

Innovation for Our Energy Future

Advancing Clean Energy Use in Mexico

Optimizing energy resources, growing markets, sharing knowledge

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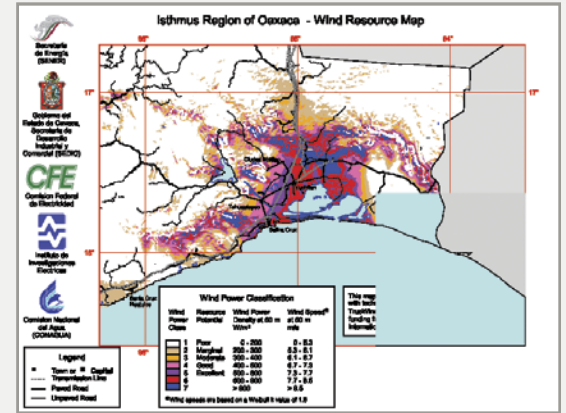
This small 10 kW wind turbine has performed well operating in the harsh seaside environment on the Caribbean coast of southern Mexico. The turbine is equipped with an anti-corrosion package that helps it withstand constant exposure to salt from ocean spray.

NREL's work in Mexico over the past ten years has focused on clean energy technology activities that support the government of Mexico's development goals. With support from the US Department of Energy (DOE) and the US Agency for International Development (USAID), NREL has built strong public and private partnerships to carry out a variety of activities including technology transfer, capacity building, resource assessment, renewable energy and energy efficiency project identification and development, and hybrid system installations. NREL also provides technical assistance to the US Environmental Protection Agency's (EPA) Integrated Environmental Strategies Program to improve air quality and reduce greenhouse gas emissions in Mexico City.

Current Activities

Wind resource assessment and large-scale wind development

In 2002, NREL completed a high-resolution wind resource map for the State of Oaxaca as well as US/Mexico border region maps. The wind resource maps, which are derived from a variety of weather data, combined with information such as wind flow



Wind resource for Isthmus Region of Oaxaca

characteristics under different terrain conditions, were placed in a Geographic Information Systems (GIS) framework for easy data analysis.

NREL's resource mapping revealed 33,000 MW of wind potential in the Isthmus region alone in Oaxaca, with over 6,000 MW of usable wind resource. The wind atlas has been described as a very useful tool by the Government of the State of Oaxaca, which has established a goal of installing 2,000 MW of renewable energy by 2015.

Success Story

Geospatial Toolkit for Oaxaca

With funding from the U.S. Department of Energy (DOE), NREL recently developed a Geospatial Toolkit (GsT) for the State of Oaxaca. The Oaxaca GsT is the next step following the development of wind and solar maps. The GsT builds on resource data, worldwide GIS datasets, and country-specific data. It is designed for the energy planner, decision maker, or project developer to allow them to understand the renewable energy resource base and the potential for a country or region and their relationship to other geographic features such as towns, roads, cities, and protected areas. With this tool, the decision maker can perform simple analyses and queries, such as "Where are the best wind resources within 10 km of a transmission line?" NREL developed the GsT as an easy to use, stand-alone geographic toolkit that requires no special software or training.

The Oaxaca GsT is an example of extensive inter-agency collaboration, as the Oaxaca GsT was developed with funding from DOE, using lessons learned under the United Nations Environment Programme's (UNEP's) Solar and Wind Energy Resource Assessment (SWERA) program, funded by the Global Environment Facility, and is based on data collected for development of wind and solar maps of Oaxaca, funded by USAID. The toolkit will likely be used for Mexico's Secretary of Energy's Rural Electrification Program to identify feasible project sites. To download the GsT, please visit: www.nrel.gov/international/geospatial_toolkits.html. For more information on SWERA, please visit: <http://swera.unep.net/swera/index.php>.



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Solar resource assessments

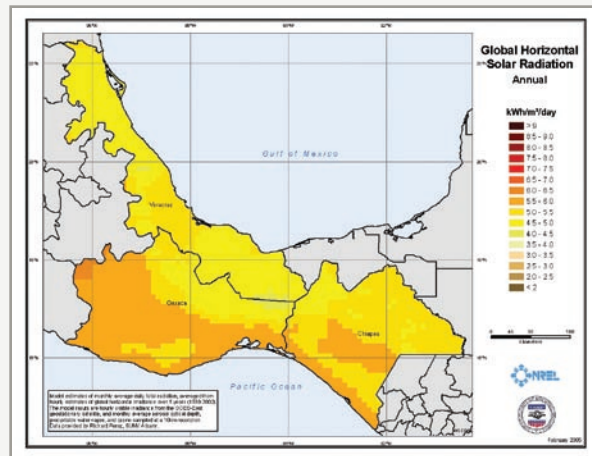
Local agencies expressed interest in complementing the Oaxaca wind atlas with a solar resource assessment of Southern Mexico. With funding from USAID, NREL developed high-resolution satellite-derived solar resource data and maps for the states of Chiapas, Veracruz, and Oaxaca. The database includes time and spatial information, with hourly time series data at selected grid cells, which allows for detailed and defined site and technology assessments that can be used to provide recommendations for technology options given the solar resource for the region. All of the solar and wind maps for Mexico can be found at: www.nrel.gov/international/rr_assessment.html

ESCO market development

NREL has worked with Mexico's National Commission for Energy Savings (CONAE) to promote Energy Services Company (ESCO) projects in the hotel and the industrial sectors since 1999. ESCOs carry out performance contracts to implement financed energy efficiency and renewable energy projects in a facility on a guaranteed savings basis. This innovative financing alternative can help advance the clean energy project market in Mexico. There is considerable market potential for ESCO projects, although there are also barriers to implementation. To help overcome these barriers, the NREL-CONAE team has helped facilitate various projects through business matchmaking (linking facility managers to potential ESCOs, project developers, financing sources, technology companies, NGOs and others), and by developing efficient financial vehicles that allow ESCOs, energy end-users and project developers to access financing, and to reduce transaction costs. The NREL-CONAE team continues to look for new partnerships with public and private sector organizations that can add value to this initiative. For more information visit the ESCO section at CONAE's website. www.conae.gob.mx/wb/distribuidor.jsp?seccion=27

Rural energy planning & technology options analysis training

NREL is working with Mexico's Secretary of Energy (SENER) to support implementation of Mexico's Rural Electrification Program by providing regional training courses on decision analysis tools including HOMER, NREL's micropower optimization model (www.nrel.gov/homer).



Annual global horizontal solar radiation: Veracruz, Oaxaca, Chiapas

This training helps with regional planning and identification and siting of renewable energy projects. With USAID and others, NREL is developing a productive uses User Manual that will also contribute to SENER's Rural Electrification Program.

Hybrid power system monitoring & replication

NREL has monitored and provided technical support to six hybrid power systems in the Yucatan and Baja California provinces for several years. NREL will follow through with activities to promote greater understanding of the market and replication of projects, including a social and technical analysis of the San Juanico power system, and a market evaluation of the resort industry in the Yucatan.

Spanish-language guidebooks

NREL has developed Spanish-language guidebooks and other training materials on the productive use of renewable energy technologies for schools, rural health clinics, and micro enterprises as well as on renewable energy technologies and applications.

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Operated for the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy by Midwest Research Institute • Battelle

NREL/FS-710-38628
September 2005

Printed with biodegradable ink on paper containing at least 50% wastepaper, including 20% post consumer waste.