FORT COLLINS 2019 SYMPOSIUM ON MICRO GRIDS
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ASSESSMENT OF COMMUNITIES FOR MINI-GRIDS ELECTRIFICATION-THE DOS AND DON'T

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Presentation Outline

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3. Rationale for Mini-grid In Ghana
4. Key Issues To Constrain Mini-grids Development
5. Policy Choices & Delivery Models
6. Pricing/Tariff Regulation and Trade-offs
7. Institutional Arrangements
8. Technical Solutions For Mini Grid Electrification
9. Conclusions and Way Forward
Country Brief

- **Land Area**: 238,533 sq km
- **Population**: 28,102,471 (July 2018 est.)
- **Electricity Access**: 84.32% (2018)
- **Consumption/Capita**: 542.5kWh (2018)
- **Av. GDP Growth Rate**: 6.3% (2018 est.)
- **Major Export**: Cocoa, Gold, Timber, Bauxite, Manganese & Oil
National Electrification Policy -1989

- National Electrification Scheme (NES) instituted in 1989 to achieve universal access of reliable electricity supply over a 30-year period (1990-2020)

RATIONALE
- Stimulate socio-economic development and promote growth of agro-based & small scale industries nationwide
- Reduce rural urban migration in search of jobs
- Improve quality of life and standard of living of rural folks

- In 1989 National Electricity Access was about 25% with only 5% Rural Penetration.

- As at the end of 2018, national electrification rate of 84.3 % and a rural electrification rate of 71%. Ministry of Energy, 2018
Rationale for Mini-grid In Ghana

- Island and lakeside communities with population between 500 and 2000 exist in Ghana.

- High cost of grid extension for last mile electrification.
Key Issues To Constrain Mini-grids Development

• Policies & Regulations frameworks
• Delivery models
• Human capacities and Institutional arrangements
• Cost and Tariff frameworks
• Social Acceptability
• Procurement Models
• Boundary issues for grid, mini-grid and standalone
Policy Choices & Delivery Models

• **Public model** – Ownership, operations and maintenance (O&M) of assets by parastatal GENSCO & DISCOS.

• **Private model** - Ownership of assets and O&M by one or more private firms.

• **Mixed Model 1** – e.g., DISCOS builds and owns systems; O&M is outsourced to the private sector, either through a concession or a management contract.

• **Mixed Model 2 (PPA model)** - Private sector builds and owns the generation part and sells power under a power purchase agreement (PPA).

• **Community Model** – The community or a community-led cooperative builds, owns and operates the mini-grid, possibly with some functions being outsourced.
Pricing/Tariff Regulation and Trade-offs

- A **cost-reflective tariff (C-RT)**, encompassing all costs necessary to develop and operated a mini-grid in a specific location for a given period, which is likely to be over $1.00/kWh.

- The **Uniform National Tariff (UNT)**, which is applied to all of the customers in the lowest consumption category, which is around $0.05/kWh.

- Cost-Reflective Tariff (C-RT) > UNT

- Costs not met by tariffs have to be met by subsidies.
  1. Direct customers (increase towards C-RT)
  2. Indirect customers (cross-subsidy)
  3. Tax-payers (including non-customers) through external subsidy
  4. Donors through donor external subsidy.
Institutional Arrangements

MINISTRY OF ENERGY
(Policy Formulation, Communication and Project Implementation & Ownership)

Engineering Procurement & Construction

STATE DISTRIBUTION UTILITIES AND VOLTA RIVER AUTHORITY (Islands)
O&M Responsibilities

MINISTRY OF FINANCE/ BANK OF GHANA
Financing

ENERGY COMMISSION, PUBLIC UTILITIES REGULATORY COMMISSION
ENVIRONMENTAL PROTECTION AND GHANA STANDARDS AUTHORITY
Technical
Commercial
Environmental Regulations
Technical Solutions For Mini Grid Electrification

- **Mini-grid Systems**
  - Using RETs, Diesel Hybrids
  - Controllers & Inverters
  - Battery Storage
  - Distribution Network & Streetlights
# Ongoing Mini Grid Projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Target</th>
<th>Expected Completion Date</th>
<th>Status</th>
<th>Funding</th>
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<td>Preparatory activities completed</td>
<td>CIF, AfDB, GoG</td>
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<tr>
<td>USTDA</td>
<td>45</td>
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Conclusions and Way Forward

- Detailed preparatory activities are key to successfully MG projects.
- Challenges in the MG sector present great opportunities for scale and acceleration for universal access.
- Demarcation of boundaries for grid, mini-grids and standalone systems essential for investment planning and execution.
- Mindful of the risks, policy choices and regulatory regimes should guide stakeholders particularly investors, developers and financiers in their decision making.
Thank You!