United States General Accounting Office

GAO

Report to Congressional Requesters

December 1992

EXPORT PROMOTION

Federal Efforts to Increase Exports of Renewable Energy Technologies

148198

GAO/GGD-93-29

GAO

United States
General Accounting Office
Washington, D.C. 20548

General Government Division

B-251279

December 30, 1992

The Honorable Gus Yatron, Chairman
The Honorable Doug Bereuter, Ranking Minority Member
Subcommittee on Human Rights
and International Organizations
Committee on Foreign Affairs
House of Representatives

As you requested, we have reviewed the efforts of the federal Committee on Renewable Energy, Commerce and Trade (CORECT) to promote the export of U.S. renewable energy technologies. This report addresses what activities CORECT has undertaken to increase exports of U.S. renewable energy technologies; what guidelines CORECT has recommended for financing such exports, including simplifying the application process for seeking export assistance; how it recommended specific markets in the Caribbean Basin and the Pacific Rim and its identification of future export markets; and whether it has followed through on trade opportunities in selected countries.

Copies are being sent to the Secretary of Energy and other interested congressional committees. Copies will also be made available to others on request. Please contact me at (202) 275-4812 if you or your staff have any questions concerning this report. The major contributors to this report are listed in appendix I.

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Executive Summary

Purpose

To promote the export of U.S. renewable energy technologies, Congress in 1984 created the Committee on Renewable Energy, Commerce and Trade (CORECT). CORECT's goal is to bolster U.S. international competitiveness by gathering and disseminating information to U.S. manufacturers on potential overseas business opportunities; organizing trade missions, fairs, and conferences; and coordinating export assistance programs.

The Chairman and the Ranking Minority Member, Subcommittee on Human Rights and International Organizations, House Committee on Foreign Affairs, asked GAO to review CORECT's efforts to promote the export of U.S. renewable energy technologies. Specifically, in this report GAO (1) discusses what activities CORECT has undertaken to increase exports of U.S. renewable energy technologies; (2) describes guidelines recommended by CORECT for financing such exports, including simplifying the application process for seeking export assistance; (3) provides information on how CORECT recommended specific markets in the Caribbean Basin and the Pacific Rim and its identification of future export markets; and (4) discusses CORECT's efforts to follow through on trade opportunities in selected countries.

Background

Under the Renewable Energy Industry Development Act of 1983 (P.L. 98-370) Congress created CORECT, an interagency working group. CORECT's goal is to help coordinate federal activities affecting worldwide commerce in renewable energy technologies. Renewable energy technologies generate electricity and/or heat through the use of renewable resources, such as sunlight (photovoltaics), heat from the sun (solar thermal), wind, naturally occurring underground steam and heat (geothermal energy), plant matter and animal waste (biomass), and water (hydropower).

CORECT's role was expanded under the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989 (P.L. 101-218). The 1989 act requires establishing a plan to increase renewable energy technology exports and submitting an annual report to Congress describing exports that have occurred as a result of CORECT activities. The plan was to be presented no later than in CORECT's 1991 annual report, and subsequent reports are to describe any modifications to the plan and the progress in implementing it. The act also requires CORECT to recommend guidelines for financing renewable energy technology exports, to simplify the application process for U.S. renewable energy firms seeking export financing assistance, and to recommend specific markets for renewable energy technologies.

CORECT is chaired by the Department of Energy and includes representatives from 14 federal agencies. It is funded through the Department, with a 1991 fiscal year budget of just under $1.5 million. CORECT works closely with the U.S. Export Council for Renewable Energy, a consortium of nine U.S. renewable energy trade associations. Approximately 30 percent of CORECT's budget for 1991 went to this consortium.

In 1990, to further the goal of coordinating and streamlining all the government's export promotion programs, the President created the interagency Trade Promotion Coordinating Committee. On October 21st of this year the Committee received a legal mandate when the President signed the Export Enhancement Act of 1992 (P.L. 102-429). The Secretary of Commerce chairs the Committee, in which over 12 federal agencies participate, including most of the same agencies represented on CORECT.

Results in Brief

CORECT has not yet completed a formal plan in consultation with representatives of affected industries for increasing exports of renewable energy technologies. However, CORECT member agencies have engaged in a number of activities that could form the basis of a plan. These activities include identifying barriers to U.S. renewable energy technology exports, commissioning studies of potential markets and educational materials about renewable energy, and sponsoring trade promotion events.

Furthermore, CORECT does not have the export information necessary to assess its progress. It does not keep track of exports associated with CORECT activities; moreover, the industry, due to concerns over confidentiality, does not provide it with the information needed to measure whether exports have increased. In addition, CORECT does not use publicly available data because such data are incomplete.

CORECT has recommended and begun to help implement guidelines for financing exports of renewable energy technologies. These guidelines include obtaining funds from U.S. and multilateral sources, helping develop new financing mechanisms, and setting a minimum funding goal. It has also simplified the application process for U.S. renewable energy technology firms seeking export financing assistance. However, it continues to face two key problems: It has limited influence over how much funding member agencies, such as the Agency for International Development, provide for renewable energy activities; and it cannot match the level of government subsidies available to foreign competitors.

Using criteria that it has developed, CORECT has recommended four countries in the Caribbean Basin and two in the Pacific Rim as potential markets for the export of U.S. renewable energy technologies. It has identified Eastern Europe and Mexico as future export markets.

In the past, CORECT did not have a system for following through on trade opportunities that it identified. However, CORECT has now helped develop a promising mechanism for financing and monitoring opportunities in Indonesia and other Pacific Rim countries. In the Caribbean Basin, opportunities identified in the Dominican Republic were lost due to a lack of available credit.

CORECT represents an early attempt to coordinate one type of export promotion effort on a governmentwide basis. This effort has been superseded to a certain extent by the creation of the Trade Promotion Coordinating Committee. However, there is currently little coordination between CORECT and this Committee.

Principal Findings

CORECT Has Engaged in Key Activities but Has No Formal Plan

Among other provisions, the 1989 act requires CORECT to establish a joint government-industry plan to increase U.S. exports of renewable energy technologies, to report to Congress on any modifications to the plan and progress in implementing it, and to describe exports resulting from CORECT activities. To date, CORECT has carried out several key activities, but has not produced or submitted a formal plan.

As one of its first activities, CORECT identified four major barriers to U.S. exports of renewable energy technologies: (1) inadequate financing, (2) little awareness of such technologies on the part of potential end-users, (3) poor coordination of existing federal export assistance programs, and (4) trade practices by foreign countries that put the U.S. industry at a competitive disadvantage (see p. 17). According to CORECT and industry spokesmen, CORECT continues to face barriers to the dissemination and use of renewable energy technologies. These barriers involve a lack of experience with renewable technologies on the part of U.S. and multilateral agencies responsible for carrying out energy projects in the markets recommended by CORECT (see p. 18).

In addition to identifying barriers, CORECT or its member agencies have commissioned at least 2 dozen studies between 1985 and 1991. These studies produced an energy resource data base on 160 countries; comparisons of U.S. and foreign government policies on renewable energy and U.S. and foreign company approaches to exporting renewable energy technologies; overviews of U.S. and multilateral sources of export assistance; and reports on market conditions in 20 countries and specific trade opportunities in 6 nations. Under CORECT's coordination, the Agency for International Development and the Department of Energy have also commissioned several educational booklets on renewable energy technologies. Additionally, CORECT has helped fund three types of trade promotion events for the U.S. renewable energy technology industry: trade missions, reverse trade missions (to bring foreign officials to the United States), and conferences held in conjunction with trade shows.

Although identifying barriers, conducting studies, and supporting trade promotion events are activities that may be included in a plan, CORECT has not finalized a plan nor does it maintain export or market share data that could be used to update or monitor the implementation of a plan. Moreover, it does not have a systematic way of recording export sales stemming from its activities. CORECT has not utilized government data, which are open to the public, because these data cover only a few types of renewable technology exports. Industry groups, which collect information on exports of renewable energy technologies, have not provided this information to CORECT. According to an industry spokesman, making such information available would reveal proprietary data, thereby giving foreign competitors an advantage over U.S. exporters. However, the industry consortium gave GAO a summary of export information that shows an increase in exports of U.S. renewable energy equipment and services from 1990 to 1992 (see p. 21). These data represent "best guess estimates" from industry sources.

CORECT Has Recommended Financing Guidelines and Simplified the Application Process

CORECT is required to recommend guidelines for financing U.S. exports of renewable energy technologies. CORECT is currently in the process of getting federal, international, and private organizations to contribute funds for training, trade promotion events, technical studies, and other activities. It is also helping develop new financing mechanisms for the Pacific Rim and other markets. One such mechanism is being set up to channel funds from large multilateral donors to small-scale renewable energy projects in Indonesia, Malaysia, the Philippines, and Thailand. Another was created to support travel to trade promotion events, to finance preliminary project

studies, and to provide information on renewable energy technologies to multilateral financing institutions. CORECT, in cooperation with the U.S. Export-Import Bank, has also set a minimum funding goal for renewable energy projects.

Additionally, the 1989 act requires CORECT to simplify the application process for seeking export assistance. In February 1992 CORECT released a streamlined application form that allows renewable energy companies to apply for assistance from several agencies with this single form (see p. 26).

However, CORECT's efforts to develop internationally competitive financing options are hindered by two obstacles. First, CORECT has little influence over the activities that member agencies, such as the Agency for International Development, undertake. For example, this agency's funding for renewable energy projects has fallen sharply in recent years (see pp. 31-32). Second, CORECT's efforts have limited impact because U.S. exporters of renewable energy technologies must compete with foreign companies whose renewable energy projects are financed in part through government subsidies (see pp. 29-31).

CORECT Has Recommended Six Specific Markets

The 1989 act states that CORECT is to recommend markets that federal export loan programs, development programs, and programs for assisting the private sector should target. CORECT has identified four countries in the Caribbean Basin—Barbados, the Dominican Republic, Guatemala, and Jamaica—and two countries in the Pacific Rim—Indonesia and the Philippines—as markets in which U.S. renewable energy technologies could be useful. It did so based on each country's availability of renewable energy resources, the amount of U.S. and multilateral development assistance given to the country, and other criteria. CORECT plans to focus on Eastern Europe and Mexico as future markets for U.S. renewable energy technologies.

CORECT helped identify and disseminate renewable energy export opportunities in Indonesia, but no one tracked the results of export opportunities that were developed in that country (see pp. 36-38). GAO believes CORECT did not adequately delegate to one or more of its member agencies responsibility for follow-up. On a more positive note, in working to formulate new financing mechanisms, CORECT has helped develop a new, multilateral approach that can now be used to monitor how renewable energy projects are carried out in Indonesia and other Pacific Rim countries. This approach is being coordinated by an office at the World

Bank that was created specifically to oversee small-scale renewable energy projects (see p. 38). In the Dominican Republic projects were not developed because credit was difficult to obtain.

CORECT is a first attempt to coordinate governmentwide export promotion efforts as they apply to one narrowly defined industry. Since CORECT's creation, the President formed the interagency Trade Promotion Coordinating Committee, which was recently established by law. This Committee is mandated to do for all U.S. industries what CORECT is attempting to do for the renewable energy technology industry. Consequently, CORECT, which does not work closely with the Committee, now coexists with this broader effort.

Recommendations

To help promote the export of U.S. renewable energy technologies, GAO recommends that the Secretary of Energy work with other CORECT member agencies and the U.S. renewable energy technology industry to

- establish a deadline for completing the government-industry plan to increase exports of renewable energy technologies;
- maintain consistent export or market share data that could be used to help update a plan and monitor its implementation;
- develop a way, through the CORECT mechanism, to assign responsibility for tracking member agency activities, including trade opportunities identified by these agencies in recommended markets, and for documenting, to the extent possible, any exports associated with such activities; and
- work with the Trade Promotion Coordinating Committee to define the way in which CORECT's mandate and activities can be integrated into the overall U.S. export plan the Committee is developing.

Agency Comments

GAO discussed the information presented in the report with responsible officials from CORECT and representatives from the renewable energy technology industry. These officials and representatives did not disagree with the facts presented in the report. Nevertheless, some suggested that the report's main focus should be on (1) the government-subsidized financing available to foreign competitors and (2) the difficulties experienced in financing renewable energy projects through the Agency for International Development. Others disagreed with GAO's assessment of CORECT's follow-up efforts, saying CORECT has done all that could be expected of an interagency body with a small budget of just over

$1 million. GAO believes that, even though CORECT's budget is limited, CORECT should be accountable for the public resources it spends.

These officials and representatives also commented on two of the four recommendations made in the report. With respect to GAO's recommendation that CORECT establish a deadline for completing a plan, they said that CORECT is currently in the process of drafting a plan. As for GAO's recommendation that CORECT work with the Trade Promotion Coordinating Committee, the Executive Director of the industry consortium expressed doubt that the Committee would be effective in promoting exports of renewable energy technologies. He responded that CORECT works because it represents an ongoing industry-government collaboration. He added that if the Committee undertakes such collaboration, it, too, may work. Their comments have been incorporated into the report where appropriate.

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Abbreviations

AID	Agency for International Development
CORECT	Committee on Renewable Energy, Commerce and Trade
DOE	Department of Energy
ECRE	U.S. Export Council for Renewable Energy
Eximbank	U.S. Export-Import Bank
FINESSE	Financing Energy Services for Small-Scale Energy Users
GAO	General Accounting Office
HTS	Harmonized Tariff System
IFREE	International Fund for Renewable Energy and Efficiency
TDP	Trade and Development Program
TPCC	Trade Promotion Coordinating Committee

Introduction

The decade of the 1980s began with oil shortages, rising oil prices, and the expectation that energy prices would continue to rise. This situation created a strategic interest in alternative sources of energy generated by using renewable energy technologies. [1] The subsequent decline in oil prices, however, led to a decreased economic incentive for pursuing renewable energy options. Moreover, countries with abundant natural gas and coal reserves and the transportation infrastructure to make them readily available have been less likely to invest in renewable energy technologies.

Nevertheless, there are certain conditions under which renewable energy technologies are economically attractive. These conditions are present in countries lacking large fossil fuel deposits and adequate infrastructure. Specifically, they are present in remote areas that are not connected to an electricity grid and have plentiful renewable energy resources. They are also present in less remote areas served by a poorly functioning electricity grid. Such conditions exist in many developing countries, where use of diesel generators by households and businesses is commonplace. Although renewable energy systems often have higher up-front costs than diesel generators, their long-term costs are much lower: Fuel costs are negligible and maintenance costs are minimal. In addition, renewable energy systems can be more reliable and require less routine maintenance. Experience with diesel generators in developing countries has often been extremely poor due to severe maintenance and repair problems.

Renewable energy systems connected to a properly functioning power grid can also be competitive with fossil fuel-fired plants in areas with good renewable energy resources and poor or expensive access to fossil fuel resources, particularly if there is an opportunity to cogenerate power using biomass.

To emphasize its concern with promoting the U.S. renewable energy technology industry, in 1984 Congress established an interagency working group called the Committee on Renewable Energy, Commerce and Trade (CORECT). [2] At first, CORECT's aim was to coordinate federal activities affecting worldwide commerce in technologies involving renewable energy. However, CORECT's role was expanded in 1989, with passage of the

[1] Renewable energy technologies generate electricity and/or heat by using sunlight (photovoltaics), heat from the sun (solar thermal), wind, naturally occurring underground steam or heat (geothermal energy), plant matter and animal waste (biomass), and water (hydropower).

[2] The act creating the committee was the Renewable Energy Industry Development Act of 1983 (P.L. 98-370). Congress approved the act on July 18, 1984.

Renewable Energy and Energy Efficiency Technology Competitiveness Act (P.L. 101-218). Currently, CORECT has a mandate to (1) develop a plan to increase U.S. exports of renewable energy technologies, (2) come up with guidelines for financing these exports, (3) make it easier for U.S. firms engaged in exporting renewable technologies to apply for funds, and (4) recommend suitable export markets to these firms. The act also states that CORECT must submit an annual report to Congress that includes a description of exports resulting from CORECT member agency activities. The plan was to be released no later than CORECT's 1991 annual report, with reports in succeeding years explaining any changes to the plan and how it is being carried out.

CORECT works closely with a consortium of nine U.S. renewable energy trade associations, called the U.S. Export Council for Renewable Energy (ECRE). Before CORECT was established, ECRE conceived of the idea of developing an interagency body composed of the federal agencies and entities involved in renewable energy, export promotion, financing, and overseas development programs. ECRE was concerned that foreign governments were doing a better job of coordinating and supporting their renewable energy industries than the United States. Consequently, the United States was losing world market share. ECRE was also concerned about the long-term prospects for sustaining the renewable energy technology industry in the United States. It determined that the best way to sustain the industry is to focus on exporting because the most viable markets for renewable energy technologies currently exist in the developing world.

The context in which CORECT operates was changed in 1990, when the President created the Trade Promotion Coordinating Committee (TPCC), an interagency committee assigned to unify and streamline the government's export promotion programs. The TPCC's role was strengthened on October 21 when the President signed the Export Enhancement Act of 1992 (P.L. 102-429), which provided a statutory basis for TPCC. Over 12 executive branch agencies serve on TPCC. The TPCC's recent activities include establishing working groups for specific geographic and industry areas, setting up export facilitation conferences for the U.S. business community, and developing a trade resource center to provide information on federal assistance available to exporters. CORECT has engaged in similar activities by bringing officials in industry and trade promotion together across agency lines, conducting trade promotion events, and developing a streamlined application form for export financing assistance.

CORECT's Composition and Budget

CORECT is chaired by the Department of Energy (DOE) and includes representatives from 13 other federal agencies. These agencies are the Agency for International Development (AID), the Department of Commerce, the Department of Defense, the Department of the Interior, the Department of State, the Department of the Treasury, the Environmental Protection Agency, the Export-Import Bank of the United States (Eximbank), the Overseas Private Investment Corporation, the Small Business Administration, the U.S. Trade and Development Program (TDP), the U.S. Information Agency, and the Office of the U.S. Trade Representative.

CORECT has four subcommittees and a task force. These entities are responsible for the following specific activities:

- The Education Subcommittee, chaired by AID, develops promotional materials and brochures and conducts seminars;
- The Market Development Assistance Subcommittee, chaired by the Commerce Department, examines potential export markets for U.S. renewable energy technologies and assists the industry in developing trade strategies;
- The Technical Competitiveness Subcommittee, chaired by DOE, develops training materials for installing and operating renewable energy technologies, studies the feasibility of various renewable energy technology applications, and assesses renewable energy resources around the world;
- The Trade Policy Subcommittee, chaired by the U.S. Trade Representative, responds to industry reports of trade barriers; and
- The Financing Task Force, chaired by DOE, develops financing options for exporters of U.S. renewable energy technologies.

The full CORECT group meets twice a year to evaluate past activities and develop new plans. The subcommittees and task force meet periodically throughout the year to draw up in-depth plans.

CORECT has no staff of its own, although it has had a series of designated managers from DOE who are also responsible for issues unrelated to CORECT. Matters pertaining to CORECT are currently referred to two individuals, the Office Director for Technical Assistance under DOE's Assistant Secretary for Conservation and Renewable Energy, and DOE's Deputy Assistant Secretary for Export Assistance under the Assistant Secretary for Domestic and International Energy Policy. A third individual, a DOE staffer in the Office of Technical Assistance, was assigned in 1991 to work with CORECT on a full-time basis. CORECT's administrative work,

annual reports, and many of the studies it helps support are done by private contractors.

Table 1.1 shows the amount of fiscal year funding for CORECT's activities since its inception in 1984. DOE funds CORECT.

Table 1.1: CORECT Funding, Fiscal Years 1984-1991

Fiscal year	Amount
1984	$125,000
1985	250,000
1986	500,000
1987	750,000
1988	750,000
1989	1,000,000
1990	1,028,000
1991	1,484,000

Source: DOE.

In 1991, 53 percent of CORECT's budget funded technical assistance to renewable energy projects around the world; 35 percent went toward market development activities; and 12 percent supported education, training, and administrative activities. ECRE received the largest single sum, $449,000, primarily for market development activities, and Sandia National Laboratory's Design Assistance Center received the second largest, $415,000, primarily for technical assistance.

Objectives, Scope, and Methodology

The Chairman and the Ranking Minority Member, Subcommittee on Human Rights and International Organizations, House Committee on Foreign Affairs, asked us to review CORECT's efforts to promote the export of U.S. renewable energy technologies. Specifically, in this report we (1) discuss what activities CORECT has undertaken to increase exports of U.S. renewable energy technologies; (2) describe guidelines recommended by CORECT for financing such exports, including simplifying the application process for seeking export assistance; (3) provide information on how CORECT recommended specific markets in the Caribbean Basin and the Pacific Rim and its identification of future export markets; and (4) discuss CORECT's efforts to follow through on trade opportunities in selected countries.

To achieve our first three objectives, we obtained documents from and interviewed CORECT member agency officials and contractors. We also obtained information from and interviewed U.S. and foreign renewable energy industry representatives and World Bank, Inter-American Development Bank, and Asian Development Bank representatives. In addition, we obtained publicly available data from government and industry sources.

To discuss CORECT's efforts to follow through on trade opportunities in selected countries, we visited the Dominican Republic and Indonesia, where we (1) interviewed officials from the U.S. embassy and AID mission, host government ministries and utilities, and private companies, and (2) visited renewable energy project sites. In addition, we visited U.S. renewable energy companies in the United States and attended CORECT's 1991 Pacific Rim conference and trade show in Los Angeles, California.

We did our work between January 1991 and August 1992 in accordance with generally accepted government auditing standards.

We gave CORECT and industry officials an opportunity to comment on the information presented in the report. These officials' responses have been included where appropriate throughout the report.

CORECT's Activities to Increase Exports of U.S. Renewable Energy Technologies

To date, CORECT member agencies have focused on three activities: identifying barriers to U.S. renewable energy technology exports, commissioning studies and educational materials, and sponsoring trade promotion events. Although the 1989 legislation requires CORECT to develop a government-industry plan to increase exports of U.S. renewable energy technologies, CORECT has not yet produced or submitted such a plan.

The 1989 legislation also stipulates that CORECT report to Congress any changes to the plan, how it is being implemented, and any exports resulting from CORECT member agency activities. However, CORECT does not monitor statistics on exports or market share that could help it update a plan and evaluate how the plan is being carried out. In addition, it does not systematically record export sales associated with its member agency activities. Although export data are available from public sources, CORECT cannot use these data because they are insufficient. Moreover, although CORECT has supported the renewable energy industry with one-eighth to one-half of its annual budget over the past 5 years, industry groups have not provided CORECT with any of the export information they collect. ECRE, which represents virtually all U.S. exporters, claims that giving export or market share data to a public government body would reveal proprietary information and in so doing put the U.S. industry at a disadvantage vis-a-vis foreign competitors. However, ECRE did provide us with a summary of export data based on "best guess estimates" from industry sources. According to these estimates, U.S. exports of renewable energy equipment and services have gone up over the past 3 years.

Barriers Identified

In 1984 CORECT identified four main barriers to exporting renewable energy technologies:

- inadequate financing for purchasing U.S. renewable energy equipment, particularly by developing country customers;
- little awareness by potential end-users about renewable energy technology performance, applications, and cost compared with conventional energy options;
- poor coordination of existing federal export assistance programs that could help exporters of renewable energy technologies; and
- trade barriers imposed by foreign countries that could inhibit U.S. renewable energy equipment sales and put the U.S. industry at a competitive disadvantage in overseas markets.

During its second year of operation (1985-1986) CORECT established a Financing Task Force to develop strategies for alleviating the first barrier. The strategies being developed by the Task Force are discussed in chapter 3. CORECT is attempting to address the second barrier through educational brochures and trade promotion events, discussed in the following sections. In order to combat the third, it developed a streamlined application form for exporters of renewable energy technologies. (For a description of the form, see chap. 3.) With regard to the fourth barrier, a questionnaire distributed by the U.S. renewable energy industry found no evidence of tariffs or other trade barriers that are specific to imports of renewable energy technologies. However, CORECT member agency officials and industry representatives agree that government-subsidized financing by foreign competitors remains an obstacle. A U.S. government effort to address this issue as it pertains to four broad industry groups, including energy, is discussed in chapter 3.

These officials also cited specific institutional barriers that include

- a lack of information on and training in renewable energy technologies on the part of U.S. government agency officials, multilateral donor agency officials, and officials from developing countries;
- a lack of infrastructure within the targeted countries for distributing and maintaining renewable energy technologies;
- an emphasis by U.S. development agencies and multilateral development banks on supporting large-scale, centralized fossil fuel energy projects, together with what CORECT and industry spokesmen describe as a lack of consideration for the environmental and social costs of such projects; and
- an emphasis by both the public and private sector on keeping short-term costs low; these costs are likely to be higher for renewable energy systems.

CORECT and industry officials say that other institutional barriers include government-subsidized prices for electricity and fossil fuels and a lack of laws, regulations, or incentives allowing private power producers to sell to utilities or other customers.

CORECT member agencies are making some attempts to deal with these barriers. For example, AID is working with developing countries to design private power legislation, and the Financing Task Force has gotten the World Bank to set up a special program for small-scale projects involving renewable energy technologies. This program is described in chapter 3.

Commissioned Studies and Educational Materials

Between 1984 and 1991, CORECT commissioned close to 2 dozen studies that were prepared by ECRE, the Commerce Department, and consultants. Two of the earliest studies compared the policies of the United States and other countries toward renewable energy and the strategies of U.S. and foreign companies for exporting renewable energy technologies. The first study concluded that U.S. renewable energy programs are not well coordinated relative to those of the Europeans, Japanese, and others. It stated that the United States does not do a good job of following through, from research and development of the technology to maintaining or increasing worldwide market share. The second study found that establishing a local presence in targeted markets is critical to an exporter's success. It also found that government support for research and development, export financing, and other activities is extremely important in developing a successful competitor.

Another study supplied data on energy resources, population, and economic indicators in 160 nations. Others provided information on U.S. and multilateral sources of export financing assistance, as well as market conditions in various countries. The market studies described the power generation sector in 11 Caribbean Basin countries; export opportunities in the Dominican Republic, Greece, India, and the Philippines; and trade and investment regulations in 10 countries. [1] In addition, ECRE reported on specific opportunities for the application of renewable energy technologies in the Caribbean Basin and the Pacific Rim.

Working together with AID, DOE, and ECRE, CORECT has also helped fund several educational booklets and brochures, including a treatise on renewable energy applications in agriculture and health, and a directory of vendors of U.S. renewable energy technologies.

Trade Promotion Events

To promote the export of U.S. renewable energy technologies, CORECT's Market Development Assistance Subcommittee has sponsored three main types of trade promotion events. These events are (1) trade missions, in which representatives of the U.S. renewable energy industry travel abroad to show their wares; (2) reverse trade missions, in which foreign public and private sector officials are invited to the United States to meet with U.S. industry representatives and tour U.S. facilities; and (3) conferences and trade shows, where U.S. and foreign government and industry officials

[1]The 10 countries were the Dominican Republic, Greece, India, Jamaica, Kenya, Mexico, Nigeria, the Philippines, Spain, and Thailand.

gather to hear presentations on U.S. technologies and view exhibits of U.S. products.

In 1988 CORECT sponsored a biomass trade mission to the Caribbean Basin, and in 1989 it sponsored a geothermal trade mission to the region. CORECT focused on biomass and geothermal technologies in part because its Technical Competitiveness Subcommittee found plentiful biomass and geothermal resources in this region. According to CORECT's annual reports for 1988 and 1989, CORECT spent $50,000 on a biomass industry brochure in 1988 and gave $50,000 to the Geothermal Resources Council in 1989.

In 1987 CORECT provided $50,000 to the Geothermal Resources Council for a reverse trade mission in which officials from Guatemala, the Pacific Rim, and other regions met with U.S. geothermal industry representatives. In 1988 it spent $50,000 on a wind energy reverse trade mission involving officials from these same regions. The following year, DOE, together with other agencies, sponsored two geothermal reverse trade missions for representatives from around the world. In 1990 CORECT provided $43,000 to the American Wind Energy Association for another reverse trade mission on wind energy for officials from the Caribbean Basin, the Pacific Rim, and other regions.

In 1989 CORECT held a Caribbean Basin/Latin America-focused conference and trade show. Two years later, it held a Pacific Rim conference and trade show. The two events are described in greater detail in chapter 4.

Numerous U.S. government and private sector officials say that these conferences, together with CORECT's regular meetings and the other trade promotion events that CORECT has helped bring about, have been useful. Specifically, the officials say that these events have increased communication and coordination among agencies and between government and industry by providing a forum in which participants can exchange ideas.

One CORECT official cautioned, however, that "you can put a buyer and seller together [e.g., at a trade promotion event], but you can't guarantee a sale." He added that successful results can be difficult to attribute to CORECT. For example, he said that a $2-million contract with Indonesia negotiated with the help of the Commerce Department's U.S. and Foreign Commercial Service and Eximbank—agencies that participate in CORECT—probably would have taken place even if CORECT did not exist.

CORECT DOEs Not Keep Track of Exports

CORECT does not solicit or maintain export or market share data that could help revise a plan and check its progress. For example, CORECT does not periodically obtain or assess such data, compare them to a baseline, or document sales resulting from member agency activities. It therefore cannot determine to what extent, if any, exports have increased.

When we asked CORECT officials for export statistics, they suggested we speak to ECRE. These officials, together with ECRE representatives, acknowledge that CORECT does not gather such information. The industry consortium, which has received a significant amount of CORECT's budget over the past 5 years, [2] does collect export information. However, ECRE declined to provide us with detailed statistics on exports or market share. ECRE contends that public dissemination of such information, which it considers proprietary, would reveal the U.S. industry's position in world markets and thus help foreign competitors gain market share at the expense of U.S. exporters.

Nevertheless, ECRE submitted to us a summary of export data (see table 2.1). This summary, which shows "best guess estimates" of U.S. exports of renewable energy equipment and services for the period 1990-1992, is based on information obtained from ECRE's member associations.

Table 2.1: U.S. Exports of Renewable Energy Equipment and Services, 1990-1992

Dollars in millions

Technology	1990	1991	1992[a]
Biomass-direct combustion[b]	$1.5	$2.4	$4.5
Geothermal[c]	3.0	5.0	12.0
Photovoltaics[d]	133.5	195.0	210.0
Solar thermal power[d]	1.0	1.0	2.0
Solar water heating[d]	8.0	10.0	12.0
Wind[e]	1.8	3.4	4.2

[a] expected

[b] Source: National Wood Energy Association.

[c] Source: National Geothermal Association.

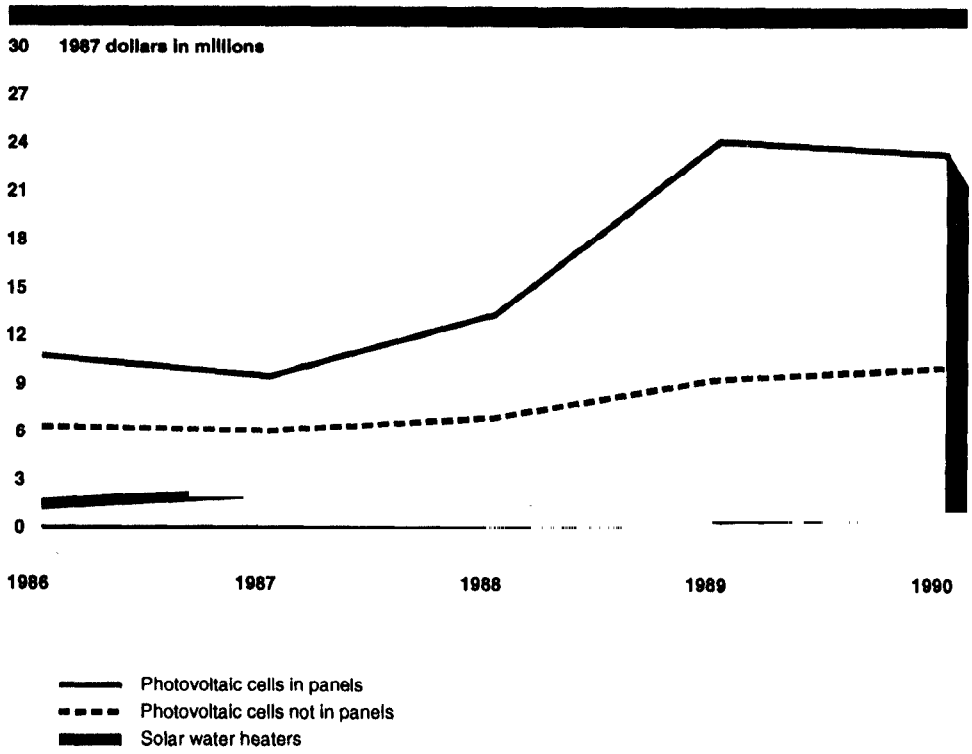
[d] Source: Solar Energy Industries Association.

[e] Source: American Wind Energy Association.

[2] In 1991 ECRE and its member organizations received $499,000, or 34 percent, of CORECT's budget for that year. In 1990 the figure was $227,000, or 22 percent. In 1989 it was $375,000 (38 percent), and in 1988 it was $390,000 (52 percent). In 1987 the industry received $100,000, or 13 percent, of CORECT's budget.

Information from public sources on some exports of U.S. renewable energy technologies does exist. For example, in our limited survey of government data we found that the Commerce Department tracks the annual dollar value of U.S. exports of photovoltaic cells assembled in panels (photovoltaic panels), photovoltaic cells not assembled in panels (photovoltaic cells), and solar water heaters for 1986-1990 (see fig. 2.1). Exports of photovoltaic cells in panels reached a high in 1989 and 1990 of over $23 million (in constant 1987 dollars). Exports of photovoltaic cells alone came to a high of just under $10 million in 1990. Exports of solar water heaters dipped from $1,337,000 in 1986 to $746,000 in 1990. These data differ from the information provided by ECRE on exports of photovoltaics and solar water heaters because the ECRE data include both goods and services and were arrived at using "best guess estimates."

Figure 2.1: U.S. Exports of Solar Energy Equipment, 1986-1990



Notes: Due to a change in the tariff code system, the Commerce Department used some estimation in correlating data from the old system to the new, Harmonized Tariff System (HTS). HTS is a series of codes used by the United States and other governments to track imports and exports of specific products.

Exports are valued as "free along side," which means free of charges before being loaded onto the ship. Exports so designated include only the domestic freight in getting the goods to port, but no ship loading charges, ocean freight, or insurance fees.

The dollar values in the figure have been adjusted to factor out inflation.

Sources: Department of Commerce, Bureau of the Census, National Trade Data Bank; and Economic Report of the President, 1992.

Several caveats to these data should be noted, however. First, U.S. exports of renewable energy technologies are determined by a number of key economic variables, including the prices of competing technologies (e.g., oil prices) and fluctuations in exchange rates. In addition, the Commerce Department's publicly available data do not include information on

exports of biomass, geothermal, hydropower, or wind energy technologies because there are currently no tariff codes specific to these technologies. [3]

Other caveats have to do with the destination of exports shown by the Commerce Department's statistics. For example, these statistics indicate that the leading export destinations in 1986-1990 for photovoltaic panels were the United Kingdom, Germany, and Mexico. The leading destinations during this period for photovoltaic cells were Japan and Mexico, and the leading destinations for solar water heaters were Canada, West Germany, South Korea, and Chile.

CORECT and industry officials say, however, that these data are inconclusive because (1) they cover only photovoltaics and solar water heaters and (2) they do not necessarily indicate the product's final destination, since items may be reassembled or repackaged in one country and then shipped to another. In addition, according to a CORECT spokesman, the leading export markets for U.S. renewable energy technology firms have changed from year to year.

Conclusions

CORECT has focused its efforts on helping conduct studies of potential markets for renewable energy technologies. In addition, it has identified barriers that hinder exports of these technologies and sponsored trade promotion events. However, CORECT has not kept consistent records on export or market share data useful for updating a plan and monitoring its implementation. In addition, CORECT has not yet established a formal plan for increasing exports of renewable energy technologies.

Recommendations

To help promote the export of U.S. renewable energy technologies, we recommend that the Secretary of Energy work with other CORECT member agencies and the U.S. renewable energy technology industry to

- establish a deadline for completing the government-industry plan to increase exports of renewable energy technologies and
- maintain consistent export or market share data that could be used to help update a plan and monitor its implementation.

[3]The Commerce Department uses 10-digit codes to track exports of specific products. Some products do not have their own codes. These products are incorporated in codes that cover other products as well. It is therefore not possible to readily determine the exports of such products from U.S. government data.

Agency Comments

CORECT and industry officials commented on the first recommendation, saying that CORECT is now working on a government-industry plan to increase exports of renewable energy technologies. These officials generally did not disagree with the facts presented in the report, although some said the report should focus more on the issues discussed in chapter 3 concerning (1) the government-subsidized financing available to foreign competitors and (2) the difficulties experienced in financing renewable energy projects through AID.

CORECT Has Streamlined the Export Financing Application Process and Is Actively Pursuing Other Financing Strategies

CORECT is required, under the 1989 act, to recommend guidelines for financing U.S. exports of renewable energy technologies. The act also requires CORECT to make it easier for U.S. exporters of renewable energy technologies to apply for funds. In February 1992 CORECT simplified this application process by producing a form that allows exporters to apply for assistance from several federal agencies at once. Additional activities currently being pursued by CORECT include getting other organizations to contribute funds, helping develop new financing mechanisms, and setting a minimum funding goal at Eximbank for renewable energy projects.

Obstacles CORECT faces involve government-subsidized financing by foreign competitors and a sharp drop in renewable energy project funding by AID, even though AID is one of the largest potential sources of federal support for the introduction of U.S. renewable energy technologies in developing countries.

CORECT Has Simplified the Export Assistance Application Process

In consultation with ECRE, CORECT has developed a new application form. The form will allow U.S. renewable energy companies, many of which are small businesses unfamiliar with federal government regulations and institutions, to apply for assistance from AID, Eximbank, the Overseas Private Investment Corporation, and TDP at the same time. The form was approved by the Office of Management and Budget in September 1991 and was made available in February 1992.

Funding Sources

CORECT is getting a number of sources to help provide funding for renewable energy activities. These sources include the following:

- AID's Office of Energy and Infrastructure, to cover such services as training, planning, developing private sector energy projects, and helping to defray the costs of certain trade promotion events;
- TDP, to help finance prefeasibility studies and trade promotion events; and
- ECRE, to help with certain trade development activities.

CORECT plans to obtain funds from the World Bank's Global Environmental Facility, a 3-year, $1.5-billion fund recently created to cover major environmental project financing through grants and concessional loans. [1] CORECT also plans to obtain funds from a World Bank-AID cooperative

[1]Concessional loans are loans offered at below market interest rates with longer terms and grace periods than market loans.

agreement, established in 1990 to fund preinvestment studies and the preparation of projects for the Global Environmental Facility.

New Financing Mechanisms

According to CORECT and industry spokesmen, one of the most promising mechanisms for funding renewable energy projects is the Financing Energy Services for Small-Scale Energy-Users (FINESSE) program. FINESSE channels funds from multilateral development banks and other donors to small-scale renewable energy projects in four Southeast Asian countries—Indonesia, Malaysia, the Philippines, and Thailand. The program was initially proposed by CORECT at a World Bank meeting in 1988 and was further developed at a workshop in Kuala Lumpur, Malaysia, at the end of October 1991.

FINESSE received funds for activities leading up to the Kuala Lumpur workshop from the U.S. government ($475,000); the Dutch government ($250,000); the United Nations' Energy Sector Management Assistance Program ($85,000); the Rockefeller Foundation ($45,000); and the Asian Development Bank ($20,000). These funds were used to create business plans for several proposed projects, to conduct market studies in the four Southeast Asian countries, to pay administrative expenses, and to finance other activities.

Based on information from the Kuala Lumpur workshop, renewable energy and energy efficiency projects in the four countries were identified for potential funding through FINESSE. The anticipated cost of these projects is $823 million. In the Philippines alone, $324-million worth of projects were proposed by FINESSE and approved by the Philippine government. The governments of Indonesia, Malaysia, and Thailand have identified other projects for FINESSE funding. The projects are currently being processed by a newly formed office at the World Bank that was set up to administer the FINESSE program. A CORECT spokesman noted that, although the U.S. renewable energy technology industry does not have a "lock" on these projects, it is in a good position to vie for them with foreign competitors.

According to CORECT, the FINESSE mechanism is promising for several reasons. First, the four FINESSE countries have now become planners of renewable energy projects instead of just recipients of aid. Second, a way has been found for the World Bank and other large donor agencies to fund small projects by channeling the funds through local intermediary organizations. Third, a large potential market for U.S. exports of

renewable energy technologies has been identified. Finally, high-level officials from each of the four countries, as well as from the World Bank, have been actively involved in FINESSE.

CORECT officials say that the FINESSE mechanism may be replicated in other parts of the world, such as the Caribbean Basin, Mexico, and India. Public and private sector representatives from these regions attended the workshop in Kuala Lumpur.

The International Fund for Renewable Energy and Efficiency (IFREE) is another mechanism for financing U.S. exports of renewable energy technologies. Funded at $2.1 million by AID, DOE, the Environmental Protection Agency, and the Rockefeller Foundation, IFREE supports travel for U.S. renewable energy industry representatives and foreign business contacts; prefeasibility and preinvestment studies; and technical assistance to multilateral financing institutions. IFREE is managed by a board consisting of representatives from AID, DOE, the Environmental Protection Agency, ECRE, and the Rockefeller Foundation.

An Innovative Financing Program in the Dominican Republic

Enersol is a U.S.-based, nonprofit development organization that works with local development organizations and distributors of photovoltaic systems for rural households in the Caribbean Basin and other parts of the world. It has created an innovative model in the Dominican Republic for disseminating and financing photovoltaic technology. The model involves setting up local credit associations that enable villagers to afford solar energy systems for their homes. Enersol identified a demand in the Dominican Republic for small-scale solar energy systems because villagers were meeting lighting and other energy needs with dry cell batteries and kerosene paid for with cash earned from agriculture, tourism, and remittances from relatives in the United States. Enersol introduced the

Instead of using their cash to buy kerosene, the villagers use it to make payments on the solar energy systems installed in their homes.

Enersol received a grant from CORECT to prepare a case study, which was presented at CORECT's Caribbean Basin/Latin America-focused conference and trade show in 1989. Enersol's Director attended the event, where he arranged an agreement with a company to supply photovoltaic panels to the Dominican Republic.

Enersol has also been assisted in its efforts by the Peace Corps, which has used small grants from AID for setting up revolving credit funds. In addition, the Peace Corps has provided volunteers to help install the photovoltaic systems in villagers' homes and organize the credit associations. The systems installed by Enersol in the Dominican Republic since it began its activities in 1985 now number in the thousands.

AID's Office of Energy and Infrastructure and DOE are currently funding Enersol's efforts to help other countries in the Caribbean Basin replicate its activities in the Dominican Republic. The agencies are also funding a video on Enersol that will be distributed worldwide.

Eximbank Funding

Eximbank has set a goal of devoting 5 percent of its energy sector financing to renewable energy projects. [2] According to Eximbank, renewable energy projects accounted for 43.8 percent of its energy sector authorizations in fiscal year 1989 and 9.9 percent in fiscal year 1990. Most of these projects involved the export of equipment for large hydropower dams. In fiscal year 1991 Eximbank authorized financing for $45.3 million of export sales involving geothermal, hydropower, and solar energy technologies. This figure represents a decrease from $65.2 million of export sales of renewable energy technologies supported by Eximbank in fiscal year 1990 and $142.9 million in fiscal year 1989. According to Eximbank, renewable energy projects accounted for only 1.6 percent of its energy sector authorizations in fiscal year 1991, falling short of the 5-percent goal. An Eximbank official responsible for renewable energy projects attributed this drop to a marked increase in authorizations for nonrenewable energy projects and insufficient requests received by Eximbank for financing from exporters of renewable energy technologies.

Funds Available to Foreign Competitors

According to ECRE's Chairman, the most significant barrier to U.S. exports of renewable energy technologies is the tied aid donor programs of the Europeans and the Japanese. "Tied aid" provides low interest financing and/or grants for purchases from the donor country. The Chairman said that such assistance can play a critical role in nurturing the adaptation of commercially viable renewable energy technologies by developing countries.

[2]Section 534(d) of the Foreign Operations, Export Financing, and Related Programs Appropriations Act of 1990 (P.L. 101-167) requires Eximbank to "seek to provide not less than 5 percent" of its energy sector export financing for renewable energy projects. Although this provision was contained in an appropriations act, Eximbank has interpreted it as a permanent requirement and has continued to apply the 5-percent goal to financing in succeeding fiscal years.

To illustrate this point, in June 1991 testimony before the Senate Appropriations Subcommittee on Foreign Operations, the American Wind Energy Association's Director of Government Affairs recounted how U.S. wind energy experts had made a marketing tour of India in 1988. Every potential customer had asked what grants or loans were available from the U.S. government. The answer was "none." The following week the Danes announced a $25-million tied aid grant to India for Danish wind turbines. Four of the five government-approved technical collaboration projects for wind turbines in India are now with Danish firms.

On May 15, 1990, AID and Eximbank announced the creation of a $500-million mixed credit (grant, loan, and loan guarantee) facility to combat foreign governments' tied aid practices in the communications, construction, energy, and transportation sectors in two Pacific Rim countries (Indonesia and the Philippines) and two other Asian countries (Pakistan and Thailand). The funding pool was drawn from the Eximbank's tied aid credit fund, Eximbank-guaranteed commercial loans, and AID's Economic Support Funds.

On October 1, 1990, AID and Eximbank authorized a $125-million tied aid credit facility for the Philippines. On June 14, 1991, $127.7 million was authorized for Indonesia. Several months later, $212.4 million was authorized for Thailand and Pakistan, bringing the total mixed credit funds authorized for the four countries to $465.1 million.

Of the $465.1 million available, $50.5 million, or 10.9 percent, was set aside for three renewable energy projects: a $28.5-million geothermal plant in the Philippines; $20 million in boiler equipment for cogeneration using biomass at a pulp and paper factory in Thailand; and a $2-million hybrid power system on an Indonesian island that will use solar energy, wind energy, and diesel fuel. According to an Eximbank spokesman, Eximbank was told that the $20-million Thai project was lost to a foreign entity due to a more competitive bid.

On October 24th of this year the President signed the Energy Policy Act of 1992 (P.L. 102-486), which mandates CORECT to conduct a study of the "subsidies, incentives, and policies" used by foreign countries to promote exports of renewable energy technologies. The new law also requires the Commerce Department to develop a database and report to Congress on (1) the environmental and energy needs of foreign countries, (2) the U.S. technologies and services that can meet those needs, and (3) the current status of bilateral and multilateral programs for promoting U.S. exports of

renewable energy technologies. No specific funding, however, was authorized for any of these tasks.

AID's Funding for Renewable Energy Programs Has Plummeted

According to CORECT and industry officials, CORECT has had difficulty promoting renewable energy projects through AID, one of the largest sources of U.S. government funding potentially available for CORECT-related activities. AID has provided erratic funding for renewable energy projects over the years. Its overseas missions, where the bulk of its resources are allocated, spent just under $5 million on renewable energy projects in the late 1970s. The figure jumped to just under $30 million in 1982 and 1983, dropped to less than $10 million in 1988, and fell to close to zero in 1989 and 1990. [3]

According to AID's Washington, D.C.-based Office of Energy and Infrastructure, renewable energy projects must compete with a broad range of overseas programs in the health, agricultural, educational, and other sectors. A 1980s reduction in officers knowledgeable about renewable energy, along with disappointing results from renewable energy projects in the first half of the decade, left renewable energy projects with little support in the field. [4] In addition, AID's efforts to consolidate activities in the field, to concentrate on fewer goals, and to avoid funding new program areas resulted in "the perception of renewable energy as a 'new area' to be avoided," according to an official from AID's Office of Energy and Infrastructure.

ECRE stated that TDP and Eximbank, in contrast to AID, are making a concerted effort to assist the U.S. renewable energy industry.

The Energy Policy Act of 1992 directs DOE to establish several programs through AID that are designed to promote U.S. exports of renewable energy technologies. One program involves training individuals from developing countries in the operation and maintenance of renewable energy equipment. The act authorizes DOE to spend $6 million annually on this program for fiscal years 1994-1996. Another program involves setting up a

[3]These figures are reflected in a graph from Daniel Waddle, Robert Perlack, and Michael Jones, "Renewable Energy Projects, Lessons from the Past and Directions for the Future," Natural Resources Forum (United Nations: New York City, Nov. 1989). The graph is included in testimony by Michael L. Marvin, Director of Government Affairs for the American Wind Energy Association, before the Senate Appropriations Subcommittee on Foreign Operations, June 25, 1991.

[4]CORECT and industry spokesmen said, however, that these disappointing results were due more to institutional barriers to renewable energy than to the technical performance of U.S. renewable energy equipment or services.

mechanism to introduce U.S. renewable energy technologies to these countries. DOE is authorized to fund the program at $100 million per year for fiscal years 1993-1998.

CORECT Has Targeted Markets in the Caribbean Basin and the Pacific Rim

The 1989 act requires CORECT to target markets for federal export loan programs, development programs, and programs assisting the private sector. Using criteria that it developed, CORECT targeted four countries in the Caribbean Basin and two countries in the Pacific Rim as good potential markets for the export of U.S. renewable energy technologies. In the future, CORECT plans to focus on Eastern Europe and Mexico.

Criteria Were Developed

According to the studies commissioned by CORECT, the Pacific Rim offers the best opportunities for increasing exports of U.S. renewable energy technologies, followed by the Caribbean Basin.

CORECT focused on the Caribbean Basin first because of its proximity to the United States. In addition, according to a Commerce Department spokesman, the White House had already established a focus on the region through the Caribbean Basin Initiative, and an interagency working group that included many of the same agencies that now make up CORECT had been set up to run the Initiative.

In 1987 CORECT targeted Barbados, the Dominican Republic, Guatemala, and Jamaica. In 1989 it targeted Indonesia and the Philippines in the Pacific Rim. CORECT and industry spokesmen stated that the following criteria were considered in selecting these countries:

- the availability of renewable energy resources in the countries,
- the amount of U.S. and multilateral development assistance flowing to the countries,
- the energy pricing structure (i.e., which countries offered the highest prices for power generated in remote locations),
- the government's attitude toward using renewable energy,
- the availability of financing and technical infrastructure for renewable energy projects,
- the political and economic stability of the countries, and
- the percentage of the population without access to electricity.

The desire to balance English-speaking countries (e.g., Barbados and Jamaica) with Spanish-speaking ones (e.g., the Dominican Republic and Guatemala) was also a factor in selecting countries in the Caribbean Basin, according to a Commerce Department spokesman.

On several trips in 1987, CORECT identified renewable energy projects in the four Caribbean Basin countries that could be used as vehicles for U.S.

exports. It also sponsored a Caribbean Basin/Latin America-focused conference and trade show in Miami, Florida, in 1989. According to CORECT's 1990 annual report, industry representatives estimated that about $10 million in sales resulted from the trade show. However, neither CORECT nor ECRE has provided any documentation to verify this figure.

In June and September 1990 CORECT made two trips to each of the two Pacific Rim countries and in early October 1991 held a Pacific Rim conference and trade show in Los Angeles, California. The Guatemalan Energy Minister was one of many foreign guests attending the show, in addition to those from the designated Pacific Rim countries. As a result of the show, according to a Commerce Department official, Guatemala plans to launch a rural electrification program using U.S. renewable energy technologies.

Federal Export Loan Programs and Development Programs in the Caribbean Basin and the Pacific Rim

Eximbank is the agency responsible for most nonagricultural federal export loan programs. The availability of its export promotion assistance depends on the creditworthiness of the countries to which U.S. goods are to be exported. For example, Eximbank eliminated all medium-term coverage [1] for exports to the Dominican Republic in 1988 and ceased to allow any loans or guarantees for the Dominican Republic in 1990. It did so due to the Dominican Republic's large accumulated debts and the country's poor prospects for repaying any new debts. Despite the Dominican Republic's poor credit rating, there is a market in that country for small-scale purchases of U.S. renewable energy technologies. This market is described in chapter 3. Eximbank maintains less severe restrictions on the financing of exports to Guatemala, Jamaica, and the Philippines, and imposes no restrictions on the financing of exports to Barbados or Indonesia.

AID, and, to a lesser extent, other U.S. government agencies, provide official development assistance to various countries around the world. Unlike Eximbank, which responds to requests from U.S. exporters, AID's funds are allocated based on a country's development needs and U.S. policy considerations. Of the six countries targeted by CORECT, Jamaica received the most dollars per capita in official bilateral development assistance from 1984 (the year CORECT was established) to 1990 (the latest

[1] Medium-term coverage applies to loans equal to or under $10 million that have a term of 7 years or less.

year for which data are available). [2] In 1986, when CORECT targeted countries in the Caribbean Basin, Jamaica received $45.73 dollars per person in U.S. official development assistance. Guatemala was next, with $11.36 per person, followed by the Dominican Republic, with $7.63 per capita. Barbados received less than $1 per person. In 1989, when CORECT focused on Indonesia and the Philippines in the Pacific Rim, the Philippines received $3.51 per capita and Indonesia received $0.53.

Future Focus on Eastern Europe and Mexico

Over the next 2 or 3 years CORECT plans to focus on Czechoslovakia, Hungary, Poland, and possibly other countries in Eastern Europe as potential markets for U.S. renewable energy technologies. During fiscal year 1992 it allocated $160,000 for project identification activities in Eastern Europe. CORECT gave ECRE funds to take an exploratory trip to Czechoslovakia in August 1991, and ECRE is currently negotiating to station a U.S. renewable energy industry representative in Prague. In addition, DOE provided $20,000 to ECRE to allow representatives of U.S. renewable energy industries to participate in United Nations-sponsored workshops in Europe during the first half of 1992. These workshops will also be attended by East European officials. According to DOE and AID officials, in fiscal year 1991 AID allocated about $150,000 to assess renewable energy resources in Bulgaria, Czechoslovakia, Hungary, Poland, and possibly Romania.

CORECT also plans to focus on Mexico in response to a Mexican government rural electrification effort involving heavy use of renewable energy technologies. According to CORECT's consultant on Mexico, in 1991 DOE began developing, in cooperation with its Mexican counterparts, a renewable energy program designed to support the rural electrification effort and other renewable energy activities. The consultant stressed that Eximbank has been extremely helpful in promoting financing for U.S. renewable energy technology exports to Mexico to support the program. Eximbank is involved in a broad U.S. effort to help Mexico restructure its economy. [3]

[2]The source for figures on U.S. official bilateral development assistance was the U.S. Department of Commerce, Bureau of Economic Analysis (Washington, D.C.: Apr. 1991). The source for population data was the United Nations Monthly Bulletin of Statistics, as published in the International Monetary Fund's International Financial Statistics Yearbook, 1991 (Washington, D.C.).

[3]For example, the Eximbank's authorizations for loans, guarantees, and medium-term insurance for exports to Mexico grew 10-fold over the last 5 years, jumping from $335 million in fiscal year 1987 to $3.5 billion in fiscal year 1991. The 1991 figure represents 48 percent of the Eximbank's authorizations for that year.

Efforts to Follow Through on Trade Opportunities Are Mixed

Although CORECT helped identify trade opportunities in the Pacific Rim and the Caribbean Basin, it did not assign responsibility for following through on those opportunities. However, FINESSE, the new multilateral financing mechanism created with the help of CORECT (see chap. 3), may be useful in monitoring opportunities in Indonesia and other Pacific Rim countries. In the Dominican Republic, financial problems made it difficult to pursue the opportunities identified in that country. Industry efforts, supported by recent legislation, may make it easier to follow through on trade opportunities.

With the creation of TPCC in 1990, and its codification on October 21, 1992, the task of promoting exports from all U.S. industries was subsumed under one forum. CORECT now coexists with this broader effort, carrying out many of the same activities to advance renewable energy technology exports that TPCC has begun to undertake on behalf of all exports. However, there is currently little coordination between CORECT and TPCC. We believe that the possibility of unnecessary overlap can be minimized if CORECT works in support of the overall TPCC effort.

Indonesia: A Case Example of Mixed Follow-Through Efforts

Indonesia has the potential to become a major market for U.S. exporters of renewable energy technologies, based on its growth rate and geography. Energy demand is outstripping capacity as the economy expands. Although currently an oil exporter, Indonesia is expected to be a net oil importer by the end of the decade. The Indonesian government is therefore eager to explore new energy options, including renewable energy, to meet the needs of its growing industrial sector and population. With close to 200 million people, Indonesia is the fourth most populous country in the world. According to Indonesia's national utility, however, the electricity grid currently reaches only about 32 percent of the population. The geography of the Indonesian archipelago—66,000 villages spread out over thousands of islands—makes grid extension fueled by large, centralized power plants costly and difficult. Representatives of the U.S. renewable energy industry say that renewable energy systems, many of which are small and decentralized, are better suited to this environment.

In order to strengthen its economy and attract foreign investors, the Indonesian government has recently instituted a series of trade, investment, and price reforms. The trade and investment reforms include simplifying port and customs procedures; lowering some tariffs (although high tariffs remain on imports of photovoltaic panels and wind turbines);

reducing the licensing requirements for manufacturers; improving access to financing for foreign and domestic firms; and establishing duty-free, bonded warehouse zones. The government also introduced new legislation in June 1991 that lowered taxes on business ventures. In addition, in April 1990 it began to implement a 1985 law authorizing private power generation. The government's pricing reforms include revising electricity and diesel fuel prices to better reflect market prices. The reforms thereby encourage contracting with private power suppliers and using alternative energy sources.

During the summer of 1990 CORECT helped sponsor two trips to Indonesia by opportunity identification teams from member agencies and the U.S. renewable energy industry. As of July 1991, approximately a year after the last team returned, there had been little action concerning the trade possibilities identified by the teams. For example, most of the Indonesian public and private sector officials who met with the teams in June and September 1990 said that they have not been contacted since then by U.S. renewable energy industry representatives. In addition, although many of these officials were told by CORECT member agency representatives that they would receive more information on U.S. renewable energy technologies, a majority told us that they had not received such information. It appears, therefore, that CORECT did not adequately assure that an appropriate agency would assume responsibility for tracking the trade opportunities identified on these trips.

Although CORECT released the names of potential customers in Indonesia to industry associations in October 1990, 1 month after the last opportunity identification trip was completed, we found no evidence that this information resulted in the initiation of any renewable energy projects involving U.S. equipment or services. The full report of the opportunity identification teams' findings was released in September 1991, 1 year after the last team returned from the Pacific Rim. CORECT spokesmen said that, given its small budget, CORECT can only provide information to and coordinate the activities of U.S. government agencies, nongovernmental organizations, and industry groups, with the ultimate goal of increasing U.S. exports of renewable energy technologies. They said CORECT cannot assure that any trade opportunities identified will result in export sales.

The AID mission in the Indonesian capital, Jakarta, currently spends less than 1 percent of its $45 million-$50 million annual budget on energy. Its main focus is on privatization of the energy industry. The only energy project funded by the mission in the last 6 years was a coal research

project. However, a U.S. wind turbine manufacturer and a contractor to AID's Office of Energy and Infrastructure recently persuaded the mission to cofinance a pilot project involving wind-powered irrigation pumps in conjunction with the mission's agricultural program. The project is being cofinanced by the Japanese government, which has experienced problems with kerosene-powered engine pumps used in its Indonesian irrigation projects.

Efforts to Establish Oversight Capabilities

The FINESSE program, discussed in chapter 3, is a new multilateral financing mechanism for small-scale energy users in Indonesia and other Pacific Rim countries. CORECT helped develop the mechanism, which may be an effective vehicle for monitoring trade opportunities identified by CORECT member agencies. The World Bank has established a special office to oversee the implementation of small-scale renewable energy projects, and several U.S. companies are pursuing potentially profitable projects in Indonesia and elsewhere in the Pacific Rim. These projects include establishing wind-powered battery charging stations in Indonesia, manufacturing and installing small photovoltaic power systems in the Philippines, and other activities.

In addition, an AID contractor is currently setting up a Renewable Energy Project Support Office to share the cost of feasibility studies. The office is slated to occupy part of a U.S.-Indonesian Business Center to be set up by the AID mission. Another AID contractor is creating an equity investment mechanism for applying renewable energy technologies. A CORECT spokesman from the Department of Commerce characterized these activities as a step in the right direction, but said that they are not as good as having the U.S. renewable energy industry station a representative in Indonesia.

Opportunities in the Dominican Republic Lost Due to Financial Difficulties

According to officials in the Dominican Republic, the government is receptive to renewable energy technologies because the country lacks indigenous fossil fuel resources and the hard currency [1] to import them. It also has a significant unmet demand for electricity. However, financing of projects is a major problem in the Dominican Republic. Unlike Indonesia, the Dominican Republic does not have abundant natural resources that it could export to earn hard currency. For this reason and others, no action has been taken on any of the trade opportunities in renewable energy that

[1]Hard currency is a medium of exchange that is freely convertible into other currency.

were identified by CORECT member agency teams in 1987. In addition, the AID mission in the Dominican Republic has focused on other efforts.

In discussions with U.S. and Dominican Republic government officials as well as with importers and users of renewable energy technologies, we found no evidence that any of the 11 renewable energy projects identified by CORECT member agencies in the Dominican Republic have been implemented. Four of the projects involved hydropower, three involved biomass, two involved photovoltaics, and two involved wind energy.

We spoke with Dominican Republic government officials and private sector representatives responsible for seven of the projects and were told that they have not acted on any of these projects. In addition, U.S., Dominican Republic, and private sector officials told us that they have seen no indication that the other four projects have been carried out.

These officials attribute the lack of action to difficulties in obtaining financing, saying that few in the Dominican Republic can pay for the equipment and services that U.S. exporters would like to provide. For example, according to a member of the U.S. National Hydropower Association who helped identify the four hydropower projects in the Dominican Republic, these projects were not implemented because the government could not pay for them.

Financial difficulties also hindered an industrial end-user who was involved in two other projects, one using solar energy, the other, biomass. The solar project involved installing photovoltaic panels to power chicken farm ventilation, lighting, refrigeration, battery charging, and water pumping. A company representative explained that the economic situation in the country rendered the project infeasible: interest rates were too high for loan financing, and letters of credit were difficult to obtain. [2] The biomass project involved using poultry manure as a reusable fuel. The company remains eager to use biomass technologies but has been unable to obtain the necessary technical assistance and equipment for this project.

According to a U.S. renewable energy industry representative who helped identify trade opportunities in the Dominican Republic, an additional reason why nothing has been done is that U.S. exporters could not contact potential customers connected with any of the opportunities until the

[2]A letter of credit is a document issued by a bank guaranteeing the payment of a customer's drafts up to a stated amount for a specified time period. It substitutes the bank's credit for the buyer's and eliminates the seller's risk. Letters of credit are used extensively in international trade.

Commerce Department released its report summarizing the findings of several CORECT cosponsored trips to the Caribbean Basin to identify potential projects. He explained that timely follow-through is critical in pursuing business contacts. The report was released in July 1988, over 8 months after the last trip was completed.

Follow-through activities are complicated by the fact that U.S. agencies in the Dominican Republic have provided limited assistance to U.S. exporters of renewable energy technologies. For example, although the Commerce Department's U.S. and Foreign Commercial Service has held local trade shows featuring U.S. renewable energy equipment, it was not able to replace the commercial officer who left the Dominican Republic in June 1991 until 6 months later. Such an officer's responsibility is to help promote exports of U.S. products. According to the Director for the Western Hemisphere for the U.S. and Foreign Commercial Service, the Dominican Republic and other countries in the Caribbean Basin represent relatively poor prospects for U.S. exports and, therefore, have a lower priority.

In addition, promoting U.S. renewable energy technologies is not a priority for the AID mission, according to conversations with mission officials. AID's energy programs in the Dominican Republic have focused on promoting independent power sales to the electricity grid, planting trees for wood fuel, and improving the national electric utility's ability to measure electricity usage and collect revenue. With respect to selling to the electricity grid, for example, only 1 of the 10 independent power projects approved by a newly created private power board involves renewable energy. [3] Moreover, this renewable energy project involves a British, rather than a U.S., firm. However, the Dominican Republic board was set up with legal and technical assistance from AID in accordance with legislation passed in February 1990. [4]

[3]Of the remaining nine projects, eight involved oil-fired power generation and one involved electricity distribution and transmission line repair.

[4]Established under Dominican Republic Law 14-90, the board is designed to stimulate the country's economic development by providing a regulatory framework for companies involved in generating power.

Industry Follow-Through Efforts Funded by CORECT

CORECT has provided funds to ECRE to ascertain how to use existing U.S. and multilateral agency offices in the Caribbean Basin, the Pacific Rim, and Eastern Europe to help the U.S. renewable energy technology industry develop a presence in these markets. Pursuant to this effort, negotiations are under way with organizations in Costa Rica to cover the Caribbean Basin/Latin America; Malaysia to cover the Pacific Rim; and Czechoslovakia to cover Eastern Europe. According to ECRE's Executive Director, DOE and AID's Office of Energy and Infrastructure are providing additional funding of $325,000 to help support the placement of industry representatives in existing federally funded facilities in these three countries. The recently enacted Energy Policy Act of 1992 mandates CORECT, in cooperation with the Commerce Department, to assign one expert in renewable energy technologies to a U.S. and Foreign Commercial Service Post in the Pacific Rim and another expert in these technologies to a post in the Caribbean Basin. The act authorizes DOE to spend $500,000 per year for fiscal years 1993 and 1994 for this purpose.

CORECT's Role Is Altered by the Creation of TPCC

Six years after CORECT was established by law, the President formed TPCC to undertake many of the same types of activities for all U.S. industries that CORECT has performed for the renewable energy industry. For example, TPCC working groups have issued an interagency calendar of upcoming U.S. trade promotion events and drafted a report that identifies structural impediments faced by U.S. exporters trying to obtain adequate financing. TPCC has also held a series of national export conferences to raise the export awareness of the U.S. business community and set up a Trade Information Center where U.S. firms can obtain information on trade promotion programs and activities. At present, little coordination exists between CORECT and TPCC.

In October TPCC received a legal underpinning when the President signed the Export Enhancement Act of 1992. This act formally mandates TPCC to unify and coordinate federal export promotion and financing efforts, to produce a governmentwide strategic plan for these efforts, and to "prevent unnecessary duplication in federal export promotion and financing activities." We believe that if CORECT's activities are not coordinated with those of TPCC, such a duplication of efforts may occur.

Conclusions

We believe that CORECT has not adequately delegated responsibility for following through on member agency activities, particularly trade opportunities identified by these agencies in recommended markets. In

addition, the creation of TPCC has altered the context in which CORECT operates: CORECT is attempting to do for one industry that which TPCC seeks to do in a coordinated manner for all U.S. industries.

Recommendations

To help promote U.S. exports of renewable energy technologies, we recommend that the Secretary of Energy, together with the other CORECT member agencies and the U.S. renewable energy technology industry,

- develop a way, through the CORECT mechanism, to assign responsibility for tracking member agency activities, including trade opportunities identified by these agencies in recommended markets, and to document, to the extent possible, any exports associated with such activities; and
- work with TPCC to define the way in which CORECT's mandate and activities can be integrated into the overall U.S. export plan that TPCC is developing.

Agency Comments

ECRE's Executive Director commented on the second recommendation, saying that he did not think TPCC would be effective in promoting exports of renewable energy technologies. He said CORECT works because it is an industry-government collaboration. But he added that if TPCC undertakes such collaboration it, too, may work. With regard to CORECT's follow-up efforts, CORECT spokesmen said CORECT has done all that could be expected of an interagency body with a small budget of just over $1 million. We believe that even though CORECT's budget is limited, CORECT should be accountable for the public resources it spends.

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