Tanzania’s Experience in Establishing a Regulatory System for Promoting Grid and Off-Grid Small Power Producers (SPPs)

AFTEG and the African Electrification Initiative (AEI)

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REA/REF-Led Electrification: Practical Implementation
Issues for SSA Access Scale-Up.
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Outline

- Small Power Producer (SPP) – real world examples
- Overview of Tanzania SPP regulations
  - Tanzania Legislative Framework
  - Goals,
  - Standardized Framework / Table of SPP documents
  - Tariff Issues
    - Main grid, mini grid, wholesale and retail sales
    - Calculation process and Levels
  - Required permissions and approvals, procedures for application; process rules
- Current situation: successes and challenges
  - PPAs, generators in the pipeline
  - Challenges
Pilot Sisal Biogas Plant 150 kW– HALE - TANGA - TANZANIA
Typical 1MW Plant from Thailand
Micro-hydropower

• 150 kW – remote mini-grid
• LUMAMA hydropower project
• Mawengi village, Njombe, Tanzania
Tanzania SPP Legislative Framework

- National Energy Policy, 2003
  - Policy Statement No. 36
- Energy and Water Utilities Regulatory Authority Act
  - Establishing EWURA,
  - Emphasis on Rural services, §6(d)
- Rural Energy Act (2005)
  - Establishing REA & REF
- The Electricity Act, 2008
  - Defines SPPA & SPPT
A goal: Light-handed regulation

1. Minimize amount of information that is required.
2. Minimize the number of separate regulatory requirements and decisions.
3. Use standardized documents, and make use of documents used by other agencies, to the maximum extent possible (reduce need for case-by-case negotiation)
4. Minimize discreetional judgment and time required for making decision.
# SPP Framework Documents

<table>
<thead>
<tr>
<th></th>
<th><strong>Main grid</strong></th>
<th><strong>Mini-grid</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standardized PPA</strong></td>
<td><strong>Standardized Power Purchase Agreement for Purchase of Grid-Connected Capacity and Associated Electric Energy Between Buyer and a Small Power Project</strong></td>
<td><strong>Standardized Power Purchase Agreement for Purchase of Off-Grid Capacity and Associated Electric Energy Between Buyer and a Small Power Project</strong></td>
</tr>
<tr>
<td><strong>Tariff methodology</strong></td>
<td><strong>Standardized Tariff Methodology for the sale of Electricity to the Main Grid in Tanzania Under the Standardized Small Power Purchase Agreements.</strong></td>
<td><strong>Standardized Tariff Methodology for the Sale of Electricity to the Mini-grids Under the Standardized Small Power Purchase Agreements</strong></td>
</tr>
<tr>
<td><strong>Process Guidelines (roadmap)</strong></td>
<td><strong>Guidelines for Developers of Small Power Projects (SPP) in Tanzania; • Includes standardized forms</strong></td>
<td></td>
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<td><strong>Process rules</strong></td>
<td><strong>Rules for Developers of Small Power Projects (SPP) in Tanzania</strong></td>
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<tr>
<td><strong>Interconnection Guidelines</strong></td>
<td><strong>Guidelines for Grid Interconnection of Small Power Projects in Tanzania (Parts A, B, C)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Interconnection rules</strong></td>
<td>◊ <strong>Rules for Grid Interconnection of Small Power Projects (Not Yet provided)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Annual Tariff calculations</strong></td>
<td><strong>Detailed Tariff Calculations under the SPPA for the Main Grid for each year</strong></td>
<td><strong>Detailed Tariff Calculations under the SPPA for the Mini-grids for each year</strong></td>
</tr>
</tbody>
</table>
Salient Features

- **Small Power Purchase Agreement (SPPA)**
  - A Must Take Plant
  - Term – 15 years
  - Seller may opt to join electricity trading
  - Isolated SPPA switches to Main grid SPPA upon interconnection with main grid

- **Standardized Tariff Methodology**
  - Avoided Costs of the Utility
  - Technology Neutral
  - Floor and Cap Prices
  - Calculated Annually / Reflect Seasonality (Main Grid)
  - Local Currency Denomination
  - Adjustment for Transmission Losses
## Tariffs determined by SPP type

<table>
<thead>
<tr>
<th>Selling wholesale (to DNO*)</th>
<th>Connected to main grid</th>
<th>Connected to isolated mini-grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td></td>
<td>Case 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Selling retail (directly to final customers)</th>
<th>Connected to main grid</th>
<th>Connected to isolated mini-grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 3</td>
<td></td>
<td>Case 4</td>
</tr>
</tbody>
</table>
Tariff Calculation Process

Case 1&2

- Annual data from TANESCO
- Data Verification and tariff computation by EWURA Staff.
- Review of results with Working Group on Small Power Development (WGSPD)
  - Composed of representative from Key stakeholders
- Formal submission to EWURA Board for approval
# Annual Feed-in-Tariff Levels

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRID</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TZS/kWh</td>
<td>100</td>
<td>96.11</td>
<td>110</td>
<td>121</td>
</tr>
<tr>
<td>Mid Yr Rate (TZS/$)</td>
<td>1176.99</td>
<td>1321.69</td>
<td>1393.82</td>
<td>1598.39</td>
</tr>
<tr>
<td>US$/kWh</td>
<td>0.085</td>
<td>0.073</td>
<td>0.079</td>
<td>0.076</td>
</tr>
<tr>
<td>ISOLATED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TZS/kWh</td>
<td>N/A</td>
<td>334.8</td>
<td>369</td>
<td>380</td>
</tr>
<tr>
<td>Mid Yr Rate (TZS/$)</td>
<td>1176.99</td>
<td>1321.69</td>
<td>1393.82</td>
<td>1598.39</td>
</tr>
<tr>
<td>US$/kWh</td>
<td>N/A</td>
<td>0.253</td>
<td>0.265</td>
<td>0.238</td>
</tr>
</tbody>
</table>
Necessary permits, clearances and procedures for application:

1. Land title or lease
2. Resource Rights (e.g. water rights from River Basin Water Office)
3. Letter of Intent (LOI)
4. Business license, tax registration, etc.
5. Building Permit
6. Environmental and Social Clearance (NEMC)
7. Power Purchase Agreement (PPA)
8. EWURA license

Sequence is important to avoid competing claims on project sites.
## SPPs In Operation

<table>
<thead>
<tr>
<th>Project</th>
<th>MW</th>
<th>Type of Resource</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACRA Tanzania</td>
<td>0.3</td>
<td>Hydro</td>
<td>In Operation / Community based—Main grid</td>
</tr>
<tr>
<td>TANWAT</td>
<td>2.34</td>
<td>Biomass -wood</td>
<td>Selling 1 MW (2010)-Main Grid</td>
</tr>
<tr>
<td>TPC Co-Generation</td>
<td>15</td>
<td>Baggasse</td>
<td>Contracted to Sell 9 MWe to TANESCO—Main grid</td>
</tr>
<tr>
<td>Katani Power Plant</td>
<td>0.3</td>
<td>Biomass - Waste</td>
<td>In Operation – Pilot, not connected to network—Isolated mini-grid</td>
</tr>
</tbody>
</table>
## SPPs in Preparation

<table>
<thead>
<tr>
<th>Project</th>
<th>MW</th>
<th>Resource</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sao Hill Energy</td>
<td>15</td>
<td>Biomass – wood (CHP)</td>
<td>Provisional Licence (Grid)</td>
</tr>
<tr>
<td>Chipole – Own use &amp; sell to the grid</td>
<td>0.4</td>
<td>Hydro</td>
<td>In operation – additional 3MW on new site planned (off-grid)</td>
</tr>
<tr>
<td>Mwenga</td>
<td>3.36</td>
<td>Hydro</td>
<td>PPA Signed with TANESCO (off-grid)</td>
</tr>
<tr>
<td>Ngombeni Mafia</td>
<td>1.4</td>
<td>Biomass</td>
<td>PPA Signed with TANESCO. Under construction (off-grid)</td>
</tr>
<tr>
<td>Kilombero Sugar Co.</td>
<td>10.6</td>
<td>Bagasse</td>
<td>Applied Licence (Grid)</td>
</tr>
<tr>
<td>Tanzania Sisal Board</td>
<td>0.5</td>
<td>Biogas</td>
<td>Applied License</td>
</tr>
<tr>
<td>Kitonga Mini Hydro</td>
<td>10</td>
<td>Hydro</td>
<td>Applied License, may increase capacity (Grid)</td>
</tr>
<tr>
<td>Andoya Hydro Electric Co.</td>
<td>0.5</td>
<td>Hydro</td>
<td>Provisional Licence (Off-grid)</td>
</tr>
<tr>
<td>Kilocha Hydro</td>
<td>12</td>
<td>Hydro</td>
<td>In discussion with REA (Grid)</td>
</tr>
<tr>
<td>Kilombero Mngeta</td>
<td>3</td>
<td>Hydro</td>
<td>In discussion with REA (Grid)</td>
</tr>
<tr>
<td>Challenge</td>
<td>Response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Lack of Renewable Energy Policy</td>
<td>1. Government needs to set clear policy with targets, etc.</td>
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<tr>
<td>2. Inadequate financial resources to support the initiative</td>
<td>2. WB has established a loan guarantee facility, engage interest of other financial institutions</td>
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<tr>
<td>3. Inadequate private sector participation in investment</td>
<td>3. Conducive Environment, rules and publicize</td>
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<tr>
<td>4. High interest rates loans from commercial banks</td>
<td>4. Promote other sources mix grant and loans</td>
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<tr>
<td>5. Land ownership and water rights for SPPs projects especially wind farms &amp; mini-hydro plants</td>
<td>5. Include land ownership &amp; water rights in RE Policy</td>
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<tr>
<td>Challenge</td>
<td>Response</td>
<td></td>
<td></td>
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<tr>
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<tr>
<td>6. Low, non-cost reflective tariffs &amp; depreciating Tsh.</td>
<td>6. Government has directed EWURA develop technology specific FiTs. But who will pay the premium?</td>
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</tr>
<tr>
<td>7. Lack of experience of key project promoters with skills in project management</td>
<td>7. Capacity building (REA)</td>
<td></td>
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<tr>
<td>8. Lack of interest on the part of potential Off-takers (TANESCO)</td>
<td>8. Improving through regular discussions with utility</td>
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<tr>
<td>9. Isolated Grid SPPA changing into Main Grid SPPA upon interconnection</td>
<td>9. Introduce technology specific FiT or maintain the higher off-grid FIT</td>
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</tbody>
</table>
Reflections

- Less than 10% of the Rural population have access to electricity
- Renewable Small Power Projects can enhance efforts towards electrification of Rural areas
- Though generally expensive SPPs can be developed much faster hence increase generating capacity on grid
- Private investments can be quickly organized and also benefit local entrepreneurs, plus multiplier effects
- Light handed regulation will reduce regulatory burden hence benefit both investors and the country
- Good Policy, Cost reflective Tariff and well designed FiT can attract foreign and local investors
Thank you

For more information, please contact
kahyoza@ewura.go.tz
chrisgreacen@gmail.com

SPP regulations available at:
www.ewura.go.tz/sppselectricity.html
Legislative Framework

- **Energy Policy Statement No. 36**
  - *Establish norms, codes of practice, guidelines and standards for renewable energy technologies, to facilitate the creation of an enabling environment for sustainable development of renewable energy sources*

- **EWURA Act, §6(d)**
  - *Promoting the availability of regulated services to all consumers including low income, rural and disadvantaged consumers*

- **Electricity Act, 2008**
  - *Standardized Small Power Purchase Agreement (SPPA) – agreement between Utility and developer to sell power to the Grid not exceeding 10MW but not less than 100kW.*
  - *Standardized Small Power Purchase (SPPT) – Tariff agreed on in the SPPA.*
EWURA license

• SPPs up to 1 MW are exempt from EWURA’s licensure requirements
  – Must submit completed registration form
    • Location, business registration, capacity of facility, GWh/yr, date of planned construction

• Non-exempt (>1 MW)
  – Submit license application
    • Same as registration, plus
      – Section on managerial competence
      – Feasibility study
      – Business plan
      – Permits and clearances (NEMC, water rights, etc.)
  – Where possible, EWURA draws on financial analysis submitted to REA for rural electrification subsidy
VSPP will get first settlement within 3 month after COD.
Coordination among PEA divisions

DG office
- Technical & System Analysis
  - Document
  - Coordinator

System Operation Div.
- First synch. test

Research Div.
- PQ test

Relay Div.
- Switchgear & Relay test

Meter Div.
- Meter installation

Legal Div.
- PPA check

Tariff Div.
- Billing

Finance Dep.
- Settlement

System Operation Area Office 1-12
- Identify circuit connection
  - Control & Operation
  - Communication

Area Office 1-12 & Local Office
- Line connecting construction
  - Meter reading