



MIKE BARROW

## THE PAY-AS-YOU-GO OFF-GRID PROJECT IN INDIA

### Addressing Energy Poverty One House at a Time

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A rural household with a solar panel  
from ADB's Off Grid Pay-as-You-Go  
Solar Power Project

- Many rural villages in India are energy poor. Recent estimates reveal that about 289 million people lack access to electricity and an additional 80 million are underserved. To quickly fill the access gap, the Asian Development Bank initiated a \$2 million equity investment in Simpa Networks.
- Simpa installed off-grid solar systems in rural households, coupled with a metering and collection system linked to India's well-developed communications infrastructure. Electricity prices were tailored to households' capacity to pay.
- To keep electricity flowing, the project allowed rural customers with low and irregular incomes to buy energy credits in small packages—akin to sachet purchases—through the short messaging service of their mobile phones.
- The project decentralized access to electricity and made a traditionally expensive technology affordable for the poor. Thousands of households in rural India now have electricity flowing directly into their homes. By the end of 2015, around 15,000 households will benefit from this innovative approach.

## CONTEXT

Energy poverty calls for innovative and cost-effective solutions, especially in India, where about a quarter of the population lack electricity. The International Energy Agency reports that 289 million Indians lack access to electricity, especially in rural areas.<sup>1</sup> About 75 million rural households are not connected to the electrical power grid and another 80 million are underserved by electrical utilities.<sup>2</sup>

This lack of access accentuates rural poverty, overburdening meager household budgets because people must pay more to access even simple light. Rural households pay as much as \$9 for a month's supply of kerosene for lighting and other electrical needs, accounting for half of per capita consumer expenditures per month (approximately \$19–\$20) (footnote 2).

India's energy sector reforms prioritize lack of access, energy efficiency, and climate change. The country has made gradual progress in extending the central electricity grid. However, the long-term feasibility of continuing such efforts remains uncertain. Even villages that may gain connection to the grid remain uncertain about when they will be connected.<sup>3</sup> The cost of infrastructure and facilities to expand energy supply is steep, political dynamics make much-needed policy reform complex and difficult (footnote 1), and energy demand continues to surge, further straining government capacity. In July 2012, the national grid broke down, causing the world's largest blackout in recent history. The failure plunged 20 Indian states into darkness, leaving 700 million people without electricity, causing road gridlocks due to lack of traffic signals, stranding hundreds of train commuters, and seriously delaying medical procedures and public and private transactions.<sup>4</sup> Even so, India's electricity demand is expected to increase from 900 billion kilowatt-hours in 2011 to 1,400 billion kilowatt-hours by March 2017.<sup>5</sup>

The poor urgently need access to energy. Therefore, India must implement strategic measures to avoid pushing the rural poor further into the spiral of poverty. Because most rural villagers can afford only enough electricity to power two light bulbs and a cell phone charger (footnote 3), new measures must expand access and affordability. In addition, expanding access should not compromise service reliability.

In January 2013, the Asian Development Bank (ADB) initiated Off Grid Pay-as-You-Go Solar Power, a \$2 million equity investment in Simpa Networks that will close the gaps in energy access with the assistance of the private sector. This will facilitate the provision of solar energy to India's energy-poor households using a prepaid "sachet," or small packaging, marketing platform.

## PROJECT SNAPSHOT

EQUITY INVESTMENT TO  
SIMPA NETWORKS:

**\$2 million**

GEOGRAPHICAL LOCATION:

**India**

TYPE OF ENERGY PROJECT:

**Off-grid solar power**

<sup>1</sup> International Energy Agency. 2012. *Understanding Energy Challenges in India. Policies, Players, and Issues*. [http://www.iea.org/publications/freepublications/publication/India\\_study\\_FINAL\\_WEB.pdf](http://www.iea.org/publications/freepublications/publication/India_study_FINAL_WEB.pdf)

<sup>2</sup> Asian Development Bank (ADB). 2013. *Knowledge Showcases: Affordable Pay-as-You-Go Solar Power for India's Energy-Poor Homes*. August. Manila. <http://www.adb.org/sites/default/files/pub/2013/affordable-solar-power-india-energy-poor-homes.pdf>

<sup>3</sup> Princeton University. 2014. *Rural Energy Alternatives in India: Opportunities in Financing and Community Engagement for Renewable Energy Microgrid Projects*. <https://www.princeton.edu/sites/default/files/content/591f%20Rural%20Energy%20Alternatives%20in%20India.pdf>

<sup>4</sup> H. Pidd. 2012. India Blackouts Leave 700 Million without Power. *The Guardian*. 31 July. <http://www.theguardian.com/world/2012/jul/31/india-blackout-electricity-power-cuts>

<sup>5</sup> R. Sharma and E. Yep. 2011. India to Add 17 GW Renewable Energy in 2012–17. *The Wall Street Journal*. 5 May. <http://www.wsj.com/articles/SB10001424052748703992704576304661127159344>

## SOLUTIONS

**Tapping the private sector.** Simpa already offers a simple, affordable, commercially sustainable, and clean energy solution to address lack of access to electricity in off-grid and largely rural areas. Established in November 2010 and incorporated in Delaware, United States, Simpa operates in India through Simpa Energy India, a 100% subsidiary.<sup>6</sup> ADB's investment will allow Simpa to extend the off-grid power solution already piloted in a Karnatak village to other parts of the country, and also raise capital from other private equity firms during the next 3 years. Thus, ADB's assistance will help India provide access to clean, reliable, and affordable energy via solar home systems (SHSs) in 15,000 rural households by 2015. Tapping the private sector can also stimulate more venture capital funding in India to make services such as electricity affordable.

**Using a renewable source.** The project offers poor rural households an optimal solution to their electricity woes. SHSs include a solar panel, a battery that stores solar energy, wires connected to the home, a charge regulator, and compact fluorescent and/or light-emitting diode lamps. It also includes the Simpa small electronic controller that locks energy flow from the battery. The controller has a keypad for entering unlock or recharge codes and a simple liquid crystal display that shows the energy credit balance available for use.

**Sachet pricing scheme.** One SHS costs about \$200–\$400. To have the system installed in the home, a customer just needs to pay about 10%–20% of the cost of the system. After installation, users can buy energy credits in small increments or quantities, according to their preference, in amounts as low as Rs.50 (about \$0.87). The minimum energy credit available for purchase is Rs.10 (about \$0.002).<sup>7</sup> Individual payments accumulate toward the final purchase price. After receiving full payment, the system unlocks permanently and continues to produce electricity without further charge or fees. Simpa calls this mode of pricing “progressive payment scheme.” It not only allows consumers to buy electricity at retail prices, but also makes it easier for customers to transform incremental payments into a household asset. This scheme considers the low and irregular incomes of rural residents, who can afford only small amounts of commodities.

**Piggybacking on a developed communications network.** When a household needs more energy, it can use a mobile phone's short messaging service to purchase credits and unlock the SHS. A return message provides a code to unlock the controller and make electricity flow into the household again. Piggybacking on the country's well-developed communications infrastructure facilitates payment and collection in a dispersed customer base such as in India, where rural villages are scattered along vast tracts of land. As of June 2012, India had a well-developed mobile telecommunications network that serves more than 930 million mobile phone users and 14 mobile network operators (footnote 6).

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<sup>6</sup> ADB. 2012. *Report and Recommendations of the President to the Board of Directors: Proposed Equity Investment to India for the Simpa Networks Off-Grid Pay-As-You-Go Solar Power Project*. December. Manila. <http://www.adb.org/sites/default/files/projdocs/2013/46931-014-ind-rrp.pdf>

<sup>7</sup> S. Advani. 2013. Simpa Networks Offers Clean Energy through a Prepaid Payment Platform. *Entrepreneur India*. 30 January. <http://simpanetworks.com/2013/02/17/entrepreneur-simpa-networks-offers-clean-energy-through-a-prepaid-payment-platform/> (accessed 26 October 2014).