

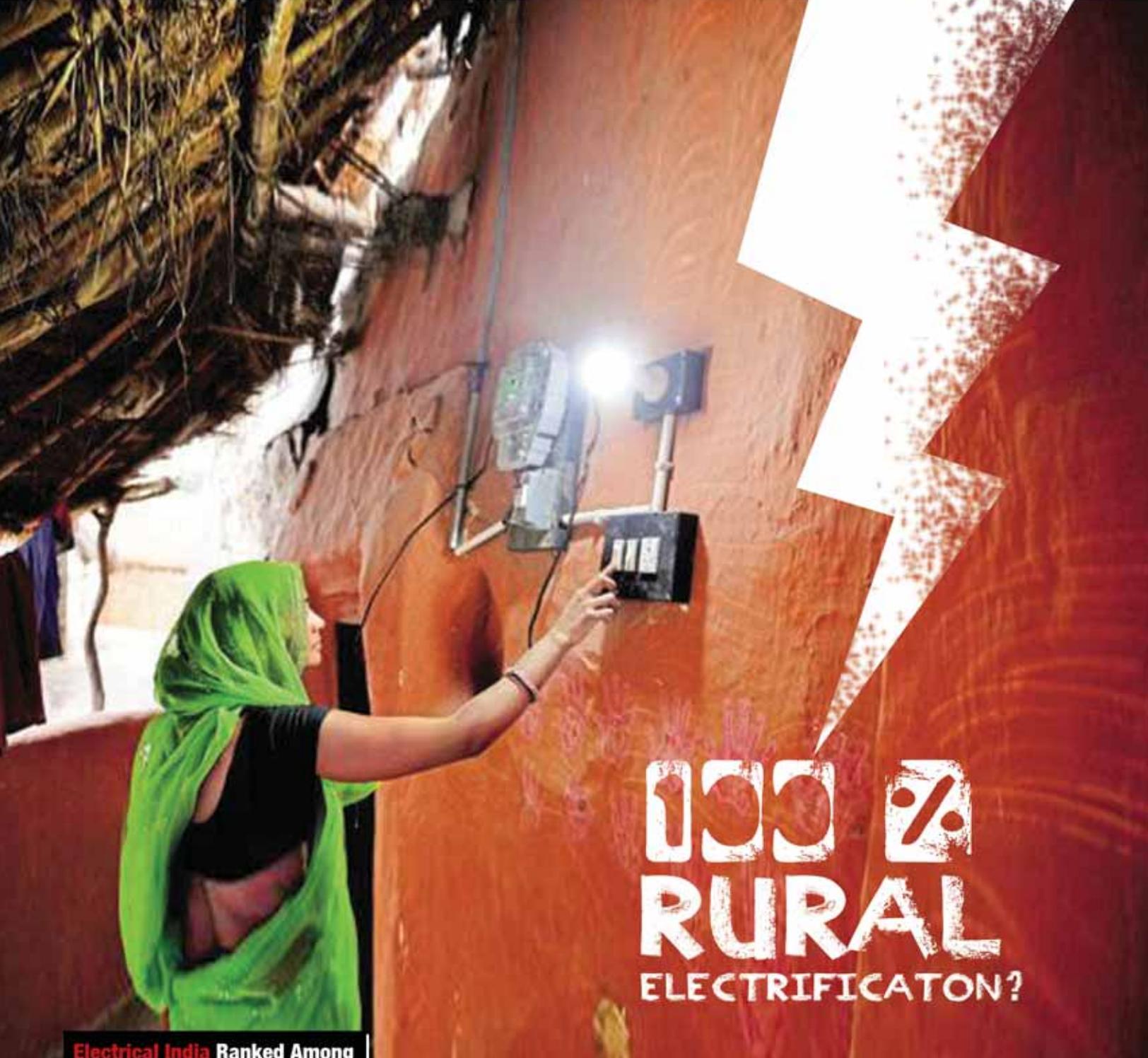
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CLEAN ENERGY MINI-GRIDS: POWERING THE INDIAN RURAL ECONOMY

Based on REEEP calculations, clean energy mini-grids could serve at least 36,5 million people and mitigate greenhouse gas emissions of up to 122 million tonnes of CO₂ between 2020 and 2035 in Bihar and Uttar Pradesh alone.

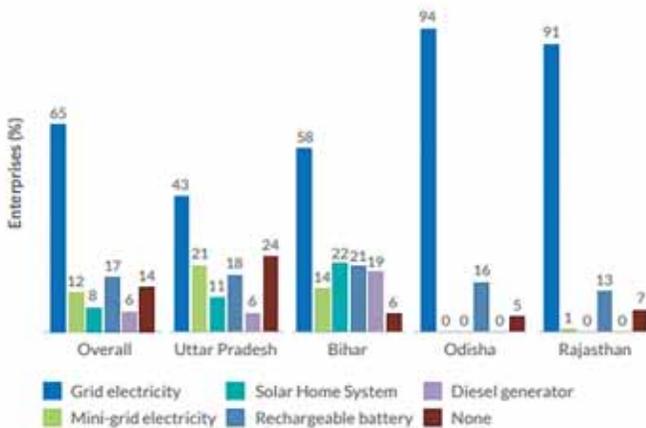
The energy landscape in India is rapidly transforming. The SAUBHAGYA scheme of the Government of India focusing on expansion of centralised grid infrastructure has brought electricity to more than 25 million households since 2017 – a huge leap forward in the universal mission to provide energy to access to all.

Yet connections in many rural areas continue to struggle with poor quality of electricity services and many hours of brownouts. According to a recent study on “Customer Behaviour and Demand for Rural Electrification in India” by the Smart Power Initiative of the Rockefeller Foundation: Almost 40 per cent off-grid electricity users do not express satisfaction with grid-electricity services. The report draws upon results from more than 10,000 surveyed households in Bihar, Uttar Pradesh, Odisha, and Rajasthan.



The same report shows a wide gap in reliability of grid-connections to rural micro-enterprises with only 65 per cent of 2,000 rural enterprises surveyed reporting grid-connections. In the most remote areas of India productive loads to power the rural economy are hence the exception, not the rule.

Figure 3.7: Electricity sources used by rural enterprises, by state



Thanks to their proven ability to provide power at high quality in a cost-efficient way, decentralised renewable energy solutions (DRE), such as clean energy mini-grids provide a reliable solution to the above challenges in the short term.

Clean energy mini-grids can provide 24x7 reliable, locally managed power with local ubiquitously available resources such as biomass, hydro, wind and solar (combined with storage, diesel backup or both). Additionally, mini-grids are quickly deployed, cost-competitive and, if done in the right way, able to integrate with the main grid. Lastly, via the use of productive renewable energy (PURE) they can also bring socio-economic development in rural areas.

In a similar vein, an impact assessment of mini-grids in Karnataka's Uttar Kannada district, showed a preference for clean energy mini-grids vis-à-vis the national grid. The customers preferred mini-grids for two reasons: Firstly, mini-grids showed higher reliability and quality of power than the national grid, which was cited as being unreliable. Secondly, interviewees referred to the benefits of a locally managed service as compared to one perceived as distant and unaccountable. A study from ISEP in Uttar Pradesh equally showed increasing demand and willingness to pay for mini-grid solutions.

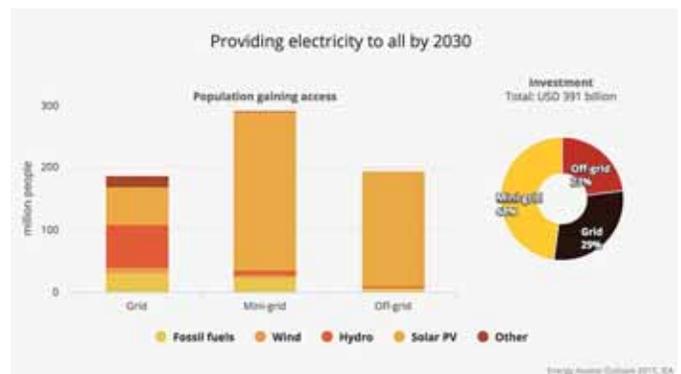
An apt example of the use case for clean energy mini-grids in rural India is Mlinda, a Member of the Alliance

for Rural Electrification (ARE). Through an ARE-managed grant from the OPEC Fund for International Development (OFID), Mlinda Association received funding to build three hybrid mini-grids in Narotoli, Shahitoli and Pasanga (Jharkhand). The successful project connected 358 households, 57 productive uses and 61 commercial outlets and was implemented one year ahead of schedule (after just 12 months instead of 24 months). Building on this success, Mlinda plans to replicate the model and to commission a total of 50 mini-grids by June 2020. The business model of Mlinda builds on agriculture as the anchor load as well as working with existing social capital in the local communities such as entrepreneurs, existing women groups, farmers clubs and local governance structures.



(Photo credits: Mlinda Association)

Based on REEEP calculations, clean energy mini-grids could serve at least 36,5 million people and mitigate greenhouse gas emissions of up to 122 million tonnes of CO₂ between 2020 and 2035 in Bihar and Uttar Pradesh alone. Globally, IEA estimates that mini-grids and off-grid installations are the lowest-cost options for over 70 per cent of the new electricity connections. To meet this demand, investment capital in mini-grids alone would be about USD 190 billion between now and 2030.



(Source: IEA Energy Access Outlook 2017)

With the above in mind, it is not surprising to see that corporate giants such as ARE Members General Electric, Sterling & Wilson, Schneider Electric and ENGIE, as well a large number of SMEs and start-ups are increasingly engaged in the Indian DRE market. Backing up this trend, the National Solar Energy Federation of India (NSEFI) recently announced that decentralisation is one the key pillars in achieving the 100 GW national solar target without straining grid infrastructure.

This begs the question - what is needed for the DRE market to reach its potential?

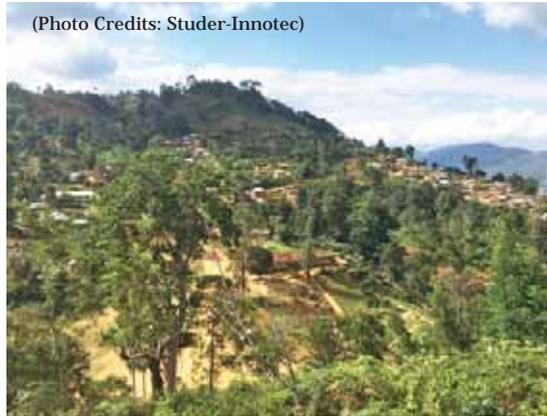
1. Coordination between private sector and government on DRE and mini-grid policy:

Energy policy in India is highly politicised and discussed on the highest echelons of politics in India. A takeaway from numerous discussions ARE has engaged in, is that additional public-private dialogue and cooperation is crucial to support more streamlined regulations and more awareness among policy makers of mini-grids as a viable and reliable solution for rural electrification. This is where an alliance of like-minded companies and stakeholders, such as the ARE, can play a key role as a mediator.

Specifically pertaining to regulations for mini-grids, more engagement is needed to define the interplay between different policies on the national and state level (in states where regulations exist that is), the interoperability between the main grid and mini-grids as well the relation between mini-grid Distributed Energy Service Companies (DESCOs) and state-owned Distribution Companies (DISCOMs).

Ultimately, the sector will require long-term cooperation between the public and private sectors in order to render mini-grid deployments viable at scale and attract sufficient amounts of domestic and international investor confidence and hence investments. Together with other relevant DRE actors, ARE is ready to engage in these dialogues with Indian policy makers.

2. Lack of data about performance, market size and demand/customer profiles for mini-grids:



(Photo Credits: Studer-Innotec)

While a number of mini-grid initiatives, such as CES-MICRO by ARE Member CES India have been successful in collecting mini-grid performance data in India (e.g. on battery performance), and others have successfully collected data on demand and market size in certain Indian states (e.g. Smart Power India Programme supporting DESCOs in Uttar

Pradesh), additional work is still needed to better understand the full market size and customer base for mini-grids in most parts of rural India.

Moreover, it is of utmost important that lessons learnt from mini-grid projects all over India are collected and analysed to ensure that past mistakes are not repeated. Going hand-in-hand with its efforts to collect global mini-grid data, based on positive experiences in other parts of the world ARE can also here play an important role as a central knowledge platform to collect and to share best practices (from India and the rest of the world) and hence ultimately to increase investor confidence and de-risk DRE investments.

3. Industry Quality Standards

In a competitive DRE market, led by private sector companies, it is fundamental to ensure that rural customers receive adequate services. In the Indian context, it is important that the DRE sector aligns with the Bureau of Standards (BIS) to ensure that service levels for rural customers meet nationally defined standards by the BIS. ARE will continue to work with and to support knowledgeable actors in this field such as IRENA and IEC.

4. Embracing innovations to increase the efficiency of DRE solutions

As in the past years, new technologies will continue to improve the efficiency and cost-effectiveness of mini-grids in the near future. Emerging innovations in generation, storage, payment systems as well as end-use equipment will increase efficiency, decrease costs and provide better energy services to end users. Examples include more efficient PV panels, remote monitoring and control systems, AI, blockchain, smart meters, swarm technology and online payment

systems, such as pay-as-you-go, which has been used with great success for off-grid solar in Eastern Africa.

To promote innovative companies, it is essential to increase support for disruptive ideas and entrepreneurship, to reduce FOREX risks and to provide technical assistance provision through start-up or SME accelerators, incubators and traditional advisory and grant financing for market entry activities (both for local Indian and foreign private sector companies).

5. Capacity building to develop human capital in the DRE sector

Being a relatively new sector, there is a shortage of job-ready talent to develop, to install, to operate, and to manage DRE solutions such as mini-grids on the-ground. The human capital gap is most pronounced in remote rural areas.

Through appropriate training programs, it is also the belief of ARE to fill this gap and build a sustainable mini-grid industry for the 21st Century, empowering activating markets for affordable energy services, and creating local jobs and inclusive economies.

As an example, ARE Member, Schneider Electric via its 'Access to Energy' Programme has provided vocational training to over 190,000 people across 150 projects in around 40 countries with more than 250 partners and why, ARE Member LED-Safari specialises in online trainings for off-grid solar. Likewise, the Skill Council for Green Jobs in India has made impressive progress in providing training to support the Indian renewable energy sector. In this context, ARE has become a global partner of the #PoweringJobs, a global campaign led by PowerforAll to create employment-ready workforce to scale distributed renewable energy solutions in emerging economies in Asia and Africa.

ARE as an association also offers on-demand specialised trainings for utilities, government and private sector to help bridge the capacity gap in the sector. As a next activity, ARE offers a one-and-a-half-day rural electrification training for policy makers and officials at Intersolar Europe on 16-17 May 2019. 



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