

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

State of the Global Mini-grids Market 2020 report launch

July 1, 2020



BloombergNEF



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
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State of the Global Mini-grids Market Report 2020

Mini-grids: Global Trends and Key Findings

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July 1, 2020



BloombergNEF



Mini-Grids: Global Trends and Key Findings



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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



Secretariat



Steering Committee



About the State of the Global Mini-grids Market Report 2020

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

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Interviews and data collection

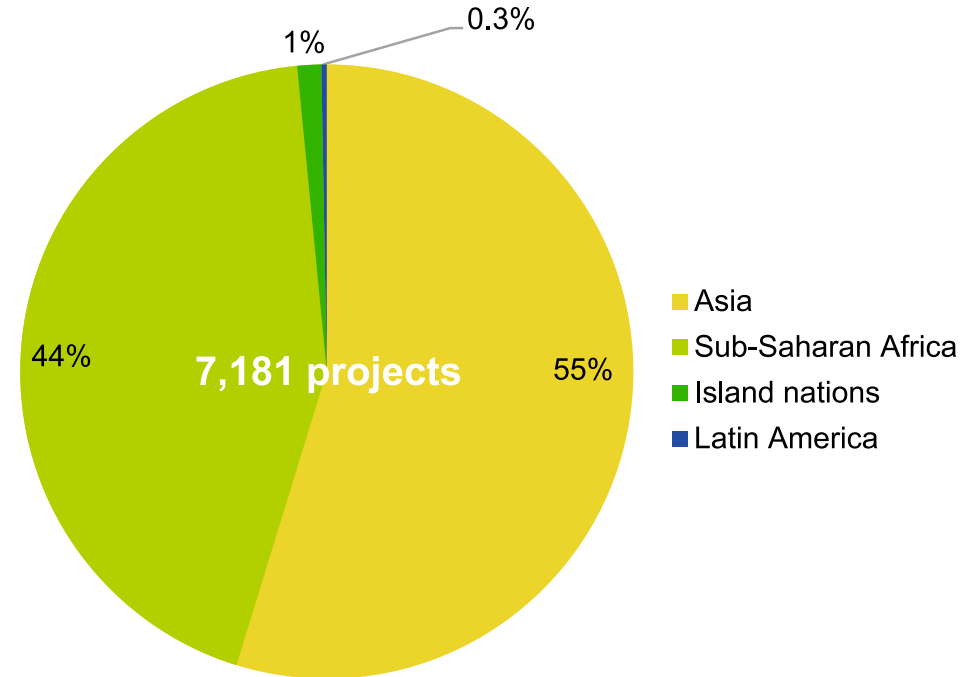
65 Stakeholders Interviewed

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

7181 Number of Projects in the Public Database

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

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



Source: BloombergNEF, GIZ, Carbon Trust, CLUB-ER, surveyed developers.

Highlights

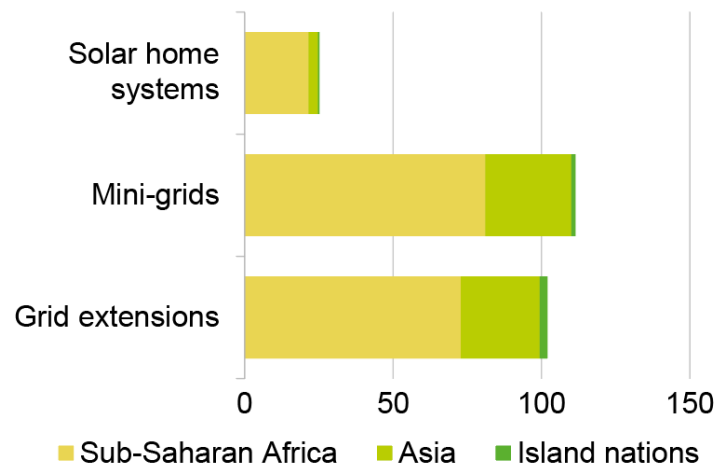
Outlook

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.

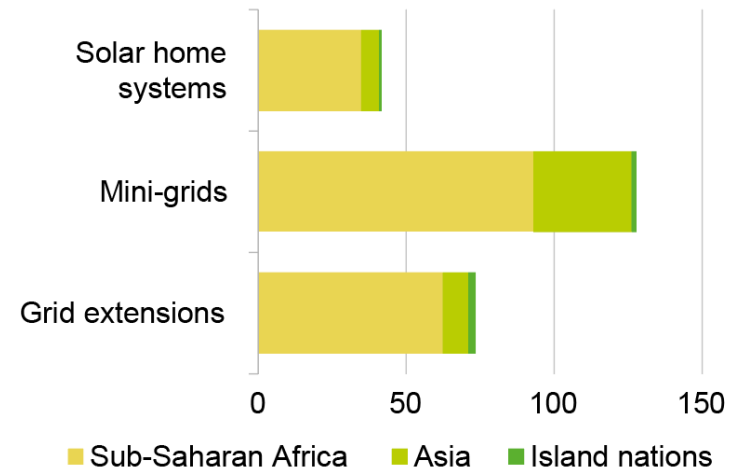
Potential market size by technologies

Households reached (million)



Investment required

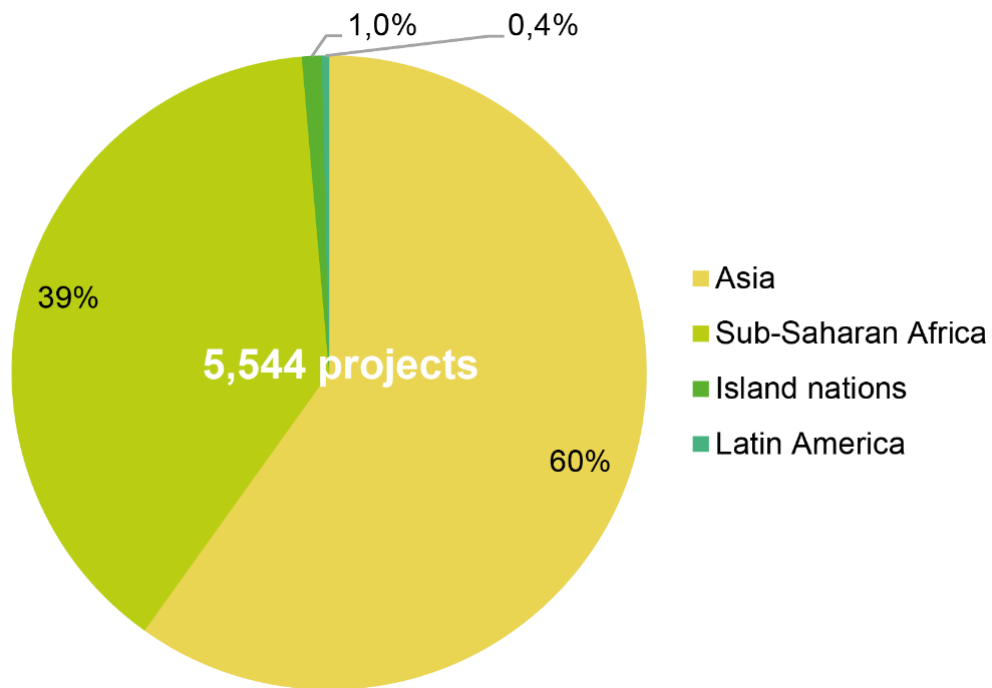
Capital expenditure (\$ billion)



Source: BloombergNEF, Climatescope, World Bank.

2. There are currently 5,544 mini-grids

Installed mini-grids by regions



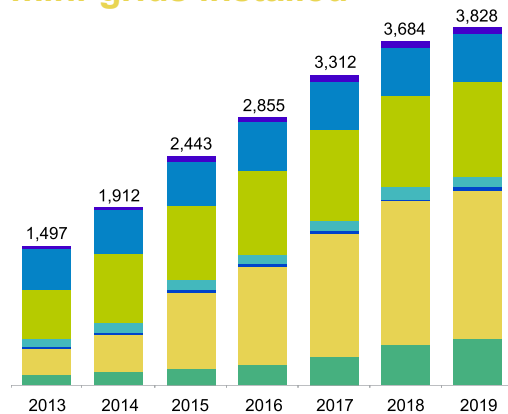
Source: BloombergNEF, GIZ, Carbon Trust, CLUB-ER, surveyed developers

- 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.

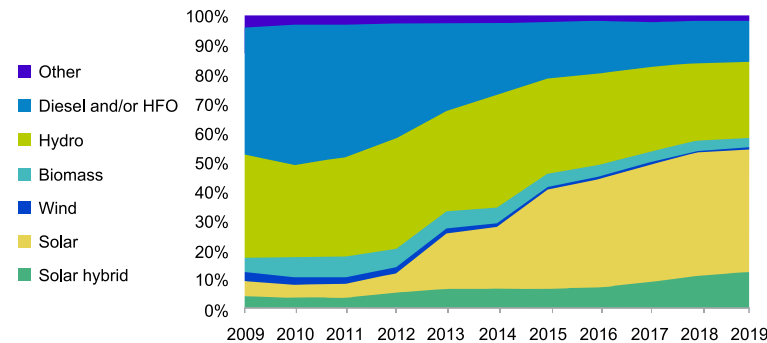
3. Solar mini-grids are becoming the norm, lithium-ion share is increasing

- 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.

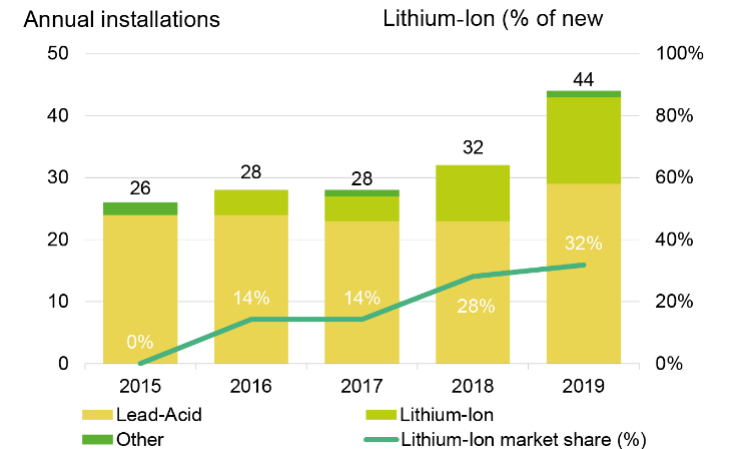
Cumulative number of mini-grids installed



Technology share of mini-grids in operation



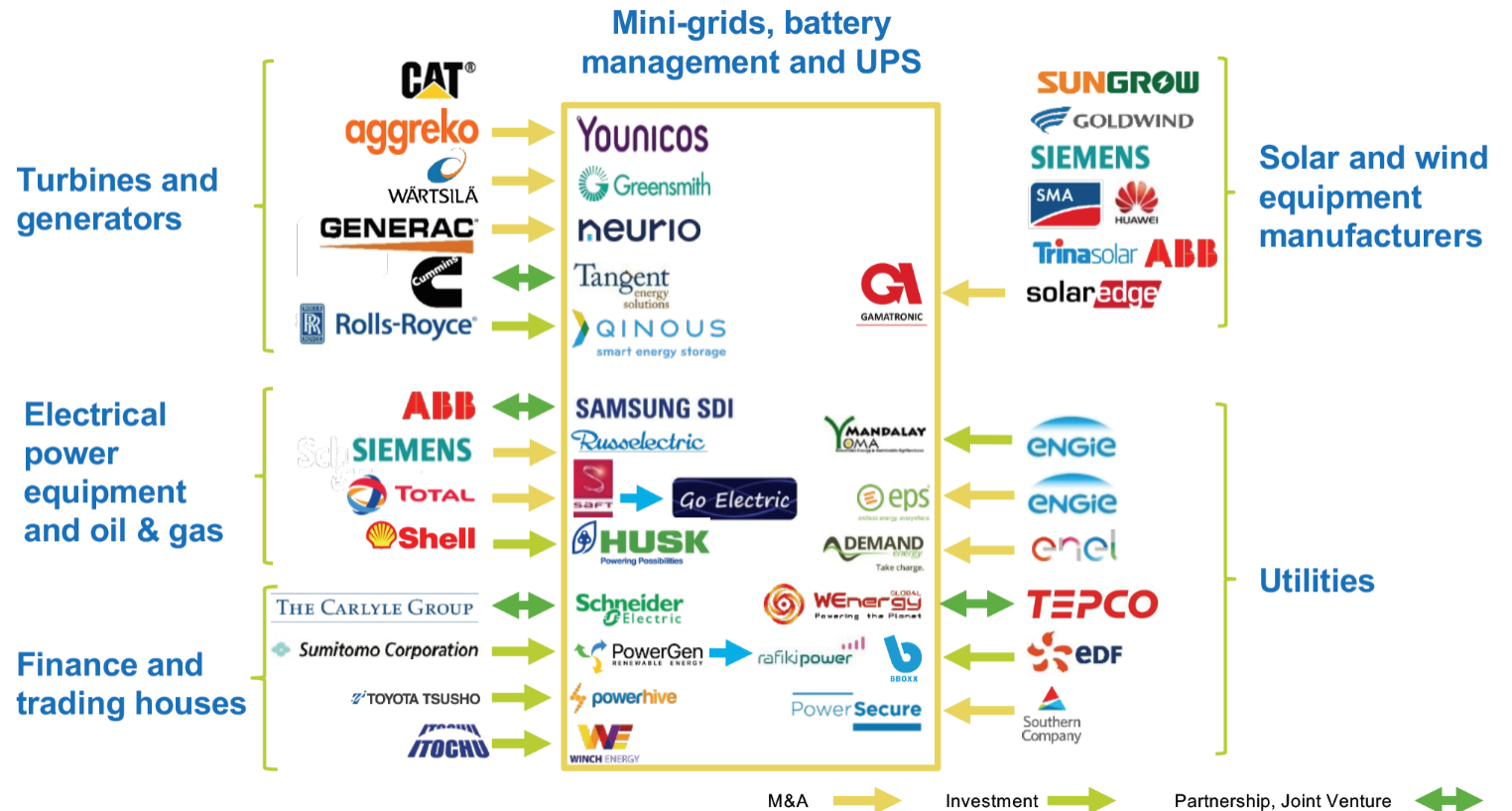
Battery storage penetration within new mini-grids



Source: BloombergNEF, Carbon Trust, CLUB-ER, GIZ, surveyed developers. **Note:** Includes only mini-grid asset data with 'operation year' available.

4. Large corporates have entered the sector

Large corporates aim to use these partners' technologies and their combined sales networks to offer new products and services, and to address new customers.

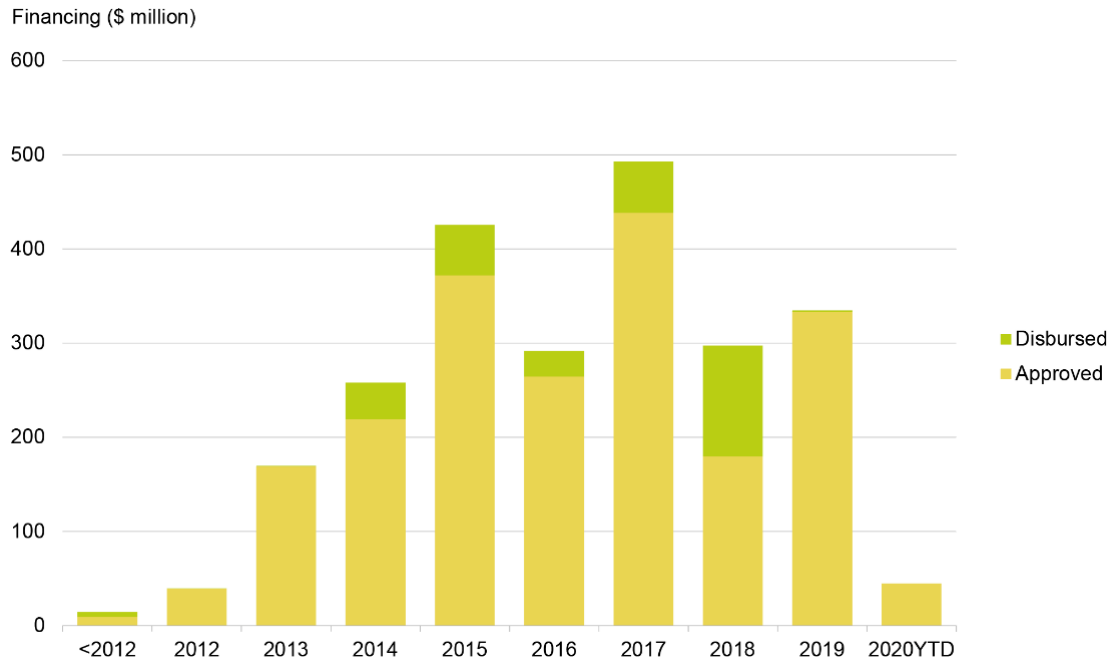


Source: Company websites, BloombergNEF. **Note:** Companies without arrows are developing proprietary products related to microgrids, battery management or UPS.

Financing

5. Only 13% of approved mini-grid financing has been disbursed

Mini-grid financing: approved vs 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.

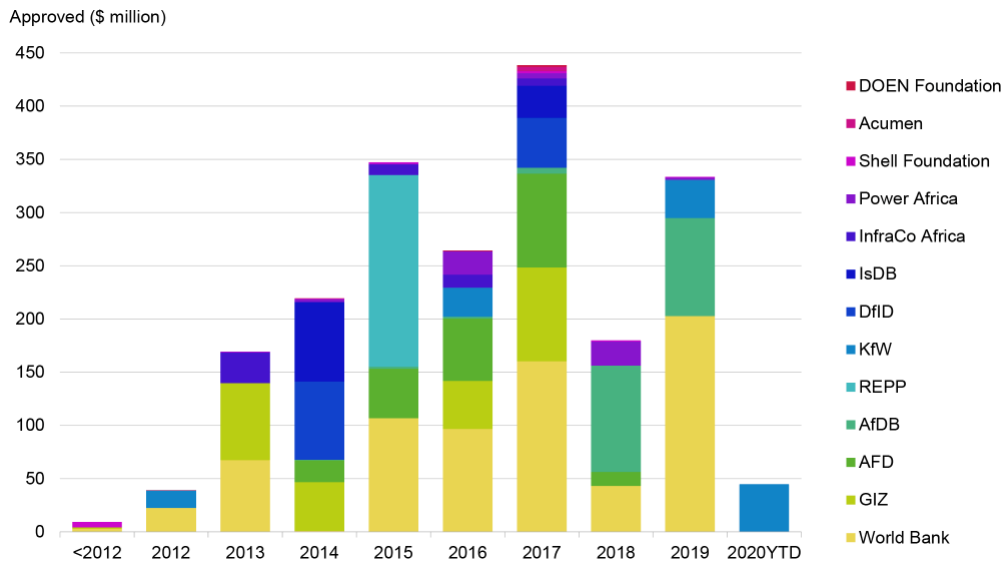
Source: Mini-grid Funders' Group, Carbon Trust, BloombergNEF. **Note:** YTD = February 29, 2020. the World Bank's \$150 million for Nigeria's results-based subsidies in 2019 is not counted as 'disbursed'

Financing

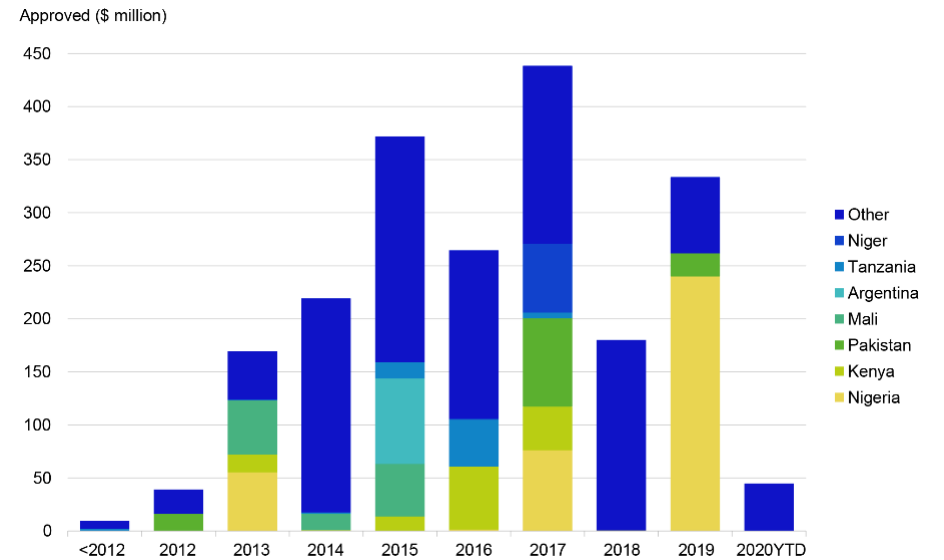
6. 66% of the approved funds were directed to 10 countries

- 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.

Approved mini-grid financing by funders



Approved mini-grid financing by recipient country



Source: Mini-grid Funders' Group, Carbon Trust, BloombergNEF. Note: YTD = February 29, 2020

7. Commercial financing possible, if public funding is available

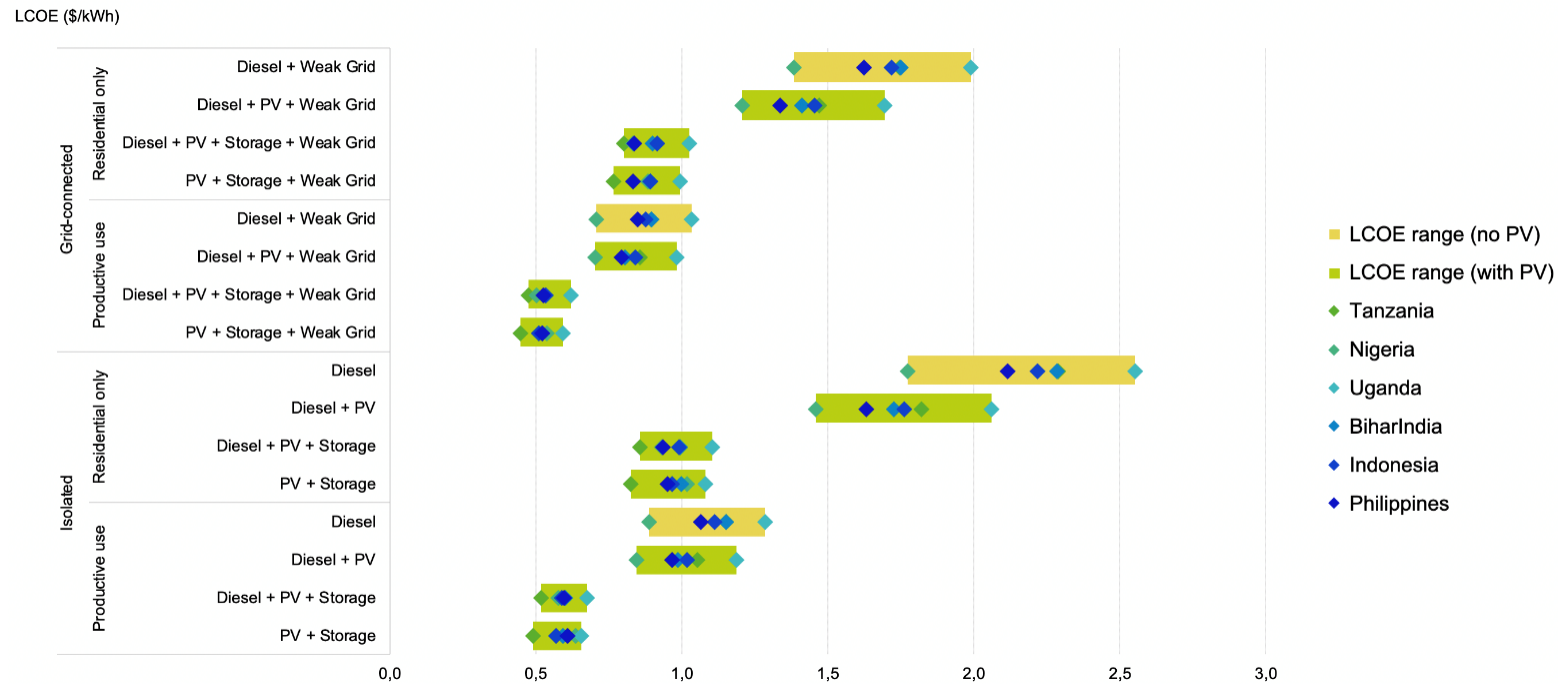
- Increasing interests by foundations and impact investors.
- Strategic investors have diversified in the last two years.
- Majority of financing to date has been through grants and concessional loans, and some equity.

	DFI/donor/ public fund	Foundation/ Impact investor	Commercial financier	Strategic investor
Grants				
Equity				
Debt				

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.

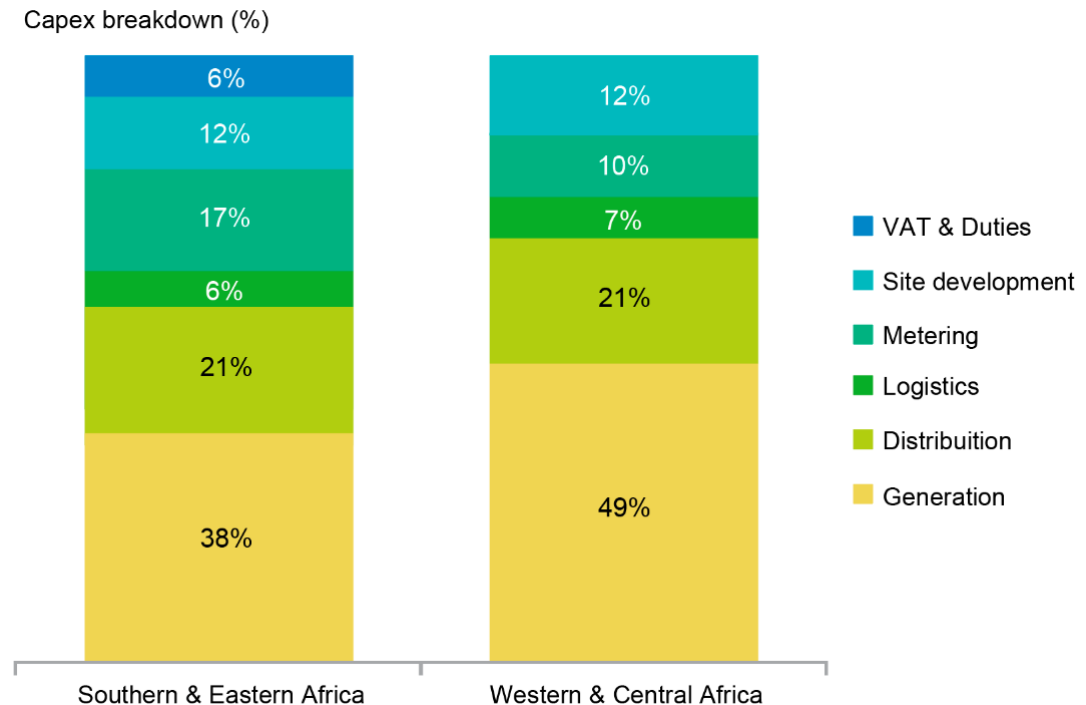


Source: BloombergNEF, HOMER Pro model. **Note:** The levelized cost of energy (LCOEs) was calculated using HOMER Pro model.

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

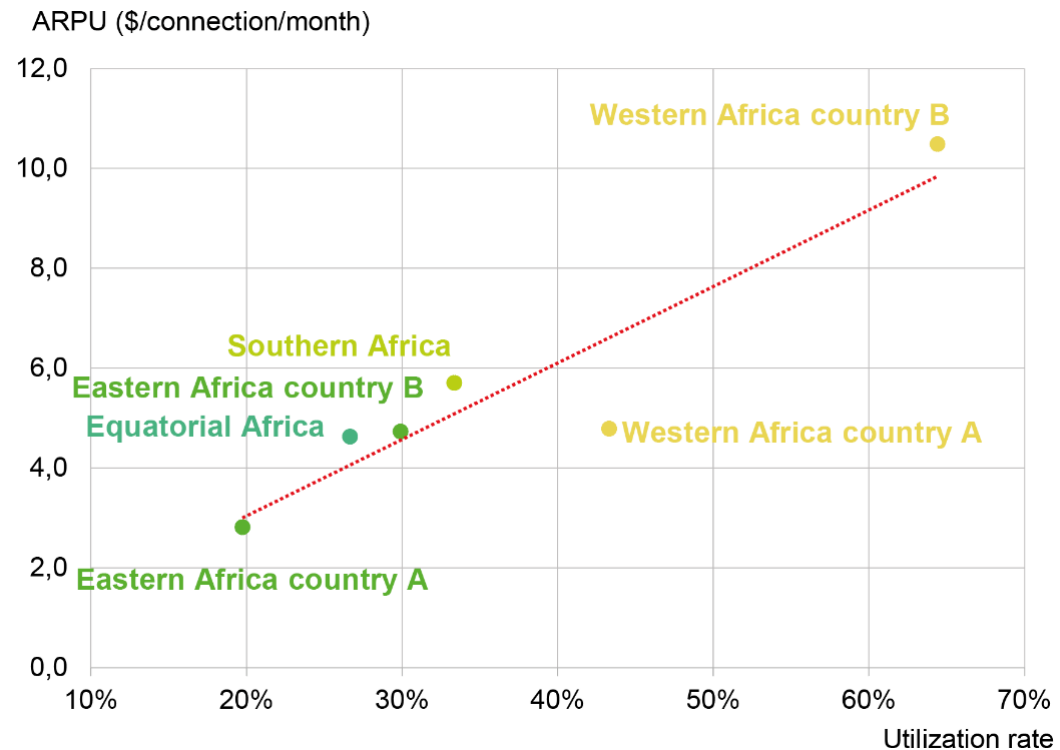


Source: Africa Mini-grid Developers Association (AMDA), ECA.

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.

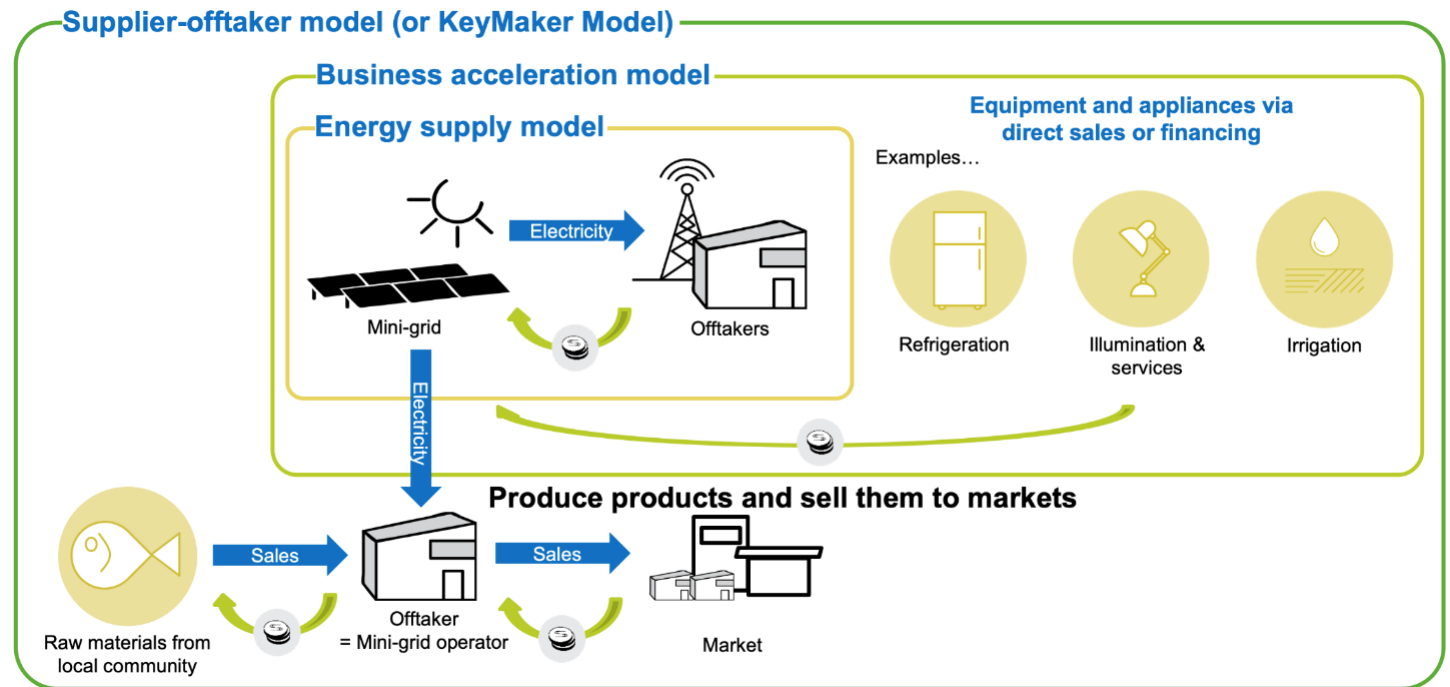
Correlation between utilization rate and ARPU



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.



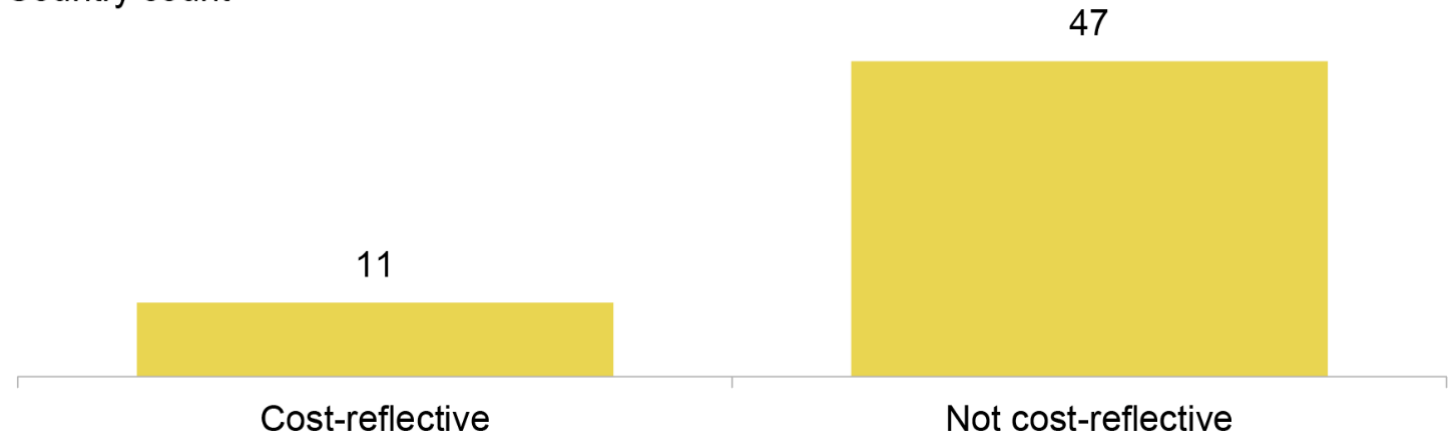
Source: Adopted from EEP Africa, Inensus, BloombergNEF.

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

Country count

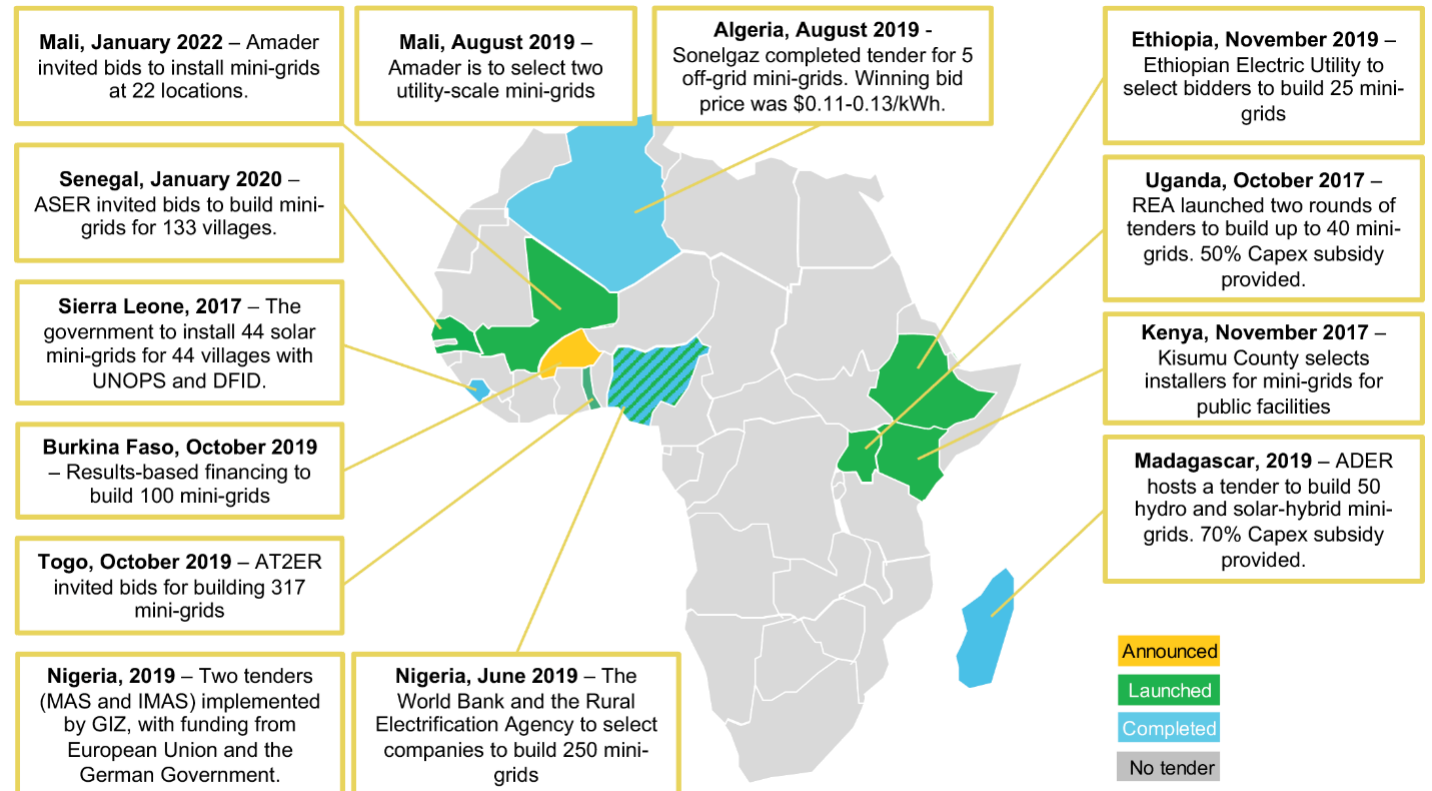


Cost reflective: Bangladesh, Cambodia, India, Philippines, Nigeria, Rwanda, Sierra Leone, South Africa, Tanzania, Togo, Zambia

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.

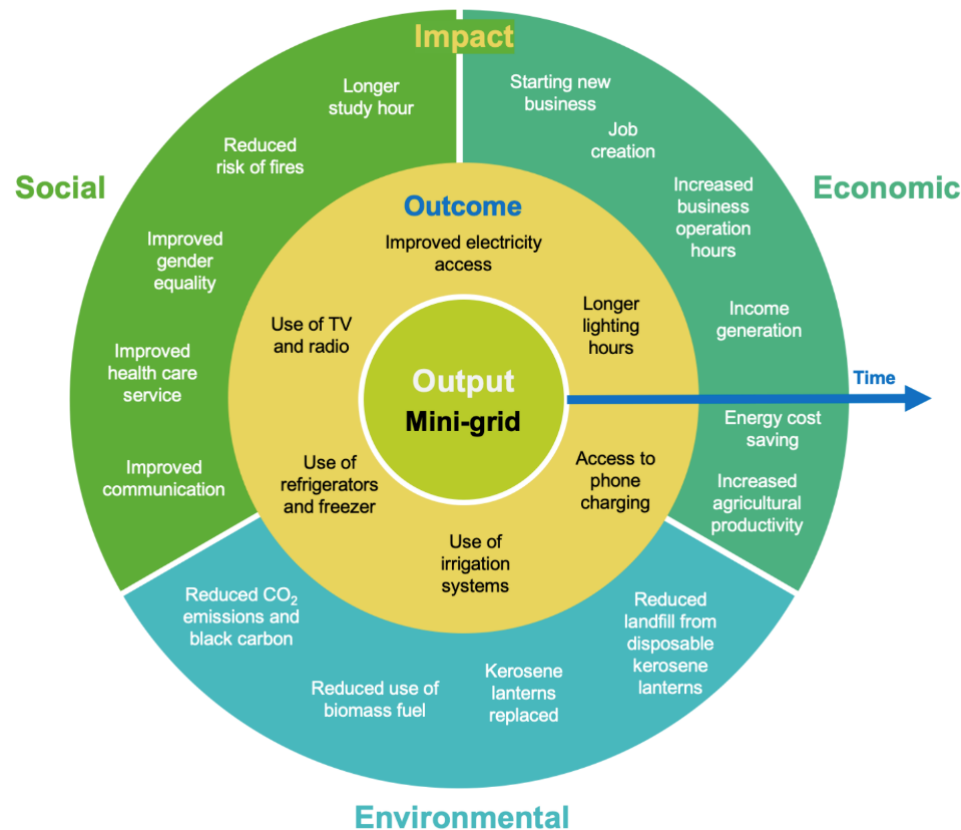


Source: BloombergNEF.

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).

Mini-grid output, outcomes and impacts

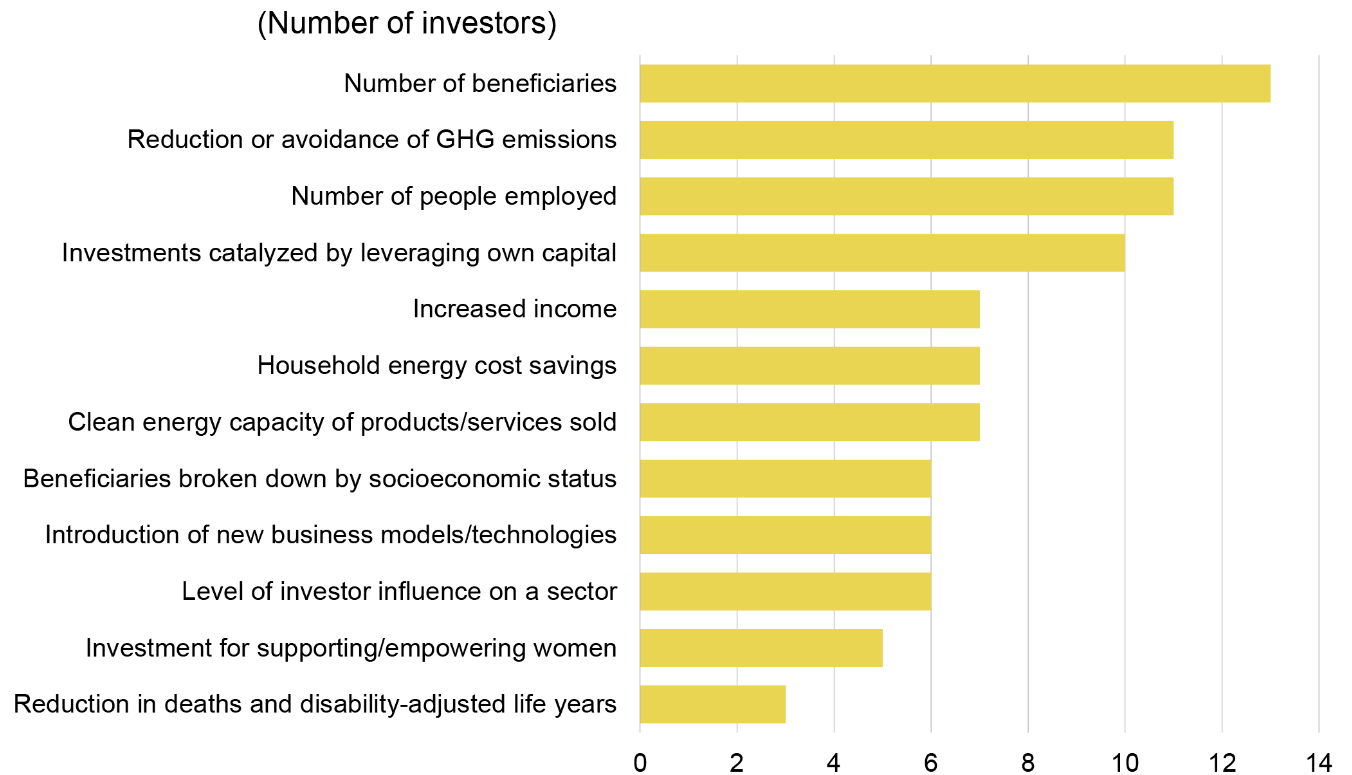


Source: BloombergNEF, GOGLA, Lighting Global, World Bank Group. **Note:** Positions of outcomes are not correlated with those of impacts.

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



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.

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Available at
minigrids.org/market-report-2020

July 1, 2020



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Q&A

Keynote



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



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



Jessica Stephens
Chief Operating Officer,
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Developers Association
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