



THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF ENERGY AND MINERALS

TANZANIA'S
SE4ALL
ACTION AGENDA

DECEMBER 2015



SUSTAINABLE
ENERGY FOR ALL



Empowered lives.
Resilient nations

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SE4ALL
ACTION AGENDA
DECEMBER 2015



ACRONYMS AND ABBREVIATIONS

AA	Action Agenda
ADP	Accenture Development Partnerships
AFD	Agence Française de Développement
AfDB	African Development Bank
BEST	Biomass Energy Strategy
BIS	Biomass Information System
BRN	Big Results Now
CAMARTEC	Centre for Agricultural Mechanization and Rural Technology
CCFAT	Clean Cookstoves and Fuels Alliance of Tanzania
CFL	Compact Fluorescent Lamp
CFP	Country Focal Point
CSOs	Civil Society Organizations
CTI	Confederation of Tanzania Industries
DANIDA	Danish International Development Agency
DEEP	Developing Energy Enterprises Programme
DFID	Department for International Development, UK
DSM	Demand Side Management
EAC	East African Community
EDF	European Development Fund
EDFC	Economic Development and Financing Corporation
EE	Energy Efficiency
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ELCT	Evangelical Lutheran Church in Tanzania
EnDev	Energising Development
EPC	Engineering, Procurement, and Construction
EPP	Emergency Power Producers
ESI	Electricity Supply Industry
EU	European Union
EWURA	Energy and Water Utilities Regulatory Authority
FiT	Feed-in-Tariff
GACC	Global Alliance for Clean Cooking
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GoT	Government of Tanzania
GTF	Global Tracking Framework
GVEP	Global Village Energy Partnerships
GWh	Gigawatts hour
HII	High Impact Initiatives
HIOs	High-Impact Opportunities
HV	High Voltage
ICS	Improved Cookstove
IEA	International Energy Agency
IP	Investment Prospectuses
IPPs	Independent Power Producers
IRENA	International Renewable Energy Agency
JESR	Joint Energy Sector Review
JICA	Japan International Cooperation Agency
KCJ	Kenya Ceramic Jiko
KfW	Kreditanstalt für Wiederaufbau
kWh	Kilowatt hour
LGA	Local Government Authorities
LPG	Liquefied Petroleum Gas
LV	Low Voltage
LTTP	Long-term Perspective Plan
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MEM	Ministry of Energy and Minerals

MEPS	Minimum Energy Performance Standards
MER	Monitoring, Evaluation and Reporting
MJ	Mega Joules
MKUKUTA	National Strategy for Growth and the Reduction of Poverty
MNRT	Ministry of Natural Resources and Tourism
MV	Medium Voltage
MW	Megawatt
NAMA	National Appropriate Mitigation Action
NGOs	Non-Government Organisations
NKRA	National Key Results Area
NORAD	Norwegian Agency for Development Cooperation
NWSC	National Water and Sewage Corporation
O&M	Operation & Maintenance
PPAs	Power Purchase Agreements
PPP	Purchasing Power Parity
PPPs	Public Private Partnerships
PSMP	Power Systems Master Plan
PV	Photovoltaic
RAGA	Rapid Assessment and Gap Analysis
RE	Renewable Energy
REA	Rural Energy Agency
REB	Rural Energy Board
REF	Rural Energy Fund
REFIT	Renewable Energy Feed-in-Tariff
REMP	Rural Energy Master Plan
RERS	Renewable Energy Resource System
RETs	Renewable Energy Technologies
SDG	Sustainable Development Goal
SE4ALL	Sustainable Energy for All
SHS	Solar Home Systems
Sida	Swedish International Development Agency
SIDO	Small Scale Industries Development Organisation
SMEs	Small and Medium scale Enterprises
SNV	Netherlands Development Organisation
SPPA/T	Standardized Power Purchase Agreements and Tariff
SPPAs	Standardized Power Purchase Agreements
SPPs	Small Power Producers
SPPT	Small Power Purchase Tariff
SREP	Scaling-up Renewable Energy Programme
SSMPs	Sustainable Solar Market Packages
SWER	Single Wire Earth Return
TANESCO	Tanzania Electric Supply Company Limited
TAREA	Tanzania Renewable Energy Association
TaTEDO	Tanzania Traditional Energy Development Organization
TBS	Tanzania Bureau of Standards
TDBP	Tanzania Domestic Biogas Programme
TDV	Tanzania Development Vision
TEDAP	Tanzania Energy Development and Access Project
TFCG	Tanzania Forest Conservation Group
TFS	Tanzania Forest Service
TGDC	Tanzania Geothermal Development Company Limited
TIRDO	Tanzania Industrial Research and Development Organisation
TShs	Tanzania Shillings
UN	United Nations
UNDP	United Nations Development Programme
UNF	United Nations Foundation
UNIDO	United Nations Industrial Development Organisation
US\$	United States Dollar
USAID	United States Agency for International Development
WB	World Bank
WWF	World Wide Fund for Nature

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FOREWORD

The Sustainable Energy for All Initiative (SE4ALL) was launched in 2011 by the UN Secretary-General Ban Ki-Moon. The goal of the initiative is to: mobilize all stakeholders to take concrete actions towards ensuring universal access to modern energy services; double the global rate of improvement in energy efficiency and; double the share of renewable energy in the global energy mix, within the UN time frame of 2030.

The Government of Tanzania fully embraces the SE4ALL objectives including the fact that access to modern energy services is a necessary precondition for achieving development goals that extend far beyond the energy sector, such as poverty eradication, access to clean water, improved public health and education, women's empowerment and increase food production.

The Action Agenda and Investment Prospectus of Tanzania have been developed through a consultative and validation process with the stakeholders of the Energy Sector, namely Development Partners, CSOs, NGOs and the private sector. We would like to acknowledge the support provided by the SE4All Hub at the African Development Bank that enabled technical assistance for the development of the Action Agenda and its Investment Prospectus and for supporting the Ministry of Energy and Minerals with the consultation and validation process.

I have a great pleasure to present the Tanzanian Action Agenda and Investment Prospectus, which are instrumental in driving Tanzania's sustainable development. As an umbrella strategy and fully consistent with the country's Vision 2025, Tanzania's Action Agenda will be immediately integrated into MEM's five-year strategic planning mechanism. As part of the integration process, the government will start a national dialogue with all stakeholders at national and sub-national level towards the adaptation, update and alignment of the existing initiatives with the country's SE4ALL Action Agenda. This will ensure that all new strategies and initiatives will have to be consistent with Tanzania's SE4ALL Action Agenda.

The Government of Tanzania has shown strong global leadership by becoming one of the first countries to opt-in on the SE4ALL Initiative. It was in April 2012 when a Tanzanian Delegation (led by two Ministers) attended the SE4ALL Forum where the Global Action Agenda was endorsed.



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As Tanzania inserts its SE4ALL strategy as a core policy for the Energy Sector, I urge development partners, private sector, civil society, academia and the general public to take an active role in realizing the country's goals towards Sustainable Energy for All.

A handwritten signature in black ink.

Prof. Sospeter M. Muhongo (MP)

MINISTER FOR ENERGY AND MINERALS



1 EXECUTIVE SUMMARY

Access to modern energy services is a necessary precondition for achieving development goals that extend far beyond the energy sector, such as poverty eradication, access to clean water, improved public health and education, women's empowerment and increase food production. The United Nations (UN) Secretary General launched the SE4ALL Initiative in September 2010 to achieve three inter-related goals by 2030:

- Ensuring universal access to modern energy services.
- Doubling the rate of improvement in energy efficiency.
- Doubling the share of renewable energy in the global energy mix.

SE4ALL proposition is that, to achieve the initiative's objectives, all stakeholders need to play a leadership role:

- National Government must design and implement a set of integrated country actions (i.e. action agendas and investment prospectus);
- Private sector provides business and technical solutions and drives investment;
- Civil society organizations (CSOs) advocate and monitor public policy and businesses actions.

To design and implement integrated country actions, after a country opted-in the initiative, national governments start the process of developing their Action Agenda (AA).

Tanzania opted-in and became one of the 14 early movers for Africa in 2012. Tanzania's SE4ALL AA seeks to integrate the multi-tier efforts that the Country is implementing towards providing universal access to energy, increased energy efficiency and an increase in the use of renewable energy. With this AA the Government of Tanzania (GoT) continues its commitment for the transformation of its energy sector, and deepen the reforms needed to scale up public and private investments in the sector to meet its SE4ALL 2030 goals.

The SE4All Initiative requires countries to set quantitative objectives for each of the three goals. Tanzania's SE4ALL goals are set as following:

Universal access to modern energy services		Doubling global rate of improvement of energy efficiency	Doubling share of renewable energy in global energy mix	
Percentage of population with electricity access	Percentage of population with access to modern cooking solutions	Rate of improvement in energy intensity	Renewable energy share in Total Final Energy Consumption	
			Power	Heat
>75%	>75%	-2.6% per year¹	>50%²	>10%

The baseline year for electricity access is 2012. For the purpose of the AA, the definition of electricity access is connections (or equivalent when dealing with Solar Home Systems (SHS), distributed power or non-metered mini-grids) consistent with the Global Tracking Framework (GTF) and with the multi-tier approach under GTF. In the baseline year, only 20.7% of the population had electricity supply when we talk about connections. It is important to keep in mind that currently TANESCO defines electricity access as having access to a nearby network where it is possible for electricity connection to occur (in this case access means proximity), and in 2012, 36% of the population had proximity to the grid. While in the baseline case, both definitions of access are considered valid, the connections definition is the one adopted for Tanzania's electricity access goal.

Tanzania biomass utilisation represented 90% of the energy consumed in 2012 of which only 4% of the biomass used was sustainable. Most of the biomass demand is for household consumption for cooking and heating (90%). The balance (10%) is used by home-based enterprises, commercial, institutional and industrial sectors. Given these particular characteristics of Tanzania's energy Matrix, the goal for renewable energy share in the total final energy consumption is disaggregated between power and thermal applications.

Based on the Rapid Assessment and Gap Analysis (RAGA) and discussions with key stakeholders, the AA includes the following priority actions:

- **Access Acceleration Strategy.** The concept behind this strategy is to bring energy solutions to communities and development centres that may not be reached by grid expansions and densification strategies for at least the next 10 years. This strategy will be designed by Ministry of Energy and Minerals (MEM) in partnership with private sector stakeholders and CSOs, and is planned to be implemented mainly during the *Transformation* phase of the initiative in Tanzania.
- **Improving the structure of the energy sector.** The goal of this strategy is to improve the interaction with all stakeholders, including donors and civil society. The SE4ALL Secretariat will lead efforts in support of private sector organisation and within national and District Government institutions to organise and improve on how the sector operates.
- **Improving the policy and regulation of the energy sector:**
 - Ministry of Energy and Minerals (MEM) and Rural Energy Agency (REA) will review the current REA Prospectus to develop a rural electrification strategy and consolidate a Rural Energy Master Plan (REMP) with a clear path outlining areas to be electrified through grid extensions and mini-grid isolated systems. A special focus should be paid to mini-grids and stand-alone systems below 1 MW.

¹ This represents the average for the period 2001 – 2010; this target will reduce energy intensity by 41% in 2030.

² This target includes renewable energy from off-grid generation.

- Formalise the biomass sector with guidance from MEM and Ministry of Natural Resources and Tourism (MNRT). Review, finalise, adopt and implement the Biomass Energy Strategy (BEST) and ensure that targets for clean cooking devices and sustainable biomass production are considered.
 - Develop specific regulations for sustainable efficient charcoal production and use methods linked with appropriate forestry management plans and afforestation efforts.
 - Develop a concrete policy, strategy and targets to regulate biomass energy, in particular the clean cooking sector.
 - Develop and implement a Monitoring, Evaluation and Reporting (MER) system for the energy sector to monitor the performance of the implementation of different strategies, policies and programmes in place in Tanzania.
 - Develop minimum national, or adopt regional, performance standards for energy products, based on government testing, labelling, and certification.
 - Assist the Energy Regulator (EWURA) achieve least cost planning in the energy sector through the development of an energy efficiency facility that can pull market engagement by paying cost reflective prices for verified energy and demand savings as per policy and acts.
- **Human and Institutional Capacity Development:**
 - The SE4ALL Secretariat will be responsible for the design and implementation of training and capacity building for financial institutions to improve their understanding of project risks, profitability and how to better assist the development of private sector, civil society and community based energy projects (including technical, business, managerial and social aspects of off-grid energy based projects).
 - Support activities to accelerate rural electricity connections through the implementation of the REA Prospectus.
 - Led by the Tanzania Forest Service (TFS) Agency, create conditions to enforce existing biomass related laws and regulations. This would include strengthening the human resources within the Agency.
 - The SE4ALL Secretariat will develop a programme to improve the capacity of national and local institutions to:
 - Conduct awareness campaigns on the benefits of using solar technologies (pico-solar and solar home system) as well as other renewable energy solutions for remote/isolated populations. These awareness campaigns should additionally inform consumers on how to purchase quality equipment, e.g., by choosing certified products.
 - Develop capacity for local personnel/entrepreneurs to improve the quality of service and identify potential productive uses of energy for their goods. This would increase the confidence of consumers in sustainable energy products and their ability to pay for energy services.
 - Support the use of improved cooking appliances by engaging youth organisations in the production, dissemination and distribution of these technologies.
 - Develop capacity of local personnel/ entrepreneurs to carry out feasibility study, plan, design, implement and manage different sizes of electricity generation, transmission and distribution systems.

- Offer training courses to form a cadre of experts for Operations and Maintenance (including technicians, engineers and electricians) in technical professional centres and universities.
- Implement business incubation facilities linked with universities to assist start-ups in developing business ideas and technology appropriate for the Tanzanian energy access sector.

- **Improve access to electricity through:**

- MEM, REA and Tanzania Electric Supply Company Limited (TANESCO) are tasked with the development and implementation of a clean energy mini-grid programme, integrating the different existing initiatives led by multilateral and bilateral donors, CSOs, and Non-Government Organisation (NGOs).
- MEM is appointed the focal point for the Energy Access Market Accelerator that will implement a collaboration mechanism and assistance facility, facilitating the coordination of activities in the energy access market, connecting enterprises with service providers, and liaising with the international community and local government to communicate on-going gaps and broker efforts to bridge them.

- **Improve access to modern cooking solutions:**

- MEM to lead on the creation of a cross-sectoral initiative to bring together different on-going efforts and improve coordination across agencies, private sector, CSOs and NGOs.
- MEM to define a strategy to foster the use of LPG as a cooking fuel especially in rural areas. Careful consideration should be given on the design of a conducive legal and regulatory framework for companies operating in the sector, communication to potential users on the benefits of using the technology and definition of credit facilities to improve access to finance by users (to purchase required equipment and gas) and companies.
- Develop woodfuels (firewood and charcoal) supply and demand master plan for the main supply and demand centres (including tree cover inventory, classification of harvesting zones, relevant data, analysis of woodfuels flows, development of conditions and technical specifications for woodfuels, production and use).

- **MEM is tasked with the development of policy, strategy with clear targets and indicators, a legal and regulatory framework, programmes and a monitoring mechanism to foster the development of RE:**

- MEM has the task to improve market data for planning and investment purposes at MEM by developing a SE4ALL database.
- Investment Incentives. Working together across Government Agencies and key stakeholders, MEM will update and expand incentives, and limit subsidies.
- Knowledge Sharing and Awareness. MEM to develop a communication strategy and design and Implement Tanzania's SE4ALL Repository for Renewable Energy Investment Prospectuses.

- **MEM to work across Government Agencies and with stakeholders to:**

- Establish a dialogue and collaboration with the SE4ALL Energy Efficiency Hub¹.
- Develop a comprehensive regulatory framework that specifically addresses energy efficiency (EE) in the electricity, petroleum and biomass sectors, with concrete goals and targets.
- Develop and implement a National Energy Efficiency Programme to assess opportunities for energy efficiency in multiple sectors.
- Identify and implement demand side management programmes across the different sectors of activity.
- Define, develop and adopt EE standards. At a first stage, regional or international standards could be adopted with a subsequent definition of more appropriate standards for Tanzania.
- Implement and enforce a labelling scheme for electric appliances. To increase its efficiency and impact, a national awareness campaign targeting consumers and distributors should be also implemented.
- Include solar water heaters as mandatory equipment for new buildings by integrating these in future building regulations (especially for large commercial and public facilities)
- Define Minimum Energy Performance Standards (MEPS), and provide adequate support for its implementation and oversight, including the development of voluntary agreements for efficient refrigerators and air conditioners.
- Implement and develop cookstoves dissemination projects and define and scale up certification processes for residential and commercial cookstoves.
- Adopt the Global Energy Efficiency Accelerator Platform, which was announced as part of the Energy Efficiency Committee Report to the Advisory Board of the SE4ALL Initiative on June 1, 2014. This accelerator may also be a mean to get support for developing projects under the energy efficiency scope.
- Establish an MER mechanism to assess the impact of the EE-standards and labelling programmes.
- MEM to promote institutional capacity development and awareness raising on energy efficiency.
- EWURA in collaboration with MEM to establish and capitalise an Energy Efficiency Facility.

Considering that the current scenario is led by the early stages of the promotion of REA's Prospectus, Scaling-up Renewable Energy Programme (SREP) and the Big Results Now (BRN) initiative, the implementation of the AA, as an overarching strategy, will require a *transitional* period.

The intention of the GoT is to integrate the strategic approach of the SE4ALL into the MEM Strategic Planning process, hence some of the targets would be subject to the assessment of the AA implementation's progression and as part of the 2016/2022 MEM Strategic Plan design process. As the GoT integrates SE4ALL into its sectoral planning, the trajectory towards the country's SE4ALL Goals is informed by the following phases:

¹ Copenhagen Centre on Energy Efficiency (C2E2) part of the UNEP Risø Centre

- *Transition (2015 – 2016). During this period, the country will integrate the AA and IP into the government mid-term planning (MTP) process by incorporating them into the MEM Five-year Strategic Plan 2016 – 2020. As part of this process, the government will start a national dialogue with all stakeholders at national and sub-national level towards the adaptation, update and alignment of the existing initiatives with the country's SE4ALL AA. During this period, all new strategies and initiatives will have to be consistent with Tanzania's SE4ALL AA. As a result of this process, and to properly mirror the MTP, the AA and IP will be updated.*
- *Transformation (2016 – 2020). Starting July 2016, the AA and IP will operate fully integrated with MEM Five-year Strategic Plan. This means that from this moment forward the AA and the IP will be subject to same revision cycles than the MTP. This interaction will create synergies and contributions between the different new government plans, programs and policies with the AA and the MTP, resulting in a dynamic IPs portfolio. In this context, the AA will be reassessed on its progress and additional initiatives and IP(s) should be incorporated as needed.*
- *Consolidation (2020 - 2025) – SE4ALL becomes the cornerstone of the national mid-term planning process. In this context, the AA will be reassessed on its progress and additional initiatives and IP(s) should be incorporated as needed.*
- *Acceleration (2025 – 2030). The sustainability and update of the actions and strategies will accelerate the process of achieving Tanzania's SE4ALL goals. In this context, the AA will be reassessed on its progress and additional initiatives and IP(s) should be incorporated as needed.*

Because of the short period of time between the AA and IP adoption before it begins its integration into the MTP process, the companion IP to this AA is envisioned as a bridge that outlines current funding needs for technical assistance, for closing priority gaps in the REA prospectus, and to present a pipeline of opportunities aimed to accelerate base load power supply and grid expansion. To facilitate its dissemination to prospective investors and Donors and to accelerate its integration into the MTP process in early 2016, this bridge IP is presented as a consolidated portfolio.

The Secretariat will be institutionalised within the MEM. Given the overarching nature of the SE4ALL initiative and GoT's commitment to the Global Initiative, a special protocol will be developed to facilitate and streamline the capacity of the Secretariat to reach across public and private sector stakeholders.

The Secretariat is the AA's lead advocacy and managerial unit that:

- Will monitor SE4ALL related projects and studies, which should remain under the responsibility of the relevant Government Agencies and institutions.
- Takes the responsibility for realising SE4ALL goals, implementing the IP(s) associated to this AA, and applying the SE4ALL MER mechanism.
- Creates and increases awareness.
- Is the focal point for exchanging information with the SE4ALL global initiative, especially with the SE4ALL Global Facility Team, the SE4ALL Africa Hub, and the SE4ALL Thematic Hubs.
- Presents draft modifications, to be reviewed by the SE4ALL Coordination Committee and GoT authorities, to the AA and proposes any other "mid-course" adjustments that may be needed to keep Tanzania on its path to achieve its SE4ALL goals.



2 PREAMBLE

2.1 The Sustainable Energy for All (SE4ALL) Initiative

SE4ALL pursues a pro-poor multi-tier stakeholder approach to facilitate investment in energy systems, eradicate energy poverty and accelerate development. SE4ALL emphasises the importance of energy issues for sustainable development and for the elaboration of the post-2015 development agenda. In support of this initiative, on December 21st, 2012, the United Nations (UN) General Assembly declared 2014 – 2024 the Decade of Sustainable Energy for All.

The initiative aims at catalysing action towards the achievement of three main objectives by 2030²:

- Ensure universal access to modern energy services;
- Doubling the global rate of improvement in energy efficiency (EE); and
- Doubling the share of renewable energy (RE) in the global energy mix.

The SE4ALL Global Action Agenda (AA) was issued in April 2012 and it is based on a framework proposing a global AA for universal energy access, foster EE and boost investment in RE. The SE4ALL goals are expected to be achieved through a number of High Impact Initiatives (HIIs), which are targeted, on-the-ground programmes or projects, and categorised into High Impact Opportunities (HIOs) which are categories of action that have been identified as having significant potential to advance the three goals. There are over 50 HIOs identified, so far, that are expected to help achieve the three goals. The HIOs are aggregated into coherent groups under one or more of the eleven Action Areas that are identified. The Action Areas address almost 95% of global energy consumption, key components of productive energy use, and the supporting mechanisms needed to overcome the most common impediments to action³.

The above is shown graphically in Figure 1.

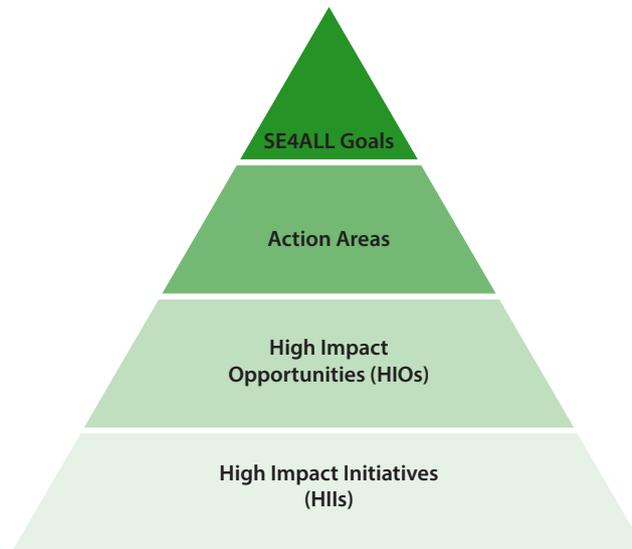


Figure 1: SE4ALL – from Initiatives to Goals

This global agenda is disaggregated into the following eleven (11) action areas, seven (7) related to sectoral areas and four (4) addressing the enabling environment⁴:

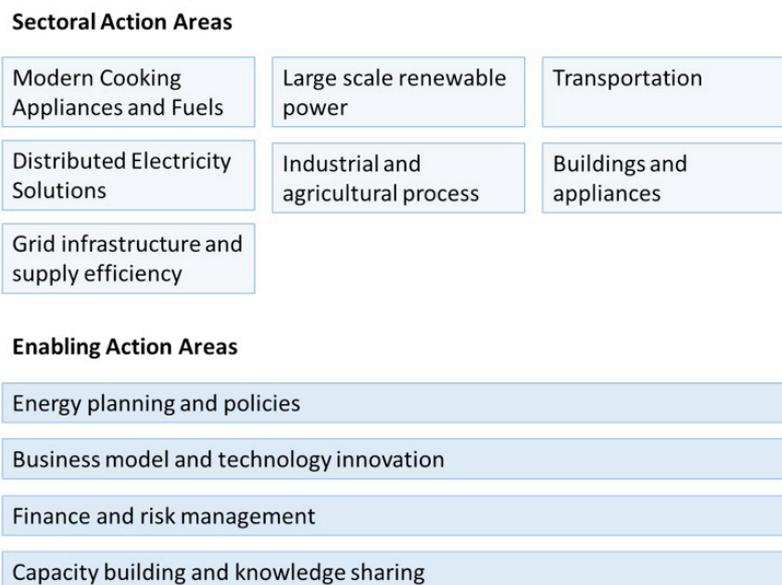


Figure 2: Action Areas of the Global AA

The SE4ALL Global AA relies on the full participation of all stakeholders and HIOs; both having a direct impact towards reaching and sustaining the SE4ALL objectives. The HIOs can accelerate action, mobilise resources and drive outcomes by building strong partnerships, fostering common actions and shaping sustainable commitments. Working together, stakeholders increase efficiency and economies of scale that drive and consolidate initiatives. Energy is not a goal in itself, but a key driver for development.

The tabular representation below (Figure 3) shows how the SE4ALL objectives and the interventions (initiatives) included under the HIOs drive sustainable development⁵.

⁴ Adapted from page 8 of the Sustainable Energy For All – A Global Action Agenda, April 2012
⁵ Based on Sustainable Energy For All – A Global Action Agenda, April 2012

SE4ALL GOALS	Ensure <i>Universal Access</i> to Modern Energy Services	Double the share of <i>Renewable Energy</i> in the energy mix	Double the rate of improvement in <i>Energy Efficiency</i>
Impact Development Nexus	<ul style="list-style-type: none"> Improved Health Services Improved Education Services Improved Access to Drinkable Water and Sanitation Empowerment of women Improved agricultural productivity Improved industrial productivity Business and Employment Creation Pillar to Post-2015 Development Goals 	<ul style="list-style-type: none"> Clean Energy Decentralization Sustainable use of biomass resources Sustainable use of watersheds and water systems Decrease variability in energy costs Increase energy security Empowerment of Women Small Business Growth Sustainable Economic Development 	<ul style="list-style-type: none"> Energy Efficiency Policies in place Efficient lighting Efficient appliances and electrical equipment Reduction or elimination of Technical Losses Redistribution of Electricity that now is wasted or lost Energy efficiency Labelling and other consumer information in place Improved cookstoves Cleaner Production systems

Figure 3: SE4ALL framework towards Sustainable Development

The SE4ALL proposition is that in order to achieve the initiative’s objectives all stakeholders need to play a leadership role:⁶

- National Government must design and implement a set of integrated country actions (i.e. country action plans)
- Private sector provides business and technical solutions and drives investment
- Civil society organisations advocate and monitor public policy and businesses actions

To design and implement integrated country actions, after a country has opted-in, the national governments start the process of developing their AA and Investment Prospectuses (IP), which is the instrument to solicit funding for the intervention, initiatives, programmes and projects included in the AA.

2.2 The SE4ALL Initiative in Tanzania

The Government of Tanzania (GoT) has shown strong global leadership by becoming one of the first countries to opt-in on the SE4ALL Initiative. It was in April 2012 when a Tanzanian Delegation (led by two Ministers) attended the SE4ALL Forum where the Global AA was endorsed. Subsequently, an energy sector meeting was convened whereby a group of stakeholders led by the Ministry of Energy and Minerals was assigned to prepare a Rapid Assessment and Gap Analysis Report, which was completed in May 2013. The following steps consisted in the development of the AA and IP starting in November 2014. This process is reflected in Figure 4, which includes the Tanzanian timeline:⁷

⁶ Adapted from page 7 of the Sustainable Energy For All – A Global Action Agenda, April 2012
⁷ The Process has four steps, for purpose of illustrating the activities pertaining the AA and IP step four was split in two and therefore five steps are shown.

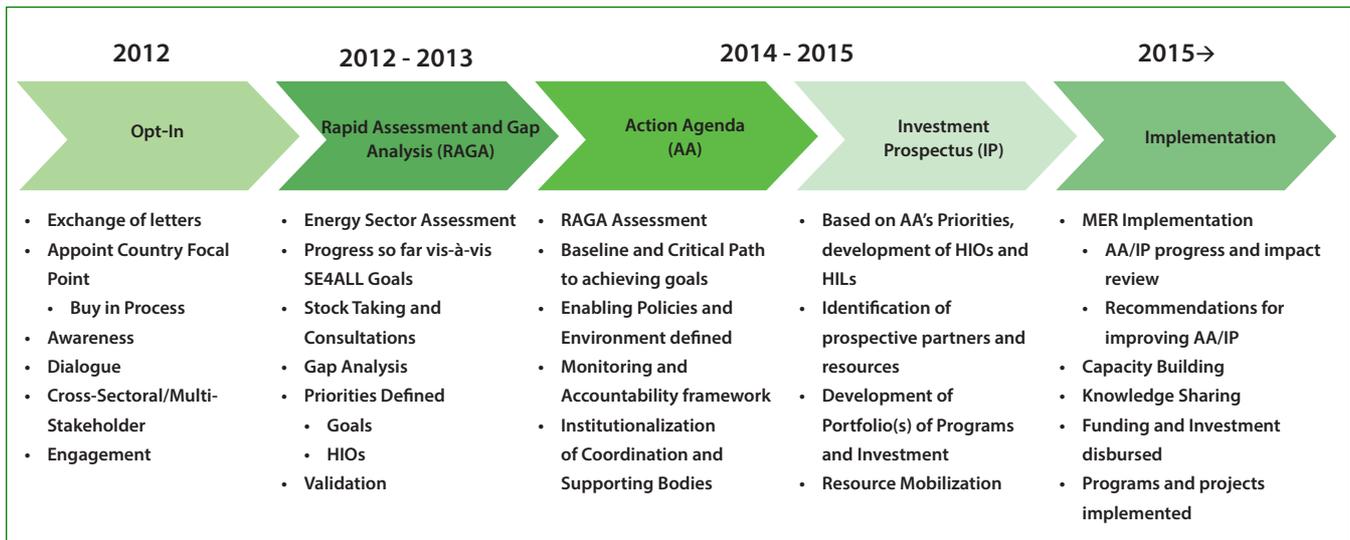


Figure 4: Proposed Actions and Timelines for Tanzania⁸

During the implementation stage, Tanzania will start executing its SE4ALL plans, and integrating these within the broader policy framework, notably the Tanzania National Development Vision 2025, the National Energy Policy of 2003 or the revised new energy policy, and the National Strategy for Economic Growth and Reduction of Poverty, as well as the key principles of the National Climate Change Strategy.

Tanzania regards the SE4ALL AA as an implementation tool for the emerging Sustainable Development Goal on Energy (SDG 7) and as part of its energy sector mid-term planning. The SE4ALL AA for Tanzania has been developed in line with the guiding principles contained in the Guidelines for Developing National Sustainable Energy for All Action Agendas in Africa that were developed by African stakeholders, notably: (i) Building on existing plans/programmes/strategies; (ii) Political commitment and leadership; (iii) A balanced and integrated approach; (iv) An inter-ministerial and cross-sectoral approach; (v) Adherence to sustainable development principles; (vi) Participation and meaningful involvement from all stakeholders; (vii) Gender equality and inclusiveness; and (viii) Transparency and accountability.

It should be noted that Tanzanian's SE4ALL process does not include the semi-autonomous region of Zanzibar as energy is not a sector governed by the United Republic of Tanzania. Energy in Zanzibar is within the competences of the Ministry of Land, Housing, Water and Energy of the autonomous region while on the mainland it is the responsibility of the Ministry of Energy and Minerals.



3 INTRODUCTION

3.1 Country Overview

Mainland Tanzania (herein referred to as Tanzania), part of the United Republic of Tanzania⁹, is located on the East Africa region and has a land area of 883,343 km². Tanzania also includes two major islands, Ukerewe and Mafia with 67 km² and 518 km², respectively¹⁰.

According to the 2012 Census, Tanzania had an estimated population of 43.6 million inhabitants, of which 70.9% was considered rural population. Tanzania's population average annual intercensal growth rate (2002-2012) has been 2.7%¹¹.

In 2007, the proportion of the population of Tanzania living below the poverty line was 33.6%; 16.4% in Dar es Salaam, 24.1% on other urban areas and 37.6% in rural areas¹². By 2012, Tanzania had 12.3 million (28.2%) below the poverty line. Poverty is higher in rural areas, 33.3%, than in urban areas, which is 15.5%¹³.

In 2012, the total GDP for Tanzania was US\$ 28.44 billion (44,718 billion TShs)¹⁴. In the last few years, between 2008 and 2012, average annual GDP has been quite stable at around 6.7%¹⁵. In 2012 the annual GDP growth in Tanzania was 6.9%. Tanzania's registered GDP per capita in 2012 was US\$ 652¹⁶.

The Tanzanian economy depends heavily on agriculture, which, in 2012, accounted for around 27% of GDP¹⁷, and employed around 62%¹⁸ of the population. Important exports in 2012 were tobacco (384 billion TShs corresponding to US\$0.24 billion), coffee (293 billion TShs corresponding to US\$0.19 billion) and cashew nuts (222 billion TShs corresponding to US\$0.14 billion)¹⁹. Minerals, such as gold (which in 2012 represented 3,410 billion TShs or US\$2.2 billion in exports) and tourism are also increasingly contributing to a substantial proportion of the country's economy. Accounting for 24% of GDP²⁰, Tanzania's industrial sector is one of the fastest growing in Africa. In recent years, Tanzania has discovered larger natural gas reserves than was previously estimated, and thus natural gas is likely to be an important future source of revenue for the country as well as playing a key role in meeting the country's energy needs.

9 United Republic of Tanzania is composed of Mainland Tanzania and Zanzibar Tanzania. This AA only makes reference to Mainland Tanzania and not to Zanzibar Tanzania, which has a separate energy system and its own development policies and plans.

10 Tanzania's National Bureau of Statistics developed the Census 2012 of which the results were presented in several reports available online on its website: the "Tanzania in Figures 2012" published in June 2013 presents a summary of the results of the Census 2012 and data from other national surveys; the "Basic Demographic and Socio-Economic Profile" published in April 2014 presents detailed statistical demographic and socio-economic information from the Census 2012; and the "Housing Conditions, Household Amenities and Assets Monograph" published in January 2015 details the statistics for population, household conditions and amenities.

11 National Bureau of Statistics Report Basic Demographic and Socio-Economic Profile, April 2014

12 National Bureau of Statistics Report Tanzania in Figures 2012, June 2013

13 World Bank World Development Indicators (<http://wdi.worldbank.org>)

14 National Bureau of Statistics Report Tanzania in Figures 2012, June 2013

15 National Bureau of Statistics Report Tanzania in Figures 2012, June 2013

16 National Bureau of Statistics Report Tanzania in Figures 2012, June 2013

17 National Bureau of Statistics Report Tanzania in Figures 2012, June 2013

18 National Bureau of Statistics Report Basic Demographic and Socio-Economic Profile, April 2014

19 National Bureau of Statistics Report Tanzania in Figures 2012, June 2013

20 National Bureau of Statistics Report Tanzania in Figures 2012, June 2013

Tanzania is endowed with diverse forms of energy resources which have not been optimised including natural gas, hydro, coal, biomass, geothermal, solar, wind and uranium.

Tanzania has a series of development and sector policies and strategies, which support the country's progress towards the three SE4ALL goals: universal access, increasing the share of RE and enhancing EE. These strategic documents and activities include the following:

- Policy Framework:
 - Energy and Water Utilities Authority Act 2001 and 2006
 - National Energy Policy of 2003
 - Rural Energy Act 2005
 - Electricity Act 2008
 - The Petroleum Act 2008
 - Public Private Partnership Act N^o. 18 of 2010 and its Policy of 2009
 - Standardized Power Purchase Agreement & Tariffs (2008) (<10 MW)
- Government driven strategies and plans:
 - Tanzania's Development Vision (TDV) 2025 (1999)²¹
 - The Tanzania's Long-term Perspective Plan (LTPP) 2011/12 – 2025/26²²
 - Joint Energy Sector Review (JESR) 2012/2013²³
 - National Strategy for Growth and the Reduction of Poverty II - MKUKUTA II (July 2010)²⁴
 - Power Systems Master Plan (PSMP) 2012 (May 2013)²⁵
 - MEM Strategic Plan from 2011/12-2015/16 (November 2012)²⁶
 - Big Results Now Phase I (BRN) Initiative 2013-2016 (April 2013)²⁷
 - Scaling-up Renewable Energy Programme (SREP) – Investment Plan for Tanzania (May 2013)²⁸
 - Biomass Energy Strategy (BEST) for Tanzania (April 2014)²⁹
 - Electricity Supply Industry (ESI) Reform Strategy and Roadmap 2014-2025 (June 2014)³⁰
 - National Electrification Program Prospectus (herein referred to as REA Prospectus) developed by REA (July 2014)
 - Guidelines for Sustainable Liquid Biofuels in Tanzania (Nov 2010)³¹
 - The National Natural Gas Policy of Tanzania (Oct 2013)³²

21 Ministry of Planning, Tanzania's Development Vision, 1999.

22 President's Office & Planning Commission, The Tanzania Long-Term Perspective Plan (LTPP) 2011/12 - 2025/26 The roadmap to a middle income country. Dar-es-Salaam: United Republic of Tanzania, 2012.

23 MEM, Joint Energy Sector Review (JESR) 2012/2013, 2014.

24 Ministry of Finance and Economic Affairs, National Strategy for Growth and Reduction of Poverty II - MKUKUTA II 2010-2015, July 2010.

25 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

26 MEM, Strategic Plan 2011/12 - 2015/16, November 2012.

27 NKRA Energy, Tanzania's Development Vision 2025 Big Results Now: Energy Lab Final Report, April 2013.

28 MEM, Scaling-up Renewable Energy Programme (SREP): An Investment Plan for Tanzania, May 2013.

29 MEM, Biomass Energy Strategy (BEST) for Tanzania, April 2014. This has not been approved yet and is currently under revision.

30 MEM, Electricity Supply Industry (ESI) Reform Strategy and Roadmap 2014-2025, June 2014.

31 MEM, Guidelines for Sustainable Liquid Biofuels Development in Tanzania, November 2010.

32 MEM, October 2013

- Preparation of National Energy Efficiency Program for Tanzania (July 2014)³³
- Energy Subsidy Policy (September 2013)³⁴
- The Draft National Energy Policy (January 2015)³⁵
- Private Sector Strategies:
 - Tanzania Domestic Biogas Programme (TDBP)
 - Country Action Plan for Clean Cookstoves and Fuels, as promoted by the Tanzania Renewable Energy Association (TAREA)
 - Results-Based Financing for Pico-Solar Market Development, as part of the Energising Development (EnDev) programme implemented by SNV.

Annex I includes a summary of the main policies, strategic documents and activities that are mentioned in the previous list, which were developed by the key Tanzanian stakeholders.

3.2 Tanzania's Energy Sector

3.2.1 The Power Sector

The sector is regulated by the Acts of 2001 and 2006 which establishes Energy and Water Utilities Authority (EWURA) as the regulatory authority; the National Energy Policy of 2003 that aims at promoting sustainable energy in Tanzania; the Rural Energy Act 2005 which established the Rural Energy Agency (REA); the Rural Energy Board (REB) and the Rural Energy Fund (REF); the Electricity Act 2008; the Petroleum Act of 2008; Gas Policy of 2014 and the Public Private Partnership (PPPs) Policy of 2009 and the PPP Act N.18 of 2010 that establishes the framework for PPPs including the coordination unit.

The Tanzania Electric Supply Company Limited (TANESCO) is the sole electricity off-taker in Tanzania. Fully owned by the Government, TANESCO is the only vertically integrated electricity supplier in Tanzania. However in June 1992, their monopoly ended when power trading was opened up to private sector participation. At the moment, TANESCO faces severe difficulties related to poor generation and financial performance because of non-payment of electricity bills while overburdened by not cost-reflective tariffs from Independent Power Producers (IPPs). Thus the GoT decided to solve these problems by reforming TANESCO from a vertically integrated company to several generation and distribution companies. The reform roadmap for the sector and a draft Energy Subsidy Policy³⁶ are already developed and the implementation of the roadmap is already in place.

In terms of total primary energy consumption, biomass represents 90% of the energy consumed in Tanzania. Electricity represents 1.5% and petroleum products represent 8% of the energy consumption in the country. Solar, coal, wind and other sources represent around 0.5% of the total energy consumed in the country.

Tanzania's installed electricity generation capacity is 1,550 MW of which 1,466 MW is available on the grid. Installed capacity consist of 553 MW of large hydropower, 501 MW of thermal generation with natural gas, 456 MW with oil; 27 MW with biomass, and 13 MW of small³⁷ hydropower³⁸.

33 MEM, Preparation of National Energy Efficiency Program for Tanzania & Institutional Capacity Building –Final Draft (April 2014)

34 MEM, September 2013

35 MEM, January 2015

36 The Energy Subsidy Policy, which is still waiting for approval by the GoT, puts "forward an approach for decision making and action in terms of energy subsidies and switches to a focus on universal access and consumers paying their fair share of the costs of energy supply". MEM Energy Subsidy Policy 2013 (Draft).

37 Small hydropower are hydropower projects with capacities of 10 MW and below.

38 MEM, Scalling-up Renewable Energy Programme (SREP): An Investment Plan for Tanzania, May 2013.

TANESCO supplied 59% of the total electricity generation capacity; IPPs 26%; emergency power producers (EPPs) 13%; and small power producers (SPPs) 2%. It is estimated that there is an additional 300 MW of distributed generation capacity, mainly composed of diesel engines that are not connected to the grid³⁹. In addition, to face demand from cross border urban centres, Tanzania imports electricity from neighbouring countries⁴⁰.

Like many other countries with high dependency on hydropower, Tanzania faces unpredictability of supply due to changing weather patterns. This is aggravated by the fact that most hydropower plants are located on two rivers prone to drought conditions. Hence, Tanzania has had to run expensive thermal power plants as base load and has suffered load shedding and high operational costs to supply electricity. It is therefore, essential that the country diversifies its generation sources to avoid risks of distribution disruptions and price increases.

In 2012, the demand was 851 MW of on-grid power⁴¹. In terms of electricity consumption per capita, Tanzania has very low levels: about 97 kWh/year in 2012⁴². Efforts have been put forward in order to achieve the PSMP 2012 target of 200 kWh/year electricity consumption per capita by 2015/16⁴³.

Through the implementation of the different policies and strategies currently in place in Tanzania, electricity demand is expected to increase at a rate of 12%-15% annually from what it is today to 7,400 MW by 2035. Generation capacity is expected to increase at a rate of 6% annually, from around 1,550 MW in 2012 to at least 8,990 MW by 2035. A recent revision of the power sector strategy expects capacity to increase to 10,000 MW in 2025⁴⁴.

For statistical purposes the GoT uses two definitions of electricity access: (i) at household level: 1 connection implies 1 household connected to electricity; and (ii) at community level: access implies that any person within 600 metres of the low voltage distribution line(s) (33 kV, 11 kV or 0.4 kV) has access to electricity services⁴⁵.

In 2012, 20.7% of Tanzania's population were connected to electricity, correspondent to 9.5 million inhabitants⁴⁶. Increasing modern energy access is a major objective of the GoT. The different policies and strategies in Tanzania set the target of 75% for national electrification by 2033 with interim targets of 30% by 2016 and 50% by 2020. By 2012, TANESCO fell short of the new connections target set in 2007.⁴⁷ Therefore, to close the gap, to face growing demand and to achieve the short-term target of increasing access to electricity to 30% by 2016, TANESCO has agreed to connect an average of 250,000 customers per year from 2013 to 2017⁴⁸.

While TANESCO has pursued on-grid access, REA has been the main driver for the deployment of off-grid electrification projects (decentralised solutions ranging from 1 to 10 MW), through the Tanzania Energy Development and Access Project (TEDAP), grid extension projects and other initiatives⁴⁹. To date TEDAP's RE based electrification outcomes include: TANESCO signing Small Power Purchase Agreements (SPPAs) with 11 power developers to supply 46 MW of power and letters of intent with another 6 for 31 MW of power. Moreover 100,000 households are expected to benefit from the REA performance based grant support to mini-grids, Sustainable Solar Market Packages (SSMPs), stand-alone systems and the Lighting Rural Tanzania⁵⁰ project.

39 MEM, Scalling-up Renewable Energy Programme (SREP): An Investment Plan for Tanzania, May 2013.

40 According to MEM Power System Master Plan (PSMP) 2012 Update (May 2013) Tanzania imported around 14 MW from Uganda, Kenya and Zambia.

41 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

42 MEM, Strategic Plan 2011/12 - 2015/16, November 2012.

43 MEM, Strategic Plan 2011/12 - 2015/16, November 2012.

44 MEM, Electricity Supply Industry (ESI) Reform Strategy and Roadmap 2014-2025, June 2014.

45 TANESCO and REA, Access to Electricity for Mainland Tanzania, 2014.

46 National Bureau of Statistics, Housing Conditions, Household Amenities and Assets Monograph, January 2015.

47 For example, at the end of 2011, TANESCO connected 75,461 new customers of the 100,000 annual target set in 2007. MEM PSMP 2012.

48 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

49 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

50 Lighting Rural Tanzania project financed by African Renewable Energy Access (AFREA) programme and TEDAP supports private enterprises in developing new business models to supply affordable energy in rural areas.

Current strategies aim to support current energy supply and access targets in the medium and long term include:

- PSMP 2012 which provides the short-term (2013-2017), medium-term (2018-2023) and long term (2024-2035) plan for the development of the electricity supply sector, focusing on providing access to electricity supply through grid extension and connection and increased generation. The plan aims at increasing the overall electrification rate to 30% by 2015 and 75% by 2033; electricity supply to 2,780 MW by 2016 and more than 7,400 MW by 2035 (mainly through the implementation of hydropower, natural gas-fired generation and coal projects and with smaller contributions of solar, wind and biomass cogeneration projects)⁵¹.
- REA's long-term strategy (2013–2022) has been put forward – the REA Prospectus – for both urban and rural households, which includes a mix of on-grid and off-grid solutions⁵². The REA Prospectus aims at supporting the GoT electrification strategy through a cost-effective approach. Through the implementation of the REA Prospectus, it is estimated that by 2022 around 5,500 settlements would be electrified through the grid connection plan and 6,000 settlements through off-grid electrification and distributed technologies, thus contributing to achieve the 30% overall electrification rate by 2016.
- BRN, which will be the main driver for the implementation of Tanzania goals and targets up to 2016, includes the development of 14 prioritised electricity distribution projects (7 generation projects to add more than 1,300 MW of newly installed capacity and 7 transmission projects to emit the generated power) and the establishment of 590,000 new connections (corresponding to providing access to approximately 5 million more Tanzanians⁵³).
- TANESCO's grid expansion and reinforcement projects. Grid reinforcement projects are already committed especially for the grids that have exceeded their thermal capacity and for the areas where more electricity generation capacity was added. The expansion of the grid expects that by 2016 more than 3,000 km of transmission lines (through the implementation of the BRN) will be added and by 2035 more than 8,700 km of transmission lines⁵⁴.
- Energy Access Market Accelerator a partnership between the UN Sustainable Energy for All, the Energy+ Technical Working Group and Accenture Development Partnerships aims to complement the existing energy access sector and aggregate existing information and services. It will also identify gaps, and work with country partners to close them, with the objective to increase competition of energy services and achieve a rapid scale-up of cross-border electricity trade. Tanzania plans to reinforce grid connections with Kenya and Zambia and to establish new connections with Uganda, Mozambique, Rwanda, Burundi and Malawi.

3.2.2 The Process Heat Sector

Biomass-to-energy, mostly for heat production is responsible for 90% of the total primary energy consumption in Tanzania. 90% of the biomass demand is for household consumption (firewood, charcoal, crop residues). The rest of the biomass demand (10%) is for commercial, institutional and industrial sectors⁵⁵.

Table 1 shows the share of the different fuels consumed for household cooking in 2012. A very small percentage of Tanzania's households use modern energy for cooking⁵⁶ (2.6%), even in urban areas (6.9% of the households use modern energy for cooking). 94.2% of the households use wood-fuel (68.6% firewood and 25.6% charcoal) as their main source of energy for cooking.

51 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

52 REA, National Electrification Program Prospectus, 2014.

53 NKRA Energy, Tanzania's Development Vision 2025 Big Results Now: Energy Lab Final Report, April 2013.

54 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

55 MEM, Biomass Energy Strategy (BEST) for Tanzania, April 2014.

56 Modern sources of energy for cooking include: electricity, solar energy, biogas and LPG.

Table 1: Primary cooking and heating energy in Tanzania – share of the different fuels in household cooking energy consumption (2012)

	Percentage			Households (million)			Population (million)		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
Electricity	1.7%	0.3%	4.4%	0.15	0.02	0.13	0.74	0.09	0.56
Kerosene/Paraffin	2.4%	1.0%	5.4%	0.22	0.06	0.16	1.05	0.31	0.69
LPG	0.9%	0.1%	2.4%	0.08	0.01	0.07	0.39	0.03	0.30
Biogas	0.0%	0.0%	0.1%	0.00	0.00	0.00	0.00	0.00	0.01
Firewood	68.6%	90.2%	24.5%	6.19	5.46	0.73	29.93	27.89	3.11
Charcoal	25.6%	7.7%	62.0%	2.31	0.47	1.84	11.17	2.38	7.87
Crop Residues	0.2%	0.3%	0.1%	0.02	0.02	0.00	0.09	0.09	0.01
Other	0.2%	0.2%	0.3%	0.02	0.01	0.01	0.09	0.07	0.04
Not Applicable	0.4%	0.1%	0.9%	0.04	0.01	0.03	0.17	0.04	0.11
Total	100.0%	100.0%	100.0%	9.03	6.05	2.97	43.63	30.91	12.71

Source: National Bureau of Statistics, *Housing Conditions, Household Amenities and Assets Monograph*, January 2015.

Charcoal demand has increased rapidly (doubled) in the last 10 years driven by rapid urbanisation and the relative high prices or scarcity of energy substitutes (such as kerosene, electricity, biogas, biomass briquettes and LPG). Nevertheless, since 2008-2009, when import duties and VAT were removed from LPG products and equipment, the use of LPG has increased more than 5-fold. This growth derives from an increase in the usage of this fuel by wealthier households and some commercial establishments, and by a continuous increase in the price of charcoal, particularly in urban centres.

Natural gas usage in households, an abundant fuel resource in Tanzania, still remains negligible. This is due to an almost inexistent natural gas distribution network in urban centres, apart from a pilot project in Dar-es-Salaam.

Tanzania is a partner country of the Global Alliance for Clean Cookstoves (GACC), and under this umbrella programme, an assessment of the market for improved cookstoves has been carried out that revealed an estimated penetration of cookstoves in approximately 1,000,000 households, with most of those being charcoal burning stoves. The market for cookstoves is very fragmented and dominated by the informal sector and, up to now, no one appears to have commercialised these technologies on a large scale. Recognizing the fragmentation of the Improved Cook Stoves (ICS) sector in Tanzania, private sector and civil society representatives initiated the ICS Taskforce, facilitated by SNV, chaired by the Ministry of Energy and Minerals (MEM), and with the Tanzania Renewable Energy Association (TAREA) elected to hold the secretariat. It aimed to increase coordination between relevant stakeholders while doing the necessary studies to come to a joint way forward for ICS market development in the country. Apart from market intelligence studies, technical assessments and ICS policy framework analysis, the ICS Taskforce developed a Country Action Plan for Clean Cookstoves and Fuels. This joint action plan was published in 2014 in collaboration with the Clean Cookstoves and Fuels Alliance of Tanzania (CCFAT).

Moreover, BEST 2014, which is not yet finalised as a fully-fledged strategy, recommends the development of an improved cookstoves project with quantitative targets in Tanzania aiming at reducing fuel-wood consumption and charcoal consumption.

The BEST 2014 aims at helping to build awareness and develop a common understanding of the biomass energy sector. The Action Plan included recommends the development of several actions involving the development of biomass energy policy, supply-side and demand-side actions to start being applied in Tanzania with a long-term view to the year 2030.

3.2.3 Energy Efficiency

Although, to date, the country has no comprehensive policy, instrument or strategy targeting Energy Efficiency (EE), the GoT is beginning to address this issue through the implementation of programmes and projects at an institutional level and in cooperation with several Development Partners. Targets to improve transmission and distribution efficiency in the power sector, petroleum consumption and electricity consumption in manufacturing industries and households, are set in the MEM Strategic Plan 2011/12-2015/16.

Power system losses in Tanzania in 2012 were of 21%. The GoT aims to reduce these losses to 15% by 2016 and, consequently, TANESCO has put in place a Loss Reduction Programme which is currently being implemented. Related to that but on demand side management, TANESCO has established a dedicated Unit which aims at targeting large power consumers. The objective is to persuade them to shift their load from the peak load by means of implementing awareness raising campaigns to encourage the consumers to install power system correction systems that will help them improve power factor problems and, at the same time, contribute to improve TANESCO's transmission and distribution losses.

On the formulation of policies, strategies and plans targeting EE, the GoT - working with several Development Partners - has developed an Energy Efficiency Report, which will be the basis for the development and implementation of a National Energy Efficiency Programme. Through this programme, the GoT expects to establish: an Energy Efficiency Policy with concrete goals and targets and develop a National Energy Efficiency Action Plan; develop a framework targeting energy managers and auditors; develop Energy Efficiency Standards and Labelling; develop standards and regulations to address EE in buildings; address industrial energy management and efficient biomass utilisation. Moreover, the programme also includes several capacity building components on EE directed at the public and private sectors.

In terms of improving efficiency in cooking energy, there is the Tanzania Domestic Biogas Programme (TDBP) that started on 2009. The first phase was completed in 2013 in which 8,799 plants were installed. The second phase started in 2014 and will end in 2017.⁵⁷ Both phases are targeting a total of 20,700 plants. The programme is hosted in the Centre for Agricultural Mechanization and Rural Technology (CAMARTEC) and receives technical assistance from SNV. It is part of the Africa Biogas Partnership Programme (ABPP) as managed by Hivos with funding from the Netherlands Directorate for Development Cooperation (DGIS), The Government of Tanzania aims to contribute with funding to TDBP through REA from 2015 onwards.

The target to reduce 20% of electricity consumption in manufacturing industries and households by 2016 is in place focussing on replacing conventional meters with intelligent automatic reading meters (AMR). One priority of BRN was the CFL programme to reduce peak demand. Currently TANESCO is conducting a pilot project to retrofit 20,000 CFL bulbs in the Ruvuma region.

57 Information retrieved from TDBP website in January 2015.



4 PART 1 - VISION AND TARGETS THROUGH 2030

4.1 Energy Sector Trajectory

The baseline year for electricity access is 2012. For the purpose of the AA, the definition of electricity access is connections (or equivalent when dealing with Solar Home Systems (SHS), distributed power or non-metered mini-grids) consistent with the Global Tracking Framework (GTF) and with the multi-tier approach under GTF. In the baseline year, only 20.7% of the population had electricity supply when we talk about **connections**. It is important to keep in mind that currently TANESCO defines electricity access as having access to a nearby network where it is possible for electricity connection to occur (in this case access means proximity). In 2012, 36% of the population had **proximity** to the grid. While in the baseline case, both definitions of access are considered valid, the **connections** definition is the one adopted for Tanzania's electricity access goal.

According to TANESCO, as of 31 December 2014, Tanzania's installed electricity generation capacity was 1,550 MW and is set to grow to at least 8,990 MW by 2035. The current strategies in place do not foresee a major change on the RE share in the mix of the power sector. The total projected power sales for 2030 are estimated to grow in excess of 12% a year.

So far, the initiatives in support of increased access to clean cookstoves or fuels have been dispersed, without any institution playing a leadership role in support of coordination and of sustainability of efforts. While the GoT has been supporting the LPG market, mainly by eliminating taxes, NGOs and CSOs has focused on alternative fuels like biogas or on training cookstoves manufacturers, but with no mechanisms to ensure the quality of equipment and manufacturing in the long run.

Tanzania biomass utilisation represented 90% of the energy consumed in 2012 and according to the UNFCCC⁵⁸ only 4% of the biomass used is sustainable. Most of the biomass demand is for household consumption for cooking and heating (90%). The balance (10%) is used by home-based enterprises, commercial, institutional and industrial sectors.

While Tanzania has set a strategy for increasing the efficiency of charcoal utilisation and expanding the supply of non-solid fuels, a stronger strategy for clean cookstoves is yet to emerge.

The focus on EE is at the early stages in Tanzania, yet TANESCO has plans to reduce losses from 21% in 2012 to 15% in 2015. The BEST recommends an improvement in charcoal production efficiency of 50% by 2025, and with the help of improved cookstoves programmes, reduction targets for urban charcoal demand to be 50% by 2025.

Implementation of the AA is framed by two additional challenges: demographics and poverty. In the baseline year, 12.3 million (28.2%) Tanzanians were below the poverty line. Poverty is higher in rural areas (33.3%) than in urban areas (15.5%)⁵⁹. The population in 2012 was about 43.6 million and, if the intercensal growth rate remains as today (2.7%), by 2030 population will be about 70.5 million. This means that, at an average of 5 people per household, today's 9 million households will grow to over 14 million. Even if the number of poor remains constant (at 12.3 million), poverty in Tanzania will drop to about 17.5%, correspondent to 2.5 million households.

4.2 Tanzania's SE4ALL Targets for 2030

Access to modern energy services is a necessary precondition for achieving development goals that extend far beyond the energy sector, such as poverty eradication, access to clean water, improved public health and education, women's empowerment and increased food production. The United Nations (UN) Secretary General launched the SE4ALL Initiative in September 2010 to achieve three inter-related goals by 2030:

- Ensuring universal access to modern energy services.
- Doubling the rate of improvement in EE.
- Doubling the share of RE in the global energy mix.

Tanzania opted-in and became one of the 14 early movers for Africa in 2012. Tanzania's SE4ALL's AA seeks to integrate the multi-tier efforts that the Country is implementing towards providing universal access to energy, increased energy efficiency and an increase in the use of renewable energy.

In 2012, 20.7% of mainland Tanzania's population had access to electricity (based on the definition of access equals connections); which means 1,881,343 households had access (average household size as per census 2012).⁶⁰ When access is defined as *proximity*, this number goes up to 36%. While in the baseline case both definitions of access are considered valid, the GoT adopted the connections definition for the purpose of setting the country's SE4ALL goals. Setting a floor for actual connections at 75% by 2030, means an effective increase in the number of households connected to at least 25% more of what the Vision 2035 targets for 2033⁶¹

Almost 95% of the population in Tanzania used biomass based fuel for cooking in 2012 – the two primary sources being firewood (68.6%) and charcoal (25.6%)⁶². Under the GACC umbrella programme, Global Village Energy Partnership (GVEP) and Accenture Development Partnerships (ADP), a market assessment of the cookstoves in Tanzania⁶³ has been undertaken. The market assessment estimated the penetration of improved cookstoves to be around 1,000,000 households, most of them burning charcoal.

In Tanzania, the process heat depends heavily on the non-sustainable use of biomass, which is responsible for over 90% of the energy generated in the country. For the electricity sector, renewable energy accounts for about 36%⁶⁴ of the country's installed power capacity.

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(68.6%) and charcoal (25.6%)

59 Figures extracted from World Bank World Development Indicators (<http://wdi.worldbank.org>)

60 In addition, there is a number of households, institutions and industries that are served by diesel engines, mini-grids and solar home systems that are not counted under the 20.7% of access.

61 This is based on accelerating the current 2035 goal for access stated on the Power System Master Plan (PSMP) 2012

62 National Bureau of Statistics, Housing Conditions, Household Amenities and Assets Monograph, January 2015.

63 GVEP, Tanzania Market Assessment, 2012

64 This figure accounts for only grid connected capacity, PSMP 2012

While the government has focused its efforts into transitioning to more efficient cookstoves and the expansion of non-solid fuels, the PSMP foresees that for on-grid power coal generation will outpace hydropower generation growth by 2035, limiting the ability to expand RE power generation to only 40% of the mix. Given these particular characteristics of Tanzania's energy matrix, the goal for renewable energy share in the total final energy consumption is disaggregated between power and thermal applications.

Table 2: Tanzania's SE4ALL targets under each goal

Universal access to modern energy services		Doubling global rate of improvement of energy efficiency	Doubling share of renewable energy in global energy mix	
Percentage of population with electricity access	Percentage of population with access to modern cooking solutions	Rate of improvement in energy intensity	Renewable energy share in Total Final Energy Consumption	
			Power	Heat
>75%	>75%	-2.6% per year ⁶⁵	>50%	>10%

Considering that the current scenario is led by the early stages of the promotion of REA's IP and SREP, and the BRN initiative, the implementation of the AA, as an overarching strategy, will require a transitional period. The intention of the GoT is to integrate the strategic approach of the SE4ALL into the MEM Strategic Planning process, hence some of the targets, would be subject to the assessment of the progression of the AA implementation and as part of the 2016/2022 MEM Strategic Plan design process. As the GoT integrates SE4ALL into its sectoral planning, the trajectory towards the country's SE4ALL Goals is informed by the following phases:

- **Transition (2015 – 2016).** During this period, the country will integrate the AA and IP into the government mid-term planning (MTP) process by incorporating them into the MEM Five-year Strategic Plan 2016 – 2020. As part of this process, the government will start a national dialogue with all stakeholders at national and sub-national level towards the adaptation, update and alignment of the existing initiatives with the country's SE4ALL AA. During this period, all new strategies and initiatives will have to be consistent with Tanzania's SE4ALL AA. As a result of this process, and to properly mirror the MTP, the AA and IP will be updated.
- **Transformation (2016 – 2020).** Starting July 2016, the AA and IP will operate fully integrated with MEM Five-year Strategic Plan. This means that from this moment forward the AA and the IP will be subject to same revision cycles than the MTP. This interaction will create synergies and contributions between the different new government plans, programs and policies with the AA and the MTP, resulting in a dynamic IPs portfolio. In this context, the AA will be reassessed on its progress and additional initiatives and IP(s) should be incorporated as needed.
- **Consolidation (2020 – 2025).** SE4ALL becomes the cornerstone of the national mid-term planning process. In this context, the AA will have its progress and additional initiatives reassessed and IP(s) should be incorporated as needed.
- **Acceleration (2025 – 2030).** The sustainability and update of the actions and strategies will accelerate the process of achieving Tanzania's SE4ALL goals. In this context, the AA will be reassessed by its progress and additional initiatives and IP(s) should be incorporated as needed.

4.3 The Methodological Approach in Support of Tanzania's SE4ALL Goals

Targets are supported by priority actions and investment opportunities that will focus on the short-term, or transitional and transformation periods. Additional actions and related investment prospectuses will be added as part of the operationalization of a fully SE4ALL compatible MEM Strategic Plan.

4.3.1 The Methodological Approach to the Baseline and Quantitative Projections on Access

The methodological approach to estimating baseline and progression on Access included the following assumptions:

4.3.1.1 Electricity

- *Baseline for Access to Electricity*
 - Baseline. In the year 2012, based on the National Bureau of Statistics, an estimated 20.7% of Tanzania's population had access to electricity. Meaning 9.1 million people (based on the 2012 Census), or 1,881,343 households (considering 4.8 members per households as per the 2012 Census).
- *Progression for Access to Electricity*
 - Progression time intervals. Consistent with PSMP, progression is presented at five-year intervals.
 - Progression, installed capacity and grid expansion. The progression, while discretionary, should consider and be consistent with the progression stipulated under the review of the PSMP, REA and BRN, in terms of installed capacity, grid expansion and sector trajectory.
 - Installed capacity. As the PSMP is been subject to a series of reviews⁶⁵ that could be further affected by the impact of the unbundling of TANESCO⁶⁶, projections are based on the current PSMP which calls for 8,990MW by 2035
 - Progression and consistency within the AA. Until the AA is fully integrated into MEM's Five-Year Strategic Plan, ratios of on-grid vs off-grid access are yet to be properly defined. The ratios indicated below are based on the idea of accelerating access levels from 2035 to 2030. Still, progression is consistent with the current status and trajectory, as well as existing plans and strategies for increasing installed capacity and access to create consistency with the section of priority action areas in the AA.
 - Connection to the main grid (85%): densification and Turnkey projects contemplated in the REA Prospectus plus additional projects from BRN. Electricity connection will be supplied to those settlements/villages/ households that are within 10 km of the grid.
 - Rural Electrification/Off-grid (15%): access to electricity is supplied through rural electrification (mini-grids associated with hydro and biomass gasifiers plants or hybrid PV system) to settlements/villages/households located beyond 10km from the main grid. This will be based on the REA Prospectus off grid plans

⁶⁵ The PSMP is currently been updated, plus recently the Energy Sector goals (ESI Reform Strategy and Roadmap 2014) are projecting 10,000 MW by 2025
⁶⁶ A summary of TANESCO Unbundling Plan and Critical Path for Internal Reform is provided in Annex II.

- **Population Growth.** Projected population is expected to be about 70.5 million by 2030, based on the population in 2012 compounded annually by the average annual intercensal growth rate from 2002 to 2012.
- **Consistency with Vision 2025.** The projections are consistent with the current long term vision, but given the country's GINI and population distribution, levels of access are also informed by challenges to reduce poverty and other non-technical barriers to access
- **Cost of Universal Access.** Cost of universal access is proposed to be based on the projected costs for urban and rural electrification set by the REA Prospectus.
 - The total cost of access at household level is estimated at US\$958.14 per connection for grid connected projects and US\$2,140 for off-grid connection;
 - The customer connection costs (US\$448 per connection for grid-connected projects and US\$469 per off-grid connected projects) are included on the total access costs.

The table below represents the progression and targets required for electricity access by 2030 in Tanzania.

Table 3: Progression and targets for electricity access by 2030

Year	Total	Added Connections	Households	Level of Access
2012	1,881,343			20.70%
2015	2,706,128	351,209	9,844,849	27.49%
2020	4,732,786	381,125	11,247,637	42.08%
2025	7,202,993	575,735	12,850,307	56.05%
2030	11,023,016	931,094	14,681,341 ⁴	75.08%

Based on the assumptions indicated above, to reach 75.08% of households connects with on-grid and off-grid power supply Tanzania needs to invest about US\$ 5.8 billions.

4.3.1.2 Clean Cookstoves

- *Baseline for Access to Clean Cooking*
 - Baseline is 2012, based on the estimated number of clean cookstoves presented in the market assessment of the cookstoves in Tanzania (Global Village Energy Partnership, 2012).
- *Progression for accessing clean Stoves*
 - **Population Growth.** Projected population of about 70.5 million by 2030, based on the population for 2012 compounded annually by the average annual intercensal growth rate from 2002 to 2012.
 - **Progression time Intervals.** Consistent with the other access indicators, progression is presented at five-year intervals.
 - **Progression and consistency within the AA.** Progression is consistent with the current status and trajectory, including the efforts by TAREA, SNV and others, as well as existing plans and strategies for increasing installed capacity and access to create consistency with the section of priority action areas in the AA

- **Progression.** The progression, while discrete in nature, is consistent with the phases of the AA implementation, where at inception we see small increments in the addition of connections, and the number of connections accelerates over time.

Table 4: Progression for accessing clean cookstoves

Year	Households	Added Cookstoves	
2012	1,000,000		11.00%
2015	1,331,000	331,000	13.52%
2020	2,241,025	1,241,025	19,92%
2025	4,507,501	3,507,501	35,08%
2030	11,216,105	10,216,105	76.40%

4.3.2 The Methodological Approach to the Baseline and Quantitative Projections on Energy Efficiency

The restrictions to properly monitor the progression of EE, as defined by the SE4ALL Global Initiative, are presented in the Global Tracking Framework. Therefore, the option is to establish the baseline for 2010 as presented in the World Bank's SE4ALL Database for Tanzania.

The SE4ALL guideline of doubling the rate of energy efficiency is based on the idea of energy intensity. The SE4ALL Global Initiative defines energy intensity as the total energy consumed divided by the GDP. Following the World Bank's SE4ALL Database, we can use the definition of the level of primary energy (MJ) divided by the GDP (US\$2005 PPP). The World Bank Data present the following description for the energy intensity variable:

Table 5: Energy intensity description as per World Bank Data

Indicator Name	Energy intensity level of primary energy (MJ/\$2005 PPP)
Indicator Code	6.1_PRIMARY.ENERGY..INTENSITY
Long Definition	Energy intensity level of primary energy (MJ/\$2005 PPP): A ratio between energy supply and gross domestic product measured at purchasing power parity. Energy intensity is an indication of how much energy is used to produce one unit of economic output. Lower ratio indicates that less energy is used to produce one unit of output.
Source	World Bank and International Energy Agency (IEA Statistics © OECD/IEA, http://www.iea.org/stats/index.asp).
Statistical Concept and Methodology	Indicator is obtained by dividing total primary energy supply over gross domestic product measured in constant 2005 US dollars at purchasing power parity
Unit of Measure	MJ/\$2005
Comments	Energy intensity level is only an imperfect proxy to energy efficiency indicator and it can be affected by a number of factors not necessarily linked to pure efficiency such as climate.

The following table presents the proposed way to define the improvement on the baseline and progression using the macroeconomic data on the SE4ALL Database. For the period 1999 to 2010, it proposes that the Historical data is used. For the period 2011 to 2030, the calculation follows the annual average for the years 2001 to 2010, which was -2.6%, which means that by 2030 energy intensity would be reduced by about 41% below the 2010 baseline.

4.3.3 The Methodological Approach to the Baseline and Quantitative Projections on Renewable Energy

Baseline for RE Mix in process heat generation and consumption. As presented in above, process heat depends heavily on the unsustainable use of biomass and is responsible for over 90% of the energy generated in the country. Based on UNFCCC, Tanzania levels of unsustainable use of biomass in 2012 was 96%. The UNFCCC conditions for demonstrable sustainable use of woody biomass requires that one of the following occurs:

1. The woody biomass originates from land areas that are forests where:
 - a. The land area remains a forest;
 - b. Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting);
 - c. Any national or regional forestry and nature conservation regulations are complied with.
2. The biomass is woody biomass and originates from non-forest areas (e.g. croplands, grasslands) where:
 - a. The land area remains cropland and/or grasslands or is reverted to forest;
 - b. Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting);
 - c. Any national or regional forestry, agriculture and nature conservation regulations are complied with.

Baseline for RE Mix in Power Generation. Based on the PSMP, Table 7 shows the structure for 2012 and projected for 2030.

Table 7: Capacity installed in 2012 and expected for 2030 as per PSMP

Source	Capacity Installed by 2012 (MW)	Capacity Installed by 2030 (based on the PSMP - Accelerating the capacity on the PSMP)
Natural Gas	501	2,584
HFO/GO/Diesel	456	676
Coal		2,200
Total Fossil Fuels	957	5,460
Large Hydro	553	2,954
Small Hydro	13	17
Wind		100
Solar	6	120
Biomass co-generation	35	67
Total RE	593	3,258
Other not classified		272
TOTAL	1,558	8,990

It is expected that the update of the PSMP as well as the development of resources like geothermal will have an impact on the capacity projections as well as the mix of resources contributing towards power generation to the grid by 2030. Therefore, an update to table 7 above will be available in 2016, on time for integrating the AA into the MEM's Five-Year Strategic Plan.



5 PART II – PRIORITY ACTION AREAS⁶⁷

The priority action areas are critical to the implementation of the AA and the rollout of the IP. Yet, this AA and its corresponding IP are to be integrated into the government mid-term planning (MTP) process by incorporating them into the MEM Five-year Strategic Plan 2016 – 2020. Ahead and as part of this process, the government will initiate the following three initiatives, which the detail and estimated costs assessment can be found in the IP,

- **Support to the SE4ALL Secretariat at MEM.** This programme aims to provide SE4ALL Technical Advisory services to MEM on the establishment of the SE4ALL Secretariat that will be responsible for the overall development, implementation and monitoring of the SE4ALL activities in the Country.
- **Revision and Alignment of the Legal Framework to the SE4ALL AA.** Support to the SE4ALL Secretariat/MEM to undertake the regulatory framework review to assess the need to appropriately update policies, regulations and energy plans, and to reinforce synergies across sectors to provide sustainability to the integration of the SE4ALL process into the MTP.
- **Analysis of Investment Projects.** This programme aims to provide technical advisory services to support the SE4ALL Secretariat/MEM in the identification, analysis, design, and implementation of other actions and interventions that will contribute to the achievement of the SE4ALL goals in Tanzania, with a special focus on its integration into the MTP process and throughout the four phases of the implementation of the AA.

Consequently, the priority actions presented in this section should be prioritized during a national dialogue with all stakeholders at national and sub-national level towards the adaptation, update and alignment of existing initiatives, new strategies and interventions and this AA into MEM's Five Year Strategic Plan, and impact on other Government Agencies' plans on nexus topics like health, education, nutrition, the environment and water.

5.1 Energy Access

5.1.1 Current Status and Trajectories

Tanzania's annual electricity consumption was 97 kWh per capita in 2012⁶⁸. While Tanzania's consumption per capita is within the expected range for basic human needs (i.e. electricity for lighting, health, education, communication and community services)⁶⁹, it is still far from the productive uses. Through the implementation of the different policies, the country aims at doubling its per capita annual consumption by 2015/2016 from the level registered in 2012. This increase is expected to be achieved through increased generation capacity and an accelerated electrification programme.

During the period between 2007 and 2013, TANESCO achieved, on average, approximately 130,000 connections per year (according to information from the MEM Strategic Plan 2011/12 – 2015/16). In 2012, 20.7% of Tanzania's population had electricity connections, corresponding to 9.5 million inhabitants⁷⁰. Increasing energy access is a major objective of the GoT. The different policies and strategies in place in Tanzania set the target of 75% for national electrification by 2033 with interim targets of 30% of national electrification by 2016 and 50% by 2020.

As of April 2014, a total of 24% of the population of Tanzania had electricity connections⁷¹ (41% of the urban population and below 16% of the rural population)⁷². From 2011 to 2014, access to electricity increased from 23% to 36% while connectivity rose from 17% to 24%.

Table 8: Summary of Electricity Sub-Sector (2011/2012 and 2014)

Year	2012	2014
Demand (MW)	851 ⁽¹⁾	934 ⁽⁷⁾
Number of TANESCO customers	0.9 million ⁽³⁾	1.5 million ⁽⁴⁾
Electrification connectivity rate	20.7% ⁽⁵⁾⁽⁶⁾	24% ⁽²⁾
Rural	6.6% ⁽⁸⁾	16% ⁽⁸⁾
Urban		41% ⁽⁴⁾
Grid-generation Installed capacity (MW)*	1,466 ⁽¹⁾	1,583 ⁽⁷⁾
Total generation installed capacity	1,550MW	NA
Transmission lines (km)*	4,816 ⁽¹⁾	4,816 ⁽⁷⁾
Distribution lines (km)*	26,565 ⁽¹⁾	45,560 ⁽⁷⁾

Sources: ⁽¹⁾ MEM PSMP 2012; ⁽²⁾ MEM Speech FY 2014-2015; ⁽³⁾ NKRA Energy, Tanzania's Development Vision 2025 Big Results Now: Energy Lab Final Report; ⁽⁴⁾ REA Prospectus ⁽⁵⁾ MEM Strategic Plan 2011/2012 – 2015/16; ⁽⁶⁾ National Bureau of Statistics, Housing Conditions, Household Amenities and Assets Monograph;

⁽⁷⁾ TANESCO data and information; ⁽⁸⁾ Information from REA (NA) stands for not available

Currently REA plans to connect about 5,500 settlements to the grid by the end of 2022 in 4 phases⁷³. In addition, 657 villages of more than 1,500 inhabitants have been identified as priority off-grid candidates for supply by biomass-fuelled plants or small hydro power plants. These electrification programmes (densification, grid extension, off-grid priority projects) would enable more than 50% of the rural population to get access to electricity by 2020.

68 MEM, Strategic Plan 2011/12 - 2015/16, November 2012.

69 UN/AGECC, Energy for a Sustainable Future. The Secretary-General's Advisory Group on Energy and Climate Change (AGECC). Summary Report and Recommendations, April 2010.

70 National Bureau of Statistics, Housing Conditions, Household Amenities and Assets Monograph, January 2015.

71 Including both on-grid and off grid electricity connections.

72 MEM, Electricity Supply Industry (ESI) Reform Strategy and Roadmap 2014-2025, June 2014.

73 REA, National Electrification Program Prospectus, 2014.

If only connection through grid extension is carried out, about 3,400 settlements would remain without access if stand-alone systems or other distributed technology options are not considered⁷⁴.

REA plans, according to its REA Prospectus, for the period 2013 – 2022 a total investment of US\$3.5 billion at 2013 prices. About US\$2.1 billion would be needed for rural electrification and about US\$1.4 billion for urban electrification (see Table 9)⁷⁵. By the end 2014, the total receipts committed for phase 1 amounted to US\$285 million stemming from the GoT (including processing fees on petroleum products), development partners (SIDA, NORAD, WB), electricity levies from TANESCO and interests earned.

Table 9: Total Costs of Urban & Rural Electrification Program⁷⁶ (Million US\$ at 2013 prices)

	Densification 2013-2011 (Exist. Grids)	Phase1 (2013-2022)	Phase 2 (2016-2022)	Phase 3 (2020-2022)	Phase 4 (2020-2022)	Off-Grid	Total ⁵
Urban	1,095.2	136.9	129.3	24.4	28.1	30.1	1,444.0
Rural	399.7	580.0	687.4	100.6	141.6	154.2	2,063.5
Total	1,494.9	716.9	816.7	125.0	169.7	184.3	3,507.5

Source: Data taken from the REA Prospectus

The peak demand increased from 851 MW in 2011/12 to 934 MW in 2014, as can be seen in Table 8. Peak demand is expected to increase to 6,000 MW by 2030 and 7,400 MW by 2035⁷⁷. The forecasted electricity demand would increase by 9% per year from 6,085 GWh/year in 2012 up to 47,724 GWh/year by 2035⁷⁸.

On the supply side, the installed power capacity is expected to increase from the 1,550 MW in 2012 (see Table 8) to 8,990 MW by 2035 for a projected population of about 70 million⁷⁹. This is expected to be achieved through the diversification of energy sources with a main focus on the most abundant energy resources in Tanzania, i.e., gas, hydro and coal as presented in Table 10.

Table 10: Projected Generation Installed Capacity by year 2035 in MW by source

Source	Current Capacity In 2014	Capacity by 2035 according to the PSMP
Hydro	561	2,971
Natural Gas	527	2,584
HFO/GO/Diesel	495	676
Coal	-	2,200
Wind	-	100
Solar	>6	120
Small Hydro	47	
Biomass co-generation	35	67
Other		272
TOTAL	1,671	8,990

Source: Revision of the PSMP 2012 by MEM

74 REA, National Electrification Program Prospectus, 2014.

75 REA, National Electrification Program Prospectus, 2014.

76 These costs include in the case of connections to the national grid: costs for connecting the settlements to the MV backbone grid; costs for setting up the initial distribution network; costs for network extension and customers' connections costs. For off-grid connections the costs include the costs of the power plants; in the case of hydropower plants the costs of network needed to transport the power from the plants to the supplied settlements; the costs of the initial distribution network and the costumers' connection costs.

77 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

78 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

79 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

The process of unbundling of TANESCO started in 2014 and will last until middle of 2025. A summary of the TANESCO unbundling plan and critical path for the internal reform is provided in Annex II.

5.1.2 Existing Plans/Strategies

On June 2014, MEM published the Electricity Supply Industry Reform Strategy and Roadmap for 2014 to 2025 (the Roadmap). The Roadmap is one of the pillars to Vision 2025 and seeks to increase the installed power capacity from 1,671 MW (April 2014) to at least 10,000 MW by 2025 and expand transmission and distribution systems. The energy sector reform is the biggest undertaking in Tanzania since setting up the privatization of TANESCO.

The Roadmap provides the actions to address the challenges in the electricity sub-sector and attract the required capital needed for the reform of the Electricity Supply Industry, including the completion the TANESCO's privatization. It presents reform initiatives and key actions covering the period from 2014 to 2025 that aim at meeting the current and future demand for electricity; reducing public sector expenditures; attracting private capital; and increasing electricity connection and access levels. The sector reform was developed in consultation with various key stakeholders including the general public, academia, private sector, financial institutions and development partners.

The implementation of the Roadmap specific needs and opportunities will be reflected in the country's consolidated IP.

5.1.2.1 Electricity Connections

REA in conjunction with the MEM, EWURA and TANESCO have articulated a concept for a Rural Energy Master Plan (REMP) to prioritise investments for on-grid and off-grid urban and rural electrification. Included in the REA Prospectus for a coordinated electricity sector-wide framework for Tanzania's national coverage (peri-urban, rural, and deep rural), there is a series of recommendations to be included on the REMP. This REA Prospectus encompasses urban and rural electrification by connection to the main grid and by off-grid technologies, where isolated mini-grids are supplied by RE sources.

The REA Prospectus aims to increase electricity customers to 4.4 million by 2019 through different project implementation phases. Phase 1 projects aims to connect to the national grid 1,987 rural villages, through extension and densification of the MV network. The total budget committed for Phase 1 of the REA Prospectus was 745 Billion TSh funded by the GoT, which contributed with over 60% of the needed funds. Phase 1 completion coincides with the development of this AA.

Phase 2 of the REA Prospectus will require an expansion in generation capacity and transmission network in order to absorb the additional demand that is to be connected by 2019. Phase 2 challenges MEM, REA and TANESCO to mobilize the funds needed to meet the goals. The implementation of Phase 2, and the funding shortcoming of Phase 1, will be reflected in the country's consolidated IP.

Table 11 presents a series of large donor and government funded programmes that aim at increasing the number of connections through grid extensions, mini grids and rural electrification projects.

Table 11: Government and Large Donor's Funded Programmes to Increase the Number of Connections

Program/Project Name	Beneficiaries / Purpose	Lead Agency	Implemented by	Funding Sources	Execution Period
Electricity V (Construction of low and medium distribution lines and rehabilitation of substations)	717 km of 33 kV 28 km of 11 kV 630 km of low voltage lines Customer connections: 13,400	TANESCO	TANESCO	GoT, AfDB	2009 - 2015
Green Mini Grid Program	Rural communities	REA	REA	DFID	2015
Up-Scaling Access to Integrated Modern Energy Services for Poverty Reduction	100 villages in northern Tanzania	REA	REA	EU	2011 - 2014
Yovi Hydro Power Project (mini-grid)	1 MW hydro power plant on the Yovi River in Msolwa, including transmission and distribution to surrounding rural communities	REA	Yovi	EU/GoT	2011 - 2014
Cluster Solar PV Project in the Lake Zone	Installation of 15,000 Solar Households Systems in the Lake Zone	MEM	REA	EU	2011 - 2014
Increasing access to modern energy services in Ikondo Ward	Upgrading of the existing Ikondo micro hydro plant and mini-grid extension to surrounding communities	REA	REA	EU/GoT	2011 - 2015
Rural electrification in Kilombero and Ulanga Districts	Construction of high, medium and low voltage grids in the Kilombero and Ulanga Districts	REA	REA	EU	2013 - 2015
Microgrid pilot	Construction of 20 micro grids for rural electrification in remote areas under the Lighting Rural Tanzania Competition (LRTC2014)	REA	REA	GoT	2013 - 2015
Support to Rural Energy Fund	Rural Electrification, primarily through turn-key grid extension and off-grid solutions	REA	REA	NORAD/GoT/Sida	2013 - 2016
Small Hydropower Mini-grids for rural electrification	Promotion of micro and mini hydropower-based mini-grids in Tanzania in support of rural electrification	REA	REA	UNIDO	2012 - 2016
15 funded SPPs in: Mawengi, Mwenga, Andoya, Tulila, Mapembasi, Ngombeni, Darakuta, Kiwira2, Isigula, Nkwiro, Luganga, Lupali, Yovi, Maguta and Luswisi.	15 funded SPPs by REA & WB, intending to connect 37,572 settlements. Total capacity of the plants being 40.7 MW.	REA	REA	GoT, WB	2012 - 2016
Rural Electrification under Turnkey arrangement (Turnkey Phase II)	Grid extension to rural households and connect a total of 250,000 initial customers in all 25 regions of mainland Tanzania	REA	REA	GoT	2013 - 2015

Village Electrification Initiative under Backbone Transmission Investment Project (BTIP)	Electrification of 53 villages along the backbone transmission line to connect 24,300 initial customers	REA/TANESCO	REA/TANESCO	GoT/Sida	2013 - 2015
Underline Distribution Transformers for rural electrification (Densification) project	Electrification of 60,000 households along the 33 kV transmission lines within 333 villages in 23 districts	REA	REA	GoT/NORAD	2015 - 2017
Village electrification under low cost design standards pilot project in Kilombero and Mbozi districts	Electrification of 7,000 households in Kilombero and Mbozi districts.	REA	REA/TANESCO	GoT	2014 - 2016
Tanzania Transmission and Distribution Power Services: Access to Energy	Access to energy program development including infill and intensification projects in 3 regions and 42 villages	TANESCO	TANESCO	MCC/GoT	2016 - 2018
Results-Based Financing for pico-solar market development in the Lake Zone	Distribution chain development with pico-solar import-suppliers, aimed to benefit an estimated 115,000 rural households in 6 regions of the Lake Zone	SNV/GIZ (EnDev)	SNV, TIB, solar companies	DFID	2013-2017

5.1.2.2 Grid Infrastructure

TANESCO owns the transmission (HV) and distribution (MV/LV) networks in Tanzania and has interconnections to Uganda (132 kV), Zambia (66 kV), Kenya (33 kV), Zanzibar and Pemba Island (132 kV). Figure 5 shows the generation, transmission and distribution networks in Tanzania in 2013 and the projected grid plans up to 2022, which are part of the country's investment in transmission and distribution strategies.

In 2014 the transmission network comprised a total length of 4,816 km. The PSMP 2012 foresees an additional 400 kV line of 647 km from Iringa to Shinyanga which is currently under construction and which will be completed by 2016. This line will link the Southern and Western grid networks. Three other lines of 220 kV are under construction and will connect Kinyerezi-Ubungo; Somanga Fungu-Kinyerezi and Makambako-Songea by 2016. The HV line is expected to expand from its current length to 8,700 km by 2030. Part of this expansion (3,000 km) is planned under BRN. The expanded grid will allow the HV network to absorb the additional load introduced through the implementation of the new generation projects scheduled under the PSMP 2012. The PSMP 2012 estimated that the total cost for the expansion of the transmission system will reach US\$ 2.7 billion by 2035.

In parallel to the expansion of the transmission grid, TANESCO has planned grid reinforcement activities. This work is mainly focused on upgrading substations and transformers. Under this plan, the total cost for phase transformers is estimated at US\$ 141 million, for phased substations is US\$ 635 million and for phased reactive compensation is around US\$ 109 million⁸⁰.

It is expected to double by the end of 2019 after completion of Phase 1 and Phase 2 of the REA Prospectus. This expansion can be seen in Figure 5 below.

45,560km
The approximate current distribution network (LV Lines) of 33kv and 11 kv

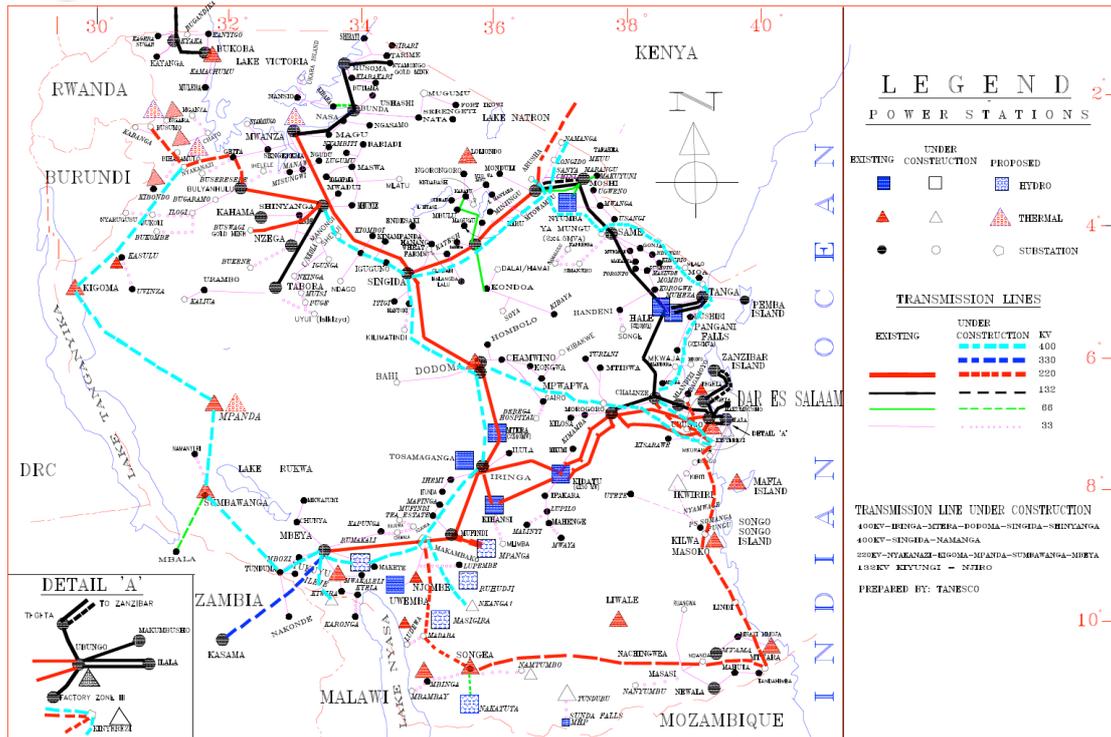


Figure 5: The National Grid System up to 2022 Source: MEM & TANESCO

Support for the grid related work is funded by the GoT, bilateral and multilateral donors. Table 12 presents the main government and donor funded programmes with the purpose of upgrading and extending the existing high and medium voltage grid infrastructure.

Table 12: Government and large donor funded programmes for grid upgrade and development

Program/Project Name	Beneficiaries / Purpose	Lead Agency	Implemented by	Funding Sources	Execution Period
Backbone Project (Iringa- Dodoma-Singida-Shinyanga Transmission Line)	Construction of new 400kV transmission line from Iringa to Shinyanga. Increase availability, reliability, and quality of grid based power supply to northern regions of Tanzania.	TANESCO	TANESCO	AFDB, JICA, EIB, WB	2013 - 2016
Backbone Project (construction of substations)	Four substations at Iringa, Dodoma, Singida, Shinyanga	TANESCO	TANESCO	Government of South KOREA	2014-2016
Transmission line Geita-Nyakanazi	Construction of 220 kV transmission line, construction of a 220/33 kV Substation in Nyakanazi	TANESCO	TANESCO	Germany/ KfW	2015-2017
Rehabilitation and Construction of New Lines in Dar es Salaam	Reinforce power transmission and distribution networks.	TANESCO	TANESCO	JICA	2014 - 2016
Makambako-Songea	Makambako-Songea Transmission Line and Distribution Network	TANESCO	TANESCO	Sweden	2013-2017

5.1.2.3 On-Grid and Off-Grid Generation

In 2008, the GoT issued the first Standardised Power Purchase Agreements (SPPAs) model which allowed private sector companies to enter the power generation market, either by establishing isolated, as well as grid-connected, mini-grids. Through the success of the SPPAs, Tanzania has become a mini-grid pioneer in Sub-Saharan Africa. Today, through the revision of the Small Power Purchase Tariff (SPPT) and the Feed-In-Tariff (FIT), which is currently almost three times more attractive than the FIT for on-grid connections, the GoT expects that the role of the private sector, especially in off-grid areas, will expand even further.

While Phase 1 of the REA Prospectus indicates that the supply can meet demand, the implementation of Phase 2 of the REA Prospectus will require an expansion in generation capacity and transmission network in order to manage the additional demand forecasted for 2019. Therefore, to accomplish Phase 3 goals, MEM, REA and TANESCO will work on mobilising funds to increase generation and transmission networks in support of the goal to add about 4,015 MW of generation and an additional 1,276 km of 220 kV transmission lines to the grid.

Besides REA Prospectus implementation, the GoT has the BRN initiative that supports the implementation of different projects in the electricity and natural gas sectors including the provision of technical assistance. The project funded by DFID is being implemented by MEM. The BRN was launched in February 2013, started implementation in June 2013 and is expected to run until 2016.

5.1.2.4 Clean Cooking

According to data from the National Bureau of Statistics, 94.4% of the population in Tanzania used biomass based fuel for cooking in 2012 – the two primary sources being firewood (68.6%) and charcoal (25.6%)⁸¹. Firewood is used mostly in rural areas while many of the urban centres use charcoal. Charcoal consumption has been increasing rapidly in recent years due to greater demand, ease of transport and storage.

The BEST, which is yet to be adopted by the government, recognises that the demand for firewood and charcoal for cooking, heating and commercial uses is one of the most important factors affecting Tanzania's forest sustainability. As it tries to address basic issues of biomass management, the BEST has not set quantitative targets. The current BEST recommends the development of a major Improved Cookstove (ICS) programme, which should set quantitative targets. Reducing woodfuel consumption in households, industries, commercial establishments and institutions will help meet the BEST Tanzania goal of ensuring the sustainability of Tanzania's wood fuel supplies.

Tanzania is a partner country of the Global Alliance for Clean Cookstoves (GACC). Under the GACC umbrella, Global Village Energy Partnership (GVEP) and Accenture Development Partnerships (ADP), a market assessment of the cookstoves in Tanzania⁸² has been undertaken in 2012. The market assessment estimated the penetration of ICS to be around 400,000 households in 2012, mostly charcoal burning stoves. Improved stoves are more available around the urban centres of Dar-es-Salaam, Arusha, Morogoro, Dodoma and Mwanza. Complementary market intelligence studies on clean cookstoves have been done in 2013 by the ICS Taskforce as chaired by MEM, with TAREA holding the secretariat.

A number of development partners, CSOs and NGOs, including private sector, are already engaged in activities and programmes in this sector⁸³, such as.

- Sustainable charcoal production - the Swiss SDC, WWF, TaTEDO, TFCG, Farm Africa, among others;
- Biomass and coal briquetting as an alternative to traditional charcoal and wood - like ARTI Energy and East Africa Briquetting, TaTEDO, others);
- Improved cookstove, ovens, kilns, boilers - SNV, TaTEDO, TAREA and others;
- Biogas - ELCT, CAMARTEC, MIGESADO, CARITAS, SNV, SimGas, and Katani among others.

81 National Bureau of Statistics, Housing Conditions, Household Amenities and Assets Monograph, January 2015.

82 Global Village Energy Partnership, Tanzania Market Assessment, 2012.

83 EUEI-PDF and Camco, BEST Tanzania: Key Elements of Biomass Energy Strategy, 2013.

Few of these initiatives have grown into a wide reach programme.

Table 13 presents information about three of them: the Tanzania Domestic Biogas Programme (TDBP), the Developing Energy Enterprises Programme (DEEP), and the Tanzania Improved Cook Stoves (TICS) programme as part of the global Energising Development (EnDev) programme).

Table 13: Government and large donor funded programmes for clean cooking or cookstoves

Programme/ Project Name	Beneficiaries / Purpose	Agency	Execution Period
TDBP	This programme will support the construction of 20,700 new biogas plants in total nationwide and keep at least 95% of the constructed biogas plants in continuous operation (protect 8,000 hectares of forest and benefit 72,000 people directly by eliminating the need to gather fuel wood). From 2009 until December 2014, 11,103 biogas plants were constructed.	TDBP under CAMARTEC with SNV Technical support	2014-2017 (Phase II)
GVEP – DEEP Programme	Supports the development of a sustainable and widespread industry of micro and small energy enterprises in Kenya, Uganda and Tanzania. As of June 2012, the programme had worked with 975 energy entrepreneurs, with 492 involved in the cookstove sector in the three countries.	GVEP (implemented by IT Power East Africa)	2008-2013
Introducing a new concept for affordable biogas system	Private sector development and market extension in order to reach at least 10,000 rural households	REA/TDBP/ SNV/ NORAD/Got	2015 - 2017
TICS - Tanzania Improved Cook Stove Programme	The overall objective of the Tanzania Improved Cook Stove (TICS) programme is to improve access and sustained use of appropriate cooking technologies for poor rural households and urban commercial biomass users in the Lake Zone of Tanzania. The focus is on market linkages with quality private sector ICS product and service providers. Activities are clustered around ICS diversification, targeted enterprise development services, and ICS marketing. By July 2015, the initial target of 50,000 beneficiaries has been surpassed, and scaling of activities is foreseen until 2017.	SNV, as part of the global EnDev programme managed by GIZ.	2013-2015 (with extension foreseen until 2017)

5.1.2.5 Initiatives in Support of Investment

EWURA requested the Technical Assistance from USAID to draft a roadmap for cost-reflective RE Feed-in-Tariffs (REFITs) along with associated Regulations, and to provide Power Purchase Agreement (PPA) Guidelines, and Application Procedures conducive to mobilising Independent Power Producers (IPPs) and their investors into Tanzania's electricity sector.

5.1.3 Existing Gaps

5.1.3.1 Universal Access - Electricity

The main challenges/gaps that Tanzania faces to reach SE4ALL universal access to electricity by 2030 are as follows:

- **Strengthen governance** in the energy sector. There is a need to enhance the governance and transparency in the energy sector with the objective to increase investors' confidence by diminishing perceived and actual risks during project development and operation.

- **Financial challenges.** The financial capacity of key institutions makes the financial gap that REA is set to close with its Prospectus, particularly challenging to address. In order to reach Tanzania's ambitious goals for increased energy access, the Rural Energy Fund (REF) must increase the volume of investment ten-fold - to 120 million USD and 600,000 new connections a year (instead of about 130,000 connections in 2013⁸⁴).
- **Affordability of electricity.** Although connection fees were lowered significantly in January 2013, their cost is still a deterrent for rural households and the poor. The same is true for off-grid solutions such as solar home systems and mini-grids, although these can be scaled down to an appropriate cost for consumers.
- **Lack of adequate financial instruments to last mile energy services and equipment.** In Tanzania, SMEs will benefit from increased number of funding options that focus on facilitating equipment and product vendors with funds to accelerate clean technology adoption and consumer access to these technologies.
- **Fragmented energy access market.** Most of the population lacking access to modern energy services are dispersed and not properly mapped which is a challenge for companies providing services to this market resulting in uncoordinated, immature and not widely known services to stakeholders.
- Although there are strategies and plans to address access above 1 MW, there is **no comprehensive strategy for mini-grids and stand-alone systems for access below 1 MW**. Such a strategy will boost the development of micro-decentralised systems that may be a cost effective solution to small settlements in remote areas of Tanzania.
- There is a need to understand the capacity supplied through diesel engines, mini-grids and isolated systems, which go beyond TANESCO's current/future plans.

5.1.3.2 National Grid

The implementation of the grid development plan up to 2022, will expand and reinforce the existing grid, ensuring not only the transmission of the installed and newly added capacity and expand access to electricity but also contributing to security of supply. Nevertheless, two key challenges remain: financial and technical ones.

- Funds for the implementation of the REA plan have not been fully realised and the funding gap amounts to US\$ 3,222 million. If customers' connection costs are deducted from the total, the cost of the grid development plan still lacks US\$ 1,628 million⁸⁵.
- TANESCO faces some financial and technical limitations that need to be addressed to reinforce grid infrastructure and to improve project implementation, such as:
 - Operation and maintenance (O&M) challenges. As the consumption is low in rural areas, the rate of return from grid extension projects is not sufficient to finance the proper operation of the grid and thus even fully funded projects suffer from O&M issues;
 - The cost of transmission and distribution grids is high and could be reduced through the application of least-cost techniques (e.g. SWER⁸⁶, 2-phase MV system, MV span length and effective allocation of budgets to villages according to techno-economic criteria).

84 103,000 connections were established in 2012 before lowering the connection fees.

85 Estimates based on the figures and amounts committed depicted in the REA Prospectus (REA, 2014)

86 SWER: Single Wire Earth Return

5.1.3.3 Universal Access – Clean Cooking

For Tanzania to achieve universal access to clean cooking by 2030 the following gaps need to be addressed:

- Insufficient policy, strategy and regulations related with biomass use to ensure the sustainable use of biomass in the cooking sector despite being the major energy consumer in the country.
- The unsustainability of the biomass sector is exacerbated by the fact that consumers do not pay the true cost of woodfuel. Market prices of charcoal and firewood only reflect the opportunity costs for harvesting, transformation and transport and do not reflect the costs for producing wood. This reduces the competitiveness of companies operating in the sustainable woodfuel sector, including more efficient cookstoves.
- Insufficient resources from the Tanzania Forest Service (TFS) Agency to enforce existing biomass related laws and regulations.
- Scattered and inadequate biomass energy data and information that are necessary for policy formulation and design of necessary interventions.
- Inadequacy of awareness of indoor pollution and its impact on health within the general population⁸⁷. This limits the rate of adoption of efficient cooking stoves, especially by the rural population.
- Inadequacy of energy performance standards for ICS, which make the stoves available on the market of general low quality and reliability.
- Informal charcoal sub sector is hampering enforcement of the charcoal stove standards in the country, as the result most of charcoal consumers are still using substandard cook stoves.
- Inadequacy of charcoal production sector regulation which lead to informality of sector and low efficiency in transforming biomass into charcoal.
- People's preference to traditional cooking solutions because of cultural heritage. In order to increase the use of modern cooking solutions it would be necessary to raise awareness about its benefits so people will start to shift to cleaner or improved cooking.
- Prevalence of unplanned settlements limiting creation of natural gas distribution infrastructures which could enable the use of this energy resource by households and industries.
- Limited LPG use for cooking in rural areas due to:
 - The lack of a distribution network or filling centres,
 - Inadequate awareness regarding the health, economic and technology benefits of using LPG for cooking
 - The high upfront investment cost for households for purchasing the cylinder, cooker and gas.
 - The inability to afford to purchase large refills of gas (usually 6kg refills of gas). Often, residents in these areas will typically be buying sufficient charcoal for just a few meals whereas a normal gas cylinder could represent over one month's usage.

5.1.3.4 Access to Modern Energy Services

In addition to the above-mentioned gaps related to universal access to both electricity and clean cooking (described in 5.1.3.1 and 5.1.3.3), there are a number of other limitations that need to be addressed to provide access to modern energy services:

- Insufficient information on available technologies and on the demand profile. There is limited information on the available technologies, limited baseline studies and information on the willingness and capacity to pay for energy services, which hinder the definition of appropriate strategies regarding energy access.
- Need for a Monitoring, Evaluation and Reporting (MER) system for the energy sector. There is a need to implement these systems to continuously monitor the implementation of the strategies and plans in place and to be able to effectively address any non-conformances that may arise.
- Limited availability of performance or other standards for energy products. Consumers are therefore unprotected against substandard equipment and services.
- Need to mainstream gender, cultural practices and the nexus of energy, especially on the sectors of health, cooking and water.
- Awareness raising, promotion and capacity building for the Non State Actors (private sector, CSOs, FBOs, etc) in both electricity and clean cooking fuels and technologies are required to encourage large investments in the energy sector.
- Decentralize institutional structure of the energy sector to the local governments (district councils) in order to support renewable energy and energy efficiency at local levels.

5.1.4 High Impact Initiatives for Achieving the Overarching Objective of Energy Access

- **Access Acceleration Strategy:** The concept behind this strategy is to bring energy solutions to communities and development centres that may not be reached by grid expansions and densification strategies for at least the next 10 years. This strategy will be designed by MEM in partnership with private sector stakeholders and CSOs, and is planned to be implemented mainly during the *Transformation* phase of the initiative in Tanzania. The strategy is foreseen to have the following characteristics:
 - Correct and update baseline information on capacities installed by providers other than TANESCO and information on available technologies and demand profile. The information on the capacities supplied by services other than the ones provided by TANESCO (diesel generators, mini-grids and stand-alone systems) and on the available technologies and demand profile will provide a better picture of the overall access to electricity in the country) and inform the correct access strategy.
 - User based solutions. Based on interacting with, and surveying, the target users, defines needs, willingness and financial affordability of users.
 - Productive uses and holistic approaches to creating demand - there is also a need to promote and support productive uses of power in an off-grid context through expanding significantly hybrid and smart systems, particularly to increase farming productivity and farm product processing. This is not only about delivering technical systems, but there also needs to be a clear plan on how to stimulate productive uses of energy to ensure demand. This is a common problem, inside and outside of Tanzania, in which local business stimulation and support is needed to generate demand. Energy services and appropriate technologies. The energy service approach is one that goes beyond the most obvious need, and truly serves the basic needs of the user, like electricity and water, as well as productive and community service necessities. Services should be driven by a technology that is commercially ready, affordable and appropriate for the solution that is pursued.

- Adaptive business and financing models. Based on a review of experiences in Sub-Saharan Africa and best practices from the developing world, a basket of business and financial models will be integrated into a guide to develop and invest in sustainable decentralised projects in Tanzania.
- **Improving the structure of the energy sector:** The goal of this strategy is to improve the interaction with all stakeholders, including donors and civil society. The SE4ALL Secretariat will lead efforts in support of private sector organisation and within national and District Government institutions to organise and improve on how the sector operates. Sample initiatives are:
 - MEM to take a pro-active role in support of the acceleration of the organisation and services by WWF, TaTEDO and TAREA as an umbrella of all private sector and NGOs working in the sustainable energy sector.
 - MEM to drive the development and implementation of clean cooking policies and the coordination of efforts among all stakeholders to consolidate and accelerate the transition towards clean cooking.
 - Improve participation of sub-national governments/local government in the definition of policies and strategies and in the implementation and monitoring of regional initiatives.
- **Improving the policy and regulation of the energy sector:**
 - MEM and REA will review the current REA Prospectus to develop a rural electrification strategy and consolidate a REMP with a clear path outlining areas to be electrified through grid extensions and mini-grid isolated systems. A special focus should be paid to mini-grids and stand-alone systems below 1 MW.
 - Formalise the biomass sector with guidance from MEM and MNRT. Review, finalise and adopt the BEST and ensure that targets for clean cooking devices and sustainable biomass production are considered.
 - Develop specific regulations for sustainable efficient charcoal production methods linked with appropriate forestry management plans.
 - Develop a concrete policy, strategy and targets to regulate biomass energy sector in particular the clean cooking sector.
 - Develop and implement an MER system for the energy sector to monitor the performance of the implementation of different strategies, policies and programmes in place in Tanzania.
 - Develop minimum national, or adopt regional, performance standards for energy products, based on government testing, labelling, and certification.
- **Human and Institutional Capacity Development**
 - The SE4ALL Secretariat will be responsible for the design and implementation training and capacity building for financial institutions to improve their understanding of project risks, profitability and how to better assist the development of private sector and community based energy projects (including technical and social aspects of off-grid energy based projects). How about building capacity (technical, business and managerial) of the private and CSOs
 - Support activities to accelerate rural electricity connections through the implementation of the REA prospectus and by:
 - Providing capacity building to regional and local governments to improve their energy planning capacity and monitor the progress of implementation of their plans, strategies and programmes.

- Supporting local and regional governments in the establishment of energy desks to back developers and local communities.
- Assist and build capacity of local entrepreneurs, last mile institutions and CSOs throughout the development of energy related projects. Support should be provided, in particular, for project identification, business plan development and project financing.
- Led by the TFS Agency, create conditions to enforce existing biomass related laws and regulations. This would include strengthening the human resources within the Agency.
- The SE4ALL Secretariat will develop a programme to improve the capacity of national and local institutions to:
 - Conduct awareness campaigns on the benefits of using solar technologies (pico-solar and solar home system) as well as other renewable energy solutions for remote/isolated populations. These awareness campaigns should additionally inform consumers on how to purchase quality equipment, e.g., by choosing certified products.
 - Develop capacity for local personnel/entrepreneurs to improve the quality of service and identify potential productive uses of energy for their goods. This would increase the confidence of consumers in sustainable energy products and their ability to pay for energy services.
 - Support the use of improved cooking appliances by engaging youth organisations in the production, dissemination and distribution of these technologies.
 - Develop capacity of local personnel/ entrepreneurs to carry out feasibility study, plan, design, implement and manage different sizes of electricity generation, transmission and distribution systems.
- Offer training courses to form a cadre of experts for Operations and Maintenance (including technicians, engineers and electricians) in technical professional centres and universities.
- Implement business incubation facilities linked with universities to assist start-ups in developing business ideas and technology appropriate for the Tanzanian energy access sector.

- **Improve access to electricity through:**

- MEM, REA and TANESCO are tasked with the development and implementation of a **clean energy mini-grid programme** as a means to accelerate clean off-grid access, including:
 - Development and implementation of small-scale renewable energy solutions.
 - Providing distributed electricity solutions that support productive use and economic development.
 - Creating more favourable business environments with appropriately refreshed (or new) policies, regulations, and energy plans to incentivise commercial investments and develop markets.
 - MEM and REA to work with local stakeholders, donors, regional organisations, such as the Alliance for Rural Electrification, and the SE4ALL Clean Energy Mini-grids HIO coordination group to leapfrog this initiative by capturing experience and lessons learned from within Tanzania and Sub-Saharan Africa.
- MEM is appointed the focal point for the Energy Access Market Accelerator that will implement a collaboration mechanism and assistance facility, facilitating the coordination of activities in the energy access market, connecting enterprises with service providers, and liaising with the

- international community and local government to communicate on-going gaps and broker efforts to bridge them.
- Facilitating financing for mini-grid and stand-alone energy access projects:
 - Implement a governmental subsidy to support the development (pre-investment, capital and operation) of micro/mini-grids in particular for productive uses in off-grid areas.
 - Design and implement a risk-mitigation instrument to cover delayed payments to investors in mini-grids and off-grid generation projects.
 - Project profitability should be maintained when an off-grid project becomes connected to the grid. This should take into consideration the feed-in-tariffs offered to both on and off grid generation projects.
 - Encourage developing partners and the private sector to use result-based financing such as the Clean Development Mechanism to facilitate investments in energy access.
 - MEM is appointed the focal point for the Energy Access Market Accelerator that will implement a collaboration mechanism and assistance facility, facilitating the coordination of activities in the energy access market, connecting enterprises with service providers, and liaising with the international community and local government to communicate on-going gaps and broker efforts to bridge them.

- **Improve access to modern cooking solutions:**

- MEM to lead on the creation of a cross-sectoral initiative to bring together different on-going efforts, like TICs, and improve coordination across agencies, private sector, CSOs and NGOs. This initiative should also:
 - Foster an enabling environment by engaging national and local stakeholders, building the evidence base for the benefits of stoves, promoting regional/international standards and rigorous testing protocols and enhancing monitoring and evaluation.
 - Promote industry standards for efficiency, safety, and emission reduction, based on testing and certification for clean cooking appliances, such as ICS.
 - Support continuous research on consumer use and demand for efficient stoves and on the design of products that meet user needs.
 - Contribute to improving the policy framework, train entrepreneurs and develop sustainable value chains and robust infrastructure for clean and efficient cooking stoves and fuels
 - Assist the validated regional CDM programme of activities *Improved Cook Stoves for East Africa*⁸⁸ to register cooking stove projects in Tanzania.
 - Explore possibility for establishing a national biomass energy agency with mandate, human capacity and adequate financing to ensure sustainable development of biomass energy.
 - Support development and implementation of large national programme on scaling up ICS.

- Develop an awareness campaign to promote the use of ICS and to move into non-solid biofuels to reduce the negative health impact of smoke and reducing the time that women and children spend in collection firewood.
- MEM to define a strategy to foster the use of LPG as a cooking fuel especially in rural areas. Careful consideration should be given on the design of a conducive legal and regulatory framework for companies operating in the sector, communication to potential users on the benefits of using the technology and definition of credit facilities to improve access to finance by users (to purchase required equipment and gas) and companies.
- Develop woodfuels (firewood and charcoal) supply and demand master plan for the main supply and demand centres (including tree cover inventory, classification of harvesting zones, relevant data, analysis of woodfuels flows, development of conditions and technical specifications for woodfuels, production and use).

5.1.5 Relevant High-Impact Opportunities⁸⁹

These include:

- Clean Energy Mini-Grids, to accelerate clean off-grid access:
 - Develop and implement small-scale renewable energy solutions.
 - Provide distributed electricity solutions that support productive use and economic development.
- Energy and Women's Health:
 - Understand the needs of health centres in rural and urban areas critical to increase the level of services to women.
 - Improve the technical capacity of women to take advantage of the market opportunities resulting from the implementation of the SE4ALL initiative in Tanzania.
- Universal Adoption of Clean Cooking Solutions, objective that can be pursued under the umbrella of the GACC.
- Improve smart grid technology solutions, grid-scale storage and interaction between renewables and fossil fuels.
- Innovative Finance, to support financial closure and financing access to energy services and clean cookstoves by
 - Developing financing schemes to provide credit to households that cannot afford the upfront costs of access to modern energy services.
 - Providing regulatory support for scalable and sustainable business and financial models.

5.1.6 Modern Cooking Appliances and Fuels

5.1.6.1 Cooking Appliances

Tanzania is a partner of the Global Alliance for Clean Cookstoves (GACC). The improved cookstove (ICS) sector in Tanzania started in the 1980s with the development of the Morogoro wood and charcoal stoves. Since then, NGOs and development partners have tried to introduce many designs to the market. The local designs were often based on models from other countries, such as the successful Kenya Ceramic Jiko (KCJ).

The market today is very fragmented and dominated by the informal sector. There are numerous stove designs on the market and several prominent players operating in the sector. However, no one appears to have had commercial success on a large scale yet.

Barring a few higher end-producers, the quality of stoves in the market is commonly perceived as being in need of improvement and there are no standards currently in place. However, TaTEDO are working with Tanzania Bureau of Standards (TBS) to develop standards for the Jiko Bora and Okoa stoves. These activities could be complemented by a renewable energy fund for research and development, market development, awareness generation and product quality check in the field.

Some of the Improved Cookstoves available and marketed in Tanzania are:

- SEECO Improved Charcoal Stove.
- CAMARTEC Improved Charcoal Stove.
- Envirofit Imported Stove.
- Portable rocket wood stoves.
- TaTEDO fixed and portable okoa wood stoves and Charcoal Baking Oven.

5.1.6.2 Sustainable Fuels

The Petroleum Act of 2008 recognises that biofuels are a priority to reduce the dependence on petroleum products. In response to this policy, the government has drafted guidelines for the development of liquid biofuels in the country. However, the growth of the sector is being hampered by national and local level planning issues, including the acquisition of land by developers of biofuels.

On the other hand, the discovery of larger reserves of natural gas in Tanzania will certainly affect the fuel market for cooking in the medium and longer term, at least in urban areas. However, in the shorter term, efficient use of the firewood and charcoal (including efficient production) is important for sustainability.

5.2 Renewable Energy

5.2.1 Current Status and Trajectory

Tanzania has RE potential capacity, mainly hydro, geothermal, solar, wind and biomass. Several studies were undertaken in Tanzania to estimate the true resource and potential of key renewable resources like wind and solar. The geothermal resource potential is being assessed.

In terms of wind in 2000-2003 TANESCO, in collaboration with DANIDA carried out a study on wind assessment capacity by erecting 30m masts at four selected sites: Karatu, Mkumbara, Gomvu and Litembe. The outcome established high quality data. TANESCO extended the studies to other sites at Makambako, Mgagao, Singida, Ukara and Mafia. To date Makambako (Iringa) and Kititimo (Singida) data is considered suitable for commercial purposes.

In 2014, TANESCO established the Solar Map of Tanzania. The outcome shows high viability of investing in solar farms for power generation. It identifies several sites (> 20) with Solar PV Farms for grid power generation at payback periods of 5-6 years. Potential sites for PV are areas in the central and Western part of the country: Dodoma, Singida, Shinyanga and Mwanza.

In 2012, the baseline year, RE represented 37% of the resources used in power generation. Based on the PSMP 2012, this participation is not projected to increase significantly. The potential impact of the gas reserves, may delay further the increase of RE in the mix of power generation.

BEST recognises that the demand for firewood and charcoal for cooking, heating and commercial uses is one of the most important factors affecting Tanzania's forest sustainability, as it tries to address basic issues of biomass management.

5.2.2 Existing Plans/Strategies

5.2.2.1 Renewable Energy Strategy

The GoT will develop a new RE specific policy and strategy. On the power generation side, the PSMP 2012 expects Tanzania to require massive capacity additions to meet the electricity demand envisaged for 2035. The GoT estimates that about 8,990 MW of capacity will need to be added to meet demand and replace retired generation units in order to meet economic growth and access expansion targets. The majority of these additions are expected to be large hydropower (37%) and, coal (42%)⁹⁰. The use of HFO is envisioned to remain strong in the early part of the plan, while the use of natural gas may be revisited in response to the discovery of new natural gas reserves.

Although the potential for RE is significant, only 3% is considered by the PSMP 2012 to be included in the generation mix by 2035, when large hydro is excluded, due to unavailability of information that can support RE investment decisions. Therefore, there are no long-term specific goals for its development other than a mid-term target for non-hydro RE to be increased from 4% in 2012 to 10% in 2016, which is included on the MEM Strategic Plan 2011/12-2015/16.

90 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

Consequently, the current grid-connected generation plan (as it can be seen in Figure 6) is based on the addition of fossil fuel generation projects up to 2020, as those require shorter lead times, and only a few RE projects (wind and solar). In later years, longer-gestation coal and large-hydro projects predominate.

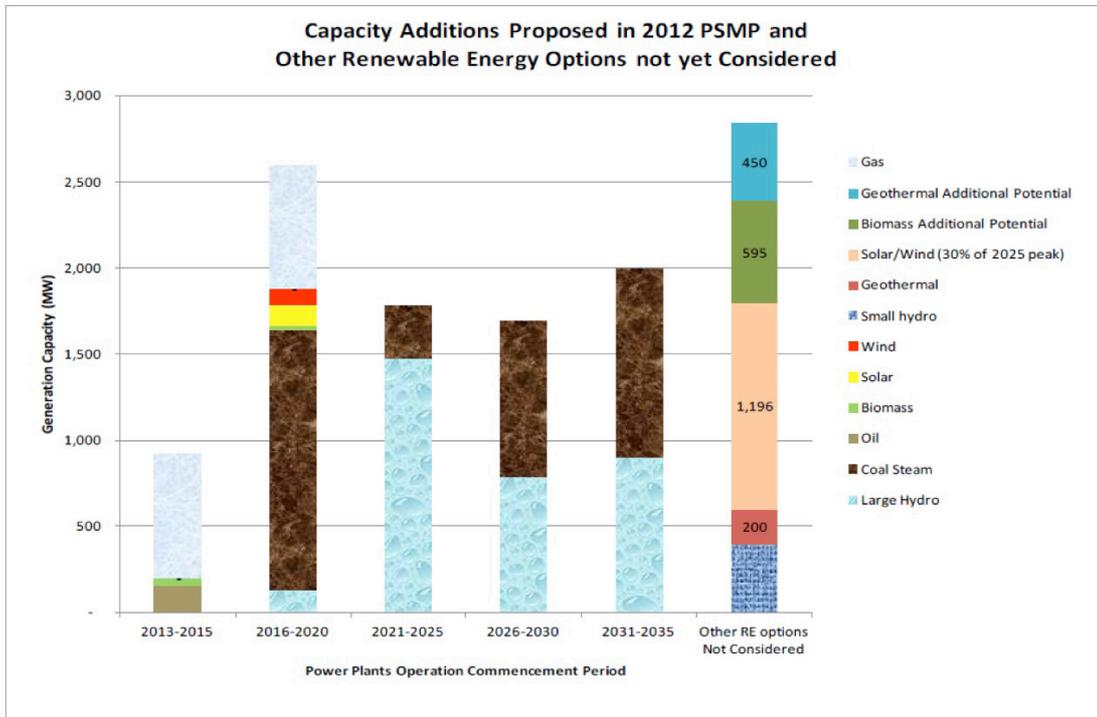


Figure 6: Capacity additions by 2035 Source: MEM PSMP 2012

The RE potential, shown in the last column of Figure 6, is merely indicative. The estimated potential for RE is based on intermittent solar and wind accounting for no more than 30% of 2025 daytime peak demand for system stability reasons. Biomass generation is assumed to be derived from only half of the available biomass waste. Small hydro and geothermal potentials are based on estimates of resource potential.

For off-grid and decentralised systems, RE (mainly hydro and solar) and hybrid solutions are considered as a vehicle of the REA Prospectus. To date, 6 MW of solar PV has been installed in schools, hospitals, health centres, police posts, small telecommunication enterprises, households and street lighting. Moreover, solar thermal energy is used in the country to dry crops (solar dryers) and for heating water in households, hotels, hospitals and health centres.

5.2.2.2 Biomass Energy Strategy (BEST)

BEST⁹¹, which is not yet finalised as a fully-fledged strategy, has the overall goal of making biomass energy sustainable in Tanzania. Its main objectives are to: improve sustainability of the supply of biomass energy, increase production efficiency and use of biomass energy, promote alternative sources of energy where appropriate and affordable; and ensure an enabling institutional environment for its implementation. BEST is based on the following group of actions⁹²:

91 BEST 2014 has not yet been launched as is still undergoing some modifications and the transformation of the strategy into a policy document
 92 MEM, Biomass Energy Strategy (BEST) for Tanzania, April 2014.

- Creation of favourable national and local policies: creation of the BEST Steering Committee or Biomass Energy Agency!!! to support the implementation of the BEST strategy and Action Plan and for the development/ streamlining of biomass as one of the key elements of existing policies and activities;
- Creation and implementation of forestry supply side measures that ensure sustainability of biomass energy supplies working closely with villages, the private sector and local government to:
 - i. Increase overall sustainable wood energy production by an indicative target of 20% by 2030 (based on 2012 figures).
 - ii. Harmonise and simplify local biomass energy production and trade governance and to increase local (district) and national revenues by an indicative target of 50% by 2020 (based on 2012 figures).
 - iii. Promote the use and commercialisation of agricultural waste (e.g. coffee husks, sisal residues etc.) and technologies to use those wastes for briquettes, biogas, amongst others.
 - iv. Organise and provide a license to charcoal producers so that they use sustainably sourced wood supplies and their efficiency of production increases substantially with an indicative target of 50% efficiency improvement on a national level in 2025.
- Creation and implementation of demand side measures to ensure sustainable use of biomass through:
 - i. Implementation of an ICS programme prioritising urban households and commercial and institutional consumers, with the indicative target of reducing urban charcoal demand by 50% in 2030.
 - ii. Commercially mainstreaming biomass alternatives (in particular biomass briquettes and biogas) with the objective of reducing current demand (2012) for charcoal and commercial fuel wood by 5% by 2030.
 - iii. Making non-biomass charcoal and commercial fuel wood alternatives competitive on a non-subsidised basis in terms of availability and price with the target of reducing demand for charcoal by 50% in 2020.

To accomplish its goals, BEST adopts an Action Plan, which has been integrated in this AA under sections 5.2.4 (Actions Needed) and 5.2.5 (HIOs).

5.2.2.3 Scaling-up Renewable Energy Programme (SREP)

Tanzania is one of the pilot countries selected to benefit from the Scaling-Up Renewable Energy Programme (SREP) in Low Income Countries. As a consequence, the GoT prepared the SREP-Tanzania Investment Plan, through a National Task Force led by the MEM with support from the Multilateral Development Banks (MDBs) in-line with the government's strategies and plans in place.

SREP funding is planned through AfDB to catalyse the development of about 100 MW, or more, of geothermal power, principally by the private sector, and establish an enabling environment for large-scale geothermal development. It will do so by:

- Creating the necessary policies, laws, infrastructure (enabling environment) and capacities.
- Reducing development risks by co-financing the riskiest stage of development – exploration through to test drilling at several promising locations. It is normally harder and more costly for the private sector to raise such funds where there are no geothermal power projects to set a precedence.
- Providing risk mitigation or other forms of financing for the geothermal power development phase. While

SREP funding alone will not suffice, it must catalyse significantly greater resources from both public and private sectors.

The GoT plans to use SREP funding to reduce development risks at both the resource confirmation stage and the power development stage. This lower investor risk, should lower the cost of capital, and will therefore make more geothermal resources available at any given tariff level. The SREP funding will also be used to improve the legal and regulatory frameworks, improve power planning capabilities, and strengthen institutional and human capacities.

5.2.2.4 MKUKUTA II - National Strategy for Growth and the Reduction of Poverty II

This policy, which is a vehicle to realise the TDV 2025 and the Tanzania MDGs apart from energy access, has set a target for non-hydro RE sources for power generation, to increase from 4% in 2010 to 6% in 2015⁹³.

5.2.2.5 BRN

The BRN refers to the increase of renewables as one of the contributors to increase generation and includes a 50 MW wind power plant generation project to be developed by 2016.

5.2.2.6 REA Prospectus

REA has been the main driver for off-grid electrification in Tanzania. The REA Prospectus encompasses both grid and off-grid connection projects to provide access to electricity to Tanzania's population. The on-grid aspects will be based on the development of turnkey solutions following the government strategies and plans, and the off-grid based on mini-grids and decentralised solutions based on small-scale RE projects and hybrid solutions.

The off-grid aspects of the REA Prospectus electrification plan by 2020, small hydro power plants and biomass gasifiers are expected to supply at least 80 development centres with at least 2,500 inhabitants each and diesel-PV hybrids to supply 73 with at least 5,000 inhabitants. This is expected to have an investment cost of US\$ 176 million⁹⁴.

5.2.2.7 Sustainable Solar Market Packages (SSMPs)

The Sustainable Solar Market Packages (SSMPs) is a contracting mechanism that bundles supply, installation and maintenance of solar PV system for public facilities and incentives for commercial sale to households, business and other non-government customers. It has been providing off-grid solar electricity for public facilities and households. MEM in collaboration with REA has implemented the first set of SSMPs (SSMP I) in Rukwa thus benefitting 82 villages and the model has been adopted as SSMP II for projects in the regions of Kigoma, Geita, Kagera, Tabora and Ruvuma.

SSMP II is being prepared for 8 districts within the regions mentioned above to be implemented by REA with TEDAP and Sida funding. The Tanzania SREP project aims to replicate this model.

93 Ministry of Finance and Economic Affairs, National Strategy for Growth and Reduction of Poverty II - MKUKUTA II 2010-2015, July 2010.

94 REA, National Electrification Program Prospectus, 2014.

5.2.2.8

Incentives for Small Power Producers

EWURA has in place direct and indirect incentives for the participation of the private sector in rural electrification:

- Small power plant (SPP) projects can propose their own tariffs when selling to retail customers – this incentive has the aim of promoting a direct involvement of SPPs to sell the energy produced in the form of a supplier to retail customers. Under this scheme, the operator can charge a tariff that *“at a minimum, shall be limited to the sum of the operating costs, depreciation on capital, whether supplied by the operator or others, debt payments, reserves to deal with emergency repair and replacements, taxes, plus a reasonable return on capital provided by the operator that reflects the risks faced by the operator”*⁹⁵. The tariff needs to be approved by EWURA.
- Exemption from licensing requirements for suppliers who conduct an off-grid and supply activity of less than 1 MW.
- Standardised Power Purchase Agreements (SPPAs) for producers of power generation projects with installed capacity ranging between 100 kW and 10 MW who sell to the grid and off-grid operator.
- Feed-in-tariff (FiT) systems in place to attract private investors to set up small power plants (SPPs) using RE. The FiT applies to small power producers that are connected either to TANESCO's main grid or one of its 20+ existing isolated mini-grids. The FiT's are specified by EWURA for both cases.
- Obligation or exemption from electrifying costumers: depending on the capacity of the SSP, i.e., the SPP owner has no obligation to electrify customers in the area where the plant is located where the SPP capacities are below 1 MW. However, there are obligations where they have capacities exceeding 1MW.

5.2.2.9 Tanzania Domestic Biogas Programme

This project launched in 2009 aims to develop the biogas sector as a whole through the implementation of biogas plants; ensuring that 95% of the constructed biogas plants are operated properly; that 80% of the biogas households have facilities that enable proper bio-slurry use; and that 100% of the biogas plants have a second inlet pipe to allow for future toilet connections⁹⁶. The first phase was from 2009 to 2013, during which a total of 8,799 biogas plants were constructed. The second phase commenced in 2014 and will end in 2017, targeting an additional 20,700 plants. As of December 2014, 11,103 bio digesters had been installed on Mainland Tanzania and Zanzibar.

5.2.3 Existing Gaps

Tanzania could benefit from a comprehensive Renewable Energy Strategy, and an accompanying resource assessment and investment prospectuses. This could be an answer to some of the challenges that RE faces in Tanzania, such as:

- Uncertainty regarding the future direction of the inclusion of non-large-hydro renewables in power-generation investment planning.

95 EWURA, Electricity (Development of Small Power Projects) Rules 2013 (Part VIII), 2013.

96 TDBP, Tanzania Domestic Biogas Programme (TDBP), 2015.

- Although considerable progress has been made in improving the regulatory framework (especially for SPPs), project developers still face more risks in developing RE projects in Tanzania than the fossil fuel developers, like off-taker related risks, PPA structuring, and clear licensing procedures.
- There is a need to undertake technical studies (including drilling) to understand and identify the precise potential from geothermal resources so that this can be considered and integrated in the development of policies for the energy sector. A proper assessment not only requires information on geothermal potential, but also how the dedicated energy and mining policy and regulatory framework support such development.

Moreover Tanzania faces the following constraints in the involvement of the private sector in the development of RE:

- Sector specific issues:
 - No Renewable Energy Technology (RET) database and technology vendors.
 - Limited publicly available information on RE resource assessment and mapping to support investment promotion, decision making and energy planning.
 - Limited diversification on policies to address specific issues and challenges associated to the different RETs.
 - No specific RE strategy in place.
 - There is a need to finalise and adopt the BEST.
- Private Sector Driven Projects. The FiT programmes, as well as the programmes and projects being carried out by REA and TANESCO have accelerated private sector participation. Although developers with signed PPAs are known, there are a number of organisations that have already deployed solutions, mainly decentralised generation and distribution, and have amassed valuable best practices linking energy with other nexus areas. However, most of these organisations are not currently participating in discussions around energy sector policy and strategy development.
- REA prospectus encompasses off-grid access mainly through the development of mini-grid systems supplied by RE. Nevertheless there is a financial constraint that needs to be addressed for the complete deployment of the prospectus.

5.2.4 High Impact Initiatives for Achieving the Overarching Objective of Renewable Energy

- MEM is tasked with the development of a **legal and regulatory framework to foster the development of RE:**
 - Develop a specific Renewable Energy Strategy with clear goals and targets integrated in the Energy Sector Wide policy framework. This should include targets and goals for grid-connected and off-grid RE technology integration.
 - Develop a mini-grid policy that fosters the use of RE with guidelines and targets in order to increase the confidence of the private sector to invest in these projects.

- Establish the biofuels policy and act and the required institutional framework to implement the Tanzanian policy on biofuels. These should complement the Guidelines for Sustainable Liquid Biofuels already in place in Tanzania.
- Finalise and adopt the BEST and its action plan.
- MEM has the task to improve **market data for planning and investment purposes at MEM by developing a SE4ALL database** which includes:
 - Renewable Energy Technology (RET) Database and technology vendors. This database should integrate information on vendors of technologies, systems and solutions by the type of technology and service provided.
 - Biomass Information System (BIS). The major purposes of the information system are to: (i) Keep track of the new biomass energy technologies and their success rates; (ii) Support continuous updating of the strategy; and (iii) Provide timely information for decision making and planning.
 - Renewable Energy Resource System (RERS). Will be the umbrella for the different renewable energy resources assessment and mapping, in order to confirm the potential of specific sites and accelerate project development by the private sector. This database will also be linked to, or use, the resources available under SE4ALL renewable energy hub at IRENA.
- **Investment Incentives.** Working together across Government Agencies and key stakeholders, MEM will update and expand incentives, and limit subsidies by:
 - Continuous reviewing of FiTs in place to provide adequate incentives to investors in renewable energy projects.
 - Providing TA to support the streamlining of regulatory requirements to accelerate investments in, and operations of, medium and small scale renewable electricity IPP projects.
 - Implementing a governmental subsidy for supporting the development (pre-investment, capital and operation) of micro/mini-grids in particular for productive use in off-grid areas.
 - Developing and implementing a risk-mitigation instrument to cover delayed payments by TANESCO to IPPs and PPPs.
 - Developing and implementing risk-mitigation instruments in partnership with SREP, the East Africa Geothermal Risk Mitigation and the Green Africa Power facilities.
 - Foster the development of a number of innovative funding mechanisms such as grants, challenge funds and carbon credits to promote the development of RE projects.
 - After attaining a dissemination of certain critical mass in terms of number of units and assemblers / manufacturers, the renewable energy industry, with the support of MEM and other stakeholders, can become self-sustaining and subsidies can be gradually withdrawn without any adverse effects on continued dissemination of renewable energy technologies.
- **Knowledge Sharing and Awareness.** MEM to develop a communication strategy for: (i) Fostering a common understanding and appreciation of RE among the multiple actors in each of the RE sub-sectors; (ii) Making basic resource and technology information public through regular information dissemination, exchange and sharing; (iii) Engaging and promoting communication synergies with key stakeholders in the Renewable Energy sector.

- Design and Implement **Tanzania's SE4ALL Repository for Renewable Energy Investment Prospectus** by:
 - Defining high level programmes and develop beyond concept and assess funding needs and gaps.
 - Develop the portfolio of investment and indicative funding needed for the inventory of programmes.
 - Defining matchmaking/identification of multi-stakeholders that will partner with each programme.
 - Designing the resource mobilisation strategy and implementation of the prospectus.

5.2.5 Relevant High-Impact Opportunities⁹⁷

The access to energy in many areas especially rural settings in the country is not encouraging. This is due to a fact that extending grid lines to those areas cannot be done in a near future. The only option available is to develop mini-grids using locally available resources. However, majority of the community is still using traditional technologies which are inefficient causing negative impacts to individuals.

- Clean Energy Mini-Grids, to accelerate clean off-grid access:
 - Develop and implement small-scale renewable energy solutions.
 - Provide distributed electricity solutions that support productive use and economic development.
- Universal adoption of clean cooking solutions, goal that can be pursued under the umbrella of GACC.
- Energy and Women's health.

5.2.6 Renewable Power Generation

To accelerate the development of RE, Tanzania has put the following instruments in place:

RE FIT. A revision of the FiT is under discussion and will include specific tariffs for RE projects. The new Renewable Energy Feed-In Tariffs (REFITs) Programme will define tariffs for RE projects under 10 MW of installed capacity. The goal of the programme is to provide developers of small solar, wind, hydro and biomass power plants with appropriate technology specific tariffs for their projects. Replacing the existing avoided cost approach used in the current FiT scheme. The REFIT is intended to streamline the development of this type of project by providing clarity regarding the approval process by the different institutions involved and facilitating the assessment of project financials.

- **Benchmark tariffs.** EWURA is planning to start designating benchmark tariffs for large power plants (above 10 MW) in Tanzania. For renewable energies, the tariffs cover hydro, wind (onshore and offshore), solar (photovoltaic and thermal), and geothermal plants (flash and binary). These are intended to offer an indication to stakeholders of appropriate tariffs for large-scale projects. EWURA is expected to revise the indicative tariffs on an annual basis.
- **Operational TGDC.** In 2013, the Government of Tanzania created the Tanzania Geothermal Development Company Limited (TGDC) as a subsidiary company of TANESCO. The aim of TGDC is to spearhead geothermal development in the country by conducting feasibility assessments, mobilising finance for different activities, applying for international funding and promoting business development.

⁹⁷ This is based on the list of HIOs identified by the Global Action Agenda

- **Renewable energy resource assessment information.** This will be made available to the general public through the Renewable Energy Resource System (RERS). Associations such as TAREA, as well as information retrieved by TANESCO, REA and other development organisations should feed into this system.
- **General project development support.** Identify bankable renewable energy generation projects, especially on geothermal, solar and biomass. Assist identified projects in the development cycle towards financial closure.

5.3 Energy Efficiency

5.3.1 Current Status and Trajectory

There is no specific EE policy, instrument or strategy in Tanzania. Although there are no specific targets or plans for EE in Tanzania, a number of sporadic smaller initiatives related with EE have been implemented, such as energy audits in industries and governmental buildings; studies on demand side management potentials; and studies for preparation of EE standards and labels. These activities have been carried out by MEM, local Tanzanian organisations and institutions, such as: Tanzania Industrial Research and Development Organisation (TIRDO), TaTEDO, Small Scale Industries Development Organisation (SIDO), TANESCO and the University of Dar es-Salaam.

Nonetheless, EE has been referred and targeted in some of Tanzania's energy sector policies and plans:

- Energy Policy (2003), but with no indication of targets or policy instruments.
- MEM Strategic Plan 2011/12-2015/16 sets the following targets and indicators to be measured for EE⁹⁸:
 - Targets:
 - Reduction of transmission and distribution power losses from 23% in 2011 to 15% by June 2016;
 - Reduction of petroleum consumption by 15% in industries, transport and households by June 2016;
 - Reduction in electricity consumption by 20% in manufacturing industries and households by June 2016

Table 14: Indicators and targets for EE in the MEM Strategic Plan 2011/12-2015/16

Indicator	2012 value	30 June 2014 target	30 June 2015 target	30 June 2016 target
% of energy lost during transmission and distribution	21%	19%	17%	15%
Inefficient lamps replaced by CFL bulbs and EE standards and labels prepared (Programme to be implemented by MEM with funding from Sweden, to be implemented 2013-2014)	0	- Inefficient lamps replaced by 3.2 million fluorescent light bulbs in Pilot phase (in Dar es Salaam, Kilimanjaro, Arusha and Mwanza) and impact of pilot evaluated - industrial roundtable discussion meeting conducted in four regions	EE programme Report published	EE labels and standards in place
Number of improved cookstoves and biogas plants disseminated to households	9,400	13,900	14,000	16,000

- Loss Reduction Programme put in place by TANESCO aiming at reducing losses from 21% in 2012 to 15% in 2015⁹⁹. Although the programme implementation will cost around US\$ 75.70 million it will enable the country to save around 162,189 MWh of energy and US\$ 348.32 million in the three years of the programme¹⁰⁰.
- BEST recommends an improvement in charcoal production efficiency by 50% in 2025 and with the help of a yet to be established improved cookstove programme, targets a reduction of urban charcoal demand by 50%.

Apart from these, MKUKUTA II and JESR 2012 point out the need to:

- Promote the use of more efficient appliances and equipment, use of natural gas for industrial heating and domestic cooking.
- Promote the use of EE technology at households, firms, institutions and community levels.
- Promote EE and energy conservation as well as integrated environmental management.
- Develop guidelines and standards to be used to implement EE and energy conservation activities in the different sectors (industrial, commercial, transport and household sectors).
- Develop energy management system standards for intensive energy users.
- Expand, strengthen, stabilise and reduce losses on the National grid.
- Promote projects qualifying for carbon credits through the Clean Development Mechanism (CDM).

5.3.2 Existing Plans/Strategies

5.3.2.1 Formulation of policies, strategies and plans targeting EE:

- GIZ is implementing a three year "*Energy Sector Support Programme*"¹⁰¹, which started in 2014, and which, through its EE component, will support MEM in the:
 - Development of a National Energy Efficiency Action Plan and capacity building for MEM.
 - Development of a framework for Energy Managers and auditors for the private sector as well as support to ongoing activities to promote EE in Industries.
 - Promotion of EE in Water Utilities, including looking into possible regulatory measures to facilitate investments in EE by water utilities.
- GoT, with the assistance from the Embassy of Sweden is completing the formulation of the "*National Energy Efficiency Programme*"¹⁰² which aims, in conjunction with the different activities on-going in the field of EE, at: setting EE targets; identifying barriers and addressing the identified barriers through appropriate solutions; designing sub-programmes to meet determined energy saving targets; increasing capacity and skills of MEM in the area of EE. The project document for this 3-year project was completed in April 2014 and the programme implementation is yet to start. With this programme the following outputs in terms of policies and strategy development are expected to be achieved:

99 MEM, Strategic Plan 2011/12 - 2015/16, November 2012.

100 MEM, Power System Master Plan (PSMP) 2012 Update, May 2013.

101 Information supplied by GIZ on the EE component of the Energy Sector Support Programme. 5 million Euros are available for the project.

102 MEM, Project Document for the Preparation of the National Energy Efficiency Programme for Tanzania & Institutional Capacity Development, 2014.

- National and sector specific EE indicators and targets.
- A National Energy Efficiency Programme/Strategy document.
- Projects/sub-programmes in: (i) Legal, regulatory and institutional framework; (ii) EE Standards and Labelling; (iii) EE in Buildings; (iv) Industrial Energy Management; and (v) Efficient Biomass Utilisation.

5.3.2.2 Demand side management programmes:

- TANESCO has a new unit that focuses on Demand Side Management which is working on:
 - An awareness campaign targeting large power consumers regarding load management (trying to persuade them to shift their load from the peak load).
 - Helping customers to solve power factor problems by encouraging them to install power factor correction systems which also improve TANESCO's transmission and distribution system.
- Under the Partnership for Growth Initiative and within the MEM Strategic Plan 2011/12-2015/16, USAID has (i) conducted the study "*Load Management Analysis for Large Energy Consumers*" in collaboration with TANESCO; (ii) is assisting TANESCO in designing a time-of-use tariff (the idea is to analyse, through a voluntary pilot study on large costumers, how much such a tariff structure can affect the peak load); and conducted a study "*Demand Side Management*"¹⁰³ that provides an analysis of the potential savings that Tanzania may yield through demand side management programmes between 2014 and 2018.
- JICA through the project "*Capacity Development of Efficiency Distribution and Transmission Systems*" is supporting TANESCO to decrease its technical losses through increasing maintenance capacity within TANESCO. This US\$ 5 million project started in 2009 and has been extended now until March 2016.
- MEM together with Korean Energy Management Corporation (KEMCO) prepared a project proposal for the project "*Building up the system for energy management in the industrial sector of Tanzania*"¹⁰⁴ which aims at introducing energy management tools for the industrial sector and to target energy intensive industries and energy management engineers. This project, with a budget of US\$ 2 million and two years of duration, has been submitted for financing to KOICA. The project is yet to be approved for implementation.

5.3.2.3 Programmes targeting buildings:

- UN-Habitat is supporting the US\$ 15 million regional programme "*Promoting Energy Efficiency in Buildings in Eastern Africa*" running for the years 2011-2015 at the objective is to improve energy saving and conservation measures in buildings in the EAC members.
- Under the Partnership for Growth Initiative and within the MEM Strategic Plan 2011/12-2015/16, USAID aims to focus on green buildings. USAID already carried out a study in April 2014 on how a green buildings initiative could address EE opportunities in Tanzania¹⁰⁵.

5.3.2.4 Energy audits:

- Danish Industry is supporting the Confederation of Tanzania Industries (CTI) with a capacity development programme running through 2014-2015 which aims at assisting 25 industries to carry out energy audits of their activities;

103 USAID, Partnership for Growth: Energy Efficiency in Tanzania –Demand Side Management, 2014.

104 MEM and KEMCO, Project Concept Paper, Building up the System for Energy Management in the Industrial Sector of Tanzania Prepared, 2013.

105 USAID, Partnership for Growth: Energy Efficiency in Tanzania – Green Buildings, 2014.

- Bank of Africa-Tanzania has a credit line of US\$ 12 million financed through the *Agence Française de Développement* (AFD) that targets the implementation of RE and EE projects and provides support to carry out energy audits.

5.3.2.5 Retrofitting of equipment:

- TANESCO, as part of the BRN programme, has plans with MEM to implement the project "*Efficient Lighting (CFLs) Retrofit*" with the objective of replacing 3.2 million incandescent bulbs with CFL in Dar es Salaam, Arusha, Kilimanjaro and Mwanza with the objective of reducing the evening peak load. The budget of this project is estimated at US\$ 11.5 million (20.48 Billion TShs).

5.3.2.6 Capacity building and awareness raising programmes and projects

- Danish Industry is supporting the CTI with a capacity development programme running throughout 2014-2015 which consists of awareness raising and seminars related with EE;
- GoT, with the assistance of the Embassy of Sweden, has just completed the formulation of the "*National Energy Efficiency Report*" which will support development of the *Energy Efficiency Programme* with the aim, in terms of capacity building and awareness raising, of:
 - Developing a project/programme aiming at capacity development, education, information and awareness in the field of EE.
 - Strengthening the capacity of MEM and other institutions in EE issues and put systems in place for coordination, measurement, reporting and verification of EE initiatives.
 - Developing a communication strategy and national information campaigns and a government promotional package on EE.
- The Integrated Renewable Energy Services (IRES) programme as being implemented by SNV (2012-2015) with funding from DGIS, aims to design, develop and validate innovative RET business models and distribution channels, addressing the diversity in household energy needs and preferences by providing a ladder for access to multiple and scalable RET options for consumers. Activities include market intelligence assessments, capacity building of local private and public stakeholders, and piloting innovative market development strategies including business-to-business fairs and "Switch to Clean Energy" campaigns at local level. Another key area of the intervention, in collaboration with TAREA, is to foster improved relations amongst micro, meso and macro level stakeholders and decision makers so as to lend positive influence upon energy and RE sector development that is reflective of local level demands.
- Funded by the Mastercard Foundation, the Opportunities for Youth Employment (OYE) programme (SNV, 2013-2018) aims to improve the livelihoods and prospects for 20,500 rural youth in Tanzania, Rwanda and Mozambique, by creating youth (self-) employment opportunities in agri-business and renewable energy. In Renewable Energy, the programme engages with private sector companies in the solar, ICS, briquettes and biogas sub-sectors, training youth while providing them with job opportunities and strengthening their business skills. EE Project implementation and Development:
- Bank of Africa-Tanzania through the credit line of US\$ 12 million financed by AFD that targets the implementation of RE and EE projects (with financing ranging from US\$ 2,000 – US\$ 4,000 per project) aims at providing project investment, as well as technical support for feasibility studies, preparation of project documents and risk assessments.

5.3.2.7 Programmes for improving cooking efficiency:

- Developing Energy Enterprises Project DEEP (GVEP International) – this programme, besides promoting energy access, also aimed at improving cooking facilities in the East Africa region. Within this programme 150

improved cookstoves business received support and around 97,000 improved cookstove units were sold up until the end of 2012.

- The European Commission is preparing its 11th European Development Fund (EDF) (years 2014 – 2020) that will support work on sustainable management of natural resources in the area of EE, focusing specifically on the charcoal and firewood areas of forestry management, reforestation, afforestation and improved production for wood fuels.

5.3.3 Existing Gaps

The main weaknesses and disincentives to improve the efficient use of energy in Tanzania include:

- Incomplete framework regulating energy efficiency:
 - Absence of a specific energy efficiency policy and strategy package impacts the country due to lack of: (i) guidance for the country in terms of objective savings; (ii) incentives and security for investors in the EE field; (iii) of an institution/agency with a clear mandate to design and implement EE activities.
 - Lack of minimum energy performance standards (MEPS) regulations and labelling regulations for energy equipment and appliances.
 - Existing building codes overlook efficient use of energy and users are unaware of the benefits of more energy sustainable buildings.
 - Limited capacity in organisations and weak institutional framework in general: in particular, the manpower in the key institutions (MEM, EWURA, REA, TANESCO) dedicated to EE is limited. There is also a constraint on budget allocations earmarked for EE.
- Limited capacity and awareness of main energy actors (MEM and other governmental institutions) on EE related matters such as: energy saving opportunities, investment costs, financing instruments, available technologies and standards.
- Limited information and options to access more efficient fuels and technologies.
- Limited understanding on the potential savings from the different economic subsectors and the impact on the projected energy demand if EE measures are implemented.
- Need to follow up implemented programmes and initiatives in order to understand their impact and identify lessons learned for future initiatives.
- Limited awareness by end users in the residential, commercial and industrial sectors on the benefits of investing and adopting energy efficient measure in their activities.
- High dependence on external financing/Limited local financing.

5.3.4 High Impact Initiatives for Achieving the Overarching Objectives of Energy Efficiency

- **MEM to establish a dialogue and collaboration with the SE4ALL Energy Efficiency Hub.** The Copenhagen Centre on Energy Efficiency (C2E2) is the thematic hub for energy efficiency; with the **prime** responsibility of supporting actions towards the SE4ALL energy efficiency target.
- **MEM to work across Government Agencies and with stakeholders to:**

- Develop a comprehensive regulatory framework that specifically addresses energy efficiency (with concrete goals and targets).
- Develop and implement a National Energy Efficiency Programme to assess opportunities for energy efficiency in multiple sectors.
- Identify and implement demand side management programmes across the different sectors of activity.
- Define, develop and adopt EE standards. At a first stage, regional or international standards could be adopted with a subsequent definition of more appropriate standards for Tanzania.
- Implement and enforce a labelling scheme for electric appliances. To increase its efficiency and impact, a national awareness campaign targeting consumers and distributors should be also implemented.
- Include solar water heaters as mandatory equipment for new buildings by integrating these in future building regulations (especially for large commercial and public facilities).
- Define Minimum Energy Performance Standards (MEPS), and provide adequate support for its implementation and oversight, including the development of voluntary agreements for efficient refrigerators and air conditioners.
- Implement and develop cookstoves dissemination projects and define and scale up certification processes for residential and commercial cook stoves.

- Adopt the Global Energy Efficiency Accelerator Platform, which was announced as part of the Energy Efficiency Committee Report to the Advisory Board of the SE4ALL Initiative on June 1, 2014. This accelerator may also be a mean to get support for developing projects under the energy efficiency scope.
- Establish an MER mechanism to assess the impact of the EE-standards and labelling programmes.
- Establish an Energy Efficiency Facility in EWURA to pay a cost reflective reward for verified energy and demand savings initially funded through donors using existing and trusted windows and later through a dedicated window carbon income and levies on regulated fuels.
- **MEM to promote institutional capacity development and awareness raising on energy efficiency.**
 - Improve capacity of MEM in coordinating, measuring, reporting and verifying energy efficiency initiatives, including the implementation and operation of tools designed to assist in the objectives.
 - Improve the capacity of MEM to develop national communication and awareness strategies and campaigns.
 - Implementation of a promotion campaign for the use of cogeneration technologies in Industries – particularly, in facilities connected to the natural gas distribution network.
 - Include energy efficiency in the curriculum of primary and secondary institutions.
- **MEM to work with TANESCO to:**
 - Optimise TANESCO generation efficiency through the implementation of a benchmarking programme across its power plants.
 - Develop a smarter grid programme between TANESCO and larger consumers to allow the

demand side management approach proposed in BRN. Capacity building should be provided to TANESCO and industry to allow planning, implementation and operation of such a programme.

- Develop a strategic plan for the application of smart grid technologies in the generation, transmission and distribution infrastructure. The plan would lay the path for improving the efficiency and reliability of the existing and future grid infrastructure.
- **Big Results Now.** GoT to implement the measures identified in the strategy document, including:
 - Complete the Mtwara-Dar pipeline in order for existing and future gas powered power plants to be able to operate at rated capacity and improve the efficiency of the electricity generation sector.
 - Demand side management to reduce daily evening peaks through awareness campaigns and load shifting from large consumers, allowing for a deferment in generation investments.
 - Implement an energy dispatching system to allow the prioritisation of power plants according to their operational cost.

5.3.5 Relevant High-Impact Opportunities¹⁰⁶

- Establish efficiency targets for existing and new generation assets;
- Adopt targets and trajectories for the energy efficiency of products and services;
- Advocate for strong government efficiency standards, develop monitoring mechanisms and educate consumers and business.
- Deploy and scale up energy management systems and tools for reducing energy use
- Retrofit municipal and public buildings, street lighting and urban water pumping systems.
- Enact building codes and higher appliance energy efficiency standards
- Encourage regulatory phasing out of inefficient appliances, such as incandescent lamps
- Establish and capitalise an energy efficiency facility to create market pull for energy efficiency and drive further interest across sectors in undertaking energy efficiency initiatives.

5.4 Additional Nexus Action

5.4.1 Current Status and Trajectory

Energy is one of the key drivers of development. Tanzania understands that this is a precondition for achieving developmental goals. It has a direct nexus with related actions regarding the access to clean water, improvement of public health and education, women's empowerment and increase in food production. As part of Tanzania Energy Development Access Programme (TEDAP), Tanzania has extended energy access to schools and hospitals through:

Implementation of prospective solar PV projects for schools and health facilities in five districts or regions without grid access, covering a total of 173 rural facilities (78 secondary schools, 67 dispensaries, 26 health centres and 7 hospitals). Total estimated cost of US\$18 million including training package for technicians and maintenance contracts to sustain the projects¹⁰⁷.

¹⁰⁶ This is based on the list of HIOs identified by the Global Action Agenda

¹⁰⁷ REA, Rural Energy Access Through Off-Grid Renewables: A perspective from Tanzania, http://siteresources.worldbank.org/EXTAFRREGTOPENERGY/Resources/717305-1264695610003/6743444-1268073490440/4.4.REF_REA_Tanzania_offgrid_renewables.pdf

Implementation of the Lighting Tanzania Competition: competition on Lighting Tanzania, as part of the Lighting Africa programme that aims at promoting the use of RE in the rural areas especially the use of solar LED lanterns in social institutions including schools, health centres and homes with the ultimate goal of getting rid of wick and kerosene lamps thus contributing to improve the health of women and girls prone to smoke and respiratory illness. REA is in charge of promoting this competition and aims at implementing 10 projects in 11 regions.

5.4.2 Existing Plans/Strategies

The MEM, REA and its development partners are currently focusing on the TEDAP.

5.4.3 Relevant High-Impact Opportunities¹⁰⁸

- Energy and women's health. The goal of this high impact opportunity is to increase access to, and the effective and sustained use of, energy-dependent health services, with a particular emphasis on women in low- and middle-income countries.
- Clean Energy Mini-Grids, or self-contained system, some of the goals of this high opportunity are:
 - To develop and implement small-scale renewable energy solutions for social services.
 - For healthcare establishments, street lighting, and schools.
 - To address the energy and water nexus with solar and other technology options for energy-efficient water pumping and provision of potable water.
- Universal adoption of clean cooking solutions, a goal that can be pursued under the umbrella of GACC, although Tanzania is only a partner country.
- Advocate for and educate consumers on the importance of health, environment and gender benefits of clean cooking.

5.5 Enabling Action Areas

Previous and on-going projects face similar challenges on issues that cross through different stages of project development. These include governance and policy issues as well as access to finance and required technical capacity.

5.5.1 Energy Planning and Policies

Energy policies are quite well developed in Tanzania; however, there are some areas which require further development, particularly, the biomass and off-grid sectors. Also, there is a general need to improve the clarity in terms of enforcement and overlapping with other sector policies as well as to improve governance and interaction between all the stakeholders, including governmental institutions, donors and civil society.

5.5.1.1 Critical Areas

- National coordination to monitor the implementation of policies and strategies, develop effective and comprehensive planning and define adequate funding. While the dialogue and coordination across national Governmental Agencies exists, Tanzania lacks an effective communication mechanism between

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This is based on the list of HIOs identified by the Global Action Agenda

local government authorities (LGAs) and national government.

- These results on energy planning, implementation and monitoring centralised by national Government Agencies with limited or no intervention from regional authorities and other local stakeholders. Dialogue and coordination need to be improved between national/regional institutions particularly for the central government to understand the situation and needs at regional level.
- Improve access to existing energy sector studies on resource assessment and feasibility studies.

5.5.1.2 **Actions Needed**

- ***The GoT to develop a governance and regulatory strategy to address the critical areas associated to energy planning and policies.*** It is expected that under the SE4ALL framework MEM will proceed to undertake the regulatory framework review to assess the need to refresh (or renew) policies, regulations and energy plans as appropriate, and to reinforce synergies across sectors. Within this the GoT will:
 - Establish a rural electrification strategy and consolidate the REMP.
 - Develop a specific Renewable Energy Strategy with clear goals and targets and integrate that into the Energy Sector Wide policy framework.
 - Develop clear policy and legal framework to guide the sustainable development and growth of biomass sector.
 - Review, adopt and implement a biomass strategy including supply and demand of forestry products.
 - Develop specific regulations for sustainable efficient charcoal production methods depending on availability of raw materials.
 - Develop a concrete policy, strategy and targets to regulate the clean cooking sector.
 - Develop and implement an MER system for the energy sector to monitor the performance of the implementation of the different strategies and plans in place in Tanzania.
 - Develop minimum national and regional performance standards for energy products, based on government testing, labelling, and certification (governments and manufacturers).
- Institutional planning. The planning departments in governmental institutions such as MEM and REA required strengthening in order to facilitate the identification of projects, the monitoring of existing ones and budgeting for future initiatives.
- Integration of regions in the energy planning process, as energy planning in Tanzania is mostly the responsibility of the central government. Improve dialogue with local stakeholders to better understand needs and gaps at this level.
- Develop institutional capacity at local level to facilitate regional participation in national energy planning.
- Big Results Now. GoT to implement the measures identified in the strategy document:
 - Improve the monitoring and execution of projects.
 - Eliminate bottlenecking of inter-ministerial and inter-institutional issues and streamline critical processes in different governmental institutions.
 - Develop an Energy Sector Roadmap to provide long-term vision and increase investor confidence (e.g. sector targets, utility structure and private sector participation).

- Increase transparency in the energy sector by publishing an approved Subsidy Policy detailing the government plans to subsidise the electricity market in the short-medium term.

5.5.2 Finance and Risk Management

5.5.2.1 Critical Areas

- Dependence on donor funding for critical energy sector initiatives such as financing of pilot projects particularly of sustainable energy projects.
- Limited involvement from the local banking sector in financing small and medium size energy projects.
- Limited capacity of developers to raise finance for small energy projects.
- Uncertainty for energy generators regarding payments from TANESCO, which may or not may be resolved as the unbundling of the electricity sector progresses.

5.5.2.2 Actions Needed

- Increase the affordability of loans for sustainable energy projects through governmental and donor risk mitigation guarantees.
- Develop finance instruments for end users to improve their level of access to energy services.
- Increase the role of the government during resource assessment and development of preliminary studies so that the private sector feels more attracted to invest in energy projects.
- Energy sector data. Improve the coordination and capacity of energy sector institutions to generate sound data and statistics.
- Big Results Now. Implement the measures identified in the strategy document:
 - Reduce government funding burden through the use of Public-Private Partnership (PPP) model for transmission, distribution and generation projects.
 - Use benchmarking in transmission projects to reduce investment costs.

5.5.3 Capacity Building

5.5.3.1 Critical Areas

- Limited human resources at MEM and other key energy related institutions.
- Lack of awareness by general public to identify and understand the benefits of quality equipment.
- Lack of capacity from entrepreneurs, NGOs and CSOs to develop technologies adapted to the local environment.
- Lack of investment in local factories for fabricating RE equipment (all solar, wind, geothermal energy equipment are imported from other countries).
- Human skills in the area of energy auditing and energy management.

5.5.3.2 Actions Needed

- Institutional capacity development to close the gap between responsibilities/commitment and management capacity:
 - The capacity of governmental institutions, namely, MEM, REA, EWURA and TANESCO, should be developed to assist in the implementation of policies, strategies, programmes and project management.
 - Staff of local banks should be trained in order to better understand and become more comfortable when lending to energy projects.
 - Assist organisations in developing gender mainstreaming tools.
 - Regional energy planning capacity should be improved for the purpose of increasing coordination and planning of energy related activities, investment strategies and monitoring the progress of SE4ALL and other energy related initiatives.
 - Develop codes of conduct to energy practitioners.
- Design and implement awareness raising campaigns targeting the general public to the benefits of using sustainable energy equipment.

5.5.4 Awareness and Knowledge Management

- **SE4ALL Information Database.** Develop a methodology and implementation plan for creating and maintaining the SE4ALL Energy Database. Design of data collection and processing plans should apply rigorous methods (such as individual programme evaluations, cross-national quantitative studies, systematised expert interviews, and sectorial surveys) and be capable of producing timely data suitable for Tanzania's implementation of SE4ALL's GTF and country reporting to the International Energy Agency's (IEA). It will also encompass the:
 - **Biomass Information System (BIS).** The major purposes of the information system are to: (i) Keep track of the new biomass energy technologies and their success rates; (ii) Support continuous updating of the strategy; and (iii) Provide timely information for decision making and planning.
 - **Renewable Energy Resource System (RERS).** Which will be the umbrella for the different renewable energy resources assessment and mapping, in order to confirm the potential at specific sites and accelerate project development by the private sector.
 - **RET Database and technology vendors.** This database should integrate information on vendors of technologies, systems and solutions by type of technology and service provided.
- **Tanzania's SE4ALL website.** The website is conceived as a portal for stakeholders to access the critical information and links, as well as for dissemination of information, reports and the gathering of comments/suggestion through a blog or on-line contact form.
- **Social Media and other engagement activities (SMS campaigns).** Given the unpredictability of Internet in Tanzania, and the high penetration of cellular telephony and radio, the use of social media and radio has proven highly successful in socialisation campaigns and surveys on different topics in the country.
- **SE4ALL and regional integration.** Power pooling and cross-border projects and programmes, standardization and other infrastructure guidelines and strategies developed through EAC.



6 PART III – COORDINATION AND FOLLOW-UP

6.1 Action Agenda's Implementation

The process to develop the AA in Tanzania has followed the pattern shown in Figure 7.

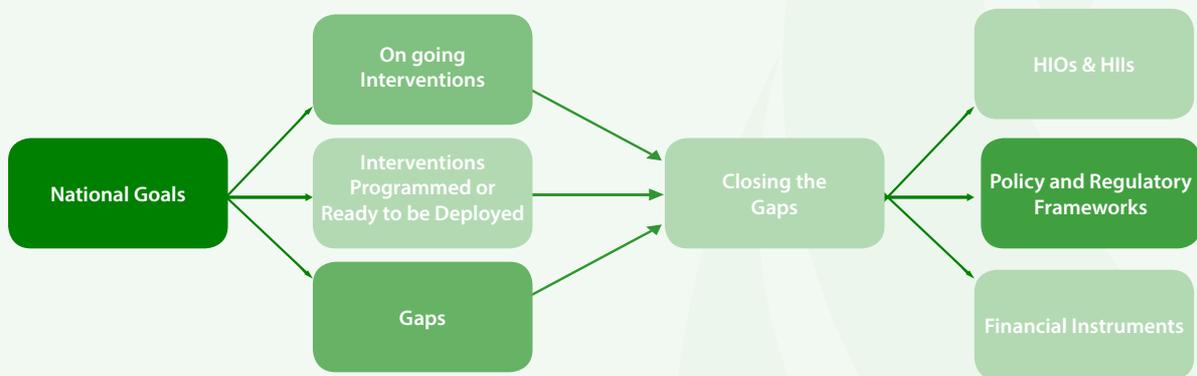


Figure 7: Process for the Development of the AA

6.2 Implementation Methodology

6.2.1 Overview

The AA is developed at a time when:

- The first phase of the BRN initiative has passed its mid-term process and is heading into the design of a second phase.
- REA master plan and its associated Prospectus is at the centre of a new effort towards expanding access in rural and peri-urban areas, promote decentralisation and the use of clean energy technologies for mini-grids.
- BEST is expected to be launched with the overall goal of making biomass energy sustainable in Tanzania. Its main objectives are to: improve sustainability of supply of biomass energy, increase efficiency of production and use of biomass energy, promote alternative sources of energy where appropriate and affordable; and ensure an enabling institutional environment for its implementation.

The integration of these initiatives with the current policy and regulatory framework and the on-going review of targets and plans present some challenges to the early stages of implementation of the AA, among them:

- Initiatives may overlap with each other, like with REMP and SREP.
- Key stakeholders vary in leading and implementing roles, sometimes for cases where initiatives are comparable or the same.
- Key strategies and high priority programmes, which for the energy sector may have complementary and subsidiary roles, are set at different levels of government hierarchy thus presenting a potential challenge for implementation, like REMP and BRN.

It is expected that the transformation of the SE4ALL team at MEM, led by the Country Focal Point (CFP) institutionalised as Tanzania's SE4ALL Secretariat, will increase the capacity of the GoT to improve coordination of activities across initiatives funded and implemented by key stakeholders. As a result of this process, it is expected that the harmonisation and integration of strategies and programmes under the SE4ALL AA will be facilitated, and key implementation challenges will be mitigated.

In this context, and with the deployment of the AA, it is impossible to think a way forward that will not include a transition into an energy sector-wide strategy that is SE4ALL consistent. One or more subsequent phases may need to be defined as the process of integration and harmonisation of policies, regulations, strategies and programmes moves forward during the transitional period.

The GoT envisions that this transitional period starts with the final validation of this AA and may last until the end of a second phase of BRN, when the impact of this programme and other currently in place will be mature enough to show their impact in the energy sector and provide a clear indication on the progress towards Tanzania's SE4ALL goals.

6.2.2 Implementation Timeline and linkages with the IP

Considering that the current scenario is led by the early stages of the promotion of REA's IP and SREP, and the BRN initiative, the implementation of the AA, as an overarching strategy, will require a transitional period. The intention of the GoT is to integrate the strategic approach of the SE4ALL into the MEM Strategic Planning process, hence some of the targets would be subject to the assessment of the AA implementation's progression and as part of the 2016/2022 MEM Strategic Plan design process. As the GoT integrates SE4ALL into its sectoral planning, the trajectory towards the country's SE4ALL Goals is informed by the following phases:

- **Transition (2015 – 2016).** During this period, the country will integrate the AA and IP into the government mid-term planning (MTP) process by incorporating them into the MEM Five-year Strategic Plan 2016 – 2020. As part of this process, the government will start a national dialogue with all stakeholders at national and sub-national level towards the adaptation, update and alignment of the existing initiatives with the country's SE4ALL AA. During this period, all new strategies and initiatives will have to be consistent with Tanzania's SE4ALL AA. As a result of this process, and to properly mirror the MTP, the AA and IP will be updated.
- **Transformation (2016 – 2020).** Starting July 2016, the AA and IP will operate fully integrated with MEM Five-year Strategic Plan. This means that from this moment forward the AA and the IP will be subject to same revision cycles than the MTP. This interaction will create synergies and contributions between the different new government plans, programs and policies with the AA and the MTP, resulting in a dynamic IPs portfolio. In this context, the AA will be reassessed on its progress and additional initiatives and IP(s) should be incorporated as needed.
- **Consolidation (2020 - 2025).** SE4ALL becomes the cornerstone of the national mid-term planning process. In this context, the AA will be reassessed on its progress and additional initiatives and IP(s) should be incorporated as needed.

- **Acceleration (2025 – 2030).** The sustainability and update of the actions and strategies will accelerate the process of achieving Tanzania's SE4ALL goals. In this context, the AA will be reassessed on its progress and additional initiatives and IP(s) should be incorporated as needed.

Because of the short period of time between the AA and IP adoption before it begins its integration into the MTP process, this IP is envisioned as a bridge to outline current funding needs for technical assistance, for closing priority gaps in the REA prospectus, and to present a pipeline of opportunities aimed to accelerate base load power supply and grid expansion. To facilitate dissemination to prospective investors and donors and to accelerate its integration into the MTP process in early 2016, this bridge IP is presented as a consolidated portfolio.

The priority action areas are critical to the implementation of the AA and the rollout of the IP. Yet, this AA and its corresponding IP are to be integrated into the government mid-term planning (MTP) process by incorporating them into the MEM Five-year Strategic Plan 2016 – 2020. Ahead and as part of this process, the government will initiate the following three initiatives, which the detail and estimated costs assessment can be found in the IP,

- **Support to the SE4ALL Secretariat at MEM.** This programme aims to provide SE4ALL Technical Advisory services to MEM on the establishment of the SE4ALL Secretariat that will be responsible for the overall development, implementation and monitoring of the SE4ALL activities in the Country.
- **Revision and Alignment of the Legal Framework to the SE4ALL AA.** Support to the SE4ALL Secretariat/ MEM to undertake the regulatory framework review to assess the need to appropriately update policies, regulations and energy plans, and to reinforce synergies across sectors to provide sustainability to the integration of the SE4ALL process into the MTP.
- **Analysis of Investment Projects.** This programme aims to provide technical advisory services to support the SE4ALL Secretariat/MEM in the identification, analysis, design, and implementation of other actions and interventions that will contribute to the achievement of the SE4ALL goals in Tanzania, with a special focus on its integration into the MTP process and throughout the four phases of the implementation of the AA.

Consequently, the actions that will be integrated in the MTP should be prioritized during a national dialogue with all stakeholders at national and sub-national level towards the adaptation, update and alignment of existing initiatives, new strategies and interventions and this AA into MEM's Five-Year Strategic Plan, and impact on other Government Agencies' plans on nexus topics like health, education, nutrition, the environment and water. Once the Integration process is completed, the resulting IP(s) will comprise of an investment needs assessment, the resulting consolidated portfolios of opportunities and complete prospectuses, as presented in the figure below.

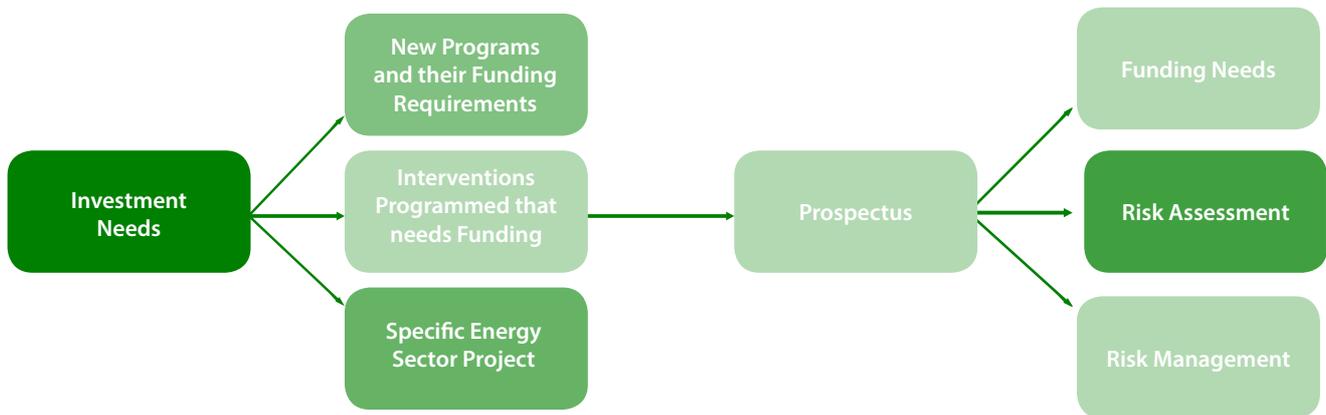


Figure 8: Process for the Implementation of the AA

The following timeline presents a suggested sequence of key activities and initiatives to be implemented upon the validation of the AA ahead of the AA and IP transition into MEM's MTP. The GoT accepts that, if it fails to provide continuity to the efforts that led to this AA, it will put Tanzania's ability to reach its SE4ALL goals at risk.

Activity	VIQ 2015	1st half 2016	2 nd Half 2016
SE4ALL Secretariat institutionalisation, define the implementation and operational programme, and secure funding for personnel, equipment and execution of activities			
TA assistant support to the SE4AALL Secretariat at MEM			
National Dialogue, including sub-national structures like Local Governments, in preparation to the transition of the AA and IP into the MEM Five-Year Strategy Plan			
Integration of the AA and IP into the MEM Five-Year Strategy Plan			
Development and implementation of the communication, awareness, sensitisation campaign (s)			
Institutional and human capacity building of government institutions and private sector organisation (i.e. trade associations)			
Design and implement a programme for institutional and human resources at regional level to increase the role of local governments on local and regional energy planning needs and monitoring			
Development of a legal and regulatory framework to foster the development of RE			
Access Acceleration Strategy – Design and Rollout			
Development of a mini-grid strategy to improve access to electricity			
Design and rollout of a cross-sectoral initiative to improve access to modern cooking solutions to expand and accelerate TICS			
Improved market data for planning and investment purposes at MEM by developing a SE4ALL database - Design and rollout			
Design and Implement Tanzania's SE4ALL Repository for Renewable Energy Investment Prospectuses			
Development, enact and rollout a full regulatory and enabling environment framework for energy efficiency			

6.3 Action Agenda's Coordination

6.3.1 Tanzania's SE4ALL Coordination Committee

The SE4ALL process in Tanzania includes the creation of the SE4ALL Steering Committee to support the design of the AA and the IP. The members of this Committee represent government agencies, donor, local government, CSOs (inclusive of private sector) and NGOs representatives.

Once the AA is validated and adopted, this Committee should remain in place and should meet regularly to provide support and advice to the SE4ALL Secretariat.

6.3.2 Tanzania's SE4ALL Secretariat

The Secretariat is the AA's lead advocacy and managerial unit that:

- Will monitor SE4ALL related projects and studies, which should remain under the responsibility of the relevant Government Agencies and institutions.
- Takes the responsibility for realising SE4ALL goals, implementing the IP(s) associated to this AA, and applying the SE4ALL Monitoring, Evaluation and Reporting (MER) mechanism.
- Creates and increases awareness.
- Is the focal point for exchanging information with the SE4ALL global initiative, especially with the SE4ALL Global Facility Team, the SE4ALL Africa Hub, and the SE4ALL Thematic Hubs.
- Presents draft modifications, to be reviewed by the SE4ALL Coordination Committee and GoT authorities, to the AA and proposes any other "mid-course" adjustments that may be needed to keep Tanzania on its path to achieve its SE4ALL goals.

6.3.2.1 Organisational structure of Tanzania's SE4All Secretariat

The Secretariat will be institutionalised within the MEM. Given the overarching nature of the SE4ALL initiative and GoT's commitment to the Global Initiative, a special protocol will be developed to facilitate and streamline the capacity of the Secretariat to reach across public and private sector stakeholders.

The Secretariat will be led by the SE4ALL Country Focal Point (CFP) and supported by a small team of experts with experience and expertise in each of the SE4ALL goals. The personnel of the Secretariat will be employed by MEM and if possible by other government entities. It is not envisaged that SE4All would have financial autonomy; rather, it would initially draw its financial resources from a budgetary line from MEM's budget, and will incorporate additional funding from programmes related to the Secretariat's activities and as appropriated by the mid-term planning process.

The CFP will serve as lead programme manager of the AA. He/she will support the implementing executive stewardship of the AA and IP resources in general and advise on the best opportunities for delivering the SE4ALL outcomes and how the required investments can be made and managed to ensure maximum returns. She/He will be responsible for the monitoring and working with project implementation partners identified in the AA.

The CFP will facilitate project initiatives, coordinate agencies and institutions activities such as, but not limited to, project implementation, feasibility studies, consumer and end-user research, work plan preparation and monitoring results.

It is expected that a technical assistance programme will be put in place immediately to provide SE4ALL Technical Advisory services to the Secretariat to:

- Support the institutionalization process and provide on-demand support.
- Revised and updated, with clear defined actions for the post-transitional period, including at sub-national level.
- Support the SE4ALL Secretariat, to lead, identify, implement and monitor SE4ALL activities at sub-national level.
- Support the Secretariat throughout the AA and IP's integration to the MTP process and through the early stages of the transformational phase.

6.4 Monitoring and Accountability Framework

6.4.1 Guidelines

Designing and implementing a Monitoring, Evaluation and Reporting system is an essential task that will allow Tanzania to track, assess and report progress on the achievement of expected outcomes under the SE4ALL initiative. The MER, as a tool, allows key issues that need to be addressed to be identified to ensure the proper implementation of the AA. It will also allow the GoT to review and update the AA in the future.

The MER system should comprise a Monitoring Plan, an Evaluation Plan, and a Reporting Plan. The design of the SE4ALL MER system should be based on Global Tracking Framework (GTF) criteria and should also take into consideration the current monitoring and tracking system used in the country that could feed in information to track indicators, such as the National Census.

The monitoring plan provides a guide on how to monitor the set of indicators that will show how Tanzania is progressing towards the achievement of its SE4ALL goals. A monitoring protocol should be defined for each indicator. The evaluation process basically consists of comparing the results obtained against a selected baseline and against the interim and final targets that are set in Tanzania's AA. This evaluation procedure enables the country to redefine strategies and goals for the following monitoring periods. The reporting process implies producing a performance assessment report or similar document where the results from the monitoring and evaluation are described and, potentially, shared with the public.

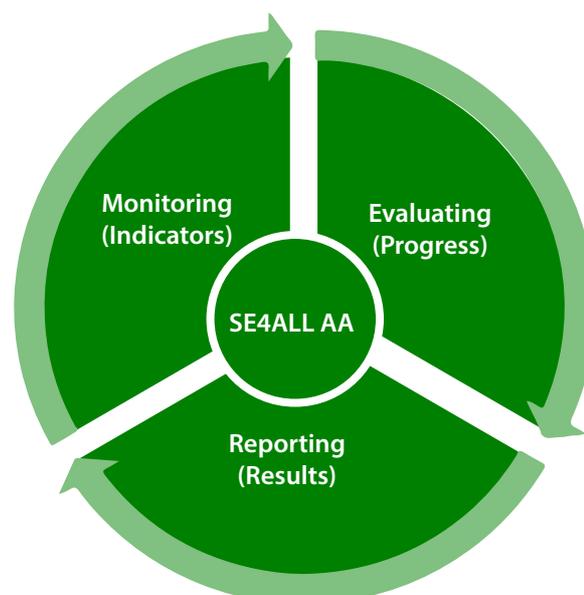


Figure 9: Relationship among different parts of a MER framework and the AA

Monitoring Plan

The GTF proposes guidelines for monitoring each SE4ALL goal, i.e. for monitoring the progress made on energy access (electricity and modern cooking), renewable energy and energy efficiency. For access to energy the key components are presented in Figure 9 as in the GTF:

TRACKING ACCESS TO ELECTRICITY	GLOBAL TRACKING	NO ACCESS	NO ACCESS	ADVANCED ACCESS			
		NO ELECTRICITY	SOLAR LANTERN OR RECHARGEABLE BATTERY LANTERN	HOME SYSTEM OR GRID CONNECTION			
	COUNTRY-LEVEL TRACKING	TIER-0	TIER-1	TIER-2	TIER-3	TIER-4	TIER-5
TRACKING ACCESS TO COOKING	GLOBAL TRACKING	NO ACCESS	BASIC ACCESS		ADVANCED ACCESS		
		SELF-MADE COOKSTOVE	MANUFACTURED NON-BLEN COOKSTOVE		BLEN COOKSTOVE		
	COUNTRY-LEVEL TRACKING	TIER-0	TIER-1	TIER-2	TIER-3	TIER-4	TIER-5

Figure 10 Key components for tracking access to energy under the GTF

As shown in Figure 8 the GTF proposed to track access to energy using different “levels of access” or Tiers. Using a multi-tier approach, it is possible to track access not only from the “yes/no” point of view, which means that people *have* or *do not have* access, but also from a multi-dimensional perspective where it is possible to track the several attributes associated to access, such as affordability, quality, capacity (Watts), reliability, safety, efficiency, impact on health, etc. thus providing the opportunity to perform a much more in-depth analysis. Currently, Tanzania tracks access by means of collecting information during the National Censuses. It is important to keep in mind that TANESCO currently defines electricity access as having access to a nearby network where it is likely for an electricity connection to occur (in this case access means proximity).

In 2012, 36% of the population had *proximity* to the grid, and 20.7% had access to electricity if we consider it as *connections*. For the sake of the SE4ALL goal, the number of connections is the chosen indicator for energy access. The number of connections includes grid-connected clients to TANESCO’s grid and mini-grids. This means that the GoT is tracking those people falling under Tier 2 to 5, although there is no specific breakdown indicating how many fall under each tier.

In the case of RE, the GTF concludes that the best way to track this is as final energy consumed because:

“Since renewable energy sources do not have fuel inputs, they are only reported in final energy terms; expressing them in primary terms would require the use of somewhat arbitrary conversion factors.”

The definition of RE used in the GTF is *“Energy from natural sources that are replenished at a faster rate than they are consumed, including hydro, bioenergy, geothermal, aerothermal, solar, wind and ocean.”*

In general terms, the main goal is to track the proportion of RE capacity in the national energy mix (derived from both on and off-grid initiatives) to analyse how much Tanzania is contributing to the overall goal of increasing the share of RE in the global mix.

The definition of energy efficiency under the GTF is: *“Energy efficiency is defined as the ratio between useful outputs and associated energy inputs. Rigorous measurement of this relationship is possible only at the level of individual technologies and processes, and the data needed for such measures are available only for a handful of countries. Even where data are available, they result in hundreds of indicators that cannot be readily used to summarize the situation at the national level.”*

Given the complexity of measuring energy efficiency, energy intensity (energy consumed per dollar of gross domestic product) has been used as a proxy although it is an “imperfect” approximation.

Data collection during monitoring:

In order to save costs, time and efforts, data sources which are already available should be identified and analysed before deciding to create new data sources, such as the national census, etc. to create synergies amongst initiatives, instead of duplicating efforts. For each indicator, potential organisations that could be involved or that could provide data should be identified and contacted to analyse how they can help. For example, the GACC (Global Alliance for Clean Cookstoves) may be collecting information that is relevant for tracking access to clean cooking solutions, which relate to the energy access SE4ALL goal. Also, following this same example, the Ministry of Health may be tracking deaths derived from indoor air pollution, which also relates to tracking access to clean cooking solutions. Complementary analysis or data collection activities may be planned in order to collect additional information to provide a complete monitoring of indicators for Tanzania.

Evaluation Plan:

The evaluation process consists of annual reviews of the progress made through the activities conducted and performance achieved towards the targets that are set under Tanzania’s SE4ALL AA.

The evaluation will ensure a broad and representative perspective on the achievements and challenges in the implementation of Tanzania’s SE4ALL activities, and will allow the adequacy of the adopted strategy to be assessed to meet the targets as planned and take any corrective action if needed. The evaluation should include the provision of recommendations for future monitoring periods and it is also intended to inform the stakeholders participating in the implementation of the AA of follow-up actions required to further strengthen its performance and strategic activities.

In general terms, the purpose of the evaluation activities is twofold:

- (i) To contribute to improving programme effectiveness and delivery towards Tanzania’s SE4ALL goals by 2030 by using knowledge and lessons learnt from its implementation back into the country initiative.
- (ii) To contribute to overall alignment of strategic activities of the AA and ensure that it remains relevant to addressing country level objectives whilst also aligned to the global SE4ALL initiative.

During the annual SE4ALL evaluation, the designated SE4ALL Secretariat will review the results achieved in the current monitoring period in comparison to the baseline and the previous year: progress on actions and targets met as planned in Tanzania's AA using the selected indicators. It will also help identify the actions needed for the following year.

Reporting Plan:

Using the results of the evaluation phase, the designated SE4ALL Secretariat will report on an annual basis on the progress and performance towards the implementation of Tanzania's SE4ALL AA. The yearly progress will be presented in a Performance Assessment Report or similar reporting document. This report must clearly show the baseline scenario and the progress made against the targets set where this is required and available.

The annual report would be prepared in consistent manner with MEM's Five-Year Strategic Planning cycle and shared with Stakeholders for awareness, socialisation and proper contributions on their part.

6.4.2 General Performance Monitoring Indicators

There are different levels of performance, for which different indicators need to be identified:

- At goal level, the country will track general indicators usually associated to country growth and socioeconomic development (e.g. poverty, GDP, energy consumed per capita, etc.)
- At objective level, the country will track indicators associated with its SE4ALL goals (i.e. related to energy access, RE and EE).
- At outcome level, the country will assess results that measure progress towards objective and goal achievement. For example, the country may track the percentage of connections to the grid in order to follow up how access to electricity services is varying over time.

Complementary indicators can be included but its relevance needs to be carefully assessed in each case because monitoring is a costly activity in terms of human time and monetary resources and needs to be conducted efficiently.

Tanzania should be able to select the most appropriate indicators to show how they are progressing towards the achievement of the SE4ALL goals. Two aspects related to indicators are essential to reduce the demand of resources associated to monitoring activities: diversity and number of indicators. It is necessary to assess those indicators that, although they are more difficult to monitor, capture the substance of the change that is occurring in a better way. Moreover, having fewer indicators would reduce associated monitoring costs but it is important to analyse the relevance of each indicator and verify that there are enough to cover everything that needs to be tracked.

A list of potential indicators for measuring SE4ALL progress in Tanzania is show in table 15. The list shows several indicators that are useful to monitor the progress under each goal. This list serves as an initial guideline on the type of indicators that can be associated to each goal, as an example.

Table 15: Illustrative list of indicators for Tanzania SE4ALL initiative

Results	Indicators	
Goal		
Sustainable Economic Growth	Deaths by indoor air pollution (deaths/year)	
	GDP per capita (USD/person*year)	
	National electricity generation capacity (MW)	
	Poverty in rural and urban areas (%)	
SE4ALL Global Objective 1: Universal access to modern energy services		
Increase Electricity Access	National electricity access rate (%)	<i>Percentage of population with electricity access calculated as % of households with connections</i>
	Energy consumption per capita (kWh/person*year)	
Increase access to modern cooking solutions	National access rate to modern cooking solutions (%)	<i>Percentage of population with access to modern cooking solutions. Definition of modern cooking solutions can be taken from GTF.</i>
SE4ALL Global Objective 2: Doubling share of renewable energy in global energy mix		
Increase renewable energy share in national mix	Share of RE in the national energy mix (%)	<i>Proportion of installed capacity from renewable energy sources, over the total installed capacity</i>
	On-grid RE installed capacity (MW)	
	Off-grid RE installed capacity (MW)	
	Sustainable biomass used in process heat (%)	
SE4ALL Global Objective 3: Doubling global rate of improvement of energy efficiency		
Reduce energy intensity	Reduction in the annual rate of energy intensity per year (%)	
	Energy losses in electricity distribution (%)	

The definition for those indicators that directly relate to the SE4ALL goals is provided below. These would be the ones to show how the country is contributing towards the achievement of the SE4ALL goals (increasing energy access: *electricity and clean cooking*; renewable energy; and energy efficiency):

- **National electricity access rate (%):** Percentage of population with electricity access calculated as % of households with a connection to an electricity service.
- **National access rate to modern cooking solutions (%):** Percentage of population with access to modern cooking solutions. Definition of modern cooking solutions can be taken from GTF (defined as non-BLEN¹⁰⁹ manufactured cookstoves and BLEN cookstoves).
- **Share of RE in the national energy mix (%):** Proportion of installed capacity from renewable energy sources, over the total installed capacity, both on- and off-grid.
- **Reduction in the annual rate of energy intensity per year (%):** Energy intensity is a ratio between energy supply and gross domestic product measured at purchasing power parity (MJ/\$2005 PPP). Energy intensity is an indication of how much energy is used to produce one unit of economic output. Lower ratio indicates that less energy is used to produce one unit of output. Energy intensity level is only an imperfect proxy to energy efficiency indicator and it can be affected by a number of factors not necessarily linked to pure efficiency such as climate, but can be used by countries to monitor its progress in this area.

Tanzania will select those indicators that better fit their objectives and the activities that will be conducted during AA implementation. When selecting indicators it is important to define the following for each of them: entity responsible for its calculation and monitoring, frequency of calculation and monitoring, means of verification, sources of data and information, as well as assumptions and risks that could be associated to its monitoring.



7 WORKS CITED

- EUEI-PDF and Camco. (2013). *BEST Tanzania: Key Elements of Biomass Energy Strategy*. Dar es Salaam: EUEI-PDF and Camco.
- EWURA. (2013). *Electricity (Development of Small Power Projects) Rules 2013 (Part VIII)*. Dar es Salaam.
- Global Village Energy Partnership. (2012). *Tanzania Market Assessment*. Retrieved January 6, 2015, from Global Village Energy Partnership: <http://cleancookstoves.org/binary-data/RESOURCE/file/000/000/186-1.pdf>
- GoT & SE4ALL. (2013). *Rapid Assessment and Gap Analysis (RAGA)*. Dar es Salaam: GoT & SE4ALL.
- IEA. (2014). *Key Words Statistics 2014 Edition*. Retrieved January 07, 2015, from International Energy Agency website: <http://www.iea.org/publications/freepublications/publication/key-world-energy-statistics-2014.html>
- IEA. (2015). *United Republic of Tanzania: Indicators*. Retrieved January 15, 2015, from International Energy Agency: <http://www.iea.org>
- MEM. (2010, November 01). *Guidelines for Sustainable Liquid Biofuels Development in Tanzania*. Retrieved December 15, 2014, from Development Partners Group Tanzania: http://www.tzdpg.or.tz/fileadmin/documents/dpg_internal/dpg_working_groups_clusters/cluster_1/Energy_and_Minerals/Key_Documents/Strategy/Liquid_Biofuel_Strategy.pdf
- MEM. (2012, November 01). *Strategic Plan 2011/12 - 2015/16*. Retrieved December 15, 2014, from Ministry of Energy and Minerals: https://mem.go.tz/wp-content/uploads/2014/02/0097_18102013_MEM_Strategic_Plan_2011_12-2015_16.pdf
- MEM. (2013). *Energy Subsidy Policy (Draft)*. Dar es Salaam.
- MEM. (2013, May 01). *Power System Master Plan 2012 Update*. Retrieved November 15, 2014, from TANESCO: www.tanESCO.co.tz
- MEM. (2013). *Scaling-up Renewable Energy Programme (SREP): An Investment Plan for Tanzania*. Dar Es Salaam: Ministry of Energy and Minerals.
- MEM. (2014, April 01). *Biomass Energy Strategy (BEST) for Tanzania*. Retrieved December 15, 2014, from EUEI-PDF: http://www.euei-pdf.org/sites/default/files/files/field_pblctn_file/BEST%20Biomass%20Energy%20Strategy%20Tanzania_Final%20Version%20April%202014.pdf
- MEM. (2014, June 01). *Electricity Supply Industry (ESI) Reform Strategy and Roadmap 2014-2025*. Retrieved December 15, 2014, from Government of Tanzania: <http://www.gst.go.tz/images/TANZANIA%20ELECTRICITY%20SUPPLY%20INDUSTRY%20REFORM%20STRATEGY%20&%20ROADMAP.pdf>
- MEM. (2014). *Joint Energy Sector Review (JESR) 2012/2013*. Dar: Ministry of Energy and Minerals.
- MEM. (2014, April 25). *Project Document for the Preparation of the National Energy Efficiency Programme for*

Tanzania & Institutional Capacity Development. Dar es Sallam. Retrieved from Project Document for the Preparation of the National Energy Efficiency Programme for Tanzania & Institutional Capacity Development.

MEM. (2014). *Speech FY 2014-2015*. Dar es Salaam.

MEM and KEMCO. (2013). *Project Concept Paper, Building up the System for Energy Management in the Industrial Sector of Tanzania Prepared*. dar es Salaam.

Ministry of Finance and Economic Affairs. (2010, July 01). *National Strategy for Growth and Reduction of Poverty II - MKUKUTA II 2010-2015*. Retrieved November 15, 2014, from National Strategy for Growth and Reduction of Poverty II: http://planipolis.iiep.unesco.org/upload/Tanzania%20UR/Tanzania_MKUKUTA-II-2010-2015.pdf

Ministry of Planning. (1999). *Tanzania's Development Vision*. Retrieved December 15, 2014, from Ministry of Planning: <http://www.tzonline.org/pdf/theTanzaniadevelopmentvision.pdf>

National Bureau of Statistics. (2013, June 01). *Tanzania in Figures 2012*. Retrieved December 05, 2014, from National Bureau of Statistics: www.nbs.go.tz

National Bureau of Statistics. (2014, April 01). *Basic Demographic and Socio-Economic Profile*. Retrieved December 05, 2014, from National Bureau of Statistics: www.nbs.go.tz

National Bureau of Statistics. (2015, January 10). *Housing Conditions, Household Amenities and Assets Monograph*. Retrieved January 15, 2015, from National Bureau of Statistics: www.nbs.go.tz

NKRA Energy. (2013). *Tanzania's Development Vision 2025 Big Results Now: Energy Lab Final Report*. Dar es Salaam: NKRA Energy.

President's Office & Planning Commission. (2012). *The Tanzania Long-Term Perspective Plan (LTPP) 2011/12 - 2025/26 - The roadmap to a middle income country*. Dar-es-Salaam: United Republic of Tanzania.

Putti, D. V. (2012, October 30). *Energy Access in Africa - WB/ESMAP Initiatives*. Retrieved November 03, 2014, from ECREEE website: http://www.ecreee.org/sites/default/files/event-att/ghana_ppt.pdf

REA. (2014). *National Electrification Program Prospectus*. Renewable Energy Agency . Dar es Salaam: Renewable Energy Agency.

SE4ALL. (2012, April 01). *Sustainable Energy for All - Global Action Agenda*. Retrieved November 05, 2014, from Sustainable Energy for All: <http://www.un.org/wcm/webdav/site/sustainableenergyforall/shared/Documents/SEFA-Action%20Agenda-Final.pdf>

TANESCO and REA. (2014). *Access to Electricity for Mainland Tanzania*. Dar es Salaam.

TDBP. (2015). *Tanzania Domestic Biogas Programme (TDBP)*. Retrieved January 25, 2015, from Tanzania Domestic Biogas Programme (TDBP): <http://www.biogas-tanzania.org>

UN/AGECC. (2010, April 28). *Energy for a Sustainable Future. The Secretary-General's Advisory Group on Energy and Climate Change (AGECC). Summary Report and Recommendations*. Retrieved January 7, 2015, from United Nations: <http://www.un.org/wcm/webdav/site/climatechange/shared/Documents/AGECC%20summary%20report%5B1%5D.pdf>

USAID. (2014). *Partnership for Growth: Energy Efficiency in Tanzania – Green Buildings*. Dar es Salaam.

USAID. (2014). *Partnership for Growth: Energy Efficiency in Tanzania – Demand Side Management*. Dar es Salaam.

World Bank. (2014). *World Development Indicators*. Retrieved February 19, 2015, from World Development Indicators: <http://wdi.worldbank.org>

ANNEX I: TANZANIA'S ENERGY SECTOR MAIN POLICIES AND STRATEGIES

Name of Strategic Document and/or Activity	Brief Summary
Policy Framework:	
Energy and Water Utilities Authority Act 2001 and 2006	<p>Promulgated to establish a regulatory authority – Energy and Water Utilities Regulatory Authority (EWURA). EWURA was formed as an autonomous multi-sectoral regulatory authority and is responsible for technical and economic regulation of the electricity, petroleum, natural gas and water sectors in Tanzania. This authority became operational in 2006.</p> <p>EWURA regulates tariffs for all electricity trade in the country. This is done through Power Purchase Agreements (PPAs) including those for TANESCO to sell to final consumers and Small Power Distributer's (SPDs) and other producers to sell to TANESCO, consumers and SPDs.</p>
National Energy Policy of 2003 (2003)	<p>This policy aims at having affordable and reliable energy supplies in the whole country, reform the market for energy services and establish an adequate institutional framework; enhance the development and utilisation of indigenous and RES and technologies, take environmental considerations in all energy related activities; increase EE and conservation in all sectors as well as increase energy education and build gender-balanced capacity in energy planning, implementation and monitoring. The National Energy Policy also supports research and development of RE and also promotes the use of efficient biomass and end-use technologies. The National Energy Policy of 2003 is under review.</p>
Rural Energy Act 2005 (2005)	<p>Established the Rural Energy Board (REB), the Rural Energy Fund (REF) and Rural Energy Agency (REA). The act aims at promoting improved access to modern energy services in the rural areas of Mainland Tanzania.</p>
Electricity Act 2008 (2008)	<p>General framework for the powers of the MEM and EWURA. It defined key parameters for EWURA with regards to tariff-setting criteria and procedures, criteria for awarding provisional and permanent licences, monitoring and enforcement activities, requirements for ministerial plans and strategies for rural electrification, dispute resolution procedures and a process for determining possible future reorganisation of the electricity sector.</p>
The Petroleum Act 2008 (2008)	<p>Makes provisions for importation, exploration, transportation, transformation, storage and wholesale and retail distribution of petroleum and petroleum products in a liberalised market and provides for related matters.</p>
Public Private Partnership Act No. 18 of 2010	<p>Sets out the responsibilities and obligations of the parties, penalties, remedies, and financial management and control requirements. It also established a PPP Coordination Unit within the Tanzania Investment Centre and a PPP unit in the Ministry of Finance.</p>
Standardized Power Purchase Agreement & Tariffs (2008) (<10MW)	<p>Standardised Power Purchase Agreements and Tariff (SPPA/T) exist for projects to feed <10MW to the grid, which is enforced by the independent regulator EWURA. The SPPA purchase terms are based on avoided cost, which are calculated by EWURA every year with floor and ceiling prices</p>
Government Driven Strategies and Plans:	
Tanzania's Development Vision (TDV) 2025 (1999)	<p>The TDV 2025 aims at making the country a middle income country by 2025. It aims to turn the country into a strong and competitive economy that will provide improved socio-economic opportunities, public sector performance and environmental management. The TDV 2025 is based on the principle of sustainable development, in particular with the target of 8% of annual growth rate or more for the economy.</p>
2010 Joint Energy Sector Review (JESR) (2012) (MEM, 2014)	<p>Sets the national electrification targets of: 30% by 2015; 50% by 2025; and 75% by 2033. Reviews the energy sector performance up to 2012.</p>

<p>The Tanzania's Long-term Perspective Plan (LTPP) 2011/12 – 2025/26 (President's Office & Planning Commission, 2012)</p>	<p>The Government of Tanzania's Long-Term Perspective Plan (LTPP) unveiled in June 2012 aspires to:</p> <ul style="list-style-type: none"> • Act as a vehicle for achieving the TDV 2025 of middle-income status by 2025. • Create growth based on six key pillars of: broad-based growth; macroeconomic stability, competitiveness; national cohesion and cultural heritage; good governance and accountability, and sustainable development from the economic, environmental and social points of view. • Ensure availability of adequate power supply on a sustainable basis, so that energy does not remain a binding constraint to development by 2015. • Enhance the energy sector based on market economy principles and develop a modern energy infrastructure.
<p>MKUKUTA II (National Strategy for Growth and the Reduction of Poverty II) (July 2010) (Ministry of Finance and Economic Affairs, 2010)</p>	<p>MKUKUTA II is a vehicle for realising TDV 2025 and the Millennium Development Goals (MDGs). This strategy to be implemented between 2010/11-2014/15 has three primary focal areas: (i) growth and reduction of income poverty; (ii) improvement of quality of life and social wellbeing; and (iii) governance and accountability. The strategy closely aligned with the National Energy Policy of 2003 highlights the importance of electricity, LPG and clean energy sources to address poverty. The strategy also articulates the following targets for Tanzania:</p> <ul style="list-style-type: none"> • Increase in electricity generation from 1,064MW in 2010 to 2,128MW in 2015. • Use of non-hydro renewable for power generation to increase from 4% in 2010 to 6% in 2015. • Double the total length of transmission and distribution lines by 2015. • Electricity access to increase from 2% in 2010 to 6% in 2015 in rural areas and from 14% in 2010 to 18% in 2015 at national level. • Access to clean and affordable substitutes for wood fuel for cooking to increase from 10% in 2010 to 20% in 2015.
<p>Power Systems Master Plan 2012 (2013- 2035) (May 2013) (MEM, 2013)</p>	<p>The 2012 Power System Master Plan (PSMP), adopted by the Government of Tanzania has a short-term (2013-2017) and medium-term (2018-2023) and long-term (2024-2035) plan. The plan estimates:</p> <ul style="list-style-type: none"> • An increasing demand for energy/electricity at an average rate of 8.5-15% per year. • An increase in per capita electricity consumption from 81kWh in 2011/2012 to 200kWh by 2015/16 through the combination of increased generation capacity and accelerated electrification programme. • Increase of the electrification level from 18.4% in 2011/12 to 30% by 2015/16, implying connecting 250,000 new costumers per year between 2013 and 2017. • Target of reaching 75% of electrification of households by 2035. • In order to be able to ensure adequate energy supply, the Electricity Act of 2008 gives procedures for providing electricity from different sources. <p>This plan also indicates and revises the projected demand, generation and necessary transmission systems up to 2035.</p>
<p>MEM Strategic Plan from 2011/12-2015/16 (November 2012) (MEM, 2012)</p>	<p>This strategy was put together as a way of the Government of Tanzania to put the country on track towards the achievement of the TDV 2025. With this plan the GoT seeks to achieve a growth rate of 8% through: (i) large investments in infrastructure; (ii) enhanced skill development; (iii) a significant improved business enabling environment and (iv) institutional changes for more effective implementation. The actions on this strategy are intended to achieve a balance of government participation in the economy as well as attract private investment.</p> <p>This plan also states the following targets:</p> <ul style="list-style-type: none"> • Increase electricity generation capacity from 1,100MW in 2011 to 2,780MW in 2016. • Increase electricity consumption per capita from 81kWh in 2011/12 to 200kWh in 2015/16. • Increase percentage of population with access to electricity from 6.5% in 2011 to 15% in 2016 in rural areas and from 14.5% in 2011 to 30% by 2016 countrywide.

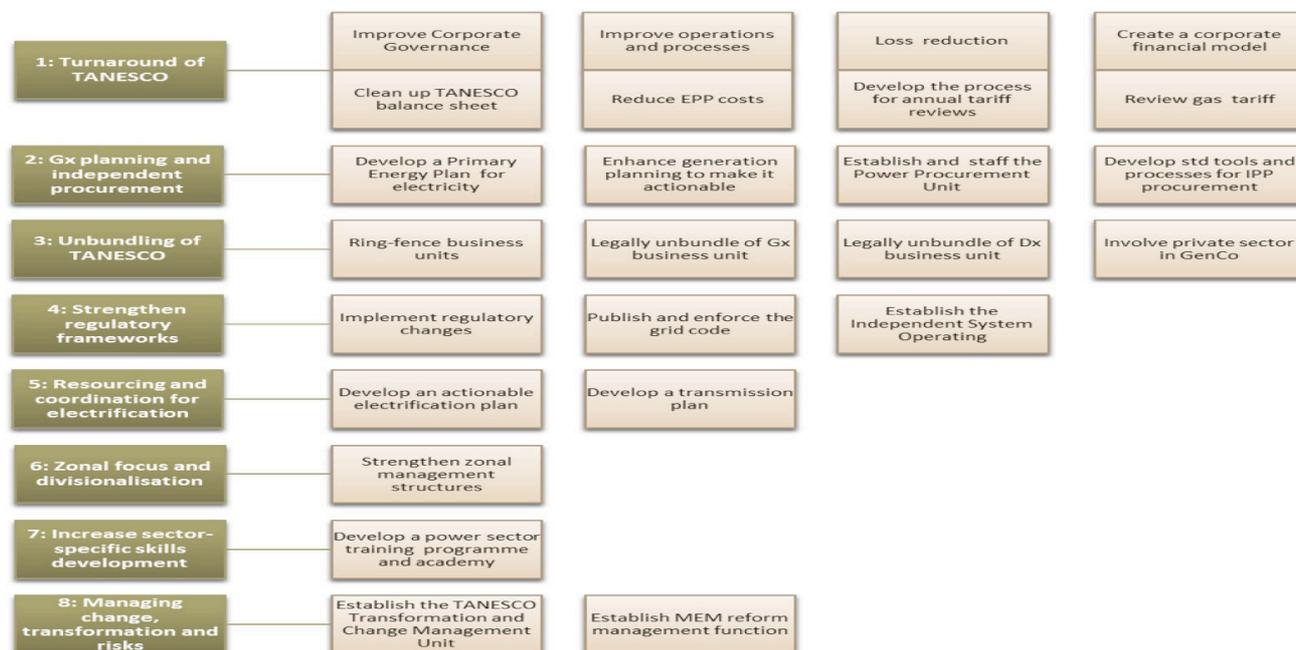
<p>Big Results Now Phase I (BRN) Initiative (2013-2016) (NKRA Energy, 2013)</p>	<p>Launched in January 2013, this initiative aims at supporting the GoT in achieving its TDV2025 through country-driven reforms to strengthen institutions. The BRN initiative focus on the following priority areas: (i) energy and natural gas; (ii) agriculture; (iii) water; (iv) education; (v) transport; and (vi) mobilisation of resources. The approach of the initiative is to centre on “delivery labs” for the referred priority areas where actions and programmes were set up by the stakeholders. The main aim of the Electricity and Gas Delivery lab was to unlock key power generation projects to increase Tanzania’s electrical generation capacity. The Electricity and Gas Delivery lab recommended achieving results in 3 initiatives that will double the base capacity and energy delivery by 2015:</p> <ul style="list-style-type: none"> • Achieving 50% increases in energy delivery and TANESCO revenue by revamping operations of existing assets. • Prioritising and delivering 14 generation projects and 590,000 new connections supported by unusual delivery approaches. • Refining the energy sector strategy and structure, including a gradual restructuring of TANESCO to bring vitality to the entire system. • The outcomes of the BRN are to be achieved in 2015/2016.
<p>Scaling-up Renewable Energy Programme (SREP) – Investment Plan for Tanzania (May 2013) (MEM, 2014)</p>	<p>The objective of this programme is to scale-up RE to transform the country’s energy sector (mainly the electricity sub-sector) from one increasingly dependent on fossil fuels to one that uses a more balanced supply of diverse energy sources, helping Tanzania to move along a low-carbon development pathway while increasing energy security, generating new economic opportunities and expanding access to energy services. The programme included the development of two distinct and complementary investment projects (with 147MW of combined generation potential): (1) geothermal power development project; and (2) RE for rural electrification (RERE) project. The total estimated budget for the SREP programme is US\$719.25 millions (US\$536.80 million for the geothermal power development project and US\$182.45 million for the RERE project).</p>
<p>Biomass Energy Strategy (BEST) (April 2014) (MEM, 2014)</p>	<p>Government of Tanzania, with funding from EUEI PDF developed the Biomass Energy Strategy (BEST) for Tanzania. Within this, the Government aims at: ensuring a more sustainable supply of biomass energy; raise efficiency with which biomass energy is produced and used; contribute to promote access to alternative energy sources where affordable and appropriate; and create an enabling institutional environment for its implementation. The strategy also includes the BEST Tanzania Action Plan that recommends the establishment of a biomass energy policy, supply-side and demand-side actions to be initiated in the years of 2014 and 2015, with a long term view towards 2030.</p>
<p>Electricity Supply Industry (ESI) Reform Strategy and Roadmap 2014-2025 (June 2014) (MEM, 2014)</p>	<p>Describe the intended reform initiatives and key actions covering the period 2014 to 2025 aiming at meeting the current and future demand for electricity, reducing public expenditure on ESI for operational activities, attracting private capital, and increasing electricity connection and access levels. The main intended outcomes of this strategy and roadmap include: increased efficiency; quality services and goods; availability of affordable power; satisfaction of the client; satisfaction of the business partners and their shareholders; increased transparency and competition; and abolition of subsidies in the electricity sub-sector.</p>

<p>Rural Electrification Program Prospectus developed by REA with support from NORAD (July 2014) (REA, 2014)</p>	<p>The Prospectus aims at supporting the electrification policy by proposing a strategy for the period 2013-2022 delivering advance electrification in a cost-effective way. It encompasses both urban and rural electrification and covers electrification by connection to the main grid and by off-grid technologies where isolated mini-grids are supplied by RE sources or hybrid systems.</p> <p>The prospectus identifies: that about half of the population might be more cost-effectively served by mini-grid and off-grid services; and that 20% could benefit from RE mini-grids and 32% from stand alone micro-grid solar PV.</p> <p>The prospectus identifies that until the end of 2022 around 5,500 settlements would be electrified through the grid connection plan and 6,000 settlements would be candidates for off-grid electrification and distributed technologies.</p> <p>With the implementation of the prospectus the following is expected in terms of <u>electrification ratio from the number of households</u>:</p> <ul style="list-style-type: none"> • in 2015: ratios of 40% in urban areas; 7% in rural areas and 18% overall. • in 2022: ratios of 57% in urban areas; 20% in rural areas and 31% overall. <p>The total investment costs estimated for the period between 2013-2022 are of US\$3.5billion at 2013 prices; with US\$2.1 billion for rural electrification and US\$1.4 billion for urban electrification.</p>
<p>Guidelines for Sustainable Liquid Biofuels (MEM, 2010)</p>	<p>The Biofuels Guidelines address, amongst other issues, the following: (i) institutional framework; (ii) application procedures for investors; (iii) land acquisition and use; (iv) contract farming; and (v) sustainability of biofuel production.</p>
<p>Private Sector Strategies:</p>	
<p>Tanzania Traditional Energy Development Organization (TaTEDO)</p>	<p>Leading organization in the promotion of RE technologies in Tanzania. Its overall objective is to contribute to poverty reduction and environmental conservation. In order to address energy problems especially in rural and peri-urban areas and to push forward the utilisation of more efficient technologies for biomass use, TaTEDO created a Biomass Energy Department. This department has been working for more than 16 years in the promotion of efficient cook stoves (charcoal, firewood & sawdust) and baking ovens in the country. Moreover the department is also promoting fuelwood baking ovens which complement initiated efforts of disseminating charcoal ovens.</p>
<p>Tanzania Renewable Energy Association (TAREA)</p>	<p>Founded in the year 2000 and officially registered in 2001 TAREA's objective is to promote the sustainable development of Renewable Energy in Tanzania.</p> <p>TAREA cooperates with all important enterprises in Tanzania, as well as (inter-) national organisations.</p>
<p>Tanzania Domestic Biogas Programme (TDBP)</p>	<p>Tanzania Domestic Biogas Programme (TDBP) which started in 09.2013 During the first phase(2009-2013) a total of 8,799 biogas plants were constructed. During the second phase (2014-2017) an additional 20,700 biogas plants are targeted.</p>

ANNEX II: SUMMARY OF TANESCO UNBUNDLING PLAN/ CRITICAL PATH OR INTERNAL REFORM

This information was supplied by TANESCO.

A) SUMMARY OF KEY ACTIVITIES OF THE REFORM ROADMAP



B) REFORM ROADMAP

➤ Immediate term (July 2014 – June 2015)

MAJOR ACTIVITIES	TIMEFRAME	LEAD RESPONSIBILITY
Establish a Task Force (MEM) and TCMT at TANESCO	Jul 2014	TANESCO
Human Capital Needs Assessment and Capacity Build Program Prepared	Dec 2014	MEM/TANESCO/EWURA
Carry out MIS review and ring fence TANESCO's SBUs	Dec 2014	TANESCO
Develop standard template Power Purchase Agreement (PPA) models;	Jul 2014	EWURA
TANESCO Turnaround Strategy	Dec 2014	MEM
Designate Grid Control Center as Independent System Operator (ISO);	Dec 2014	EWURA
Reviewing of the Electricity Act, 2008, in particular, Section 41(6)	Dec 2014	TANESCO
Initiate Business process review and TANESCO's Assets and Liabilities valuation	Dec 2014	MEM
Develop of Grid Codes to guide Tx and Dx operations	Dec 2014	EWURA

➤ **Short term (July 2015 – June 2018)**

MAJOR ACTIVITIES	TIMEFRAME	LEAD RESPONSIBILITY
Unbundle Gx from Tx and Dx	Dec 2017	TANESCO
Generators (IPPs) to sell to bulk off takers	Dec 2017	MEM
Establish market information Desk	Mar 2015	MEM
Designate Independent Market Operator	Dec 2015	TANESCO
Continue with TANESCO turnaround	Dec 2016	TANESCO
Decentralize decision making (Procurement, budget implementation an Business Plans management	Dec 2016	TANESCO

➤ **Medium Term (July 2018 – June 2021)**

MAJOR ACTIVITIES	TIMEFRAME	LEAD RESPONSIBILITY
Unbundle Dx from Tx	June 2021	MEM
Zonal Offices' Performance Assessment	Sept 2020	Dx
Setting up a mechanism and rules for the operation of a retail market	Nov 2018	EWURA

• **Long term (July 2021 – June 2025)**

MAJOR ACTIVITIES	TIMEFRAME	LEAD RESPONSIBILITY
Unbundle Dx segment into Zonal Distribution Companies	June 2025	MEM
Establish ESI service standards	Jul 2020	EWURA
Invest in human capital and trading system in preparation to retail market operations	Jul 2020	MEM
Introduce Retail Competition	Jul 2023	MEM
Prepare Gx Company and Dx for listing	Jan 2025	GenCo & DxCos
Reduce total losses from 15% to 12% by 2025	Dec 2025	Tx & Dx
Increase electricity connectivity from 36% to 50% by year 2025	Dec 2025	DxCos
Unbundle Dx segment into several Zonal Distribution Companies	Dec 2023	MEM
Establish ESI service standards	Jul 2020	EWURA
Invest in human capital and trading system in preparation to retail market operations	Jul 2020	MEM
Introduce Retail Competition	Jul 2023	MEM
Prepare Gx Company and Dx for listing	Jan 2025	GenCo & DxCos
Reduce total losses from 15% to 12% by 2025	Dec 2025	Tx & Dx
Increase electricity connectivity from 36% to 50% by year 2025	Dec 2025	DxCos

C) SWOT ANALYSIS

The SWOT analysis for the intended future TANESCO covers four areas, namely operational excellence, customer delight, business growth and our people.

➤ OPERATIONAL EXCELLENCE

GOAL 1: Build an Effective Procurement Function effective procurement function	
STRATEGY	ACTIVITY
Decentralize Procurement Operations	<ul style="list-style-type: none"> ➤ Provide guidelines on procurement authority levels for zones, regions and plants ➤ Prepare job descriptions and person specifications for zonal, regional and plant procurement staff ➤ Provide office space, furniture and equipment for zonal, regional and plant procurement staff ➤ Source procurement staff for zonal, regional and plant procurement offices Orient and Induct new employees ➤ Orient and Induct new employees
Restructure PMU	Establish specialized procurement sections for Generation & Transmission; Distribution; Projects & Consultancies; and General Procurements <ul style="list-style-type: none"> ➤ Prepare new PMU structure with relevant positions ➤ Provide office space, furniture and equipment for specialized procurement section staff ➤ Prepare job descriptions and person specifications for specialized procurement section staff ➤ Source procurement staff for specialized procurement section offices ➤ Orient and Induct new employees
	Prepare Procurement Manual <ul style="list-style-type: none"> ➤ Provide first draft of the internal procurement manual ➤ Seek approval from relevant authorities such as EMM, BOD, MEM & PPRA ➤ Train relevant personnel and test them (with pass mark of 80%) ➤ Operationalize manual
	Build PMU Capacity <ul style="list-style-type: none"> ➤ Train all procurement principals, managers and the SMP ➤ Effective Leadership and Management skills ➤ Procurement laws and regulations ➤ Ensure all senior positions in PMU are manned by NBMM certified personnel and that they meet NBMM CPD requirements
GOAL 2: Effective Management of Stock	
STRATEGY	ACTIVITY
Enhance Stock Management - Near JIT	<ul style="list-style-type: none"> ➤ Determine materials requirements per region per month ➤ Engage material suppliers on long-term (at least 3 years) framework contracts with regular (quarterly) delivery frequency
Enhance Stock Management - Stock Monitoring	<ul style="list-style-type: none"> ➤ Identify systems requirements including regular reports for stock management, monitoring and evaluation ➤ Procure a modern stock management Information system with realtime online processing capability ➤ Train relevant staff to use the new stock management IS ➤ Snap check stores to verify reported stock levels ➤ Establish stock position ready for migration to the new IS

GOAL 3: Make ICT Department a Source of Solutions to Management and Operational Challenges	
STRATEGY	ACTIVITY
Establish Corporate Management System	<ul style="list-style-type: none"> ➤ Operationalize CMS ➤ Train relevant staff to use the CMS
Automate Operations	<ul style="list-style-type: none"> ➤ Automate all processes
GOAL 4: Improve Collection of Energy Sales Revenue	
STRATEGY	ACTIVITY
Replace all post-paid meters by smart prepaid meters within three (3) years	<ul style="list-style-type: none"> ➤ Commence replacement of post-paid meters by smart prepaid meters
Use Banks for collection of payments from customers	<ul style="list-style-type: none"> ➤ Ensure customers start paying bills through banks
Establish electronic payment systems	<ul style="list-style-type: none"> ➤ Ensure all customer payments to TANESCO are made through electronic methods such M-Pesa, Tigo-Pesa, Airtel Money, Ezy-Pesa, Sim-Banking, NMB Mobile, POS networks, and ATMs
Stretch collection targets with attractive Incentives	<ul style="list-style-type: none"> ➤ Set collection targets to 100% of current bills ➤ Establish competitions and recognition of large power users for timely payment of bills (Safety, Energy Efficiency)
GOAL 5: Increase Revenue Protection	
STRATEGY	ACTIVITY
Increase severity of penalties to thieves	<ul style="list-style-type: none"> ➤ Initiate process for review of Electricity Act and other relevant laws to make energy theft an economic sabotage offence
Educating customers on energy theft	<ul style="list-style-type: none"> ➤ Launch an awareness campaign against energy theft
Enhance partnerships with customers to increase informers on energy theft	<p>Establish informers incentives policy</p> <ul style="list-style-type: none"> ➤ Implement informers incentives policy
Stern disciplinary action on staff involved in energy theft	<ul style="list-style-type: none"> ➤ Enforce disciplinary action on staff involved in energy theft with immediate effect
GOAL 6: Use Modern Tools, Technology and Improved Technical Design	
STRATEGY	ACTIVITY
Acquire modern tools	<ul style="list-style-type: none"> ➤ Identify and prepare specifications for automated tools such as bucket wagons, clamps, hole drilling and pole erection ➤ Procure automated tools
Low cost but good quality design and materials	<ul style="list-style-type: none"> ➤ Establish appropriate performance objectives and metrics for regional planning engineers ➤ Evaluate loss of materials due to poor design and lack of cost consciousness in material issuance practices and report to management ➤ Review design and material specification semi-annually (Continuous improvement) ➤ Train regional planning and construction Engineers on use of low cost designs and materials

➤ CUSTOMER DELIGHT

GOAL 1: Improve Quality of Power Supply to Customers effective procurement function	
STRATEGY	ACTIVITY
Improve maintenance of the system	<ul style="list-style-type: none"> ➤ Recruit Manager and other staff for KAUDA ➤ Provide separate maintenance budget for KAUDA ➤ Establish Zonal Maintenance Units with Manager and budget ➤ Enhance Maintenance Plans ➤ Strengthen Regional Maintenance Units with Engineers, Supervisors and Proper Equipment
Ensure that standard voltage is available at power delivery points	<ul style="list-style-type: none"> ➤ Enhance adherence to Design Procedures and Standards for new projects ➤ Identify overloaded networks and areas with under-voltage then carry out corrective measures
GOAL 2: Improve Electrical Safety	
STRATEGY	ACTIVITY
Monitor compliance on safety measures in distribution lines e.g. use of insulators, cutting of trees and use of PPE	<ul style="list-style-type: none"> ➤ Ensure insulators are used in all relevant points ➤ Ensure all trees under electricity lines are cut or frequently pruned immediately ➤ Provide PPE to all relevant staff in regions and plants ➤ Enhance adherence to Switching Procedures to all Operation Staffs ➤ Ensure availability of Communication Radios ➤ Ensure availability of Circuit Breakers for Distribution Transformer LV Circuits ➤ Enhance pre-job discussion for risk management ➤ Enhance commissioning of all projects/works ➤ Introduce Safety and Quality Control Officers/Engineers in regions
Enhance customer education on electrical safety	<ul style="list-style-type: none"> ➤ Use mass media to educate the public on electrical safety ➤ Conduct roadshows on electrical safety ➤ Introduce safety training to Primary School pupils and Nursery School children
Institute friendly process and timely compensation to affected customers	<ul style="list-style-type: none"> ➤ Review compensation processes and authorities
Goal 3: Develop Friendly Customer Culture, Ambience and Business Processes	
STRATEGY	ACTIVITY
Enhance customer Relations Management	<ul style="list-style-type: none"> ➤ Review RCRO and HO Liaison office roles and performance criteria to focus on customer relations
Establish one stop shop under reviewed customer processes	<ul style="list-style-type: none"> ➤ Review all customer business processes at regional and head office levels ➤ Automate all customer business processes ➤ Train relevant staff on the reviewed and automated business processes
Enhance monitoring and evaluation of CSC implementation	<ul style="list-style-type: none"> • Use ICT online systems to obtain data from regional offices for CSC monitoring
Implement national call centre services throughout the country	<ul style="list-style-type: none"> • Centralise at Head Office Call Centre all emergency telephone operation for Dar es Salaam ALL regions ➤ Use mass media to inform customers on centralized emergency/call centre telephone numbers/e-mails/sms short-code/ WhatsApp/twitter/YouTube/facebook
Customer Service Training	<ul style="list-style-type: none"> ➤ Train all staffs (managers, principals, supervisors, foremen, lower staffs, STEs) in customer service management ➤ Train all front-staff on customer service skills

Goal 4: Enhance Stakeholders Relationship and Engagement Including Functional PR	
STRATEGY	ACTIVITY
Develop communication policy and strategy	<ul style="list-style-type: none"> ➤ Ensure communication policy is available, approved by BOD and distributed to all HOD's, RM's, PM's for implementation ➤ Ensure PR office is guided by a functional Communication strategy
Capacity building	<ul style="list-style-type: none"> ➤ Recruit competent personnel to fill vacant positions ➤ Identify training needs for each PR staff ➤ Train all PR staff in relevant skills
Train stakeholders on business solutions	<ul style="list-style-type: none"> ➤ Train staffs on available and new business solutions ➤ Use mass media to educate customers on available solutions (TVs/Radios, flyers, e-mails, SMS short-code, WhatsApp, Twitter, YouTube and Facebook
Provide adequate tools and equipment	<ul style="list-style-type: none"> ➤ Provide adequate tools and equipment for PR work
Provide strategic guidance for stakeholders Relations Management at various organizational levels i.e. Corporate, zonal and regional levels	<ul style="list-style-type: none"> ➤ Provide tailor-made training to all Plant Managers, RMs and SZM on Diplomacy and PR ➤ Hold stakeholder events at each plant, region and zone ➤ Allocate Funds to Enhance Regional, Plants and District Corporate Social Responsibility

➤ BUSINESS GROWTH

Goal 1: Build a Lean HO Structure Focused on Supporting Regional Operations	
STRATEGY	ACTIVITY
Customer Service Training	<ul style="list-style-type: none"> ➤ Decentralise Operations and empower zonal and regional offices ➤ Review HO structure ➤ Conduct job analysis of all positions basing on the new HO structure ➤ Establish appropriate manpower requirements for head office ➤ Redeploy resources
Goal 2: Increase Access to Electricity in Urban Areas	
STRATEGY	ACTIVITY
Source commercial financing for network expansion and rehabilitation	<ul style="list-style-type: none"> ➤ Survey all regions to identify new urban settlements for electrification ➤ Prepare bankable proposal for urban electrification program ➤ Source funds from commercial financial institutions
Implement urban electrification Program	<ul style="list-style-type: none"> ➤ Procure contractors for rehabilitation and network expansion works ➤ Rehabilitate and upgrade existing distribution network ➤ Expand distribution network to identified settlements ➤ Start connecting customers in newly electrified settlements
Goal 3: Expand Customer Base	
Outsourcing distribution network expansion and rehabilitation	<ul style="list-style-type: none"> ➤ Identify BAU network expansion works ➤ Procure contractors for BAU distribution network expansion works
Stretch connection targets for all region and plants	<ul style="list-style-type: none"> ➤ Set annual targets as minimum performance standards ➤ Issue new performance contracts to plant, regional and zonal management

➤ **OUR PEOPLE**

Goal 1: Involvement of Regional Management in Setting Performance Objectives	
STRATEGY	ACTIVITY
Participatory/region driven performance contract	<ul style="list-style-type: none"> • Harmonise business planning and budgeting activities • Train plant, regional and zonal managers on business planning and budgeting ➤ Prepare plant, regional and zonal business plans for 2015
Goal 2: Inculcate Business Management orientation and Sense of Responsibility and Accountability	
STRATEGY	ACTIVITY
Enhance Management and Leadership Capacity	<ul style="list-style-type: none"> ➤ Train all plant, regional and zonal managers on business management skills ➤ Design and internal leadership development program for various levels of management ➤ Enroll 30% of managers in leadership development programs
Enhance Management and Leadership Capacity	<ul style="list-style-type: none"> ➤ Develop management financial reporting standards for plants, regions and zones ➤ Train RFO to refresh knowledge and skills to prepare management financial reports for plants, regions and zones ➤ Train plant, regional and zonal managers on in financial management for non-finance managers ➤ Roll out new financial reporting framework for plants, regions and zones

(Footnotes)

1. This represents the average for the period 2001 – 2010; this target will reduce energy intensity by 41% in 2030.
2. This target includes renewable energy from off-grid generation.
3. This represents the average for the period 2001 – 2010; this target will reduce energy intensity by 41% in 2030.
4. This total number of households is about 25% higher than the original target of 75% connections by 2033, under Vision 2025, as the original target was set on the “proximity” definition.
5. Customer connection costs represent around 45% of the total costs (47% for urban and 44% for rural).



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