INVESTMENT OPPORTUNITIES IN THE ENERGY SECTOR IN THE UNITED REPUBLIC OF TANZANIA

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POLICY, LEGAL AND REGULATORY FRAMEWORKS OF THE POWER SUB-SECTOR

♦ TANESCO Act, 1964
♦ Petroleum (Exploration and Production) Act, 1980
♦ EWURA Act, 2001
♦ National Energy Policy, 2003
♦ Occupational Safety and Health Act, 2003
♦ Environmental Management Act, 2004
♦ Income Tax Act, 2004
♦ REA Act, 2005
♦ Electricity Act, 2008
♦ Petroleum Act, 2008
♦ Public-Private Partnership Act, 2010
♦ Natural Gas Policy, 2013
♦ Natural Gas Act (under preparation)
**Generation:**
- The installed capacity in the main grid is 1,583 MW. Hydro (35%), Natural Gas (33%) Oil (32%)
- Off-grid stations total capacity is 76.4 MW
- Highest grid system demand is 898.72 MW recorded in November 2013.

**Transmission System:**
Transmission network comprises of:
- 2,732 km of 220 kV lines
- 1,555.8 km of 132 kV lines
- 578.7 km of 66 kV lines
Total= 4,866.5 km by the end of November 2013.

**Distribution System:**
Comprises of:
- 17,021 km of 33 kV lines
- 5,375 km of 11 kV lines
- 34,513 km of LV
- 11,124 distribution transformers
<table>
<thead>
<tr>
<th>ENERGY SOURCE</th>
<th>POTENTIAL</th>
<th>DEVELOPED TO POWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal: Kiwira, Mchuchuma, Ngaka, Rukwa and around Lake Nyasa</td>
<td>5-7 billion tons</td>
<td>None</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>46.5 tcf</td>
<td>501 MW</td>
</tr>
<tr>
<td>Geothermal: 58 sites including: Songwe (Mbeya), Luhoi (Rufiji), Manyara, Lake Natron and Kisaki.</td>
<td>&gt;3,000 MW</td>
<td>None</td>
</tr>
<tr>
<td>Hydro</td>
<td>4.7 GW</td>
<td>562 MW</td>
</tr>
</tbody>
</table>
## ENERGY RESOURCES POTENTIAL

<table>
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<tr>
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<tbody>
<tr>
<td>Wind: Makambako, Singida, Litembe (Mtwar), Mkumbara (Tanga), Gomvu (Dar), Karatu (Manyara) and Mafia</td>
<td>Average wind speed 5 - 8m/s</td>
<td>None</td>
</tr>
<tr>
<td>Solar</td>
<td>Average daily solar isolation of 4.6/kWh/m2</td>
<td>About 6 MW</td>
</tr>
<tr>
<td><strong>BIO-ENERGIES</strong></td>
<td><strong>UNLIMITED</strong></td>
<td>35 MW from bagasse and woody residue</td>
</tr>
</tbody>
</table>
**DISCOVERIES**

- **Mkuranga**
  - 2007 (0.2 TCF)

- **Kiliwani**
  - 2008 (0.07 TCF)

- **Songo Songo**
  - 1974 (2.5 TCF)

- **Mnazi Bay**
  - 1982 (5 TCF)

- **Ntorya**
  - 2012 (0.178 TCF)

**Total GIIP onshore = 8 TCF**

**TOTAL GIIP (December 2013):**

- **Deep Sea (2010-12)**: 38.5 TCF

**Total GIIP onshore = 8 TCF**

**TOTAL GIIP (December 2013):**

- **46.5 TCF**
URANIUM DEPOSITS

♦ MKUJU PROJECT: 137.3 Million Lbs

Namtumbo - 35.9 MILLION LBS
Tunduru - 101.4 MILLION LBS

♦ MANYONI PROJECT: 19 Million Lbs (57 M tonnes)

Prospecting Licenses (Regions):
Arusha, Dodoma, Iringa, Lindi, Ruvuma, Mbeya, Morogoro, Mtwara, Rukwa, Shinyanga, Singida and Tanga

4. Namibia: 4,496 tons, 8.4% world’s production
5. Niger: 4,198 tons, 7.8%
11. Malawi: 670 tons, 1.2%
12. South Africa: 583 tons, 1.1%
Available renewable energy The volume of the cubes represent the amount of available geothermal, hydropower, wind and solar energy in TW, although only a small portion is recoverable. The small red cube shows the proportional global energy consumption.
## TRANSMISSION PROJECTS

<table>
<thead>
<tr>
<th>Transmission Projects</th>
<th>Distance (km)</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>400kV Singida – Arusha - Namanga</td>
<td>414</td>
<td>2016</td>
</tr>
<tr>
<td>220kV Kiwira – Mbeya</td>
<td>100</td>
<td>2016</td>
</tr>
<tr>
<td>400kV Kasama (Zambia) - Mbeya – Iringa</td>
<td>540</td>
<td>2018</td>
</tr>
<tr>
<td>400kV Shinyanga – Mwanza</td>
<td>140</td>
<td>2018</td>
</tr>
<tr>
<td>220kV Geita – Nyakanazi – Rusumo</td>
<td>228</td>
<td>2018</td>
</tr>
<tr>
<td>220 kV Kihansi -Ruhudji – Mufindi</td>
<td>250</td>
<td>2025</td>
</tr>
<tr>
<td>400kV Ngaka – Makambako</td>
<td>200</td>
<td>2017</td>
</tr>
<tr>
<td>220kV Somanga – Lindi - Mtwara</td>
<td>358</td>
<td>2017</td>
</tr>
<tr>
<td>400kV Mtwara – Songea</td>
<td>656</td>
<td>2021</td>
</tr>
<tr>
<td>400kV Nyakanazi– Kigoma – Sumbawanga</td>
<td>808</td>
<td>2015</td>
</tr>
<tr>
<td>400kV Mchuchuma – Mufindi</td>
<td>200</td>
<td>2018</td>
</tr>
<tr>
<td>220kV Rumakali – Makambako</td>
<td>200</td>
<td>2020</td>
</tr>
</tbody>
</table>
FUTURE GRID MAP BY 2035

THE NATIONAL GRID SYSTEM

LEGEND

POWER STATIONS
- EXISTING
- CONSTRUCTION
- PROPOSED
- HYDRO
- THERMAL
- SUBSTATION

TRANSMISSION LINES
- EXISTING
- CONSTRUCTION
- PROPOSED

TRANSMISSION LINE UNDER CONSTRUCTION
- DAR ES SALAAM (U) - DAR ES SALAAM (U)
- DAR ES SALAAM (U) - DAR ES SALAAM (U)
- DAR ES SALAAM (U) - DAR ES SALAAM (U)

PREPARED BY: CAMERON
REFORM OF TANESCO

♦ DIFFERENCE BETWEEN REFORM AND OWNERSHIP

♦ REFORMED TANESCO – KEY PLAYERS
  1. PUBLIC SECTOR
  2. PRIVATE SECTOR
  3. PRIVATE-PUBLIC PARTNERSHIP (PPP Act 2010)

♦ DIALOGUE ON THE REFORM BY STAKEHOLDERS:
  ROADMAP, March 2014

♦ GOVERNMENT’S APPROVAL: June 2014
NEW REVENUE COLLECTION MECHANISMS

♦ Installation of Prepaid meters
♦ Purchasing of Electricity through mobile phones and ATM (Banks)
♦ Automatic Meter Reading (AMR)
♦ Electronic Payments & Applications for New Clients
Existing Projects:

- Power factor Correction Program
- Public awareness Campaign via Media and Exhibition

Projects to take off by January 2015:

- Time Of Use Pricing
- Distribution of Compact Fluorescent Lamp to D1 and T1 customers - (CFL)Program
RECENT IMPROVEMENTS... - LOSS REDUCTION

- decrease: 19%
- Above Target (BRN): 11%
SCHEMATIC DIAGRAM SHOWING THE NATURAL GAS PROCESSING PLANTS IN MTWARA AND SONGOSONGO AND THE UNDERCONSTRUCTION PIPELINE TO DAR ES SALAAM

- **Mnazi Bay Mtwarra**: 4 wells, 3 trains (210 mmmscfd)
- **Songo Songo**: 2 trains (140 mmmscfd), 7 wells
- **Somangafungu**: Ownership: 100% TPDC, 320 MW, 200 MW
- **Onshore Pipeline**: Ownership: 100% TPDC
- **Offshore Pipeline**: Ownership: 100% TPDC, 487 Km, 36"
- **Kiliwani North**: 1 well
- **TANESCO Power Generation Plants**: Ownership: 100% TANESCO
  - 300 MW, 300 MW, 240 MW, 150 MW

For more details, please refer to the images of the natural gas processing plants.
UTILIZATION OF THE NATURAL GAS

- Power generation: 3,000 MW
- LNG (Onshore)
- Smelting plants
- Cement industries
- Other industries
- Household (Homes)
- Motor vehicles (CNG)
- Fertilizer production
- Methanol plants
- Plastics industries
- Other Petrochemical Industries
Natural Gas is **condensed** into a liquid at close to atmospheric pressure (maximum transport pressure set at around 25 kPa (4 psi) by cooling it to approximately −162 °C.

**1 TRAIN: 1 MILLION TONS PER ANNUM – 150 mcft/day – 25 yrs = 4.8 tcf**
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