel and of municipal waste is a possibility. However, such large-scale production would be dependent on high investments costs, and for bio-fuel production also the availability of land and water.

Policy Issue 8: Reducing Dependency

Policy Statement:

The general overall principle on long-term basis strives towards reduced energy dependency, increased energy security, and full utilisation of indigenous energy sources, renewable and non-renewable.

Strategy Statements

- i. Develop legal instruments for promotion of public/private establishments of modern power plants based in Zanzibar.
- ii. Consider feasible opportunities, in long-term, for communities to arrange for provision of electricity locally.
- iii. Establish clear and tangible objectives for power utilities for development and utilization of renewable energy sources (solar, wind, bio-gas, bio-mass, wave and sustainable bio-fuel) for generation of electricity.

7.0 Exploring and Increasing the Use of Indigenous Sources for Energy Supply

All energy resources, except for firewood and agricultural residues, are imported to Zanzibar, including a large share of the charcoal. With marginal exception this situation will remain for a foreseeable future. However, the process for exploration and increase of indigenous energy sources and supply must start within the framework of the Zanzibar Energy Policy.

7.1 Exploration of Potential Fossil Reserves

Earlier investigations of Zanzibar' geology indicates possibilities of fossil reserves. Investors have showed interest for further investigations and exploration. In order to re-activate the exploration of fossil resources, the present arrangements for administration and benefit sharing shall be reconsidered.

Beside exploration of fossil reserves, it is of immense importance to closely follow the technological development in all areas of energy utilisation. Zanzibar shall be open to all types of opportunity sources for energy, including fusion and nuclear power.

Policy Issue 9: Exploration of Potential Fossil Reserves

Policy Statement:

Zanzibar shall establish its own legal and administrative enabling environment for further investigations and explorations and shall ensure full control of fossil reserves on its territory including exclusive economic zone.

Zanzibar shall actively promote and support exploration, up-stream production and supply of gas and petroleum products. Such exploration and production shall take environmental and socio-economic conditions in due consideration.

Zanzibar shall ensure collection and equitable distribution of revenues and use them to create lasting values for the entire nation.

Zanzibar House of Representatives shall ratify model of exploration and production contracts.

Strategy Statements

- i. Establish and implement Petroleum law and its regulations.
- ii. Develop a comprehensive plan and model for exploration for fossil fuels and determine the benefit sharing relations between the Government and investors in potential fossil fuel findings in Zanzibar.
- iii. Build institutional administrative and professional capacity to handle exploration of fossil fuels on land and off-shore, as well as renewable energy sources.
- iv. Develop comprehensive conditions for exploration and production in relation to International Laws and Conventions that comply on environmental conservation.
- v. Establish petroleum fund that will ensure equitable distribution of petroleum revenues between all the people of Zanzibar.

- vi. Establishing guidelines based on good governance, fairness and transparency in managing all contracts of exploration and production of petroleum and natural gas that will be ratified by the Zanzibar House of Representatives.

7.2 Indigenous Renewable Sources of Energy

Renewable energy sources are not dependent on finite resources, and will reduce harmful impacts on the local as well as the global environment. In addition, the uses of renewable energy sources are likely to create local employment opportunities.

The major renewable indigenous energy potentials in Zanzibar are assessed to be wind and solar power. During the last decade, wind power technology has taken a long leap forward and the economic attractiveness of such installations has improved substantially. Investigation of the most suitable sites for wind power generation in Zanzibar has to be implemented as soon as possible.

However, costs for investments in wind and solar powered electricity generation and adaption for compatibility to the distribution system are relatively high. In addition, wind energy will always depend on the power of the wind and its daily and seasonal variations. Therefore, wind based electricity generation has to be combined with other sources of electricity generation.

Large-scale solar power installations are rare in comparison with wind power. However, the technology is developing fast and solar power may become one of the economic and commercial solutions in the future, in particular in rural areas that are not connected to the electricity grid. The benefit from solar heaters in all areas is obvious.

On long term, wind and solar power can be assessed as a strong complement to electricity import from Mainland Tanzania and/or thermal energy based on indigenous fuel.

There is also an obvious potential for energy utilisation from wave.

The Zanzibar Energy Policy should consider support to plantations for production of wood-fuel. However wood-fuel production is controversial. While wood-fuel is in high demand and it is usefulness as main the source of energy, in the future the availability of this resource is doubtful. Promotion of modern energy sources such as LPG, ethanol, and electricity will in a long-term perspective reduce use of wood-fuel and possibly make it easier available for those who remain dependent on this source of energy.

As discussed above, the establishment of agricultural plantations for energy purposes is also an option, although the availability of land and water is likely to be insufficient. The Zanzibar Growth Strategy places the trust for economic growth on agriculture as one of the main sector and available land may be allocated primarily for this purpose.

In rural areas, agricultural residues are an additional source of energy. With increased agriculture production this material represents a non-negligible source for rural energy. Also efficient waste management in urban and semi-urban areas may contribute to the supply of energy. The technology is however complex and investments may be disproportional in regards to the expected volumes of household- and commercial waste.

Policy Issue 10: Indigenous Renewable Sources of Energy

Policy Statements:

Zanzibar recognises the potential for solar and wind power based electricity generation and will investigate suitable locations, and develop clear directions for exploration, public-private joint ventures, possibilities for connection to the grid and feed-in tariff guaranties for investors.

Zanzibar shall advance investments in the energy sector by attracting local and foreign investors by support from the Zanzibar investment promotion policies and through administrative priorities. In addition, cooperation with different civil society organisations and other development partners shall be further developed.

Zanzibar shall promote development of energy efficient uses of agricultural waste as well as of household and commercial waste. All innovative forms of energy transformation and use shall be facilitated by the energy administrative regime of the state.

Strategy Statements

- i. Investigate and actively promote cooperation with local and foreign investors for investments in the energy sector. Review the Foreign Direct Investment (FDI) promotion conditions.
- ii. Investigate and develop clear directions for exploration for solar and wind power plants, public-private joint ventures, possibilities for connection to the grid, and feed-in tariff guaranties for investors.
- iii. Investigate suitable locations for wind power plants through wind measures on sites in Unguja and Pemba with a potential for wind energy on land and at sea.
- iv. Continue and intensify the on-going work on solar PV, in particular in those areas where electricity through the grid is not yet available.
- v. Investigate opportunities for provision of energy via waste-to-energy or sea based energy generation. Implement a feasibility studies on these possibilities in Zanzibar.

- vi. Investigate and seek corporation in research programmes on renewable sources of energy in collaboration with other research institutions, NGOs, development partners and others.

8.0 Supporting Energy Demand in the Growth Sectors of the Economy

An important task for the Zanzibar Energy Policy is to promote the priority growth sectors of the economy. Such sectors, identified by the Zanzibar Strategy for Growth and Reduction of Poverty are agriculture, trade and tourism.

8.1 Energy and the Zanzibar Strategy for Growth and Reduction of Poverty

At present, the major part of the agricultural production is subsistence farming with only marginal value added to the economy of Zanzibar. In line with the Zanzibar Strategy for Growth and Reduction of Poverty; agricultural production should increase its commercial value by improving productivity, market orientation, new commercial products, etc. This implies that the need of energy for agricultural production is likely to be increased. Energy will be needed for irrigation, for application of modern methods in agriculture, for processing, storage, and for transporting agricultural products. Rural electrification will play a key role as the support to change in agricultural practices and to add value. Efficient and safe distribution of diesel and petroleum products is another necessity to achieve these developments.

The other main growth sector of the Zanzibar Strategy for Growth and Reduction of Poverty; is Tourism. High-class tourism is energy intensive. Storage of food, intensive lighting, air conditioning, provision of hot and cold water, modern kitchen facilities, etc. is highly dependent on electricity supply. Reliability of the supply is a key factor.

Furthermore, the ZSGRP declares that as to achieve the MDG's, energy is strategic in transformation of rural health, education, water, agriculture, and environmental issues.

The Government continue to address issues of good governance and national unity using its institutions.

Policy Issue 11: Energy and the Zanzibar Strategy for Growth and Reduction of Poverty

Policy Statements:

Zanzibar shall promote further electrification of rural areas. Extension of the electricity grid and supply of electricity to the farming society shall be undertaken in coordination with the agricultural authorities.

Development of energy supply facilities for electricity and other fuels shall reflect the Zanzibar Strategy for Growth and Reduction of Poverty and support the paced efforts by the responsible authorities and agencies. Priority shall be given to a coordinated cluster approach for modernisation and efficiency in these key growth sectors.

Strategy Statements

- i. Assign ZECO, to determine the objectives for the scope, time and level of completion for rural electrification. Priority should be given to the defined growth areas and undertakings in agriculture and tourism.
- ii. Establish Energy Master Plan in cooperation with concerned Ministries and in coordination with the Zanzibar Water Management Master Plan and the Zanzibar Irrigation Master Plan, as well as with other stakeholders.

8.2 The energy-intensive transport sector

The transport sector represents the necessary support to all economic activities. The main part of the imported petroleum and diesel is used by the transport sector. Availability of safe and standardised products is essential for efficient functioning of the sector. The licensed suppliers of petroleum products should ensure fair competition.

As a means to reduce the dependency of imported fossil fuels, sustainably produced bio-fuels can be used in the transport sector of Zanzibar. In many countries worldwide, a 5-10 % additive of bio-fuel such as ethanol or biodiesel (RME) in fossil fuels is now common, and is seen as the simplest way to increase the share of renewable energy in the transport sector. Several countries in Africa are currently distilling ethanol at significant scales.

Policy Issue 12: The energy intensive transport sector

Policy Statements:

Zanzibar shall stimulate a competitive fuel market and ensure fairness conditions for all licensed businesses of petroleum products.

Zanzibar shall address the prevailing market disturbance by restraining free actors practicing illegal import and theft. Safe and reliable fuel distribution services shall be extended to all parts of Zanzibar.

Zanzibar shall promote uses of bio-fuels as additives to transportation fuels for reduction of fossil fuel uses and as an environmental friendly substitution to lead in fuels.

Strategy Statements

- i. Perform a study of the Zanzibar market for petroleum products with regards to accessibility and quality of the products in rural and urban

areas of Unguja and Pemba. The study shall include proposals on actions for improvements.

- ii. Investigate the possibilities to facilitate the introduction of modern bio energy fuels in Zanzibar (ethanol, RME etc.) and promote distribution and overall availability of unleaded petrol.
- iii. Ensure the timely supply of quality fuel for the transport sector by fair competition among the petroleum companies.
- iv. Establish a Zanzibar Petroleum law and set up rules and regulations regarding import and supply of petroleum fuels in order to eliminate obstacles and simplify regulation for lowering the costs of fuel for the transport sector.

9.0 Coordination and Regulation of the Energy Sector

The energy sector, being one of the most important sectors of the economy and society is traditionally subject to diverse regulatory measures. Beside the Ministry responsible for energy, which has the main responsibility for policy, legislation, and regulations, several ministries and authorities of the Government are involved in the governance and regulations of the sector. The Ministry of Finance and Economic Affairs controls taxes, levies, road fund, licensing, and customs. The Ministry responsible for Transport controls the road tax and vehicle standards. The Ministry responsible for Environment and Forestry influences the production and supply of wood-based fuel, controls the environmental aspects.

Coordination among the multiple actors in the energy sector is a challenge. Efficiency in the regulatory system, avoidance of conflicting or overlapping measures, clarity and c of conditions in the sector will need strong coordination. Taking into consideration the limited professional and economical resources available to Zanzibar, both regulatory and development tasks of the energy sector will have to be entrusted to a sole energy regulatory authority, as one of the main institutional instrument for implementation of the energy policy.

Among these tasks can be mentioned issues such as; licensing of energy related undertakings, control of safety, storage and installations, monitoring market efficiency, distortion and disturbances; undertaking of market interventions, regulating energy tariffs, administrating financial incentives such as subsidies, guaranties, non fiscal levies, and fees, promoting development of rural energy, renewable energy and utilisation of indigenous sources, awareness creation and energy efficiency measures. The function of acting as a negotiator with Mainland Tanzania on electricity prices is as well important. Further important tasks of the regulatory authority are to ensure and coordinate development of human resources and competence needed for a modern energy sector as well as promotion of production of energy related products in Zanzibar. In addition, the body will deal with relations to and representation on the international energy arena.

The regulatory body shall be given independent status particularly in relation to market operators in the energy sector such as ZECO, petroleum companies, IPPs, suppliers of bio-fuel, etc. It should be governed by an independent Board of Directors or Commission with the mandate to decide on all issues within the jurisdiction of the regulator.

The energy regulator may gradually take form of multi-sector regulator by adding new regulatory functions to the existing body. Such new functions could be regulation of the water sector (as it is organised in Mainland Tanzania) or even a broader constellation including the ITC sector and others. In order to reduce complexity and costs for performing some technical functions the Zanzibar energy regulator can consider partnerships and cooperation with institutions, authorities and agencies of the Union and in the East African Cooperation.

Policy Issue 13: Coordination and Regulation of the Energy Sector

Policy Statement:

Zanzibar shall strive to achieve functioning coordination among and between the stakeholders within the energy sector by the establishment of a coordinated regulatory system of the sectors.

Strategy Statements

- i. Establish a sole energy regulatory body for Zanzibar. The regulatory body shall be governed independently by its board or commission, as an independent regulator (authority) under a relevant Ministry or a specific regulatory department within the concerned Ministry. The regulatory authority shall be adequately resourced for the broad range of tasks it shall perform.
- ii. Determine the scope of jurisdiction, the duties, functions, and mandates of the energy sector regulatory body with respect to all relevant energy areas, and its function regarding international relations and representation.
- iii. Develop and implement an Act which will establish the energy regulatory body and define its duties, functions, and mandates.

10.0 Energy Markets and Market Interventions in Zanzibar

Rational pricing principles are one of the most important elements of the energy policy. Prices and tariffs must reflect costs in order to enable operators of all kind of energy to carry out their businesses, maintain their infrastructure, and invest in the future. At the same time, energy prices and tariffs are influencing the whole economy heavily and are affecting the standard of living conditions for all. Energy prices are determinants for investments in different

sectors of the economy particularly in transport, hotels and resorts, and value added agriculture.

10.1 Interventions by Government and Society

Zanzibar's basic development principle for a modern society is a free and sound market economy. In theory, market mechanisms deliver the needed goods and services of the society, allocate the resources rationally, and stimulate social and economical mobility. However, markets are seldom free and sound. Monopolies, oligopolies, unbalanced powers between producers, distributors and customers, blockades of available resources, etc. distort markets and create inefficiency and inequalities. Also, market forces do not always and not automatically support societal priorities. Development of certain priority sectors, protection of environment, defence of the poor, etc. is not necessarily in line with short-term market interests. Therefore, society as a whole and Government in particular needs to intervene. Such interventions have to be applied with transparency, rationally and consequently.

Policy Issue 14: Interventions by Government and Society

Policy Statement:

Zanzibar shall rely on and promote the principles of free and sound energy markets as the primary driving force for the economy and society. Interventions in the energy markets, when and if necessary, will be carefully analysed, transparent and consequent.

Strategy Statements

- i. Perform a thorough review and analysis of the existing market interventions (levies, fees and subsidies) within the energy sector in Zanzibar. The analysis shall cover both direct and indirect interventions, and propose changes and adjustments if found necessary.
- ii. Promote establishment of new businesses and competition among all commercial actors in the energy sector.
- iii. Review all regulations on issuing licenses, permissions, and other administrative arrangements with the purpose to simplify and stimulate markets and competition in the energy sector.

10.2 Regimes for levies

In all countries, developed and developing, energy market prices are subject to tax regime. Taxes may serve purely fiscal objectives i.e. generating revenues to the Government and society. Taxes also have market regulating objectives i.e. making certain products less attractive and more difficult to purchase and consume, and vice versa. Taxes on electricity are used mostly with the objectives of generating revenue and sometimes for cross subsidising purposes (between commercial and domestic sectors or between fossil fuels and renewable energy). Taxes on petrol and diesel often represent regulatory

purposes for decreasing consumption of fossil products (for environmental, safety and climate change reasons).

Taxes and levies shall be used for the transition from traditional energy sources towards modern energy sources. Contradictory, while modern energy products such as electricity, petrol, diesel, gas, and kerosene are carrying heavy burden of taxes and levies, the traditional energy such as firewood and charcoal are produced, marketed, and used on the expense of the common resources. This dilemma needs be taken into consideration while forming the tax regime for energy products.

Policy Issue 15: Regimes for levies

Policy Statement:

Zanzibar shall sustain levies and fees on energy products equitably. The use of levies and fees on energy products for fiscal and regulatory purposes shall be carefully examined on socio-economic, climate and environment protection considerations.

Strategy Statements

- i. Develop the energy price control model as a first priority for petroleum products and electricity to be executed by the Energy Regulatory Body.
- ii. Establish and implement quality-monitoring system for the fossil fuel (petroleum) products.
- iii. Stimulate private sector engagement in the energy sector by reviewing the foreign investment promotion rules and introducing government guaranty schemes.

10.3 Subsidies and Incentives in Energy Market

Subsidies are the opposite of taxes and levies. They are mainly Government expenditures aimed at easing market prices for specific products or for categories of people in the society. Subsidies may facilitate consumption or use of specific products or stimulate investments.

Subsidies are necessary for promotion of sustainable development, economic equalities, and in some cases to facilitate change. Subsidies are inevitable particularly for enabling the poor to take part in the use of modern energy sources and to stimulate change in traditional behaviour. Subsidies can appear in many forms e.g. direct subsidies to producers or consumers of goods, services or processes, tax exemption, price differentiation, guaranties, etc. Even differences of taxes for certain products can be seen as subsidies of the one with the lower tax.

Policy Issue 16: Subsidies and Incentives in Energy Market

Policy Statement:

Zanzibar shall apply subsidy regimes for stimulating investments in and production of renewable energy sources, to facilitate the accessibility of modern energy products and services to all inhabitants, to enable the poor to use modern energy for economic undertakings and to make the minimum of modern energy affordable for all.

Strategy Statements

- i. Investigate experiences of energy subsidies and levies of neighbouring countries and in the region.
- ii. Develop a scheme for public sector subsidies to grid extension and connection of rural and low-income consumers.
- iii. Introduce a scheme for subsidies for storing and distributing small size LPG gas tubes by the petroleum companies and in rural municipality deposits.

10.4 The Danger of Market Intervention and Price Control for Monopolies

Prices determined by markets can be heavily manipulated by taxes and subsidies. Such manipulations always distort the market forces and have to be seen as temporary measures, subject to revisions, and changes should be carefully monitored and analysed.

Due to the limited size of the energy market in Zanzibar, electricity supply is a legal monopoly and there are certain risks for oligopoly situations even in other areas of the energy market such as petroleum and gas. In the best interest of the public, Government may use instruments such as cost-plus pricing principles or price caps in order to control and avoid misuse of the monopoly or oligopoly positions.

Policy Issue 17: The Danger of Market Intervention and Price Control for Monopolies

Policy Statement:

Zanzibar shall through the energy regulatory body monitor and control energy prices. Price control instruments will be applied evidently and transparently.

Strategy Statements

- i. Perform a thorough review and analysis of the existing market interventions (levies, fees and subsidies) within the energy sector in Zanzibar. The analysis shall cover both direct and indirect interventions, and propose changes and adjustments if found necessary.

- ii. Review all regulations on issuing licenses, permissions, and other administrative arrangements with the purpose to simplify and stimulate markets and competition in the energy sector.
- iii. Stimulate private sector engagement in the energy sector by reviewing the foreign investment promotion rules and introducing government guaranty schemes.

11.0 Increased Energy Efficiency

Energy efficiency improvements refer to a reduction in the energy used for a given service or level of activity, usually associated with technological changes or organisational and managerial improvements. It is a wide concept stretching from the management of infrastructure of the utility to the stoves of the rural households, representing opportunities for short payback periods on investments, reduced need for establishment of new energy generation, and positive effects on environment and climate change. However, energy efficiency is first of all a matter of individual behavior and reflects the rationale of energy consumers. Avoiding unnecessary consumption of energy or choosing the most appropriate equipment to reduce the cost of the energy helps to decrease individual energy uses without decreasing individual welfare.

The present use of energy in Zanzibar can to a substantial degree be improved by means of energy efficiency. Future interventions for increased energy efficiency will be seen as key measures in all areas of the society, such as use of petroleum products in the transport sector, and the use of different energy sources in industries, hotels, institutions, and in the domestic sector.

11.1 Energy Efficiency in the Domestic Sector, Businesses and Institutions

More than 80 % of the total energy uses in Zanzibar are within the domestic sector. There is therefore an obvious need to address the energy efficiency potential in the domestic sector, such as through promotion of efficient cooking stoves, energy efficient lighting equipment, and activities towards behaviour change of individuals concerning their energy uses. The activities shall be combined with subsidies as to affect a broader demographic range and prompt more widespread fuel switching. Subsidies that target the fixed costs of fuel switching (e.g. investment) offer such a potential.

In businesses and institutions, there are substantial potentials for energy efficiency measures, such as use of efficient lighting equipment, modern air conditioners, solar water heaters, and through awareness creation towards management and staff. The need for fuel switching from fuel-wood to modern energy sources for cooking is prevailing also for businesses and institutions.

Efficient use of energy is highly dependent of the quality and function of the equipment, particularly trucks and cars in the transport sector. The use of a large number of old vehicles in Zanzibar results in an unnecessary high unit

consumption of petroleum products, and in a negative impact on the environment and the global climate.

Equipments such as stoves, fridges and air conditioners of older models are often inefficient and uneconomical from an energy point of view.

Policy Issue 18: Energy Efficiency in the Domestic Sector, Businesses and Institutions

Policy Statement:

Zanzibar shall have an Energy Efficiency Strategy for all sectors of the economy and society, incorporating effective dissemination of awareness creating activities on benefits of increased energy efficiency.

Strategy Statements

- i. Develop an Energy efficiency Master Plan for households, businesses, institutions and Government, with the aim to address the most effective means to increase energy efficiency within the Zanzibar society.
- ii. Stimulate import of energy efficient appliances (including energy saving bulbs) by lowering custom tariffs and taxes for such products.
- iii. Promote use of energy efficient and renewable energy solutions in the commercial farming and tourism businesses.
- iv. Organize within the Energy Regulatory Body a permanent team of energy efficiency experts.

11.2 Support to Standardisation of Energy Efficient Appliances

Low quality products are at present dominating the market for energy appliances in Zanzibar. In addition, there is a lack of adequate indigenous capacity to design, manufacture, market, distribute as well as install and maintain energy efficient technologies and in particular renewable energy technologies. As described above, there is also a low level of awareness and understanding of available practices, technologies and resources, thus contributing to reluctance towards utilisation of energy efficient appliances. There is a need to address economic, cultural, and social barriers on the local capacity to design, develop, manufacture, market and provide suitable technologies and after-sales services. Norms, codes of practice, guidelines and standards have to be further developed to facilitate the creation of an

enabling environment for safe use of energy efficient appliances and in particular appliances based on environmentally friendly technologies.

Policy Issue 19: Support to Standardisation of Energy Efficient Appliances

Policy Statement:

Zanzibar shall set limits for standards for import of trucks, cars and vehicles.

Zanzibar shall introduce limits on standards for import of electrical appliances. Energy efficient equipment shall be promoted by lowering import duties for such goods.

The development of norms and standards will be further enhanced to facilitate the creation of an enabling environment for safe use of high quality energy efficient appliances and in particular appliances based on environmentally friendly technologies.

Strategy Statements

- i. Review import volumes, types and administrative arrangements (customs, tariffs, permissions, licences, etc) for all major equipments requiring petroleum or electricity for its operation.
- ii. Initiate development and establishment of minimum energy efficiency standards for all type of equipment (including lighting) operated by electricity. Assess the electrical appliances delivery systems and ensure access to good standard equipment for households as well as businesses.
- iii. Increase custom tariffs for import of energy demanding equipments below the specifically defined standards for each category.

11.3 Institutional Support to Energy Efficient Technology

As described above, a major obstacle for development and market up-take of energy efficient technology is a short and medium-term negative cash flow. The cost of the initial investment in equipment is likely to be higher compared to other technologies, and the return on investment due to comparably lower operating costs is usually based on medium or long-term. Financing the investments is therefore a main challenge of the energy policy.

On a small scale; micro-finance institutions can play an important role in facilitating investments in energy efficient equipment such as small gas tubes,

improved stoves, and simple electrical boilers/kettles. For bigger investment there is a need for special credit lines or a financial institution such as a Renewable Energy and Energy Efficiency Fund.

Policy Issue 20: Institutional Support to Energy Efficient Technology

Policy Statement:

Zanzibar shall promote financial arrangements through the banking system, micro-finance institutes or specific financial institutions to make funds available for investments in energy efficiency and in generation of renewable energy.

Strategy Statements

- i. Stimulate import of energy efficient appliances (including energy saving bulbs) by lowering custom tariffs and taxes for such products.
- ii. Introduce in cooperation with the banks a special low interest credit line for energy efficiency investments by households and business.
- iii. Establish a Renewable Energy and Energy Efficiency Fund co-financed with development partners, development banks and the use of Clean Development Mechanism.

12.0 Development of Human Resources for Administration, Service and Maintenance in the Energy Sector

A continued development of energy related competence is of crucial importance to support the implementation of the Zanzibar Energy Policy. Government will need new competence for designing and executing administrative and regulatory measures by existing and new institutions. Competence will also be needed in institutions and civil society organisations for creating awareness and understanding of the benefits of transition from traditional to modern energy uses.

The awareness of the benefits of energy efficiency, and the advantages of modern energy services, needs to be supported by competent demand side management, good services, and maintenance of equipment.

To achieve the vision of the energy policy, technology improvements in all sectors of the Zanzibar society will be needed. This imply improved production and uses of firewood and charcoal on a short-term basis, to its transition towards modern energy sources, and the establishment of wind power generation on a medium-term. Human resources all over the islands would need to be trained. While the Government needs to take the initiative and the

first steps, the private business sector would have to be the main actor and carrier of this movement.

The development of human resources is a key condition for using the potential for employment creation within the energy sector. Education is a key input to any country's sustained development. Energy education in schools curricula, vocational training centres, colleges and other relevant learning institutions shall be encouraged.

The structural changes and growth in the energy sector would open new possibilities for entrepreneurship in services and production. It is of immense importance that Government and private sector cooperates closely in order to drive this development and to exploit new opportunities. Wherever possible, partnerships and cooperation with organisations outside of Zanzibar shall also be considered as a means to reduce costs, and speed up the human resource development through exchange of know-how.

Policy Issue 21: Development of Human Resources for Administration, Service and Maintenance in the Energy Sector

Policy Statements:

Zanzibar shall drive and promote development of energy related competence and human resources.

Zanzibar shall direct co-operation between the energy sector and other sectors of Government and society, for education and training.

Zanzibar shall promote cooperation with business associations and corporations for active participation in competence development and supply of trained personnel throughout Zanzibar.

The Zanzibar Energy Policy shall direct development of public-private partnership for development of new business undertakings, employment creation and the promotion of innovations and entrepreneurship related to the energy sector.

Strategy Statements

- i. Formalise the database information system for monitoring and evaluation of the energy situation in Zanzibar
- ii. Carry out training needs assessment (TNA) providing guidance for a necessary capacity development within the responsible Ministry. Competence within other important governmental stakeholders should also be considered.

- iii. Establish agreement with any energy investor including oil exploration companies to set-aside special funds for human resources development as well as training and capacity building schemes.
- iv. Establish relations with regional and international energy development institutions for long-term support and capacity building in the energy sector.
- v. Initiate and develop cooperation with bilateral and multilateral donors for long-term financial commitment and support to the energy sector administrative and infrastructure capacity building.
- vi. Develop curriculum for energy related vocational training at mid level and at higher-level educational institutions.
- vii. Establish public private partnership energy forum for consultation and communication regarding business development for production, supply, distribution and maintenance of a good energy product including from small electricity generation equipment for efficient energy utilisation.
- viii. Investigate the possibilities for local community Energy Cooperatives with the potential to supply energy related equipment, provide electricity services by subcontract with power utility, organise maintenance.

13.0 Cross Cutting Energy Policy Issues Regarding Environmental Sustainability, Gender Issues, and Energy Industry Development

All uses of energy have consequences on our surrounding society, irrespective of if dealt with from an economic, social, political, or environmental perspective. This is illustrated by the fact that seven of the eight Millennium Development Goals (MDGs) have been identified to be linked to energy services. The MDGs ranging from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the countries in the world.

However, it has to be realised that an Energy Policy cannot embrace all conceivable effects on health, environment, or other sectors of the society. This has to be dealt with only in cooperation with other sector policies etc.

13.1 Specific Environmental and Climate Considerations

The goal specified in the Environmental Policy of Zanzibar 1992 is to protect and conserve the environment, mainstreaming the environmental norms into development projects, and to raise environmental awareness in Zanzibar.

Energy uses are causing a substantial amount of environmental damage to air, soil, water and climate. The effects of over-consumption of wood-fuel on forests and vegetation, as well as that of combustion of fossil fuels on the global and local climate are well known and have been discussed previously in this energy policy. It is of outmost importance for a sustainable development of Zanzibar that all energy related activities planned for and implemented are realised only with due consideration to the environment.

The global climate is undergoing a process of change mainly due to the significant rise in temperature of the earth over the last decades. An increase in the mean temperature has the consequence, for example, that the sea-level rise and that there are changes in rainfall patterns. Zanzibar as being a low-lying island with arid regions, and a reasonably large share of the population living along the cost, is likely to be among those countries that are most vulnerable to climate change.

There is a worldwide consensus that emissions of greenhouse gases (GHG) are causing the global temperature to rise. To help stimulate investments and the implementation of environmental friendly technologies that eventually will support the global reduction of GHGs, the Clean Development Mechanism (CDM), a global instrument for reducing greenhouse gas emissions, may be of interest for Zanzibar. It would be one of the tasks of the energy regulatory body to identify and negotiate CDM agreements.

Policy Issue 22: Specific Environmental and Climate Considerations

Policy Statement:

Zanzibar shall consequently promote environmental security and sustainability when planning for energy related measures. Environmental impact assessments shall be a requirement for all energy programs and projects.

Strategy Statements

- i. Require an Environmental Impact Assessment (EIA) prior to all energy related programmes/projects implementation. For larger programmes/projects a Strategic Environmental Assessment (SEA) shall be necessary.
- ii. Energy Authorities shall actively search for possibilities to adopt on Clean Development Mechanism projects.
- iii. Ensure that the Code of Conduct for Government offices and State Owned undertakings shall include energy saving efforts for reducing negative impacts on environment.
- iv. Make necessary efforts to introduce, in cooperation with the petroleum distribution companies, bio-fuels and bio-fuel mixes in order to reduce CO₂ emission in the transportation sector.

- v. Promotion of renewable energy (with no CO₂ emission) for electricity generation shall be a leading program for ensuring energy security.
- vi. Develop in cooperation with the Department of Forest an action plan to counter the depletion of forest areas for production of charcoal and firewood.

13.2 Gender Issues, HIV/AIDS and other chronic diseases in the Energy Sector

Energy development is likely to have different impact on women, men and vulnerable groups. More efficient stoves, water pumping and agro-processing can reduce women's workloads and improve their health. Better lighting can extend the day for productive work and strengthen education and health services. Irrigated agriculture can provide better income-generation and employment opportunities. Elimination of indoor air pollution and of the need to spend time and efforts for collection of cooking fuel by switching from cooking with traditional use of wood-fuel to modern energy sources can also be considered as a benefit for women.

Policy Issue 23: Gender Issues, HIV/AIDS and other chronic diseases in the Energy Sector

Policy Statement:

The Energy Policy of Zanzibar emphasises on sustainability, equity and equality as explicit goals.

Strategy Statements

- i. Apply and support Government policy and action plans for fighting HIV/AIDS, malaria, and TBC diseases in all parts of the energy sector.
- ii. Consider gender aspect and representatives from vulnerable groups participating in the process of implementation of energy policy strategies.
- iii. Develop a health index in cooperation with the Ministry of Health in order to measure the effects of wood and charcoal uses.

13.3 Promotion of Energy Equipment Industry, Research and Development by Regional and Global Cooperation

Large-scale development of the energy sector in Zanzibar would require a substantial share of investments, foreign as well as domestic. Such investments should also provide possibilities for establishment of energy related equipment production within the Zanzibar.

Research and Development of modern energy technologies is a global issue. However, an adjustment to prevailing local and regional conditions requires qualified field based experiences and research. Zanzibar and Mainland Tanzania should coordinate such efforts in order to be able to create the "critical mass" for these undertakings.

Policy Issue 24: Promotion of Energy Equipment Industry, Research and Development by Regional and Global Cooperation

Policy Statement:

Zanzibar shall aim at strengthening cooperation and joint ventures between Zanzibar and mainland Tanzania in establishment of energy related industries, research and development. Zanzibar shall also seek participation in a regional and global context.

Research, technology development and pilot programmes shall be observed and followed in cooperation with other concerned states and actors. Zanzibar shall promote preparedness for such programmes and installations on the islands.

Strategy Statements

- i. Stimulate investments, business development and joint ventures for local production of products related to energy supply and energy efficiency.
- ii. Investigate and actively seek cooperation in research programmes for renewable and non-renewable energy sources etc. through contact with research institutions, NGOs, development partners etc.

14.0 Responsibilities of the Various Sectors in the Implementation of the Energy Policy

In order secure smooth and efficient implementation of the energy policy, the department responsible for energy should collaborate with other Government and private institutions in planning and implementation in utilisation and control of energy resources.

14.1 Ministry Responsible for Energy through its Relevant

Department

- i. To be an executive agent of all energy sub-sectors
- ii. To develop and supervise the implementation of the energy policy
- iii. To ensure that there is a close corporation with the established energy related institutions
- iv. To provide the needed assistance to established institutions to promote energy policy implementation
- v. To provide assistance to health education programmes to enhance promotion of awareness to the community on the effects of unsafe utilisation of energy resources.
- vi. To encourage people to use renewable energy resources in sustainable manner.
- vii. To influence other energy related institutions in the implementation of the energy policy
- viii. Advise the government on energy related issues
- ix. To act as a consultant to other sectors in issues related to energy development

14.2 Ministry Responsible for Agriculture, Forestry and Environment

Collaborate with the Department responsible for energy to ensure that energy uses do not harm the environment. Also to protect, conserve and develop forest resources for social, economical and environmental benefit.

14.3 Ministry Responsible for Transport

Collaborate with the Department responsible for energy to ensure timely supply of quality fossil fuels and is used in an environmentally friendly.

14.4 Ministry Responsible for Education

To ensure production of relevant technicians to cope with the market demand through the educational institutions and system so as to support the technical capacity of the energy sector. Also to develop awareness programmes on issues related to energy and its proper use.

Promote relevant research and studies in collaboration with the Ministry responsible for energy and any other relevant institutions.

14.5 Ministry responsible for Regional Administration

- i. To mobilise the community in implementation and monitoring energy services in district and regions
- ii. To support the sectoral plans in the regions that have been nationally approved with interest to the energy issues.

14.6 Ministry Responsible for Health

Educate the community of the hazards caused by different energy usage.

14.7 Ministry Responsible for Good Governance

Collaborate with the Department responsible for energy in the preparation of all Petroleum exploration and production contracts and any other energy related contracts.

14.8 Ministry Responsible for Disaster

Collaborate with the Department responsible for energy to ensure timely efficient handling of all disaster from Petroleum exploration and production and any other energy related disasters.

14.9 Role of Other Stakeholders

Effective implementation of any policy depends on transparency on assigning roles and responsibilities to different stakeholders. Inter-coordination is extremely important, since energy involves various government institutions, local authorities, private sectors, NGOs and development partners.

The development partners' roles comprise that of providing support in the implementation of the energy policy, related strategies and programmes.

Raising national awareness to support the implementation of the energy policy can be successfully achieved through civil societies.

Private sector is expected to take a leading role in the provision of energy in the areas where other authorities have a difficulties or not capable of doing so. Full dialogue and participation of the private sector with other stakeholders, energy policy objectives will be realised.

15.0 MONITORING AND EVALUATION (M&E)

Monitoring and evaluation exercises need to be carried out on an annually basis, as to analyse the outcomes of the policy and its implementation strategy. The exercise will provide information on the extent to which the policy is being implemented, and on the progress being made in achieving the Zanzibar Energy Policy objectives.

The policy will be reviewed after five years after its approval by the Cabinet. The responsibility for the overall review is assigned to the Ministry responsible for energy.

Output and outcome planning, monitoring and evaluation are required at all levels from policy making to implementation. Although some of the issue encountered would be solved administratively, some will need to be taken to the policy level for solution. This means that the policy level needs its own targets, performance indicators, especially about impacts and outcomes, issues like the level of investment made in the sector per years, assessment of social, economic and environmental impacts will require to be monitored at the policy level, thereby necessitating availability of data on a regular basis.

The policy proposes that the system of result and outcomes monitoring and evaluation be adopted at the policy level. This system shall be based on minimal indicators that can be tracked at the policy level but be adequate to give key signals about performance of the energy sector.

Within the Ministry responsible for energy, monitoring of this policy and its evaluation shall be undertaken by the responsible Sector for energy. This Sector shall produce regular reports as part of the policy implementation and monitoring role.

At the highest level, it is the responsibility of the Ministry responsible for Finance under ZSGRP Monitoring Master Plan to monitor and evaluate all government policies. The policy monitoring systems has to be enhanced to incorporate energy monitoring and evaluation systems. These systems shall be used to monitor and evaluate the successes and failure of implementing this policy and its effectiveness in achieving the desire objectives.