

Solar lighting for rural households: A case of innovative model in Bihar, India

Debajit Palit, Sangeeta Malhotra,

Nikita Bankoti, Manish K Pandey

The Energy & Resources Institute, New Delhi



Background

- Access to electricity in India has been a major concern with around 43% of the rural population still without electricity access (Census 2011);
- In Bihar, only 16% of the population has electricity access
- Grid extension has been the predominant mode of electrification with almost 96% coverage of inhabited villages
- PV systems have been mostly adopted for rural electrification as an alternative options to grid
- SREDAs has largely supported implementation of solar lighting program using Solar Home Systems (SHS) and Solar Mini-Grids (SMGs).
- Almost 95% of around 10,000 villages have been covered with lighting solutions only (under MNRE's Remote Village Electrification Program)
- TERI have taken up initiatives to build and support innovative solar lighting solutions under its flagship program 'Lighting a billion Lives' (LaBL)

Solar Lighting Program in Bihar

- As part of the LaBL initiative, TERI and BRLPS collaborated to promote SHS to women led SHGs under the *JEEViKA**project.

MoU was signed between TERI and BRLPS on 26th October, 2012

- Under this MoU, SHS were installed in 5000 households in Purnia district
- Dhamdaha block was selected with an objective to cover all households with SHS and saturate the entire block

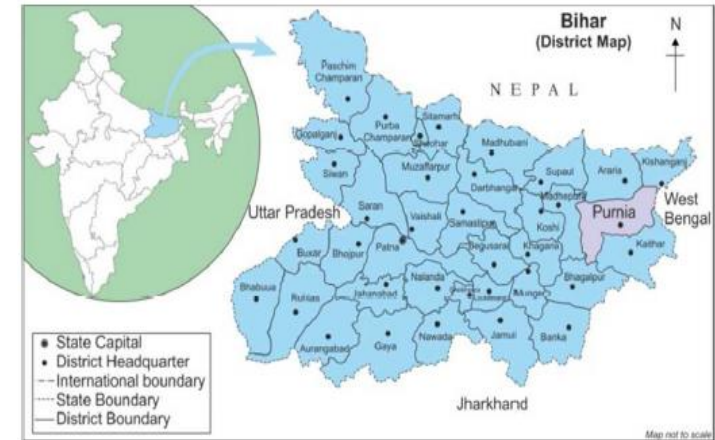
Once Dhamdaha block was saturated, the project moved to other adjoining blocks namely, Barhara Kothi and Baisi block

- Currently, over 12,000 SHS have been installed under the JEEViKA project in across 3 districts of Bihar - Purnia, Gaya and Madhubani

*JEEViKA is a project for social & economic empowerment of rural women in Bihar, implemented by Bihar Rural Livelihood Promotional Society of Government of Bihar and World Bank

Study Objective & Methodology

- **Objective:** Comprehensive assessment of the solar lighting project by examining multiple aspects
 - Technical design
 - Delivery model
 - Financing
 - Impacts.
- **Area of Study:** Dhamdaha block of Purnia
- **Sample size:** 100 Households
- **Targeted village:** Selected on the basis of time period of SHS installation
 - 40 households (> 1 year; *installed between Dec 2012 to Mar 2013*)
 - 60 households (< 1 year; *installed in Aug 2013 & onwards*)
- Households were chosen randomly for both the categories
- Primary Data collection through Questionnaires and Focus Group Discussions



Project Area : District Purnea, Bihar



Total Population of district

25,43,942

Literacy

35%

SC/ST Population

17%

No of Blocks

14

No of Panchayats

251

No of villages

1296

Dhamdaha block

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Technical features

- 15 Wp Solar Panel
- 12V 10Ah rechargeable lead acid battery (specially designed under this LaBL programme)
 - Cost of conventional battery = 40 US\$
 - Cost of specially designed battery = 19 US\$



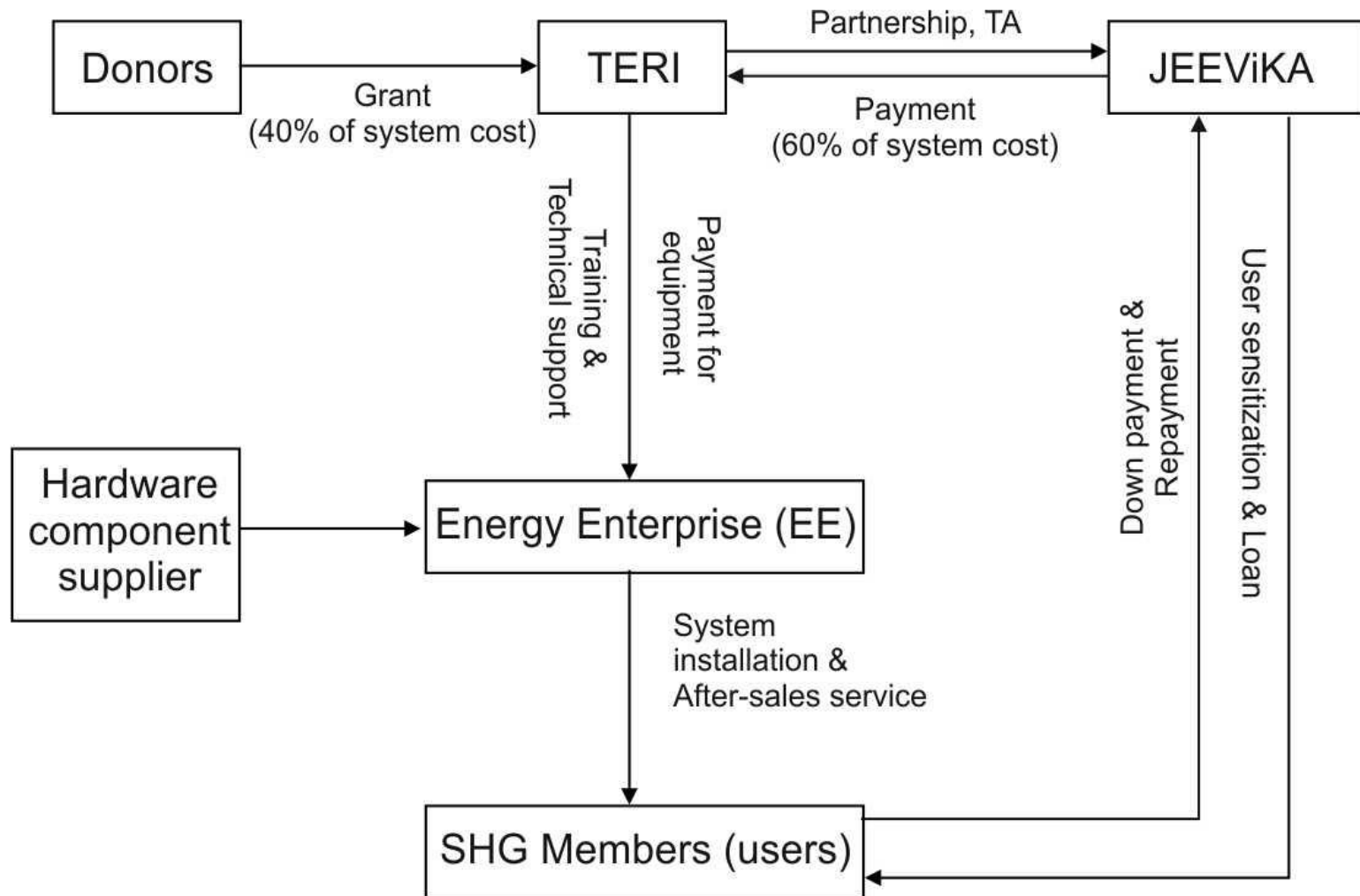
- Two LEDs of 2.4 W (~200 lumens and 7-8 lux from a height of 2.5 metre) and a mobile charging point

Service Delivery & Financial Model

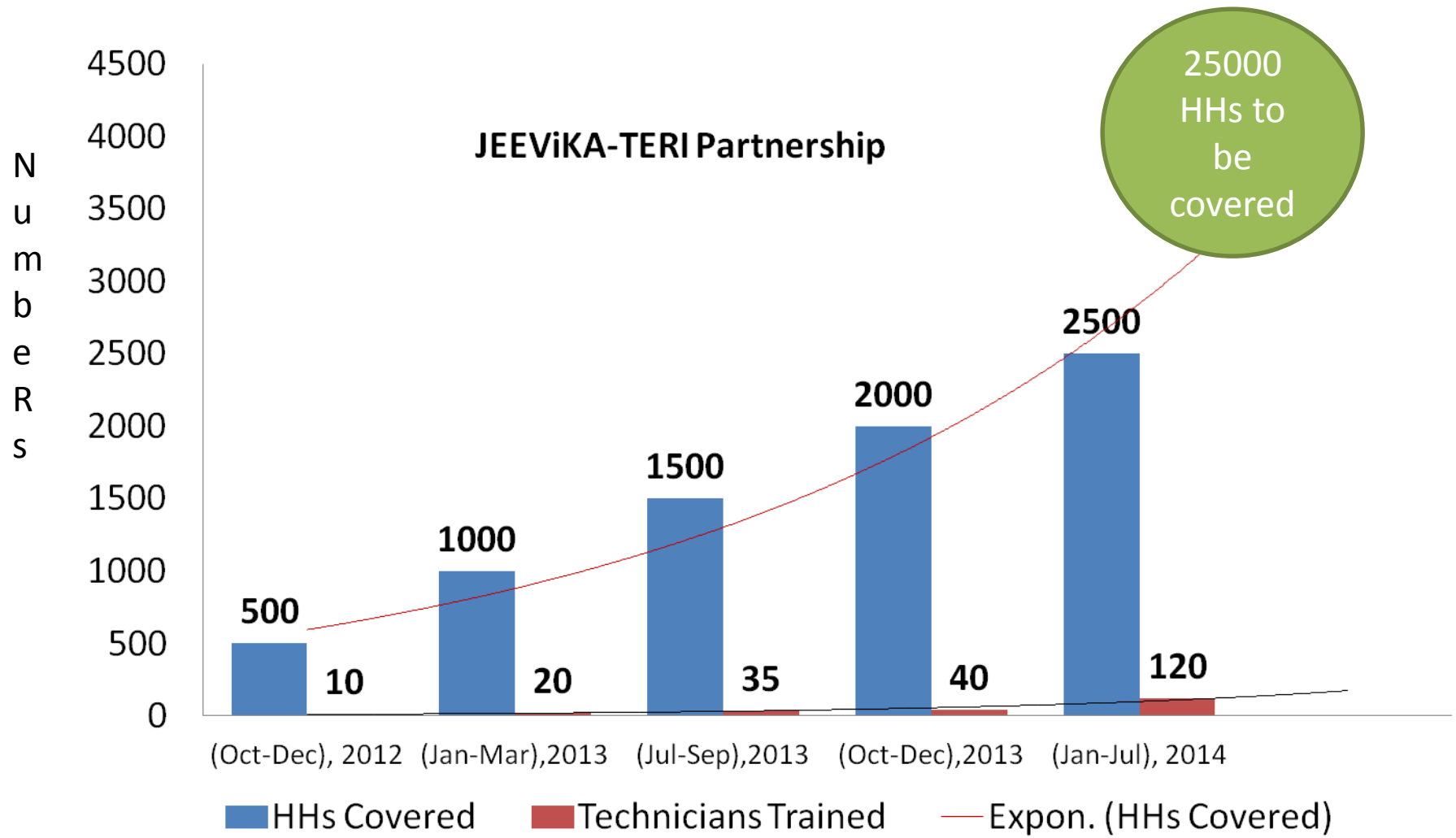


- Dhamdaha block
 - Activity intensive block under JEEViKA
 - Strong relationship with SHGs
- Remote and un-electrified villages with a good history of loan repayment
- Cost of each SHS = INR 5050 (82 US\$)
- Down payment of INR 500 (8 US\$)
- Monthly installments @2% interest rate on balance principal
- Flexibility in repayment from 5 to 20 months

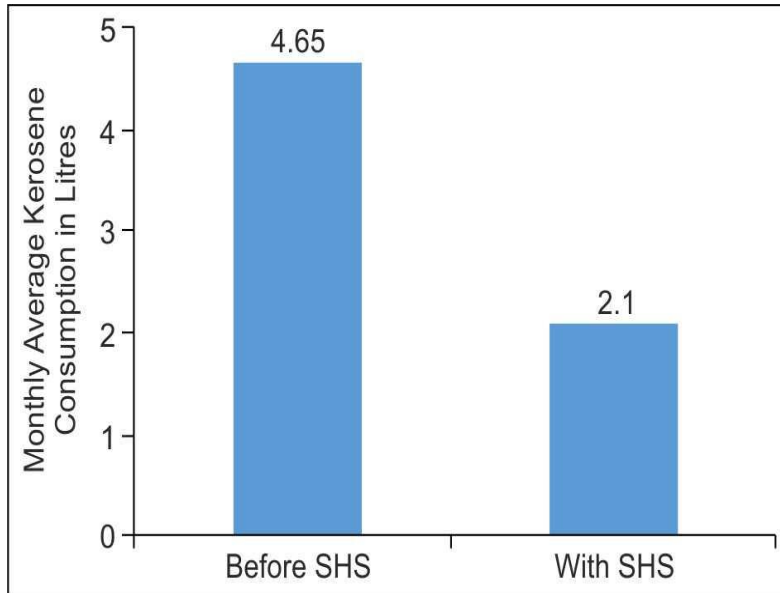
Service Delivery & Financial Model



Achievements

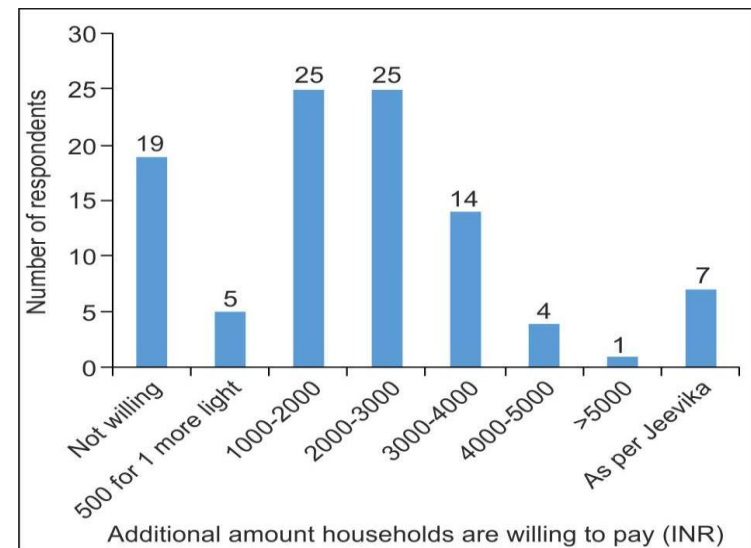


Project Impacts



➤ Increase in monthly income due to increase number of working hours post sunset and starting of indoor income generation activities.

- Beneficiaries extremely satisfied with the light quality
- Reduction in kerosene expenditure from INR 163 to INR 54 (US\$ 2.6 to US\$ 0.8)
- Total money saved from per month on reduced kerosene use and mobile phone charging was found at INR 184/-
- Thus payback for solar light comes to about 1.5 years



Key Lessons

- Bottom-up approach resulting in structured flow of service and funds
- Easy loan mechanism (recover rate \sim 84% within one year of system installation)
- Strong institutional presence vital for scale up in rural areas
- Facilitation and training of Energy Entrepreneur at the beginning of installation



Key Lessons for Policy design

- ***For ensuring long system life, after-sales service*** charge component included in the capital cost during the warranty period
- ***Financing at easy and flexible terms*** by JEEViKA without any collateral requirement
- ***Flexibility in loan repayment*** by the beneficiary
- ***Reasonable pricing of the system*** due to customization of the product configuration (after subsidy under LaBL)

Going forward

- Project now being scaled up to cover additional 25,000 households across 3 districts in Bihar
- Establishment of more women energy enterprise for proper after sale mechanism
- Reduce grant component to make it self sustaining in 2 years
- Increase in the module capacity & battery capacity to also include forced draft cook stove



Any Questions