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The
SUCCESS
of **PRIVATE**
POWER in
CENTRAL
AMERICA:

USAID'S
ROLE

USAID



MESSAGE FROM THE REGIONAL DIRECTOR

On October 16, 1996 the Guatemalan Congress passed a law transforming the country's electricity sector. The law paves the way for the privatization of the generation and distribution functions of INDE, the large state electric utility, and the establishment of a wholesale electricity market. These changes in the electricity sector will attract private sector investment, thus ensuring the long-term development of Guatemala's electricity resources and adequate supply at competitive costs to Guatemalan electricity consumers.



Reaching this milestone in Guatemala is the culmination of nearly ten years of technical assistance and support by USAID for private sector involvement in the electricity sector in Central America. With relatively low levels of funding, but in a consistent and targeted approach, USAID has nurtured the evolution of Guatemala's electricity sector to an efficient, environmentally-friendly, and competitive private market for electric power.

USAID's strategic objectives in Central America have evolved over the years, but we have never wavered in our support for broad-based economic growth and expanding the economic opportunities for the region's poor. The development of private power has been critical to these countries' ability to provide adequate and reliable supplies of electricity to greater portions of the population and to fuel economic growth.

Today USAID recognizes the need for sound environmental and natural resource management; however, this does not diminish the role of private power in these countries. Indeed, it creates a new opportunity for USAID and the governments of Central America. At the December 1994 Summit of the Americas, President Clinton and the presidents of the seven Central American countries signed the CONCAUSA Declaration (Conjunto Centroamérica - USA). Under the CONCAUSA Declaration, these governments agreed to work cooperatively for the establishment of policy and regulatory frameworks to increase private sector participation in the electricity subsector and also to identify and promote investments in renewable energy and energy efficiency. We must use this opportunity to emphasize the multiple benefits of renewable energy resources and work with private developers to ensure power is delivered in an efficient and sustainable manner.

Stacy Rhodes

THE SUCCESS OF PRIVATE POWER IN CENTRAL AMERICA: USAID'S ROLE

BACKGROUND

In the spring of 1988 the United States Agency for International Development (USAID) prepared for the United States Congress a landmark study that described the extensive power shortages that existed or were projected in many developing countries, including the countries of Central America. The study, entitled *Power Shortages in Developing Countries: Magnitude, Impacts, Solutions, and the Role of the Private Sector*, marked the beginning of concerted efforts on behalf of many organizations, including USAID, to facilitate the development of private power projects in developing countries.

The analysis contained in the report revealed that power shortages existed in over half of the countries assisted by USAID at that time, and that these shortages often exceeded 10 percent of existing generation capacity. Power shortages were restraining economic growth. Moreover, most developing countries did not have the capital to build new power generating capacity that would be sufficient to meet future energy demand. The report projected a need for an additional 1,500 GW of generating capacity over the period 1988-2008 (based on a medium economic growth scenario).

Despite the clear advantages of private power, numerous barriers existed in developing countries that discouraged private sector investors. These included policy and institutional barriers, weak domestic economies, and political, technical and financial risks.

The *Power Shortages* report highlighted the need for both innovative approaches to solving the power shortages and also the many benefits that the private sector could bring by investing in developing countries' power sectors. The report stimulated the interest of developing countries in creating a role for the private sector to own or invest in new generating plants that would sell power to utilities on a long-term basis and led to the eventual development of a broader role for private enterprises in the power sector.

CENTRAL AMERICA'S POWER CRISIS

In the late 1980s many Central American countries began experiencing power shortages as a result of rapidly growing energy demand. In some parts of Central America the level of unmet demand was as high as 20%. A study prepared by USAID in 1990 estimated that Honduras and El Salvador would face capacity shortages by 1992. In fact, by 1994 Honduras was in the midst of an energy crisis, causing the utility to implement rotating 12-hour blackouts. Guatemala experienced its own energy crisis in 1991 that also forced severe rationing of electricity.

Many utilities in Central America were relying on old, inefficient thermal plants for their power supply because of disruptions to hydropower plants and other adverse conditions. Following the oil price shocks of the 1970s, many of the countries developed a heavy reliance on a single hydro plant and abandoned their thermal plants. The completion of Guatemala's Chixoy Hydro Power Plant in 1986, although adding capacity, also meant that 40% of the country's power was now supplied by a single source. When droughts reduced the capacity of the hydro plants, the threat of power outages increased.

The state-owned utilities faced serious financial constraints, however, that limited their ability to expand generation capacity. Central America's combined external debt in 1988 was \$14.7 billion. The electric power sector was responsible for almost 35% of this external debt. In Guatemala the cost of building the Chixoy Hydro Power Plant accounted for 60% of the public sector's total external debt in 1985. For Honduras, the El Cajon hydropower plant resulted in capital and interest payments amounting to almost 40% of the country's external debt service in 1986.

The poor financial condition of the public utilities was further weakened by widespread subsidies in electricity tariffs. One study estimated that utilities' rates of return on assets had dropped to levels of around 5%. In Costa Rica, electricity tariffs ranged from 66% to 94% of the utility's economic costs over the period 1985-1989 and generated only enough revenue in 1989 to cover approximately 75% of the utility's debt service. The utility had insufficient resources to cover its operating expenses or finance capacity expansions.

These serious power shortages and financial constraints forced the Central American countries to begin considering the possibilities of private investment in the power sector. Central American nations estimated they needed

to add 1.7 GW of new generating capacity by 1999 to meet future energy demand. Demand for energy was growing faster than many utilities had projected — approximately 5-6% per year. The costs to the countries' economies of not meeting this demand ranged from a low of \$0.50 to as high as \$5.00 per kWh not supplied. The utilities and governments recognized the need to locate new sources of financing if capacity were to be expanded.

Against this backdrop, Central American governments and utilities became increasingly interested in creating a role for private investment in power generation.

THE FIRST STEPS TOWARD INDEPENDENT POWER GENERATION

USAID recognized that Central American countries would need to overcome some barriers to private power. By providing Central American countries access to the knowledge and experience other countries had already gained in developing private power, USAID provided the means to overcome some of these barriers.

In September 1988 USAID, Costa Rica's Instituto Costarricense de Electricidad (ICE) and the Ministerio de Recursos Naturales, Energía, y Minas (MIRENEM) co-sponsored the Central American and Caribbean Electric Power Workshop, held in Costa Rica. The workshop presented information on issues fundamental to private power, including discussions of financing mechanisms, benefit/cost analysis, sugar mill-based cogeneration and contractual questions.

One of USAID's objectives for the workshop was to ensure that participants share and learn about other countries' experiences with private power. USAID brought together representatives of multilateral and bilateral development agencies, energy sector institutions and private companies, all of whom could bring to bear experiences with private power development in other countries. More than 130 representatives of national electric power companies and governments in the region attended the workshop.

By 1989 the first private power projects were under discussion in several countries. Costa Rica had issued an executive decree governing the development of non-utility private power (less than 10 MW) and five project proposals were under review by the government. One sugar mill, El Viejo, benefiting from technical assistance funded by USAID, became one of

Costa Rica's first two private power producers, providing 5.5 MW of capacity to the country's utility in 1991. Later that year, during a disruption of the power connection between the Guanacaste local substation and the Costa Rican national grid, the private sugar mill single-handedly carried the local grid, supplying over 6 MW of power to three medium-sized towns nearby.

BUILDING THE LEGAL AND INSTITUTIONAL FRAMEWORK

USAID assisted Central American countries in building the foundations for private power. A major challenge to overcome was the existing legal structures in these countries, which needed formal changes to make private power a realistic and significant alternative to public sector investments in power generation.

Private sector investors wanted clear guidelines governing the sale of electricity to public utilities before any significant investments would take place. Power purchase agreements (PPAs), and, specifically, provisions for tariffs on power sold to the utilities, needed to be addressed. In most cases, this meant that the public utilities needed to determine their true costs of production.

Guatemala was a case in point. The National Energy Plan, formulated in 1986, included provisions for the promotion of private sector cogeneration in sugar mills and other facilities. However, few attempts, if any, had been made to determine the marginal costs of electricity generation to enable the private contracting of cogeneration. With technical assistance from USAID, Guatemala was able to address this issue:

- In August 1989 Guatemala's Ministry of Energy and Mines (MEM), the Asociación de Azucareros (Sugar Producers Association) and USAID hosted a workshop on the technical, pricing, legal and policy-related issues surrounding the sale of electricity from private sector power producers, principally sugar mills, to the public utility.
- In 1990-1991 USAID financed and directed a study that was instrumental in allowing Guatemala's utility to determine its marginal costs. The study established for the utility a method for calculating the marginal costs of electrical generation and outlined guidelines for power purchase contracts between private generators and electrical utilities.

Milestones in USAID's Assistance for the Transformation of Guatemala's Electric Sector

- 1988 USAID publishes *Power Shortages in Developing Countries*
- Central American and Caribbean Workshop on Electric Power held in Costa Rica
- 1989 USAID hosts workshop with MEM and Asociación de Azucareros in Guatemala
- 1991 USAID directs and finances study on marginal cost determination for Guatemala's utilities
- Workshop with INDE, EEGSA, MEM and USAID to examine subject of private power
- USAID supports the participation of Guatemala and other Central American countries in the International Conference on Energy from Sugarcane
- 1992 Five sugar mills begin selling power to EEGSA
- 1993 110 MW barge-mounted steam plant owned by private power developer Enron comes on line
- 1994 Guatemala is a signatory to Renewable Energy in the Americas declaration
- Fundación Solar becomes a host for a REPSO: adds to project pipeline
- Central American countries and the United States sign the CONCAUSA Declaration
- 1995 USAID consultant assists Guatemalan government in drafting new electricity law
- 1996 New electricity law passes, dramatically transforming the country's electricity sector
- USAID and World Bank jointly assist Guatemala to draft new electric sector regulations

Equally important, the study concluded that Guatemala needed an energy policy that could initiate a new institutional structure capable of supporting private investment in the power sector. Restructuring the energy sector would facilitate private sector investment by separating the functions of generation, transmission and distribution, adding independent regulation, and creating a more efficiently operating power sector.

- A workshop was held in 1991 — this one involving the state utilities INDE and EEGSA as well as MEM and USAID and sugar producers— to examine the subject of private power and the related legal and policy issues. At the time of this workshop, Guatemala was experiencing serious electricity shortages, providing a strong impetus for more than 200 persons to attend the workshop.

Sugar mill owners were able to pursue long-term contracts with INDE to supply power to the grid (although INDE and EEGSA were willing to pay the sugar mills only for the energy supplied, not for their available capacity). By 1992 five Guatemalan mills had begun generating power using bagasse and selling the excess electricity to EEGSA.

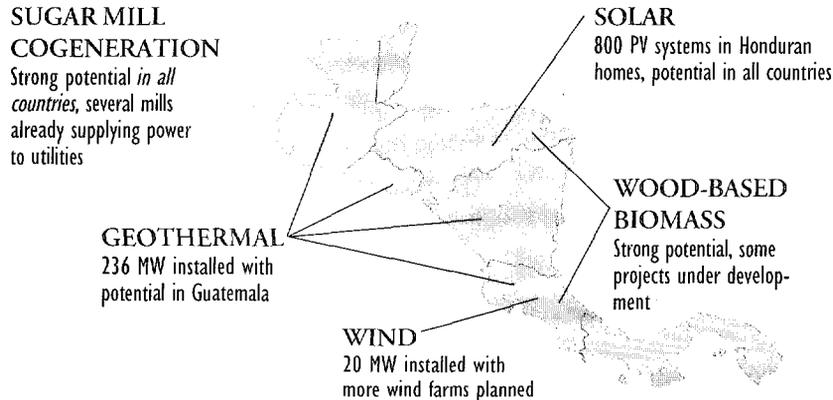
In El Salvador, USAID also undertook similar efforts to encourage private power. Key power sector representatives participated in USAID-funded missions to Chile, Jamaica, and the United States. In June 1991 USAID, the government of El Salvador and the national utility organized a conference to discuss potential opportunities for private power in El Salvador. Individuals with experience in private power in other countries were invited to speak at the conference. Building on the momentum from that workshop, an initial PPA was drafted in 1992. Although no award was made, that workshop and the opportunities power sector representatives had to witness other countries' experiences were important catalysts for reforming El Salvador's power sector, which was well under way by 1996.

RENEWABLE ENERGY AS A SOURCE OF PRIVATE POWER

Although the Central American countries urgently needed to expand their power generation capacity, the region also needed to expand electric capacity in an environmentally-friendly manner and without increasing oil imports (which would have negatively affected the countries' balance of payments). Since Central America is a region rich in renewable resources, including biomass, geothermal, solar, wind and hydro, renewable energy projects offered one solution to this problem.

Many substantial hurdles to project development existed, however. In most of the countries there was a lack of knowledge about renewable energy and renewable energy technologies. A significant step toward addressing this lack of knowledge was taken in 1991, when USAID supported the participation of representatives from Guatemala, Costa Rica, El Salvador, and Honduras at the International Conference on Energy from Sugarcane held in Hawaii. This workshop raised the awareness of the potential for using sugarcane waste as a source of energy. Almost 150 MW of power (using sugar cane waste) have been added in the region since this workshop.

RENEWABLE ENERGY IN CENTRAL AMERICA



Another step was taken in 1991 with the establishment of a Renewable Energy Project Support Office (REPSO) in San José, Costa Rica. The REPSO represented the collaboration of USAID, Fundación Ambio (a Costa Rican organization) and the National Rural Electric Cooperative Association (NRECA). It was designed to serve as an administrative mechanism

for identifying promising renewable energy projects in need of financial assistance for the preparation of pre-investment analyses. In 1992 the Costa Rican REPSO awarded grants to support pre-investment work on three small hydroelectric projects and one biomass cogeneration project.

Building on this success, a REPSO was established in Guatemala (hosted by Fundación Solar) in 1994. The REPSO, with funding from USAID, established the Renewable Energy Pre-Investment Support Fund which shares the costs of evaluating the feasibility of proposed projects with private companies. The REPSO has contributed significantly to the project pipeline in Guatemala. The initial solicitation of proposals led to funding of seven projects, including a 3 MW geothermal plant and a 6 MW hydro-power plant.

In the summer of 1994 the U.S. Export Council for Renewable Energy (US/ECRE) organized another key workshop entitled Renewable Energy in the Americas. The workshop, held in Puerto Rico, was funded by USAID and drew over 600 persons from countries throughout the Americas. In the end, 15 countries and several multinational organizations signed a declaration committing their countries or organizations to support the use of renewable energy. Costa Rica, Guatemala, Honduras and Nicaragua were signatories of the declaration.

During this period of time, USAID prepared eight technical reports on the potential for producing energy from various residual wastes and funded, in part or in whole, a total of 23 pre-investment studies covering the use of various renewable energy technologies in Central America.

THE CHALLENGE OF FINANCING PRIVATE POWER

Mobilizing the large amounts of financing that are generally required for private power projects has been problematic, and not just in Central America. Private lenders and investors are unwilling to assume significant levels of risk, including political risk, for any one project. And yet, many of the Central American countries urgently needed the private sector to finance and build power projects.

A study conducted jointly by USAID and the World Bank in 1994, entitled *Mobilizing Private Capital for the Power Sector*, addressed some of the key issues surrounding private sector participation in the power sector. These issues included country risk, the regulatory environment, the bid-

ding process, least-cost planning, and electricity tariff issues. The study also examined financing structures and sources and the sharing of risk between the public and private sectors. While the study did not specifically address the Central American experience with private sector financing for power projects (although one of the case studies analyzed for the report was Enron's barge-mounted facility in Guatemala), it did contribute to the broader base of knowledge on the mobilization of private capital for the power sector.

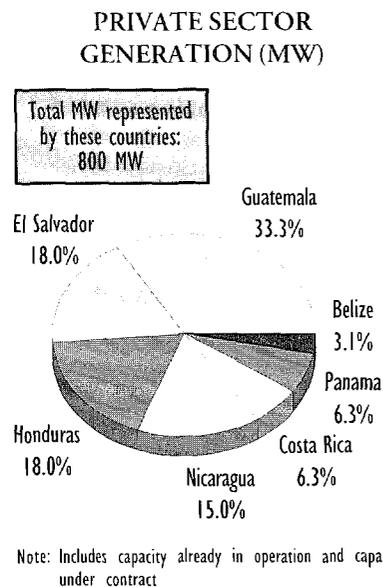
It was also an important objective of USAID to seek out the practical mechanisms for financing power projects. In the early 1990s there was a very real concern that power projects, specifically renewable energy projects, would clear the feasibility study phase, only to languish due to lack of financing. To remedy this situation, USAID and the Rockefeller Foundation helped to found the Environmental Enterprises Assistance Fund (EEAF). EEAF mobilizes grant funding and private capital to assist small- and medium-scale energy (and environmental) enterprises. In 1992 EEAF established an affiliate office, EACA, in Costa Rica. EACA and EEAF in 1996 signed an agreement with the Multilateral Investment Fund (MIF) to create the Corporacion Financiera Ambiental (CFA), a \$10 million venture capital fund to finance environmental enterprises in Central America. Approximately 40% of the investments made by this fund will be directed to renewable energy projects.

As part of the effort to finance environmentally friendly sources of energy in the region, USAID introduced Central American countries to joint implementation project opportunities. The concept of joint implementation (JI) refers to arrangements between entities in two or more countries for the purpose of implementing a project that will reduce or sequester greenhouse gas emissions, including renewable energy projects (which displace fossil fuel use for power generation). In many cases such arrangements can bring private sector capital to a project. Examples of successful JI arrangements for renewable energy projects in Central America include the 20 MW Planta Eolicas S.A. wind facility, the 6.4 MW Aeroenergia wind facility and a 20 MW windfarm — all selling power to Costa Rica's national utility; a 15 MW biomass waste-to-energy project in Honduras; and a geothermal project in Nicaragua scheduled to come on line in 1999.

PRIVATE POWER IN CENTRAL AMERICA TODAY

A USAID study published in 1992 estimated that 1,845 MW of private power would be constructed in Central America by 1999. As the figure below illustrates, 800 MW of private power exist or are in the pipeline.

- **Guatemala** has incorporated a significant amount of private power into its electric sector. Of a total operating capacity of 1,080 MW, private power supplies 266 MW. Enron International operates a 110 MW oil-fired plant, located on two barges moored off the Pacific coast. TECO Power Services operates a 80 MW diesel-fueled plant.
- **El Salvador** has one private power project already in place. The 144 MW Nejapa project accounts for about 15% of El Salvador's electricity supply.



- In 1996 the government of **Panama** awarded a concession for a 50 MW plant to a US-Panamanian consortium. The plant will begin operations in 1997. Another award, for a 100 MW thermal plant on a build-own-operate (BOO) basis, may potentially be granted in 1997.

USAID's assistance has been critical to the continued progress towards incorporating private power in Central America. This is particularly evident in Guatemala.

In 1995 USAID funded the participation of an expert consultant to assist Guatemala's government in writing a new electricity law and conducting a review process. In 1996, another USAID consultant assisted EEGSA in planning the privatization of two thermal generation plants which will be sold through an international bidding process. This sale is an important milestone in a privatization effort that Guatemala set in motion in 1994.

After nearly two years of development and review, Guatemala's new electricity law was passed in October 1996. The passage of the law is the

culmination of USAID's private power development assistance to this country. Guatemala's new electricity law paves the way for the privatization of the generation and distribution functions of INDE, the large state electric utility, and the establishment of a wholesale electricity market. In 1997, USAID, in coordination with the World Bank, will assist Guatemala in the development of regulations for the new law and methodologies for assigning wheeling charges. These changes in the electricity sector will facilitate private investment, thus ensuring the long-term development of Guatemala's electricity resources and adequate supply at competitive costs to Guatemalan electricity consumers.

...USAID's energy sector assistance over the past decade is very positive. Due to USAID's local presence and the leverage provided by its other activities, USAID has been able to achieve a substantial positive impact in the development of the energy sector with a comparatively small investment. In particular, USAID's activities have been a key factor in the development of the private energy sector in Guatemala...USAID's influence in this development came mainly through well-targeted technical assistance, activities that raised the awareness of the problems among sector participants, and studies that pointed out the need for larger private participation in the sector.

— *A private power developer in Central America*

LOOKING TO THE FUTURE

The legal and regulatory frameworks for private power are established in most Central American countries. Guatemala, Honduras, El Salvador and Panama recently passed new electricity laws that establish competitive markets. Nicaragua and Costa Rica have proposed new electricity laws.

USAID continues to provide targeted assistance to Central American countries to assist with the development and implementation of laws and regulations. In Nicaragua, for example, USAID has funded several consultants to help the government draft a new electricity law that will create a competitive generation market and establish a free tariff regime.

USAID will also continue to provide assistance to Central American countries to address the need for increased private sector investment in energy efficiency services and to ensure the continued development of renewable energy power projects.

LIST OF RELATED USAID PUBLICATIONS

Fuel Alcohol Production in Honduras: A Technical and Economic Analysis, April 1986

Electric Power from Sugarcane in Costa Rica: A Technical and Economic Analysis, July 1988

Power Shortages in Developing Countries: Magnitude, Impacts, Solutions, and the Role of the Private Sector, March 1988

Review of Cost Accounting, Financial Planning and Control Systems, Assessment of Current Financial Situation and Tariff Evaluation, May 1990

Export Power Options for Five Sugar Mills in Costa Rica, May 1991

Energy from Citrus Wastes in Belize: Industry Overview, December 1991

An Energy Strategy for Latin America and the Caribbean, November 1991

Energy from Sawmill Wastes in Honduras: Industry Overview, 1991

Private Power Business Opportunities: Central America, 1992

Thermal Generating Plants Efficiency Improvements in Guatemala, 1993

Mobilizing Private Capital for the Power Sector: Experience in Asia and Latin America, November 1994 (produced jointly with the World Bank)

Energy from Sugarcane Cogeneration in Honduras, August 1994

Energy from Sugarcane Cogeneration in El Salvador, November 1994

Reform of the Electricity Sector in Guatemala: Principles, Reform Plans and Strategy Analysis, March 1995