International Renewable Energy Activities at Sandia National Laboratories

A Brief Overview
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Why Do We Do International Programs?

- **Maintain a Strong US Industry in the Global Market**
- **Support National Security**
  - Energy Independence for the US
  - Economic Development and Regional Stability in Developing Nations
- **Assist Economic Growth through Application of Clean Energy Technologies**
- **Support DOE International Agreements and Commitments**
Why do international programs?

77.5% of US PV Modules Produced are Exported
Why do international programs?

U.S. Market Share of Worldwide Total PV Module Shipments

The US is Losing International Market Share!
Sandia’s International RE Activities

- **Mexico Renewable Energy Program (MREP)**
- **Central American Program**
- **South American Program (Brazil)**
- **International Energy Agency (IEA) Support**
- **US/Mexico Bi-Lateral (& /Canada Tri-Lateral) Energy Agreement Support**

Sponsors of these activities:

- DOE/Solar Technology Programs
- DOE/Weatherization and Intergovernmental
- USAID (EGAT and Missions)
Leveraging International Activities

- USAID Mexico ($575K in FY03)
- USAID EGAT/Energy ($125K in FY03)
- USAID EGAT/Forestry ($150K in FY03)
- USAID Brazil ($160K c/o to FY03)
- DOE WI ($150K in FY03)
- DOE SP ($715K in FY03 [AOP Request] [Includes SW RES])
Meeting DOE’s Solar Program Goals

- Reducing Installed System Life-Cycle Costs
- Improving System Quality and Reliability (resulting in Sustainability)
- Assuring and Monitoring Performance
- Removing Barriers to replication and dissemination through education and training and influencing policy
- Growing international Markets (~78% of US PV production) for US Industry
- Developing New Applications for Renewable Energy Technology systems

International Goals ≡ DOE/SP & NCPV Goals
Project Implementation Process

- Build strong **partnerships** with in-country organizations,
- Implement **pilot projects** as a way to institutionalize the use of renewable energy technologies,
- Build **technical capacity** within both demand-side and supply-side organizations,
- Provide **technical assistance** to assure project quality and reliability,
- Conduct **monitoring** to catch problems and feed **reliability** and **life-cycle-cost** information back into the system, and
- Project **replication** - the true measure of success - **market growth**.

*This approach has a proven record of sustainable success*
Partnerships are Critical for Success

- Joint DOE and USAID support for the PASA and IAA has made this partnership successful.
- Neither Sandia program can stand on its own.
Sandia’s Working Partners

Our Sponsors are:
- DOE/Solar Technology Programs
- DOE/Weatherization and Intergovernmental
- USAID (EGAT and Missions)

Implementation Partners include:
- New Mexico State University, SWTDI (aka SW RES)
- Winrock International
- Enersol Associates and Adesol in Honduras
- Fundación Solar in Guatemala
- National Rural Electrical Cooperative Association in CA
- SOLUZ in Honduras and Dominican Republic
- NREL in Mexico
- Greenstar in Brazil
- SENER, FIRCO, DGTVE, CONANP, ILCE, SEMARNAT, INI in Mexico

Collaborative Partners include:
- The World Bank
- Inter-American Development Bank
- Organization of American States
- UN Food and Agriculture Organization
- UN International Telecommunications Union
- NASA
- Dept of Commerce/TDA
Current International Projects

**Mexico**
- Distance Education (Chihuahua, Chiapas, San Luis Potosi)
- Rural Electrification (microhydro in Veracruz and Chiapas)
- Water Purification (Chihuahua) and Pumping (FIRCO)
- Protected Areas (Southern Mexico)
- Native American and Mexican Indigenous Technical Exchanges

**Central America**
- Honduras
  - WB/ESMAP-IDB Telecentros
  - ENERSOL AID Briefing
  - UN/FAO PicoHydro mini-grid
- Guatemala
  - NRECA Codes and Standards Workshop
  - Fundación Solar School Project
  - TNC Sierra de las Minas forestation/RE project

**South America**
- Greenstar Brazil (3 villages)
Central America
Sandia-led pilot installations are leading to the formation of new renewable energy strategies

Honduras: PV for rural water training has led to technical assistance requests from three international development organizations doing their own projects

Guatemala: Technical assistance has led to installation of 850 PV home lighting systems

Honduras: World Bank, IDB, Organization of American States, Honduran Government are collaborating on several pilot PV-powered rural telecenters with Sandia technical input

Regional: Strategic plans in progress for broader PV applications to distance education, conservation programs.

Students enjoy their first distance education class with a newly-installed PV system in rural Guatemala
Central American Projects

**Honduras**

- **World Bank/ESMAP Telecenters Project**
  - Pilot for IDB $8.5M Distance Education Project
  - Two villages (Las Trojas, Montaña Grande)
  - Multi-use Telecenters (e-mail, internet, distance education)
  - Workshop for decision makers on PV and project development and sustainability

- **UN/FAO Pico-hidro Project**
  - Village of Los Suncuyos, Lempira
  - Combined forestation/energy project
  - Hydroelectric turbine and mini-grid
  - High potential for replication
Central American Projects

**Guatemala**

- **NRECA Workshops**
  - Emphasis on Codes and Standards
  - Improves reliability and performance and builds markets for US products
  - Supports multiple rural electrification projects

- **FUNRURAL**
  - Rural electrification for coffee co-op villages
  - Coffee co-op has funding and motivation for replication

- **The Nature Conservancy Project**
  - Combined Forestation/Energy project
  - Sierra de las Minas
  - Combines watershed protection with productive uses of renewable energy-produced electricity in Protected Area buffer zones
  - Project is an excellent carbon sequestration program

- **Fundación Solar School Project**
  - Part of Peace Program
  - Continuation of efforts with a solid local partner
South American Projects

- **Rural Community Centers with Greenstar Foundation (Brazil)**
  - PV powered connectivity projects to include several services: education, health, water
  - 3 projects to be implemented with local partners
  - Cost recovery through Greenstar’s “digital culture” approach
  - Sustainability (we hope) through Sandia’s partnered philosophy, described earlier

- **Remote Educational Platforms for Conservation Professionals (Brazil likely)**
  - Supported by USAID/Forestry
  - Phase 1: 2 pilot projects containing RE-powered computing platforms and training materials
  - Phase 2: demonstrate connectivity and network of training sites.
Support of Distance Education, Rural Connectivity (Peru)

- December ’01 mission with OAS highlighted several opportunities
  - Gov't of Peru plans to provide internet to over 1000 rural communities;
  - Plan Huascaran to include comm links to 5000 schools, over 1000 off-grid
- Present discussions with Ministry of Energy and Mines on possible technical collaborations