Seizing the Mini-grids Opportunity: Market Trends and Pathways to Growth

State of the Global Mini-grids Market 2020 report launch

July 1, 2020
Agenda

Opening Remarks

Mini-grids: Global Trends and Key Findings

Q&A

Keynote

Facilitated High-Level Dialogue

Q&A

Closing

(Event concludes 17:00 CEST)
Opening Remarks

Ethan Zindler
Head of Americas
BloombergNEF
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About the Mini-Grids Partnership and the Report
Mini-Grids Partnership

- A consortium of over 300 mini-grid stakeholders such as financiers, developers, facilitators, and policymakers
- Tapping on collective experience of its members to accelerate the development and deployment of clean energy mini-grids
  - Coordinate sector knowledge and action
  - Champion the sector & help shape policy for public and private sector
  - Broker partnerships

An “umbrella” group that bridges discrete but related stakeholders and initiatives, especially those of industry, government and investors; tapping on collective experience of its members
About the State of the Global Mini-grids Market Report 2020

Project overview

Raise awareness about and mobilize investments for the global mini-grids sector

Provide stakeholders with information on the latest market and industry trends in the mini-grids sector

Propose viable recommendations for key stakeholders to address challenges for the mini-grid market to scale-up

First-ever open source public database of projects
**Interviews and data collection**

- 21 financiers and Development finance institutions (DFIs)/donors.
- 23 developers.
- 20 policymakers, researchers, others.
- 4 vendors.

- 3,145 in Sub-Saharan Africa.
- 3,933 in Asia.
- 81 in island nations.
- 22 in Latin America.
- 5,544 projects are operational.

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**Mini-grid project data collected (as of February 2020)**

- **7,181 projects**
- 55% in Asia
- 44% in Sub-Saharan Africa
- 1% in island nations
- 0.3% in Latin America

**Source:** BloombergNEF, GIZ, Carbon Trust, CLUB-ER, surveyed developers.
Highlights
1. $128 billion is required for mini-grids to achieve universal access by 2030

- 111 million households (~47%) can be served by mini-grids in sub-Saharan Africa, Asia and island nations.
- Total capital expenditure of $128 billion is required to install solar hybrid mini-grids.

**Potential market size by technologies**

**Investment required**

*Source: BloombergNEF, Climatescope, World Bank.*
2. There are currently 5,544 mini-grids

- Many of them are solar hybrid systems built under the development programmes with support by donor agencies (e.g., EnDev).
- Robust regulatory frameworks attract private developers and spur solar hybrid mini-grid market.

**Installed mini-grids by regions**

- Asia: 39%
- Sub-Saharan Africa: 0.4%
- Island nations: 0.1%
- Latin America: 60%

*Source: BloombergNEF, GIZ, Carbon Trust, CLUB-ER, surveyed developers*
3. Solar mini-grids are becoming the norm, lithium-ion share is increasing

- Solar/solar hybrid mini-grids have been steadily increasing their market share through the last decade – nearly 5-fold increase in the market share seen between 2009 and 2019.
- Lead-acid remains dominant battery choice, but lithium-ion share has increased.

Source: BloombergNEF, Carbon Trust, CLUB-ER, GIZ, surveyed developers. Note: Includes only mini-grid asset data with ‘operation year’ available.
Large corporates aim to use these partners' technologies and their combined sales networks to offer new products and services, and to address new customers.

**Source:** Company websites, BloombergNEF. **Note:** Companies without arrows are developing proprietary products related to microgrids, battery management or UPS.
5. Only 13% of approved mini-grid financing has been disbursed

- 14 funders in the Mini-grid Funders’ Group approved a total of more than $2 billion by the end of February 2020.
- Only $297 million or 13% has been disbursed in the mini-grid sector.

Source: Mini-grid Funders’ Group, Carbon Trust, BloombergNEF. Note: YTD = February 29, 2020. The World Bank’s $150 million for Nigeria’s results-based subsidies in 2019 is not counted as ‘disbursed’
6. 66% of the approved funds were directed to 10 countries

- The World Bank approved $705 million, followed by GIZ ($253 million) and AFD ($227 million).
- Nigeria, Kenya and Pakistan are the top three fund recipients.

Source: Mini-grid Funders’ Group, Carbon Trust, BloombergNEF. Note: YTD = February 29, 2020
7. Commercial financing possible, if public funding is available

- Increasing interests by foundations and impact investors.
- Strategic investors have diversified in the last two years.
- Majority of financing to date has been through grants and concessional loans, and some equity.

<table>
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<tr>
<th></th>
<th>DFI/donor/public fund</th>
<th>Foundation/Impact investor</th>
<th>Commercial financier</th>
<th>Strategic investor</th>
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<tbody>
<tr>
<td><strong>Grants</strong></td>
<td>[Logos of donors]</td>
<td>[Logos of foundations]</td>
<td></td>
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<tr>
<td><strong>Equity</strong></td>
<td>[Logos of investors]</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Debt</strong></td>
<td>[Logos of lenders]</td>
<td>[Logos of foundations]</td>
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Source: BloombergNEF, company websites.
8. Adding productive use lowers LCOEs by 39-50%

- Diesel price, distribution system and installation costs are a source of variation amongst countries.

- But, capex significantly varies by project even in the same country.

- Adding productive use customers lowers LCOEs, benefitting all customers. Business model is the key.

Source: BloombergNEF, HOMER Pro model. Note: The levelized cost of energy (LCOEs) was calculated using HOMER Pro model.
9. Generation accounts for the largest component of capex, followed by distribution

- Generation accounts for the largest component of capex.

- Longer distribution lines are required for communities in which the households are scattered across a wide range.

- Site development costs are also high in both regions, which could be lowered by streamlining the government’s administrative procedures.

### Capex breakdown for mini-grid projects in sub-Saharan Africa

<table>
<thead>
<tr>
<th>Component</th>
<th>Southern &amp; Eastern Africa</th>
<th>Western &amp; Central Africa</th>
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<tbody>
<tr>
<td>Generation</td>
<td>38%</td>
<td>49%</td>
</tr>
<tr>
<td>Site development</td>
<td>6%</td>
<td>12%</td>
</tr>
<tr>
<td>Logistics</td>
<td>17%</td>
<td>10%</td>
</tr>
<tr>
<td>Metering</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>VAT &amp; Duties</td>
<td>12%</td>
<td>12%</td>
</tr>
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**Source:** Africa Mini-grid Developers Association (AMDA), ECA.
10. Higher daytime utilization of solar hybrids leads to better economic returns

- ARPU hinges on how much electricity customers use and the price they pay per kWh, kW or energy service they receive.

- Increasing ARPU is pertinent in improving a developer’s economic returns and subsequently attracting private investment.

Source: Africa Mini-grid Developers Association (AMDA), ECA.
11. Revenue and generated income depends on the business model

- Developers tend to serve productive use customers to increase revenues.

- Governments should allow flexible tariff settings, streamline licensing processes and remove regulatory requirements for small-scale projects to encourage mini-grid developers.

Source: Adopted from EEP Africa, Inensus, BloombergNEF.
12. Tariff setting flexibility is critical for mini-grid projects to be viable

- Many governments limit power prices to protect poorer rural customers.

- Even if developers are allowed to impose cost-reflective tariffs, true cost of a solar hybrid mini-grid is expensive for rural customers in general. In either cases, subsidies are mostly required.

- The past research shows electricity consumption increased when tariffs were lowered by subsidising developers.

**Mini-grid tariff regulations, 2018**

<table>
<thead>
<tr>
<th>Cost-reflective</th>
<th>Not cost-reflective</th>
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<tr>
<td>11</td>
<td>47</td>
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Cost reflective: Bangladesh, Cambodia, India, Philippines, Nigeria, Rwanda, Sierra Leone, South Africa, Tanzania, Togo, Zambia

**Source:** BloombergNEF, Climatescope 2019.

**Note:** Countries surveyed are 39 in sub-Saharan Africa, 12 in Asia, 7 in Latin America and Caribbean.
13. Eight nations implemented tenders since 2019, Nigeria launched largest RBF

- Two main subsidy schemes: upfront capex subsidies and results-based financing.

- RBF is usually simpler and faster than tenders, but developers may still require financing support to achieve early milestones.

Source: BloombergNEF.
14. Most countries lack main grid arrival rules

- Clear grid arrival rules are one of the most important regulatory factors for mini-grid projects to be viable.
- Only 15 surveyed countries have clear main grid arrival rules.
- Even if the rule exists, governments do not always implement it.

*Source: Climatescope 2019, BloombergNEF.*
15. Advanced impact metrics focus on change in quality of life

- Measuring impacts is difficult as they can be diverse.

- No single impact metrics is standardized and used by many organisations in the mini-grid sector.

- There are some advanced metrics developed for electricity access projects (e.g., GOGLA, 60 Decibel).

Source: BloombergNEF, GOGLA, Lighting Global, World Bank Group. Note: Positions of outcomes are not correlated with those of impacts.
16. Quantifiable metrics are commonly used, social impacts are complex to measure

- Metrics that are relatively straightforward to measure are more commonly used.
- Impact metrics that financiers have adopted are different depending on their objectives.
- Metrics are also used selectively by transaction of financing depending on their relevance to the investee, business model, customers, or type of product or services.

![Metrics used for impact assessment by investors in the clean energy sector](chart)

**Source:** GIIN, BloombergNEF.
Recommendations
**Recommendations**

- **Government**
  - Take a least-cost approach for rural electrification.
  - Set electricity access targets and roadmaps by technology.
  - Outline clear “grid arrival” rules to protect value of mini-grids.
  - Identify and disclose potential sites for mini-grid development.

- **Development finance institutes/donors**
  - Set up a results-based financing programme to scale mini-grids or provide more financial support for existing ones.
  - Provide partial-risk guarantees to financiers to insure against non-payment from utilities or governments.
  - Consider cross-sector collaboration.

- **Financiers**
  - Finance mini-grid portfolios to increase potential economic return, and diversify operational and regulatory risks.
  - Employ advanced impact assessment metrics to collect social, economic and environmental impact data and use them to evaluate results.

- **Developers**
  - Apply data analytics solutions throughout various stages of a project’s lifetime.
  - Focus on opex reduction and demand stimulation
  - Involve operational and customer support service providers.

Available at minigrids.org-market-report-2020

July 1, 2020
Q&A
Damilola Ogunbiyi
CEO and Special Representative of the UN Secretary-General for Sustainable Energy for All, Co-Chair of UN-Energy
Facilitated high-level dialogue

**Moderator**

**Wale Shonibare**
Director,
Energy Financial Solutions, Policy & Regulations,
African Development Bank

**Panelists**

**Jaideep Mukherjee**
Chief Executive Officer,
Smart Power India

**Jessica Stephens**
Chief Operating Officer,
Africa Mini-Grid
Developers Association (AMDA)

**Lolade Abiola**
Component Lead,
Solar Mini Grids for Nigeria Electrification Project (NEP)

**Steven Hunt**
Senior Energy Innovation Advisor,
UK Department for International Development (DFID)

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