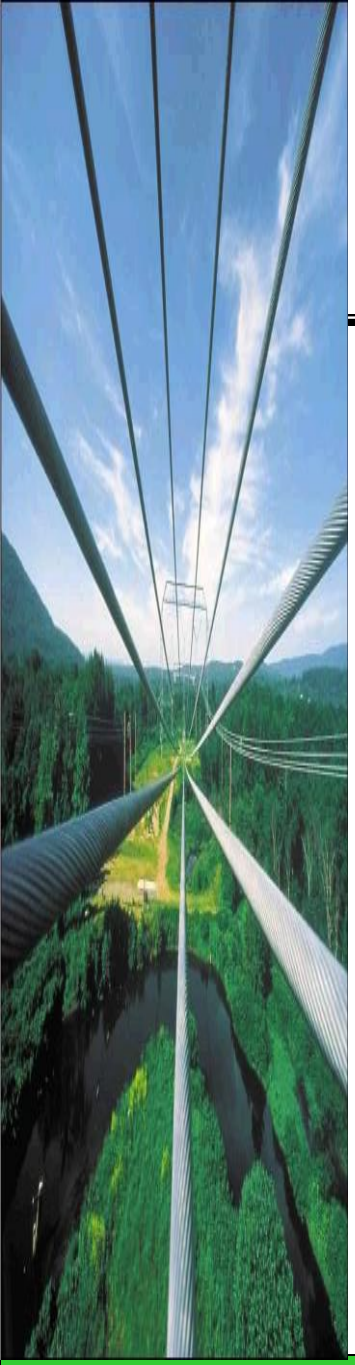


TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

TANESCO OVERVIEW

A Presentation

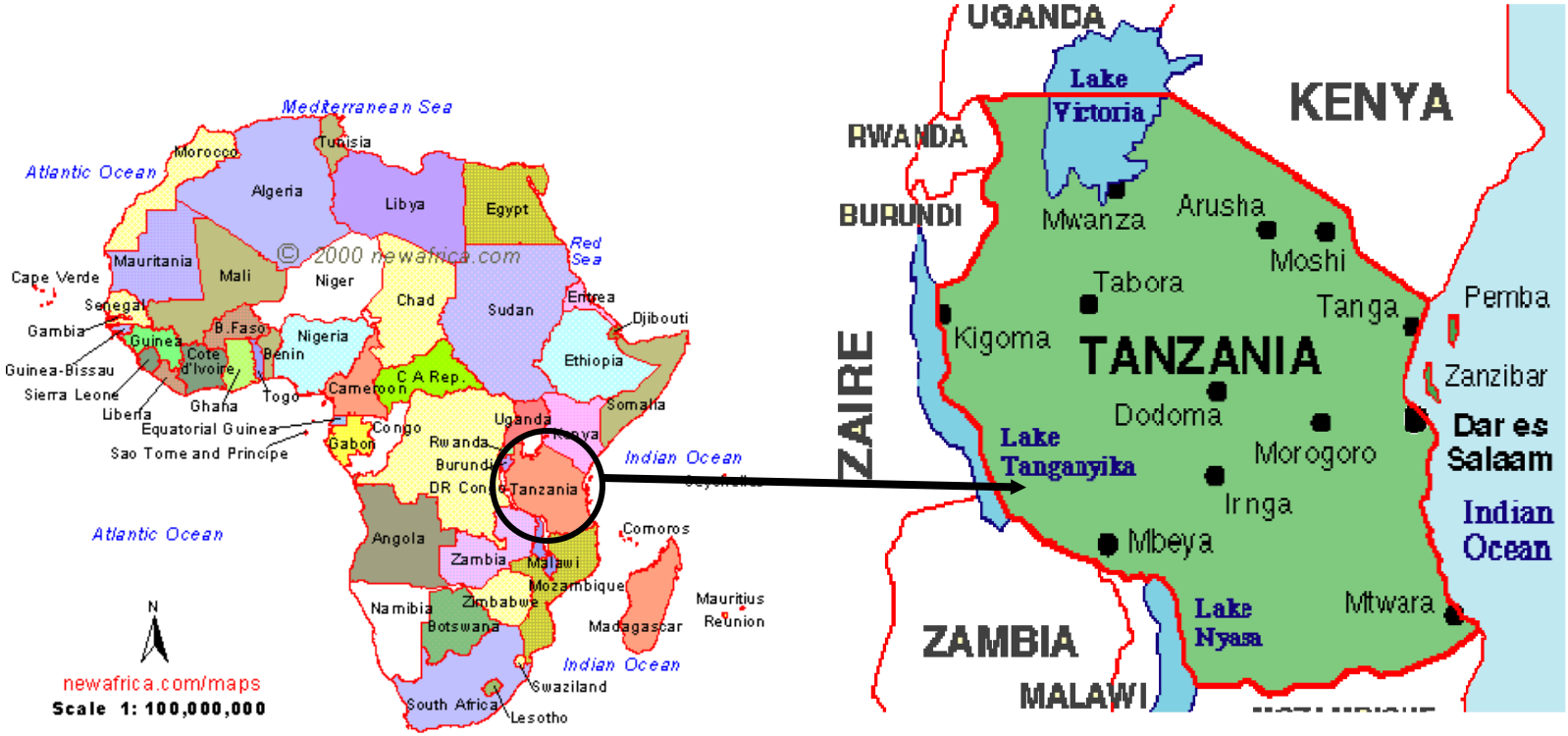
By

TANESCO Managing Director,
Eng. Felchesmi Mramba

Contents

INTRODUCTION

1. Introduction



Brief Information on Tanzania

- Area: 945, 203 km^2
- Tanzania's population is 49.6 million people (NBS).
- Population growth 3%
- GDP USD43.8 billion (After 2014 Rebasing)
- Customer base 1,501, 162 (as at 30/06/2015)
- Access to electricity 38% (as at 30/06/2015)
- Connectivity: 28.7% (as at 30/06/2015)
- Per Capita Electricity Consumption : 101 kWh
- **Key Geographical Features**: Mount Kilimanjaro, The Serengeti National Park, Ngorongoro Crater, Lake Victoria, Lake Tanganyika

1. **Introduction(…)**

- Energy Potential
  - Discovered Natural Gas (55.6Tcf),
  - Hydropower Potential (4.7GW),
  - Coal (1.9 bn tons),
  - Uranium oxide (24,550 tons)
  - Wind (5-9 m/s),
  - Solar (insolation 4.6/kWh/m^2),
  - Biomass (500MW) and
  - Geothermal (5GW)
  - Tidal Energy
- Private sector participation in the sector started in 1992 with IPP; currently the law allows both IPP and PPP.

TANESCO BACKGROUND INFO

TANESCO Background Info

- Tanzania Electric Supply Company Limited is a Public Limited Company incorporated in 1964 accordance with provisions of the Companies Ordinance Cap 212 (now the Companies Act)
- The Company's principal activities are generation, transmission, distribution and sell of electricity to the Mainland Tanzania. Also sells bulk power to Zanzibar
- Directed by the Board of Directors constituted by a Chairperson and 8 members
- TANESCO is 100% owned by the Government under the Ministry of Energy and Minerals (MEM).
- The Ministry of Energy and Minerals (MEM) is responsible for policy and overall sector supervision while the Energy and Water Utilities Regulatory Authority (EWURA) is the sector regulator
- The Treasury Registrar is the Legal owner and custodian of TANESCO shares on behalf of the Government.

Vision and Purpose

Our Vision

Is to be an efficient and commercially focused electricity utility supporting the development of Tanzania, and to be a power house of East Africa

Our Mission

Is to generate, transmit and supply electricity in the most efficient, competitive and sustainable manner

Our Core Values

Ethical: Honest, integrity and adhere to regulations, set principles and policies in service delivery.

Excellence: Timely delivery of quality service

Receptiveness: Willingness to accept stakeholder's opinion and challenges.

Gender Equality: considers gender balance

Background and History of TANESCO

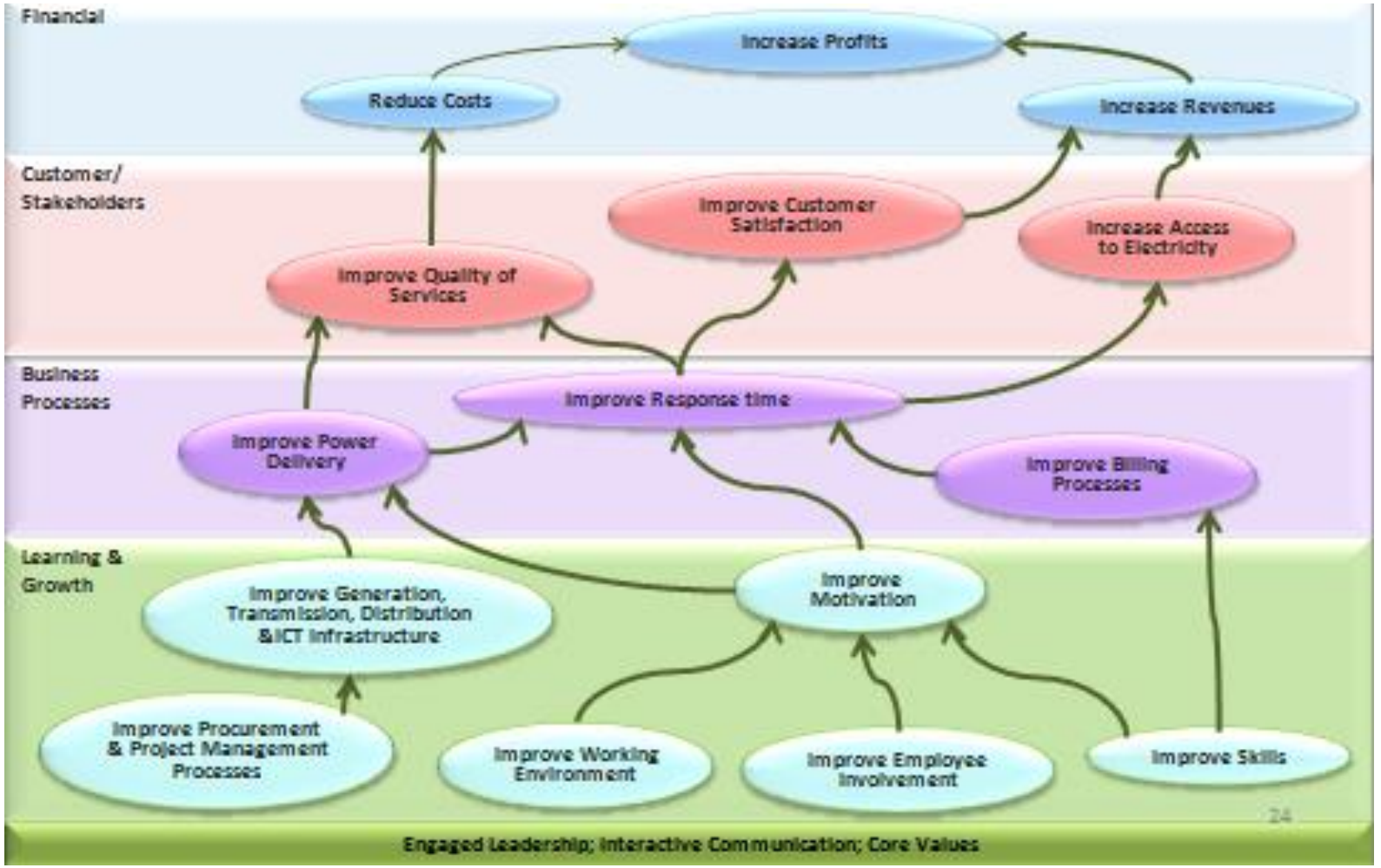
- Policy, Legal And Regulatory Framework
  - National Energy Policy (2003),
  - Electricity Act of 2008,
  - EWURA Act of 2001,
  - REA Act of 2005 and
  - Public Private Partnership Act, 2009.
- Other Key Legislations:
  - Procurement Act 2011, and
  - Investment Act (…..)

VISION FOR THE FUTURE

3. TANESCO Vision for the Future

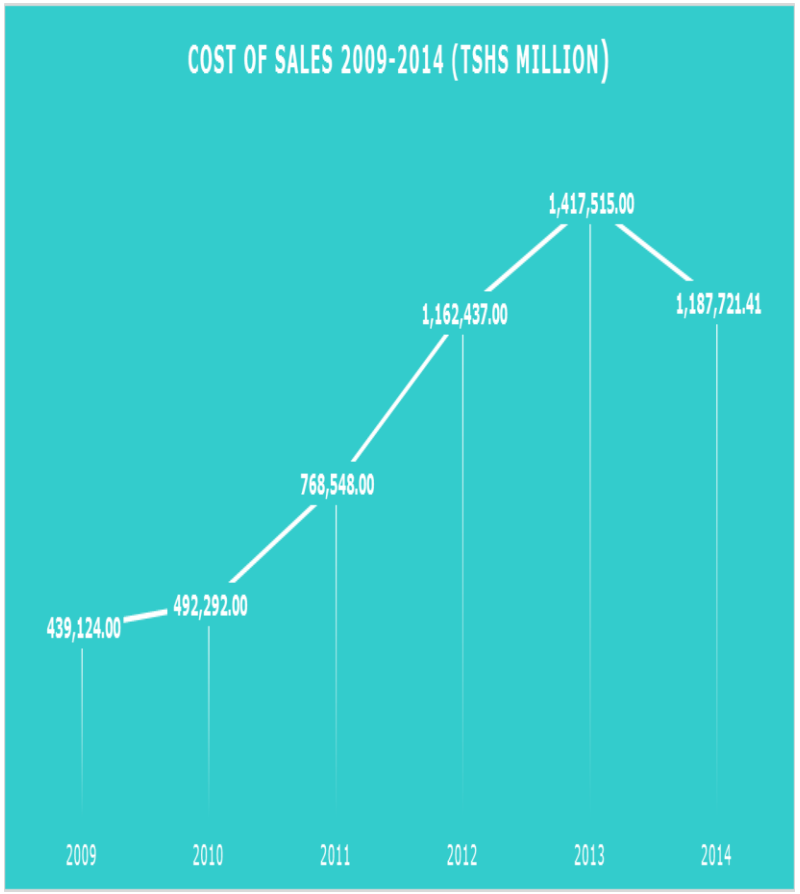
- Financial turnaround of the Company by making it a **profitable utility within 2 years**
- Make TANESCO a **competitive utility** within the region participating in **power trading**
- Improve power **availability, reliability** and **efficiency**
- **Solicit Investment** on Generation, Transmission and Distribution
- Ensure **increased access to electrification** that will also contribute to business growth.

TANESCO Strategy Map



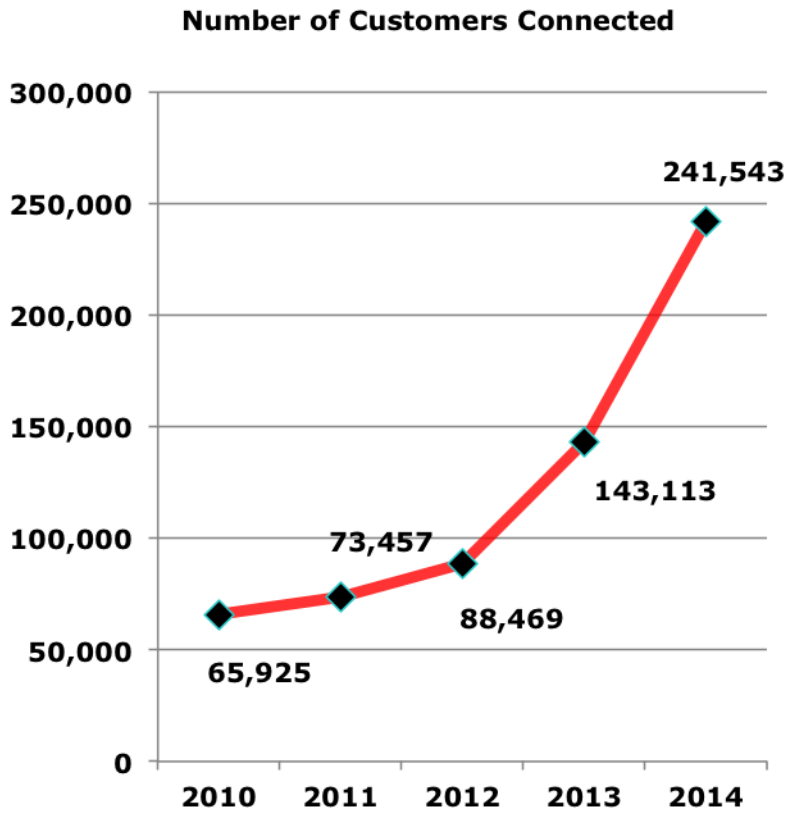
Financial turnaround of the Company

- Using less expensive fuel/sources
- Loss reduction through system maintenance and revenue protection
- Modern metering (prepaid, AMR) and online payment.
- Competitive PPAs



Increased access to electrification

- Own Financing
- Government subsidy
- Development partners like MCC, JICA, World Bank, AfDB, AFD, EU, Korea etc.
- Rural Electrification Partners like Sida, Norad, and ORIO.

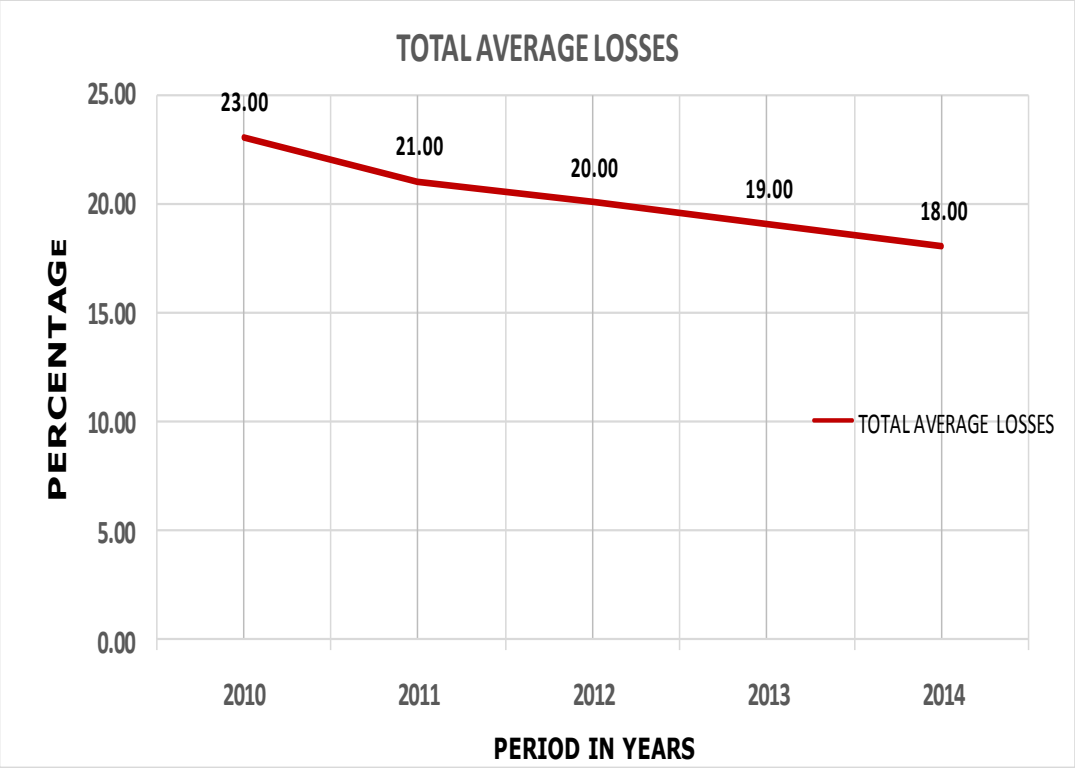


Increased access to electrification

- The Customer base is 1,501,162 (June, 2015)
- From 2011 to 2015, access to electricity increased from 23% to 38% and connectivity from 17% to 28.7%, contributed by massive Electrification Program ongoing in the Country.
- The Target was to have access of 30% end of year 2015
- The New Target is to increase Access to >75% by 2025.

Reduction of System Losses

Due to efforts done by the Company on maintenance and revenue
protection the losses have been reduced from 23% in 2010 to 18% in December, 2014.



THE POWER SYSTEM OVERVIEW

4. Existing Power System Overview

Generation:

- Main-grid installed capacity = 1250MW (Hydro 45.0%, Gas plants 35.3%, Liquid Oil (HFO/Diesel) plants19.4% and SPP 0.3%.
- Main-grid highest peak load = 934.62MW
- Isolated min-grids installed capacity = 73.77 MW, and the maximum peak load supplied is 48.58MW.
- Import =12MW.
- Total Maximum Demand for the Country ~ 1GW.

Transmission System :

- 4,866.85km of Transmission network (220kV=2,732.36km; 132kV=1,555.79km and 66kV =578.7 km).
- **43** Grid Primary substations of 2,189MVA.

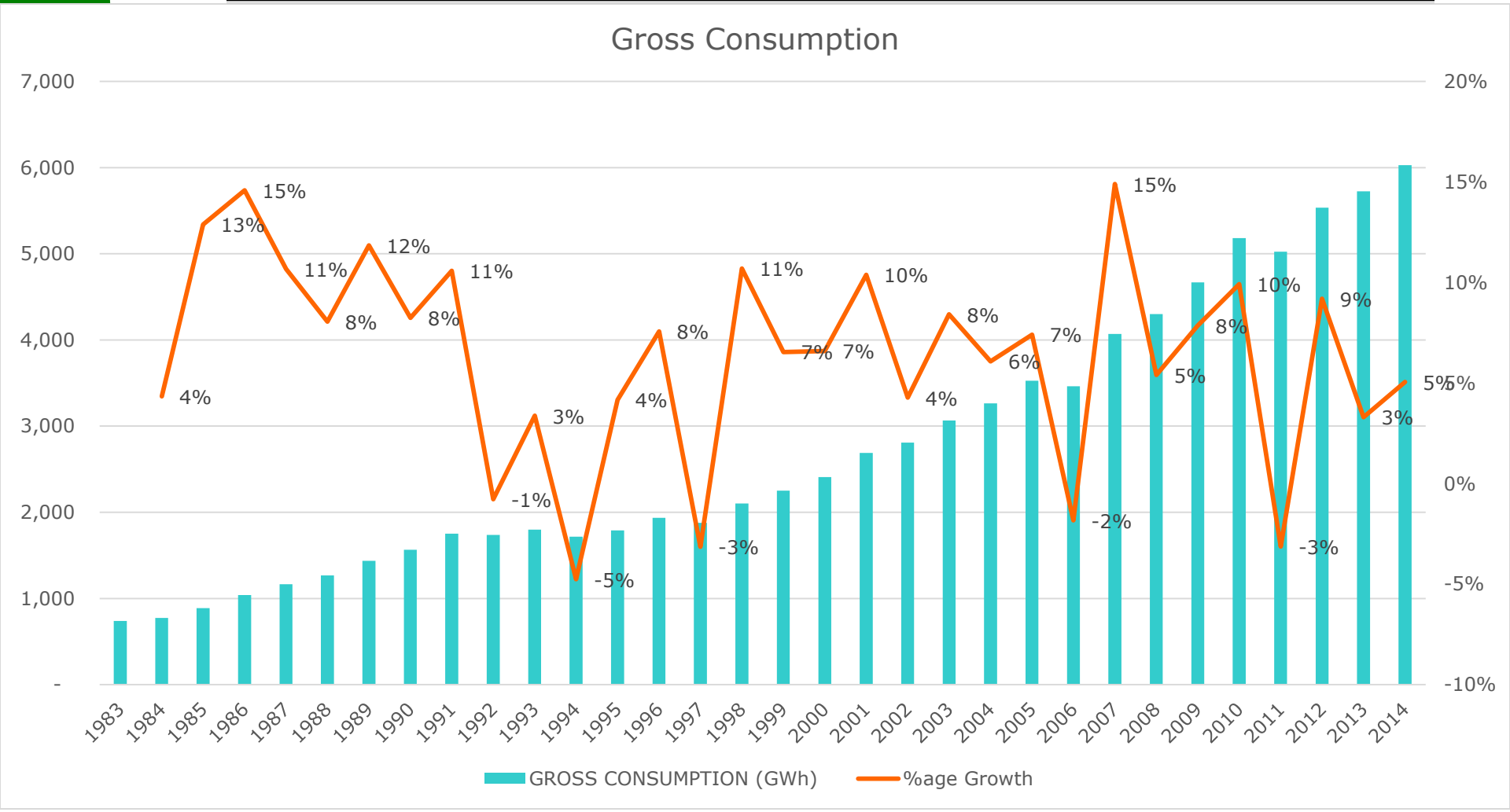
Distribution System (30th June 2015):

- 15,165 km of 33kV and 5,687 km of 11kV lines
- 40,822 km of LV (400V and 230V lines).
- 12,340 distribution transformers

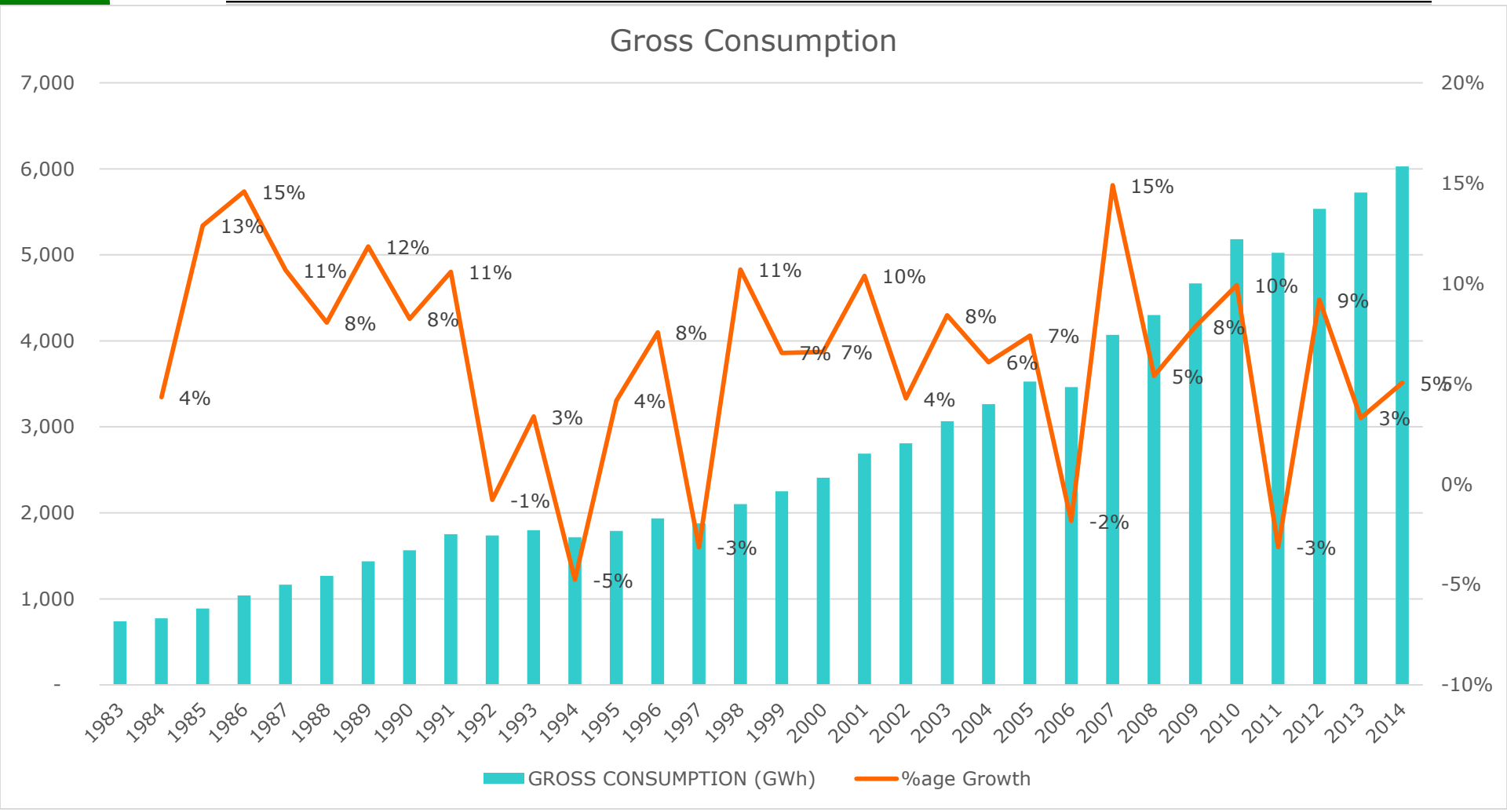
Optical fiber network:

- 2025km along existing high voltage transmission network

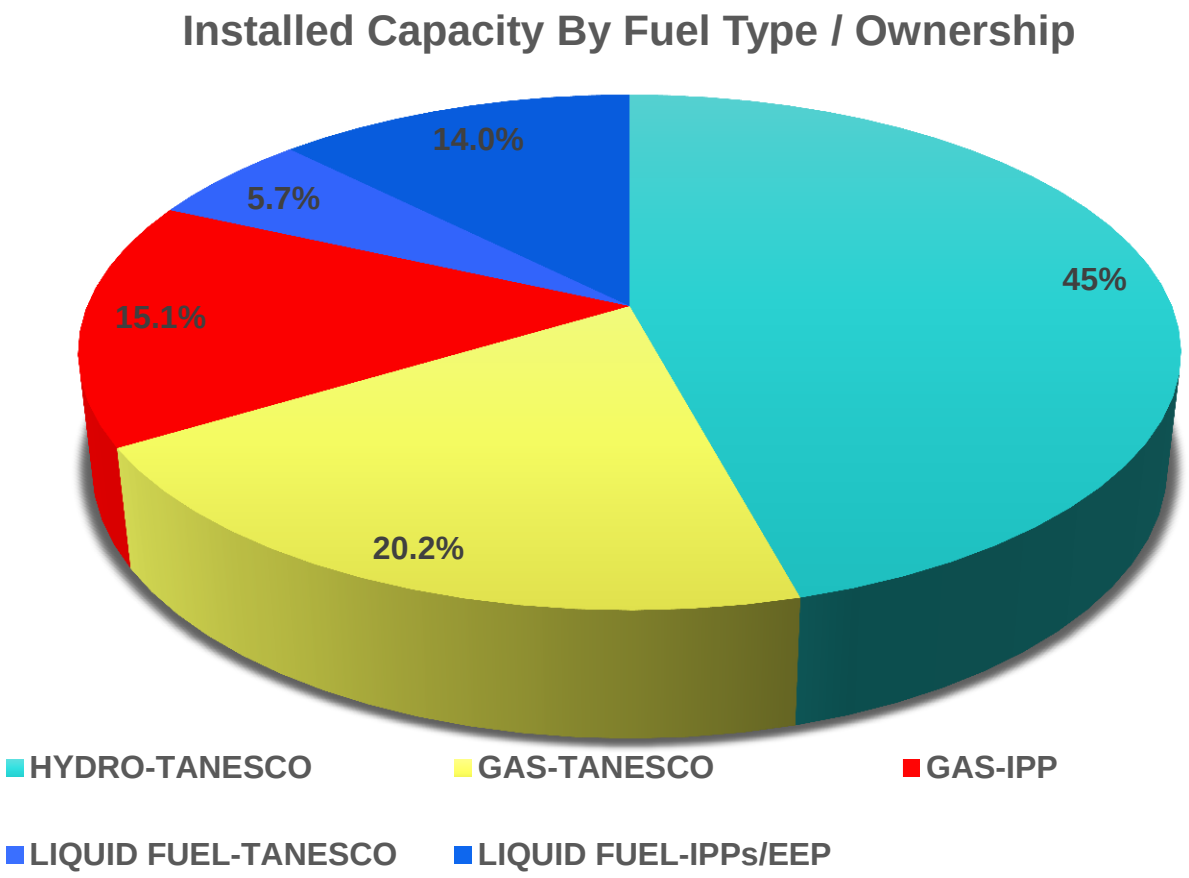
Consumption History



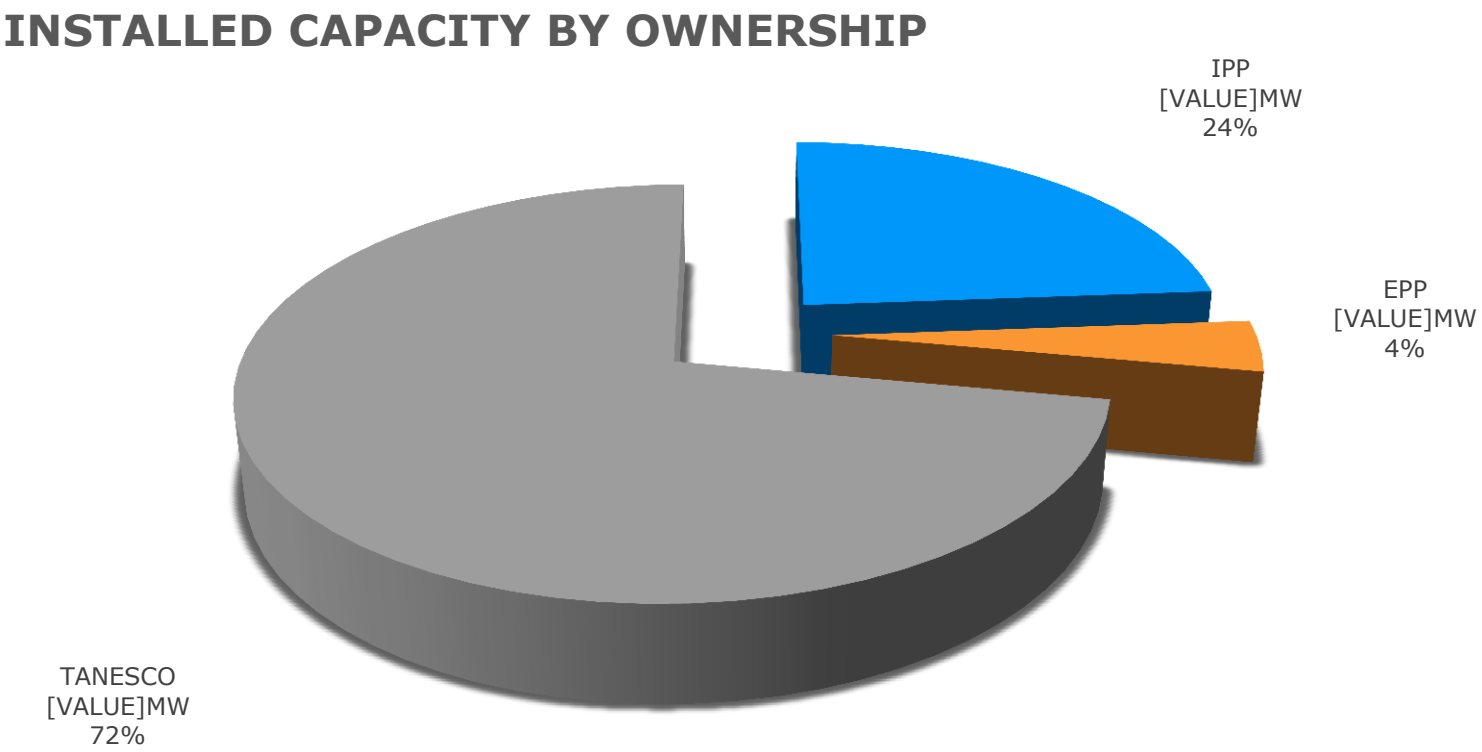
Consumption History



GENERATION MIX

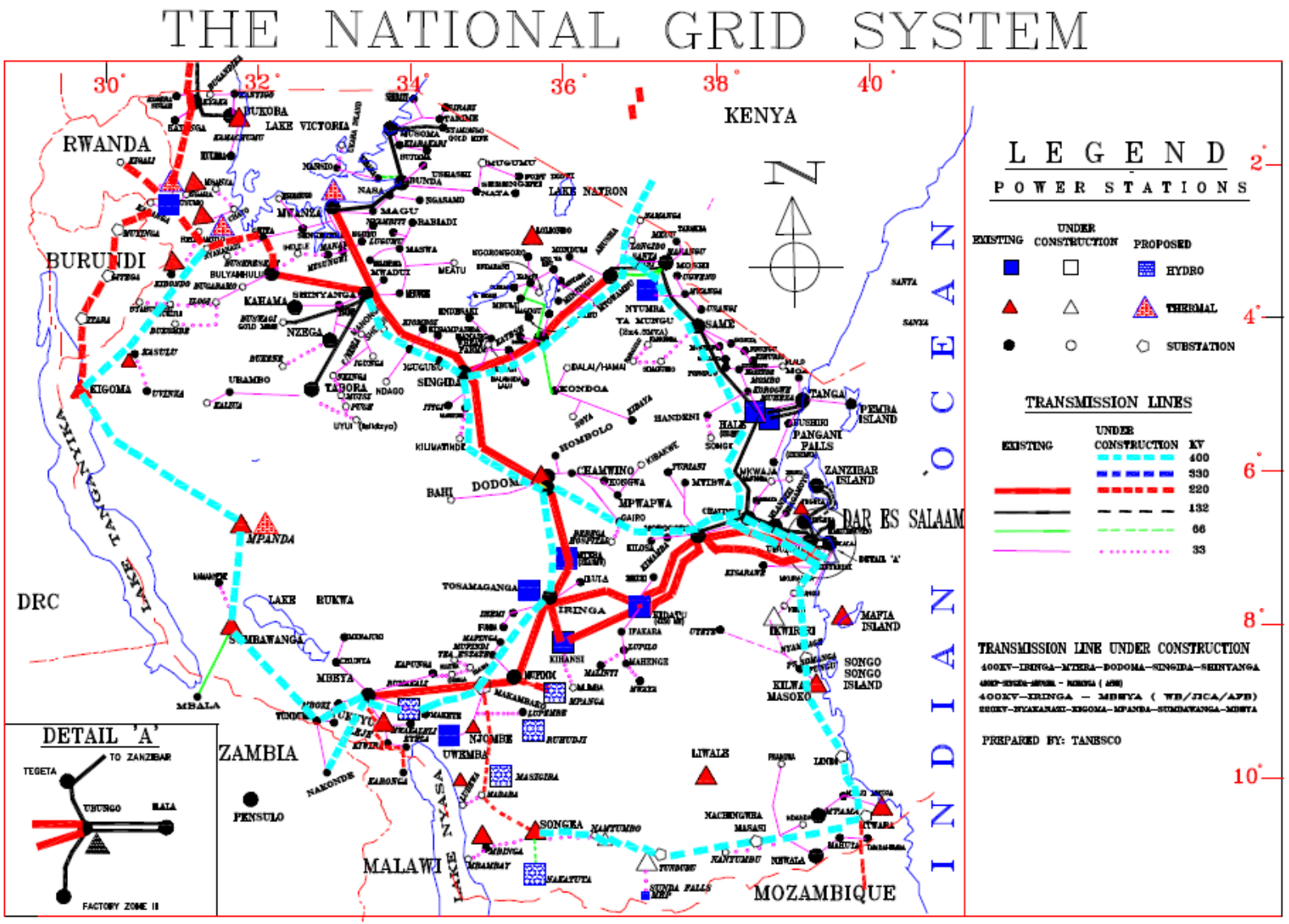


Current Situation - Generation Capacity

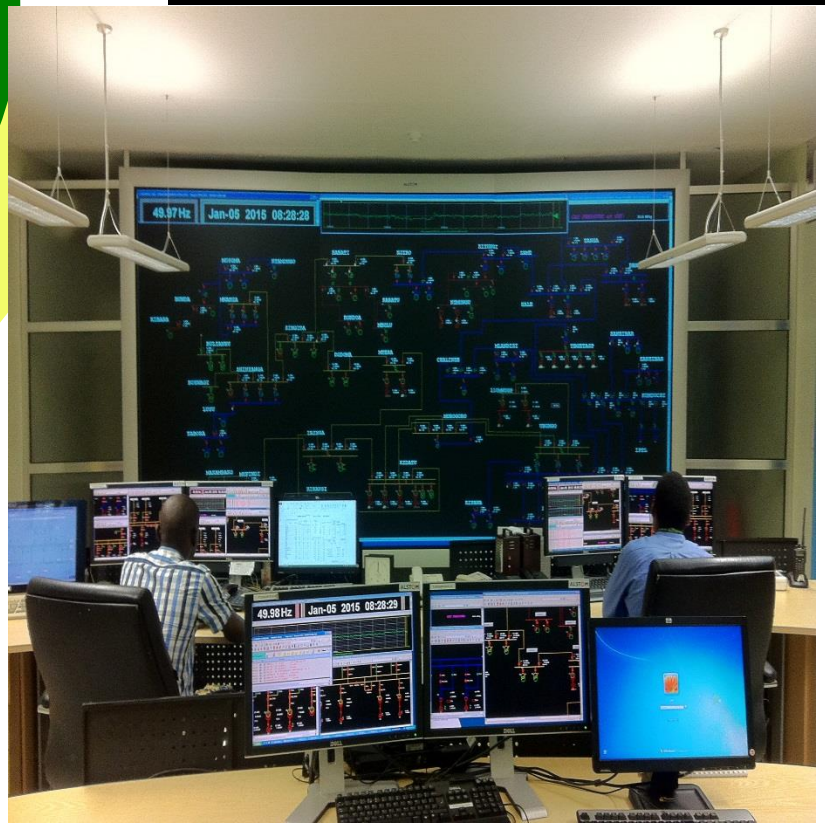


THE NATIONAL POWER GRID

Grid Map and Planned Extensions



5. Operation And Maintenance Of Transmission Infrastructure



Operation and Monitoring of Grid system at National Grid Control Centre – SCADA/EMS

Repair, Maintenance, Upgrade and Rehabilitation of high voltage Transmission lines including way leave management

REFORMING THE SECTOR AND THE UTILITY

Electricity Supply Industry Reform Strategy and Roadmap

- The ESI Reform Strategy and the Roadmap describe the intended reform initiatives and key actions covering the period from 2014 – 2025.

The reform initiatives aim at:

- Meeting the current and future demand for electricity
- Reducing public expenditure on ESI for operational activities
- Attracting private capital and
- Increasing electricity connection and access levels

Electricity Supply Industry Reform Strategy….cont.

The Roadmap is composed of detailed activities which will be implemented in the immediate, short, medium and long terms.

- In the immediate term, key activities involve ring-fencing TANESCO Strategic Business Units, valuation of assets and liabilities of TANESCO, and a human capital needs assessment.
- In short term, TANESCO generation segment is expected to be unbundled with IPPs unconditionally allowed to sell electricity directly to bulk off-takes and pay wheeling charges only to the company responsible for transmission.
- In the medium term, the distribution segment will be unbundled from the transmission unit.
- In long-term, there will be further unbundling of the distribution segment into several companies.

Electricity Supply Industry Reform Strategy … cont.

The intended major outcomes of the ESI Reform Strategy and Roadmap include:-

- To increase efficiency
- To provide quality services and goods
- To provide adequate and affordable power
- To improve customers satisfaction
- To increase transparency and competition
- To enhance satisfaction of business partners and their shareholders.
- Stop subsidies in the electricity sub-sector.

ESI Reforms Status

- Transformation and Change Management Unit (TCMT) has been established at TANESCO (2014)
- At final stages of generation, transmission and distribution assets valuation (2015).
- Have engaged M/s Deloitte to advise on the Integration of management information system for integrated resources planning (2014)
- As a step towards improving Financial Performance of TANESCO, 207 MW of expensive Emergency Power Plants(EPPs) were retired in 2014 (2014)
- Concept paper prepared for Establish an Electricity Infrastructure Procurement Coordinator (EIPC) (2015)
- Ring fence the core functions into strategic business units - SBU (2015)

POWER SYSTEM EXPANSION PLAN

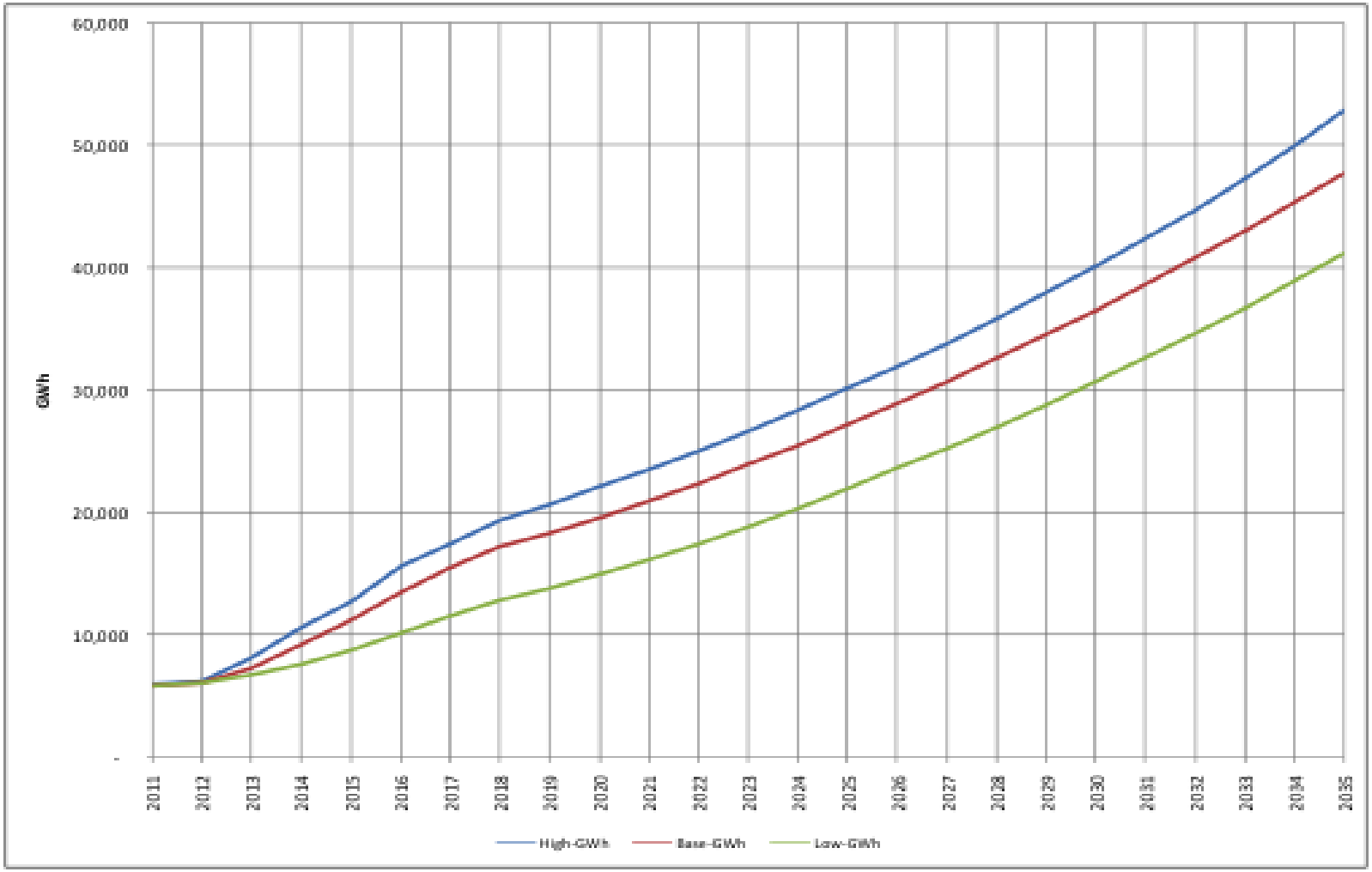
Energy Potential Resources

ENERGY SOURCE	POTENTIAL	DEVELOPED TO POWER
Coal:	1.9 Bil. tons (25% proven)	None
Natural Gas:	55.6 Trillion cubic feet (Tcf) discovered	501 MW
Geothermal:	5000 MW	None
Hydro:	4.7GW (10% developed)	562 MW
Wind	Avg. Speed: 5 - 9m/s	None
Biomass	Potential 500MW	35MW
Solar	Avg. insolation 4.6-6.2/kWh/m2	About 6MW

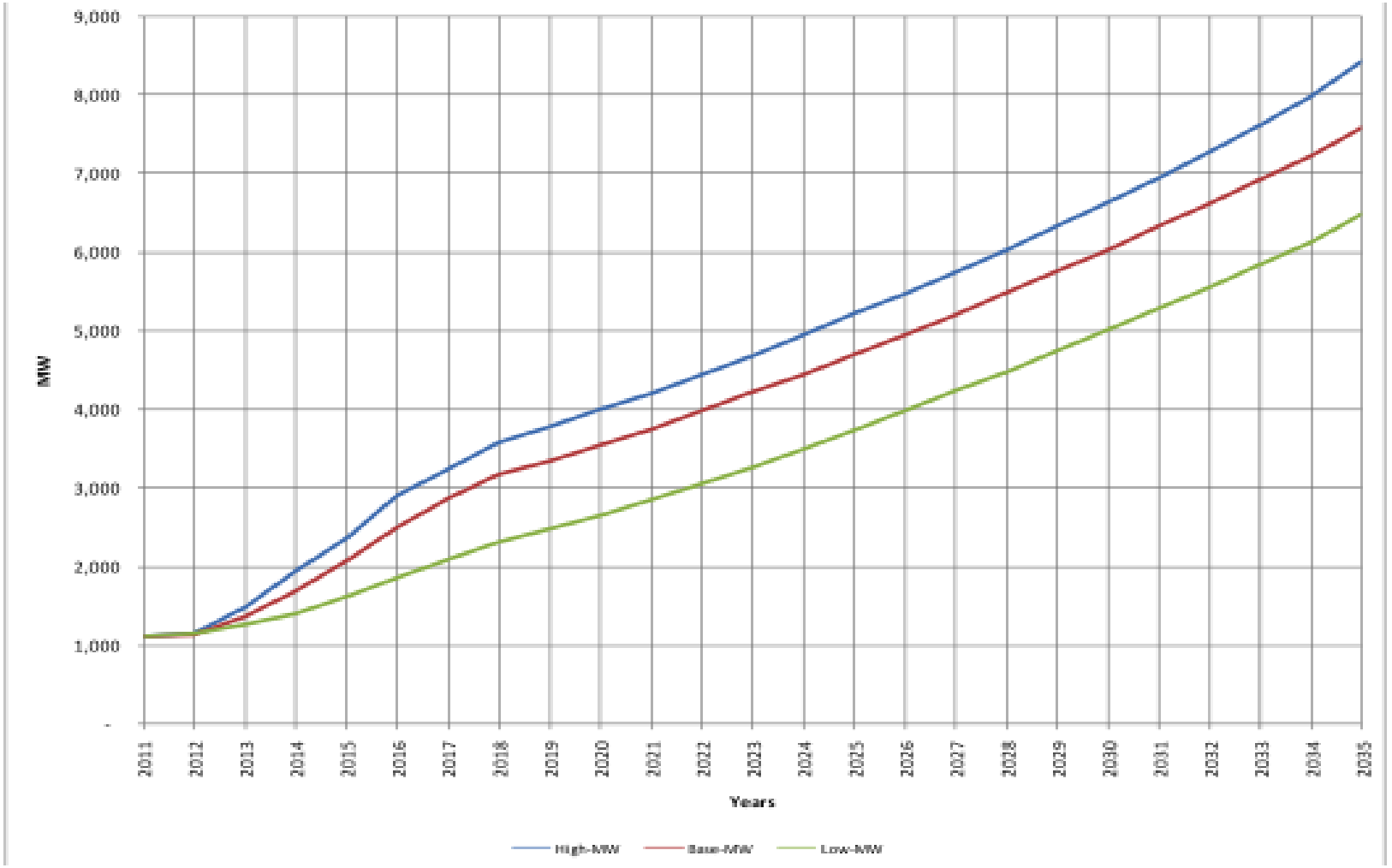
Power System Expansion Plan

- Generation and Transmission Expansion Plans are listed in the Power System Master Plan (PSMP) update of 2012
- Planning Horizon: Up to 2035
- PSMP expansion objectives are:
  - To meet internal demand (growth at 8 - 15% per annum)
  - To supply to the external Market
- PSMP expansion plans are geared to:
  - Increase generation capacity
  - Expand and reinforce transmission network
- The Big Results Now (BRN) Programme comprise of projects that addresses short-term power requirements

Gross Generation Forecast: 2011 - 2035 as per PSMP 2012 Update



Gross Peak Demand Forecast: 2011 – 2035 as per PSMP 2012 Update



8. Major Ongoing Projects - Generation

S/NO	PROJECT DESCRPTION	SOURCE OF FUNDING	PROJECT COST	STATUS	COMPLETION DATE
1	Kinyerezi I - 150MW gas fired power plant	GoT	USD 183m	Construction 99% completed	September 2015
2	Kinyerezi II – 240MW gas fired power plant	GoT - 15% JBIC – 85% Contractor: Sumitomo Corporation	USD 344million	Financial Closure has been achieved. GOT contributing 15%	2017
3	Kinyerezi III – 600MW gas fired power plant	China Power Investment (CPI)	USD 401million	JV Company formed and feasibility study is under review	2017
4	Kinyerezi IV – 330MW gas fired power plant	Poly Technology Inc. of China	USD 300million.	Preliminary feasibility study is under review	2017
5	Somanga Fungu 320MW Gas Fired Power Plant	Kilwa Energy - IPP	USD 365.6 Million	financial closure in August 2015	2017

Ongoing and Upcoming Projects

S/NO	PROJECT DESCRPTION	SOURCE OF FUNDING	PROJECT COST	STATUS	COMPLETION DATE
6	GeoWind 50MW Wind Power Plant at Singida	Exim Bank of China	USD 136 Million	Discussion to conclude financial closure is in progress	2017
7	400MW gas fired power plant at Mtwara with M/s Symbion Power	Symbion	USD 396.577million	Feasibility study is under review	2018
8	87MW hydropower plant to be developed at Kakono in Kagera Region	Not yet secured	Estimated cost USD 379.4million	Feasibility Study completed Solicitation of financing in progress	2019
9	44.8MW hydropower plant to be developed at Malagarasi river in Kigoma	Not yet secured	Estimated cost: USD 149.5million	Feasibility Study completed Solicitation of financing in progress	2020

Transmission Projects

S/NO	PROJECT DESCRPTION	SOURCE OF FUNDING	PROJECT COST	STATUS	COMPLETION DATE
1	400kV Iringa – Shinyanga transmission project (Backbone)	IDA, AfDB, JICA, EIB and Korea EDCF	USD 470 Million	Construction 60% completed	June 2016
2	400kV North East Grid Dar – Chalinze – Tanga - Arusha	GoT - 15% Exim Bank of China – 85 %	USD 692.7million	GoT is soliciting funds for financing the 15% of the contract value of the project	2017
3	200kV Makambako – Songea transmission line	SIDA & GoT	USD 111.43million	Distribution component 5% completed	2017
4	400kV North West Grid Phase 1: Mbeya - Sumbawanga	Negotiations with AfDB	USD 259.2million	Contract for upgrading the feasibility study from 220kV to 400kV by SWECO is in progress	2018
5	400 kV Singida-Arusha transmission line (Part of Z-T-K Project	AfDB, JICA	USD 258.82 million	Tenders for Contractors advertized, Valuation of properties for compensation has started	2018

Transmission Projects …

S/NO	PROJECT DESCRPTION	SOURCE OF FUNDING	PROJECT COST	STATUS	COMPLETION DATE
6	400 kV Chalinze-Dodoma transmission line	Financing not firmed	Estimated USD 175 million	Procurement of Consultant for feasibility study is in progress	2018
7	220 kV Bulyanhulu-Geita transmission line	Arab Bank for Economic Development in Africa (BADEA), OFID & GoT	USD 30million	Contract signing with Consultant for project supervision is underway	2017
8	220kV T/L Geita – Nyakanazi transmission line	KfW, AFD, EU & GoT	Euro 29million & TZS 5billion	Contract signing with Consultant for project supervision is underway	2017

PARTICIPATION IN POWER TRADING

9. Participation in Power Trading

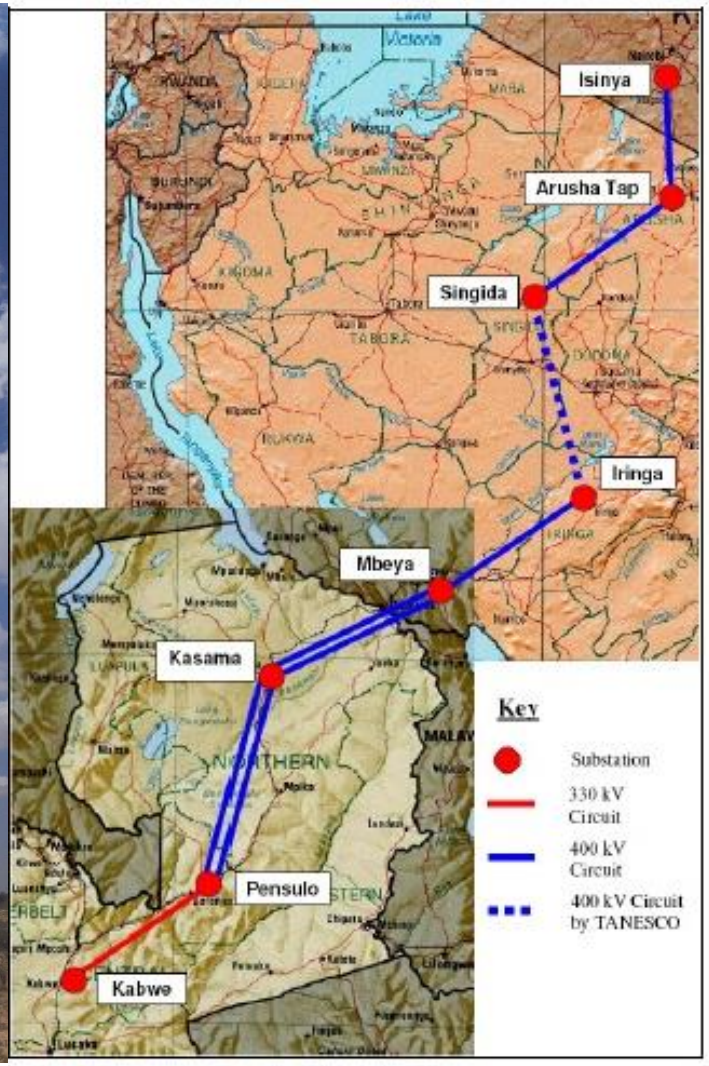
- Sources of Electricity Power for trading:
  - From Within - IPPs, Small Power Producers (SPPs) and Public Private Partnership (PPPs) companies
  - Import – through interconnectors

- The interconnection projects will link Eastern Africa Power Pool (EAPP) to the Southern Africa Power pool (SAPP) and allow power trading to take place between regions.
- Improved reliability of electricity services as well as reduction of average energy production cost.

- Will reduce investment cost due to improved energy utilization and improved economies of scale
- The market practice will be coordinated through the IMO in collaboration with the Regulator

ZAMBIA – TANZANIA – KENYA (ZTK) TRANSMISSION LINE

Backbone will be a part of the planned ZTK line



Participation in Power Trading …

SN	INTERCONNECTOR	CAPACITY (MW)	FINANCING	COMPLETION DATE
1	Kenya – Tanzania (400kV)	200	Available	2017
2	Zambia – Tanzania (400kV)	200	Negotiating with WB and AFD	2018
3	Uganda – Tanzania (220kV)	100	Negotiating with NELSAP	2018
4	Tanzania – Burundi, Tanzania - Rwanda – (Rusumo Project) 220kV	87	AfDB	2018
5	Mozambique – Tanzania (220kV)	100	MoU Signed	2018

Participation in Power Trading …)

S/N	INTERCONNECTOR	CAPACITY (MW)	FINANCING	COMPLETION DATE
5	Tanzania – Burundi (Through Kigoma) 220kV	100	Not Firmed	2019
6	Tanzania – Malawi (Songwe Project) 400kV	200	Not Firmed	2019
7	Mwanza – Kisumu 220kV	100	Not Firmed	2019

Improve power **availability, reliability** and **efficiency**

S/NO	PROJECT DESCRPTION	SOURCE OF FUNDING	PROJECT COST	STATUS	COMPLETION DATE
9	Improving the reliability of Electric power supply in the city of Dar es Salaam	Finish	EUR. 21.8million	Construction 60% completed	September, 2015
20	Tanzania Energy Development and Access Expansion Project (TEDAP) - Transmission	Korean Export - Import Bank through EDCF & IDA	USD 34,252,345.78	Construction 70% completed	December, 2015
21	Tanzania Energy Development and Access Expansion Project (TEDAP) - Distribution	IDA	USD 43,543,460.07	Construction 60% completed	December, 2015
22	Electricity V	AfDB & GoT	USD 51.25million	Construction 75% completed	June, 2015

Improve power **availability, reliability** and **efficiency**

S/NO	PROJECT DESCRPTION	SOURCE OF FUNDING	PROJECT COST	STATUS	COMPLETION DATE
23	Reinforcement of transmission and distribution facilities in Arusha and Kilimanjaro	World Bank & IDA	USD 20,176,384	Construction 75% completed	September 2015
24	Rehabilitation of Hale Hydro Plant 21MW	Co-financed by SIDA (60% grant) and GoT (40% commercial loan)	SEK 197 Million	The contract for the technical consultant has been signed	2016
25	Rehabilitation and Upgrade of Grid Network.	AFD	EUR. 53.0M	Procurement of Consultant for supervision of the project is underway	2016
26	Project for Reinforcement of Power Distribution in Dar es salaam Region	JICA	Japanese Yen 4.41 Billion equivalent to USD 38 Million	Contract signing with Consultant for project supervision is underway	2017

RENEWABLE ENERGIES OPPORTUNITIES

Renewable Energy Feed-In Tariff (REFIT) Program

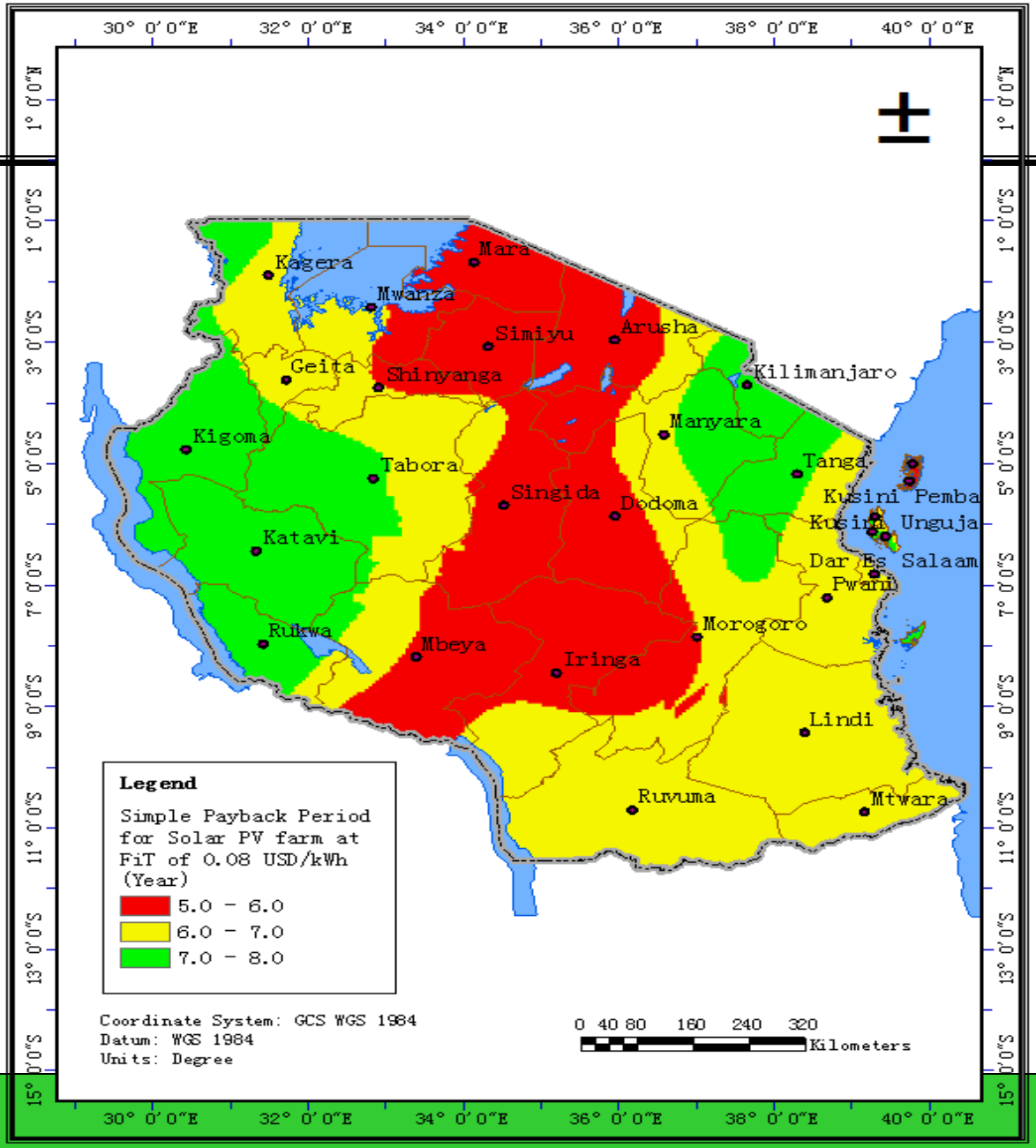
- In 2013 EWURA with financial assistance from USAID engaged a consultant to undertake study on REFIT.
- In August 2014 the consultant made presentation of draft final report to the stakeholders.
- In December 2014 EWURA conducted stakeholders workshop of the REFIT program. The REFIT program has proposals for mini-hydro, biomass both for main grid and mini-grid SPPs and mini-grid connected solar and wind projects.
- Grid connected solar and wind SPPs are to undergo competitive bidding process.
- EWURA's decision on the REFIT program is awaited.

Solar Map for Tanzania

The Company has in 2014 researched and developed Solar Map of Tanzania;

- The solar map will be used as a basic tool to identify solar power potential areas for development of Solar Power Projects
- The map shows that the average Solar Potential in Tanzania ranges between 4.2-6.2kWh/m2/day;
- Minimum payback period time for a Solar PV Project is 5Yrs and Maximum is 7-8Yrs.

Tanzania Solar Map



POWER AFRICA RELATED PROJECTS

Power Africa Related Projects

Tanzania is amongst six countries earmarked for the Power Africa initiatives by the USA Government.

Under the initiative following Projects are at various stages:

- MCC (Compact I completed, Compact II in preparation)
- Symbion Mtwara Project (600MW Power Plant and about 600km T/L)
- Nexgen Solawazi Solar Project
- Capacity Building initiatives by USAID and USEA
- Various interests on Renewables from US Companies