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**Sample Size**

450 households in Myanmar's Dry Zone region

**Research Implemented by IPA**

Yes

# Equitable Access to Solar Mini-grids in Myanmar

## Abstract

Access to electricity can bring significant economic benefits to communities, but in many rural areas extending the electrical grid can be costly, difficult, and unreliable. Decentralized, “off-grid” energy systems such as solar mini-grids may be another effective way to provide energy to communities that do not have access to an electrical grid, but less is known about their impacts, particularly for women. In Myanmar, IPA is working with researchers to study what determines household energy use and to examine the associations between solar mini-grids and outcomes for households, firms, and community facilities.

## Policy Issue

Globally, an estimated 1.1 billion people lack access to electricity, including over 400 million people in Southeast and South Asia.<sup>1</sup> Evidence suggests that enabling access to electricity may have a variety of benefits for communities, leading to increases in business activities, productivity, and income. Existing electrical grids often do not reach remote, rural, low-density communities, though, and extending those grids is expensive and difficult. Meanwhile, when communities do gain access to grids, they can be unreliable and prohibitively expensive for many households, and women and low-income households are often excluded from access.<sup>2</sup>

In these contexts, decentralized “off-grid” energy systems such as solar mini-grids may be an effective alternative to grid electrification, offering rural populations affordable and climate-friendly energy access. Women are likely the primary beneficiaries of these systems and may facilitate community-wide transition to clean energy. However, little rigorous evidence exists about whether and how women facilitate clean energy transition, and what the effects of these off-grid systems are on households, firms, and community facilities. In particular, little is known about the effects of access to mini-grids on women’s empowerment and whether energy access addresses or exacerbates existing forms of social inequality.

## Context of the Evaluation

This study is being conducted in three townships in Myanmar’s Dry Zone region, the country’s most densely populated rural region. Approximately 60 percent of Myanmar’s rural population lacks electricity access, relying heavily on solid fuels (wood, charcoal) for cooking, and diesel generators and candles for lighting. The Government of Myanmar’s National Electrification Plan (NEP) aims to provide electricity to all households by 2030 through grid and off-grid technologies. The Department of Rural Development is implementing the NEP’s off-grid component with private developers and technical advisory services from GIZ. Under the NEP, a total of 35 renewable energy mini-grid projects are operational, mainly concentrated in and around the Dry Zone region.

## Details of the Intervention

With support from the Sustainable Energy Transitions Initiative (SETI), researchers are working with IPA and GIZ to study (1) the associations between access to the solar mini-grid program and a range of outcomes on households, business firms, and community facilities and (2) the factors that determine household energy use, particularly enrolment in the off-grid program and electricity access and consumption.

Researchers are collecting data from 450 households in the Dry Zone region. These households are divided into three equal groups of 150: households in areas where there are existing solar mini-grid projects; households in areas where solar mini-grids will be implemented with the next two years; and households in areas where there are currently no planned solar mini-grid projects.

To compare the groups, researchers are using propensity score matching, a technique enabling matching on community and household characteristics other than mini-grid access that could influence study outcomes. The study will analyze the associations between access to solar mini-grids and various household-level outcomes, including electricity consumption and uses of electricity, women’s empowerment, how respondents use their time, and measures of household well-being such as economic consumption and health measures.

Researchers will also conduct a contingent valuation experiment to understand respondents’ willingness to pay to connect to a community solar mini-grid. The study will also collect data from 55 community facilities on their electricity uses and energy sources for lighting.

Separately, using national-level secondary data, researchers are evaluating the determinants of household energy use and estimating the demand for alternative energy sources to inform the government and its partners' pricing models.

## Results and Policy Lessons

Project on-going; results forthcoming.

## Sources

[1] International Energy Agency, 2017. "Energy Access Outlook 2017." <https://www.iea.org/access2017/>

[2] World Bank. (2014). Myanmar: Towards Universal Access to Electricity by 2030. Washington, D.C.: The World Bank. [http://www.esmap.org/sites/esmap.org/files/DocumentLibrary/Myanmar NEP BBL presentation 10-01-2014.pdf](http://www.esmap.org/sites/esmap.org/files/DocumentLibrary/Myanmar%20NEP%20BBL%20presentation%2010-01-2014.pdf).

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