International Renewable Energy Activities at Sandia National Laboratories

A Brief Overview

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Sandia National Laboratories

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

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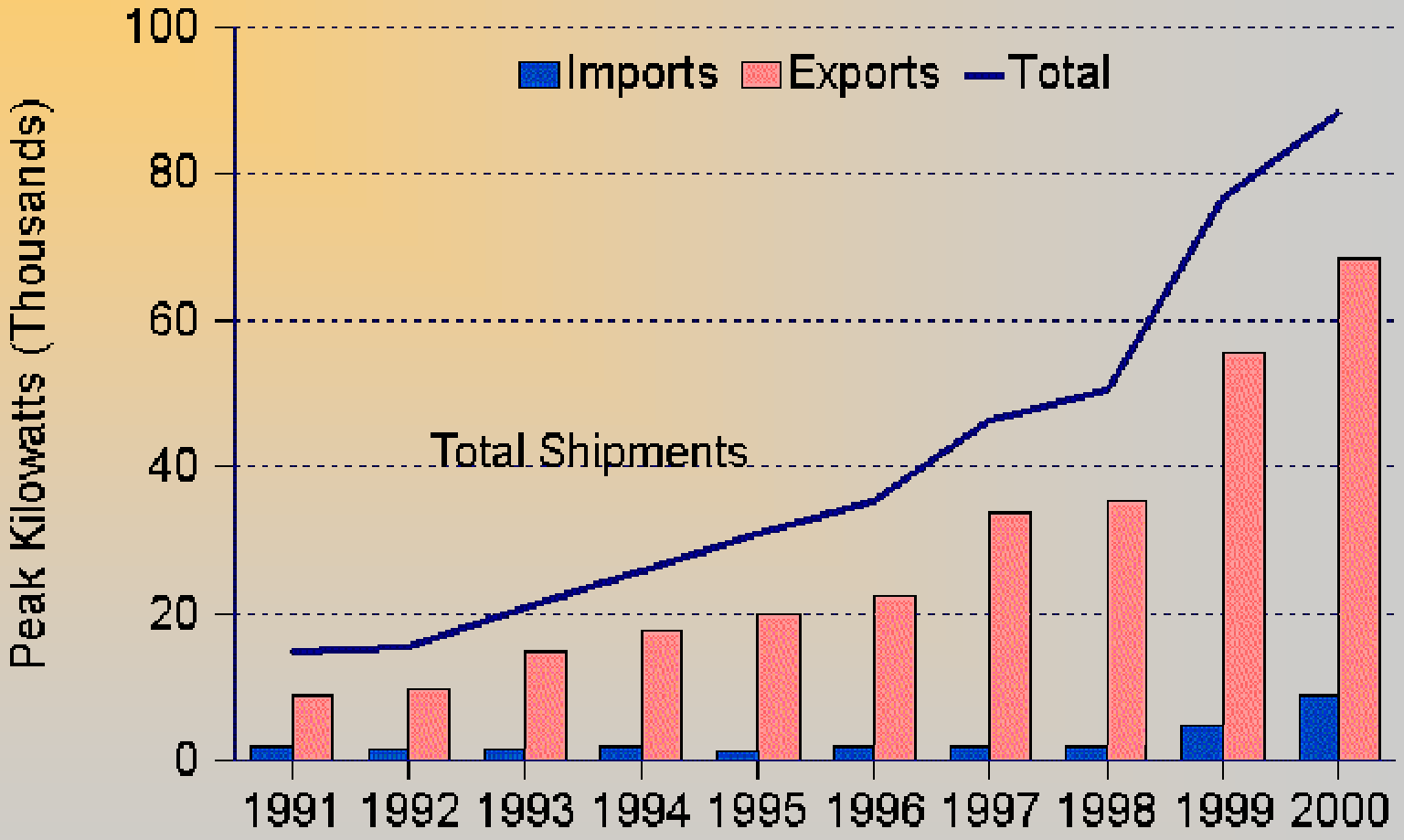
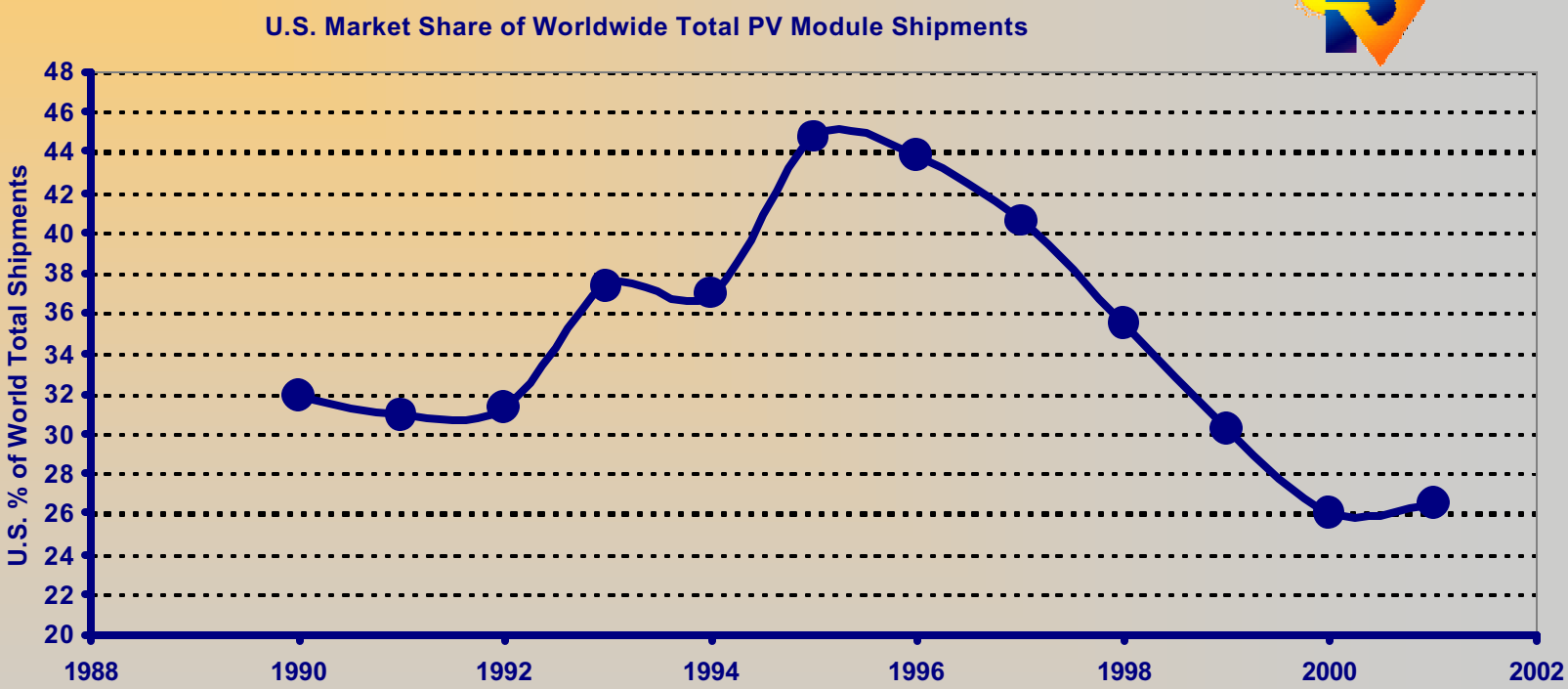
Why do international programs?



77.5% of US PV Modules Produced are Exported

Why do international programs?



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

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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

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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)

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Central America

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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

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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 America

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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 philosopy, 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.

South American Projects

- 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 Huascarán to include comm links to 5000 schools, over 1000 off-grid
  - Present discussions with Ministry of Energy and Mines on possible technical collaborations