TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

TANESCO OVERVIEW

A Presentation

By

TANESCO Managing Director,
Eng. Felchesmi Mramba
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INTRODUCTION
1. Introduction
Brief Information on Tanzania

- Area: 945, 203 km²
- 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/m²),
  - 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

- 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) plants 19.4% 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

Gross Consumption

- GROSS CONSUMPTION (GWh)
- %age Growth


-10% -5% 0% 5% 10% 15% 20%

-10% -5% 0% 5% 10% 15% 20%
GENERATION MIX

Installed Capacity By Fuel Type / Ownership

- 45% HYDRO-TANESCO
- 20.2% GAS-TANESCO
- 15.1% LIQUID FUEL-TANESCO
- 14.0% GAS-IPP
- 5.7% LIQUID FUEL-IPPs/EEP
Current Situation - Generation Capacity

INSTALLED CAPACITY BY OWNERSHIP

- IPP [VALUE] MW 24%
- EPP [VALUE] MW 4%
- TANESCO [VALUE] MW 72%
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

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

<table>
<thead>
<tr>
<th>S/N</th>
<th>PROJECT DESCRIPTION</th>
<th>SOURCE OF FUNDING</th>
<th>PROJECT COST</th>
<th>STATUS</th>
<th>COMPLETION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kinyerezi I - 150MW gas fired power plant</td>
<td>GoT</td>
<td>USD 183m</td>
<td>Construction 99% completed</td>
<td>September 2015</td>
</tr>
<tr>
<td>2</td>
<td>Kinyerezi II – 240MW gas fired power plant</td>
<td>GoT - 15% JBIC – 85% Contractor: Sumitomo Corporation</td>
<td>USD 344million</td>
<td>Financial Closure has been achieved. GOT contributing 15%</td>
<td>2017</td>
</tr>
<tr>
<td>3</td>
<td>Kinyerezi III – 600MW gas fired power plant</td>
<td>China Power Investment (CPI)</td>
<td>USD 401million</td>
<td>JV Company formed and feasibility study is under review</td>
<td>2017</td>
</tr>
<tr>
<td>4</td>
<td>Kinyerezi IV – 330MW gas fired power plant</td>
<td>Poly Technology Inc. of China</td>
<td>USD 300million.</td>
<td>Preliminary feasibility study is under review</td>
<td>2017</td>
</tr>
<tr>
<td>5</td>
<td>Somanga Fungu 320MW Gas Fired Power Plant</td>
<td>Kilwa Energy - IPP</td>
<td>USD 365.6 Million</td>
<td>financial closure in August 2015</td>
<td>2017</td>
</tr>
</tbody>
</table>
# Ongoing and Upcoming Projects

<table>
<thead>
<tr>
<th>S/N</th>
<th>PROJECT DESCRIPTION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>GeoWind 50MW Wind Power Plant at Singida</td>
<td>Exim Bank of China</td>
<td>USD 136 Million</td>
<td>Discussion to conclude financial closure is in progress</td>
<td>2017</td>
</tr>
<tr>
<td>7</td>
<td>400MW gas fired power plant at Mtwara with M/s Symbion Power</td>
<td>Symbion</td>
<td>USD 396.577 million</td>
<td>Feasibility study is under review</td>
<td>2018</td>
</tr>
<tr>
<td>8</td>
<td>87MW hydropower plant to be developed at Kakono in Kagera Region</td>
<td>Not yet secured</td>
<td>Estimated cost: USD 379.4 million</td>
<td>Feasibility Study completed Solicitation of financing in progress</td>
<td>2019</td>
</tr>
<tr>
<td>9</td>
<td>44.8MW hydropower plant to be developed at Malagarasi river in Kigoma</td>
<td>Not yet secured</td>
<td>Estimated cost: USD 149.5 million</td>
<td>Feasibility Study completed Solicitation of financing in progress</td>
<td>2020</td>
</tr>
</tbody>
</table>
## Transmission Projects

<table>
<thead>
<tr>
<th>S/N</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>400kV Iringa – Shinyanga transmission project (Backbone)</td>
<td>IDA, AfDB, JICA, EIB and Korea EDCF</td>
<td>USD 470 Million</td>
<td>Construction 60% completed</td>
<td>June 2016</td>
</tr>
<tr>
<td>2</td>
<td>400kV North East Grid Dar – Chalinze – Tanga - Arusha</td>
<td>GoT - 15% Exim Bank of China – 85 %</td>
<td>USD 692.7million</td>
<td>GoT is soliciting funds for financing the 15% of the contract value of the project</td>
<td>2017</td>
</tr>
<tr>
<td>3</td>
<td>200kV Makambako – Songea transmission line</td>
<td>SIDA &amp; GoT</td>
<td>USD 111.43million</td>
<td>Distribution component 5% completed</td>
<td>2017</td>
</tr>
<tr>
<td>4</td>
<td>400kV North West Grid Phase 1: Mbeya - Sumbawanga</td>
<td>Negotiations with AfDB</td>
<td>USD 259.2million</td>
<td>Contract for upgrading the feasibility study from 220kV to 400kV by SWECO is in progress</td>
<td>2018</td>
</tr>
<tr>
<td>5</td>
<td>400 kV Singida-Arusha transmission line (Part of Z-T-K Project)</td>
<td>AfDB, JICA</td>
<td>USD 258.82 million</td>
<td>Tenders for Contractors advertized, Valuation of properties for compensation has started</td>
<td>2018</td>
</tr>
</tbody>
</table>
# Transmission Projects …

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</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>400 kV Chalinze-Dodoma transmission line</td>
<td>Financing not firmed</td>
<td>Estimated USD 175 million</td>
<td>Procurement of Consultant for feasibility study is in progress</td>
<td>2018</td>
</tr>
<tr>
<td>7</td>
<td>220 kV Bulyanhulu-Geita transmission line</td>
<td>Arab Bank for Economic Development in Africa (BADEA), OFID &amp; GoT</td>
<td>USD 30 million</td>
<td>Contract signing with Consultant for project supervision is underway</td>
<td>2017</td>
</tr>
<tr>
<td>8</td>
<td>220kV T/L Geita – Nyakanazi transmission line</td>
<td>KfW, AFD, EU &amp; GoT</td>
<td>Euro 29 million &amp; TZS 5 billion</td>
<td>Contract signing with Consultant for project supervision is underway</td>
<td>2017</td>
</tr>
</tbody>
</table>
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 …

<table>
<thead>
<tr>
<th>SN</th>
<th>INTERCONNECTOR</th>
<th>CAPACITY (MW)</th>
<th>FINANCING</th>
<th>COMPLETION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kenya – Tanzania (400kV)</td>
<td>200</td>
<td>Available</td>
<td>2017</td>
</tr>
<tr>
<td>2</td>
<td>Zambia – Tanzania (400kV)</td>
<td>200</td>
<td>Negotiating with WB and AFD</td>
<td>2018</td>
</tr>
<tr>
<td>3</td>
<td>Uganda – Tanzania (220kV)</td>
<td>100</td>
<td>Negotiating with NELSAP</td>
<td>2018</td>
</tr>
<tr>
<td>4</td>
<td>Tanzania – Burundi, Tanzania - Rwanda – (Rusumo Project) 220kV</td>
<td>87</td>
<td>AfDB</td>
<td>2018</td>
</tr>
<tr>
<td>5</td>
<td>Mozambique – Tanzania (220kV)</td>
<td>100</td>
<td>MoU Signed</td>
<td>2018</td>
</tr>
</tbody>
</table>
## Participation in Power Trading ...

<table>
<thead>
<tr>
<th>S/N</th>
<th>INTERCONNECTOR</th>
<th>CAPACITY (MW)</th>
<th>FINANCING</th>
<th>COMPLETION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Tanzania – Burundi (Through Kigoma) 220kV</td>
<td>100</td>
<td>Not Firmed</td>
<td>2019</td>
</tr>
<tr>
<td>6</td>
<td>Tanzania – Malawi (Songwe Project) 400kV</td>
<td>200</td>
<td>Not Firmed</td>
<td>2019</td>
</tr>
<tr>
<td>7</td>
<td>Mwanza – Kisumu 220kV</td>
<td>100</td>
<td>Not Firmed</td>
<td>2019</td>
</tr>
</tbody>
</table>
# Improve power availability, reliability and efficiency

**PROJECT DESCRIPTION**

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Improving the reliability of Electric power supply in the city of Dar es Salaam</td>
<td>Finish</td>
<td>EUR. 21.8million</td>
<td>Construction 60% completed</td>
<td>September, 2015</td>
</tr>
<tr>
<td>20</td>
<td>Tanzania Energy Development and Access Expansion Project (TEDAP) - Transmission</td>
<td>Korean Export - Import Bank through EDCF &amp; IDA</td>
<td>USD 34,252,345.78</td>
<td>Construction 70% completed</td>
<td>December, 2015</td>
</tr>
<tr>
<td>21</td>
<td>Tanzania Energy Development and Access Expansion Project (TEDAP) - Distribution</td>
<td>IDA</td>
<td>USD 43,543,460.07</td>
<td>Construction 60% completed</td>
<td>December, 2015</td>
</tr>
<tr>
<td>22</td>
<td>Electricity V</td>
<td>AfDB &amp; GoT</td>
<td>USD 51.25million</td>
<td>Construction 75% completed</td>
<td>June, 2015</td>
</tr>
</tbody>
</table>
## Improve power availability, reliability and efficiency

<table>
<thead>
<tr>
<th>S/N</th>
<th>PROJECT DESCRIPTION</th>
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<th>STATUS</th>
<th>COMPLETION DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Reinforcement of transmission and distribution facilities in Arusha and Kilimanjaro</td>
<td>World Bank &amp; IDA</td>
<td>USD 20,176,384</td>
<td>Construction 75% completed</td>
<td>September 2015</td>
</tr>
<tr>
<td>24</td>
<td>Rehabilitation of Hale Hydro Plant 21MW</td>
<td>Co-financed by SIDA (60% grant) and GoT (40% commercial loan)</td>
<td>SEK 197 Million</td>
<td>The contract for the technical consultant has been signed</td>
<td>2016</td>
</tr>
<tr>
<td>25</td>
<td>Rehabilitation and Upgrade of Grid Network</td>
<td>AFD</td>
<td>EUR. 53.0M</td>
<td>Procurement of Consultant for supervision of the project is underway</td>
<td>2016</td>
</tr>
<tr>
<td>26</td>
<td>Project for Reinforcement of Power Distribution in Dar es Salaam Region</td>
<td>JICA</td>
<td>Japanese Yen 4.41 Billion equivalent to USD 38 Million</td>
<td>Contract signing with Consultant for project supervision is underway</td>
<td>2017</td>
</tr>
</tbody>
</table>
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.
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.
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