

The following is a summary of the findings of the renewable energy market in Mexico that was prepared for Sandia National Laboratories Renewable Energy Office by KPMG Peat Marwick.

Market Guidebook of Renewable Energy Applications In México

(Executive Summary)

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Introduction and Scope

This study provides a high-level, country-wide market assessment of Renewable Energy (RE) applications in Mexico within the following segments: agricultural applications, potable water, rural electrification. For each of these applications, the report provides market/customer segmentation diagrams, an environmental analysis, market qualification, market barriers, and market penetration strategies. The market for water pumps where appropriate was quantified. Current and potential niche markets such as solar thermal applications in Mexico City, dairies, ecotourism, refrigeration for fisheries, aquaculture, electric fencing were analyzed to a much lesser degree as were established commercial markets such as public lighting and rural telephony. Reference maps are provided throughout the document.

Although technological factors have been included in this study, technology use decisions (i.e., using wind vs. photovoltaics) are left to the Sandia technical team and individual companies to make.

This report can be used by U.S. and Mexican RE vendors to gain insight and guidance in entering the Mexican market, or expanding their presence there. It should be used as a reference and business planning guidebook to doing RE business in Mexico.

This report was conducted by KPMG Peat Marwick LLP (KPM G) for Sandia National Laboratories. Sandia National Laboratories manages the Mexico RE Program funded by the U.S. Department of Energy and the United States Agency for International Development.

Background and Current Trends

This section of the report summarizes current political trends, programs and policies applicable to RE in Mexico. Areas summarized include: an overview of rural Mexico, current economic information, resource maps, non-governmental organization activities, an overview of rural energy markets in Mexico, NAFTA RE equipment tariff information, and an evaluation of competing energies. Reference maps and other background material useful to companies pursuing RE business in Mexico are provided.

Although municipal governments often lack financial and human resources, they are playing a more important role in the implementation of potable water and rural electrification projects and can serve as "local champions" to ensure projects are carried to fruition.

Summary of Findings

The potential market for the rural RE applications analyzed in this report is valued at \$1,036 billion.

Rural Electrification

Valued at \$511 million, rural electrification represents the greatest overall market potential, but projects are difficult to fund:

- Federal rural electrification programs have been dissolved, and their duties have been passed on to the municipios, which often have inadequate resources.
- For government-sponsored projects, target states include Veracruz, Chiapas, Guerrero, San Luis Potosí, Chihuahua, Oaxaca and Michoacán.
- For projects funded by end-users and state/local governments, target states are Chihuahua, Jalisco, Tamaulipas, Nuevo León , Querétaro , Sonora and Campeche.

Potable Water

The potential market for potable water projects is estimated at \$135 million. The water pump market is estimated to be 13,350 units:

- Government funding for potable water projects is available.
- The CNA and SEDESOL are able and willing to fund RE potable water projects.
- Best states for federally-funded projects are Veracruz, Chiapas, Oaxaca, Guerrero and San Luis Potosí.
- Target states for state/local-funded projects are Chihuahua, Jalisco, Tamaulipas, Baja California, Sonora, Campeche, Nuevo León and Querétaro .
- States with smaller markets but pro-active state potable water commissions are Quintana Roo, Hidalgo, Nayarit, Yucatán and Tabasco.

Livestock Watering

The market potential for livestock watering using RE-driven pumps is valued at \$297 million and 42,430 units:

- Livestock watering for cattle is the best agricultural application for RE.
- A large proportion of the ranching industry can afford to invest in an RE pump without government subsidies, although financing programs are still needed.
- Chihuahua and Sonora are the most important markets. Other states that should be targeted include Veracruz, Jalisco, Coahuila, Tamaulipas, Chiapas, Nuevo León , and Zacatecas.

Small-Scale Irrigation

The market potential for RE-driven systems for small-scale irrigation is estimated to be \$94 million or 11,700 units. However, due to the lack of existing data, and because this segment is under-developed, these projects were too difficult to make:

- The market for RE pumps for small-scale irrigation does not yet exist, but pilot projects are well-warranted.
- Best opportunities exist in high-value crops that can be efficiently produced in small plots.
- Potential target states include Hidalgo, México, Puebla, Chiapas, Michoacán.

Overall Market Summary

Overall, the states representing the greatest opportunities can be separated into two groups:

1. States with high market potential but low buying power (i.e., federal government funding is essential)--Veracruz, Chiapas, San Luis Potosí , Oaxaca, Guerrero.
 2. States with good market potential and relatively high buying power--Chihuahua, Jalisco, Sonora, Tamaulipas, Coahuila, Nuevo León .
- Other states with significant opportunity include--Durango, Zacatecas, Querétaro , Campeche and Yucatán.

Summary of Findings

Barriers to market entry identified in this assessment include: subsidized pricing for conventional energy sources; lack of financing availability; a federal policy emphasizing grid extension over renewables; generally poor, rural target buyers; unfamiliarity with RE systems among government agencies and users; lack of trained technicians; the municipios lack of resources to implement RE projects.