Ethiopia: Supporting rural mini-grids
Ethiopia: Opportunities created by ambitious climate action

**Significant Climate Change Risks**
- Hotter, drier, more water stressed
- Vulnerable due to limited capacity to adapt and due to water-related climate shocks
- Land degradation due to unsustainable agricultural practices likely to worsen as the climate crisis evolves
- Sustainable use of water sources, such as groundwater, acting as a buffer and to supplement surface water supply

**NDC requires international support and investment**
- The CRGE - Ethiopia’s climate strategy for both adaptation and mitigation.
- Increase resilience of agricultural - productivity, minimize food insecurity and increase rural livelihoods.
- Prioritize renewable energy to increase energy access in rural areas.
- A focus on sustainable land management practices in agriculture and forestry creates opportunities for both adaptation and mitigation projects.
Agriculture Clusters are the primary target

Hypothesis: Productivity gains will fund the PPA’s

Agricultural Commercialisation Clusters

- Strategy driven by government to improve food security and the rural economy
- Several thousand clusters in Ethiopia
- Use cases
  - Irrigation,
  - storage,
  - agri-processing
- Aligned with Government policy objectives (NEP II, GTP II, CRGE)
  - Building a resilient rural economy
  - Supporting food security in the face of climate change
  - Clean renewable energy for off-grid electrification
- Strong climate change mitigation and adaptation benefits
- Alignment with SDGs
Horticulture crops: avocado, banana, mango, onion, tomato

Electricity increases productivity

- Irrigation
  - multiple crop cycles in one year
  - Increases plant height, germination rate and overall yield increasing productivity
- Storage & temperature control after harvest
  - maintains the quality
  - increase the shelf life
  - keeps pests away
  - Increases revenue
- Small scale processing for extracting oil and juicing
Using GIS – National grid and rooftop data

• The grid data was then used to identify areas with higher concentration of rooftops.
• Many of the concentration points were found in Afar, Tigray, Amhara and Oromia regions.

• The national grid was compiled using medium voltage and low voltage lines, data on population density and BTS towers (on-grid), NASA’s black marble technology to capture artificial lightening.
Using GIS to identify sites – ground water, BTS, health facilities

- Datasets of ACCs, BTS towers, social amenities and shallow ground water points were overlaid.
- BTS towers and health facilities mostly overlap.
- But shallow groundwater points overlap little with the health facilities and BTS towers.

Then, solar irradiation data was added to the data that had been overlaid.
- Higher insolation was registered in northern, middle and eastern parts of the country and numerous overlap points were found in those areas.
## Business Models...

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>EPC + O&amp;M</strong></td>
<td>All works are conducted in service of the public as the primary owner</td>
</tr>
<tr>
<td><strong>BOT</strong></td>
<td>Private sector designs, implements, and ensures successful operation for limited time then transfers to public</td>
</tr>
<tr>
<td><strong>BOOT</strong></td>
<td>Private operator develops and operates for duration of concession, then transfers assets at no cost to public</td>
</tr>
<tr>
<td><strong>BOO</strong></td>
<td>A fully privatized utility</td>
</tr>
</tbody>
</table>

### Alignment of interest

#### Public sector involvement
- Private sector service provider
- Risk carried by government
- Maximum public funding
- Lower efficiency
- Lower cost to end-user

#### Private sector involvement
- Private sector is long-term partner
- Risk carried by private sector
- Minimal public funding
- Greater efficiency
- Higher cost to end-user
Lessons from the Ethiopia experience

Financing NDC's

- Build alignment behind policy
- Convene stakeholders
- Early involvement of private sector
- GIS in planning mini-grid roll
- De-risked demonstration projects
- Independent broker/playmaker
- Support from Champions

Building alignment behind policy
Convening stakeholders
Early involvement of private sector
GIS in planning mini-grid roll
De-risked demonstration projects
Independent broker/playmaker
Support from Champions
What next?

10 Demonstration projects - de-risked
Learn and test business models

Investment cases and pre-feasibility studies on 10 sites, present at investment forums.
Strong M&E lens to feed in to adaptive management, & collect robust data

Broader roll-out once barriers removed
& financial viability proved

There are a number of outstanding questions
✓ Ownership models - PPPs or fully privately owned?
✓ Cost-reflective tariffs for business off-takers?
✓ Regulatory barriers – licensing, restrictions on foreign investors, repatriation of returns
Thank you