UPDATED FINAL REPORT

MINISTRY OF ENERGY AND MINERALS

Joint Energy Sector Review (JESR) 2012/13

Preface

Based on a frame agreement with Sida[1] (Swedish International Development Cooperation Agency), the Swedish consultant Pöyry SwedPower AB has been engaged by MEM (Ministry of Energy and Minerals) to carry out consultancy services for the Joint Energy Sector Review (JESR) 2012/13 for Tanzania.

The assignment has been carried out by a Pöyry Team including

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[1] All abbreviations used in this report can be found in Appendix 4

Summary

This Updated Final Report is the main result of Pöyry SwedPower's consultancy services for the Joint Energy Sector Review (JESR[2]) 2012/13 for Tanzania. The Joint Energy Sector Review is a key element for coordination, planning and financing of the energy sector. It establishes a common basis for monitoring the performance and set the priorities of the energy sector. The Ministry of Energy and Minerals (MEM) in collaboration with the Development Partners (DPs) have been facilitating JESR's since 2007.

The overall objective of the study is to review the overall performance of the energy sector since the last JESR, the implementation of the energy policies and strategies, sector governance and financing structure.

The Tanzania Development Vision 2025, published by the Planning Commission in 1999, is still a main strategy document in order to outline the general development for Tanzania.

For the electricity sector the last year was dominated by the Emergency Power Plan (EPP) and TANESCO's financial situation. The planned generation capacity increase was fulfilled to 40% mainly due to changes in plans. An update of the Power System Master Plan was published and the Big Results Now Initiative (BRN) was started. BRN focus on a number of key projects and a major structural change of the electricity sector. The most important projects in the short run are natural gas fired power plants at Somangafungu (Kilwa) and Kinyerezi.

Main focus for the gas sector is also given in the BRN, and that is about the new gas supply to Dar es Salaam based on:

- New gas processing plants in Songo Songo and in Mnazi Bay
- New pipeline from Mtwara to Dar es Salaam passing Somangafungu where the new pipeline from Songo Songo connects

This project should be finalised before the end of 2014 in order to supply the new power plants. It is the most important energy project in Tanzania at the moment. The project is on track.

The renewable sector consists of a number of project developers and a huge number of projects, whereof many with financing. For the future there is a good potential for improving and develop the biomass, wind power and small hydro sectors as well as increase over-all energy efficiency. In the long term perspective also geo-thermal energy can be of importance for Tanzania. Recommendations for further development of the sector are elaborated.

Financing of the energy sector's expansion is based upon a mix of loans and grants both from the Development Partner Group and from other organisations.

Finally there seem to be some communication problems between authorities, TANNESCO and some project developers concerning the development process for new projects. These problems have to be solved in cooperation between the actors.

[2] All abbreviations used in this report can be found in Appendix 4

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Annexes

1 INTRODUCTION

1.1 Background

The Joint Energy Sector Review (JESR[3]) is a key element for coordination, planning and financing of the energy sector in Tanzania. It establishes a common basis for monitoring the performance and set the priorities of the energy sector. The Ministry of Energy and Minerals (MEM) in collaboration with the Development Partners (DP's) have been facilitating JESR's since 2007. The exercise is carried out annually to give a general overview of the sector performance to the public and private stakeholders involved in the energy sector. It should also generate inputs for the General Budget Support (GBS).

Starting with the 2009/10 JESR, the annual report has covered the fiscal year July-June. Hence this 2012/13 JESR report will primarily cover the period July 2012 - June 2013 and an outlook on the period July 2013 - June 2014.

1.2 Objectives

The overall objective of the study is to review the overall performance of the energy sector since the last JESR, the implementation of the energy policies and strategies, sector governance and financing structure. Specifically the study intends to:

- Provide an update on the current situation of the energy sector and assess progress made since last JESR and the Energy Temporary Process Actions (2012) including outcome Indicators agreed during the previous annual review.
- Review actions taken by the GoT and the EDPs since the last JESR (2012) on energy sector governance and the sector's financing structure.

1.3 This JESR Process

1.3.1 Fact Finding

The consultant has carried out desktop analysis of available documentation and then held some thirty meetings with main stakeholders in Dar es Salaam in the end of August 2013 and after that prepared a draft final report that has been sent out for comments.

1.3.2 Final Report

The Final Report was delivered and presented to the client before the Stakeholders' Workshop. The consultant has incorporated comments on the Draft Final Report in this revision.

1.3.3 Stakeholders' Workshop

The consultant will assist MEM in preparing, organising and implementing the 2013 JESR Stakeholders' Workshop. This report will be presented as a background for the discussions at the Workshop.

1.3.4 Updated Final Report

After the Stakeholders' Workshop, the consultant presented this Updated Final Report with notes from the discussions and results from the group work. This revison also includes a road map for the implementation of the 2012/13 JESR as well as a proposed set of indicators, by which the performance of the sector could be measured.

[3] All abbreviations used in this report can be found in Appendix 4

2 OVERALL SECTOR REVIEW

2.1 Energy Consumption and Supply in Tanzania

Tanzania is a country in transition from an agricultural-based economy to a country with a more mixed economy. The current energy situation is shown as sector wise energy consumption in Figure 1.

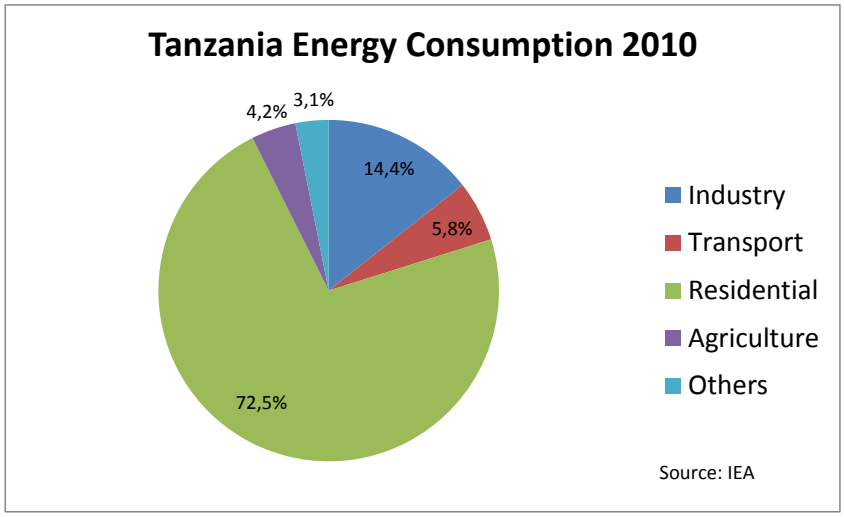

Figure 1: Tanzania Energy Consumption 2010 (Source: IEA)

The picture shows that the residential sector consumes about ¾ of the total energy consumed. This high residential proportion of the total energy depends on two things: 1) the use of firewood and charcoal for cooking using rather inefficient stoves and 2) the low total energy consumption.

Figure 2 shows the primary sources of energy supply, with nearly 90% biomass.

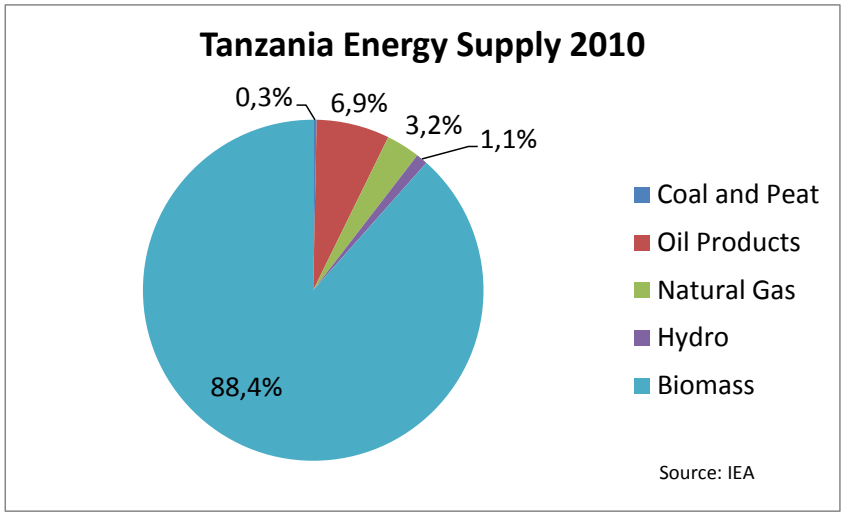

Figure 2: Tanzania Energy Supply 2010 (Source: IEA)

The picture shows clearly that biomass is the dominating energy source today. The use of charcoal is small compared to the use of firewood. However, roughly 20% of the total biomass energy supplied is lost during conversion of biomass to charcoal. In the future, with much higher total energy consumption and less use of firewood and charcoal in inefficient stoves, the proportion of biomass will be reduced. This will also have a

positive impact on the problems with deforestation. Currently Tanzania's forests are reduced by 130,000-500,000 hectares[4] per annum or roughly 1% per year.

After this brief description and statement of the importance of biomass supply in Tanzania, the main focus will be electricity generation and fuel supply for electricity generation.

2.2 Stakeholders

Important stakeholders[5] are listed and to some extent also described in appendix 4. They are grouped into Governmental organisations, Development Partners and Other organisations. Below follows brief descriptions of the different groups.

2.2.1 Governmental

On the top of the executive power there is the president with his vice president, followed by the prime minister. Then there are a number of ministers responsible for different sectors, whereof three influence the energy sector: Ministry of Energy and Minerals (MEM), Ministry of Finance (MoF) and Ministry of Water (MoW).

The following organisations are organised under MEM:

- Tanzania Electricity Supply Company (TANESCO), which is a state owned company working with power generation, transmission and distribution
- Tanzania Petroleum Development Agency (TPDC), which participates and engages in the exploration, development, production and distribution of oil and gas and related services.

National Development Corporation (NDC) is organised under the Ministry of Industry and Trade. They have been given a broad mandate as a development and promotion institution to stimulate industrialization in partnership with private sector.

MoF is of special importance, because they develop the final budget for all state owned investment projects including those that are financed by foreign loans and grants.

MoW is important when it concerns utilisation of the available water resources and coordination between power production and irrigation.

Energy and Water Utilities Regulatory Authority (EWURA) is an independent Authority organised under MoW. The functions of EWURA include among others, licensing, tariff review, monitoring of performance and standards.

Rural Energy Agency (REA) is established by the Act of the Parliament as an autonomous Agency. Its main role is to promote access to modern energy services in rural areas of Mainland Tanzania.

National Bureau of Statistics (NBS) is responsible for collection and preparation of national statistics for Tanzania.

COSTECH - Tanzania Commission for Science and Technology should be a driver for science, technology and innovation.

National Environment Management Council (NEMC) promotes environmental management in Tanzania.

Finally there are three other organisations with a special influence on the Energy sector:

[4] Food and Agriculture Organization of the United Nations, Forestry Department, FRA2010/222, Rome, 2010
[5] Selection of stakeholders based on previous JESR's, MEM recommendations and Consultant's stakeholder discussions

- President's Office Planning Commission (PO-PC), which is responsible for monitoring; analysing and providing advice on big picture and long term sectorial policies and socio-economic developmental issues.
- Vice President's Office (VPO – Environment), which coordinates all environmental management issues, including climate change.
- Big Results Now Initiative – EnergyLab is a special initiative and will be described later in the report.

2.2.2 Development partners

Development Partners Group (DPG) was formally established in 2004. DPG has been working with the Government of Tanzania and other domestic stakeholders to strengthen development partnership and effectiveness of development cooperation. DPG comprises 17 bilateral and 5 multilateral (UN counted as one) development agencies providing assistance to Tanzania. The main development partners in the energy sector are African Development Bank (AfDB), European Union (EU), European Investment Bank (EIB), Finland, Japan (JICA), Korea (EDCP), Millennium Challenge Corporation (MCC), Netherlands (SNV), Norway (Norad), Sweden (Sida), United Nations Industrial Development Organisation (UNIDO), United Nations Development Programme (UNDP), World Bank (WB), Germany (KfW and GIZ), The U.S. Agency for International Development (USAID) and France (AFD).

A new partner which is not a member of DPG is China.

2.2.3 Other organisations

This group consists of Non-Governmental Organisations (NGO's), Sector Associations and Commercial companies.

Among the NGO's, Tanzania Renewable Energy Association (TAREA) and Tanzania Traditional Energy Development Organization (TaTEDO) ought to be noted.

Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA) and Confederation of Tanzania Industries (CTI) represent the Sector associations.

Finally there are a number of IPP's, Project developers other commercial actors.

3 SECTOR POLICY AND STRATEGY

3.1 Overview

3.1.1 Strategy Documents

The Tanzania Development Vision 2025 published by the Planning Commission in 1999 is still the main strategy document in outlining the general development for Tanzania. The vision has been made more concrete in the Tanzania Long-Term Perspective Plan (LTPP) 2011/12-2025/26, published in June 2012. This plan outlines a roadmap to a middle income country. The Tanzania Five Year Development Plan 2011/2012-2015/16 shows what has to be done in the shorter perspective in order to implement Vision 2025. Two more Five Year Development Plans will be submitted, one starting 2016/17 and one starting 2021/22. The Five Year Development Plans are also called National Development Plans. Finally, the Ministry of Energy and Minerals has published their strategic plans for 2011/12-2015/16 in November 2012.

The Big Results Now Initiative (BRN) aims at finalising 29 prioritised projects before 30 June 2016. This is a way to speed up the processes and fulfil Vision 2025 and the plans mentioned above. The results of the initiative are monitored by President Delivery Bureau. The Ministry Delivery Units for BRN have daily meetings and weekly reporting.

Another process with influence on the energy sector strategy is the General Budget Support group and the annual GBS review including the Performance Assessment Framework. This process involves the government as well as the development partners and sets up Key Policy Actions and Key Performance Indicators.

3.1.2 Policies and Legislation

Policies and legislation relevant for the Energy Sector are listed below. Where applicable, comments on update status are included.

Document	**Current Status and Plans**
General	
National Energy Policy 2003	In place, update under review
Power Sector (Reform) Policy	Roadmap for Sector Reform included in BRN. To be published 30 June 2014.
PPP Implementation Strategy	To be covered in the roadmap above
MEM Three Year Strategic Plan	In place, 2011/12-2015/16, published Nov 2012
Public Procurement Act 2011	In place
Electricity Sector	
Electricity Act 2008	In place
Rural Energy Act 2005	In place
Power System Master Plan	2012 Update, dated May 2013
Rural Energy Strategy	Draft Rural Energy Prospectus ready
Rural Electrification Master Plan	To follow the Rural Energy Strategy
Renewable Energy Sector	
Environmental Management Act 2004	In place
Guidelines for Sustainable Liquid Biofuels Development in Tanzania (Nov 2010)	In place
New and Renewable Energy Policy	Draft ToR for consultant ready
Biofuels Policy	Draft policy ready. To be finalised in 2014
Biofuels Act	To follow the Biofuels Policy

Document	Current Status and Plans
Biomass Energy Strategy	In process. To be finalised in 2014
Agro-Ecological Zoning	ToR for consultant ready - waiting for funds
Energy Conservation and Efficiency Policy	Part of possible Sida energy efficiency programme
Climate Change Adaption Plan	June 2016 in MEM Strategic Plan
Climate Change Adaption Strategy	June 2016 in MEM Strategic Plan
Environmental Action Plan	In place
Tariffs	
EWURA Act 2001	In place
Feed-in Tariff Policy	Consultancy study on REFIT started August 2013 and will be ready March 2014
Subsidy Policy	Included in BRN. To be published 30 September 2014. Consultant report for study finalised. Consultant for policy hired.
Gas and Petroleum Sector	
Gas Strategy	Focus today on NGUMP
Natural Gas Utilisation Master Plan	Draft prepared in 2013, waiting for policy and act
Natural Gas Policy	In place
Natural Gas Act	To follow the Natural Gas Policy
Model Production and Sharing Agreement 2008	In place
Petroleum Act 2008	In place
Petroleum (Exploration and Production) Act 1980	In place, focus today on MPSA
Petroleum Policy	In process. To be finalised in 2014

Table 1: Policies and Legislation Relevant for the Energy Sector

3.2 Roadmap for Sector Reform

Big Result Now (BRN) has had a lot of the focus since the process started less than a year ago. It is expected that this focus will last at least until 2016 when the initiative officially ends. Many important policy and strategy issues are planned to be covered under this umbrella. Electricity subsidies are discussed in the next section. The Roadmap for Sector Reform is to be published by June 2014. This roadmap should cover[6]:

- TANESCO restructuring
- Private sector participation and privatisation
- Matching of objectives and targets to the updated PSMP
- Expected state of the power sector in 2015, 2020 and 2035

3.3 GoT's Initiatives on the Development of a National Policy on Electricity Subsidies

The Performance Assessment Framework for the year 2013 included in the 2012 General Budget Support Annual Review (19th November 2012), Annex 15, has one Key Policy Action for the energy sector. This is the formulation of an energy subsidy policy by September 2013. After that the Big Results Now Initiative[7] has stated the publishing of the energy subsidy policy by September 2014 as a Key Performance Indicator for MEM.

The progress so far is that the draft policy has been submitted and then MEM will prepare the final policy document.

[6] As described for example in the Energy Lab Cabinet Presentation from April 2013
[7] Energy Lab Final Report, Executive Summary, April 2013, page 44

4 ELECTRICITY SECTOR UPDATE

4.1 Underlying Situational Analysis; Policy and Planning

4.1.1 Power System Master Plan

A national team was created to manage the power sector planning. This team should provide the basis for proper information management. The 2012 PSMP Update was concluded in May 2013. The team was composed of experts from MEM, PO-PC, MoF, NBS, REA, TANESCO, TPDC and EWURA. DPs were involved in the process by providing comments to the Draft PSMP and participated in the consultation workshop.

The following table shows expectations from the electricity sub-sector panel at the 2012 JESR Workshop on the new PSMP, together with the current status.

JESR 2011/2012 Expectations	Current Status
Proper stakeholder's consultation during the development of the PSMP	The team, which carried out the work, was composed of experts from major stakeholders mentioned in the text. [8]
SMART[9] indicators to monitor the PSMP implementation	BRN has taken over for the short term. MEM strategic plan contains a Results Framework Matrix. Both are using indicators that seem to fulfil the SMART requirements.
Inclusion of development partners in the review of the PSMP	DPs were involved in the process. [10]
PSMP should clearly indicate which projects to be implemented under IPP, PPP or government alone	BRN has taken over for the short term.
Decision makers to adhere with PSMP implementation by avoiding side projects	BRN has taken over for the short term.
The JESR 2011/12 expects the updated PSMP to be reflected in MEM's five year medium term plan document.	MEM strategic plan contains a Results Framework Matrix. The targets there contain much of the targets in the PSMP.

Table 2: Expectations on PSMP at the 2012 JESR Workshop

4.1.2 Big Results Now Initiative

The Big Results Now Initiative was started to speed up the processes necessary to fulfil Vision 2025. There are no new electricity projects compared to the projects mentioned in PSMP. The major changes are the priorities and the time schedule for some projects.

The Mtwara-Dar natural gas infrastructure is the most important project for the electricity generation plans, because it will supply the fuel for most of the new power plants. Construction has started and the planned date of commission is November 2014.

In the following tables the prioritised generation and transmission projects are described:

[8] PSMP 2012, May 2013
[9] Specific, Measurable, Achievable, Relevant and Timed
[10] Sida

Generation Project	Planned Commission Date		Current Status
	PSMP	BRN	
Mwanza, 60 MW HFO	2013	-	In operation
Kinyerezi I, 150 MW, NG GT	2014	Sep 2014	Construction has started
Kinyerezi II, 240 MW, NG CC	2015	Jan 2016	Negotiations for loan agreement
Kinyerezi III, 300 MW, NG GT	2016	Jan 2015	MoU, JV, discussing PPA
Kinyerezi IV, 300 MW, NG GT	-	Jan 2015	MoU, discussing JV
Singida Geo Wind Ph 1, 50 MW	2016	Dec 2014	Negotiations on financing, settling land issues
Kilwa Energy Ph 1, 210 MW, NG GT	2014	June 2015	Seeking project guarantee

Table 3: Prioritised Generation Projects

Transmission Project	Planned Commission Date		Current Status
	PSMP	BRN	
Backbone (657 km)		2015/16	Contracts in place
Dar-Arusha (702 km)	2016	2015/16	Negotiations with China Exim Bank
Singida-Arusha (414 km)		2015/16	Discussions with Kenya. Negotiations with lenders.
Somanga-Kinyerezi (203 km)	2014	2015/16	Government guarantee not signed
Makambako-Songea (300 km)	2015	2015/16	Final stage of procuring a contractor, expecting to sign the contract in October 2013. Additional cost (USD 20 M; Norway 7 and GoT 13) for upgrading from 132 kV to 220 kV not yet secured.
North West Grid Phase 1 (340-1000 km)		2015/16	Negotiations with China Exim Bank
Dar-Dodoma (431 km)	2017	2015/16	Negotiations with China Exim Bank.

Table 4: Prioritized Transmission Projects

Next table shows five projects that should give impact within the first 12 months.

Other Projects	Planned Commission Date
Optimise EPP usage, Max 520 GWh/a	June 2014
150 000 new connections => 1.2 million Tanzanians with electricity access	June 2014
3.2 million efficient bulbs replacing conventional ones => evening peak reduced by 85 MW	June 2014
T&D losses reduced from 21%-19%	June 2014
Optimise dam operations	June 2014

Table 5: Other BRN Projects with Impact Expected within 12 Months

Another important goal for BRN is to start the transformation of TANESCO from one vertically integrated company to several generation and distribution companies that

don't need financial support from the government. The suggested way forward is that within 12-18 months the following milestones should be reached:

- A roadmap for sector reform and a subsidy policy should be published
- TANESCO should be reorganised with 3 profit centres – Generation, Transmission and Distribution
- TANESCO's debts should be reduced

After these initial actions for restructuring of TANESCO, the following steps are suggested by BRN:

- By 2015/16
  - Split TANESCO into 2-3 companies
  - Perform operational improvement of each company
  - Create an independent system operator
  - Adopt a cost reflective tariff
  - Pay all TANESCO's debts
- By 2020
  - Restructure TANESCO into Generation companies and Distribution companies in accordance with MEM's road map (to be published 2014)
  - Commercialise in accordance to MEM's Road map
  - Eliminate GoT subsidies to electricity sector

4.1.3 Tariff Setting [11]

EWURA has undertaken a Cost of Service Study (COSS) with the assistance of ÅF-Mercados EMI. The study aimed at determining TANESCO's current costs of providing electricity services, for the purpose of setting cost reflective tariffs. The COSS was concluded in December 2012. This methodology has not yet been implemented on applications from TANESCO.

JESR 2011/2012 Expectations	Current Status
The 2012 JESR Workshop expected the electricity tariffs to be Cost reflective	EWURA has undertaken a Cost of Service Study (COSS). • Methodology is approved. • Tariffs have not been revised with the new methodology yet, because EWURA is waiting on an application from TANESCO.
The 2012 JESR Workshop expected the electricity tariffs to be Sustainable in order to attract investment	Current FIT is based upon TANESCO's avoided cost. New REFIT is discussed in section 6.3.7.
The JESR 2011/12 expects any findings in the COSS to be implemented in the power tariff regime.	Methodology in COSS was approved in January 2013.
The 2012 JESR Workshop expected the COSS to address issues related to subsidies.	This does not seem to be the case. Subsidies are discussed in section 3.3.

Table 6: JESR 2011/12 Expectations on Tariffs

[11] Meeting with EWURA 2013-08-28

The current chain for tariff review contains the following steps:

- An application is normally elaborated by the applicant and submitted to EWURA (changes can also be initiated by EWURA)
- EWURA performs a quality check of all input in the application
- EWURA assesses the requirements in the application using the COSS methodology
- EWURA carries out Public hearings
- Stakeholders prepare comments and supply these to EWURA
- EWURA analyses the stakeholder comments
- EWURA carries out an Exit Meeting with the applicant and key stakeholders
- EWURA prepares their final proposal and supply it to their board
- The final decision on the tariff revision is taken by EWURA's board

4.1.4 Overall Development in the Last 12 Months

Table 7 shows the generation projects that were expected to be finalised during 2012/2013.

Project or Activity	Target Year JESR 2011/2012 or JESR 2010/2011	Current Target Year	Previous Status	Status August 2013
Rehabilitation of Hale Hydro Power Station, 21 MW	2013	2017	In process	Preparations
Mwenga hydro (4 MW)	2012	n/a	In operation	Finalised
Mafia biomass power plant (1-1.5 MW)	2012	n/a	In operation	Finalised
Mwanza heavy oil power plant (60 MW)	2013	n/a	In progress	Commissioned
Symbion 205 DAR-1 NG power plant (100 MW)	2013	n/a	n/a	Cancelled

Table 7: Generation Projects with Finalisation Expected during 2012/13

The expectations were 175 MW new or rehabilitated generation capacity and the result was 65 MW of new capacity. This was due to the fact that the rehabilitation of Hale was delayed and the Symbion plant (EPP) was cancelled.

4.1.5 Generation Mix

The development of annual generation mix by power source is shown in Figure 3. In table 8, the proportion of generation from each power source is given and in table 9, the planned development of the installed capacities in the existing generation is given.

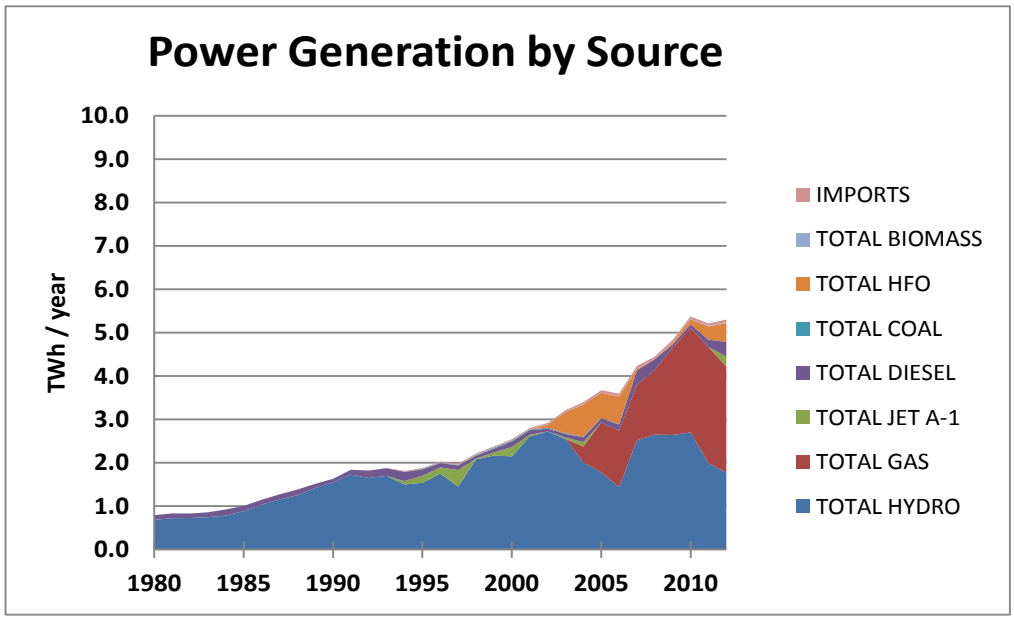

Figure 3: Annual Power Generation 1980-2012 [12]

From 1980 to 2000, hydro power contributed nearly 100% of the generation mix, but during the past decade we have witnessed an increasing share of thermal power. Today the thermal plants contribute more than 50% of the total power generated.

In 2006/2007 there was poor hydrology in the hydro sites by -35% which resulted in huge lack of power. With failed rains and non-optimal management of the hydro power, it was expected that the situation 2011/2012 could be similar to the one in 2006/2007.

However, in order to minimise the consequences of power shortage the Emergency Power Plan was implemented. The technical result was a better electricity supply situation but at the same time an economic disaster for TANESCO due to cost of EPP. Moreover the alternative cost for the society would probably be even higher. Studies carried out in Western Europe during the 1980's indicated the following cost to the society:

- Planned rationing – USD 0,45 /kWh
- Unplanned outages – USD 4,5 /kWh.

There is also a Tanzanian study on the cost of unreliable supply[13]. This study does not quantify the cost in terms of cost/kWh.

It should be noted that, the European figures should be increased by the inflation during the past 30 years. The figures should probably also be increased even more depending on the fact that the processes and the process control are more dependent on reliable electricity supply today than they were 30 years ago. Anyhow the cost for the society of the EPP is less than the cost of unsupplied power.

[12] Source TANESCO
[13] Challenges of Unreliable Electricity Supply to Manufacturers in Tanzania, CTI, July 2011

Fuel	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Hydro	79%	59%	49%	40%	60%	60%	55%	50%	38%	31%	32%
Gas		11%	31%	36%	30%	34%	42%	45%	51%	50%	44%
Jet A-1	1,0%	3,0%								4,0%	8,0%
Diesel	2,5%	3,3%	2,6%	3,9%	7,9%	5,6%	1,5%	1,5%	3,2%	5,9%	8,0%
Coal	0,5%	0,4%	0,3%	0,2%							
HFO	15%	22%	16%	18%	0,9%		0,8%	2,2%	5,9%	7,5%	6,7%
Biomass	0,1%	0,2%	0,2%	0,1%				0,2%	0,2%	0,4%	0,1%
Imports	1,3%	1,4%	1,4%	1,7%	1,4%	1,2%	1,3%	1,1%	1,1%	1,1%	1,0%

Table 8: Fuel Mix for Power Generation 2003-2012 (2013 until end of July) [14]

	Owner	Installed	Retire	Fuel	Capacity	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*
Aggreko-Tegeta	Aggreko, rental	2011	2014	Gas oil	50	50	50	50						
Aggreko-Ubungo	Aggreko, rental	2011	2014	Gas oil	50	50	50	50						
Hale	Tanesco	1967	2017	Hydro	11	11	11	11	11	11	11			
Kidatu	Tanesco	1975	2025	Hydro	204	204	204	204	204	204	204	204	204	204
Kihansi	Tanesco	2000	2050	Hydro	180	180	180	180	180	180	180	180	180	180
Mtera	Tanesco	1988	2038	Hydro	80	80	80	80	80	80	80	80	80	80
Mwanza	IPP	2013	2038	HFO	60		60	60	60	60	60	60	60	60
Mwenga	IPP	2012	2062	Hydro	4	4	4	4	4	4	4	4	4	4
Nyumba ya Mungu	Tanesco	1968	2018	Hydro	8	8	8	8	8	8	8	8		
Pangani falls	Tanesco	1995	2045	Hydro	68	68	68	68	68	68	68	68	68	68
Songas 1	IPP unit	2004	2023	NG	38	38	38	38	38	38	38	38	38	38
Songas 2	IPP unit	2005	2024	NG	110	110	110	110	110	110	110	110	110	110
Songas 3	IPP unit	2006	2025	NG	37	37	37	37	37	37	37	37	37	37
Symbion 112 (Ubungo)	Symbion, rental	2011	2014	NG/Jet-	113	113	113	113						
Symbion105-Arusha	Symbion, rental	2012	2014	NG/Die	50	50	50	50						
Symbion105-Dodoma	Symbion, rental	2012	2014	Diesel	55	55	55	55						
Tanwat	SPP/IPP	1995	2029	Biomas	2	2	2	2	2	2	2	2	2	2
Tegeta IPTL	IPP unit	2002	2021	HFO	100	100	100	100	100	100	100	100	100	100
Tegeta GT	Tanesco	2009	2028	NG	44	44	44	44	44	44	44	44	44	44
TPC	SPP/IPP	2010	2030	Biomas	17	17	17	17	17	17	17	17	17	17
Ubungo I	Tanesco	2010	2026	NG	102	102	102	102	102	102	102	102	102	102
Ubungo II	Tanesco	2012	2031	NG	100	100	100	100	100	100	100	100	100	100
Zuzu Diesel	Tanesco	1980	2014	Diesel	7	7	7	7						
Andoya		2012	2062	Hydro	1	1	1	1	1	1	1	1	1	1
Ngombezi 1	Mkonge	2012	2062	Hydro	0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total existing generation						**1,431**	**1,491**	**1,491**	**1,166**	**1,166**	**1,166**	**1,156**	**1,148**	**1,148**
Whereof Rental						**318**	**318**	**318**						
Whereof IPP						**189**	**249**	**249**	**249**	**249**	**249**	**249**	**249**	**249**
Tanesco						**924**	**924**	**924**	**917**	**917**	**917**	**906**	**898**	**898**

Table 9: Existing Generation System (Capacities in MW)[15]

4.1.6 Capacity Utilisation

In Table 10 the development of the utilisation of the generation capacity for the last years is presented.

Utilisation	2010	2011	2012
Hydro	65%	48%	43%
Thermal Gas	70%	60%	39%
Other Thermal	44%	92%	71%

Table 10: Utilisation of Generation Capacity [16]

The table shows clearly the low utilisation of hydro power. This depends on the available amount of water. Usually hydro power plants with storage facilities are designed

[14] Source TANESCO
[15] Source: Compilation by the consultant, based on information mainly from PSMP but also from several of the stakeholders met
[16] Source TANESCO

to have utilisation around 50% while run of river plants are designed for 70-80% utilisation.

The table also shows a falling utilisation factor for gas fired thermal generation. This indicates that some of the gas fired plants are used for peak power production. The reason is that around 50% of the EPPs has a possibility to operate on natural gas and that option is used as much as possible because natural gas is cheaper than diesel and fuel oil.

4.1.7 Power Outages and Estimated Unconstrained Levels

Table 11shows the monthly unserved energy, distributed on Load shedding, faults and maintenance.

(GWh/month)	Unserved Energy Due To			
Month	Load Shedding	Faults	Maintenance	Total
Jul 2011	89,6	9,1	0,9	99,6
Aug 2011	63,7	3,1	2,0	68,8
Sep 2011	51,0	12,6	0,8	64,5
Oct 2011	4,1	5,6	2,4	12,1
Nov 2011	63,7	3,1	2,0	68,8
Dec 2011	1,1	62,1	77,2	140,4
Jan 2012	1,3	2,8	3,2	7,3
Feb 2012	9,1	3,7	6,1	19,0
Mar 2012	6,5	6,6	3,0	16,1
Apr 2012	1,6	3,2	3,1	7,9
May 2012	0,5	2,7	5,5	8,7
Jun 2012	0,2	3,5	3,9	7,5
Jul 2012	6,3	1,8	1,6	9,7
Aug 2012	23,1	1,3	1,9	26,2
Sep 2012	5,0	1,9	3,4	10,2
Oct 2012	3,6	1,7	3,7	9,0
Nov 2012	8,1	6,5	3,4	18,0
Dec 2012	1,0	4,1	3,7	8,8
Jan 2013	5,2	17,9	3,3	26,4
Feb 2013	9,4	6,5	3,2	19,1
Mar 2013	2,8	4,2	3,3	10,3
Apr 2013	0,2	4,2	2,6	7,0
May 2013	0,5	2,0	2,0	4,5
Jun 2013	0,3	0,9	1,7	2,8

Table 11: Power Outages Distributed on Main Reasons

The table clearly indicate that, the high levels of unserved energy that occurred in 2011 have been lowered. For example, during July 2011 until June 2012 the total unserved energy were 520 GWh, while the unserved energy during July 2012 – June 2013 was only 151 GWh.

If we instead analyse the first 6 months of 2013, the result is that the load shedding has increased by 28% and the faults have increased by 85% compared to the same period of 2012.

4.1.8 TANESCO's Economy

As mentioned above, EPP became expensive for TANESCO. Therefore TANESCO applied (09 November 2011) for a tariff increase of 155% to cover the cost of EPP.

EWURA notified the government of a possible tariff increase of 56.12%. The government intervened by supporting TANESCO with payment of the ITPL capacity charge, and by exempting tax on imported fuel for power generation and by converting a loan into a grant. Then in January 2012 EWURA approved an increase of 40.29%.

In January 2013 EWURA was about to announce a new tariff when TANESCO suddenly withdrew their application. EWURA is now waiting for a new application from TANESCO. [17]

Today TANESCO has got a huge debt (roughly USD 167 million[18]) for fuel purchase to EPP, capacity payment to EPP and energy purchase payment to ordinary IPPs. WB (USD 300 M) and AfDB (USD 200 M) have promised to participate in financing a restructuring of TANESCO including payments of the debts. The banks will give loans to GoT which will provide TANESCO with subsidised loans to restructure the company, finance necessary investments, maintenance measures as well as pay the debts.

4.1.9 Power Sector Procurement Process

The Public sector procurement is regulated by the Public Procurement Act of 2011, which requires an open tendering process, unless the government has declared an emergency situation. The same requirements are valid for all projects that are financed by any of the members of DPG.

When it became clear that there would be a situation with too little water available in the reservoirs, GoT declared an emergency situation. This made it possible for Government to develop an Emergency Power Plan (EPP) and a procurement process without open tendering. The emergency situation will end as soon as the new power plants are taken into operation.

The first steps in BRN were to procure the natural gas pipeline, Kinyerezi I and Kinyerezi II. Those were also procured and financed without any open tendering processes. Kinyerezi III and IV will be joint ventures and not an open tendering process. For future projects, after the mentioned ones, the plan is to have open tendering process. [19]

4.2 Current State of the Emergency Power Plan

The emergency power contracts have been extended by a year and now they will end during the second half of 2014. This means that there will still be capacity charges and some fuel cost.

The proportion of electricity generated by the emergency power plants during the first 7 months of 2013 is nearly the same as the proportion during the whole 2012[20]. This means that there is still a need for purchase of fuels for peak demand supply.

The emergency power contracts are planned to come to an end when the new natural gas infrastructure is finalised by late 2014. Even if the time schedule is kept, some of the EPP contracts have to be extended some months until the end of 2014.

[17] Source: Meeting with EWURA 2013-08-28
[18] Source: Comments from MEM 2013-10-17
[19] Source: Meeting with BRN 2013-08-27
[20] Source: TANESCO

4.3 Development of the Generation Mix

4.3.1 Current Demand Forecast

The current forecast is based upon a trend model combined with forecasts of specific new loads. It includes electrification of around 250 000 households per year during the coming years and connection of a number of industries that are not connected to the grid. This trend-plus forecast is then compared to a forecast based upon an econometric model. The differences between the two are huge but after the PSMP analysis of those differences it is stated that the main reason is the electrification program[21].

Figure 4 shows the expected development of the use of electricity, according to the PSMP 2012[22] update. The development will heavily depend on the development of the electrification of the country.

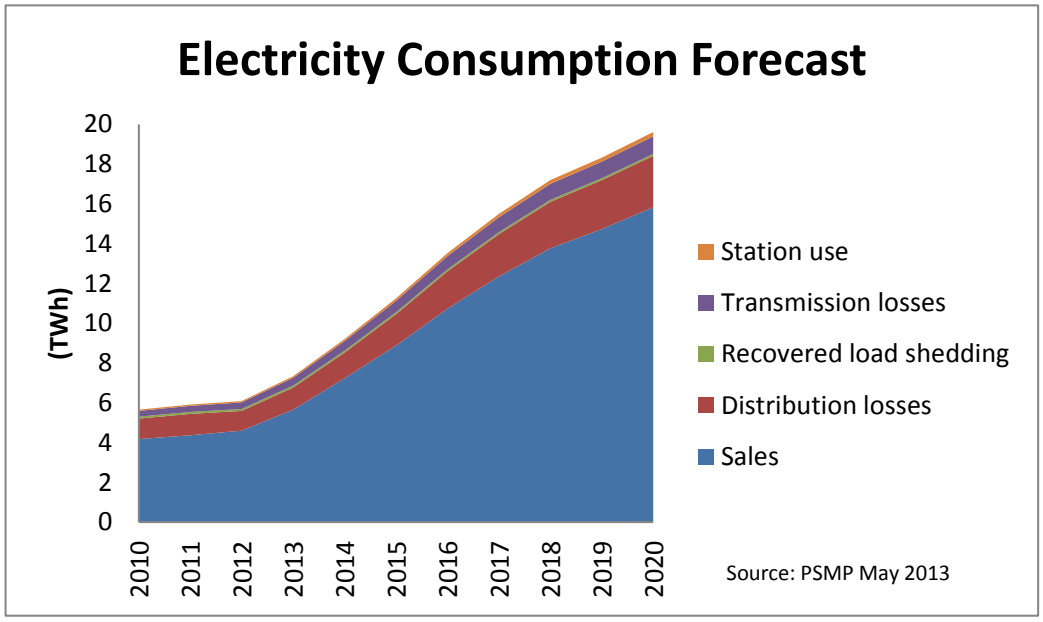

Figure 4: Electricity Consumption Forecast

The consultant view is that the analyses of the differences between the two used forecast models are not clearly shown in the PSMP report. The consultant's own experiences of load forecasting [23] and use of the methodology with a trend plus specific loads is that the demand increase usually is overestimated. The average sales increase during the last 5 years has been 7.0% per year and 7.2% per year during the last 10 years. The current forecast estimates an increase of 22.9 % per year 2012-2013, 28.0 % 2013-2014 and 21.8 % 2012-2017. From around 2020 the annual increase will come down to the historic levels of around 7% per year. On the other hand connection of existing industrial facilities to the grid doesn't mean an increase in power consumption but rather taking power from the grid instead of taking from their own generation plants.

In JESR 2011/2012[24] it was written that "TANESCO has begun transitioning to a new modelling tool, MAED-1". During discussion[25] with TANESCO it was said that MAED will be used from next year together with another model "Message".

[21] PSMP 2012 Update, May 2013, Chapter 2.9
[22] PSMP 2012 Update, May 2013, Chapter 2.6
[23] Load forecasting manager at Sydkraft AB (nowadays EON Nordic) with 25% of the Swedish annual generation during 1984-1992
[24] JESR 2011/2012 chapter 3.2.1
[25] Meeting with TANESCO 2013-08-21 10.00-14.00

The consultant view is that use of a formalised forecasting tool can help the load forecasters to prepare a forecast that will be consistent to the forecasts of economic development.

4.3.2 Current and Planned Supply Capacity

Figure 5 shows the estimated development of the existing generation capacity[26], together with the current maximum demand forecast.

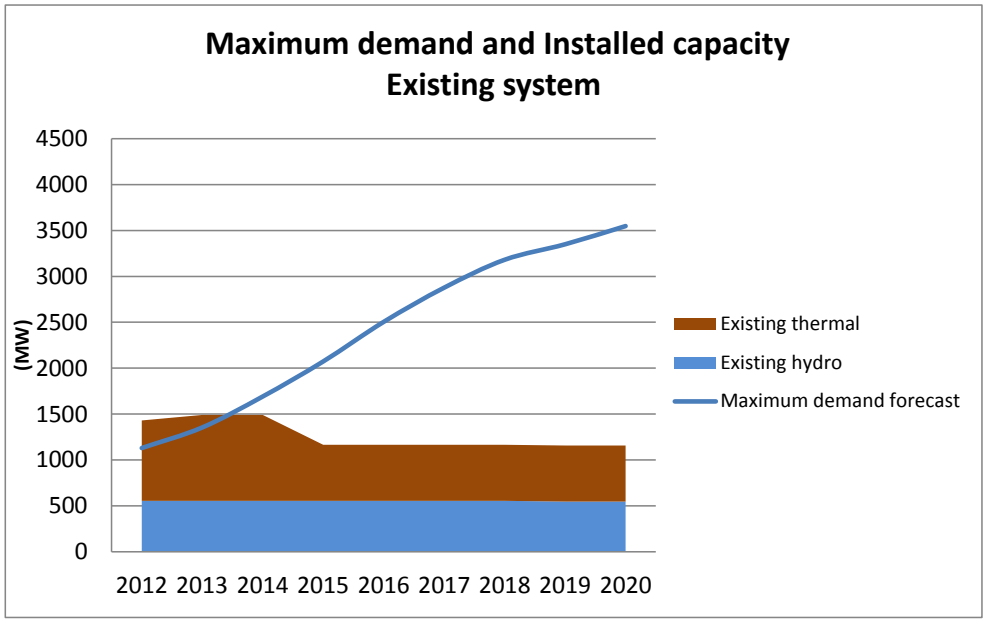

Figure 5: Development of Existing Generation System and Maximum Demand Forecast

Figure 5 shows clearly:

- That huge amount of new capacity will be necessary to cover the estimated future demand
- The planned phase out of the Emergency Power Plants

In order to meet the demand increase the following Short Term Expansion plan is given[27] (Figure 6).

[26] Figures compiled by Pöyry based upon PSMP, BRN and other sources
[27] Figures compiled by Pöyry based upon PSMP, BRN and other sources

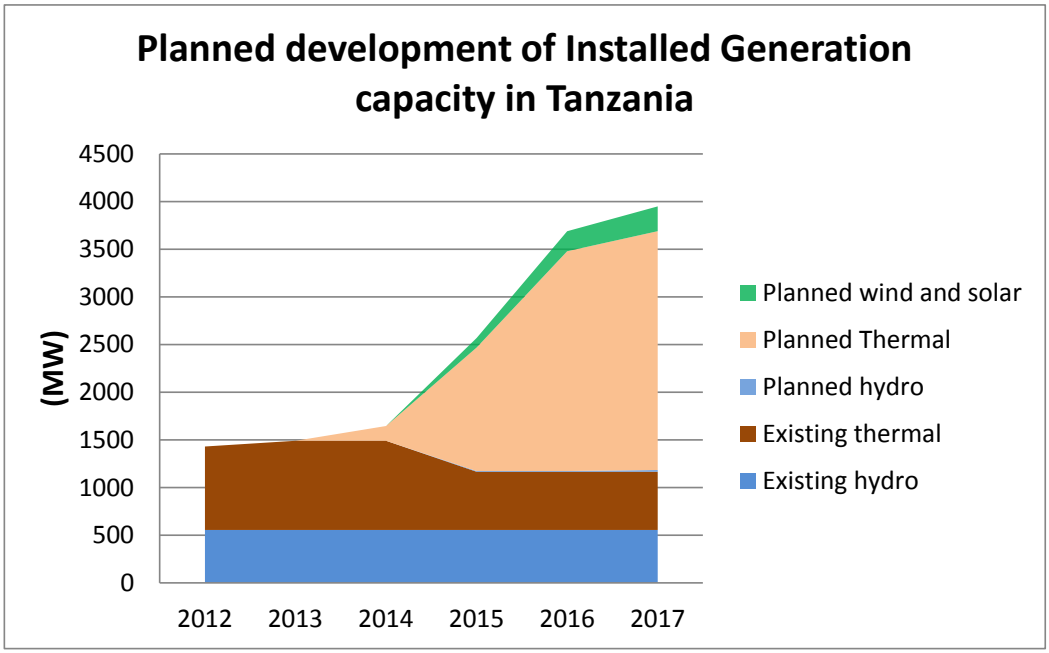

Figure 6: Existing Generation System Together with Short Term Expansion Plan

The Short Term Expansion plan is also given in a more detailed version in Table 12.

Plant	*Owner*	*Commis-sioned*	*Source*	*Fuel*	*Capacity*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*
Hale	Tanesco	2017	PSMP	Hydro	10,5						10,5
Somanga Fungu 2 (Kilwa)		2015	Tanesco	NG-GT	210				210	210	210
Somanga Fungu 2 (Kilwa		2016	Tanesco	NG-CC	110					110	110
Kinyerezi I	Tanesco	2014	PSMP	NG-GT	150			150	150	150	150
Kinyerezi II	Tanesco	2015	PSMP	NG-CC	240				240	240	240
Kinyerezi III	Tanesco	2016	PSMP	NG-GT	300					300	300
Kiwira I		2016	PSMP	Coal	200					200	200
Mgolo COGEN (Mufundi)		2015	PSMP	Biomass-CHP	30				30	30	30
Mkuranga		2015	PSMP	NG	250				250	250	250
Mtwara		2016	PSMP	NG	400					400	400
Ngaka I	Intra Energy/IPP	2017	NDC	Coal	200						200
Sao Hill		2015	PSMP	Biomass-CHP	10				10	10	10
Singida Wind	Wind East Africa	2015	WB	Wind	100				100	100	100
Singida Wind I	Geo Wind Power	2016	NDC	Wind	50					50	50
Singida Wind II	Geo Wind Power	2017	NDC	Wind	50						50
Solar I		2016	PSMP	solar	60					60	60
Zinga		2015	PSMP	NG	200				200	200	200
Darakuta		?	REA	Hydro	0,8						
EA Power		?	REA	Hydro	10						
Kikuletwa II hydro			REA	Hydro	7						
KMRI Tunduri biomass	Symbion	2014	Symbion	Biomass-CHP	1			1	1	1	1
KMRI-Kigoma biomass	Symbion	2014	Symbion	Biomass-CHP	4			4	4	4	4
Mapembasi		ongoing	REA	Hydro	10						
Mantera	Mkonge	?	Mkonge	Hydro	8						
Mkurunga solar		?	REA	solar	?						
Mofajus-Mpanda hydro			REA		1,2						
Somanga Fungu 1	Tanesco	2015	PSMP	?	8				8	8	8
Tulila (St Agnes?)		?	REA	Hydro	7,5						
Zinga-Bagamoyo		2015	PSMP	NG-CC	200				200	200	200
Total planned generation								**155**	**1403**	**2523**	**2784**

Table 12: Short term expansion plan

After 2017 the medium and long term plans take over. Those plans contain a number of opportunities that together can cover more load than forecasted. This report focuses on the development during the last twelve months and expected development during the coming twelve months. Therefore these plans are not discussed here.

The estimated development of installed capacity and maximum demand during 2013-2015 is shown in Figure 7 below. There is also a line that approximately describes the development of the total firm capacity, calculated by the loss of load probability method (LOLP).

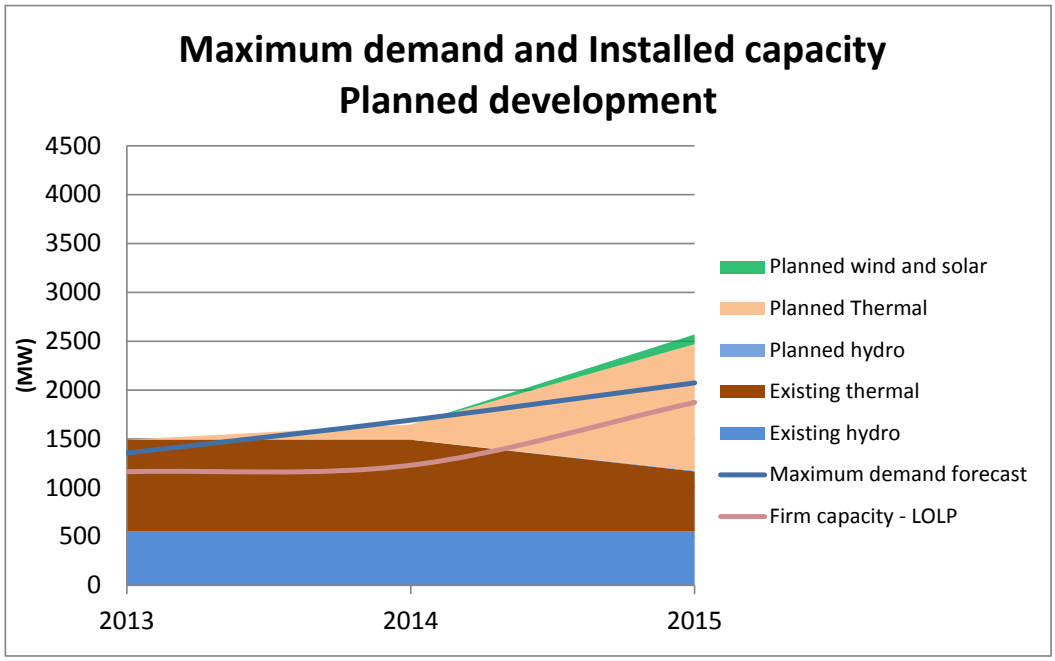

Figure 7: Maximum Demand and Generation system Expansion Plan 2013 - 2015

It should be observed that the figures for installed capacity usually refer to the situation at the end of the year and the maximum demand usually occurs in October, which is close to the end of the year.

From Figure 7 can be seen that:

- The planned installed capacity in 2014 does not cover the estimated maximum demand.
- At the end of 2015 the generation system will be close to balance between capacity and demand (total firm capacity is equal to maximum demand).

Another thing that is important to note for the future, is that the proportion of the capacity increase consisting of wind and solar power has a firm capacity factor of around 25% compared to 80-90% for thermal power. This means that, it will be necessary to install 3-4 times more wind (or solar) capacity compared to thermal (or hydro) to get the same improvement of firm capacity.

4.3.3 Ongoing Electricity Sector Projects

During the review a large number of electricity sector development projects were noted. The table below is compiled by the consultant and lists some of the projects considered to be of interest. The projects are classified as capacity building, electrification, generation, hydro power, policy, structure or transmission and distribution. In the comments

column the projects' current status and the financing are noted. Some of the projects are cancelled and that can also be of interest for the reader so those not are taken up for new discussions.

Project	Type	Year	Comments
REA Capacity Development[1, 10]	Capacity	2014	Sida, on-going
TANESCO feasibility O&M[5, 10]	Capacity	2017	Sida, document preparation
Capacity development for efficient T&D[11]	Capacity	2014	JICA, on-going
Partnership for Growth[12]	Capacity	2018	USAID, on-going
Twinning Stattnet TANESCO[13]	Capacity	2015	Norad, on-going
Capacity development for efficient T&D systems II[11]	Capacity	2016	JICA, considered
Mpanda, Ngara, Biharamulo electrification[14,20]	Electr.	2022	SNV, concept
Rural electrification in 7 regions[15]	Electr.	2013	MCC, finalised Sept 2013
Up-Scaling Access to integrated modern energy services[13, 16]	Electr.	2013	EU, Norad, on-going
Rural electrification in Kilombero and Ulanga district[16]	Electr.	2015	EU, doc preparation
WB Trust Fund Electricity Access[10]	Electr.	2015	Sida, on-going
Marongo-Kikagati (Uganda) - 6.25 MVA substation + 194 km[1]	Electr.	-	Budget money for 2012/13
Grid reinforcement to mines in NW[1]	Electr.	-	
Rural Electrification Programme Phase 4[5]	Electr.	-	Norad
20 substations[15]	Electr.	2013	MCC, finalised Sept 2013
Kinyerezi I GT power plant (150 MW)[2, 3, 21]	Generation	2014	Signed, Jacobsen
Kinyerezi II GCC PP (240 MW)[2, 3, 21]	Generation	2016	MoU signed, Sumitomi
Mnazi Bay 300 MW Development Proj[1,4]	Generation	-	
Kinyerezi III GT PP (300 MW) [2, 3, 21]	Generation	2015	Not signed, PPP China
Kinyerezi IV GT PP (300 MW) [2, 3, 21]	Generation	2015	Negotiations, Private China
Mchutchuma-Katewaka coal-fired PP (50/300/600 MW)[1, 6, 23]	Generation	2018	NDC, negotiations
Ngaka coal-fired PP (120/200/400)[2, 22]	Generation	2016	NDC, negotiations
Mwanza heavy oil PP (60 MW)[1, 6, 30]	Generation	2013	Finalised
Mkuranga power plant (300 MW)[1]	Generation	-	
Kiwira coal-fired PP (200-300 MW)[1, 6, 20]	Generation	2014	Early stage
Ubungo gas-fired power plant (100 MW)[6]	Generation	2012	
Symbion 205 DAR-1 NG PP (100 MW)[1, 21]	Generation	2013	Cancelled
Symbion 205 DAR-2 NG PP (100 MW) [1, 21]	Generation	2014	Cancelled
Somangafungu 2 NG PP (210 MW)[6]	Generation	2014	Kilwa
Upgrade of Mawengi micro HP[16]	Hydro	2014	EU, on-going
Masigira hydro (118 MW)[2]	Hydro	2013	Norad, feasibility study
Rumakili hydro (520 MW) [2]	Hydro	2012	WB, feasibility study to start
Yovi HP[16]	Hydro	2014	EU, on-going
Upgrade of Ikondo micro HP[16]	Hydro	2015	EU, on-going
Ruhuji and Kakono hydro, transm study[10]	Hydro	-	Sida, on-going
O&M Existing HP[13]	Hydro	-	Norad, procurement stage
Kihansi small hydro[13]	Hydro	2015	Norad, procurement stage
Emergency repair of HPP[13]	Hydro	2013	Norad, on-going
Mpanga JV (144 MW)[2, 7]	Hydro	-	
Kakono hydro (53 MW)[2]	Hydro	-	
Rusumo hydro (27 MW) [2]	Hydro	-	
Songwe hydro (170 MW) [2]	Hydro	-	
Stieglers Gorge hydro (1200 MW) [2]	Hydro	-	
Ikondo hydro (340 MW) [2]	Hydro	-	
Taveta hydro (145 MW) [2]	Hydro	-	
Malagarisi hydro (45 MW) [2]	Hydro	-	
Integrated Rural Elecctricity Planning[16]	Policy	2012	EU, finalised
Reduce TANESCO's debt level[3, 20]	Structure	2016	WB and AfDB, on-going

Project	Type	Year	Comments
"Backbone Iringa-Dodoma-Singida-Shinyanga (657 km) BTIP[3, 11, 17 21] - T Lot 1: 5 SS 132/33 kV DSM - T Lot 2: 4 transmission lines 132 kV DSM - T Lot 3: 1 SS 132/33 kV KIA - D Lot 1: 6 SS 33/11 kV DSM - D Lot 2: Rehab 5 SS 33/11 kV DSM - D Lot 3: 8 SS 33/11 kV Arusha + Kilim - D Lot 4: 33 and 11 kV overhead in DSM	T&D	2014	AfDB, JICA, WB, EDCF Tender review Sida, Norad (rural component)
Makambako-Songea transm (300 km) [3, 10, 21]	T&D	2014	Sida, procurement
Electricity V[1, 5, 17]	T&D	2015	AfDB, on-going
Geita-Nyakanazi transmission 220 kV[6, 18]	T&D	2017	KfW, doc preparation
Reinforcem T&D DSM, Kilim, Arusha[6, 16]	T&D	2012	EDCF, on-going
Master plan for T&D in DSM[11]	T&D	2015	JICA, start 2014
Improving power supply reliability DSM[16]	T&D	2014	Finland, on-going
Reinforcement distribution Kilimanjaro[11]	T&D	2013	JICA, finalised
Rural Energy Fund support[10]	T&D	2014	Sida and Norad, on-going
Interconnector Tanzania-Zambia[16]	T&D	2014	Norad, procurement
NW Grid phase 1 (340-1000 km) [3, 6, 7, 10, 21]	T&D	2016	Negotiations
Malagarasi hydropower distribution[1, 15]	T&D	-	HP station cancelled
Dar-Chlinze-Tanga-Arusha tr , 702 km[3, 7, 21]	T&D	2016	Negotiations on China EPC-F
Somanga-Kinyerezi transm (203 km)[3, 21]	T&D	2015	Signed, Kilwa Energy
Dar-Morongoro-Dodoma tr (431 km)[3, 21]	T&D	2016	Procurement not started
Singida-Arusha Kenya connector (414 km)[3, 11, 17, 21]	T&D	2016	Norad, feasibility study JICA AfDB WB, negotiations
Rusumo HP transmission[17]	T&D	2015	AfDB, negotiations
Submarine Tanga-Pemba (33 kV)[1]	T&D	-	
Reinforcement of T&D Oyster Bay[5, 11]	T&D	2010	JICA, finalised
Kahama-Geita transmission 220 kV[6]	T&D	2013	
Mtwara-Singida 300 kV HVDC[6]	T&D	2014	Cancelled
Transmisison to Mchuchuma & S Ngaka[6, 22]	T&D	2018	NDC, planning
Preparatory study for rehab of new lines and SS's in DSM[11]	T&D	2013	JICA, on-going
Construction of above[11]	T&D	2016	JICA, considered

Table 13: Electricity Sector Projects

Sources for table 14:

1	JESR 11/12	10	Sida	20	MEM	30	Symbion
2	PSMP	11	JICA	21	Tanesco		
3	BRN	12	USAID	22	NDC		
4	MoF Budget	13	Norad				
5	ODA	14	SNV				
6	FYDP	15	MCA-T				
7	GBS 2012	16	EU				
		17	AfDB				
		18	KfW				

4.4 Electricity Contribution to the Gross Domestic Product

The latest available document from the National Bureau of Statistics covering the development of the GDP is the Quarterly Gross Domestic Report of Tanzania Mainland, third Quarter, 2012, published in December 2012.

The GDP statistics still has one heading called Electricity and Water, covering electricity generation as well as water supply. This sector had a growth rate in Q3, 2012 of 15.3% compared to a negative growth rate of 2.8% in Q3 2011. The reason is increased generation of electricity from oil and gas.

The total gross value added from the Electricity and Water sector in Q3 2012 was TZS 128 billion at constant 2001 prices. This is 2.3% of the total GDP.

5 PETROLEUM AND NATURAL GAS SECTOR UPDATE

5.1 Current situation in Petroleum and Gas Sector

5.1.1 Petroleum

The petroleum sector was liberalized in 2000. Initially petroleum import was unregulated, but today Tanzania is back to centralised import via the Petroleum Importation Coordinator, a private company.

The sector is controlled and regulated by EWURA. Today EWURA sets cap prices on diesel, petrol and kerosene. Heavy fuel oil (HFO) and LPG do not have cap prices, but these fuels are likely to be included in the system soon.

Tanzania has no oil findings today, but 18 companies are involved in drilling.

5.1.2 Gas

Gas was first found in Tanzania in the 1970's. Currently gas from two areas is utilised:

- Gas from Mnazi Bay is transported in a pipeline with approximate length of 30 km to a power plant in Mtwara. The capacity used today is about 2 million standard cubic feet per day.
- Gas from Songo Songo is transported in a pipeline with approximate length of 250 km to Ubungo (Dar es Salaam) and Tegeta. The capacity used today is about 100 million standard cubic feet per day with the following off-takers:
    - Songas Power Plant, Ubungo, 45%
    - TANESCO Power plants, Ubungo, 35-40%
    - Twiga Cement, Tegeta, 10-12%
    - Smaller customers, 6-8%

The existing gas wells in Mnazi are utilised only to about 20% of their capacity, while the situation in Songo Songo is that the gas processing plant and the pipeline capacity are utilised to their maximum capacity.

5.2 Increase of the Gas Supply

5.2.1 Gas Reserves

The known gas reserves at the two existing sites in commercial operation have been estimated at:

- Songo Songo, 880 billion standard cubic feet
- Mnazi Bay, 262 billion standard cubic feet

For the deep sea reserves, with operation beyond 2020, the official figure is 43 trillion standard cubic feet. The PSMP has, however, not included the utilisation of the deep sea reserves in the forecasts.

5.2.2 Infrastructure

The PSMP 2012 Update as well as the Big Results Now Initiative has identified an increased demand of gas for power production. Out of the 29 projects in BRN, a main project is the Mtwara-Dar es Salaam gas pipeline, which is to be commissioned by November 2014. The implementation of the USD 1,250 M project, financed by a loan from Exim Bank of China, commenced in May 2013.

The capacity of the new pipeline is estimated to be 784 million standard cubic feet per day in the year 2020. Deliveries in the year 2015 are planned to reach 306 mmscfd, corresponding to the generation of 1070 MW of electric power. This power generation capacity figure is based upon the estimated proportions of single cycle and combined cycle power plants. It will be higher if all single cycle plants are rebuilt to combined cycle plants.

The pipeline project includes:

- New Gas processing plants in Mnazi Bay and Songo Songo
- New Pipelines from Mnazi Bay and from Songo Songo connecting in Somangafungu and then continuing to Kinyerezi, Ubungo and Tegeta.

Main new off-takers in the short perspective will be the following power plants:

- Somangafungu (Kilwa)
- Kinyerezi
- Symbion Ubungo
- IPTL

Other off-takers will be industry and households close to the pipeline.

This is the most important energy project in Tanzania at the moment, because nearly all new power generation capacity during the close future is based upon a successful finalisation of this pipeline. If it becomes delayed the EPP agreements have to be increased further. The project has encountered several unexpected circumstances. These have been solved and the project is now back on track.

5.3 Capacity Building Initiatives and Facilitation for Petroleum and Natural Gas Subsectors

Some on-going and recently initiated capacity building initiatives have been identified:

- ESCBP (Energy Sector Capacity Building Project)

  The ESCBP includes technical assistance in order to enhance the government framework, legal and institutional capacity in the natural gas sector with regard to large power generation PPP projects. The project is financed by the World Bank and Canadian CIDA and will continue until 2017. Several training programmes are planned and the first one will start in October.

- Extractive Industries Transparency Initiative

  Canadian International Development Agency (CIDA) is supporting this project, which will include the petroleum and gas sector and continue until 2018.

- African Infrastructure Programme (Partnership for Growth):

  This programme financed by USAID will provide capacity building and at later stage transactional services on clean and conventional energy projects to the government and private project developers in the development of the oil, gas, and power sectors. The programme will continue until 2018.

- MEM Strategic Plan 2011/12-2015/15 says:

  "1350 students trained in geology and mineral explorations, oil and gas geosciences, mining and mineral processing, and mining environmental management by June 2016."

- For the Sida financed "Capacity building programme for Operation and Maintenance for TANESCO's gas power generation facilities" project document preparation in on-going.

5.4 Current Situation Compared to Recommendations Made in Last Year's Review

5.4.1 Construction of the Natural Gas Pipeline from Mtwara to Dar es Salaam

Priority set up in 2011/12 JESR: Construction of the Natural Gas Pipeline from Mtwara to Dar es Salaam. Responsibility: MEM

This priority set up in 2011/12 JESR has been discussed in section 5.2 above.

5.4.2 Model Production and Sharing Agreement

Action point set up in the 2012 JESR Workshop: Review of MPSA by December 2013. Responsibility: MEM, TPDC

In the 2012 JESR Workshop, the MEM's review of the MPSA from 2008 was expected by December 2013. Launched at the fourth licensing round for seven deep sea natural gas blocks in October 2013.

5.4.3 Natural Gas Policy and Legislation

This priority for 2012/13 has resulted in a Draft Natural Gas Policy during 2012. The policy is in place. The act will follow.

5.4.4 Finalisation of the National Gas Utilisation Master Plan

Priority set up in 2011/12 JESR: Finalisation of the National Gas Utilisation Master Plan. Responsibility: MEM

The NGUMP was a priority for 2012/13. A draft version has been prepared, but it is now on hold waiting for the updated Natural Gas Policy and Natural Gas Act.

5.4.5 Petroleum Policy

Action point set up in the 2012 JESR Workshop: Formulation of sector specific plans and regulations to guide petroleum exploitation activities. Should be based on the Draft Petroleum Policy, which should be in place by May 2013. Plans should be developed by December 2013. Responsibility: MEM, TPDC

The Petroleum Policy was an action point set up in the 2012 JESR Workshop. MEM was expected to have the Draft Petroleum Policy in place by May 2013. This was realised. A second draft is now expected later in 2013 and a final Petroleum Policy in 2014.

5.4.6 Price Setting Methodology

Action point set up in the 2012 JESR Workshop: Feasibility study for establishing current and future margins and its respective future adjustments by December 2013. Responsibility: EWURA

The 2012 JESR Workshop expected EWURA to finalise a feasibility study for establishing current and future margins in the petroleum downstream industry and its respective future adjustments by December 2013. Ernst & Young started working for

EWURA on the study in July 2013 and the first report was expected already in August 2013.

5.5 Natural Gas Contributions to the Gross Domestic Product

Natural gas is included in the statistical data for the Electricity and Water sector, which is described in section 4.4.

5.6 Activities for 2013/14

Some of the activities expected in the petroleum and natural gas sub-sector between July 2013 and June 2014 are listed below.

5.6.1 Construction of the Natural Gas Infrastructure

To be finalised during 2014 as a part of the Big Results Now Initiative.

5.6.2 Natural Gas Legislation

The Natural Gas Policy is now in place and then the Natural Gas Act is expected to follow.

5.6.3 Finalisation of the National Gas Utilisation Master Plan

The draft version of the NGUMP is to be finalised when the Natural Gas Policy and the Natural Gas Act are in place.

5.6.4 Petroleum Policy

A second draft of the petroleum policy is expected during the fourth quarter of 2013 and a final Petroleum Policy in 2014.

5.6.5 Price Setting Methodology

EWURA is expected to finalise a feasibility study for establishing current and future margins in the petroleum downstream industry and its respective future adjustments by December 2013.

5.6.6 Capacity Building Initiatives and Facilitation for Petroleum and Natural Gas Sub-sectors

The already on-going capacity programmes will continue:

- ESCBP (Energy Sector Capacity Building Project), which is about to start
- Extractive Industries Transparency Initiative
- African Infrastructure Programme (Partnership for Growth)
- Student training as per MEM Strategic Plan 2011/12-2015/15
- "Capacity building programme for Operation and Maintenance for TANESCO's gas power generation facilities"

Progress reports should be available before June 2014.

6 RENEWABLE ENERGY

There are many potential renewable energy sources in Tanzania like solar, wind, biomass, small hydro and geothermal. Renewable energy production is possible for electricity production, heat production, cooking, process industry and transport. The renewable energy production should be harnessed sustainably all the way from project identification up to and including decommissioning. This also implies that unwanted deforestation has to be avoided.

6.1 On-Going and Completed Projects

During the review, a large number of renewable energy projects - large, medium, small and micro - were noted and are shown in the table below. For the larger production projects, a connection to the national grid is expected.

Project	Type	Year	Comments
Sao Hill power plant (6-16 MW)[1]	Biomass	2015	CDM financing expected
Symbion-KMRI Tadura (1 MW) [1, 30]	Biomass	2014	Bamboo, financial closure Sept 2013
Symbion-KMRI-Kigoma (4 MW) [1, 30]	Biomass	2014	Bamboo, financial closure Sept 2013
Ngombeni (Mafia) power plant (1.4 MW)[8]	Biomass	2012	In operation
TPC Moshi power plant (9-17 MW) [1]	Biomass	-	In operation
Tanwat power plant (1.5-2.7 MW) [1]	Biomass	2010	In operation
Kilombero Sugar power plant (1 MW) [1]	Biomass	-	
CDM Capacity Building[1, 10]	Capacity[28]	2013	Some Sida financed, on-going
Biofuels task force[1, 10]	Capacity	2013	Sida/Norad financed, on-going
East Africa Power Pool[5, 16]	Capacity	-	Norway supported this local group's participation in Singida Wind
Capacity development for REA[5, 10]	Capacity	-	Sida financed
Concept for affordable biogas system[16, 31]	Capacity	2015	EU financed, on-going
Renewable Energy Programme[18]	Capacity	2016	KfW financed, on-going
Partnership for Growth EE[16]	Capacity	2013	USAID, on-going
Mtoni landfill gas[1, 8]	CDM	-	Planned
Aggregation of small CDM projects[1, 23]	CDM	2013	REA, on-going
Light bulb replacement[3, 10, 21]	EE	2014	BRN/Sida, programme prep
Time-of-Use Tariff[21]	EE	2015	BRN/EE group
Energy Efficieny Group[1, 21]	EE	2013	Active
Distribution Loss Reduction3	EE	2015	BRN
EE standards and labelling[3, 21]	EE	2016	BRN/EE group
EE Programme report[3, 21]	EE	2015	BRN/EE group
Load Shifting[21]	EE	-	EE group
Azorom/ABB capacitor, loss reduction[16]	EE	2013	MCC
Reticmaster technical assistance to TANESCO for distribution planning[16]	EE	2013	MCC
Nyumba Ya Mungu mini hydro (8 MW)[2]	Hydro	1968	In operation
Rehabilitation of Hale HP Station[1, 2, 10, 18]	Hydro	2015	Sida, preparatory stage
Mini-grids based on micro hydropower[1, 23]	Hydro	2016	UNIDO, on-going
Tanga - 12 small hydro power plants[1]	Hydro	-	REF
Mwenga hydro (4 MW)[1, 16, 23]	Hydro	2012	EU, finalised
Ruhuji hydro (358 MW)[29] [1, 2, 6, 16]	Hydro	2018	WB partial risk, doc prep
EA-Power-Tukuyu hydro (10 MW)[1, 23]	Hydro	-	WB credit line, negotiations
St Agnes-Songea hydro (7.5 MW)[1]	Hydro	-	

[28] Type = Capacity indicates a project for institutional capacity building or similar
[29] Not considered as renewable when following the definition that only hydropower smaller than 10 MW is renewable

Project	Type	Year	Comments
Kikuletwa II hydro (7 MW)[1]	Hydro	-	
Darakuta mini hydro (0.88 MW)[1, 23]	Hydro	-	WB credit line, negotiations
Mofajus-Mpanda hydro (1.2 MW)[1]	Hydro	-	
Andoya (AHEPO-Mbinga) HP (1 MW)[23]	Hydro	-	WB credit, UNIDO, finalised
EA Power Kiwira River (10 MW)[1]	Hydro	-	
Cook stove standards[1, 20, 32]	Policy	2014	For paraffin to be approved For charcoal has been gazetted
Tanzania Energy Development and Access Project TEDAP[1, 19, 23]	Renewable	2015	WB, on-going
Sustainable Solar Market Packages[1, 23]	Renewable	2014	BRN, on-going
National Biogas Programme [1, 20, 32]	Renewable	2014	SNV, on-going
National Task Force for Geothermal[1, 20]	Renewable	2013	Group formed, SREP
SREP[1, 17, 20]	Renewable	2013	Approved on 12th Sept 2013
Sustainable Energy for All (SE4ALL)[1, 20]	Ren + EE	2013	UNDP, action plan
Large-scale oil seed for biodiesel[1]	Renewable	2014	
Kwimba - 3 biogas plants[1]	Renewable	-	REF
Kibaha biogas[1]	Renewable	-	REF
Support to companies involved in equipment for renewable energy[1, 23]	Renewable	2013	On-going
Agro Eco-Energy Tanzania - sugar based ethanol[6]	Renewable	2016	
Sustainable charcoal business development (Gala Consulting OY, Finland)[33]	Renewable	-	Nordic Climate Facility
DSM Network[9]	Renewable	-	SNV, on-going
Solar PV[1, 10]	Renewable	2012	Sida, completed
Kigoma solar for schools[1, 15]	Solar	2013	REF, finalised Sep 2013, MCC
Clusters Solar PV Project - Lake Zone[5, 16]	Solar	2014	EU, on-going
PV market development in rural Tanzania 2003-12[5, 10]	Solar	2011	Sida, finalised
Singida GeoWind phase 1 (50/300 MW)[3, 22]	Wind	2015[30]	NDC, negotiations
Mkunga wind power (250 MW)[2]	Wind	2015	
Singida Wind (Wind East Afr; 100 MW)[19]	Wind	2014	WB partial risk, doc prep
Makambako wind power[32]	Wind	-	TAREA

Table 14: Renewable Projects

Sources for table 15:

1	JESR 11/12	9	SNV	20	MEM	30	Symbion
2	PSMP	10	Sida	21	Tanesco	31	TaTEDO
3	BRN	11	JICA	22	NDC	32	TAREA
4	MoF Budget	12	USAID	23	REA	33	NCF
5	ODA	13	Norad				
6	FYDP	14	SNV				
7	GBS 2012	15	MCA-T				
8	CDM DB	16	EU				
		17	AfDB				
		18	KfW				
		19	WB				

6.2 Project Developers

Below, some of the important developers of large and medium scale renewable projects in Tanzania are shortly described[31]. At the meetings performed by the review team a number of problems were mentioned. In general it was about the price they get for their

[30] First phase of 50 MW

[31] Selection of stakeholders based on previous JESR's, MEM recommendations and Consultant's stakeholder discussions

electricity generation, about the process that they think could be better streamlined and about the risks that the investors take. The consultant's views are:

- Streamlining of the project development process has to be developed in cooperation between the developers, MEM and TANNESCO. This is also in accordance with one important goal in BRN[32].
- In general, risks have to be taken by the investors and be covered by the payment they get for the electricity sales.

6.2.1 Katani Limited - Mkonge Energy Systems Co Ltd

Katani is a private company manufacturing products from sisal plants. The main manufacturing factory is located at the Hale estate. The energy development within Katani is performed by Mkonge Energy System Co Ltd which is owned by Katani 70% and Te Tong (Chinese company) 30%.

Only about 3% of the sisal plants are used for the manufactured products. That is why the company planned to build a biogas plant at the Hale estate. Today there is a pilot plant of 300 kW (two lines of 150 kW each, not running simultaneously) in Hale, but according to Mkonge there is a total potential of 500-1000 MW energy from biomass.

As Katani owns large land areas with potential for hydro power, Mkonge plans for several small hydro stations with capacity between 2 and 8 MW. Today they have an existing hydro plant in Ngombezi (Hale) of 400 kW with a planned upgrade to 2,2 MW. Financing is under discussion.

Projects planned by Mkonge are listed in the table below.

Project	Comment
Ngombezi Sisal Estate Run-Off River Hydropower Plant	2.2 MW (two turbines of 1.1 MW each) to be provided to the grid.
Hale Biogas Plant	Upgrading from 300 kW to 500 kW and grid connection.
Mandera Run-Of River Hydropower Plant	8 MW (two turbines of 4 MW each) to be provided to the grid.
Mwelya Biogas Plant	1 MW for grid connection
Masigira Hydropower Plant	90 MW (two turbines of 45 MW each) on the Ruhuhu River
Kiwira Hydropower Plants	Approximately 9.9 MW from cascading hydropower plant on the Kiwira River

Table 15: Mkonge Planned Projects

6.2.2 Geo Wind Power Tanzania Ltd

Geo Wind Power Tanzania Ltd is owned by NDC 60%, TANESCO 20% and a local partner (Power East Africa) 20 %. The company focuses on wind power development in Tanzania.

The first phase of the Geo Wind project in Singida is for 50 MW and the project is planned to be taken into operation by 2015/16. In total, Geo Wind plans to build 300 MW wind power in Singida with 50 MW each year. For the first project, Chinese turbines are planned. Financial closure is not yet reached. The first 50 MW project is part of the Big Results Now Initiative.

Geo Wind also plans a 100 MW wind farm in Makambako. A due diligence has been performed by the German consultant Lahmeyer and an inception report is prepared.

[32] Energy Lab Final Report, Executive Summary, April 2013, page 34

6.2.3 Wind East Africa

Wind East Africa (WEA) is owned by Six Telecom 40%, Aldwych 40% and IFC (from 2012) with right to 20%. WEA plans a 100 MW wind farm in Singida. According to WEA, all land lease agreements for Singida are not yet signed and there are transport limitations setting limits to the maximum size of turbines (max weight of nacelle) that can be used. WEA today performs wind measurements at Singida at the height of 65 metres showing good wind speed.

WEA stated that an approved procedure for finding new houses and villages for settlements that have to be moved when a wind farm is established would improve the conditions for establishing large wind farms and shorten the development process.

It was further mentioned that TANESCO now have appointed a consultant that should support TANESCO with the future wind projects and grid connection issues.

6.2.4 The National Development Corporation

The National Development Corporation (NDC) is involved in the development of wind power projects in co-operation with other parties (see GEO Wind projects above).

They are also interested in geothermal energy. However some of their licences have been taken back by the government.

6.2.5 TANESCO

TANESCO is owned by the GoT and is the major energy player in Tanzania and responsible for the national electricity grid.

TANESCO do not sit in the driver seat for any new large renewable project with the exception for the energy efficiency task force where they have the chair (see section 6.3.5).

However, TANESCO is involved in the wind power development at Singida by being a co-owner of GEO Wind, see above.

TANESCO has in general an important role in the development of renewables as being responsible for connecting energy projects to the grid and signing grid connection agreements.

6.2.6 Symbion

Symbion is a major player in the energy field supplying and operating oil and natural gas power stations. They are also involved in the development of the biogas projects Tadura (1 MW) and Kigoma (4 MW). Both plants shall replace diesel and the biogas is produced by thermal gasification of bamboo. The projects are developed with the partner KMRI (50/50%) and are expected to be taken into operation in 2014.

6.3 Progress Made in the Renewable Energy Subsector

The 2011/12 JESR set out fourteen recommendations for the renewable energy development. These recommendations are listed below together with comments on the progress achieved during the last year.

6.3.1 Government to Invest More in Promotion and Scale-Up of Renewable Energy Technologies

Action point set up in 2011/12 JESR: Next review of the Medium Term Expenditure Framework (MTEF) Q3 2012/13. Responsibility: MEM

GoT Budget

In the GoT Budget 2013 the following addressed money for renewables (clause 123 (v)): *"Grant import duty exemption to plastic bag biogas digesters under HS Code 3926.90.90. This measure is intended to promote the use of alternative sources of energy and preserve environment."*

This aspect has not been given the exemption[33].

The consultants view is that this ought not to be a problem, because during the review it was also stated that better technologies are available today[34].

National Biogas Programme (Biogas Digesters).

According to MEM the budget for this project is TZS 200 million. The project is being executed by CARMATEC, and supported by the Netherlands in 15 Regions. The project which was to end in 2013 has been extended to 2014. In 2013, 6,000 domestic plants have been implemented and in 2014, another 6,000 units are scheduled to be undertaken.

6.3.2 Expedite the Development of Large-Scale Geothermal Power Plants for Electricity Generation

Action point set up in 2011/12 JESR: After receipt of exploratory drilling. Responsibility: MEM – Task Force on Geothermal Energy

The drilling was not executed due to budgetary constraints. However, one company, The Power Tanzania Company, drilled a shallow well at Mbaka. The results have not yet been communicated to the National Geothermal Task force.

Geothermal energy is a potential source of power in the country. Currently, there are, according to the PSMP, about 50 geothermal potential sites in the country, with an estimated geothermal potential of more than 650 MW. Three promising sites are proposed for more detailed investigations:

a) Lake Natron in Arusha region

b) Songwe river basin in Mbeya region

c) Luhoi Spring site, with potential of 50 – 100 MW located in Lower Rufiji (Rift) Valley,

The National Geothermal Task force is in place since 2012 to coordinate activities within the geothermal sector. In the year 2013, the following was achieved[35];

- Preparation of the Legal framework has commenced
- Update of the geothermal resource survey has started in order to replace the existing information from the 1970's
- An awareness workshop on the activities of the task force was organized by MEM and AfDB to stakeholders

GoT has decided on an investment priority for a Geothermal Development Project within SREP which would enable exploratory drillings.

[33] Source: Meeting with MEM-Renewable 23 August 2013
[34] Source: Meeting with TAREA 27 August 2013
[35] Source: Meeting with MEM-Renewable 23 August 2013

6.3.3 Align Actors in the Renewable Sub-Sector to be able to Fully Utilise Different Big Projects

Action point set up in 2011/12 JESR: Immediate. Responsibility: MEM

From the review performed it could be seen that stakeholders are informed on that there are different on-going projects like SE4ALL and SREP for enforcing the development of larger renewable projects. The support from REA within this field has been appreciated. However there seems to be a lack in communication of present status.

The Scaling Up Renewable Energy Program in Low Income Countries (SREP) is a targeted program of the Strategic Climate Fund (SCF), which is one of two funds within the framework of the Climate Investment Funds (CIF).

Sustainable Energy for All (SE4ALL) is an initiative launched by the United Nations Secretary-General and guided by his High Level Group that brings all key actors to the table to make sustainable energy for all a reality by 2030. SE4ALL covers three aspects, energy access, renewable energy and energy efficiency.

GoT has accepted to take part in SREP. SREP Tanzania is supported by the AfDB and the World Bank Group including IFC. In the first phase an Investment plan (IP) has been prepared. The IP was approved by MEM and GoT and published in April, 2013. The two investment project priorities in the SREP are:

- Geothermal Development Project. The objective is to make geothermal energy a low-cost, reliable and significant contributor of electric power to Tanzania, to be developed by the private sector with public sector support targeted to overcome the riskiest phases of development. The total estimated cost is USD 465 M of which USD 400 M is for the 100 MW geothermal power plant which would be under PPP (Public Private Partnership) arrangements. USD 25 M is sought from SREP with about USD 45 M from the AfDB. Private sector, other development partners and commercial banks will provide the balance.
- Renewable Energy for Off-Grid Electrification Projects. The objective is to build a scalable off-grid rural electrification project development infrastructure and support private sector investments in off-grid electrification. The Rural Energy Agency (REA) will be the implementer.
  Total estimated cost is USD 160 M, of which USD 25 M is sought from SREP with about USD 50 M to be sought from the World Bank Group. Private sector, other development partners and commercial banks provide the balance.

6.3.4 Expedite the Implementation of Large-Scale Wind Power Projects

Action point set up in 2011/12 JESR: Immediate. Responsibility: MEM

Presently the focus for large scale wind power development is in the Singida area and the first Geo Wind project (50MW) has been included in the BRN. Financial closure is not yet reached.

Two main developers in Tanzania, Geo Wind and Wind East Africa (WEA), have been identified. For Singida they plan to build a total wind capacity of 400 MW. Geo Wind is planning for 300 MW and WEA for 100 MW.

A wind atlas or wind map based on measured data is not yet available for Tanzania. Wind assessment for Singida is ongoing in several locations (mainly at 65 metres) and for the future, the planning of a wind map or wind atlas for Tanzania based on proven wind assessment methods, would be beneficial according to several stakeholders.

Transport restrictions and grid connection as well as other interest conflicts should also be considered when preparing the map.

6.3.5 Promote Demand Side Management through Energy Efficiency and Energy Conservation

Action point set up in 2011/12 JESR: Implement existing recommendations from 2012/13. Responsibility: MEM

According to the Energy Lab Report (a part of BRN) "Demand management can reduce the daily evening peak by 60% and save TZS 67 billion TZS in EPP fuel cost per year."

The following actions have been set up to reach this target:

- Run pilot to retrofit 3.2 million incandescent light bulbs with CFL in selected areas and assess implementation challenges of a country-wide rollout (to be finalised by June 2014)
- Conduct large-scale public awareness campaign about efficient use of electrical household appliances and produce energy efficiency standards and labelling (June 2016).
- Conduct round table discussions between TANESCO and the largest industrial power consumers to shift load away from the evening peak
- Develop National Energy Efficiency Programme to assess other opportunities (June 2016)

A task force on energy efficiency has been set up to work with those activities. Up to now, one pilot project as part of BRN has been launched "The bulb exchange program". It will take place in 4 regions: Dar es Salaam, Kilimanjaro, Arusha and Mwanza. Existing bulbs will be replaced by energy efficient bulbs. Sida is supporting MeM to prepare a programme for this bulb exchange activity. The program ought also to contain procedures and strategies for disposal of energy efficient lamps.

The next milestones are to prepare a financial concept for the initial six months, starting from May 2013, launch the full programme by December 2013 and have the programme ready for evaluation by June 2014.

6.3.6 Support Training of Personnel to Serve the Growing Renewable Energy Industry

Action point set up in 2011/12 JESR: Immediate. Responsibility: MEM

Training programs have been set up by REA both for decision makers and for other stakeholders and involved parties.

6.3.7 Introduce REFIT to Promote the Development of Renewable Energy Resources

Action point set up in 2011/12 JESR: Immediate. Responsibility: MEM

According to the Environmental Management Act paragraph 64(b), the Minister shall in consultation with the Minister responsible for forestry or as the case may be, energy, promote the use of renewable source of energy by:

- Creating incentives for the promotion of renewable energy source.

REFIT has not yet been introduced, but a Consultancy study was started by EWURA in August 2013 and will be ready March 2014. The objective is to review the possibilities of having tariffs reflecting the technology used to feed the power. The existing SPPA is

valid for production units smaller than 10 MW[36]. When REFIT is replaces SPPA it is expected that the 10 MW limit will be increased.

6.3.8 Increase Technical Support to Companies Manufacturing Renewable Energy Equipment

Action point set up in 2011/12 JESR: On-going activity. Responsibility: REA

According to information from REA such training and support is on-going. Furthermore, UNIDO and GEF are supporting local fabrication of micro hydro equipment.

6.3.9 Finalise and Utilise Rural Energy Prospectus

Action point set up in 2011/12 JESR: Prospectus approved by Q2 2013. Responsibility: REA

REA has prepared a Rural Energy Prospectus with the assistance of IED (France) in Q2 2013. The prospectus is in draft version and has not yet been approved by the government.

6.3.10 Finalise the Biomass Energy Strategy (BEST)

Action point set up in 2011/12 JESR: Finalisation of BEST by June 2013. Responsibility: MEM

A guide to all biomass sub-sectors (also transports) is under preparation. Support for Bio Energy Strategy is received from EU. After 4 workshops with stakeholders the consultant is now finalising the Strategy. The Strategy document will be submitted in December 2013.

A comment could be that normally a policy should be in place before the strategy.

6.3.11 Cook Stove Standards

Action point set up in 2011/12 JESR: Gazetting of Cook Stove Standards by June 2013. Responsibility: MEM

Action has been taken and a new cook stove standard for kerosene (not renewable) has been prepared and is ready for approval. Cook stove standard for charcoal has been gazetted

6.3.12 Biofuels Policy

Action point set up in 2011/12 JESR: Finalisation of Biofuels Policy by June 2013. Responsibility: MEM

A draft for a policy for liquid fuels from biomass has been completed and is awaiting approval by the govenment. This work was preceded by Guidelines for Sustainable Liquid Biofuels Development in Tanzania from November 2010.

No policy for solid biomass fuel is in preparation and a time schedule is not set.

A task force to strengthen the institutional framework for biofuels (Sida/Norad) has been set up.

According to information received from MEM[37] a New and Renewable Energy Policy is under preparation. Draft Terms of Reference is completed and a consultant shall be hired to prepare the Draft proposal, which then shall be finalized by MEM.

[36] Source: Meeting with EWURA 28 August 2013
[37] Source: Meeting with MEM Renewable 2013-08-23

6.3.13 Biofuels Act

Action point set up in 2011/12 JESR: Finalisation of Biofuels Act by June 2013. Responsibility: MEM

The act for liquid biofuels will follow the policy during 2014.

No legal document for solid bio fuels is in preparation.

6.3.14 Agro Ecological Zoning

Action point set up in 2011/12 JESR: Finalisation of Agro[38] Ecological Zoning by June 2013. Responsibility: MEM

The status for the Agro Ecological Zoning is that the Terms of Reference are prepared, but there have been no funds to implement the project.

The agro ecological zoning is going on to identify areas where biofuel crops should be grown.

6.4 CDM

Renewable projects in Tanzania have the possibility to get carbon credits through the CDM system (Clean Development Mechanism). The biggest market for such credits is the EU emission trading system. EU has decided to not accept credits from CDM-projects registered after 2012 unless such credits stem from projects in countries classed as Least Developed Countries (LDC) by the UN. As Tanzania is a LDC country, there is still a possibility to sell carbon credits from CDM-projects in Tanzania into the European Emissions trading system (EU-ETS) even for projects registered after 2012.

The UNEP Risoe Centre keeps a database of CDM-projects (www.cdmpipeline.org). Currently that lists contains 11 projects in Tanzania (Table 16). Three have been successful in reaching registration. Four projects have been terminated and four have been at validation for several years.

[38] In the 2011/12 JESR Report this was called *Hydro* Ecological Zoning – probably just a typo.

Project name	Province / State	Status	Main type	Sub-type
Afforestation in grassland areas of Uchindile, Kilombero, Tanzania & Mapanda, Mufindi, Tanzania	Morogoro & Iringa	Validation terminated	Afforestation	Afforestation
LUIGA Hydropower Project in Mufindi District, Tanzania	Iringa	Validation terminated	Hydro	Run of river
35.6 MW Biomass Power Plant project of Mufindi Paper Mills Limited – Tanzania	Iringa	Validation terminated	Biomass energy	Forest residues: other
"Mtwara Energy Project"	Many	Validation terminated	Fossil fuel switch	Oil to natural gas
Mtwara Energy Project	Mtwara & Lindi	Replaced At Validation	Fossil fuel switch	Oil to natural gas
Landfill gas recovery and electricity generation at "Mtoni Dumpsite", Dar Es Salaam, Tanzania	Dar es Salaam	Registered	Landfill gas	Landfill flaring
Nyanza Bottling Company Clean Drinks CDM Project	Mwanza	Registered	Biomass energy	Agricultural residues: other kinds
Mwenga Hydro Power Project	Iringa	Registered	Hydro	Run of river
Reforestation at the Idete Forest Project in the Southern Highlands of Tanzania	Iringa	At Validation	Reforestation	Reforestation
Sao Hill Energy Combined Heat and Power (CHP) 15 MWel project, Tanzania	Iringa	At Validation	Biomass energy	Forest residues: other
Replacement of Fossil Fuel by Biomass in a Crude Palm Oil (CPO) Refinery at BIDCO's Dar es Salaam Facility in Tanzania	Dar es Salaam	At Validation	Biomass energy	Agricultural residues: other kinds
Nuru Lighting Project - Tanzania	Many	At Validation	EE Households	Lighting

Table 16: CDM Projects in Tanzania

The CDM process is regulated by the CDM Executive Board, a UN body. According to the World Bank, the international UN requirements for making an application are clear and could be rather easily accomplished. In order to apply for registration as a CDM project, a Letter of Approval (LoA) from the host country is also required.

In Tanzania the applications for Letter of Approval are handled by the DNA office (Designated National Authority) under the Vice President's Office, Division of Environment. The consultant has been told that the internal process in Tanzania to make a formal application is complicated.

The consultant's view is that, if it is true, the problem has to be solved in cooperation between the authorities and the stakeholders. Otherwise Tanzania will go on losing possible incomes from the European emission trading system.

REA has initiated a project where many small projects will be aggregated into larger CDM packages.

6.5 Best Practices and Recommendations for Development of the Renewable Subsector

In general the premises for using energy from renewables in Tanzania are good. There is good availability of both wind, solar, biomass and to some extent small hydro. Based on the experience from Kenya, geothermal energy could also be of interest for Tanzania. The renewable sector in Tanzania is highly diversified with many projects but no clear targets.

According to the Environmental Act par 64(b) the Minister shall promote the use of renewable energy by "promoting research on appropriate renewable sources of energy". This review shows that most stakeholders have good relations with the work of the university and this should be encouraged for the future development of Renewables in Tanzania.

Based on the consultants review and discussions with a number of stakeholders the following general recommendations can be given:

- More analysis and drilling for the geothermal energy ought to be performed.
- Define targets for the short and long term for the development of renewables in Tanzania.
- Identify the costs for meeting the targets and a strategy on how to measure them and how to reach them with suitable steering instruments.
- One steering instrument is to introduce REFIT.
- Prepare indicative price estimations for the production of different types of renewables in Tanzania.
- Review the present procedures and implement mitigation measures for the CDM applications.
- Aim for a more sustainable fuel production for cook stoves and for an improved efficiency.
- Prepare a review of selected renewable projects and publish a lessons learned report identifying good examples for the future.

After these general recommendations, the consultant team makes the following more detailed prioritized recommendations for the renewable energy sector in Tanzania:

6.5.1 Setting Targets for the Renewable Energy Sector

Action 1: Assessment of the MKUKUTA II operational target, "Use of non-hydro renewable for power generation increased from 4 percent 2010 to 6 percent in 2015" shall be performed and documented. Start up immediately.

Action 2: Start the process of setting new targets (medium/long term) for the whole renewable sector as well as identifying relevant costs. Start up immediately.

Responsibility: MEM

6.5.2 Government to Invest More in the Promotion and Scale-Up of Renewable Energy Technologies

Action: Identify and subsidise prioritized pilot projects showing the potential for scaling up renewable technology in Tanzania. Money for this should be included in the budget. Start up immediately.

Responsibility: MEM

6.5.3 Geothermal Energy Development

Action: Ensure that the drilling and the geothermal assessment will be performed. Work to be co-ordinated with SREP.

Responsibility: MEM

6.5.4 Inform Actors in the Renewable Sector on On-Going Big Projects and Opportunities

Action: Set up a communication plan for renewables and identify responsible contact persons for stakeholders. Start up immediately.

Responsibility: MEM

Remark: Could this be accomplished by a dedicated homepage for the renewable sector?

6.5.5 Implementation of Large Scale Wind Power

Action 1: Prepare a wind map for Tanzania based on wind assessment and measurements, grid connection availability and considering conflicting interests as land use, air traffic and environment. The wind map should assign prioritized areas for wind in Tanzania. Immediate start-up.

Action 2: Ensure that the new standards on noise are implemented. Immediate action.

Responsibility: MEM

6.5.6 Demand Side Management through Energy Efficiency and Energy Management

Action 1: Perform energy efficiency audits on large energy consumers like cement industries and identify profitable energy efficiency measures that could be performed. Start up immediately.

Action: 2: Ensure that energy efficiency projects performed are sustainable.

Action 3: Ensure that the program for energy efficiency is implemented and followed up.

Responsible: MEM, to be executed by the energy efficiency task force.

6.5.7 Finalize and Implement the Rural Energy Prospectus

Action: Finalize and implement the Rural Energy Prospectus. On-going.

Responsible: MEM

6.5.8 Support to Training of Personnel within TANESCO and Decision Makers on Renewable Energy.

Action: Set up a plan for training and assign money in the budget. Action immediately.

Responsible: REA

6.5.9 Agro Ecological Zoning

Action: Ask GoT to finance the work according to the already finalised Terms of Reference. See also chapter 6.3.14.

Responsible: MEM

7 SECTOR FINANCING STRUCTURE

7.1 Introduction

The intention of this section is to give a brief overview of the financing structure of the Tanzanian mainland energy sector. This includes mainly an overview of money assigned for major energy projects during the financial years of 2012/13 and 2013/14. Analysis of the operational budgets for MEM or its agencies like TANESCO, MEM, TPDC etc. are not included.

7.2 Sources of information

The main sources of information have been

- Budget information: Volume IV Public Expenditure Estimates - Development as Passed by the National Assembly 2013-2014
- Information from the Development Partners

Budget data relevant for the energy sector has been found in

- Vote 50, MoF, account 1007, for MCA-T project
- Vote 58, MEM, accounts 1003, 1008 and 3001 for other projects

Other funds for energy project financing do exist, but are not included here.

7.3 Summary of Project Financing

7.3.1 Budget Projects with Financing from Other Sources than EDPG

Three of the main components for increased power generation capacity included in the Big Results Now Initiative are planned to be financed from sources outside the Energy Development Partners Group. The natural gas pipeline from Mtwara to Dar es Salaam is being financed from Exim Bank of China, while the two first gas-fired power plants in Kinyerezi will be financed by the EPC contractor. The North-West Grid extension is not yet financed.

Project	**Budget Data**				**PSMP Estimate** *BTZS*	**Comment**
	Account	***2011/12 Actual BTZS***	***2012/13 Appr Est BTZS***	***2013/14 Estimate BTZS***		
Mtwara-DSM gas pipeline	58-3001-3162	0	93	83		Exim Bank of China
Kinyerezi I PP	58-3001-3164	0	13	208	306	EPC contract with Jacobsen
Kinyerezi II PP	58-3001-3163	0	5	110	702	EPC contract with Sumitomo
North West Grid phase I	58-3001-3166	0	6	0.6		Potential Chinese financer
Mnazi Bay 300 MW	58-3001-3153	0.5	0	0		
Total		**0.5**	**117**	**402**		

Table 17: Projects Included in the Budget and Not Financed from the Energy Development Partners Group Members (Amounts in Billions of Tanzanian Shillings)

7.3.2 Budget Projects with Financing from EPDG – included in Budget

Several projects with full or partial financing by members of the EPDG are also included in the budget. There is no full agreement between amounts in budget and amounts mentioned by the DP's. One reason for this is that the projects span over sev-

eral years. Another reason is probably that money under headings like "Rural Energy Fund support" will be spread to several projects.

Project	**Budget Data**				**DP**		**Comment**
	Account	***2011/12 Actual BTZS***	***2012/13 Appr Est BTZS***	***13/14 Est BTZS***	***Fi-nance BTZS***	***Est Total BTZS***	
Backbone	58-3001-3157	0	13	5	476	778	WB, AfDB+JICA, EIB, EDCF
Makambako-Songea trans-mission	58-3001-3121	3	10	13	120	102	Sida
Reduce TANESCO's debts	58-3001-3147	205	50	273			WB, AfDB
Rehabilitation of Hale Hydro Power Station	58-3001-3158	0.5	4	31	56	384	Sida
ESCBP	58-3001-6298	0	4	11	67		WB, CIDA
TEDAP	58-3001-3110	14	10	6	249	249	WB
10th EDF Energy Pro-gramme	58-3001-3144	0	0.5	0.5			EU
REA Capacity Development	58-3001-3146	0.3	0.7	0.5	7		Sida
Electricity V	58-3001-3191	0	2	22	70	70	AfDB
Malagarasi HP distribution	50-1007-3143	3	9	2			MCA-T
Marongo-Kikagati	58-3001-3167	0	12	0			
Mpanda, Ngara, Biharamulo electrification	58-3001-3156	0	3	2	11	23	SNV
Environment Management Act Impl	58-1008-6571	0.1	0.2				Canada, Denmark
Rural electrification in 7 regions	50-1007-3144	48	51	2	147	147	MCA-T
Improving power supply reliability in DSM	58-3001-3154	0.7	62	20	50	53	Finland
Reinforcement distribution Kilimanjaro	58-3001-3155	0	2	0.5	46	50	JICA
Rural Energy Fund support	58-3001-3113	60	157	340	348	137	Sida, Norad
Renewable Energy Pro-gramme	58-3001-3102	0.1	9	3	10		KfW
Twinning Stattnet at TANESCO	58-3001-3159	0	1	1	10		Norad
Petroleum Sub-Sector De-velopment	58-3001-3115	6	0	2			
Climate Change Adaption and Mitigation	58-1008-3151	0.4	0.7	0			
Total		**341**	**401**	**735**	**1667**	**1993**	

Table 18: Projects Included in the Budget and Financed from the Energy Development Partners Group Members (Amounts in Billions of Tanzanian Shillings)

7.3.3 Projects with Financing from EPDG - not Specifically Included in Budget

Some projects with full or partial financing by members of the EPDG are not included in the budget. Again, a reason for this could be that the projects span over several years and that money under budget headings like "Rural Energy Fund support" will be spread to several projects.

Project	**DP**		**Comment**
	Finance BTZS	***Est Total BTZS***	
Mwenga hydro (3 MW)	7	15	EU
Ruhuji hydro (358 MW)	480	1300	WB
CDM Capacity building in energy sector personel	2		Sida
Upgrade of Mawengi micro HP	3	4	EU
Masigira hydro (118 MW)	2		Norad
Rumakali hydro (520 MW)	2		WB
Biofuels task force	3	3	Sida
Clusters Solar PV Project - Lake Zone	2	2	EU
Capacity building programme for Operation and Maintenance for TANESCO's gas power generation facilities	9	9	Sida
PV market development in rural Tanzania 2003-12	7		Sida
Geita-Nyakanazi transmission 220 kV	40	70	KfW
Reinforcement transmission and distribution DSM, Kilimanjaro, Arusha	37	37	EDCF
Capacity development for efficient T&D systems	5	5	JICA
Up-Scaling Access to integrated modern energy services for poverty reduction	8	7	EU, Norad
Integrated Rural Elecctricity Planning	2	2	EU
Yovi HP	5	8	EU
Upgrade of Ikondo micro HP	3	4	EU
Introducing a new concept for affordable biogas system	2	4	EU
Rural electrification in Kilombero and Ulanga distr	16		EU
WB Trust Fund Electricity Access	7	7	Sida
Ruhuji and Kakono hydro, transmission study	3	3	Sida
Singida Wind (Wind East Africa; 100 MW)	160	488	WB
Communication strategy for the natural gas sector	4		KfW
Extractive Industries Transpareny Initiative	4		CIDA
Partnership for Growth	12	12	USAID
O&M Existing HP	11		Norad
Kihansi small hydro	4		Norad
Emergency repair of HPP	7		Norad
Interconnector Tanzania-Zambia	5		Norad
Total	**866**	**1994**	

Table 19: Projects Financed from the Energy Development Partners Group Members - Not Specifically Included in the Budget (Amounts in Billions of Tanzanian Shillings)

8 PROCEEDINGS FROM 2013 JESR STAKEHOLDERS' WORKSHOP

8.1 Programme

The workshop took place on 31st October 2012 at Kilimanjaro Hyatt Regency Hotel in Dar es Salaam. The program follows below.

Time	Activity	Responsible
0830 – 0900	Registration	Secretariat
0900 – 0905	Welcoming Remarks	Commissioner, MEM
0905 – 0920	Opening Speech	Permanent Secretary, MEM
0920 – 0925	Remarks by Lead EDP	EDP Lead, WB
0925 – 0930	General guidance on the Workshop	Facilitator
0935 – 1035	Consultants' Presentation	Consultants
1035– 1120	Plenary discussions/Questions /Answers	Facilitator / Consultants
1120 – 1140	**Health Break**	**All**
1140 – 1145	Introduction to group work/formation	Consultants / Facilitator
1145 – 1345	Group Work	Consultants / Facilitator
1345 – 1450	**Lunch**	**All**
1450 – 1450	Continuation with Group Work	Consultant
1450 – 1550	Presentation from group work discussion	Working Group Rapporteur
1550 – 1600	Summary of results	Consultants
1600 – 1605	Closing remarks	Chairman of the Workshop
1605 – 1630	**Tea**	**All**

Speakers:

Commissioner for Energy and Petroleum Affairs: Hosea A. Mbise, MEM

Permanent Secretary: Eliakim C. Maswi, MEM

EDP Lead: Natalia Kulichenko-Lotz, WB

Chairman Deputy Permanent Secretary: Ngosi C.X. Mwihava, MEM

Facilitator: Dr Samuel M Nyantahe, Daima Associates Ltd

Consultants: Dr Lennart B Larsson, Pöyry SwedPower AB

Professor Geoffrey R John, University of Dar es Salaam

8.2 QUESTIONS AND CLARIFICATIONS SESSION

After the consultants presentation (Appendix 7) of the report the following questions were put to the consultant.

Question 1.1 REA: Slide 6, Energy Supply and Consumptions statistics are from the 2010 data. Does it mean there are no updates?

RESPONSE: These statistics are the latest available to us. However, they are sufficient enough to reflect the fact that the situation in the country is heavily dependent on energy supply from biomass.

Question 1.2: REA is coordinating a number of projects but these are not reflected in your presentations.

RESPONSE: The projects appear in appropriate sections of the main report. The presentation, however, covers only a minor selection of the total number of Tanzanian energy projects.

Question 2 Kfw: It is noted that the TANESCO debt is huge and the AfDB and the WB are willing to assist. What is the GoT strategy to contribute to the effect?

RESPONSE: The two institutions are going to extend a loan to the GoT to bail out TANESCO. This will be repaid by the GoT.

Question 3.1 UNDP: The Figures in Slide 19 do not sum up to 100%

RESPONSE: The figures describe the utilization for each source. They are not meant to sum up to 100%.

Question 3.2: It is noted that there has been negligible benefit for the GoT from CDM. Are there any GoT strategies to reverse the situation?

RESPONSE: The MEM noted the concern and promised to discuss it.

Question 3.3: What plans are there to utilize geothermal resources?

RESPONSE: A taskforce for this is in place and the GoT is planning to set up a unit at MEM and TANESCO. This shall coordinate measures to realize the plans for using the resources. Furthermore, MEM disclosed that there are 52 potential sites. Plans are underway to start on the three of them.

Question 4 Swedish Embassy: The GBS and key performance indicators should be updated.

RESPONSE: The Updated Final Report will include indicators.

Question 5: Why are there so little about household energy consumption?

RESPONSE; Households consume nearly 75% of the total energy today. This is typical for a country with a low industrialisation degree. All national plans aim to develop the country to a more industrialised nation. Therefore the focus has been mainly on energy supply and efficiency measures for the future.

8.3 Group Work - Introduction

8.3.1 Panels

There were three working groups:

1. Renewable Energy and Energy Efficiency
2. Petroleum and Natural Gas Sub-Sector
3. Electricity Sub-Sector

8.3.2 Activities of the Panels

Each group discussed how the energy sector had performed in the previous year. Then they made a brief review of the action items from last year's JESR. After that they should develop proposals on action items to be followed in the coming year.

The main points from the group work were then presented to the plenary session by their rapporteur. Finally each group handed over documentation from their discussions to the consultant.

8.3.3 Background Document

The background documentation consisted of the consultant report, the slides from the presentation and group specific questions picked from the slides.

8.4 Renewable Energy and Energy Efficiency Sector

8.4.1 Comments on Achievements to Date

General Comments:

- According to the report, little progress has been made in regards to renewable energy. Large-scale projects are in the pipeline, but no projects seem to have reached financial completion.
- Although in reality there are a number of small renewable energy projects that have been implemented since 2003 — mostly solar photovoltaic in social institutions and most recently through the rural lighting program giving household access to solar products
- It was stated that the slow process in getting renewable projects up and running causes great cost for the people in Tanzania — most of the rural population lack access to electricity and rely upon unsustainable and costly energy sources. They can benefit from a mix of renewable energy solutions, both in respect to lighting and cooking
- Although the capital cost of renewable energy is more expensive than that for gas or coal projects, they are often economically sustainable and environmentally sound energy solutions compared to traditional energy sources.

In the absence of bureaucracy, renewable energy projects could ideally develop quickly and displace the cost of emergency power generation.

Achievement 1

- GoT is focused on the development of geothermal resources. The challenge is that utilization of geothermal energy needs significant up-front investment, especially investment in energy infrastructure
- The GoT is in the process of securing 800 MUSD from the Climate Change Investment Fund and the private sector — they will sign a MoU with Kenya Geothermal Development Company (PPP arrangement) to advance this initiative further. Significant progress on this plan is expected in the upcoming year 2014.
- The geothermal energy strategy will be followed by the act and all to be completed within 1 year.

Achievement 2

- Cook stove standards have been issued for charcoal and standards for kerosene are in process.
- It was mentioned that standards for firewood should be developed and implemented.
- The group noted that having standards had no value unless there are specific implementation plans, which are enforced throughout the supply chain, i.e. to the village level.

Achievement 3

- MEM mentioned that significant progress has been made in preparing a biomass strategy, which is expected to be completed by the end of 2013.
- Completion of a draft for biofuels (liquid biomass) is in progress.

Achievement 4

- REA has implemented several projects (on-grid and off-grid) through TEDAP
- Several private companies

8.4.2 Comments on Future Development of Sector Including Recommendations

Overall it was noted that the renewable energy subsector lacks focus. It was also stated that significant barriers existed for private sector involvement in the development of the sector.

Challenges Include:

1. Biofuel Strategy: Lack of analysis of the biomass sector, since 88% of total energy supply comes from biomass.

Progress: Draft of an energy efficiency programme

Solutions:

- Establish solid biofuels plan and in depth review of biomass use — draft biofuel policy
- TBS should coordinate the energy efficiency standards

2. REFiT Plan (Feed-In Tariffs)

- The lack of a financially viable feed-in-tariff (FiT) to encourage private investment.
- Current REFiT is based on avoided cost to TANESCO — it is not cost reflective for the producers.
- The current tariffs, that varies between off-grid and grid-connected projects, is given in TZS, while the generators cost depends on a various currencies.
- Renewable energy requires a significant upfront cost to meet capital requirements. This includes the cost of feasibility studies and securing land for project development.

Progress:

- EWURA is working on this, part of it will be developed in the National Energy Policy and incorporated in the Renewable Energy Policy
- SPP's have been operating

Solution:

- It was suggested that the GoT should speed up the process to enact a renewable energy strategy and policy, which is currently planned for 2014.
- EWURA should evaluate the structure of the FiT for the country. GoT has committed themselves to complete the development of a strategy and policy for renewable energy in 2014.

- EWURA should commit itself to make recommendations for REFiT.
- GoT should seek local funding (or from GBS) to develop solar and wind maps for the country to reduce up-front costs.

3. TANESCO Investment:

- TANESCO is viewed as a financial risk and not credible to private investors (the utility does not honour their payments).
- The current tariff structure in Tanzania is not sustainable.

Progress: EWURA is working on approving TANESCO's application for new tariffs

Solution:

- MEM and EWURA should make the cost reflective tariff a priority in order to get TANESCO back on a firm financial footing.
- This should be done together with a subsidy program financed by the MoF as a transition to ensure that TANESCO can pay the bills, move forward and provide comfort to potential investors to invest in the industry.

4. RE Investment and Financing

- Lack of a focused renewable energy strategy, mostly due to no renewable energy policy — solar, wind, and geothermal projects are very different to traditional energy projects.
- The private sector has difficulties in coordinating efforts with the government — bureaucratic procedures and capital-intensive projects that require risk guarantees from the GoT.
- Lack of involvement of local project developers — mostly dominated by big foreign companies.
- Renewable energy project development is complex — local banks and pension funds do not understand renewable energy project financing and the process to obtain long tenors required to finance these projects.
- Interest rates from local banks are too high for local private developers.
- Currently local banking institutions are not well in position for renewable energy projects. Typically, bilateral and multilateral funding sources must be approached as the most viable institutions prepared to take on the commercial and political risks associated with the financing of renewable energy projects.

Progress:

- GoT implemented PPP arrangements for renewable energy project developers, also funding from TEDAP under REF (managed by REA).
- Tanzania Investment Centre (TIC) was established to support the private sector in renewable energy investments — revised TIC website to help potential investors and streamline the investment process.

Solution:

- Increase the role and awareness of TIC's work — needs better marketing
- Coordinate efforts among public and private renewable energy stakeholders

- TIC can work with TAREA — local renewable energy think tank to improve the renewable energy investment environment
- Consider long-term impact of renewable energy and energy efficient products

8.4.3 Comments on Clean Development Mechanism (CDM)

- CDM has not been accessed in Tanzania, although there is an opportunity for export income from CDM.
- The global market for CDM is not progressive — currently private sector developers do not see the benefit to develop CDM projects because the Kyoto Protocol has expired and the market for carbon credits has crashed giving very little incentive for developers to invest in the process, which is complicated.
- Only three CDM projects have been approved this far — historically there has been very little support from the GoT.
- REA is working on renewable energy development to cover carbon credits.

8.5 Petroleum and Gas Sector

8.5.1 Performance Last Year and Proposed Action Items for the Upcoming Year

a. <u>Main Item, Gas Pipeline</u>

i. Progress well on the pipeline. Welding underway, soon to lay pipeline.

ii. Five ships of material have arrived.

iii. Way-leave completed

iv. 100 km of pipeline completed

v. Expectation for commission is December 2014.

vi. Current approach – six teams – each has a section, and the work is done in parallel, then they interface – highly efficient approach.

- Pipeline fully complete in June 2014

vii. Gas sales agreement between TANESCO and TPDC today

- Pan African still outstanding

viii. Discussion of issue of local content

- How do we develop capacity to ensure that most possible can be delivered from our own supply market?
- Recommendation: This is a key upcoming activity. It is a process in the early stages, but a more formal report on local content policy expected from MEM by December 2013 (?)

ix. Proposed: Keep up the good work to ensure efficient way forward. Actors: MEM, TPDC and other stakeholders.

b. <u>Model Production and Sharing Agreement, December 2013</u>

i. Completed and launched October 25, 2013

- Has been uploaded to the website

c. Natural Gas Policy and Legislation

i. Policy Approved October 10, 2013.

- Hope the Act will be ready by January or February and hope to set in place and confirm by June – if not overshadowed by Budget.
- Recommendation: Draft Act should be communicated to stakeholders in a timely fashion. MEM and the Ministry of Judiciary are key actors.
- Recommendation: Translate to KiSwahili as soon as possible, and need to set a specific date for completion – propose and agree completion by Dec 2014.
- Recommendation: Make sure policy is uploaded to the website.
- Recommendation: Public consultation to confirm alignment of act to policy, but limited in scope and time.
- Extensions and renewals must apply.

d. Natural Gas Utilisation Master Plan

i. This is an activity now that the policy is in place, expect it in time for the next meeting.

e. Draft Petroleum Policy

i. Still holding, some progress, upstream policy draft debated expected by April 2104

f. Price Setting Methodology

i. There is an on-going discussion of downstream margins of wholesalers and retailers, and it will be finalised in December 2013.

ii. Petroleum

- Downstream study underway, draft done, and working to complete final report by December 2015.
- EWURA launched a study, Ernst and Young, looking at downstream costs.

iii. Gas Pricing

- Mechanism to address issue of demand and supply. Current approach is negotiations with gas producers, get supply, and send to market. Thought was that there should be a reviewed system to better understand the cost components and more cohesively set the pricing plan in the future. This is still expected in the future.
- Priced based on prudent cost of operating the business.

g. Capacity Building

i. Significant steps underway to achieve improved capacity. The importance of this is understood by the Ministry and due steps are underway to ensure this is undertaken efficiently. The Ministry has enacted the Marshal Plan to send students abroad, have institutions stepping up the focus and curriculum, updating the industry standard.

- Recommendation: The report for June 2014 will get due attention to ensure complete and timely completion.

ii. In service training efforts supplement the external training. In addition, items like the pipeline project working with Chinese partners

iii. Other governments supporting such activities, including Canada, Norway, Netherlands.

h. General. Comment on Deep Sea Report/LNG

- Recommendation: Suggest consultant expanded reporting of the LNG projects and the timeline for such activities.
- Recommendation: Also consider other gas projects as applicable.

8.6 Electricity Sector

8.6.1 Assessment of Activities

Issue: Tariff: Why and when will the tariff be increased? The tariff application process is taking too long.

Status: The application has been resubmitted. EWURA reviewed the tariff application and adviced TANESCO to resubmit. The application did not comply with regulations.

Proposal: The decision is going to be taken by December

Issue: Electricity Access

Status: The methodology for accessibility was discussed. The fact that customers are connected by REA, TANESCO and also from private sector suppliers complicates the issue., No clear recommendation are available from East African Community (EAC) in order to harmonise the accessibility formula. There is a working group in process to find a consultant to execute the formula.

Proposal: There is a need for timeframe for aclear framework for TANESCO to have clear definition for electricity access. Next year a common formula in line with EAC recommendations should be in place.

Recommendation: Should consider to measure access and to put a plan in place to increase connections in order to meet the BRN indicator of 30% to 2015.

The connection cost has already been reduced to cater the accessibilities and connections.

Issue: Risk that TANESCO's financial situation will delay or stop on-going projects

Status: Risks in connection to the TANESCO non-payments. The government has guaranteed to resolve the TANESCO financial difficulties.

Proposal: The government process is taking too long and could affect on-going project.

Recommendation: The BRN goals should be aligned with the government plans to execute the financial guarantees

Issue: Policies and regulations

Status: Various strategies not well articulated and harmonized

Recommendation: Activities for priorities and strategies should be defined.

Issue: There is a need for harmonization of private sector participants – IPP's, PPP's and PPA's - in procurement of energy projects

Status: The status is not clear

Recommendation: The PPA's, IPP's and PPP's should be harmonized. The PPP framework should be simplified. Need for capacity on the part of TANESCO and Government staff to negotiate with the private sector, particularly in the energy sector. There should be a discussion with the private sector on how to cater the private sector participation after the un-bundling of TANESCO.

Issue: Update on litigations on judgment on IPTL and impact on TANESCO's financial situation

Status: The financial status can become a risk factor for project support.

Recommendation: We need to monitor the progress and the real cost in order to continue support

Issue: Electricity Subsidy Policy

Recommendation: The major TANESCO customers should have access to the policy. Donors should come with position on subsidy to the Government to plan for envisaged subsidies

Issue: Power Purchase Agreement

Status: The procedure is well known between the offtaker and the developer of the projects

Issue: REA activities not included

Status:

Proposal:

Recommendation: The Consultant should include activities undertaken by REA to improve the distribution network and access

8.6.2 Prospective for next year

- Commissioning of Kinyerezi I and II
- Natural gas available for IPTL

9 ROADMAP AND PERFORMANCE INDICATORS

This section summarises the results of the consultant's report and of the discussions during the workshop (section 8) in the form a roadmap for the implementation of the 2012/13 Joint Energy Sector Review. This could also be an input to the Performance Assessment Framework for the General Budget Support. As described in section 3.3, the latest GBS Review included only one Key Policy Action for the energy sector. This was the formulation of an energy subsidy policy, which is also a Key Performance Indicator for MEM in the Big Results Now Initiative.

For the electricity sector, the main activities for the coming year definitely are the major generation and transmission projects outlined in the Big Results Now Initiative. In the same way the new gas pipeline from Mtwara is the major expected achievement in the gas sector. In addition, the finalisation of the Natural Gas Utilisation Master Plan is important for the future successful utilisation of the off-shore gas findings. In the renewable sector, a couple of policies and strategies should come in place. The Singida wind power project, a BRN project, should be well underway by June 2014 and a variety of smaller projects listed in section 6.1 should have moved forward.

The tables in the following sections summarise main activities in the respective energy sectors together with expected progress by June 2014.

9.1 Renewable Sector

Activity	Finalised	Report Section	Indicator for 30 June 2014
New and Renewable Energy Policy	2014	3.1.2	In place
Biofuels Policy	2014	3.1.2	Draft completed
Biomass Energy Strategy	2014	3.1.2	Draft completed
Targets for the renewable energy sector	2014	6.5.1	In place
Pilot project for renewable energy	2014	6.5.2	Progress report available
Geothermal assessment	2014	6.5.3	Progress report available
Communication plan for renewables	2014	6.5.4	In place
Wind map	2014	6.5.5	Progress report available
Noise standards for wind power	2014	6.5.5	In place
Energy efficiency audits	2014	6.5.6	Progress report available
Energy efficiency programme	2014	6.5.6	Progress report available
Rural Energy Prospectus	2014	6.5.7	In place
Training on renewable energy	2014	6.5.8	On-going
Agro Ecological Zoning	2014	6.5.9	On-going

9.2 Petroleum and Gas Sector

Activity	Finalised	Report Section	Indicator for 30 June 2014
Petroleum Policy	2014	3.1.2 5.6.4	Draft completed
Natural Gas Utilisation Master Plan	2014	3.1.2	In place
Mtwara – Dar es Salaam gas pipeline	Nov 2014	5.2.2	Final stage
Natural Gas Act	2014	5.6.2	In place
Feasibility study for current and future margins in the petroleum downstream industry	Dec 2013	5.6.5	In place
Capacity building initiatives		5.6.6	Progress reports

9.3 Electricity Sector

Activity	Finalised	Report Section	Indicator for 30 June 2014
BRN Generation Projects			
Kinyerezi I, 150 MW, NG GT	Sep 2014	4.1.2	Construction work finalised, all major equipment in place
Kinyerezi II, 240 MW, NG CC	Jan 2016	4.1.2	Financing in place, contract in place
Kinyerezi III, 300 MW, NG GT	Jan 2015	4.1.2	Construction work ongoing, major equipment in place
Kinyerezi IV, 300 MW, NG GT	Jan 2015	4.1.2	Construction work ongoing, major equipment in place
Singida Geo Wind Ph 1, 50 MW	Dec 2014	4.1.2	Financing in place, contracts in place, network connections agreed, construction works has started
Kilwa Energy Ph 1, 210 MW, NG GT	June 2015	4.1.2	Financing in place, contract in place, construction work has started
BRN Transmission Projects			
Backbone (657 km)	2015/16	4.1.2	Financing in place, contract in place
Dar-Arusha (702 km)	2015/16	4.1.2	Financing in place, contract in place
Singida-Arusha (414 km)	2015/16	4.1.2	Financing in place, contract in place
Somanga-Kinyerezi (203 km)	2015/16	4.1.2	Financing in place, contract in place
Makambako-Songea (300 km)	2015/16	4.1.2	Financing in place, contract in place
North West Grid Phase 1			
(340-1000 km)	2015/16	4.1.2	Financing in place, contract in place
Dar-Dodoma (431 km)	2015/16	4.1.2	Financing in place, contract in place
BRN Other Projects with COD not Later than June 2014			
Optimise EPP usage, Max 520 GWh/a	June 2014	4.1.2	Total EPP generation July 2013-June 2014
150 000 new connections	June 2014	4.1.2	Number of new connections
3.2 million efficient bulbs replaced	June 2014	4.1.2	Number of bulbs replaced
T&D losses reduced from 21%-19%	June 2014	4.1.2	Total T&D losses July 2013-June 2014
Optimise dam operations	June 2014	4.1.2	Thermal peak generation July 2013-June 2014 compared to July 2012 - June 2013
Road map for Energy Sector Reform	Sep 2014	4.1.2	Draft Road map presented
Tanesco reorganised with three profit centres	Sep 2014	4.1.2	Reorganisation scheme presented, management appointed
Tanesco's debt reduced	Sep 2014	4.1.2	Debt at end of June 2013 lower than 167 MUSD
Other Electricity Sector Projects with COD not Later than 2014			
REA Capacity Development	2014	4.3.3	Progress reports
Capacity development for efficient T&D	2014	4.3.3	Progress reports

Appendix 1: Contact List

Consultant Team		
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Embassy of Sweden		
Stephen Mwakifwamba Energy	Embassy of Sweden Dar es Salaam	stephen.mwakifwamba@foreign.ministry.se +255 222 19 65 00
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DP's		
Natalia Kulichenko Senior Energy Specialist	World Bank Chair for Energy Development Partners Group (EDPG) and Co-Chair for the Joint Energy Sector Working Group (JESWG)	nkulichenko@worldbank.org

Appendix 2: Abbreviations

Abbreviations used in this report and in background documentation.

AfDB	African Development Bank
ADB	African Development Bank
ADF	African Development Fund
AFD	L'Agence Française de Développement French Development Agency
ASIP	Annual Survey of Industrial Production
BEST	Biomass Energy Strategy
BFZ	Berufliche Fortbildungszentren der Bayerischen Wirtschaft (bfz) gGmbH
BG	British Gas
BGR	Bundesanstalt für Geowissenschaften und Rohstoffe Federal Institute for Geosciences and Natural Resources, Germany
BPTC	Bulk Procurement Technical Committee
BRN	Big Results Now Initiative
BTZS	Billion Tanzanian Shillings
CIDA	Canadian International Development Agency
CIF	Climate Investment Funds
CDM	Clean Development Mechnism
CFL	Compact Fluorescent Lamp
CMS	Corporate Management System
COD	Commissioning Date
COSS	Cost of Service Study
COSTECH	Tanzania Commission for Science and Technology
CTI	Confederation of Tanzania Industries
DFID	Department for International Development
DMS	Document Management System
DNA	Designated National Authority
DP	Development Partner
DPG	Development Partners' Group
DPP	Director of Policy Planning
DSM	Demand Side Management
DSM	Dar es Salaam
DTP	Deutsche Tanzanische Partnerschaft

EAC	East African Community
EAPP	Eastern Africa Power Pool
EDCF	Economic Development Cooperation Fund (Korea)
EDP	Energy Development Partner
EDPG	Energy Development Partners' Group
EE	Energy Efficiency
EPP	Emergency Power Plan
ESCBP	Energy Sector Capacity Building Project
EU	European Union
EU-ETS	The EU Emissions Trading System
EWURA	Energy and Water Utilities Regulatory Authority
FiT	Feed-in Tariff
FMO	Netherlands Development Finance Company
	Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden N.V
FYDP	Five-Year Development Plan 2011/12 – 2015/16
GBS	General Budget Support
GCC	Gas Combined Cycle
GDP	Gross Domestic Product
GDT	Geothermal Power Tanzania Company
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoT	Government of Tanzania
GST	Geological Survey of Tanzania
GT	Gas Turbine
GTZ	German Technical Cooperation (Today GIZ)
GVA	Gross Value Added
HFO	Heavy Fuel Oil
HP	Hydro Power
HPP	Hydro Power Plant
IDA	International Development Association (WB)
IFC	International Finance Corporation (WB)
IMF	International Monetary Fund
IP	Investment Plan
IPP	Independent Power Producer
IRES	Integrated Renewable Energy Services Programme
ISIC	International Standard Industrial Classification

JESR	Joint Energy Sector Review
JESWG	Joint Energy Sector Working Group
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau Reconstruction Credit Institute
km	kilometre
KPI	Key Performance Indicator
KPA	Key Policy Action
kV	kilovolt
LCGP	Least Cost Generation Plan
LDC	Least Developed Countries
LoA	Letter of Approval
LOLP	Loss of Load Probability
LRMC	Long Run Marginal Cost
LTPP	Tanzania Long Term Perspective Plan
MAED-1	Model for Analysis of Energy Demand
MCA-T	Millenium Challenge Account – Tanzania
MCC	Millenium Challenge Corporation
MDA's	Ministries, Departments and Agencies
MDU	Ministerial Delivery Unit
MEM	Ministry of Energy and Minerals
MIT	Ministry of Industry and Trade
MMSCFD	Million Standard Cubic Feet per Day (gas)
MoF	Ministry of Finance
MoU	Memorandum of Understanding
MoW	Ministry of Water
MPSA	Model Production and Sharing Agreement
MTEF	Medium Term Expenditure Framework
MTP	Medium Term Plan
M	Million US Dollars
MUSD	Million
MW	megawatt
NBS	National Bureau of Statistics
NDC	National Development Corporation
NEMC	National Environment Management Council
NG	Natural Gas

NGCC	Natural Gas fired Combined Cycle power plant
NGGT	Natural Gas fired single cycle Gas Turbine power plant
NGO	Non-Governmental Organisation
Norad	Norwegian Agency for Development Cooperation
NTF	Nigeria Trust Fund (AfDB)
OPM	Oxford Policy Management
PAF	Performance Assessment Framework
PIC	Petroleum Importation Coordinator
PO-PC	President's Office Planning Commission
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PSH	Peak Sun Hours
PSMP	Power System Master Plan
PSR	Power Systems Research Inc.
PV	Photo Voltaic
Q1	First Quarter
Q2	Second Quarter
Q3	Third Quarter
Q4	Fourth Quarter
RBA	Rapid Budget Analysis
RE	Renewable Energy
REA	Rural Energy Agency
REFIT	Renewable Energy Feed-In Tariff
REF	Rural Energy Fund
RET	Renewable Energy Technology
SAM	Social Accounting Matrix
SCF	Strategic Climate Fund
SCFD	Standard Cubic Feet per Day (gas)
SDDP	Stochastic Dual Dynamic Programming
SE4ALL	Sustainable Energy for All (UN)
Sida	Swedish International Development Cooperation Agency
SMART	Specific, Measurable, Achievable, Relevant and Timed
SPM	Single Point Mooring
SPP	Small Power Projects
SREP	Scaling Up Renewable Energy Programme (SCF)
SSMP	Sustainable Solar Market Packages

STAMICO	State Mining Corporation
T&D	Transmission and Distribution
TA	Technical Assistance
TANESCO	Tanzania Electricity Supply Company
TAREA	Tanzania Renewable Energy Association
TaTEDO	Tanzania Traditional Energy Development Organization
TBS	Tanzania Bureau of Standards
TCCIA	Tanzania Chamber of Commerce, Industry and Agriculture
TCF	Trillion Cubic Feet (gas)
TDFL	Tanzania Development Finance Company Limited
TEDAP	Tanzania Energy Development and Access Project
TF	Trust Fund
TIB	Tanzania Investment Bank
TIC	Tanzania Investment Centre
ToR	Terms of Reference
TPA	Temporary Process Action
TPC	Tanganyika Planting Company
TPDC	Tanzania Petroleum Development Corporation
TRA	Tanzania Revenue Authority
TSCF	Trillion Standard Cubic Feet (gas)
TZS	Tanzanian Shillings
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organisation
USAID	The U.S. Agency for International Development
USD	US Dollars
VPO	Vice President’s Office
WB	World Bank
WEA	Wind East Africa Ltd.

Appendix 3: List of Received Documents

The list below includes documents received in different ways by the consultant.

- Acts, Policies, Master Plans, etc
  - The Electricity Act, 2008
  - The Rural Energy Act, 2005
  - Environmental Management Act, 2004
  - The Petroleum Act, 2008
  - The Petroleum (Exploration and Production) Act, 1980
  - EWURA Act, 2001
  - The Energy Policy of Tanzania, MEM 1992
  - The National Energy Policy, MEM 2003
  - Power System Master Plan 2012 Update, MEM 2013
  - Guidelines for the Preparation of Annual Plan and Budget for 2013/14 in the Implementation of the Five Year Development Plan, December 2012, MoF
  - The Natural Gas Policy of Tanzania, Draft-1, October 2012
  - The Public Procurement Act, 2011
  - Guidelines for Sustainable Liquid Biofuels Development in Tanzania, MEM November 2010
- JESR Documents
  - Consultancy Services Towards the Joint Energy Sector Review (JESR) for 2011/12 for Mainland Tanzania, Revised Final Report, ECA 2012
  - Consultancy Services Towards the Joint Energy Sector Review (JESR) for 2011/12 for Mainland Tanzania, Final Report, ECA 2012
  - Final Report on Joint Energy Sector Review 2010/11, MEM 2011
  - Final Report on Joint Energy Sector Review 2010, MEM 2010
  - Final Report on Joint Energy Sector Review 2009, MEM 2009
  - Key issues Raised on 2011 Energy Sector Review, Andrew Mnzava 2011
  - Comments on the Consultancy Services Towards the Joint Energy Sector Review for 2011/12 for Mainland Tanzania Draft Final Report, MEM 2012
  - 2010/11 Joint Energy Sector Review, Presentation of initial findings to the JESWG, August 2011, Oxford Policy Management
  - 2011/12 Joint Energy Sector Review, Presentation, October 2011, Oxford Policy Management
  - Joint Energy Sector Review 2011/12, Presentation to Stakeholders' Work-shop, Renewable Energy and Climate Change, October 2012

- Other Reports
  - 2011 Annual Review of the General Budget Support, Final Report, 2011
  - 2012 General Budget Support, Annual Review, 2012
  - Quarterly Gross Domestic Product of Tanzania Mainland Third Quarter 2012, NBS 2012
  - AID Management Platform: Analysis of ODA Portfolio for FY 2010/11 & 2011/12, External Finance Department 2013
  - A Handbook for Clean Development Mechanism (CDM) Project Activities in Tanzania, VPO 2007
  - Clean Development Mechanism in Tanzania
  - Official Organisation Structure of the Ministry of Energy and Minerals, 2011
  - MKUKUTA II Key Priority Result Areas, Ministry of Finance and Economic Affairs, 2010
  - Annual Survey of Industrial Production and Performance, NBS 2008
  - Annual Survey of Industrial Production NBS 2009
  - EWURA Annual Report 2012
  - The Tanzania Five Year Development Plan 2011/2012-2015/16, June 2011
  - Speech by the Minister of State, President's Office, Social Relations and Coordination Hon. Stephen Masato Wasira (MP), Presenting the State of the Economy for 2011 and National Development Plan for 2012/13 to the Parliament
  - The Tanzania Long-Term Perspective Plan (LTPP) 2011/12-2025/26, June 2012
  - Poverty and Human Development Report 2009, MKUKUTA December 2009
  - Poverty and Human Development Report 2007, MKUKUTA 2007
  - MKUKUTA 1; National Strategy for Growth and Reduction of Poverty, Vice President's Office June 2005
  - MKUKUTA II; National Strategy for Growth and Reduction of Povergy II NSGRP II, Ministry of Finance and Economic Affairs July 2010
  - Electricity Loss Reduction Study, June 2011
  - Challenges of Unreliable Electricity Supply to Manufacturers in Tanzania, Confederation of Tanzania Industries, July 2011
  - Cost of Service Study (Final Report), AF-Mercados EMI, January 2013
  - Speech by the Minister for Finance Hon. Dr. William Augustao Mgimwa (MP) Introducing the National Assembly, the Estimates of Government Revenue and Expenditure for Fiscal Year 2013/14
  - The Ecnomic Survey 2011, President's Office, Planning Commission, August 2011

- IEA Energy Balance 2009
- ORCA Exploration Group Inc. 2012 Annual Report
- Budget 2013/14 Vote 58 MEM and Vote 50 MoF
- Millennium Challenge Account – Tanzania, Monitoring and Evaluation Plan, April 2012
- Vision 2025; Big Results Now!; Energy Lab Final Report Executive Summary, April 2013
- Big Results Now Key Performance Indicators Energy
- Scaling-up Renewable Energy Program in Tanzania, April 2013, MEM
- Scaling-up Renewable Energy Programme (SREP), Investment Plan for Tanzania, April 21 2013, MEM
- The Executive Summary of Power System Master Plan 2012 Update, May 2013, MEM
- Power System Master Plan, 2012 Update, May 2013, MEM
- Strategic Plan 2011/12-2015/16, November 2012, MEM
- EDPG Project Matrix, May 2013
- Awareness Raising of Renewable Energy Technologies in Tanzania
- Tanzania Renewable Energy Association (TAREA) Strategy 2011-2014, February 2011

Appendix 4: Stakeholders

Some important stakeholders in the Tanzanian energy sector are listed below. The selection of stakeholders is based on previous JESR's, MEM recommendations and Consultant's stakeholder discussions

Governmental Organisations

- Ministry of Energy and Minerals (MEM)
- Ministry of Finance (MoF)
- Tanzania Electricity Supply Company (TANESCO)
- The Energy and Water Utilities Regulatory Authority (EWURA)
    - The functions of EWURA include among others, licensing, tariff review, monitoring performance and standards with regards to quality, safety, health and environment. EWURA is also responsible for promoting effective competition and economic efficiency, protecting the interests of consumers and promoting the availability of regulated services to all consumers including low income, rural and disadvantaged consumers in the regulated sectors.
- Rural Energy Agency (REA)
    - REA is an autonomous body under the Ministry of Energy and Minerals. Its main role is to promote access to modern energy services in rural areas of Mainland Tanzania.
- Tanzania Petroleum Development Agency (TPDC)
    - TPDC participate and engage in the exploration, development, production and distribution of oil and gas and related services; facilitate a fair trading environment; safeguard the national supply of petroleum products.
- President's Office Planning Commission (PO-PC)
    - The Planning Commission is responsible for monitoring; analysing and providing advice on big picture and long term sectorial policies and socio-economic developmental issues, as well as, focus on the needs of policy makers on current policy issues. Consequently, the Planning Commission will conduct creative, insightful and counter intuitive policy analyses on problems of great public importance to provide solutions to be implemented by the Government. This process is continuous in a systemic context
- National Bureau of Statistics (NBS)
- National Development Corporation (NDC)
    - The NDC was given a broad mandate as a development and promotion institution to stimulate industrialization in partnership with private sector.
- Vice President's Office (VPO – Environment)
    - All environmental management issues, including climate change, are coordinated by the Vice President's Office. The functions of the Division of Environment are to coordinate all climate change issues, including their ad-

aptation and mitigation. The Division of Environment has the following overall functions: formulation of policy on environment, co-ordination and monitoring of environmental issues, environmental planning, and policy-oriented environmental research.

- Tanzania Commission for Science and Technology (COSTECH)
    - A prime driver of science, technology and innovation for sustainable development
- National Environment Management Council (NEMC)
    - Promoting environmental management in Tanzania through coordination, facilitation, awareness raising, enforcement, assessment and monitoring.

Development Partners

- Development Partners Group (DPG)
    - Since formally established in 2004 the Development Partners Group (DPG) has been working with the Government of Tanzania and other domestic stakeholders to strengthen development partnership and effectiveness of development cooperation. DPG comprises 17 bilateral and 5 multilateral (UN counted as one) development agencies providing assistance to Tanzania.
    - The main development partner in the energy sector are
        - African Development Bank (AfDB)
        - European Union (EU)
        - European Investment Bank (EIB)
        - Finland
        - JICA, Japan
        - EDCP, Korea
        - Millennium Change Corporation (MCC)
        - SNV, Netherlands
        - Norad, Norway
        - Sida, Sweden
        - United Nations Industrial Development Organisation (UNIDO)
        - United Nations Development Programme (UNDP)
        - World Bank (WB)
        - KfW and GIZ, Germany
        - AFD, France
        - The U.S. Agency for International Development (USAID)

Private Organisations

- Songas
    - Songas generates electricity using gas from the Songo Songo Island gas fields, off the coast of southern Tanzania. The business consists of two dif-

ferent operating streams, Gas Processing and Transportation and Power Generation.

- Tanzania Chamber of Commerce Industry and Agriculture (TCCIA)
    - TCCIA serve and support business community
- Tanzania Traditional Energy Development Organization (TaTEDO)
    - Centre for Sustainable Modern Energy Expertize
- Tanzania Renewable Energy Association (TAREA)
    - Formerly known as TASEA (Tanzania Solar Energy Association), was founded in the year 2000 and officially registered in 2001. The objective of TAREA is to promote the sustainable development of Renewable Energy in Tanzania Mainland. TAREA cooperates with all important enterprises in Tanzania, as well as (inter-)national organisations.
- Confederation of Tanzania Industries (CTI)
- Symbion Power LLC
    - Symbion is an international power developer.
- Pan African Energy (T) Ltd
    - Pan African Energy Tanzania (PAT) is the leading integrated energy company in Tanzania; developing and supplying natural gas for the power, manufacturing and transportation sectors in the country. A wholly owned subsidiary of Orca Exploration Group Inc, PAT has been in the Tanzania market since 2001 where it has been operating the Songo Songo natural gas field.
- Mkonge Energy Systems Company Limited
    - Katani Limited has incorporated Mkonge Energy Systems (MeS) Ltd to go into strategic Joint Ventures and Cooperation with various partners and stakeholders.
- Tanganyika Planting Company (TPC)
    - Tanganyika Planting Company operates a very large sugar cane plantation and company 20 km south of Moshi town. It also owns Moshi Biomass Power Plant
- Power Pool East Africa Ltd.
    - Group of local partners for the Singida wind project
- Wind East Africa Ltd.
    - Wind East Africa, a private initiative between Tanzania's Six Telecoms, UK-based Aldwych International and Danish wind consultancy KenTec Denmark, has been granted a provisional licence by the energy regulator to develop a 100MW project in the Singida region of central Tanzania.

Appendix 5: List of Meetings

List of meetings held by the consultant team between 20 and 30 September 2013 in Dar es Salaam.

Swedish Embassy and Sida	Samer Al Fayadh, First Secretary Sustainable Services Stephen Mwakifwamba, Programme Officer Energy
Ministry of Energy and Minerals, Energy Development	James Andilile, Assistant commissioner for Energy Development Samuel Innocent Mgweno, Energy Engineer
Ministry of Energy and Minerals, Gas Section	Norbert A. Kahyoza, Assistant commissioner for Energy (Natural Gas) Seleman H. Chombo, Energy Officer Ebahart Dilliwa, Senior Geologist
TANESCO	Rwanbangi P. Luteganya, Manager Investment Samwel Lucas Kessy, Reasearch Engineer Abdallah Mussa Chikoyo, Planning Engineer – Mechanical Sabina P. M. Daati, Manager, Research Mathew D Maduhu, Senior Financial Analyst
REA	Boniface Gissima Nyamo-Hanga, Technical Assistance Manager
Mkonge Eenergy Systems Company Limited	Juma S. Shamte, Director of Development, Katani Limited
NDC	Gideon J. Nasari, MD & CEO Alley C. Mwakibolwa, Heavy Industries Director Pascal E. Malesa, Head Building & construction Materials Two more persons
Ministry of Energy and Minerals Renewable Energy	Edward Leonard Ishengoma, Assistant Commissioner – New & Renewable Energy Jacob Mayalla, Geothermal Paul Kiwele, Biomass Styden Ruebaugila, Energy Efficiency
Ministry of Energy and Minerals	Adam I. Zuberi, Principal Petroleum Geologist

Petroleum	
MCA-T	Isaac A. Chanji, Director of Energy Sector Projects Peter Kigadye, civil engineer One more person
MCC	Karl Fickenscher, Resident Country Director, Tanzania Alexander Scott
Wind East Africa	Said S. Abdallah, Project Coordinator
Symbion	Peter Gathercole
TAREA	Matthew Matinbwi, Executive Secretary Klaus Winkler, Technical Advisor TAREA, Horizont 3000, Austrian Organisation for Development Cooperation
Big Results Now Initiative	Wanja A. Mtawazo, Assisent Director – Policy, BRN, MEM J.F. Mkobya, MEM-MDU Brown Foi, MEM-MDU D. Mosha, MEM-MDU Jones Olotu, MEM-MDU
AfDB	Daniel Tsenoio Tiberia Lekoetje, Country Progam Officer
EWURA	Haruna Masebu, Director General Anastas P. Mbawala, Director of Electricity Msafiri Mtepa, Manager, Financial Analysis and Modeling Poline H. Msuya, Natural Gas Transmission Manager
TPDC	Lwaga Kibona, Planning Officer Danstan Asanga, Exploration
JICA	Hiroyuki Shimakawa, Representative Lilian Masalu, Assistant Advisor Infrastructure
KfW	Katrin Brandes, Senior Project Manager Janne Rajpar, Senior Project Officer Dr Regine Qualmann, Country Director, GIZ
Songas	Malcom Taylor, Gas and Infrastructure Manager

	Obeth Mwingizi, Business Analyst
EU	Marcos Sampablo, Economic Advisor
SNV	Finias Magessa, Senior Advisor – Renewable Energy
UNIDO	Emmanuel G. Michael, National Project Coordinator (Energy)
TaTEDO	Estomih N. Sawa, Executive Director
WB	Natalia Kulichenko-Lotz, Senior Energy Specialist, Energy Unit, Sustainable Energy Department One more person
PO-PC	Omari Athumani, Principal Officer, Infrastructure & Services

Appendix 6: Terms of Reference

The Terms of Reference for the consultant's assignment is included below.

DRAFT TERMS OF REFERENCE

FOR

CONSULTANCY SERVICES FOR THE JOINT ENERGY SECTOR REVIEW (JESR) 2012/13

Background

1. The Joint Energy Sector Review (JESR) is the key element for coordination, planning and financing of the energy sector. It establishes a common basis for monitoring the performance and set the priorities of the energy sector. The Ministry of Energy and Minerals (MEM) in collaboration with Development Partners (DPs) have been facilitating JESRs since 2007. The exercise is carried out annually to give a general overview of the sector performance to the public and private stakeholders involved in the energy sector and generate inputs for the General Budget Support (GBS).

2. Recognising the essence of this review, the MEM intends to engage a consultant to review overall performance of the energy sector since the last JESR, the implementation of the energy policies and strategies, sector governance and financing structure.

Objectives

3. The overall objective of the study is to review the overall performance of the energy sector since the last JESR, the implementation of the energy policies and strategies, sector governance and financing structure. Specifically the study intends to:

a) Provide an update on the current situation of the energy sector and assess progress made since last JESR and the Energy Temporary Process Actions (2012) including outcome Indicators agreed during the previous annual review;
b) review actions taken by the GoT and the EDPs since the last JESR (2012) on energy sector governance and the sector's financing structure.;

Scope of Services

4. The scope of this study is limited to mainland Tanzania.

4.1 *Electricity sector update*

The consultant is expected to:-

a) Provide an underlying situational analysis; policy and planning;

b) review the power sector planning and procurement processes and assess the current state of the Emergency Power Plan with a comprehensive review of how it is financed.

c) Update on the overall development of demand and supply situation in the last 12 months including estimated unconstrained demand levels, generation mix, power outages and most likely demand & supply scenario for the next 12 months. and

d) Assess electricity contribution to the Gross Domestic Product

4.2 *Petroleum and Natural Gas Sector Update*

The consultant is expected to:-

a) Review last year's JESR assessment of the sub-sectors and compare the current situation with regard to recommendations made in last year's review;

b) Assess the status/progress of efforts and plans to increase the gas supply, taking the GoT generation expansion plans into account;

c) Provide an account for capacity building initiatives and facilitation for Petroleum and Natural gas sub sectors; and;

d) Assess Natural Gas contributions to the Gross Domestic Products

4.3 *Renewable Energy*

The consultant is expected to;

a) review progress made in renewable energy subsector and recommend best practices for development of the sub-sector in Tanzania.

b) The consultant is also expected to stake stock of all on going and completed projects (solar, biogas, mini hydro, wind, etc) under both public and private sector initiatives.

4.4 *Sector Policy and Strategy*

The consultant is expected to:-

a) review and comment on any changes/updates to the energy sector policy framework and their implications for the overall sector performance including the update of the National Energy Policy;
b) review and comment on GoT's initiatives taken since the last JESR Workshop (2012) on promoting enhanced private sector participation in the power generation sub-sector;

c) review, comment and evaluate GoT's initiatives since the last JESR on (i) Energy conservation/efficiency and demand side management initiatives, (ii) Development of a National Policy on Electricity Subsidies, and (iii) enhancing promotion and implementation of CDM supported energy generation Projects.

Project Management

5. The Consultant shall report to the Permanent Secretary for the Ministry of Energy and Minerals or the designate.

Qualification and Experience

6. The Consultant must be a registered consulting firm with experience of not less than five (5) years in energy issues. In addition, the firm must have done at least three (3) similar

assignments. The Team leader must be holding a Masters Degree or above in Economics, Engineering, Business, Finance, or related subjects; excellent knowledge of Tanzania and the Energy sector and the private sector.

7. The consultant also will be required to have sufficient experience in Tanzania Government Budgeting and Planning system; international exposures on energy sector frameworks, policies and set up, sufficient exposure to energy assessments, reviews, performance indicators and monitoring; strong knowledge of the national policies/strategies; and proficiency in English and strong communication skills.

8. The Team leader will be responsible for the execution of the contract, as well as coordination of all consultancy activities, and representing other consultants to meetings with key stakeholders. He/she will also be accountable for report writing and submission, organizing the group, preparing JESR document and making presentations.

Responsibility of the Client

9. The Client shall provide at least one counterpart staff for capacity building purposes from the start of the assignment to completion. The counterpart staff will also act as a focal contact person within the organization and other stakeholders throughout the implementation of the assignment. Need may be, the client will introduce the consultant to key stakeholders including the National Bureau of Statistics, the Tanzania Electric Supply Company Limited, Rural Energy Agency.

Duration and Deliverables

10. The duration estimated for this assignment is estimated to be three (3) months from the date of signing the contract. The Consultant shall deliver the following outputs:

a. Inception Report explaining detailing how the consultant will undertake the assignment under the provided scope;

b. Draft final report (in hard and editable soft copies) taking into account comments raised by the key stakeholders at the submission of interim report;
c. Final report of the assignment including presentation at the 2012 JESR stakeholders' workshop in Dar es Salaam; and
d. Final JESR 2012 report submitted to MEM and Chair of EDPG having incorporated the stakeholders' comments.

11. The consultant shall assist the client in preparing, organizing and implementing the 2013 JESR workshop in terms of preparing detailed agenda; presenting briefs, and taking part in workshop proceedings, and playing the facilitation role to the workshop.

12. Based on the overall findings of the study and consultations during the workshop, the consultant shall propose a road map for implementation of JESR for 2012/13 and propose a set of indicators by which the performance of the sector could be measured.

Improvement of the Terms of Reference

13. The Consultant may offer suggestions, improvements and comments in the Terms of Reference those results in the better implementation of the assignment. Such proposal, if accepted, shall form part of these Terms of Reference.

Appendix 7: The Consultant's Presentation at the JESR Workshop

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013
– CONSULTANT REPORT PRESENTATION

- Aim and methodology of the review
- General
- Sector Policy and Strategy
- Electricity sector
- Petroleum and Gas sector
- Renewable sector
- Financing structure
- Summary

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013 – AIM OF THE REVIEW

The objective of the JESR study is to review:

- Overall performance of the energy sector since the last JESR
- Implementation of the energy policies and strategies
- Sector governance and financing structure

Aim of the report:

- Supply basic information to the Workshop
- Provide an update on the current situation of the energy sector
- Assess progress made since last
- Review actions taken by GoT and EDPs since the last JESR (2012)

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – JESR PROCESS

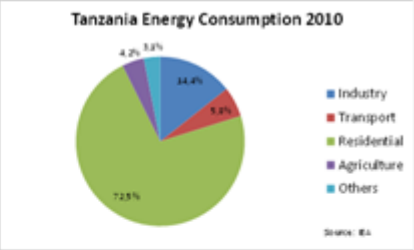
- **Fact Finding**
  - Desktop analysis of available documentation
  - 30 meetings with main stakeholders in Dar es Salaam (August 2013)
  - Preparation of a Draft Final Report
- **Final Report**
  - Takes into consideration comments on the Draft Final Report
  - Delivered to MEM before Stakeholders' Workshop
  - Constitute background for the discussions during the workshop
- **Stakeholder Workshop – Discussion of**
  - Goals for the Energy Sector during 2013/14
  - Sector indicators
  - Roadmap for implementation JESR
- **Updated Final Report**
  - Notes from discussions at the Stakeholders' Workshop
  - A proposed set of sector indicators, by which the performance could be measured
  - A road map for implementation of JESR 2012/13

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013

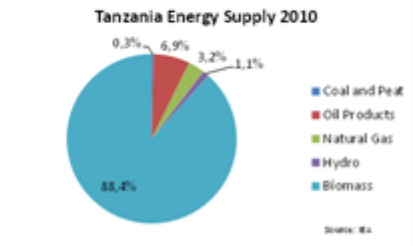
GENERAL

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013 – CURRENT SITUATION

- **Sector wise Energy consumption**
  - Low industrialisation degree
  - High residential proportion



- **Energy supply by Source**
  - Close to 90% Biomass
  - 10% Petroleum products
  - 1% Hydro



JOINT ENERGY SECTOR REVIEW WORK SHOP 2013 – STAKEHOLDERS

- Governmental organisations
  - President, Vice President and Prime Minister
    - President's Office Planning commission, Vice President's Office
    - Big Results Now
  - Ministries
    - Agencies, Bureaus, Commissions, Councils, etc
    - EWURA
    - TANESCO
- Development Partners
  - 17 bilateral
  - 5 multilateral
- Other organisations
  - Non-Governmental Organisations (NGO's)
  - Sector Associations
  - Commercial actors

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013

SECTOR POLICY AND STRATEGY

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – SECTOR POLICY & STRATEGY STRATEGY DOCUMENTS

- Tanzania Development Vision 2025, Planning Commission - Main strategy document that is further detailed in:
  - Tanzania Long-Term Perspective Plan (LTPP) 2011/12-2025/26 - Outlines a roadmap to a middle income country.
  - Five Year Development Plan 2011/2012-2015/16 – Actions to be taken in the shorter perspective
  - Ministry of Energy and Minerals - Strategic plan for 2011/12-2015/16
- Big Results Now Initiative
  - Aims at finalising 29 prioritised projects before 30 June 2016
  - A way to speed up processes and fulfil Vision 2025
  - Results monitored by President Delivery Bureau
  - Ministry Delivery Units for BRN - Daily meetings and weekly reporting.
- General Budget Support review
  - Annual process
  - Includes Performance Assessment Framework
  - Involves Government and Development partners
  - Sets up Key Policy Actions and Key Performance Indicators.

JOINT ENERGY SECTOR REVIEW -WORK SHOP 2013 – SECTOR POLICY & STRATEGY POLICIES AND LEGISLATION 1

Document	Current Status and Plans
–General	
–National Energy Policy 2003	– In place, update under review
–Power Sector (Reform) Policy	– Roadmap for Sector Reform included in BRN. To be published 30 June 2014.
–PPP Implementation Strategy	– To be covered in the roadmap above
–MEM Three Year Strategic Plan	– In place, 2011/12-2015/16, published Nov 2012
–Public Procurement Act 2011	– In place
–Electricity Sector	
–Electricity Act 2008	– In place
–Rural Energy Act 2005	– In place
–Power System Master Plan	– Plan 2012 Update, May 2013
–Rural Energy Strategy	– Draft Rural Energy Prospectus ready
–Rural Electrification Master Plan	– Plan To follow the Rural Energy Strategy

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013 – SECTOR POLICY & STRATEGY POLICIES AND LEGISLATION 2

– Renewable Energy Sector	-
– Environmental Management Act 2004	– In place
– Guidelines for Sustainable Liquid Biofuels Development in Tanzania (Nov 2010)	– In place
– New and Renewable Energy Policy	– Draft ToR for consultant ready
– Biofuels Policy	– Draft policy ready. To be finalised 2014
– Biofuels Act	– To follow the Biofuels Policy
– Biomass Energy Strategy	– In process. To be finalised in 2014
– Agro-Ecological Zoning	– ToR for consultant ready – Funds?
– Energy Conservation and Efficiency Policy	– Part of possible Sida energy efficiency programme
– Climate Change Adaption Plan	– June 2016 in MEM Strategic Plan
– Climate Change Adaption Strategy	– June 2016 in MEM Strategic Plan
– Environmental Action Plan	– In place

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – SECTOR POLICY AND STRATEGY POLICIES AND LEGISLATION 3

– Tariffs	
– EWURA Act 2001	– In place
– Feed-in Tariff Policy	– Consultancy study on REFIT started August 2013 and will be ready March 2014
– Subsidy Policy	– Included in BRN. To be published in September 2014
– Gas and Petroleum Sector	
– Gas Strategy	– Focus today on NGUMP
– Natural Gas Utilisation Master Plan and act Plan	– Draft prepared in 2013, waiting for policy
– Natural Gas Policy	– In place
– Natural Gas Act	– To follow the Natural Gas Policy
– Model Production and Sharing Agreement 2008	– In place
– Petroleum Act 2008	– In place
– Petroleum Act 1980	– In place, focus today on MPSA
– Petroleum Policy	– In process. To be finalised in 2014

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – SECTOR POLICY & STRATEGY ROADMAP FOR SECTOR REFORM

- **Big Result Now Initiative (BRN):**
  - Main focus since the process started less than a year ago.
  - Expected to have focus until 2016
  - Important policy and strategy issues to be covered under this umbrella
- **Roadmap for Sector Reform**
  - To be published by June 2014 and to cover
  - TANESCO restructuring
  - Private sector participation and privatisation
  - Matching of objectives and targets to the updated PSMP
  - Expected state of the power sector in 2015, 2020 and 2035

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – SECTOR POLICY & STRATEGY NATIONAL POLICY ON ELECTRICITY SUBSIDIES

- **The Performance Assessment Framework for the year 2013**
  - One Key Policy Action for the energy sector
  - Energy Subsidy policy
    - Formulation by September 2013 and in place by October 2014
    - Big Results Now Initiative has set Publishing of the Policy by September 2014 as a Key Performance Indicator
- **Current status:**
  - Draft policy has been submitted
  - MEM will prepare the final policy document

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013

ELECTRICITY SECTOR

PÖYRY

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – ELECTRICITY SECTOR UPDATE JESR 2011/2012 EXPECTATIONS - PSMP

- Proper stakeholder's consultation during the development of the PSMP –
  - The team, which carried out the work, was composed of experts from major stakeholders
- SMART indicators to monitor the PSMP implementation
  - BRN has taken over for the short term
  - MEM strategic plan contains a Results Framework Matrix.
  - Both are using indicators that seem to fulfil the SMART requirements.
- Inclusion of development partners in the review of the PSMP
  - DPs were involved in the process.
- PSMP should clearly indicate which projects to be implemented under IPP, PPP or government alone
  - BRN has taken over for the short term
- Decision makers to adhere with PSMP implementation by avoiding side project
  - BRN has taken over for the short term
- The JESR 2011/12 expects the updated PSMP to be reflected in MEM's five year medium term plan document.
  - MEM strategic plan contains a Results Framework Matrix. The targets there contain much of the targets in the PSMP.

PÖYRY

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – ELECTRICITY SECTOR UPDATE
JESR 2011/2012 EXPECTATIONS – TARIFF SETTING

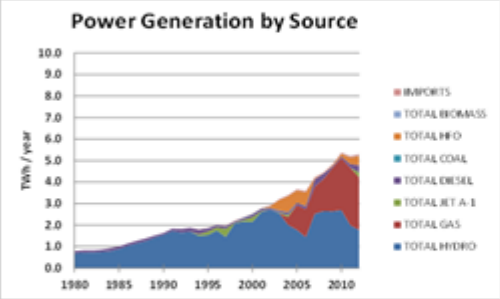
JESR 2011/2012 Expectations	Current Status
• Electricity tariffs to be Cost reflective	• EWURA has undertaken a Cost of Service Study (COSS) • Methodology is approved • Tariffs have not yet been revised with the new methodology
• Tariffs to be Sustainable in order to attract investment	• Current FIT is based upon TANESCO's avoided cost • New REFIT is under development
• Findings in the COSS to be implemented in the power tariff regime	• Methodology in COSS was approved in January 2013
• COSS to address issues related to subsidies	• This does not seem to be the case. Subsidies are discussed in section Policies

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – ELECTRICITY SECTOR UPDATE
JESR 2011/2012 EXPECTATIONS - GENERATION CAPACITY

Project or Activity	Target Year JESR 2011/2012 or JESR 2010/2011	Current Target Year	Previous Status	Status August 2013
Rehabilitation of Hale Hydro Power Station, 21 MW	2013	2017	In process	Preparations
Mwenga hydro (4 MW)	2012	n/a	In operation	Finalised
Mafia biomass power plant (1-1.5 MW)	2012	n/a	In operation	Finalised
Mwanza heavy oil power plant (60 MW)	2013	n/a	In progress	Commissioned
Symbion 205 DAR-1 NG power plant (100 MW)	2013	n/a	n/a	Cancelled

- 175 MW planned
- 65 MW realised
- 1 delayed
- 1 cancelled

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – ELECTRICITY SECTOR UPDATE
CURRENT SITUATION - GENERATION CAPACITY UTILISATION



- From 100% Hydro to less than 50%
- Poor hydrology 2006/07
- Poor hydrology 2011/12

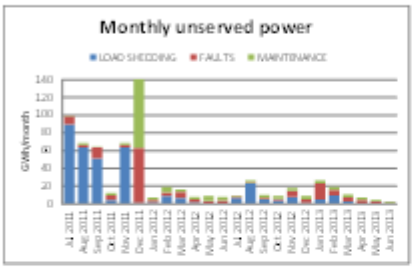
=> EPP

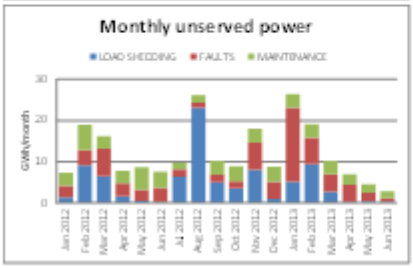
- Costly but alternative more costly
  - Planned rationing – USD 0,45 /kWh
  - Unplanned outages – USD 4,5 /kWh

Utilisation	2010	2011	2012
Hydro	65%	48%	43%
Thermal Gas	70%	60%	39%
Other Thermal	44%	92%	71%

- Hydro from 65% down to 40-50%
- Gas from 70% down to 40-60%

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – ELECTRICITY SECTOR UPDATE
CURRENT SITUATION - OUTAGES





- Huge improvements since 2011
  - 2011/12 0,50 TWh
  - 2012/13 0,15 TWh

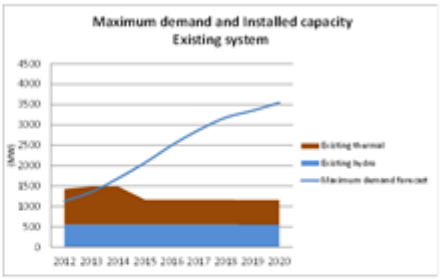
- No improvements since 2012
  - Load shedding Jan-Jun 2013/2012 +28%
  - Faults Jan-Jun 2013/2012 +85%

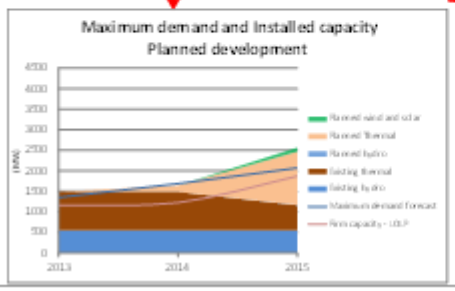
JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – ELECTRICITY SECTOR UPDATE CURRENT SITUATION - TANESCO

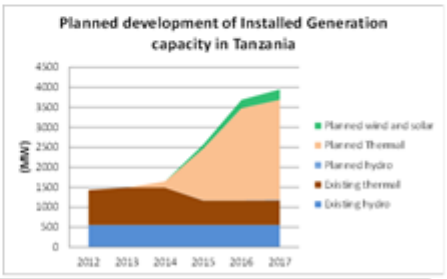
- Huge debt for fuel purchase, capacity payments and energy purchase
- WB and AfDB agreed to finance restructuring:
  - Loans to GoT
  - GoT to provide subsidised loans to TANESCO
    - Restructure the company
    - Necessary investments
    - Necessary maintenance
    - Pay the debts.

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – ELECTRICITY SECTOR UPDATE FUTURE

- Demand forecast
- Existing generation system
- Short term expansion plan
- Comparison Demand / Capacity







JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – ELECTRICITY SECTOR UPDATE FUTURE - BIG RESULTS NOW INITIATIVE

- Aims to speed up processes necessary to fulfil Vision 2025
- 7 Generation projects
- 7 Transmission projects
- 14 Distribution projects
- 1 Gas infrastructure project
- Start transformation of TANESCO

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – ELECTRICITY SECTOR UPDATE ACTIVITIES WITH RESULTS 2013/2014

- Generation Projects with COD 2014
  - Kinyerezi I – Sep 2014
  - Singida Wind – Dec 2014
- Transmission Projects – No with COD 2014
- Other Projects
  - Optimise EPP utilisation and Dam operation - June 2014
  - 150 000 new connections - June 2014
  - 3.2 million efficient bulbs replace old ones - June 2014
  - T&D loss reduction from 21% to 19% - June 2014
- Transformation of TANESCO
  - Reorganised into 3 profit centres – Q3 2014
  - Reduced debts

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013

GAS AND PETROLEUM SECTOR

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – GAS AND PETROLEUM SECTOR CURRENT SITUATION

- Petroleum
  - No domestic oilfindings, drilling ongoing
  - Market liberalised in 2000, today centralised import
  - Regulated by EWURA
    - Cap prices on diesel, petrol and kerosene
    - Currently no cap on HFO and LPG

- Natural Gas
  - First explored in 1970's
  - 2 areas
    - Mnazi Bay, 30 km pipe to Mtwara, 2 MCft/d
    - Songo Songo, 250 km to Dar, 100 MCft/d

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – GAS AND PETROLEUM SECTOR EXPECTATIONS FROM LAST YEAR'S JESR

Goal	Current situation
• Construction of pipeline Mtwara – Dar es Salaam	• Construction started in May 2013
• Model Production and Sharing Agreement, December 2013	• In place
• Natural Gas Policy and Legislation	• Natural gas Policy in Place, Act will follow
• Natural Gas Utilisation Master Plan	• Draft version prepared, on hold waiting for updated Policy and Act
• Draft Petroleum Policy, May 2013	• First draft in place, final expected 2014
• Price Setting Methodology, Dec 2013	• First report expected Aug 2013

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – GAS AND PETROLEUM SECTOR ACTIVITIES 2013/2014

• Construction of Natural gas Infrastructure	Nov 2014
• Natural Gas Legislation	Act after Policy
• Finalising of Natural Gas Utilisation Master Plan	After Act
• Petroleum Policy	2:nd draft, end 2013 Final Policy 2014
• Price Setting Methodology	Dec 2013
• Capacity Building Initiatives and Facilitation	Progress report before June 2014

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – GAS AND PETROLEUM SECTOR NATURAL GAS INFRASTRUCTURE PROJECT

- Gas Reserves
  - Songo Songo, 880 billion standard cubic feet
  - Mnazi Bay, 262 billion standard cubic feet
  - Deep sea reserves, 43 trillion standard cubic feet.
- Mtwara-Dar es Salaam gas pipeline,
  - Construction started in May 2013, to be commissioned by November 2014
  - Cost - USD 1,250 M, Financing - Exim Bank of China,
  - Capacity - 784 mmscfd, Deliveries 2015 -306 mmscfd (1070 MW,elect)
- New Gas processing plants
  - Mnazi Bay
  - Songo Songo
- Off-takers
  - Power plants: Somangafungu (Kilwa), Kinyerezi, Symbion Ubungo, IPTL
  - Industry and households close to the pipeline.
- Most important energy project in Tanzania

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013

RENEWABLE SECTOR

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – RENEWABLE SECTOR CURRENT SITUATION

- Geothermal, Wind, Solar, Biomass, Hydro, Tidal, Energy efficiency, Etc....
- Huge number of projects
- From 100 W-level up to 100 MW-level
- Many project developers of different size with different experiences and competences

=>

- Problems occur, mainly about the development process and risks, but also concerning CDM

- My views are:
  - Streamlining: To be developed in by Project developers, MEM and TANNESCO
  - Financial risks: To be taken by the investor,
  - Political risks: To be covered by guarantees from the government
  - CDM ought to be solved - Can increase export incomes to the country

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – RENEWABLE SECTOR EXPECTATIONS FROM LAST YEAR'S JESR

- Invest More in Promotion and Scale-Up: 6,000 biogas plants 2013 and 6,000 2014
- Development of Large-Scale Geothermal: Legal framework preparation; Update of resource survey started; Awareness workshop; GoT investment priority
- Align Actors to Fully Utilise Different Big Projects: Stakeholders are informed
- Implementation of Large-Scale Wind Power Projects: Geo Wind project in BRN; Two main developers identified; Wind assessment for Singida is ongoing
- Promote DSM: Task force has been set up; Pilot project is launched
- Training of Personnel: Training programs have been set up
- Introduce REFIT: Consultancy study started Aug 2013, ready March 2014
- Technical Support to Manufactures: Training and support is on-going
- Finalise and Utilise Rural Energy Prospectus by Q2 2013: Draft submitted Q2 2013
- Finalise Biomass Energy Strategy by June 2013: Strategy document by Dec 2013.
- Cook Stove Standards by June 2013: Kerosene for approval, charcoal gazetted
- Biofuels Policy by June 2013: Draft for liquid fuels; Task force has been set up
- Biofuels Act by June 2013: Act for liquid biofuels during 2014
- Agro Ecological Zoning by June 2013: Terms of Reference prepared – No Financing

JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – RENEWABLE SECTOR ACTIVITIES 2013/2014

- Targets for the Sector: Set medium and long term target for the whole sector
- Scale-Up of RET: Identify and subsidice Pilots
- Geothermal: Drilling and Assessment of resources
- Information on ongoing big projects and opportunities: Prepare a communication plan
- Implementation of large scale windpower: Prepare a wind map and Standards on noise
- DSM: Energy efficiency audits and Implementation and follow up of projects
- Rural Energy Prospectus: Finalise
- Training of personnel: Set up a plan; Assign money in the budget
- Agro Ecological Zoning: Assign money; Implement
- REFIT: Finalise and Implement

JOINT ENERGY SECTOR REVIEW WORK SHOP 2013

FINANCING STRUCTURE

JESR WS 2013
- FIN. STRUCTURE
DPG THROUGH BUDGET

Annual investment

- 2011/12 341 BTZS
- 2012/13 401 BTZS
- 2013/14 735 BTZS

Total for DPG projects

- Total 1,993 BTZS
- DPG 1,667 BTZS

Project	Budget Data			DP			Comment
	Account	*2011/12 Actual BTZS*	*2012/13 Appr Est BTZS*	*13/14 Est BTZS*	*Finance BTZS*	*Est Total BTZS*	
Backbone	58-3001-3157	0	13	5	676	778	WB, AfDB+JICA, EIB, EDCF
Makambako-Songea transmission	58-3001-3121	2	10	13	120	102	Sida
Reduce TANESCO's debts	58-3001-3167	205	50	273			WB, AfDB
Rehabilitation of Hale Hydro Power Station	58-3001-3158	0.5	4	31	56	384	Sida
ESCBP	58-3001-6298	0	4	11	67		WB, CIDA
TEDAP	58-3001-3110	14	10	6	249	249	WB
10th EDF Energy Programme	58-3001-3166	0	0.5	0.5			EU
REA Capacity Development	58-3001-3166	0.3	0.7	0.5	7		Sida
Electricity V	58-3001-3191	0	2	22	70	70	AfDB
Malagarasi HP distribution	50-1007-3163	3	9	2			MCA-T
Marongo-Kikagati	58-3001-3167	0	12	0			
Mpanda, Ngara, Biharamulo electrification	58-3001-3156	0	3	2	11	23	SNV
Environment Management Act Impl	58-1008-6571	0.1	0.2				Canada, Denmark
Rural electrification in 7 regions	50-1007-3166	48	51	2	147	147	MCA-T
Improving power supply reliability in DSM	58-3001-3154	0.7	62	20	50	53	Finland
Reinforcement distribution Kilimanjaro	58-3001-3155	0	2	0.5	46	50	JICA
Rural Energy Fund support	58-3001-3112	60	157	340	248	137	Sida, Norad
Renewable Energy Programme	58-3001-3102	0.1	9	3	10		KfW
Twinning Statnett at TANESCO	58-3001-3159	0	1	1	10		Norad
Petroleum Sub-Sector Development	58-3001-3115	6	0	2			
Climate Change Adaption and Mitigation	58-1008-3151	0.4	0.7	0			
Total		341	401	735	1667	1993	

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JESR WS 2013
- FIN. STRUCTURE
DPG OUTSIDE BUDG.

- Total 1,994 BT.
- DPG 866 BT.

Project	DP *Finance BTZS*	*Est Total BTZS*	Comment
Mwenga hydro (3 MW)	7	15	EU
Ruhuji hydro (358 MW)	480	1300	WB
CDM Capacity building in energy sector general	2		Sida
Upgrade of Mawengi micro HP	3	4	EU
Masigira hydro (118 MW)	2		Norad
Rumakali hydro (520 MW)	2		WB
Biofuels task force	3	3	Sida
Clusters Solar PV Project - Lake Zone	2	2	EU
Capacity building programme for Operation and Maintenance for TANESCO's gas power generation facilities	9	9	Sida
PV market development in rural Tanzania 2003-12	7		Sida
Geita-Nyakanazi transmission 220 kV	40	70	KfW
Reinforcement transmission and distribution DSM, Kilimanjaro, Arusha	37	37	EDCF
Capacity development for efficient T&D systems	5	5	JICA
Up-Scaling Access to integrated modern energy services for poverty reduction	8	7	EU, Norad
Integrated Rural Electricity Planning	2	2	EU
Yovi HP	5	8	EU
Upgrade of Ikondo micro HP	3	4	EU
Introducing a new concept for affordable biogas system	2	4	EU
Rural electrification in Kilombero and Ulanga dist	16		EU
WB Trust Fund Electricity Access	7	7	Sida
Ruhuji and Kakono hydro, transmission study	3	3	Sida
Singida Wind (Wind East Africa, 100 MW)	160	488	WB
Communication strategy for the natural gas sector	4		KfW
Extractive Industries Transparency Initiative	4		CIDA
Partnership for Growth	12	12	USAID
O&M Existing HP	11		Norad
Kihansi small hydro	4		Norad
Emergency repair of HPP	7		Norad
Interconnector Tanzania-Zambia	5		Norad
Total	866	1994	

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JESR WS 2013 - FIN. STRUCTURE OUTSIDE DPG

Project	Budget Data				PSMP Estimate BTZS	Comment
	Account	*2011/12 Actual BTZS*	*2012/13 Appr Est BTZS*	*2013/14 Estimate BTZS*		
Mtwara-DSM gas pipeline	58-3001-3162	0	93	83		Exim Bank of China
Kinyerezi I PP	58-3001-3164	0	13	208	306	EPC contract with Jacobsen
Kinyerezi II PP	58-3001-3163	0	5	110	702	EPC contract with Sumitomo
North West Grid phase I	58-3001-3166	0	6	0.6		Potential Chinese financer
Mnazi Bay 300 MW	58-3001-3153	0.5	0	0		
Total		**0.5**	**117**	**402**		

Annual investment

- 2011/12 0,5 BTZS
- 2012/13 117 BTZS
- 2013/14 402 BTZS

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JOINT ENERGY SECTOR REVIEW WORK SHOP 2013

SUMMARY

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JOINT ENERGY SECTOR REVIEW - WORK SHOP 2013 – SUMMARY

- Sector Policy and Strategy
  - 2013 – Big Results Now Initiative
  - 2014 – Road Map for Sector Reform
- Electricity sector
  - 2014 New Gas Fired capacity and Wind Power capacity
  - High load growth, 150 000 new connections
- Petroleum and Gas sector
  - New Gas Infrastructure: Pipeline and Gas processing plants
- Renewable sector
  - Lot of different possibilities, no clear focus
- Financing structure
  - Increasing investments, within and outside DPG

THANKS FOR YOUR ATTENTION!

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Engineering balanced sustainability™

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