

POWER FOR ALL FACT SHEET

Mini-grids have strong socioeconomic impact beyond electricity connection and consumption

**POWER
FOR
ALL**

According to the World Bank, mini-grids are the least-cost solution for half a billion people by 2030. Their impact stretches beyond electricity access and consumption into many socioeconomic aspects of rural livelihoods. This fact sheet aggregates the most recent impact data for mini-grids in low energy access countries and provides examples of impact assessment frameworks.

**180 jobs/MW
installed**

JOB MULTIPLIER FOR MINI-GRIDS

\$100

ANNUAL SAVING PER RURAL
MINI-GRID HOUSEHOLD
CONNECTION

13%

MICROENTERPRISE REVENUE
GROWTH IN INDIA

Mini-grids have proven, direct economic impact through employment and energy expenditure savings. On average, every 1MW of mini-grid installed capacity requires about 180 direct jobs and as much as US\$100 can be saved annually per rural household connection.

- » One of the most direct development impacts is job creation, both temporary employment during the construction phase and permanent employment during operation and maintenance. Mini-grids account for 180 direct jobs per MW installed, or roughly 4 direct jobs per system, according to Power for All's study in India, Kenya and Nigeria.¹
- » In the Energy and Environmental Partnership's (EEP) portfolio, 36 direct jobs are provided for every mini-grid project financed, and local women and youth account for many of the jobs in sales and payment collection.²
- » In addition to employment, household energy expenditure saving is another direct economic impact. The EEP found that mini-grid electricity has brought more than US\$100 of annual savings per household. In India, it reduces household energy expenditure by 37.5%. In Laos, it enables families to save between 2–5% of their annual income.^{3,4,5}
- » Acumen found that US\$43 of are saved annually on energy expenditure for each household served by its portfolio of power and lighting companies, including solar home units and mini-grid companies.⁶

Mini-grids enable various productive use applications, powering a wide range of commercial and agricultural electrical appliances. Indirect economic impacts such as income growth and productive use job creation vary by region and are subject to local economic conditions.

- » Agricultural applications for mini-grid electricity have proven benefits. In India, mini-grid electricity reduces the cost of irrigation by 70% and improves the productivity of rural enterprises by 50%.⁷
- » In India, almost 11% of mini-grid connected microenterprises have expanded their businesses by adding newer appliances; about 7% of rural enterprises are established as a result of gaining access to energy, creating on average 3 productive use jobs per enterprise as a result.⁸
- » As a result of the productive use of mini-grid electricity, Indian microenterprises have experienced a 13% average revenue increase.⁹
- » In the Philippines, a biomass-wind-solar-battery hybrid mini-grid powered water pumps to tackle freshwater access issues, as well as ice machines to support the local fishery activities.¹⁰

Access to mini-grid electricity brings social and communal benefits by reducing the use of harmful fuels such as kerosene, providing lighting to schools and hospitals, and therefore improving health and safety, especially for women and children.

- » A study in Kenya found that after gaining access to mini-grid electricity, kerosene and disposable battery use decreased from 86% to 4% and diesel generator use from 10% to 0%.¹¹
- » More than 75% of women report a reduction in respiratory ailments since mini-grid electricity lessened their heavy dependency on kerosene, according to a study in India.¹²

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By the Numbers:

**180 jobs/MW
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MICROENTERPRISE REVENUE GROWTH IN INDIA

- » A study in India found that ~90% of women gaining access to mini-grid electricity highly appreciated daily chores becoming easier. Women's involvement in personal development activities also increased by 0.5 hours per day from benchmark.¹³
- » Well-lit households in the community improves women's safety in India. Close to 87% of women feel that their mobility has vastly improved after dark because of the well-lit surroundings.¹⁴
- » Lighting and mobile-phone charging allow longer studying hours for children. Monitoring data since 2015 indicated children's after-sunset study hours increased an average of 30 minutes.¹⁵
- » Mini-grid electricity also improves health services. Close to 70% of the households reported that mini-grid electricity has helped health facilities expand their working hours and reduced noise pollution caused by diesel generators.^{16,17}
- » In the EEP portfolio, mini-grids reduced carbon emission by 490 tCO₂-eq per project and the per capita carbon reduction is 0.085 tCO₂-eq.^{18,19}

There is not yet an industry-wide standardized impact assessment framework for mini-grids due to the high costs associated with impact data collection and lack of understanding of relevant impact metrics.

- » Meters should be installed and surveys conducted regularly to collect data for technical and social impact assessment. Data collection effort should begin before the construction of the mini-grid plant, to establish a baseline for future assessment.²⁰
- » Governments and project developers often choose scale over inclusivity for electrification programs. Considerations of remoteness, gender, and poverty are needed to ensure that impact reaches the most vulnerable population.²¹
- » University of Strathclyde, Practical Action and Carbon Trust jointly developed a KPI framework for mini-grid social, economic and technical impacts, covering a range of relevant indicators in household connections, energy expenditure and consumption, income, gender, health, education, among others.²²
- » Acumen in its Lean Data guide advised that a sample size of more than 250 is sufficient to meet most impact assessment needs.²³

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- » Mini-grid impacts extend beyond high quality electricity access into different socioeconomic aspects of rural livelihoods. Mini-grids have proven, direct economic impacts by creating 180 direct jobs per MW and saving as much as US\$100 annually for rural households.
- » Mini-grids productive use impact varies by context. In India, rural microenterprises experienced an income growth of 13% after connecting to mini-grids.
- » Impact metrics of mini-grid projects need to consider beyond connections and energy consumption by including poverty, gender, health and education indicators.

Sources:

1. Power for All. "Powering Jobs Census 2019: The Energy Access Workforce." Jul, 2019. p.44.
2. EEP. "Opportunities and Challenges in the Mini-Grid Sector in Africa." 2018. p.19,35.
3. Ibid. p.19.
4. The Rockefeller Foundation. "Understanding the Impact of Rural Electrification in Uttar Pradesh and Bihar, India." May 2017. p.11.
5. Veolia Institute. "Field Actions Science Report: Decentralized Electrification and Development." 2016. p.31.
6. Acumen. "Energy Impact Report." 2017. p.24.
7. The Rockefeller Foundation. "Understanding the Impact of Rural Electrification in Uttar Pradesh and Bihar, India." May 2017. p.8.
8. Ibid. p.8,11.
9. Ibid. p.8,11.
10. "Off-grid Renewable Energy Solution to Improve Livelihoods: Insights from Southeast Asia" p.3.
11. Vulcan Impact Investing. "Powering Productivity: Early Insights into Mini Grid Operations in Rural Kenya." October 2016. p.16.
12. The Rockefeller Foundation. "Understanding the Impact of Rural Electrification in Uttar Pradesh and Bihar, India." May 2017. p.16.

13. Ibid. p.12,16.
14. Ibid. p.12,16.
15. Ibid. p.12,16.
16. Ibid. p.12,16.
17. EEP. "Opportunities and Challenges in the Mini-Grid Sector in Africa." 2018. p.36
18. Ibid. p.19.
19. The Rockefeller Foundation. "Understanding the Impact of Rural Electrification in Uttar Pradesh and Bihar, India." May 2017. p.13
20. Practical Action. "Poor people's energy outlook 2018." 2018. p.19,56.
21. Ibid. p.19,56.
22. A Eales, et al. "Social Impacts of Mini-Grids: Towards an Evaluation Methodology." Power Africa. May, 2018. p.5.
23. Acumen. "The Lean Data Field Guide." Nov, 2015. p.20.