

Renewable Energy Options for Central America

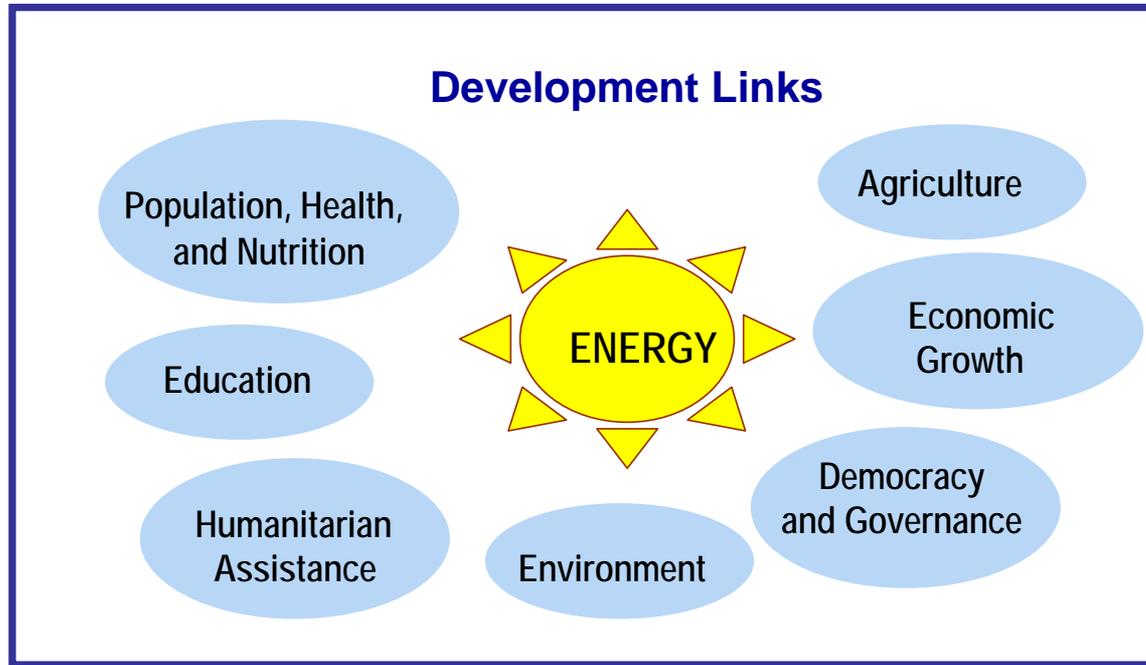
Spring 2002 PROARCA Round-UP



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Energy & Development



There is a strong relationship between the provision of energy services and global, social, economic, and political development

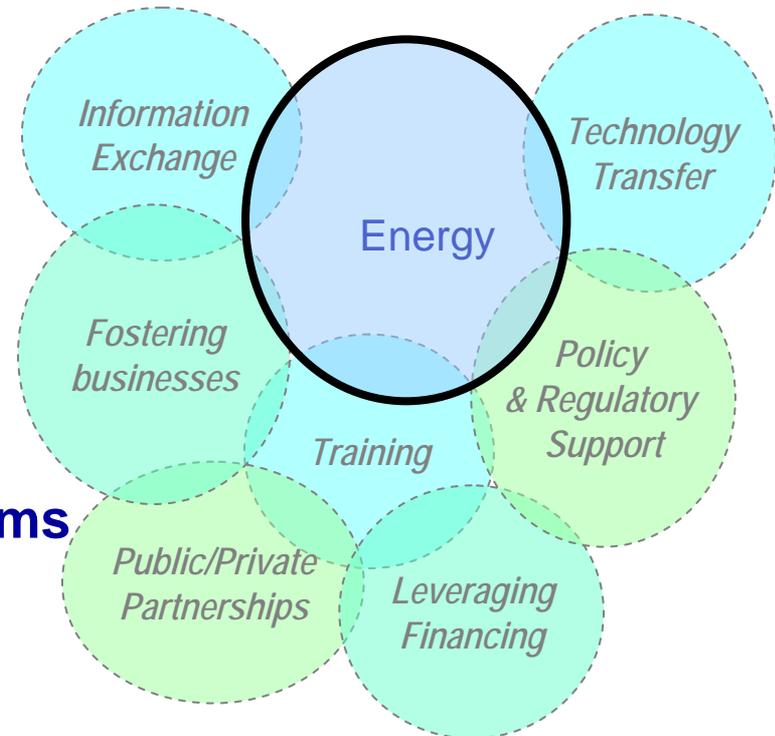
Office of Energy, Environment and Technology Strategic Objective

USAID'S Office of Energy, Environment and Technology (EET) helps developing countries increase economic growth, improve the quality of life, and promote sustainable communities by increasing access to environmentally sound energy, and improving environmental management.



STRATEGY

- **Micro interventions to enable macro development results**
- **Maintain focus on goals related to human development**
- **Support replicable projects and programs**
- **Leverage resources**
- **Focus on sustainability**
- **Promote U.S. goods and services**



EGAT/ENV/EET mechanisms to support Mission objectives in Central America

Leverage other programs and resources

- Support to MDBs (e.g., World Bank, IADB)
- Partner with other USG organizations (e.g., USDOE, USDA)

Cooperative Agreements

- Winrock International (REPSO/Guatemala - Fundación Solar)
- E&Co.

Letter Grants

- Organization of American States

Interagency Agreements:

- Sandia National Laboratories
- National Renewable Energy Labs

Indefinite Quantity Contracts (IQCs)

- in training and energy

Winrock International with Fundación Solar “Leader with Associates” Cooperative Agreement

- **Cross-sector Project Approaches and Capacity Building**
 - Develop baseline criteria for evaluating income generation
 - Apply gender approaches in planning stages of rural energy project development
 - Build local capacity to evaluate and implement renewable energy applications in agriculture, NRM, education, health, water, etc.
- **Local Business and Industry Support**
 - Assist entrepreneurs with business plan development
 - Foster links between US RE industry, project developers, financiers, etc. with local partners to conduct projects
- **Policy and Regulatory Assistance**
 - Strengthen renewable energy Trade Associations
 - Work with relevant Government Ministries



Highlights of Winrock International and Fundación Solar Rural Development Assistance

- **\$14 million GEF funding established for project portfolio in Guatemala**
- **More than 850 PV systems were installed for health centers and home electrification in Guatemala**
- **Renewable energy incentives law passed by Guatemala's Ministry of Finance with support from WI's policy advisor**
- **Asociación Chielense in Quiche strengthened to operate a village hydro system**
- **Asociación Hondureña de Pequeños Productores de Energia Renovable (AHPPER) established**



USDOE/Sandia National Laboratories Interagency Agreement

- **Focus:**
 - Task 1. Hurricane Mitch Reconstruction**
 - renewable energy for distance education
 - photovoltaic water pumping for community water supply
 - Task 2. Technical Assistance to MDB programs**
 - Task 3. Access to Lab Expertise**
- **USAID funds leveraged with DOE support in Central America**
- **Implementation team includes:**
 - Adesol/Honduras
 - Enersol Associates
 - Fundación Solar
 - New Mexico State University
 - Winrock International
 - Organization of American States



Highlights of Sandia-led Activities

Honduras: PV for rural water training has led to TA requests from 3 international development organizations doing their own projects

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

Honduras: World Bank, OAS, 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

These pilot installations are leading to formation of new renewable energy- rural electrification strategies in the region



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

E&Co. with BUN-CA “Leader with Associates” Cooperative Agreement

- **Enterprise development services and business plans**
- **Capacity-building to financial sector for smaller scale and rural energy applications**
- **Regulatory and policy options for renewable energy projects development**
- **Guidance documents:**
 - **Off-grid services manual**
 - **Carbon manual for entrepreneurs**
 - **Monitoring and evaluation manual**
- **Carbon transaction facilitation**



Highlights of E&Co.'s Financing Energy Enterprises in Central America (FENERCA) Program

- **15 business plans completed**
- **\$250k committed and/or invested by E&Co. in projects**
- **\$2M in active investment consideration by local financial institutions**
- **2 enterprises delivering new and clean energy services**
- **1 additional project currently under construction**
- **Completion of one of the largest carbon emission transactions between a Guatemalan hydroelectric company and the largest Dutch utility**



Organization of American States

Renewable Energy in the Americas (REIA) Initiative

To convene a REIA Secretariat and provide TA in the design and development of sustainable energy solutions for countries of the Americas

- **Guatemala**: Assisted in preparation of a Renewable Energy Incentives Law
- **Guatemala**: Provided financial and technical assistance for the establishment of a Renewable Energy Resource Center at the Ministry of Energy and Mines
- **Honduras**: Development of PV-powered rural telecenters pilot projects led to preparation of a \$10 million Rural Connectivity and Energy loan from IDB
- **Regional**: Performed Needs and Barrier Analyses for the development of national rural connectivity and energy programs; in discussions with the Central American Bank (BCIE) regarding the possibility of establishing a regional rural connectivity and energy initiative



Synergies Among Partners

Some examples:

- Winrock International and OAS
 - collaborating on a study to assess the potential for renewable energy in rural connectivity
- E&Co and Sandia Labs
 - BUN-CA training activities receive TA from Sandia and its partners
- Sandia, Winrock, Fundación Solar
 - collaborating on distance education pilots and strategies



Renewable Energy Activities can support the Goals of PROARCA and USAID Missions in Central America

- **Strategic Objective 2: Improved Environmental Management in the Mesoamerican Biological Corridor (MBC)**
 - Improved protected area management in the MBC
 - Expand market access for environmentally sound products and services
 - Harmonized environmental regulations
- **USAID/Guatemala Parameters Paper central themes**
 - economic growth in rural areas
 - regulatory reform and decentralization of government



IR1: Improved Protected Area Management in the MBC

- **Renewable energy systems offer several benefits:**
 - Improved communications for rangers and managers
 - Fire suppression and control
 - Greatly enhanced capabilities at research stations
 - Improved quality of life for rangers, guards (waterpumping, lighting, etc)
 - Power for educational materials in remote locations
- **RE systems also help environmentally friendly development in buffer zone communities:**
 - New services (health, education, water, etc)
 - Business opportunities (stores, farming, workshops, etc)
 - Reduced dependence on local resources, such as forest products



Renewable Energy Activity Support to South-South Protected Area Collaboration with Mexican, Central American Missions

- Over 75 renewable energy projects in protected areas implemented under USAID/Mexico's MREP Program
- Most of these projects are in Southern Mexico – the Mesoamerican Biological Corridor
- Two-way collaboration:
 - Mexican conservationists providing technical support to Central American reserves
 - Planned study tour of CA conservationists to Mexican reserves to see functioning projects



PV system on Chajul research station, Montes Azules, Chiapas, Mexico

IR2: Expanded market access for environmentally-sound products and services

This IR is focused on coffee, low impact tourism, and timber

- Coffee example:
 - drying presently consumes 15% of wood in CA
 - causes 50% of river pollution
 - husk is capable of providing 50% of energy needed for drying
- FS activities/opportunities related to biomass use and energy consumption
 - * Activities: improving thermal efficiencies of biomass furnaces; investigating use of dried coffee pulp as fuel; develop cogeneration to supply electricity and process heat
 - * Opportunities: communication systems to improve growers' access to market; application of direct solar (thermal) drying systems



(Environmentally-Sound) Tourism in Central America: Both a Growing Concern and Opportunity

- **Renewable energy systems allow tourists to enjoy more creature comforts in more remote locations**
- **Compared to diesel generation:**
 - **less polluting**
 - **less noisy**
 - **less expensive in many cases**
- **Better education is needed for tourism operators and planners on renewable energy options**
 - **can be coupled with business development training**



IR3: Harmonized environmental regulations

Including energy considerations in regulatory frameworks can have direct environmental impacts

Barrier: Policy and regulatory conditions favor low capital cost energy generation technologies

- More polluting fossil fuel sources have lower initial costs
- Less polluting RE options have higher initial costs

Actions Approach:

- Educate officials on successful policy issues and options from other countries
- Help craft regulatory framework and implement appropriate solutions
- Help to strengthen trade associations
- Address tariffs and subsidies, incl. cross-subsidies and 'smart' subsidies



Energy - Human Development Link is Inseparable

USAID/Guatemala Concept Paper case example:

- **Increase small producer productivity**
 - Water pumping; communications; drying technologies for livestock ranchers; coffee growers; etc.
- **Increase rural investment and market access**
 - Enhanced communications between producers and buyers
- **Provide workforce development opportunities in rural areas**
 - Education centers; new business opportunities
- **Improve access to child health care in rural areas**
 - Water purification; electrification of clinics; health education
- **Support decentralized decision-making; Strengthen local/municipal gov'ts; Consolidate the rule of law through improved legal & regulatory frameworks**
 - New policies combined with proper outreach to local authorities



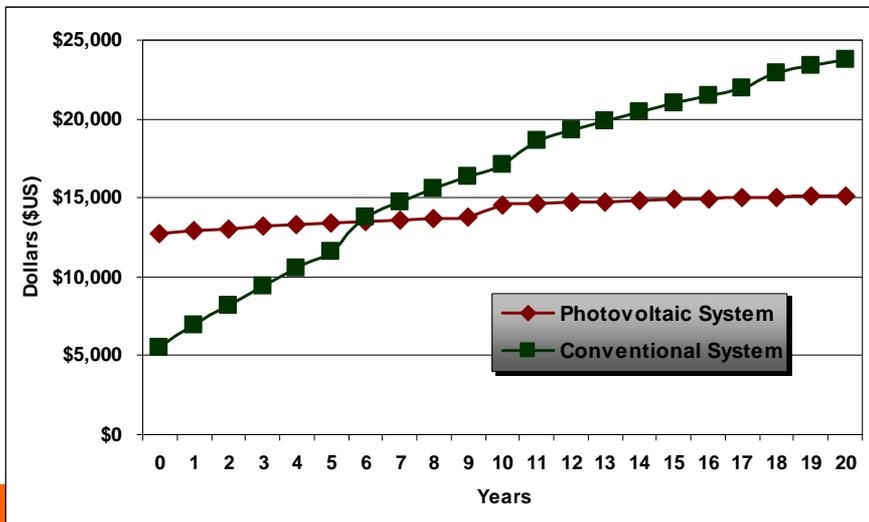
Energy and Development Needs Met Through Cross-Discipline Approach

- Training and capacity building to business, community members, regulatory authorities (national and local)
- Development of access to financing (incl. DCA)
- Technical assistance (incl. business plan development)
- Education & Outreach to municipalities and communities regarding options
- Support to Mexico's Plan Puebla-Panama
 - Fox initiative which includes *integration of regional electricity markets*
 - Assist in development of *stable, transparent marketplace with independent regulatory body*
 - Support construction of *Mexico to Guatemala electric link*
- - Support broader *inclusion of RE and rural services within PPP*



Renewable Energy Is an Economical Alternative in Many Cases

Honduras: Community and NGO involvement leads to sustainability and replication of El Fortín water pumping project



Mexico: analysis of costs over life of system shows that PV is often less expensive than diesel

Household Energy Consumption: Devastating Effects of Inefficient and Unhealthy Practices

- ***#1 cause of death for children under 5 years old*** is acute respiratory illness, often caused by indoor air pollution (poor cook stoves, kerosene)
- **Approx. 50% of global pop. dependent on fuelwood and biomass for cooking and heating = tremendous environmental impacts**
- **Opening new dialogues, creating opportunities:**
 - **Antigua, Guatemala / August, 2001: 70 participants representing 9 countries to first regional event in over 8 years**
 - **Facilitated exchange of experiences and new generation of locally-produced efficient stoves and processes**

GENES Network

improve quality of life and productivity for women and their families through increased gender-equitable access to sustainable energy services.

Activities: bi-national workshops and exchanges, outreach, pilot projects, policy guidance

Cross-sector and broader-scale impacts with new partners:

- a. IUCN (gender and environment methodologies)
- b. FAO (gender and agriculture; now RE and Ag)
- c. USAID/G-CAP (interest in gender, environment)
- d. IDB, WB (through WB/LAC-Gender)
- e. Government Social Investment Funds (FIS)

Supported by USAID/W & WB-ESMAP; managed by Winrock / Fundación Solar

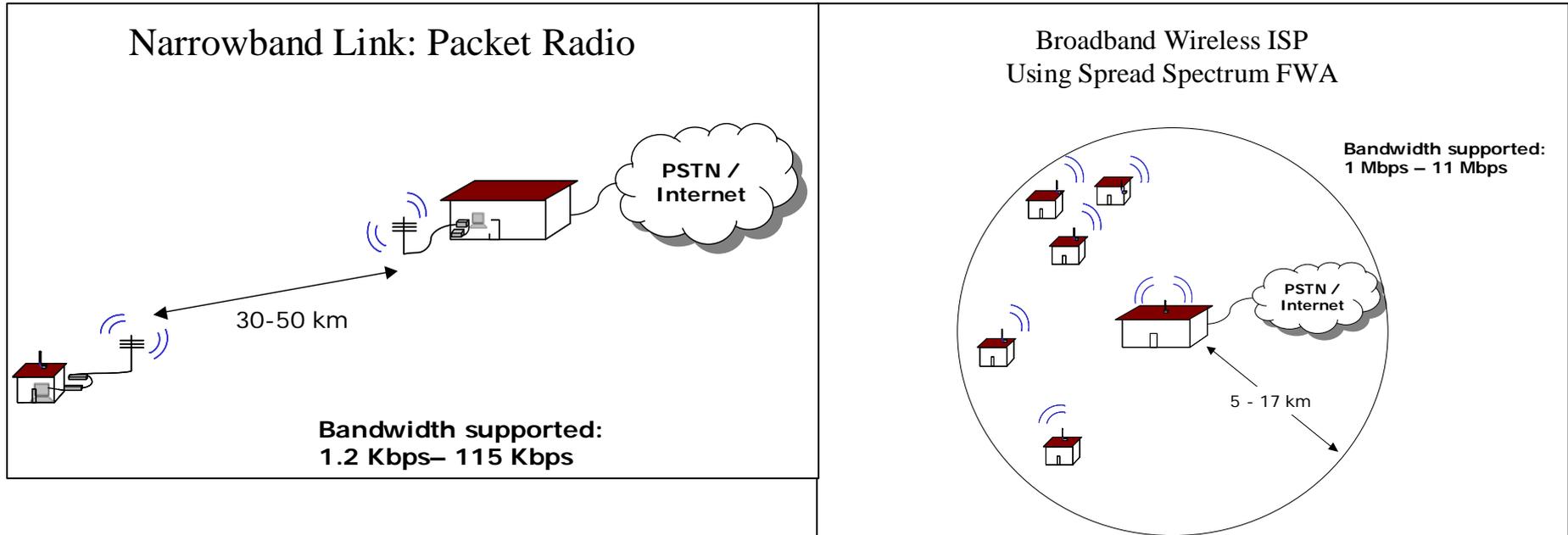


Emerging Role of Information and Communications Technologies in Rural Development

- **Emergence of reliable wireless energy and telecommunications services provide new opportunities to address needs of isolated rural communities**
- **EET and its partners are exploring distributed energy technologies to power rural telecommunications systems (computers, VSAT, telephone, radio, etc.) for the delivery of community services (e.g. distance education, tele-medicine)**



Defining Innovative Approaches to Rural Connectivity



Different technology configurations provide varying levels of service to rural users

Rural information and communications technology opportunities in Central America



“Aldea Solar” with Internet access

San Ramon, Honduras



(OAS technical/financial support)

Upcoming Events

Requesting Mission sponsorship of Central American participants

- **“PV in the Americas” workshop in New Orleans, May 20, 2002**
 - A forum for suppliers, installers and researchers to discuss technical needs related to commercial PV applications in LAC region
 - USAID co-sponsor with DOE, OAS, Sandia Labs
- **Wind Energy Applications Training Symposium, May 29 – June 1, 2002**
 - USAID co-sponsor with DOE, NREL, Texas A&M Univ., NMSU, AWEA
- **Gender and Energy workshops – Spring/Summer 2002**
 - 1) C. Rica/Panama
 - 2) Honduras/Nicaragua
 - 3) Guatemala/El Salvador/Mexico
- **PAM study tour – Late Spring/Summer**
 - Central American conservationists to visit reserves in Southern Mexico for exchange of experiences, technical options



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