

Rural Electrification in Brazil

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Introducing Cost-Effective Rural Electrification in Brazil

The United States and Brazil are collaborating to bring electricity to some 5 million households in rural Brazil. Over the next decade, there is a potential to install approximately 500 megawatts (MW) of solar home systems and 1000 MW of community systems, bringing light to households, schools, and health clinics throughout rural Brazil. Added to the potential for grid-connected systems—about 3 gigawatts (GW) from wind farms, biomass power, and photovoltaics (PV) in the next decade—the total potential for renewable energy systems in Brazil could reach 4 to 5 GW by 2010.

The U.S. Department of Energy (DOE), its laboratories, and U.S. industry are collaborating to help Brazil electrify many

rural communities. This joint program is also helping create a new export market for U.S. renewable energy technologies.

Through this collaboration, DOE and the National Renewable Energy Laboratory (NREL) have increased Brazilian confidence in renewable energy technologies, thereby benefiting both Brazil and the United States.

U.S. manufacturers of PV, wind, and hybrid energy systems are poised to gain market footholds in Brazil. If the renewable energy potential of 4 to 5 GW is realized, it will translate into an \$8 to \$10 billion market for renewable energy technologies. Capturing a significant portion of this market will mean enormous growth for the U.S. renewable energy industry.

Highlights

- **Establishes confidence in the use of renewable energy technologies in Brazil**
- **Establishes relationships between U.S. agencies and industries and the Brazilian government and utility companies**
- **Improves the quality of life and productivity for rural populations with little impact on the environment**
- **Creates an infrastructure base to help realize the potential for 1500 MW of off-grid renewable energy systems**
- **Helps expand the markets for U.S. industry through cost-effective projects.**



NREL/PIX 01027

50-watt photovoltaic electric lighting systems provide four to six hours of light each night for residents of this village in Ceara, Brazil.

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Several DOE projects are now refrigerating vaccines, powering televisions, pumping water, and lighting houses, community centers, and village schools.

As part of the U.S./Brazil collaboration, NREL is providing technical assistance to the Centro de Pesquisas de Energia Elétrica, Brazil's research institute for electricity technologies. For other segments of the Brazilian government, NREL is analyzing Brazilian policies designed to accelerate the acceptance of renewables. In coordination with this effort, private-sector organizations are developing business alliances that will translate those policies into new renewable energy installations.

This collaboration has already yielded dividends for Brazil, through cooperative projects in the states of Pernambuco, Ceará, Alagoas, Minas Gerais, Bahia, and Acre. Where the only option for electricity had been a diesel generator, several DOE projects using PV technology are now refrigerating vaccines, powering televisions, pumping water, and lighting houses, community centers, and

village schools. In Ceará, for example, all the homes in the village of Irapua have been outfitted with 50-watt PV electric lighting systems that provide four to six hours of fluorescent light each night.

In the Amazon region of Brazil, local utilities—traditionally operated with diesel-powered minigrids—are now working with DOE, NREL, and U.S. wind and solar technology manufacturers to deploy hybrid systems. Two of these hybrid systems (electronically controlled combinations of PV, wind, and diesel systems with battery storage) are now providing power to the villages of Joanes and Campinas in the states of Amazonas and Pará respectively. The projects in these eight Brazilian states now stand as models that are being replicated in other developing countries, such as India and China.

Project Partners

U.S. Department of Energy

National Renewable Energy Laboratory

Ministerio de Minas e Energia, Brazil

Eletrobras and Centro de Pesquisas de Energia Elétrica, Brazil

Siemens Solar Industries

Bergey Windpower Company, Inc.

New World Village Power

Photocom

Solarex Corporation

Advanced Energy Systems, Ltd.

For More Information:

Visit the NREL International Programs Web site at:
www.nrel.gov/international

or 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

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