

# Photovoltaic Deployment in West Bengal, India

## Showing how to improve the quality of life for millions of people using photovoltaic electrification systems

Over two billion people in developing countries—nearly one-third of the world's population—live without electricity service. Often, these people's lives would be greatly improved with only small amounts of power for such applications as indoor lighting or pumping of water. For these applications, photovoltaic (PV) electricity is often the least expensive and most reliable power alternative. This market represents one of the largest and fastest growing sectors for

renewable energy technology. The Republic of India has more than 72,000 villages that are currently without electricity.

In 1995, the technical staff of the Ramakrishna Mission, a nongovernmental organization in West Bengal, India, had little understanding of the effectiveness of PV electrification systems. They did not know if such systems would be appropriate for the villages in their region or how they could bring PV electricity to their residents.

*The Office of Power Technologies is part of the Office of Energy Efficiency and Renewable Energy*

### Highlights

- *Bringing electric power to thousands of people in India allows them to pump water electrically and to light their homes at night*
- *Helping developing countries electrify using PV, while establishing viable markets for U.S. exports*
- *Creating a marketing and installation infrastructure for PV in an electricity market that will increase 31,000 MW by the year 2000*
- *Financing the maintenance and installation of new systems through a revolving fund*
- *Helping reduce the increase in greenhouse gas emissions that will accompany India's rapid economic growth.*



NREL/PIX04875

*The systems have made a very real impact on the lives of village residents by bringing electric light into their homes.*

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**The Mission's success has led to plans to establish six more solar shops in West Bengal and the installation of 2000 additional domestic lighting systems in the region.**

Today, thanks to help from the U.S. Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL), the Mission has a trained staff of some 90 installers, has installed more than 500 PV domestic lighting systems, and has established "Aditya," a solar shop on the Mission campus in Narendrapur. Sales are brisk at the shop, which sells as many as 11 domestic lighting systems to the rural villagers each day. The systems are manufactured in India and the United States.

DOE has helped the Mission to identify private-sector partners for expanding and financing the project. Individual homeowners pay a 50% deposit prior to installation of a domestic system and pay the balance over the next one to three years. The deposits and interest on the low-interest loans form a revolving capital fund for the project. Most homeowners pay off their loans within one year, using profits from their crop harvest.

Having established their proficiency in selling and maintaining domestic lighting systems, the Ramakrishna Mission staff was recently asked to install a complete PV electrification system for the Forestry Department's new Tiger Reserve guest house on Sajnekhali Island in the Sundarbans. The Mission's success has led to plans to establish six more solar shops in West Bengal, the installation of more than 2000 additional domestic lighting systems, and seven community-scale systems in the region.

With a population in excess of 900 million, India is projected to need an additional 31,000 megawatts of generating capacity by the turn of the century. But its solar resource is large—just using 0.02% of India's land area for PV could provide this projected electrical need. DOE's work in India on projects such as this will help the country realize its solar energy potential and increase its standard of living, while reducing the increase in greenhouse gas emissions that will accompany its rapid economic growth.

## Project Partners

U.S. Department  
of Energy

Applied Power  
Corporation

Exide Industries Ltd.,  
Webel, India

Ministry of Non-  
Conventional Energy  
Sources, India

National Renewable  
Energy Laboratory

Ramakrishna Mission,  
West Bengal, India

West Bengal  
Renewable Energy  
Development Agency,  
India

### For More Information:

Visit the International Initiatives site of the U.S. Department of Energy's Energy Efficiency and Renewable Energy Network (EREN) at:

[www.eren.doe.gov/international.html](http://www.eren.doe.gov/international.html)

or visit the NREL International Programs Web site at:

[www.nrel.gov/international/](http://www.nrel.gov/international/)

Copies of *NREL International Programs*, NREL/BR-520-23256, September 1997, are available through:

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