

State of the Global Mini-Grids Market Report 2020

Overview and key recommendations for Myanmar

Mini-grids have an indispensable role to play in the integrated approach to electrification that Myanmar needs in order to achieve universal energy access by 2030. From the arid plains of the Dry Zone to the mangrove forests of Tanintharyi, off-grid energy solutions are a viable, affordable way of connecting thousands of communities to a reliable source of electricity. In doing so, these technologies can boost incomes, grow businesses and catalyse economic growth for millions of people.

Recently, [Sustainable Energy for All \(SE4ALL\)](#) and [Bloomberg New Energy Finance \(BNEF\)](#) released the [State of the Global Mini-Grids Market Report 2020](#). The report, which represents the consensus opinion of international experts working alongside partner governments, provides updates on the global mini-grids market and identifies

key trends with the aim of raising awareness, mobilising investments and serving as a benchmark to measure future progress.

In an effort to provide policymakers, investors and practitioners in Myanmar with easy-to-understand information, the Smart Power Myanmar team has reviewed all 196 pages of the report and produced this tight summary that we hope helps partners to quickly hone in on the potential strategic implications for Myanmar's nascent off-grid sector. For us at Smart Power Myanmar, this report provides robust evidence-base to justify the direction of our strategy and our key recommendations for Myanmar, including the need for a greater emphasis on least-cost planning; the need for innovative and results-based financing to bring down project development barriers; and of course the perennial need for greater investment in demand-side energy consumption initiatives.

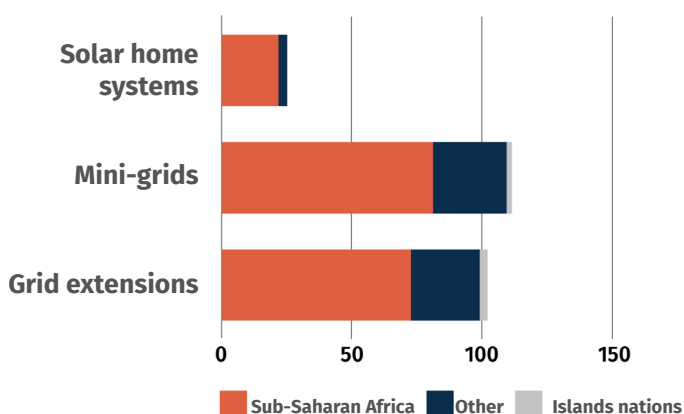
GLOBAL INSIGHTS & RECOMMENDATIONS

The new report from SE4ALL found that mini-grids have a potential global market size of 111m households, marginally larger than the global market for grid extension.

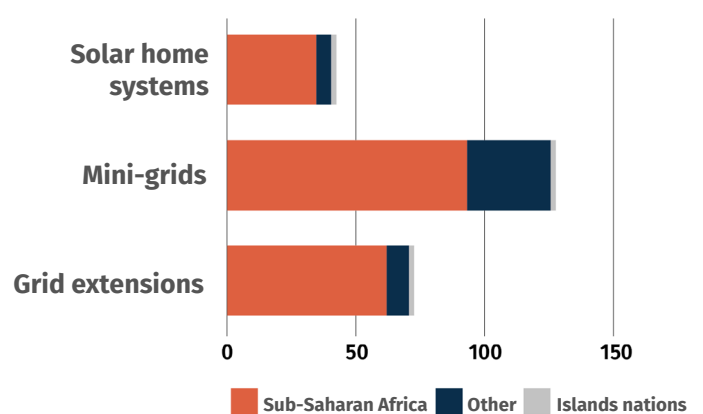
The report also found that, compared to grid extension, mini-grids require significantly more investment relative to the number of households served, particularly in Asia.

FIGURE 1: SE4ALL Optimistic Scenario

Potential market size by technologies



Investment required



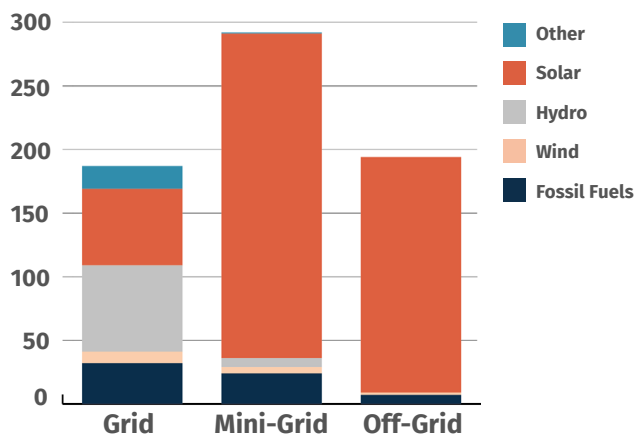
SOURCE: Adapted from [SE4ALL, BNEF \(2020, p.128\)](#)

SE4ALL's projections differ from the findings of the International Energy Agency's (IEA) 2017 Energy Access Outlook, which projected both a significantly larger global market for mini-grids and other off-grid solutions and a lower cost of deployment. SE4ALL's findings suggest a path to universal electrification that is more dependent on grid extension.

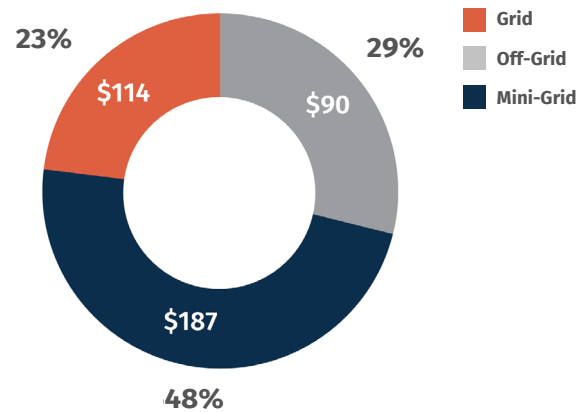
In general, solar photovoltaic (PV) and advanced energy storage provides the least cost option for both new grid-connected generation capacity and mini-grid development. The levelised cost of energy (LCOE) for hybrid solar mini-grids ranged from \$0.49–0.68 USD/kWh operating in isolated areas and serving both households and productive use customers in six countries studied.

FIGURE 2: IEA Optimistic Scenario

Population gaining access to energy by 2030



Investment in energy access by 2030 (billions)



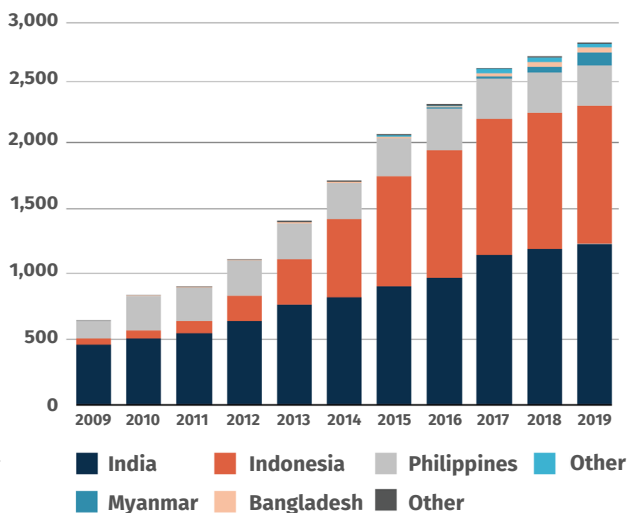
SOURCE: Adapted from IEA (2017, p.53)

The global market for mini-grids is not growing as fast as was widely expected, with less than 200 built worldwide between 2018-2019, representing a slow-down in

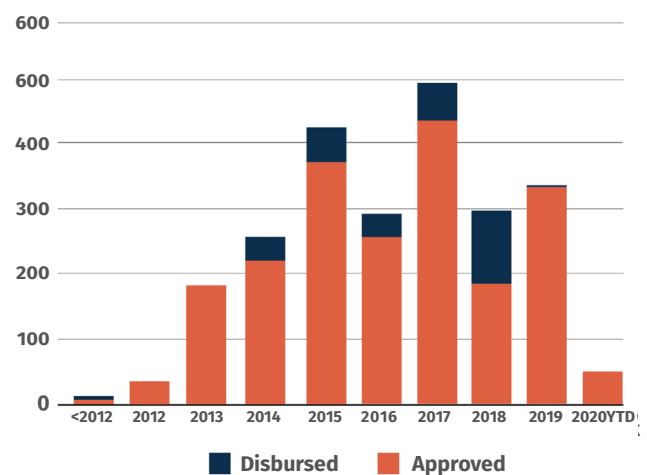
development. Driving this slowdown has been a relatively flat environment for financing, with significant bottlenecks for disbursement of funds once they have been approved.

FIGURE 3: Growth in mini-grid deployment and investment

Number of mini-grids - Asia



Mini-grid financing: approved or disbursed

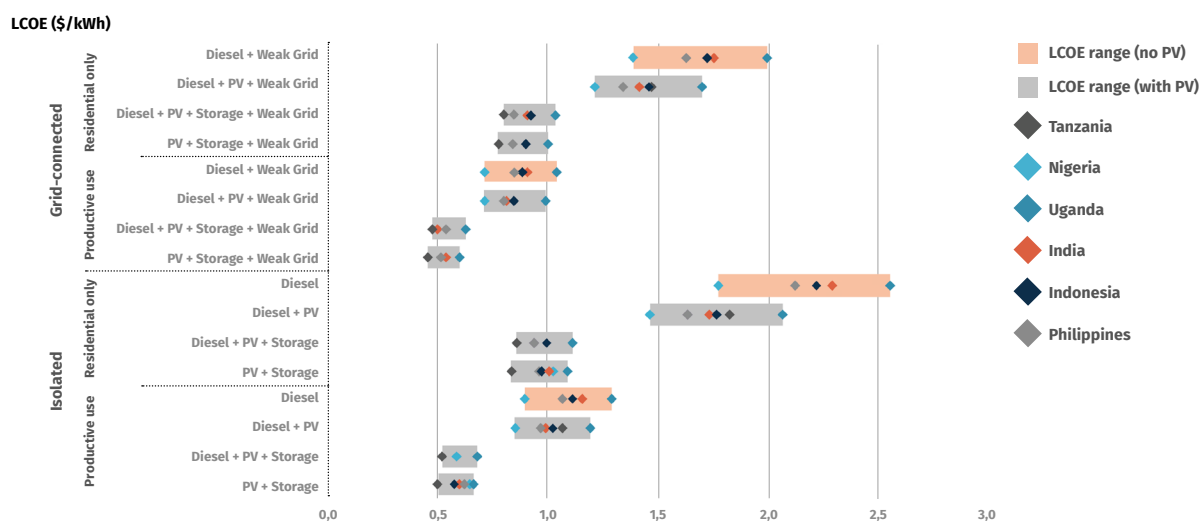


SOURCE: Adapted from SE4ALL, BNEF (2020, p.47 & p.87)

Productive use remains key to improving the economics of both on-grid and off-grid energy projects, reducing the LCOE by 39-50%. Developers need to select sites with higher productive use potential (which should be encouraged by subsidy programs), offer appliance financing (or partner with third parties who can), or even develop anchor

load businesses themselves, which has been called the 'KeyMaker model.' Dynamic tariffs (different pricing for time of day or type of customer) have also proven useful for incentivising day-time productive use, and could be an important tool, but often require regulatory changes.

FIGURE 4: Levelised cost of energy (LCOE) of mini-grids



SOURCE: Adapted from SE4ALL, BNEF (2020, p.107)

The vast majority of people who have gained access to energy have done so through a grid connection. While the market potential for mini-grids suggests that over half of the those who will gain access to energy could be served by mini-grid technology, without greater investment and

adoption of the recommendations needed to create a stronger enabling environment, grid extension will be the only way to meaningfully reduce the number of households who lack access to energy.

IMPLICATIONS FOR MYANMAR

While overall the report paints a brighter picture for grid extension versus mini-grid development, the economics differ from one country to another. For Myanmar, the combination of relatively low household energy consumption and extremely low tariffs reduces the economic viability of mini-grid development when compared to other countries.

These country-specific factors may help to explain why, despite having significantly increased energy access in recent years, Myanmar continues to make slower progress towards achieving universal electrification than other

countries in Asia. It is also worth noting that the quality of increased energy access in Myanmar has mostly been poor – customers either have limited power supply or routinely experience reliability issues ranging from load shedding to voltage instability. These issues stem from the fact that recent electrification efforts in Myanmar have largely consisted of grid extension and the proliferation of solar home systems and solar lanterns. The national grid is Myanmar can be unreliable and, whilst solar home systems and solar lanterns are an important tool for serving remote areas, they do not provide opportunities for productive use.

FIGURE 5: Grid extension fundamentals

Country (Year of project)	Cost of grid extension per household (USD)	Average household consumption (kWh/year)	Residential retail tariff in 2016 (USD/kWh)	Time for revenue to exceed grid extension cost (years)
Myanmar (2014)	500	729	0.028	24
Kenya (2014)	1,047	380	0.126	22
Mozambique (2017)	690	767	0.065	14
Rwanda (2011)	840	468	0.241	7
Botswana (2011)	615	2,201	0.070	4
Peru (2005)	710	1,589	0.138	3

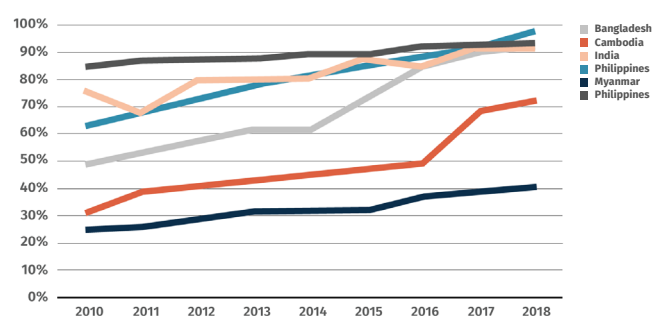
SOURCE: Adapted from SE4ALL, BNEF (2020, p.35)

Myanmar will need to continue to increase tariffs in order to generate enough revenue to support capital investment in grid infrastructure, which will also have the added

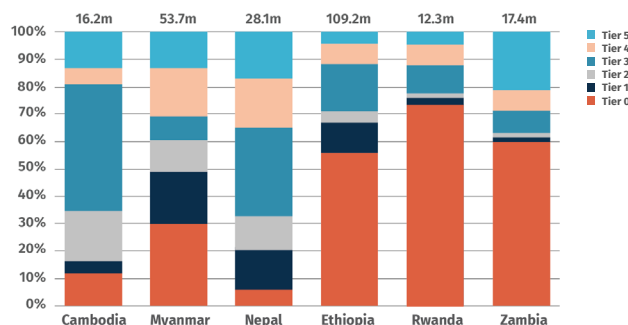
benefit of reducing the gap between mini-grid and utility tariff rates, particularly since mini-grid tariffs could be reduced over time as the costs of development go down.

FIGURE 6: Increase in access and tier of access

Historical electrification rates of select Asian countries



Household distribution by tier



SOURCE: Adapted from SE4ALL, BNEF (2020, p.42 & p.45)

RECOMMENDATIONS

The authors of the report make several recommendations for government, donors, financiers and mini-grid developers aimed at accelerating mini-grid development:

1 For government, it is **increasingly important to take a least-cost approach to rural electrification planning** – often it will cost the government less to support mini-grid development, but this is not always the case. By identifying potential sites for mini-grids and making the rules clear for development, particularly if

the grid may be extended to those locations in the future, governments can provide greater certainty to the market. Data tools, such as the Integrated Myanmar Power Map, developed by Smart Power Myanmar in partnership with the World Bank and GIZ, can also provide useful support to government and the private sector for planning.

2 The World Bank, as well as other donors and financiers, should seek to **scale up results-based financing schemes and risk guarantees** through the second phase of the National Electrification Project (NEP 2), and other programs that support Myanmar achieve universal access to energy. Mini-

grids are a proven technology that require construction and financing at scale to be economically competitive. Instead of developing or subsidising individual projects, donors and investors should focus on large portfolios of sites that reduce risk, increase economies of scale, and speed time to development.

3 In order to secure additional financing and grow their businesses, **developers should continue to focus on using advanced data analytics** to reducing operating costs and stimulate demand particularly during daytime hours, and begin to disaggregate certain aspects of the business model,

including productive use support and customer service. For Myanmar, there is a particular need for payment systems, formalisation of operations and maintenance providers, and supply chains for appliances and commercial and industrial equipment coupled with financial services.

The State of the Global Mini-Grids Market Report 2020 is a key source of annual data and analysis for people working in the energy access field. The study aims to provide stakeholders in the mini-grid sector with relevant information and propose solutions for overcome several of the challenges that currently impede growth within the sector. In addition, the reports authors have provided a database of mini-grid projects for open-source learning.

SE4ALL is an international organisation established by the United Nations to drive further, faster action toward achievement of Sustainable Development Goal 7 (SDG7), which calls for universal access to sustainable energy by 2030, and the Paris Agreement, which calls for reducing greenhouse gas emissions to limit climate warming to below 2° Celsius. BNEF is a leading provider of primary research on clean energy, advanced transport, digital industry, innovative materials, and commodities.

REFERENCES

SE4ALL, BNEF. (2020). *State of the Global Mini-grids Market Report 2020*. International Energy Agency. (2017). *Energy Access Outlook 2017*.

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