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THE U.S. GEOTHERMAL INDUSTRY: COMPETITION IN MIRAVALLES

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EXECUTIVE SUMMARY

The key impediment identified for the U.S. geothermal industry to compete in the international market is the combination of mixed credits/tied aid provided by various industrial countries, particularly Japan. Mixed credit loans are loans that combine export commercial credits with much more favorable soft loans having lower interest rates, or grants. Mixed credits are also referred to as tied aid because of the combined use of trade promotion with the bilateral aid. These can also be considered concessionary loans.

Although there are numerous U.S. government agencies that promote exports, the U.S. geothermal industry is still faced with a tremendous barrier in breaking into the international market because of the lack of mixed credits available to the industry. Mixed credits have become the key tool in the international financing battle among industrialized economies and developing countries. However, the U.S. government under its current policy provides mixed credits on such a limited basis that the U.S. industry (in this case the geothermal industry) is losing to the international competition.

For example, for the first 55-MW plant of the Miravalles geothermal project in Costa Rica, the Overseas Economic Cooperation Fund (OECF) of Japan has pledged and signed a loan to Costa Rica at a yearly interest rate of 4.75 percent, a grace period of 7 years, and an amortization rate of 25 years. The Italians are now offering a 1.75 to 2.25 percent financing rate, a grace period of 8 years, and an amortization rate of 20 years. The U.S. has not been able to develop an equally attractive financial package.

ES.1 Trade and Bilateral Aid

There has been a substantial amount of discussion and attention paid to the importance of reconciling the trade and bilateral aid activities of the U.S. government. The President's Task Force on International Private Enterprise in 1984 recognized the need to clarify government policy to combine national interests in trade and bilateral aid. The Task Force also recognized that the U.S. government must develop an aggressive, consistent trade policy that mixes aid and trade resources, thereby, enabling U.S. firms

to be more competitive in world markets and to meet the challenges posed by the growing governmental role in world competition.

Instead, the U.S. government is taking alternative steps by tightening the Organization for Economic Cooperation and Development (OECD) regulations. The U.S. has successfully put pressure on the OECD to increase the minimum permissible grant element for tied and partially untied aid credits from 25 to 35 percent for developing countries. This was done to discourage continued use of export credits by making it more expensive to the governments to subsidize their industries. (Since the last increase was in July 1988, it is too early to evaluate the impact.) However, OECD countries are able to circumvent the percentage increase by providing parallel financing which is an alternative to tying aid and financing (without any requirements) which further reduces the impact of the U.S. initiative.

At the December 1987 Development Assistance Committee (DAC) ministerial meeting of the OECD, the U.S. made various proposals to encourage the balancing of international competition, including:

- A general untying of capital projects.[1]
- Strengthening development criteria in terms of project selection and implementation.
- More flexible availability of technical support for such projects.
- More coordinated transition for middle-income countries to develop criteria for phasing down concessionary-funded bilateral projects. In parallel, greater scope would be provided to export credit agencies and multilateral development banks for appropriate capital projects.

Meanwhile, the U.S. provides very limited mixed credit financing for capital projects. While Japan provided less than half of the value of U.S. total bilateral assistance, it provided over 10 times the U.S. budget allocated for mixed credit financing of capital projects in 1986. Ambassador Ernest Preeg (Chief Economist and Deputy Assistant

[1] Capital projects are defined here as relatively larger projects with a high proportion of imported capital goods that are technology intensive. Most of these projects are in the fields of energy, transportation, and telecommunications. Capital projects have a strong commercial orientation. The projects may include a hydroelectric dam, bridges, and the Miravalles geothermal project.

Administrator for Program and Policy Coordination, A.I.D.) noted at the hearing held on May 4, 1988 before the Subcommittee on International Finance, Trade and Monetary Policy, that the U.S. Agency for International Development (A.I.D.) may in fact be at a crossroad in the orientation of the development strategies. He noted that A.I.D. faces growing concerns and pressures to change these priorities and to move toward capital intensive projects more directly supportive of U.S. export interests.

At the same hearing, the Chairman and President of the U.S. Export-Import Bank (Eximbank), John A. Bohn, Jr., noted that the U.S. industry is being damaged by the continuing heavy use of mixed credits by other industrial countries, especially Japan and France. Bohn expressed doubts on the effectiveness of Eximbank's mixed credit mechanism through its Warchest.[2] According to Bohn, the real problem is that the remaining funding in the Warchest is a drop in the bucket compared to the dimensions of the problem. Further use of the Warchest would not bring results significant enough to justify the cost of continuing the program. The solution must be found within the context of a cohesive and coherent national trade and bilateral aid policy.

The main constraints to recent initiatives adopted to promote the U.S. industry through the new Trade Bill has been the lack of readily available funding. Funds available to the Trade Development Program (TDP) through the A.I.D. Economic Support Fund, (ESF) would be of little impact. There is little incentive to agree to have the aid tied to a specific U.S. sale through the ESF since the ESF is already heavily earmarked for political and strategic reasons.

ES.2 U.S. Trade Deficit and Potential Exports

The fact that the U.S. geothermal industry is losing a substantial export market in developing countries is critical for the impact on the U.S. trade deficit. The economic welfare of the U.S. will be increasingly linked to development in the global economy, especially in the developing countries. Between 1980 and 1986, total U.S. exports to

[2] Eximbank has offered mixed credits since 1984 through its Warchest, which was created to neutralize the effect of export credit subsidies from other governments and by absorbing credit risks that the private sector will not accept.

Latin America[3] fell by 20 percent instead of growing 50 percent as expected, for a loss of about $28 billion in that foreign market. However, since the total volume of exports from other industrial economies also declined substantially in that period, the overlying cause of the decline is mainly in the debt crisis and recession in the region.

Nevertheless, capital projects in Latin America financed by France, West Germany, Japan, and the United Kingdom (U.K.) amounted to about $3 billion in 1986. If the U.S. would have supplied about one-third of this market, the U.S. could have taken advantage of $1 billion in export sales. For the U.S. geothermal industry, Central America represents an attractive market for construction services and equipment which could be worth some $500 million in exports in the next few years. The four 55-MW plants and associated works needed for the Miravalles geothermal project in Costa Rica represent about $400 million going into the year 2000. Furthermore, on a smaller scale, there is a potential for wellhead units (5-MW) worth $33 million in U.S. exports for ongoing projects in Costa Rica (e.g., Miravalles) and Guatemala (e.g., Zunil).

In addition, other opportunities continue to be developed in other countries in the Central American region, but the U.S. geothermal industry is being left out of the competition. For example, in El Salvador, the French are offering a loan for the construction of a geothermal plant at a yearly interest rate of 1.25 percent, a grace period of 4 years,and an amortization rate of 30 years.

ES.3 Miravalles Project

The Miravalles project was used as a case-study to evaluate the competitiveness of the industry. As originally structured, the project is to be financed by the Inter-American Development Bank ($74 million), Japan's OECF ($52.5 million), and the national utility (the Instituto Costarricense de Electricidad (ICE)) ($24.5 million). Bids are being sought for the first of these power plants, which is expected to be operational in 1992. In addition, because Costa Rica may face a power deficit situation in 1991, ICE is also seeking bids for three wellhead units of 5 MW each.

[3] Includes Mexico, Central and South America, and the Caribbean.

The Miravalles project is the least-cost energy alternative for Costa Rica in its current power expansion plan. It is also economically advantageous since it will be displacing imported petroleum fuels at twice the cost with an indigenous renewable energy resource. This will, in turn, reduce the increasing pressure on foreign exchange and will support efforts in alleviating Costa Rica's balance of payment difficulties. Environmentally, geothermal energy is attractive for Costa Rica since it is an alternative to fossil fuel generation plants, thereby, reducing the emission of carbon dioxide into the atmosphere.

However, the U.S. geothermal industry is skeptical about entering the geothermal market in Central America because, unlike many competing nations such as Japan, the U.S. has no central coordinating body for its export assistance, investment assistance, and foreign assistance programs. Private U.S. companies have expressed a clear dissatisfaction with the apparent lack of coordination among U.S. government agencies.

The role of the U.S. geothermal industry has been weak and ineffective in providing the first of the four 55-MW plants. For the wellhead turbines (5 MW), the U.S. industry has the turbines but has been unable to compete because of the inability to obtain commercial risk insurance.[4]

The Miravalles project is in the public sector as are most other geothermal projects of significant size in developing countries. The fact that Eximbank, which is the key U.S. lending agency for the U.S. industry, is closed to the public sector in Costa Rica is a major obstacle.

Because of the aggressive, effective competition provided by the Japanese, the U.S. is losing the large power plant (50-MW plus) market. If the U.S. government does not provide a more aggressive role to support the U.S. geothermal industry in developing countries, the U.S. technical expertise could quickly disappear. Ironically, U.S. is still a leader in the field and is the largest geothermal producer in the world; yet, it is unable to effectively compete in the international arena. The U.S. (through A.I.D./Los Alamos National Laboratory (LANL)) developed much of the basic information

[4] Commercial risk insurance covers nonpayment for reasons of deterioration of buyer's market (e.g., fluctuations in demand, unanticipated competition, shifts in tariffs, buyer insolvency).

concerning geothermal resources in Central America, information that is now helping other countries build the power plants.

ES.4 Decline in Commercial Credit and the Industry Perspective

In the late 1980s, private export credits were not available to facilitate expansion of imports on a significant scale by the developing countries. In 1986, industrial-country commercial banks received more in repayment of past credits than they lent in 1986. The U.S. private sector is restricting the financing of projects in developing countries, and the U.S. government is not taking the necessary action to make up for the lack of private export financing by providing mixed credit mechanisms as incentives to the U.S. private sector.

The industry as a whole sees that the U.S. does not provide the degree of government financing support as do the Japanese, Italians, and even the French. The U.S. geothermal industry stressed that appropriate mechanisms are necessary to equalize the international competition. Many geothermal industry representatives felt that feasibility studies such as those carried out by TDP without a firm commitment from the recipient country and attractive financing were ineffective. Thus, the U.S. industry is far less aggressive than its international competitors.

ES.5 Recommended Strategy

A well formulated, balanced, and attainable strategy must be developed to accelerate business opportunities for the U.S. geothermal industry as it seeks to compete in the development and construction of not only Costa Rica's Miravalles field, but in other Latin America countries. Potential markets must be identified at an early stage and backed with attractive financing.

However, the industry cannot act alone in its conscientious role to meet foreign competition on equitable terms. The industry must actively coordinate its strategic efforts with that of the U.S. government, clearly keeping in mind that, as the U.S. is putting pressure on the OECD to reduce the use of mixed credits, the U.S. government must also, in concert with industry, develop its own effective strategy in successfully

promoting its industry while assisting the developing countries in their economic development process.

As the U.S. government agency providing bilateral aid, A.I.D. is the major tool to effectively support the industry while assuring the projects are compatible with the country's economic priorities. The question of providing new funds for A.I.D. is a political question and budgetary reallocations; policy directives will be necessary if the bilateral aid is to become effective. Providing a stronger link between aid and trade is essential.

In order that the industry be able to potentially compete internationally in the mid- to long-term, a coordinated strategy between the U.S. government and the U.S. geothermal industry needs to be implemented which addresses four distinct elements:

- **Define a Cohesive and Coherent National Trade and Bilateral Aid Policy**

  The U.S. geothermal industry must apply extensive pressure on the executive and legislative governmental bodies in order to define, establish, and implement a uniform trade and bilateral aid policy on equal terms as that offered by other industrial countries. A cohesive and coherent national trade program cannot be developed and implemented by the geothermal industry alone. Rather, the industry must act as the primary catalyst, with the respective executive and legislative committees that oversee and direct the major international and U.S. trade-related organizations involved in the promotion of U.S. exports and technologies.

- **Establish an Energy Grant and Export Credit Program**

  In consideration of establishing and implementing the second element of the strategy, the geothermal industry must take a primary role in voicing strongly, the need to initiate an energy export credit program.

  For example, an energy grant and export credit program would be developed for capital projects that support legitimate development objectives. This would be similar to the combination of grants and concessionary loans to developing countries which are used by industrialized countries to improve the position of their firms.

  Specifically, two programs could be considered:

  1. **Energy Guaranty Loan Program.** For the near term, A.I.D. could help geothermal project developers and suppliers and, in conjunction

with targeted developing countries, work with the existing loan guaranty programs in Eximbank. This A.I.D./Eximbank endeavor needs to collectively study the financial and administrative details of implementing an energy guaranty loan program at A.I.D. that could be modeled along the lines of its ongoing Housing Guaranty Program.

2. **Energy Direct Loan Program.** Through the ESF and the Eximbank, A.I.D., could pool its financial resources to provide part of the financing of the project through a financial intermediary such as a development bank in a given developing country (of course, the credit worthiness of the county is a key element). A direct project loan of this nature adds scarce financial resources to the project which tends to reduce the perceived risk. For private sector projects, additional funds could be provided by pooling the financial resources of the A.I.D. Private Sector Revolving Fund and the Overseas Private Investment Corporation's (OPIC's) direct loan program.

- **Strengthen the Industrial Liaison Between the U.S. Industry and Governments of Developing Countries**

  A great deal of success has been realized in international competition as a result of the strong in-country networks that have been developed by the Japanese, Italians, French, and New Zealanders in developing countries, particularly Costa Rica. The U.S. geothermal industry must, as the third element of its overall mid- to long-term strategy, establish a recognized/active presence in the Latin American region if it seriously expects to contend with leading international competition.

  Investigative assessments coupled with intense dialog with Costa Rican officials and local geothermal representatives is a key element to technological application and project implementation.

  The representation scheme that is to be followed should be at the choosing of the industry. The recommendation is that, strategically, the U.S. must be united and must be in synchronization with its own goals and objectives in order to represent itself in a consistent manner.

- **Reopen the Department of Energy (DOE) Geothermal Loan Guaranty Program**

  The Geothermal Loan Guaranty Program was established by Public Law 93-410 on September 3, 1974. The program legislatively authorized the Secretary of Energy to guarantee loans, and, under certain circumstances, to make interest payments on such loans for activities related to the development construction, and operation of facilities for the production of energy from geothermal

resources. The Act also established the Geothermal Resources Development Fund to carry out the loan guaranty and interest assistance programs, including the payment of administrative expenses.

Even though the program was designed to assist the industry, it was administratively closed on March 1, 1982; DOE has not reopened the program for new applications. Since the program's implementing resolutions did limit assistance to developing projects only in the U.S., it would be necessary to amend these resolutions in order to eliminate any limitations if the program is reopened.

CHAPTER 1. INTRODUCTION

Strong activity in geothermal energy development has begun to take shape in Latin America[5] partially due to strong support on the part of the Inter-American Development Bank (IDB). However, during the past 15 years, Japanese and European companies have been awarded the vast majority of geothermal projects (i.e., from resource assessment to drilling and from plant engineering and construction to equipment supply) in that geographical area.

The Miravalles project in Costa Rica could be worth over $400 million to the U.S. geothermal industry. Although the U.S. is the technological leader in the geothermal arena and the largest geothermal energy producer in the world, U.S. companies have been unsuccessful in establishing a technological presence in Central America, particularly in Miravalles.

Under a U.S. Department of Energy (DOE) Interagency Agreement with the U.S. Agency for International Development (A.I.D.), RCG/Hagler, Bailly Inc. was commissioned by DOE's Geothermal Technology Division, acting through the Committee on Renewable Energy Commerce and Trade (CORECT), to investigate the opportunities and impediments for effective participation of the U.S. geothermal industry in developing countries. The focus of the effort is the ongoing Miravalles geothermal project (which is financed by the IDB) because of the significant geothermal potential and current opportunities available to suppliers. The objective of this study was to develop a plan of action by which the U.S. geothermal industry could compete in Miravalles or other geothermal fields in the Central American region.

The Miravalles project is currently in the construction phase of the first of four scheduled 55-MW power plants. Bids are now being sought for the first of these power plants, which is expected to be operational in 1992. Because Costa Rica may face a power deficit situation in 1991, the national utility called the Instituto Costarricense de Electricidad (ICE) is also seeking bids for three wellhead units of 5 MW each.

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5 Includes, Mexico, Central and South America, and the Caribbean.

The key impediment identified relative to the U.S. geothermal industry competing in the international market was the combination of mixed credits provided by various industrial countries, particularly Japan. For this reason, much of the focus of the study was on the use of mixed credits and the link between bilateral aid and trade. Mixed credit loans are soft loans that combine export commercial credits with much more favorable soft loans having lower interest rates or grants. Mixed credits are also referred to as tied aid because of the combined use of trade promotion with the bilateral aid. These can also be considered concessionary loans.

This study will first review tne Miravalles project, including the field development history and the linkage with the Costa Rican macroeconomy, analyze the impact of developing countries upon the U.S. trade deficit, describe the key U.S. government agencies involved in the promotion of exports in developing countries, and finally analyze the international competition faced by the U.S. industry. The conclusions and the necessary plan of action to effectively promote the U.S. geothermal industry will follow.

CHAPTER 2. MIRAVALLES PROJECT AND THE ECONOMY

About one-half of Costa Rica has the potential for geothermal energy. The three major potential areas are: (1) the Guanacaste Cordillera, (2) the Central Volcanic Cordillera, and (3) the Talamanca Cordillera (Figure 2-1).

In 1964 under a United Nations grant, two regions were selected for the greatest geothermal potential: Miravalles and Rincon de la Vieja. Both are in the Guanacaste Cordillera. The Miravalles area was targeted as the first to be developed and, pending government strategy in the energy sector, the Rincon de la Vieja would follow.

The Miravalles project is the least-cost energy alternative for Costa Rica in its current power expansion plan. This project is economically advantageous since it will be displacing imported petroleum fuels at twice the cost with an indigenous renewable energy resource and, therefore, will reduce the increasing pressure on foreign exchange and supporting efforts in alleviating Costa Rica's balance of payment difficulties.

Because the electricity demand has been growing in recent years at almost twice the forecasted rate and because a long period of drought limited the supply of hydroelectricity, there is a particularly strong interest in Costa Rica to develop its geothermal potential to substitute for the increasing need of expensive thermal power generation.

The project will also provide social benefits mainly by creating jobs during construction and operation of the plants and will increase commercial activities in the region. Environmentally, geothermal energy is attractive for Costa Rica. This is an alternative to fossil fuel generation plants, which reduce the emission of carbon dioxide into the atmosphere. Additionally, geothermal energy is an alternative to hydroelectricity, which could have serious environmental consequences with respect to dams, rivers, floods, and animal habitat.

Geothermal is more adaptable to the electricity demand growth rates. Geothermal energy has the advantage that it can be developed in a gradual phased approach,

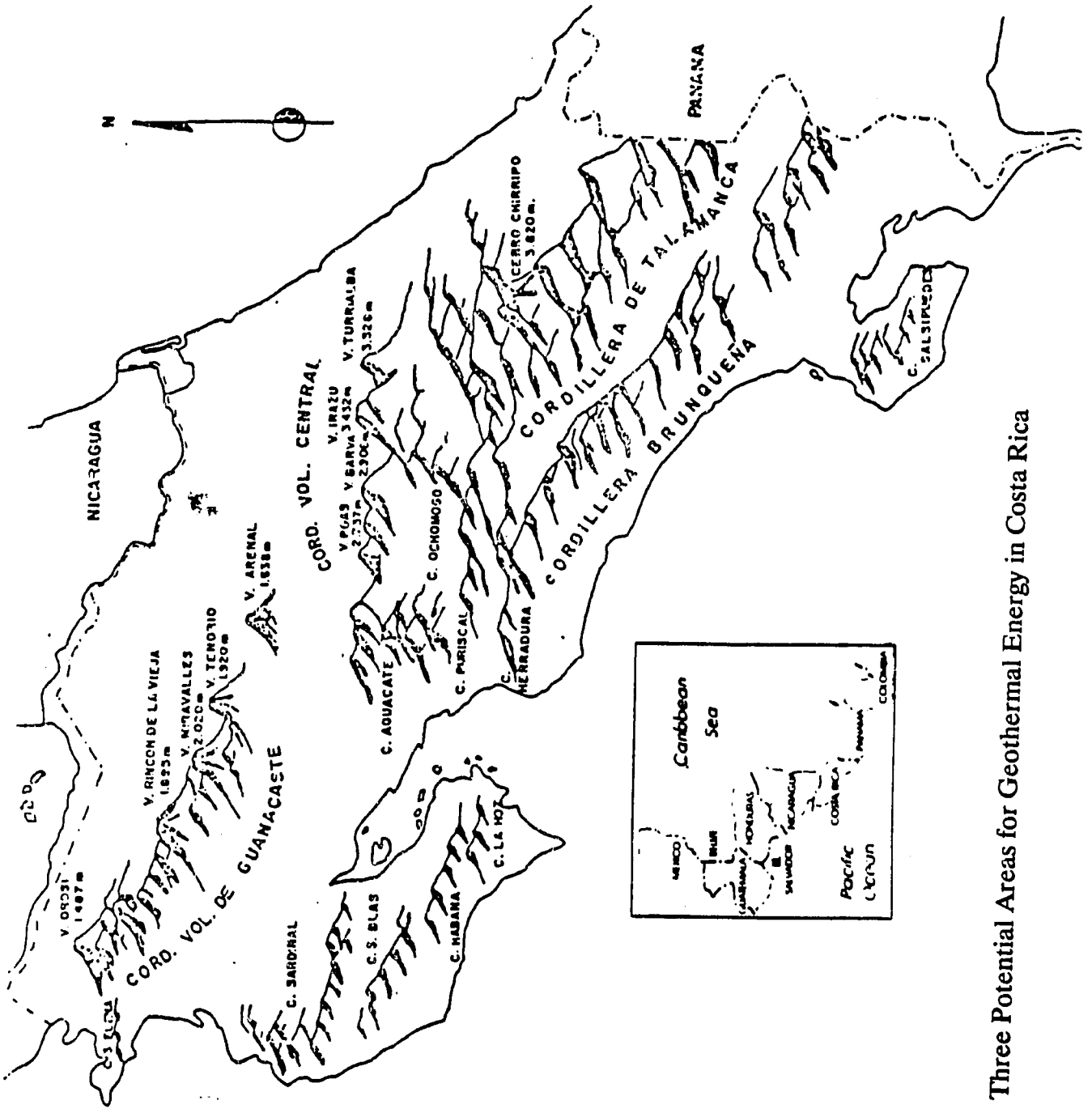

Figure 2-1. Three Potential Areas for Geothermal Energy in Costa Rica

reducing the initial need for large capital outlays such as is the case of large hydroschemes.

Field Development

The development of the field of Miravalles can be divided in four phases:

- Phase 1: Preliminary - from 1975 to 1976
- Phase 2: Prefeasibility - from 1977 to 1980
- Phase 3: Feasibility - from 1981 to 1987
- Phase 4: Construction - from 1987 and ongoing.

Phase 1. The most promising geothermal zones were identified in this phase (Figure 2-2). ICE contracted U.S. consulting services from Rogers Engineering and GeothermEx.

Phase 2. In this phase, the deep wells were drilled, and the chemical and physical characteristics of the geothermal fluids were determined. Perforation was done by the French-Belgian corporation Foraky-Foramines. Consulting services were provided again by Rogers Engineering and GeothermEx.

Phase 3. Further drilling was carried out in this phase, and the field potential was evaluated at over 200 MW. The feasibility study was carried out by the Italian Company Electroconsult. Rogers Engineering and GeothermEx separately submitted bids; however, they lost to Electroconsult because of Electroconsult's strong combined above and below ground experience.

Phase 4. In this phase the first 55-MW plant will be built, more drilling will be undertaken, and substations and transmission lines will be constructed. In 1986, two contracts were signed, one by the IDB for $74 million and the other by the Japanese (the Overseas Economic Cooperation Fund) (OCEF) for the plant itself at $52.5 million. ICE provided $24.5 million. Under apparent pressure from the Italian government, the government of Costa Rica requested in 1987 that the bid for the construction of the plant be opened to the international marketplace. The original contract limited bids to Japan and developing countries. In this phase, the U.S. role has

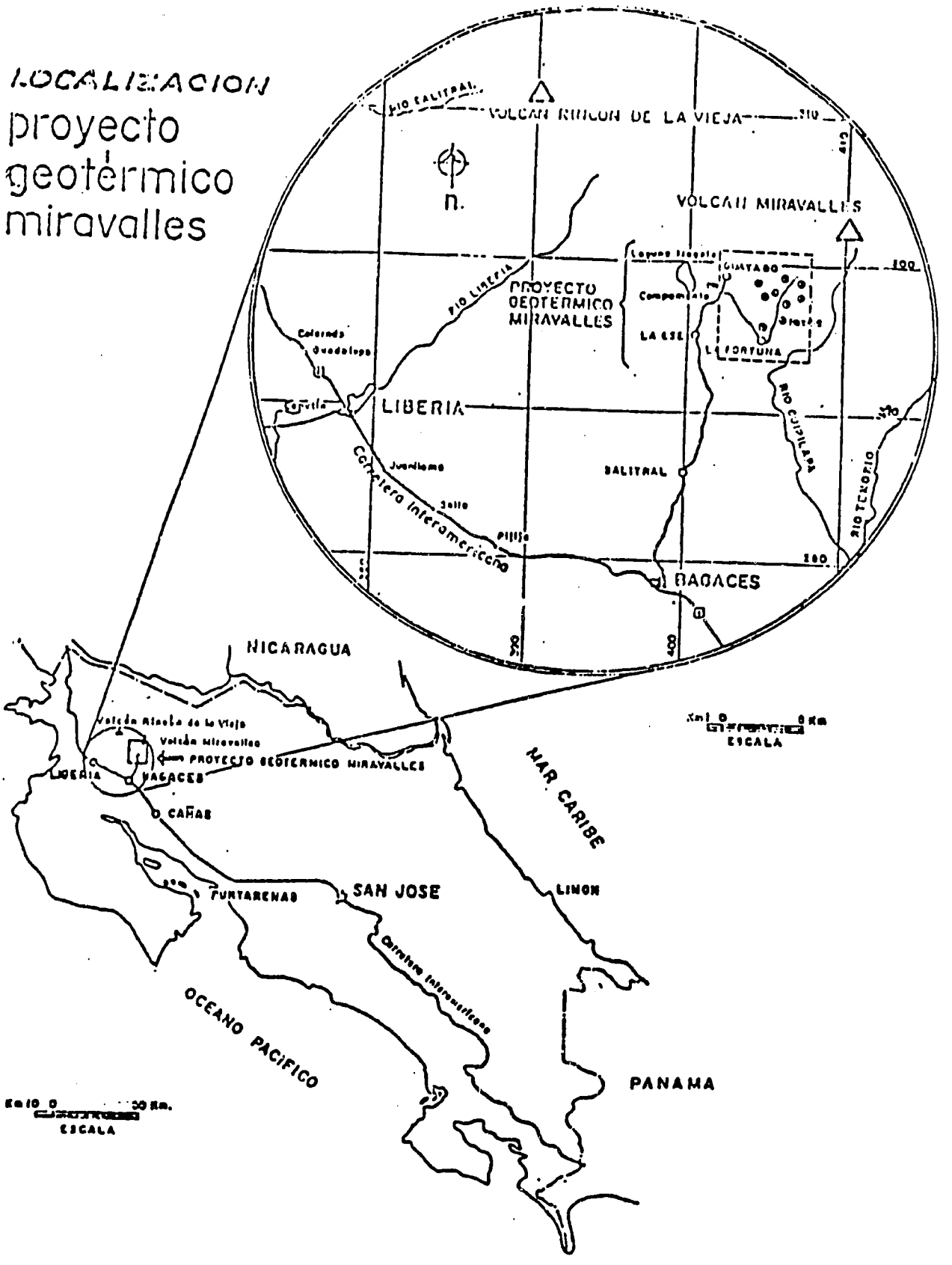

Figure 2-2. Most Promising Geothermal Zones

been minimal. A major opportunity for U.S. industry could be lost here because this is the first of three other 55-MW plants to be constructed in the same field.

CHAPTER 3. ROLE OF DEVELOPING COUNTRIES AND U.S. TRADE DEFICIT

The U.S. economic welfare is increasingly linked to development in the global economy, especially in the developing countries. U.S. exports to the developing countries dropped from $88 billion in 1980 to $75 billion in 1986. If the U.S. exports had grown in the early 1980s at the rate they did in the 1970s, they would have totaled $150 billion in 1986 as shown in Figure 3-1. According to the U.S. Overseas Development Council (ODC), the direct decline of exports to the developing countries between 1980 and 1985 resulted in a loss of about 650,000 jobs in the U.S. If the potential jobs that were never created due to the lack of export growth were added in, then the total actual and potential employment loss amounted to about 1.7 million jobs, or nearly 21 percent of the total official unemployment in 1986.

Between 1980 and 1986, U.S. exports to Latin America[6] fell by 20 percent instead of the growing 50 percent as expected for a loss of about $28 billion in that foreign market. However, with the total volume of exports from other industrial economies also declining substantially in that period, the overlying cause in the decline was mainly due to the debt crisis and recession in the region.

Nevertheless, the capital projects[7] in Latin America financed by France, West Germany, Japan, and the United Kingdom (U.K.) amounted to about $3 billion in 1986. If the U.S. would have supplied about one-third of this market, the U.S. could have taken advantage of $1 billion in export sales. Central America represents an attractive market for geothermal construction services and equipment which could be worth some $500 million to the U.S. geothermal industry within the next few years. The four 55-MW plants and associated works needed for the Miravalles project represent about $400 million going into the year 2000. Furthermore, the U.S. geothermal industry

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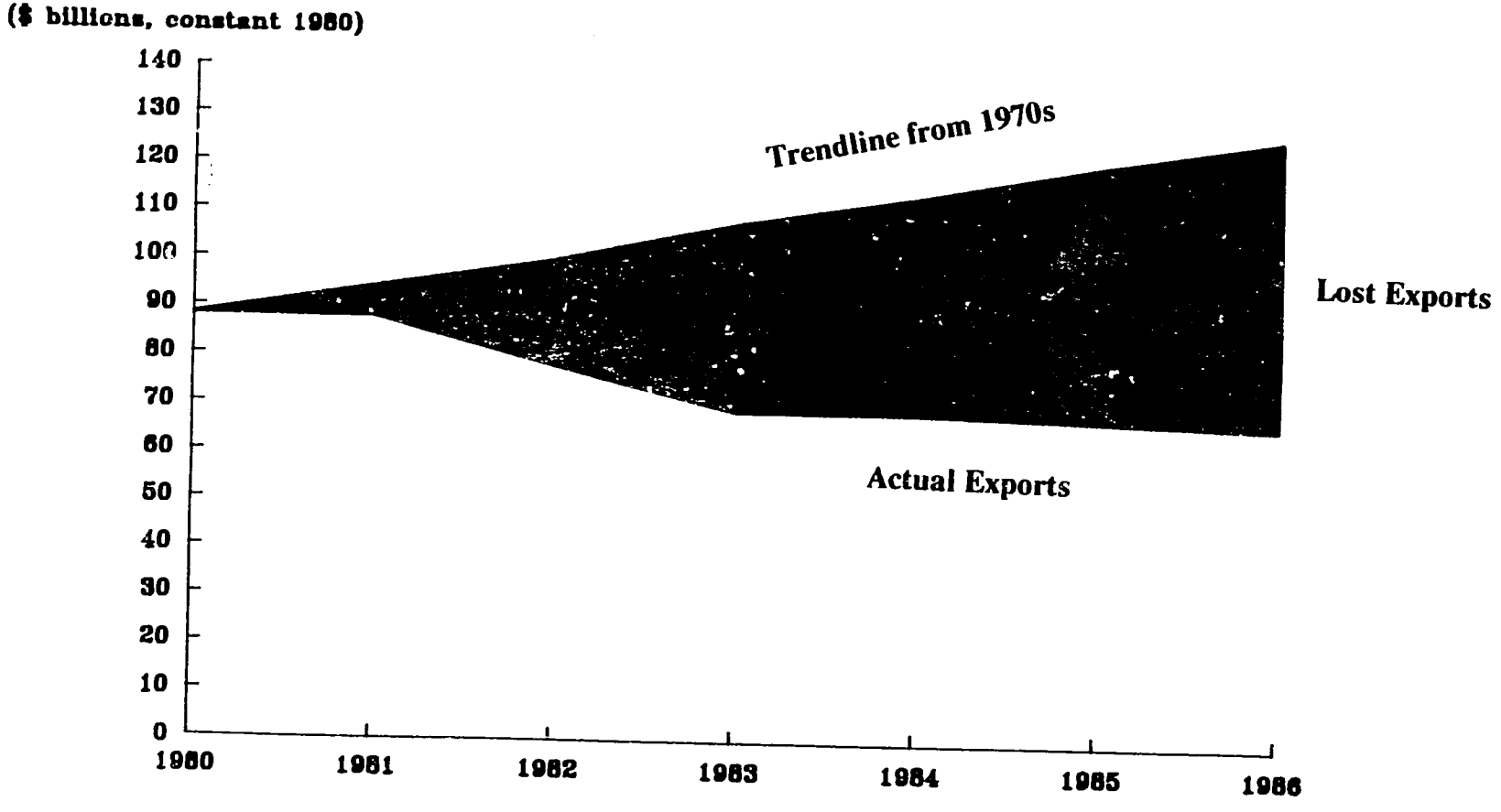
6 Includes Mexico, Central and South America, and the Caribbean.

7 Capital projects are defined here as relatively larger projects with a high proportion of imported capital goods and that are technology intensive. Most of these projects are in the energy, transportation, and telecommunications field. Capital projects have a strong commercial orientation. The projects may include a hydroelectric dam, bridges, and the Miravalles geothermal project.



Source: ODC calculations from the U.S. Department of Commerce and ODC Agenda 1988.

Figure 3-1. U.S. Exports to Developing Countries in the 1980s: Lost Opportunities ($ Billions, Constant 1980)

currently has wellhead units (e.g., 5 MW) available with a dollar value of approximately $33 million in U.S. exports for ongoing projects in Costa Rica and Guatemala.

The ODC 1988 Agenda underscored the importance of middle income developing nations in improving the U.S. trade deficit in the next 5 years and the need to support economic growth in developing countries. According to this ODC model which is shown in Table 3-1 and Figure 3-2, higher economic growth rates in developing countries will reduce the U.S. trade deficit by $32 billion by 1992. The projections developed by ODC include five growth scenarios:

A - Status quo trends from 1986

B - High industrial-country growth

C - High global growth and improved debt management

D - High global growth, improved debt management, and marked U.S. competitive gain

E - Mild U.S. recession.

Under this model, scenario D is the best option to improve the U.S. trade deficit. Scenario C highlights the importance of higher economic growth rates in developing countries over scenario B which, includes growth in industrial economies alone.

Table 3-1. Scenarios: U.S. Merchandise Trade and U.S. Trade Deficit

	1992 U.S. Exports	1992 U.S. Imports	Trade Balance
	($ billions, constant 1986)		
Growth Scenarios			
A- Status quo trends from 1986	261	459	-198
B- High industrial-country growth	347	459	-112
C- High global growth and improved debt management	379	459	-80
D- High global growth, improved debt management, and marked U.S. competitive gain	390	459	-69
Recession Scenario			
E- Mild U.S. recession	261	423	-162

Scenario Assumptions

Period Covered by Scenarios: 1989-1992[a]	Scenarios: A	B	C	D	E
	(percentages)				
U.S. Imports:					
U.S. annual GNP growth rate	3.1	3.1	3.1	3.1	1.0[b]
U.S. imports/U.S. GNP	9.1	9.1	9.1	9.1	
U.S. Exports:					
Industrial-country GNP growth rate	2.9	3.4	3.4	3.4	2.9
Industrial-country import/GNP	16.0	20.0[c]	20.0[c]	20.0[c]	16.0
U.S. share of industrial-country imports	12.2	14.0	14.0	14.0	12.2
Developing-country/GDP growth rate	2.8	4.7	6.1	6.1	2.8
Developing-country import/GNP	17.6	17.6	21.8[c]	21.8[c]	17.6
U.S. share of developing-country imports	15.7	15.7	15.7	17.0	15.7

[a] All scenarios start at the end of 1988 and use a common set of estimates for 1987 and 1988 data (IMF estimates): U.S. growth, 2.3 percent in 1987 and 3.1 percent in 1988; industrial-country growth, 2.3 percent in 1987 and 2.8 percent in 1988; developing-country growth, 3.0 percent in 1987 and 4.1 percent in 1988.

[b] 8.1 percent in 1989, 7.9 percent in 1990, 9.1 percent in 1991 and 1992.

[c] Arithmetic rise during 1988-1992 from the number listed in Scenario A to the number listed in this scenario.

Source: ODC projections, developed by Stuart K. Tucker, based on World Bank data for GNP and IMF and U.S. Department of Commerce data for trade.

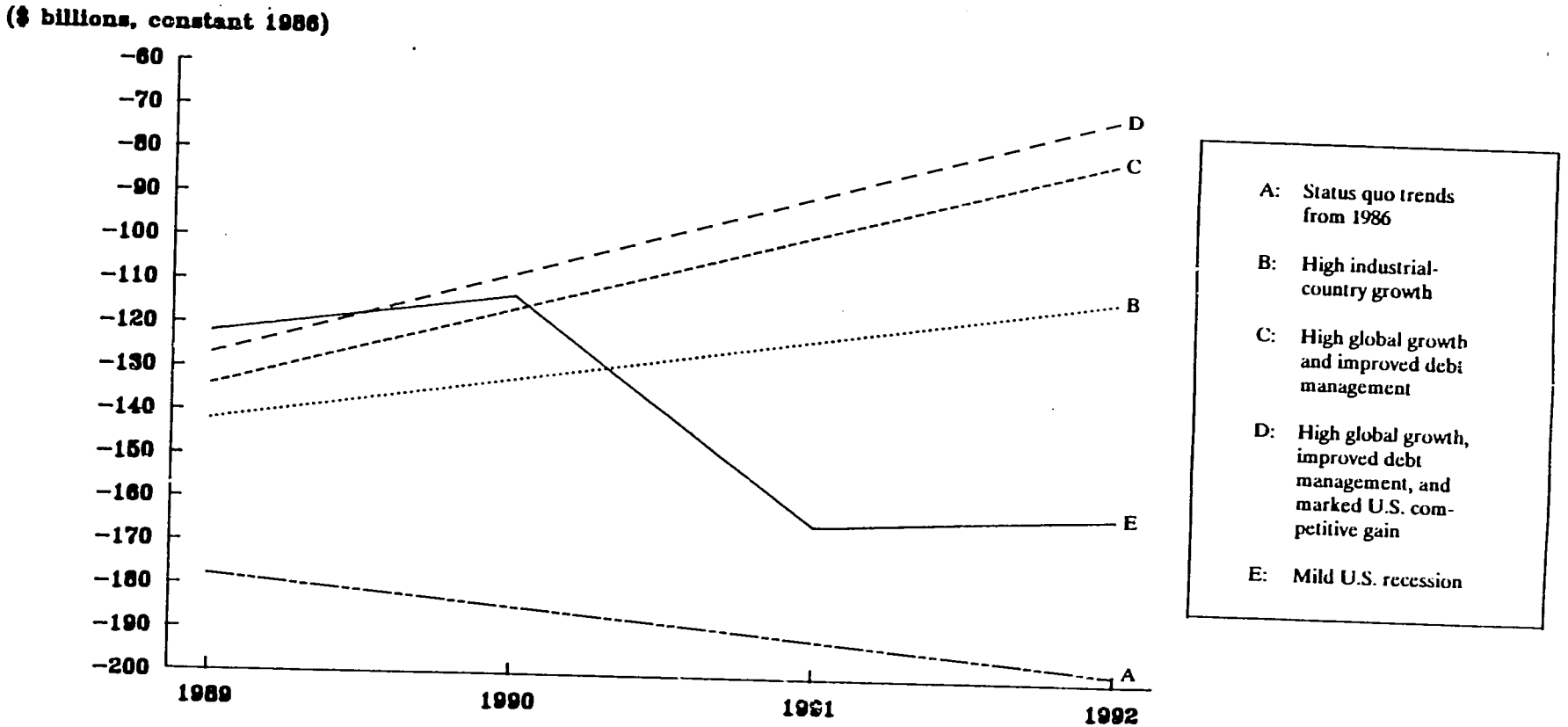


Figure 3-2. U.S. Trade Deficit

CHAPTER 4. KEY U.S. GOVERNMENT AGENCIES IN THE PROMOTION OF EXPORTS

There are various U.S. government agencies involved in the promotion of U.S. exports and technologies. The key agencies discussed here are: U.S. Export-Import Bank (Eximbank), Overseas Private Investment Corporation (OPIC), U.S. Agency for International Development (A.I.D.), U.S. Trade and Development Program (TDP), U.S. Department of Energy (DOE), U.S. Department of Commerce (DOC), and the Office of the U.S. Trade Representative.

4.1 U.S. Export-Import Bank (Eximbank)

Eximbank is the U.S. government agency that facilitates the export financing of U.S. goods and services. Through its Warchest,[8] Eximbank enables U.S. exporters to compete fairly in overseas markets on the basis of price, performance, delivery, and service.

However, the rising cost of borrowing in the 1980s outpaced Eximbank revenue increases, and Eximbank's net income has been negative since the beginning of 1982. Delinquent loans also increased from $888 million to $2.8 billion in the period of 1981 to 1986. Eximbank lost an average of $340 million annually during 1984 to 1986. Their reserves have dropped from $2.2 billion in 1981 to $302 million in 1987. Eximbank's net income is not expected to be positive until the year 2000. In the period 1981 to 1986, total Eximbank authorizations (i.e., all loans, guarantees, and insurance) fell from $12.9 billion to $6.1 billion. During this time, Eximbank's direct-lending fell from $5.0 billion to $371 million (a 93 percent drop). As a result, the Eximbank support to U.S. exports fell from $18.6 to $6.4 billion in 1986 (almost 66 percent); the virtual disappearance of the direct lending program has reduced the developmental

[8] Eximbank has offered mixed credits since 1984 through its Warchest, which was created to neutralize the effect of export credit subsidies from other governments as well as absorbing credit risks that the private sector will not accept.

role of Eximbank. Eximbank does not expect to recover financially until about the year 2000 (Figure 4-1).

Now more than ever, Eximbank requires reasonable assurance of repayment on each transaction it supports. A contradiction exists in Eximbank's objective since the credit worthiness of the buyer is essential to Eximbank; this credit worthiness substantially limits the market for the U.S. industry in developing countries. Eximbank has been referred to as the key tool to promote U.S. exports; however, Eximbank has limited funds in comparison to other government lending agencies and in relation to the demand for its services and the opportunities available to U.S. industry. In other words, it is underfunded. Furthermore, mixed credit funds through the Warchest are very small. During 1986 and 1987, $78 million of the Warchest was used.

In the case of Miravalles (a public sector project), Eximbank is closed to the public sector in Costa Rica; this makes use of the very limited mixed credit funds through the Warchest impossible. Because Eximbank now has an estimated $50 million in outstanding loans and about $15 million in arrears for Costa Rica, it is providing no assistance to U.S. exporters in the public sector at present (Figure 4-2). Eximbank is open to the private sector in Costa Rica, but is very skeptical about this market because of foreign exchange constraints in the country and overall country indebtness.

4.2 Overseas Private Investment Corporation (OPIC)

OPIC provides qualified investors with insurance against certain political risks, loan guarantees, direct loans to small businesses and cooperatives, and a variety of pre-investment programs. All are designed to reduce the perceived stumbling blocks and risks associated with overseas investment. However, their capital availability is limited, and OPIC's focus is for private sector projects only. They do not have mixed credit mechanisms to compete with soft-term financing as provided by the international competition.

U.S. investors planning to share significantly in the equity and management of an overseas venture (e.g., private sector projects only, unlike the Miravalles project) can often utilize OPIC's finance programs for medium- to long-term financing. Within this context, OPIC provides financing to investors through two major programs: direct loans

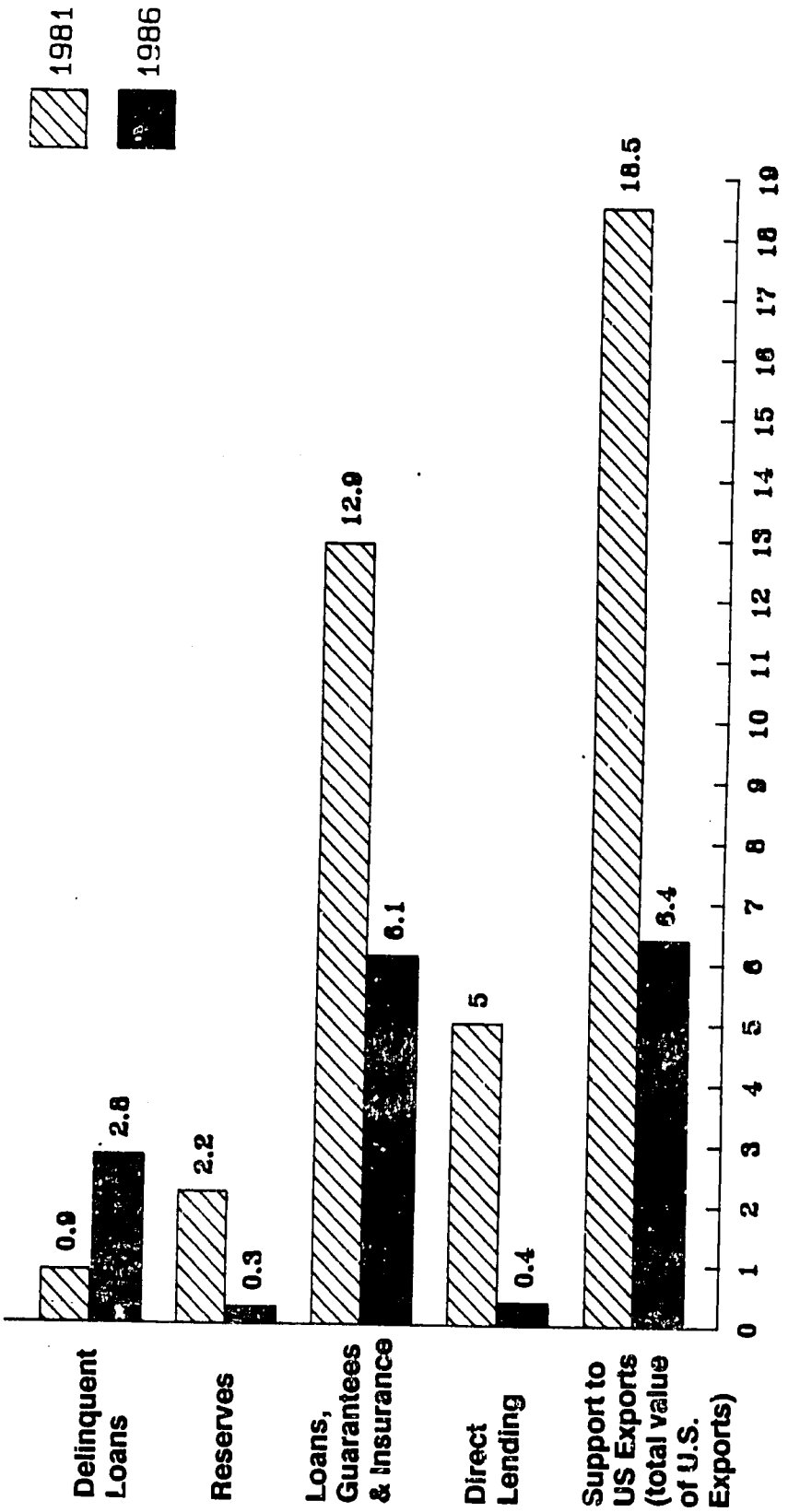


Figure 4-1. Eximbank Financial Statements

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E.O. 12356: N/A
TAGS: EFIN, CS
SUBJECT:  REF 10302 SAN JOSE - COSTA RICA INSTITUTE OF
ELECTRICITY'S GEOTHERMAL PROJECT.

1.  EXIMBANK REMAINS CLOSED TO COSTA RICA PUBLIC SECTOR
PURCHASERS.  A MAY 1988, INQUIRY FROM GEOTHERMAL POWER CO.
INC., NEW YORK REGARDING THIS PROJECT WAS REFERRED TO AID.

2.  EXIMBANK WILL CONTINUE TO MONITOR COSTA RICA'S ECONOMIC
PROGRESS.  WHITEHEAD
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Figure 4-2. Copy of Telegram: Closing of Eximbank to Costa Rica's Public Sector

and loan guarantees. Direct loans usually range from $100,000 to $6 million and are available only for ventures sponsored by, or significantly involving, U.S. small businesses or cooperatives. Under this program the loan guarantees cover both political and commercial risk insurance.[9] Interest rates on guaranteed loans are comparable to commercial rates. Repayment of direct and guaranteed loans is normally made in equal, semiannual principal payments following a suitable grace period. Final maturity generally ranges from 5 to 12 years. However, since the Miravalles project is in the public sector, as are most other geothermal projects in Central America, the usefulness of OPIC is very limited in supporting effectively the U.S. geothermal industry.

4.3 U.S. Agency for International Development (A.I.D.)

A.I.D. provides support in the form of technical assistance, training and institution building, research, and technology transfer. A.I.D. provides capital assistance in only a few countries and, therefore, seeks to leverage funds from the private sector and major development banks. In the energy sector, A.I.D. works with host country governments to develop and implement sound policies to encourage such investments.

Through its Commodity Import Program (CIP), A.I.D. can provide financing for power equipment, supplies, and construction materials. CIP provides the governments of certain developing countries with direct access to dollars which are allocated among CIP's importers in the public and private sectors. In each country where a commodity import program is established, an A.I.D. agreement with the host government specifies the type of goods or commodities that may be procured. Through its Economic Support Fund (ESF), A.I.D. can participate in a limited number of concessionary financing arrangements for specific trade projects. Through ESF, U.S. economic assistance can

[9] Political risk insurance is currently more accessible to the U.S. industry than commercial risk insurance because of the greater risk involved in the latter, particularly when dealing with the public sector in a developing country. Political risks include war risks, cancellation of an existing export, or import license, expropriation, confiscation of or intervention in the buyer's business, or transfer risk (failure of the appropriate foreign government authorities to transfer the foreign deposit into dollars). Losses due to currency devaluation are not considered a political risk. Commercial risks cover nonpayment for reasons other than specified political risks. Examples are deterioration in the buyer's market, fluctuations in demand, unanticipated competition, shifts in tariffs, technological change, buyer insolvency, and natural disasters.

be extended to countries on the basis of special U.S. economic, political, or security needs and interests.

However, the restricted level of funding, the few countries participating in CIP, the significant earmarking of ESF funds for political and strategic reasons, and the difficulty of swiftly responding to bids by other countries have limited the effectiveness of the U.S. program in promoting the export of given technologies (e.g., geothermal). Under current conditions, A.I.D. is not expected to be a major source of capital for the power sector in the future. In the case of Costa Rica, no CIP has been established, and no ESF allocations are available for projects such as Miravalles.

A.I.D. does play a role, however, in promoting the transfer of power system technologies to developing countries by: (1) supporting reverse trade missions to acquaint international representatives with U.S. technology in the field, (2) developing regional topical workshops, and (3) sponsoring technology transfer teams to implement private sector projects in the developing countries. Those projects serve as prototypes for other private sector initiatives while, at the same time, starting the transfer of technology, application, and financial resources between U.S. private sector parties and those in developing countries.

> **Note:** A regional workshop sponsored by A.I.D. on electric power was recently carried out in San Jose, Costa Rica. One of the workshop's objectives was to promote the participation of the private sector in power generation. The workshop was attended by key officials from the utilities in the region, various energy ministers, and representatives of the local private sector, multilateral and bilateral agencies, and the U.S. private sector, including U.S. geothermal industry representatives.

4.4 U.S. Trade and Development Program (TDP)

TDP has two objectives: (1) to assist in the economic development of developing countries and (2) to assist the U.S. private sector in increasing exports of U.S. goods and services to these countries. TDP accomplishes these objectives by financing the services of the U.S. private sector in planning projects in developing countries that are important to the development of the recipient countries and represent significant

opportunities for U.S. exports. Its focus is to strengthen bilateral relationships between the U.S. and developing countries by providing needed technical, financial, and managerial expertise. TDP also enables U.S. firms to gain an advantage over aggressive foreign competitors by getting in on the ground floor of major projects that provide both short- and long-term markets for U.S. goods and services. Its effectiveness in promoting the U.S. industry in developing countries is limited in that foreign competitors often have readily available soft term financing.

TDP is considering cofinancing with the Inter-American Development Bank a feasibility study for the Rincon de la Vieja geothermal field in Costa Rica (Figure 4-3). However, because of the flooding of mixed credits in the region, particularly in geothermal projects, TDP is questioning its effectiveness in assuring the U.S. geothermal industry an equal level of competitiveness in the implementation stage of the project.

4.5 U.S. Department of Energy (DOE)

Through CORECT (which DOE chairs), DOE is working to increase U.S. renewable energy exports. The statutorily authorized Geothermal Loan Guaranty Program was one of DOE's principal means of accomplishing this goal. The main objective of this program was to encourage and assist the private/public sectors to accelerate development of geothermal resources through the federal assumption of a portion of the financial risk of developing geothermal projects. However, in March 1982, this program was administratively closed.

An effort to increase exports resulted from a meeting in early 1988 between Mr. Alan Woods (Administrator of A.I.D.) and Ms. Donna Fitzpatrick (Assistant Secretary, Conservation and Renewable Energy of DOE). As a result of this meeting, three tasks (by letter dated February 5, 1988) were identified to be pursued by DOE and A.I.D. in accelerating business opportunities for U.S. renewable energy firms. These were:

- Using expert teams to increase awareness of A.I.D. mission staff and developing country decision makers about cost-effective renewable energy applications
- Identifying and defining project success stories

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[illegible]

AIDAC, FOR PCS

E.O. [illegible]

SUBJECT: TDP - POTENTIAL GEO-THERMAL PROJECT IN THE RINCON DE LA VIEJA FIELD OF COSTA RICA

1. [illegible] CHIEF OF THE NON-CONVENTIONAL ENERGY SECTION OF THE INTER-AMERICAN DEVELOPMENT BANK (IDB) INFORMED TDP THAT THE IDB PLANS TO FINANCE A FEASIBILITY STUDY, DRILLING AND CONSULTING ENGINEERING SERVICES [illegible] INVESTMENT FOR A GEO-THERMAL PLANT IN THIS FIELD.

2. PRESENTLY A UNDP TECHNICAL COOPERATION TEAM, FINANCED BY ITALY, IS DOING A RECONNAISSANCE SURVEY OF GEO-THERMAL POTENTIAL, INCLUDING A SURVEY OF THE RINCON DE LA VIEJA FIELD. WHEN THIS IS COMPLETED, THE IDB HOPES TO FINANCE THE FEASIBILITY STAGE WHICH WILL INCLUDE DRILLING. ROUGHLY ESTIMATED TO COST 19 MILLION DOLS. PLUS ENGINEERING SERVICES TO SUPERVISE DRILLING AND COLLECT AND EVALUATE DRILLING DATA; THESE SERVICES ARE ESTIMATED TO COST ABOUT 600,000 DOLLARS. THE FINAL PROJECT WILL COST ABOUT 83 MILLION DOLS. INCLUDING ABOUT DOLS. 50-60 MILLION OF IMPORTED EQUIPMENT.

3. TDP INDICATED TO MR. CALDERON THAT IT WOULD BE INTERESTED IN FINANCING THE ENGINEERING SERVICES PORTION OF THE FEASIBILITY WORK ON A GRANT BASIS SUBJECT TO TDP CONFIRMING THAT THE U.S. WOULD BE A COMPETITIVE SOURCE OF EQUIPMENT FOR THE PROJECT. TDP WOULD APPRECIATE USAID/PCS CONTACTING MR. TEOFILIO DE LA TORRE, VICE MINISTER OF NATIONAL RESOURCES, ENERGY AND MINES AND THE PRESIDENT OF ICE TO INFORM THEM OF OUR INTEREST IN GRANT FINANCING THE ENGINEERING SERVICES PORTION OF THE FEASIBILITY WORK SUBJECT TO AVAILABILITY OF FUNDS. WE WOULD HOPE THAT THIS WOULD BE OF SPECIAL INTEREST TO THEM GIVEN THE TECHNOLOGY THAT HAS BEEN DEVELOPED IN THE WESTERN U.S., PARTICULARLY IN CALIFORNIA, IN BOTH DRILLING AND GEO-THERMAL TECHNOLOGY.

4. PLEASE INFORM THE APPROPRIATE OFFICIALS THAT TDP'S FINANCING WOULD HAVE THE FOLLOWING CHARACTERISTICS:

(A) 100 PERCENT GRANT FINANCING
(B) UP TO 20 PERCENT OF THE GRANT COULD BE USED FOR LOCAL
--- CONSULTING SERVICES
(C) THE STUDY WOULD BE PERFORMED BY A U.S. FIRM TO BE
--- SELECTED BY THE ICE OR THE MINISTRY AS APPROPRIATE.
--- THE ICE OR MINISTRY (GRANTEE) WOULD SELECT THE U.S.
--- FIRM USING COMPETITIVE [illegible]
--- [illegible]
--- GRANTEE, [illegible]
[illegible]
--- FINANCE THE DRILLING

5. [illegible]

PLEASE ADVISE TDP OF YOUR REACTION [illegible]

2. Presently a UNDP technical cooperation team, financed by Italy, is doing a reconnaissance survey of geothermal potential, including a survey of the RINCON de la viaja field. When this completed, the IDB hopes to finance the feasibility stage which will include drilling. Roughly estimated to cost 19 million dollars. Plus engineering services to supervise drilling and collect and evaluate drilling data; these services are estimated to cost about 600,000 dollars. The final project will cost about 83 million dollars. Including about dollars 50-60 million of imported equipment.

3. TDP indicated to Mr. Calderon that it would be interested in financing the engineering services portion of the feasibility work on a grant basis subject to TDP confirming that the U.S. would be a competitive source of equipment for the project. TDP would appreciate U.S. AID/PCS contacting Mr. Teofilio de la Torre, Vice Minister of National REsources, Energy and Mines and the President of ICE to inform them of our interests in grant financing the engineering services portion of the feasibility work subject to availability of funds. We would hope that this would be a special interest to them given the technology that has been developed in the western U.S., particularly in California, in both drilling and geothermal technology.

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Figure 4-3. Copy of Telegram: TDP's Cofinancing with Inter-American Bank

- Informing industry of business opportunities early in the project development phase.

However, neither the Loan Guaranty Program (because of its current suspension) nor the DOE/A.I.D. renewable energy "letter of understanding" provides meaningful mechanisms (e.g., mixed credits) and/or risk insurance, the absence of which has been identified as the key impediment to the U.S. geothermal industry's ability to compete financially in Miravalles or other developing countries.

4.6 U.S. Department of Commerce (DOC)

As it relates to the geothermal industry, DOC's role is to promote industry participation in projects in developing countries by keeping the industry informed of the opportunities available in the countries. However, DOC has kept a rather low profile. The Commercial Section of the U.S. Embassy gets involved in the process only when it receives a formal request in writing from the appropriate local entity (e.g., ICE). Once this request is received, the section will translate it into English and send it to Washington for forwarding to the industry involved.

This is quite different from some other governments. For example, the Italian and Japanese embassies maintain a continuous dialogue with the appropriate local entities, offer free technical assistance, and are very well informed on the opportunities available before a request is formalized. ICE indicated that, because of the strong involvement of the Italian and Japanese embassies, the industries of Italy and Japan are also more aware of the Costa Rican legislative, contractual, and political environment. Quite often, the disqualification of potential U.S. suppliers is due to the lack of understanding about overall contracting in Costa Rica.

4.7 Office of the U.S. Trade Representative

The Office of the U.S. Trade Representative deals with all trade and commodity issues and bilateral/multilateral agreements. The office agrees with the fact that mixed credits have become a key tool in international trade for governments to support their industries; it is well aware of the competitive/soft financing problems and are working with key White House staff and key decision makers within the Organization for

Economic Cooperation and Development (OECD), and the Department of the Treasury on some eventual resolution. However, a political decision by the U.S. government is needed if it is to offer similar funding mechanisms.

In the case of the Miravalles project, the timing is difficult because of the change in the political administration. The new administration may be more receptive to offering attractive, government-supported financial packages that will enable the U.S. geothermal industry to compete on equal terms with the European and Japanese counterparts.

CHAPTER 5. INTERNATIONAL COMPETITION

Although there are numerous U.S. government agencies that promote exports, the U.S. geothermal industry is still faced with a tremendous barrier in breaking into the international market because of the lack of mixed credits available to the industry. Mixed credit support is essential for an industry to be competitive, and the U.S. geothermal industry is at a distinct disadvantage. Mixed credits have become the key tool in the international financing battle among industrialized economies and developing countries in order to win construction and consulting contracts.

U.S. companies are extremely pessimistic about their ability to successfully compete in the Miravalles project as well as others in the Latin American region. As a result, U.S. industry involvement in the implementation stage of Miravalles has been weak, ineffective, and practically nonexistent with the exception of some targeted industry involvement relative to providing small wellhead units (5 MW each).

The limited U.S. government backed loans and guarantees available to the industry are targeted mainly toward private sector projects, unlike the extensive government support provided by other industrialized economies (e.g., Japan, Italy, and France) which address both the private and public sectors. The fact that the Miravalles project is in the public sector creates a tremendous obstacle to the U.S. industry.

With regard to technical expertise, the U.S. is a leader in the field and is the largest geothermal producer in the world. However, relative to equipment and because of the aggressive and effective competition provided by the Japanese, the U.S. is losing its potential to successfully penetrate the large power plant (i.e., 50-MW plus) market both in the U.S. and overseas. For example, in the Geysers geothermal field in California, some U.S. equipment was displaced by the equipment of foreign manufacturers due to cost competitiveness. It is only with the smaller units that the U.S. still has a competitive position.[10] If the U.S. government does not provide a more aggressive role

[10] This may, in part, be due to the larger profit margins associated with large equipment (50 MW plus); therefore, there is a lack of interest shown by the Japanese to compete in the marketing of smaller units.

to support the U.S. geothermal industry in developing countries, U.S. technical expertise could quickly disappear. Figure 5-1 shows the decline of aggregate high tech manufacturers and services for the period 1981 to 1986 which clearly emphasizes this concept of competitive positioning across all industries.

Although the U.S. can compete technically on geothermal projects, they cannot compete relative to financing and risk insurance availability. This lack of financial competitiveness has been analyzed and directly relates to three distinct, yet interrelated areas:

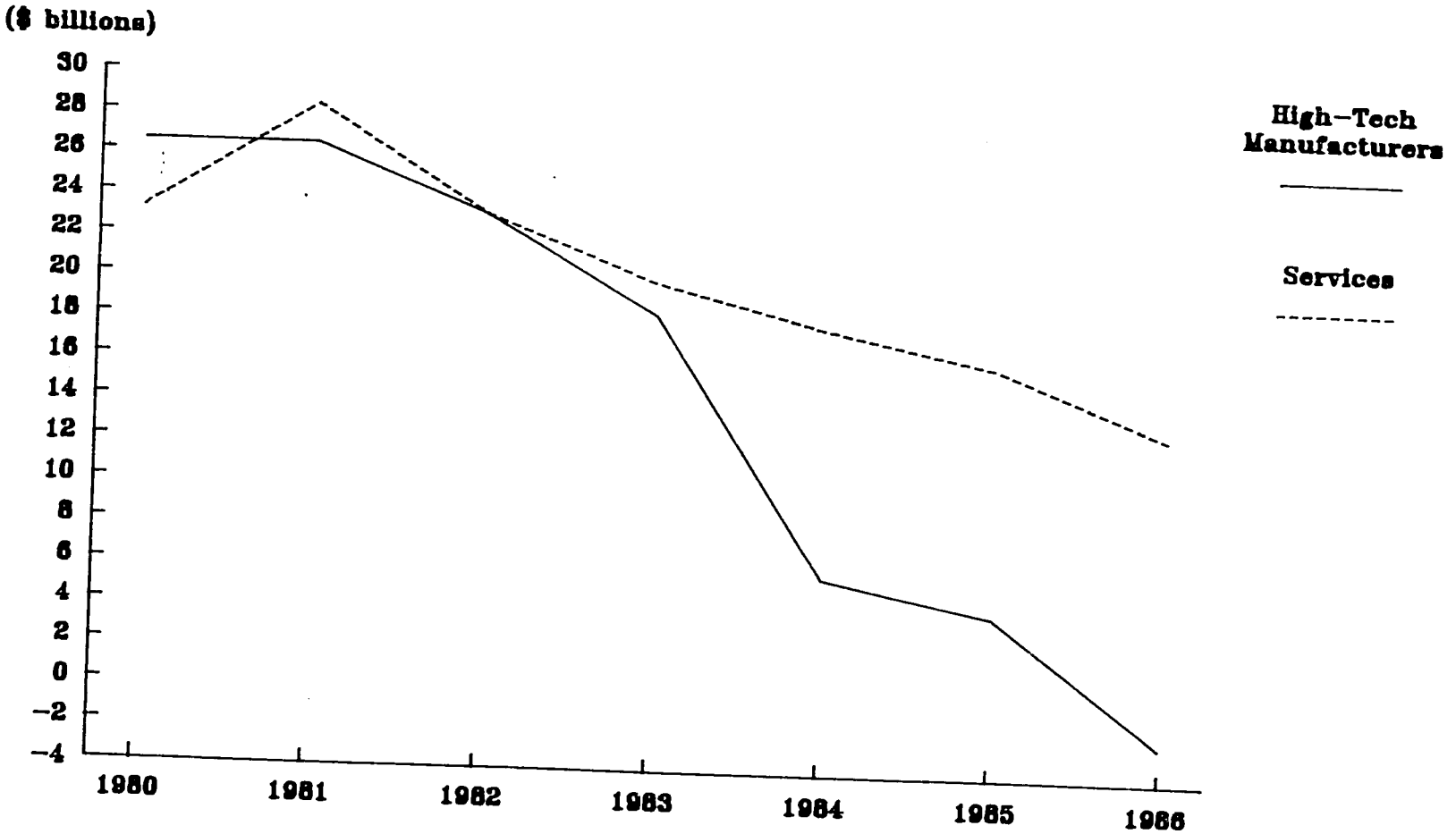
- Mixed credits and bilateral aid
- The U.S. commercial banks - a perspective
- The U.S. geothermal industry - a perspective.

5.1 Mixed Credits and Bilateral Aid

There are many arguments against mixed credits because of potential distortions in their markets, distortions which could be leading away from rational economic decisions by combining commercial loans with grants. At the urging of several of its members and led by the U.S., OECD began monitoring the flow of mixed credits in 1979. OECD is the organization of industrialized nations designed to promote economic growth and stability in member countries and contribute to the development of the world economy. In 1983, OECD's Development Aid Committee (DAC) adopted mixed credit guidelines with several objectives:

- To ensure that the soft financing is used only for priority projects in developing countries
- To avoid industrialized countries' depleting their foreign aid budgets in order to promote exports
- To maintain fair trade competition.

Under the OECD rules, the minimum combined grant or aid element of a mixed credit package was established at 25 percent. This was increased under U.S. government pressure to 35 percent (July 1988) for most developing countries. The U.S. is hoping



Source: U.S. Department of Commerce Data and ODC Agenda 1988.

Figure 5-1. U.S. Trade Balances for High Tech Manufacturers and Services

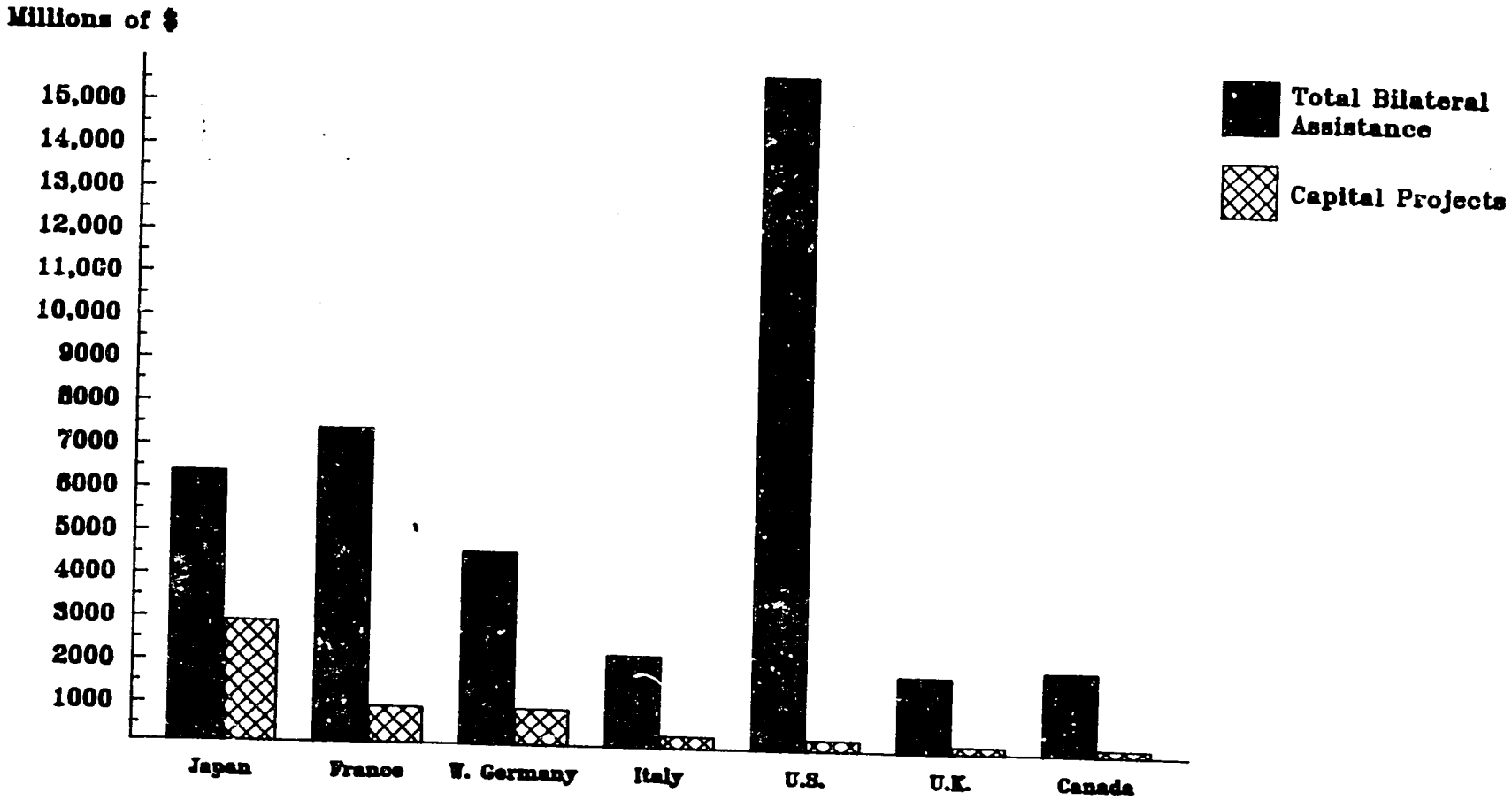
that the development side of the loan is the primary motivation for the aid, not solely the promotion of the industry. With a larger grant element (at least 35 percent) in the mixed credit, the trade promotion activities would be more expensive and more difficult to justify on behalf of the country providing it, e.g., subsidizing their particular industry.

Mixed credit financed projects by bilateral donors reported to DAC amounted to almost $7 billion over the 2-year period of 1985 to 1986. The largest share was from Japan at $2,934 million, followed by France at $970 million, West Germany at $963 million, Italy at $395 million, the U.S. at $373 million, U.K. at $291 million, and Canada at $287 million. As a percent of the total bilateral economic assistance, the concentration in capital projects is: Japan 45.8 percent, Denmark 33.0 percent, Norway 22.5 percent, West Germany 20.8 percent, Italy 17.0 percent, U.K. 15.4 percent, Canada 14 percent, Sweden 13.3 percent, France 13 percent, and the U.S. 2.3 percent.

While Japan provided less than half of the amount of U.S. total bilateral assistance, it provided over 10 times the U.S. budget allocated for mixed credit financing of capital projects for 1985 and 1986. Capital projects refer to relatively large projects with a high proportion of imported capital goods and which generally incorporate a high level of technology (e.g., hydroelectric dams, bridges, and the Miravalles geothermal project). The most prominent sectors involved are energy, telecommunications, and transportation for they play a major role in recipient country development strategies. Capital projects have a strong commercial orientation, unlike aid in such sectors as health, education, and small-scale farming. Figure 5-2 compares the U.S. bilateral assistance with other industrialized economies.

Financing is also available through IDB, the World Bank, and the regional development banks to finance public sector capital projects, based on international competitive bidding and at commercial rates. However, these loans cannot be expected to offset the effect of mixed credits provided by other countries through bilateral aid in pursuit of expanding an industry or dominating key industrial sectors (e.g., geothermal).

The government of France has consistently fought U.S. proposals in which the OECD raised the minimum aid component of mixed credits as high as 50 percent. The French indicate that such an increase would serve only to reduce the total amount of



Source: OECD Data

Figure 5-2: Total Bilateral Assistance and Mixed Credit Fananced Capital Projects (Transport, Energy, and Telecommunications), 1985-1986

development aid. Nevertheless, France accounted for 46 percent of the total mixed credits extended by OECD members during 1981 to 1983.

Furthermore, OECD members have developed means to disguise mixed credits. Canada, for example, has shifted the emphasis of its concessionary financing away from mixed credits toward parallel financing through its aid agency. While mixed credit blends aid with commercial funds in one loan, parallel financing provides aid and loans under two separate contracts for the same project. Canada is not required to warn OECD members of its intention to use parallel financing.

According to Japan's OECF, the financing terms do not break the OECD mixed credit rules. The loan is government-to-government foreign aid (not an export subsidy) and, therefore, does not qualify as a mixed credit as the Japanese contend.

The U.K. reversed its official position on mixed credits in 1984. This was a departure from the usual British formula under which loans and grants are issued separately. The new U.K. position was the result of the impact of British exporter's mounting losses to foreign firms which provided more attractive financing.

Sweden and Denmark came up with their own mixed credit formulas by streamlining existing procedures to speed up soft loan approval.

For the U.S., mixed credits are available on a very limited basis. Bilateral aid is provided through A.I.D.; however, A.I.D. does not have the necessary political support and infrastructure to effectively support the U.S. industry when competing with the soft financing provided by the international market. For example, in Japan and in Canada, there is a closer link between foreign aid and support to their industries. In the case of Japan, the Japan Eximbank and OECF are in effect competitors since, unlike A.I.D., OECF is targeted toward supporting the exporter. In the case of Canada, the Canadian International Development Agency (CIDA) helps Canadian companies to compete in foreign markets by combining aid with its Export Development Corporation to finance trade activities. CIDA also provides funds for companies to prepare project bids for the World Bank or regional development bank contracts.

For the U.S., the scenario is quite different as can be observed from a Bechtel project in Egypt. Bechtel was chosen in the bid as the lowest in price and first in technical

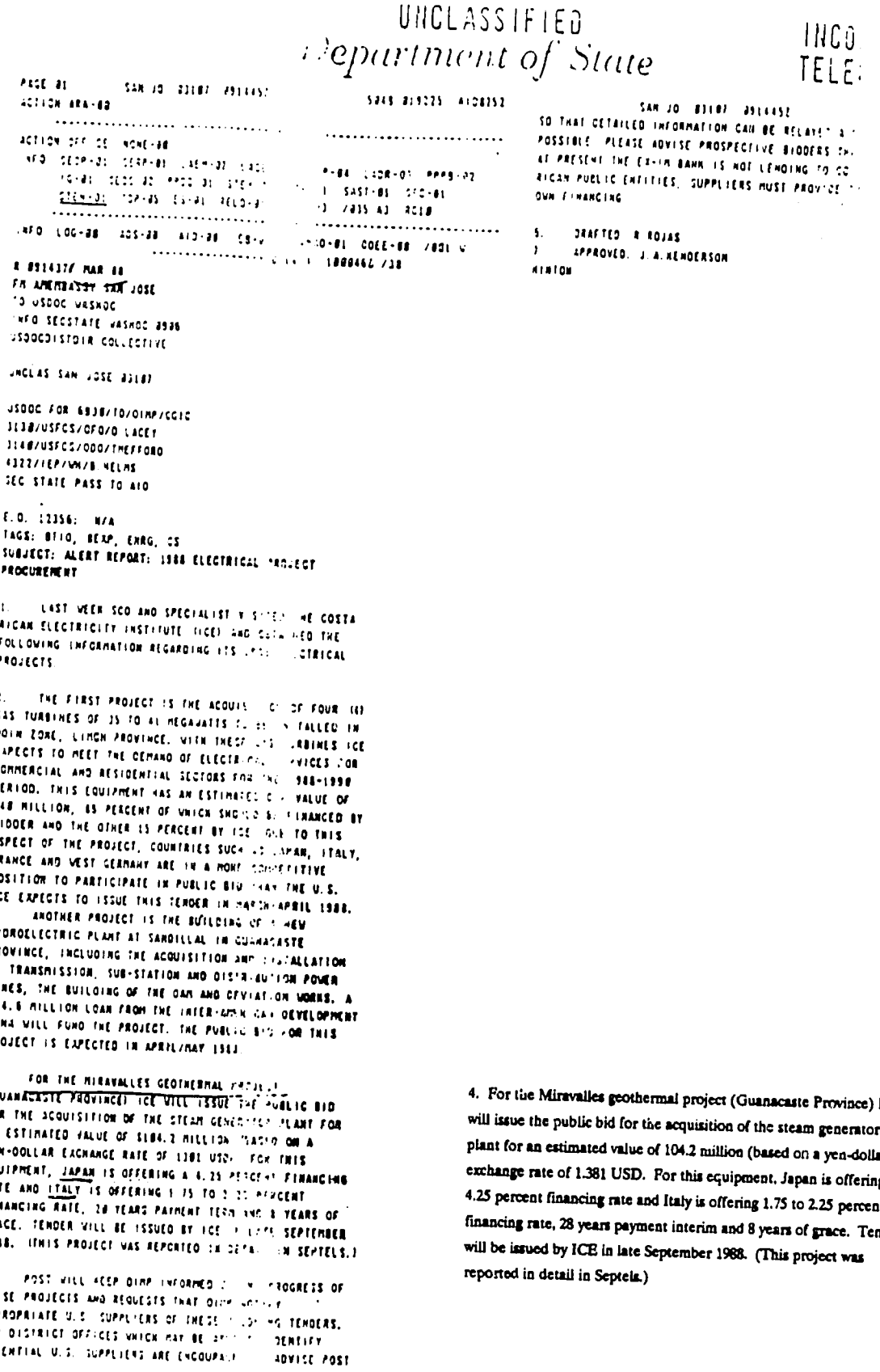
qualifications on a training contract with the Egyptian Pipeline Company. However, an Italian company won the contract because they provided a grant tied to the award.

In regards to the Miravalles project (while the Eximbank is closed to the public sector in Costa Rica), the OECF of Japan has pledged and signed a loan to Costa Rica at a yearly interest rate of 4.75 percent with a grace period of 7 years and an amortization period of 25 years. Ironically, the Italians are now offering a 1.75 to 2.25 percent financing rate, a grace period of 8 years, and an amortization period of 20 years (Figure 5-3).

Unlike the 55-MW units, the U.S. does have wellhead (5 MW) equipment available. A U.S. supplier has been able to surmount the financing impediments by identifying U.S. and Costa Rican sources willing to back the export effort. These units are particularly competitive for they are new marine turbines which can be supplied at relatively low cost. Unfortunately, this supplier has been unable to obtain the commercial risk insurance that it needs and, as a result, may lose its chance to gain a foothold in the growing geothermal market both in Costa Rica and Latin America at large.

In-depth discussions held in Costa Rica with ICE staff, with officials from the Ministry of Natural Resources, Energy, and Mines (MRNEM), and with the IDB indicated that Costa Rica often favors U.S. suppliers because of their geographical proximity to the U.S., reliability of spare parts, and political and strategic linkages. However, because of the attractive financing provided by non-U.S. suppliers, they did not see how the U.S. geothermal industry could compete on equipment sales. The Costa Ricans are concerned about getting the best product but at the lowest cost. The end result is that the U.S. geothermal industry in equipment sales is being forced out of the market by fiercely subsidized foreign competition.

Additional opportunities continue to be developed in other countries in the Central American region, but the U.S. industry again is being left out of the competition. For example, in El Salvador, the French are offering a loan for the construction of a geothermal plant at a yearly interest rate of 1.25 percent with a grace period of 4 years and an amortization period of 30 years (Figure 5-4).



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R 091437Z MAR 88
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USDOC FOR 6830/TO/OIMP/CGIC
3038/USFCS/OFO/O LACEY
3140/USFCS/OOO/THEFFORD
4322/IEP/WH/B HELMS
SEC STATE PASS TO AID

E.O. 12356: N/A
TAGS: BFIO, BEXP, ENRG, CS
SUBJECT: ALERT REPORT: 1988 ELECTRICAL PROJECT PROCUREMENT

1. LAST WEEK SCO AND SPECIALIST V [illegible] OF THE COSTA RICAN ELECTRICITY INSTITUTE (ICE) AND [illegible] THE FOLLOWING INFORMATION REGARDING ITS [illegible] ELECTRICAL PROJECTS.

2. THE FIRST PROJECT IS THE ACQUIS[illegible] OF FOUR (4) GAS TURBINES OF 35 TO 41 MEGAWATTS [illegible] TALLED IN MOIN ZONE, LIMON PROVINCE. WITH THESE [illegible] RBINES ICE EXPECTS TO MEET THE DEMAND OF ELECTR[illegible] RVICES FOR COMMERCIAL AND RESIDENTIAL SECTORS FOR THE 1988-1990 PERIOD. THIS EQUIPMENT HAS AN ESTIMATED C[illegible] VALUE OF $48 MILLION, 85 PERCENT OF WHICH SHOULD BE FINANCED BY BIDDER AND THE OTHER 15 PERCENT BY ICE OWN FUNDS. DUE TO THIS ASPECT OF THE PROJECT, COUNTRIES SUCH AS JAPAN, ITALY, FRANCE AND WEST GERMANY ARE IN A MORE COMPETITIVE POSITION TO PARTICIPATE IN PUBLIC BID THAN THE U.S. ICE EXPECTS TO ISSUE THIS TENDER IN MARCH-APRIL 1988.

3. ANOTHER PROJECT IS THE BUILDING OF A NEW HYDROELECTRIC PLANT AT SANDILLAL IN GUANACASTE PROVINCE, INCLUDING THE ACQUISITION AND INSTALLATION OF TRANSMISSION, SUB-STATION AND DISTRIBUTION POWER LINES, THE BUILDING OF THE DAM AND DEVIATION WORKS. A $94.6 MILLION LOAN FROM THE INTER-AMERICAN DEVELOPMENT BANK WILL FUND THE PROJECT. THE PUBLIC BID FOR THIS PROJECT IS EXPECTED IN APRIL/MAY 1988.

4. FOR THE MIRAVALLES GEOTHERMAL PROJECT (GUANACASTE PROVINCE) ICE WILL ISSUE THE PUBLIC BID FOR THE ACQUISITION OF THE STEAM GENERATOR PLANT FOR AN ESTIMATED VALUE OF $104.2 MILLION (BASED ON A YEN-DOLLAR EXCHANGE RATE OF 1381 USD). FOR THIS EQUIPMENT, JAPAN IS OFFERING A 4.25 PERCENT FINANCING RATE AND ITALY IS OFFERING 1.75 TO 2.25 PERCENT FINANCING RATE, 28 YEARS PAYMENT TERM AND 8 YEARS OF GRACE. TENDER WILL BE ISSUED BY ICE [illegible] SEPTEMBER 1988. (THIS PROJECT WAS REPORTED IN DETAIL IN SEPTELS.)

5. POST WILL KEEP OIMP INFORMED [illegible] PROGRESS OF THESE PROJECTS AND REQUESTS THAT OIMP NOTIFY [illegible] APPROPRIATE U.S. SUPPLIERS OF THESE [illegible] TENDERS. ANY DISTRICT OFFICES WHICH MAY BE [illegible] IDENTIFY POTENTIAL U.S. SUPPLIERS ARE ENCOURA[illegible] ADVISE POST SO THAT DETAILED INFORMATION CAN BE RELAYED [illegible] POSSIBLE. PLEASE ADVISE PROSPECTIVE BIDDERS TH[illegible] AT PRESENT THE EX-IM BANK IS NOT LENDING TO CO[illegible] RICAN PUBLIC ENTITIES. SUPPLIERS MUST PROVIDE [illegible] OWN FINANCING.

5. DRAFTED R ROJAS
APPROVED: J.A.HENDERSON
HINTON

4. For the Miravalles geothermal project (Guanacaste Province) ICE will issue the public bid for the acquisition of the steam generator plant for an estimated value of 104.2 million (based on a yen-dollar exchange rate of 1.381 USD. For this equipment, Japan is offering a 4.25 percent financing rate and Italy is offering 1.75 to 2.25 percent financing rate, 28 years payment interim and 8 years of grace. Tender will be issued by ICE in late September 1988. (This project was reported in detail in Septels.)

Figure 5-3. Copy of Telegram: Announcement of Financing Rates by Japan and Italy

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Department of State

INCOMING TELEGRAM

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- I IN BERLIN, 1 IN COA-
- TEPEQUE (20 MW EACH)
-
- 1998 2 EL TIGRE SAN HYDRO 261.6 270 1188.9
- UNITS (135 MW EACH)

- TOTALS 795.7 547.5

DISTRIBUTION AND TRANSMISSION

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5. CEL OFFICIALS CURRENTLY ESTIMATE THAT 184.3 MILLION DOLLARS WILL BE INVESTED IN THE DISTRIBUTION SYSTEM THROUGH YEAR 2000, OR APPROXIMATELY 8.5 MILLION DOLLARS PER YEAR. 40 PERCENT OF THIS TOTAL WOULD REPRESENT SALVADORAN PARTICIPATION.

6. EXPANSION PLANS CALL FOR THE ESTABLISHMENT OF 115 KV LINES FOR THE INTERNAL DISTRIBUTION NETWORK AND 230 KV LINES FOR THE CONNECTIONS WITH OTHER CENTRAL AMERICAN COUNTRIES.~~--~~ ~~SHORT~~-TERM GOALS EMPHASIZE THE IMPORTANCE OF ALTERNATIVE ROUTING TO AVOID OVERLOAD DUE TO SABOTAGE, WHILE LONG-TERM PLANS CONCENTRATE ON INTERNATIONAL CONNECTIONS. PLANS CALL FOR THE CONSTRUCTION OF 10,000 KMS. FOR THE DISTRIBUTION NETWORK, 1500 KM. OF LINES FOR SUBTRANSMISSION, 18 DISTRIBUTION SUBSTATIONS, AND RELATED INFRASTRUCTURE.

7. THE FOLLOWING CHART OUTLINES A TIME LINE FOR MAJOR EXPENDITURES CURRENTLY PLANNED FOR TRANSMISSION EXPANSION THROUGH 1998. TOTAL EXPENDITURES THROUGH 1997 EQUAL 73.86 MILLION DOLLARS OF WHICH 56.17 MILLION WOULD BE FOREIGN FUNDS AND 16.69 MILLION LOCAL.

- TRANSMISSION EXPANSION, 1988-1998:
- PROJECTS AND AMOUNTS

YEAR	TOTAL INVESTMENT COLS (000)	OF WHICH FOREIGN COLS (000)	PROJECT DESCRIPTION
1988	3,853.8	2,761.8	- CERRON GRANDE-SAN MARTIN LINE (115 KV, 40 KM) - MODIFY SUBSTATION SAN RAFAEL CEDROS
1989	13,288.6	10,812.7	- HEJAPA-SAN MARTIN LINE (115 KV, 17 KM) - 15 DE SEPTIEMBRE-SAN MIGUEL LINE (115 KV, 50 KM)
1990	21,544.3	17,924.9	- SAN MARTIN-SAN BARTOLO LINE (115 KV, 9 KM) - SAN BARTOLO SUBSTATION (115/23 KV, 18 MVA) - SOYAPANGO CAPACITOR BANK (23 KV : 20 MVAR) - SAN ANTONIO ABAD CAPACITOR BANK (23 KV : 20 MVAR)
1991	837.5	554.2	- HONDURAS-EL SALVADOR INTERCONNECTION (230 KV) - SUBSTATION FOR

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- INTERCONNECTION
- (230/115/46 KV)
- 2ND. CIRCUIT 15 DE SEPTIEMBRE-SAN MARTIN
- (115 KV, 60 KM)
- CHIPILAPA SUBSTATION
- (46/4.16 KV)
- CONNECT REFINERY (SUGAR) EL ANGEL
- (23 KV)
- CONNECT REFINERY (SUGAR) ZIRIGUA
- (46 KV)

1992	2,618.2	1,576.8	NO NEW PROJECTS
1993	1,396.4	728.3	- BERLIN SUBSTATION (60) - LINE (115 KV, 5 KM)
1995	3,028.3	1,651.1	- SAN MARCOS SUBSTATION (115/23 KV)
1996	13,488.2	10,614.2	- SAN VICENTE SUBSTATION (115 KV)
1997	11,886.9	8,548.8	- COATEPEQUE-SANTA ANA LINE (115 KV, 15 KM) - CERRON GRANDE-HEJAPA LINE (115 KV, 40 KM) - COATEPEQUE SUBSTATION (115 KV)
1998	NO NEW EXPENDITURES		- EL TIGRE-15 DE SEPTIEMBRE LINE (115 KV, 30 KM) - EL TIGRE-SAN BARTOLO- LINE (115 KV, 75 KM) - EL TIGRE-HEJAPA LINE (115 KV, 65 KM) - EL TIGRE SUBSTATION (115 KV)
TOTALS	73,867.2	56,175.8	

U. S. EXPORT PROSPECTS

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8. BEST PROSPECTS FOR U.S. PARTICIPATION IN DISTRIBUTION PROJECTS IN THE SHORT-TERM INCLUDE BIDS FOR THE 40 KM, 1X477 MCM, 115KV CERRON GRANDE TO SAN MARTIN LINE (1988), THE 50 KM, 1X4/0 ACC/PASE 15 DE SEPTIEMBRE-SAN MIGUEL LINE, AND A PLANNED 100 KM INTERCONNECTION WITH HONDURAS ALONG EL SALVADOR'S EASTERN BORDER IN 1991. BIDDING FOR THIS PROJECT SHOULD BEGIN IN AUGUST OF 1988, WITH A TOTAL ESTIMATED VALUE OF 27 MILLION DOLLARS.

9. PROSPECTS FOR U.S. PARTICIPATION IN THE CHINAMECA GEOTHERMAL PLANT (REF. USDOC 1672) APPEAR NEGLIGIBLE

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Figure 5-4. Copy of Telegram: Announcement of Financing by France (Sheet 1 of 2)

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Department of State

INCOMING
TELEGRAM

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UNLESS AN ATTRACTIVE FINANCING PACKAGE CAN BE ARRANGED. THE GOES CONTINUES TO RELY HEAVILY ON SOFT FINANCING TERMS IN MAKING DECISIONS FOR EXPANSION. FOR EXAMPLE, THE GOES HAS AGREED WITH THE FRENCH GOVERNMENT ON THE FOLLOWING TERMS FOR THE CONSTRUCTION OF THE CHIPILAPA GEOTHERMAL PLANT: 50 PERCENT GOVERNMENT TO GOVERNMENT LOAN FOR A 30 YEAR TERM AT 1.25 PERCENT INTEREST WITH A FOUR YEAR GRACE PERIOD, AND 50 PERCENT VIA A COMMERCIAL LOAN FOR 8 YEARS AT 6.5 PERCENT INTEREST. FRENCH EQUIPMENT AND FRENCH CONSULTING SERVICES WILL OBVIOUSLY BE USED FOR THIS PROJECT

10. THE EXPANSION OF THE 5TH. OF NOVIEMBRE POWER STATION, POSSIBLY TO BE FINANCED BY THE INTERAMERICAN DEVELOPMENT BANK (IDB), IS TENTATIVELY PLANNED FOR 1996. CEL OFFICIALS ARE CURRENTLY DISCUSSING TECHNICAL ASSISTANCE PROJECTS RELATED TO THIS EXPANSION WITH THE IDB. IN GENERAL, CEL OFFICIALS POINTED OUT THE DIFFICULTY FOR U.S. EXPORTERS DUE TO THE RELATIVELY HIGH FINANCING COSTS OFFERED BY U.S. PROGRAMS.

11. FURTHER INFORMATION CAN BE OBTAINED BY CONTACTING ING. LUIS ERNESTO ANGULO, MANAGER OF INVESTMENT ADMINISTRATION, AVE. MELVIN JONES SUR, NUEVA SAN SALVADOR, SANTA TECLA, TELEPHONE (503) 28-2888, TELEX 20303 CEL SAL; OR JOAQUIN EDUARDO ROCAS, MANAGER OF STRATEGIC PLANNING, AT KM. 11 1/2 CARR. PTO. DE LA LIBERTAD, CTGO. COL. UTILA, TELEPHONE (503) 28-1582, FAX (503) 23-1911.

12. IN SUM, THE GOODS AND SERVICES EXPORT POTENTIAL FOR U.S. FIRMS IN ELECTRICAL SECTOR PROJECTS HERE IS CONSIDERABLE. WE WOULD URGE INTERESTED FIRMS, ESPECIALLY THOSE WILLING TO ENGINEER AN ATTRACTIVE FINANCING PACKAGE, TO MAKE INITIAL CONTACT WITH CEL OFFICIALS. THE UTILITY APPEARS OPEN TO THE PURCHASE OF U.S. GOODS AND CONSTRUCTION SERVICES FOR THESE PLANNED PROJECTS. WE WOULD ALSO EMPHASIZE THAT AN OFFER OF FINANCING COULD SWAY CEL TO ALTER EXPANSION PLANS, E.G., WHILE CHINAMECA AND THE 5TH OF NOVIEMBRE EXPANSION DO NOT APPEAR ON THE UTILITY'S OPTIMUM CONSTRUCTION LIST, THE PROJECTS MAY BE UNDERTAKEN IF FUNDING IS AVAILABLE.
DLOUNY

NOTE BY OC/T: (80) OMISSION. CORRECTION TO FOLLOW.

9. Prospects for U.S. participation in the CHINAMECA Geothermal Plant (REF. USDOC 1672) appear negligible Page 83 of 83 San sa 96989 80 of 84 2421172 5454 unless an attractive financing package can be arranged. The GOES continues to rely heavily on soft financing terms in making decisions for expansion. For example, the GOES has agreed with the French government on the following terms for the construction of the Chipilapa geothermal plant: 50 percent government to government loan for a 30 year term at 1.25 percent interest with a four year grace period, and 50 percent via a commercial loan for 8 years at 6.5 percent interest. French equipment and French consulting services will obviously be used for this project.

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Figure 5-4. Copy of Telegram: Announcement of Financing by France (Sheet 2 of 2)

The Eximbank Chairman and President, John A. Bohn, Jr., said before a House Banking subcommittee taking testimony on the bilateral aid and trade issue in May 1988 that the U.S. industry is being severely damaged by the continuing heavy use of mixed credits by other industrial countries, especially by Japan and France. Bohn expressed doubts on the effectiveness of the Warchest; he further stated, that the use of the Warchest would not bring results significant enough to justify the cost of continuing the program. According to Bohn, the real problem is that the remaining funding in the Warchest is a drop in the bucket compared to the dimensions of the problem.

5.2 U.S. Commercial Banks - A Perspective

The private, commercial, short- and medium-term credits offered by industrialized countries to facilitate transactions with developing nations dropped from $29.4 billion in 1981 to $14.6 billion in 1986. Net disbursements of such credits went from $10.5 billion in 1981 to negative $0.8 billion in 1986. As a result, in 1986 industrial-country commercial banks received more in repayment of past credits than they lent in 1986. This data was provided in the hearing before the subcommittee on International Finance, Trade, and Monetary Policy in May 1988 to illustrate that private export credits were not available to facilitate expansion of imports on a significant scale by the developing countries in the late 1980s.

Relative to U.S. export financing, in-depth discussions were held with the commercial banking community to determine their position with respect to financing geothermal projects in Latin America: Bank of Credit & Commerce International, S.A., National State Bank, Security Pacific National Bank, Security Pacific Corporation, Imperial Bank, Lloyds International, Chase Manhattan Bank, CitiBank, and Bankers Trust. The representatives from these banks were chosen for their experience in international financing in Latin America. CitiBank, Security Pacific Corporation, Bankers Trust, Chase Manhattan, and Lloyds are all members of a steering committee for Latin America, whereas, Bank of Credit & Commerce, Imperial, and Security Pacific were selected because of their involvement in export activities in conjunction with the California Energy Commission.

None of the commercial banks were aware of any specific geothermal export projects that their institutions had ever been involved in; however, a few were aware that their bank had provided energy sector loans in the past. When considering export project loans in the Latin American region, every bank representative stated that government guarantees are a prerequisite.

The major considerations expressed by the commercial banks for loan considerations were:

- Foreign and U.S. government guarantees -- an absolute necessity, especially if the loan is going towards a project in a debt ridden country
- Country indebtness and ability to pay debt service
- Short-term duration of loan (1 to 1 1/2 years on return on investment)
- Borrower's portfolio.

The key issue for these lenders, which covers all the concerns of the commercial banks, is the security of the cashflow from project revenues needed to repay the principal and interest on the loan. This is the major impediment for the U.S. geothermal industry in Miravalles because the project is in the public sector and in a country which is highly indebted; additionally, there are many other geothermal projects found in highly indebted countries.

The commercial banks indicated that foreign government guarantees are required for they represent a full faith credit guarantee by the central government to fulfill the obligations of the loan if, for financial and nonfinancial reasons, the borrower cannot make the required debt payment. Multilateral development banks have the same requirements for public sector projects. However, the governments of developing countries have been reluctant to provide commercial banks with the sovereign guarantees since these would appear as obligations on the financial statements of the countries which, in turn, reduces their ability to borrow for other purposes.

Most commercial banks require U.S. government backed guarantees. In order to reduce the banks' exposure (e.g., associated risk), the commercial banks are particularly interested in mixed credits. However, as indicated previously, the U.S. government does not endorse a mixed credit policy. Some of the commercial banks indicated that

the projects would become more attractive if the multilateral banks, A.I.D., or other U.S. government agencies would provide a type of insurance against defaulted loans. The World Bank recently developed a political risk insurance program, but this program is oriented only to private sector projects in developing countries.

Relative to the financial conditions required for an export project loan such as Miravalles, the commercial banks emphasized that a thorough analysis would have to be done before any loan would be granted; depending on the situation, certain terms would be made. Most importantly, however, any loan would have to be short-term in duration so that the bank could make a return on investment within a reasonable timeframe (1 to 1 1/2 years).

The commercial banks stressed that Eximbank needs to be more aggressive since Eximbank is not competitive with Japan and the other countries. They also indicated their preference for debt to equity swaps in Latin America and not direct lending.[11] However, since the Miravalles project is in the public sector, the option for debt for equity swaps is not available. A detailed description of the discussions held with the selected representatives of the commercial banks are included in Appendix A.

5.3 U.S. Geothermal Industry - A Perspective

The U.S. industry has repeatedly indicated that the U.S. government does not provide equal financial support as do the Japanese, Italians, and the French. The U.S. geothermal industry stressed that appropriate mechanisms are necessary to equalize the international competition. Many geothermal industry representatives felt that feasibility studies (e.g., those carried out by TDP) without a firm commitment from the recipient country and attractive financing were ineffective. It is clearly understood that the U.S. industry is far less aggressive than its international competitors.

To provide a perspective on the opportunities for, and impediments to, geothermal technology export to the Latin American region, nine major companies were contacted: Geysers Geothermal, Oxbow Geothermal, Stone & Webster, UNOCAL, Chevron

[11] A debt to equity swap occurs when a the commercial bank converts its debt at a specified discounted dollar denominated value into local currency which, in turn, is to be used for investment in the country.

Geothermal, Elliott Turbines, GeoProducts Corporation, DeLaval Turbines, and Geothermal Power Company, Inc. The Geothermal Resources Council and National Geothermal Association were integral industry participants as well.

The topics covered in the discussions can be broken into the following categories: export experience, availability of information, competitiveness, and the perceived role of government.

5.3.1 Export Experience

All of the companies are either evaluating projects in developing countries or have done so in the past. However, many of them (e.g., Geysers Geothermal, UNOCAL, Oxbow, GeoProducts, and Chevron) are looking for investments that would allow them to operate plants (these firms generally do their own financing and insure themselves) and make a profit from the sale of their product, be it steam or electricity. Many companies interested in project investments felt the Miravalles project was not a worthwhile investment because of the small opportunity for the U.S. to succeed against the government-supported international competition. However, if the U.S. government would provide financial backing, the U.S. industry would have a superior incentive to participate in public sector projects in developing countries.

5.3.2 Availability of Information

The information available to industry regarding geothermal exports is largely dependent on company contacts. Smaller companies are, therefore, at a disadvantage because they do not necessarily have affiliate companies overseas. Other sources of information include the Geothermal Resources Council, the National Geothermal Association, U.S. embassies, and the DOC.

5.3.3 Competitiveness

As a whole, the industry is familiar with the financial aspects of exporting geothermal products and services but felt that it was extremely difficult for the U.S. geothermal industry to compete in the international market. Those familiar with the Miravalles

project were frustrated with the unfair bargaining scenario, e.g., the soft financing being offered by their competitors.

A typical response when asked if a company can compete in the Latin American market, especially in the case of Miravalles, was: What U.S. industry can offer the same financial terms as the Japanese and Italians? Those that had done market and feasibility studies on the Miravalles project (e.g., Stone & Webster, Oxbow, Elliott) felt that the bidding scenario was unfair. The general feeling is that the foreign competitors have the blessing of the Costa Rican government to develop the field with the financial backing from their respective governments. The argument is that there was no way for U.S. companies to compete when the foreign competitors are subsidized by their respective governments.

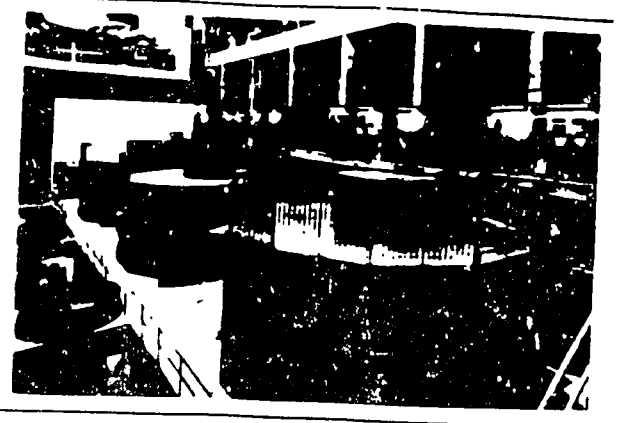
A case in point was a geothermal development project in Indonesia involving UNOCAL. In 1982, UNOCAL signed a contract with the national utility, PLN, to develop a geothermal field and provide steam for power production. (To date, UNOCAL has spent approximately $88 million on the development of this field.) The government of Indonesia then asked UNOCAL to submit a proposal to build an entire system including a power plant at the field. UNOCAL proposed a build-operate-transfer system with their own financing and insurance from OPIC. They planned to fund the project without a government guarantee. However, after some preliminary negotiations, the Italian government offered the Indonesian government financing to build the plant with a 20-year, $71 million loan at 1 1/2 percent interest, and a 10-year grace period. Ansaldo of Italy is now developing the plant, which remains in the public sector (Figure 5-5).

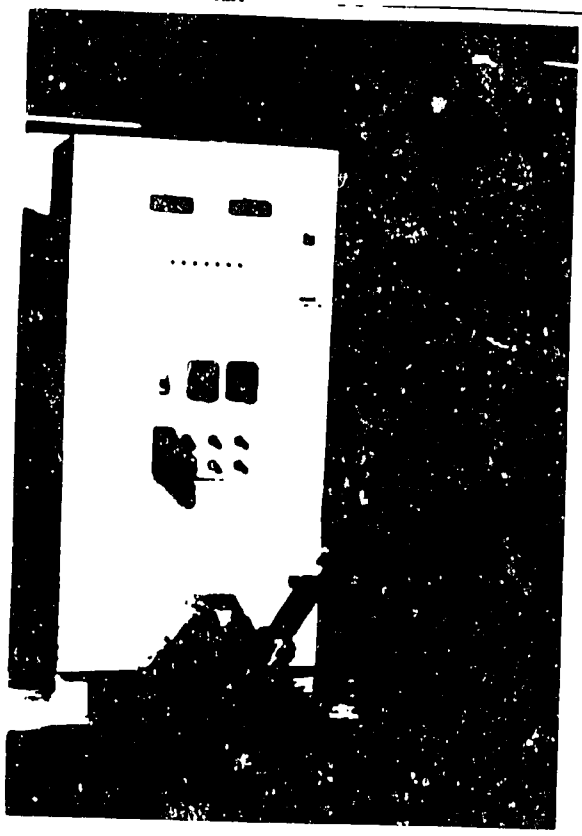
Another major point raised by the industry was the institutional barriers that exist in many developing countries. For the most part, these industries are looking for investments that will allow them to own and operate their facilities and sell the energy. Therefore, these companies are concerned with such barriers as the price of energy, the tariff structure, and the political and contractual policies of the governments involved. Such institutional barriers further exacerbate U.S. industries' problems with competitiveness.

Kotmale Hydro synchronised

The third unit of the Kotmale Hydro Power Station, Sri Lanka, was synchronised with the network in March, 1988, the first stage of the power station having been commissioned in August, 1985. Its total generating capacity is now 270 MVA.

ABB acted as main contractor for all the electro-mechanical equipment, and among the major subcontractors was Nohab KMW, which was responsible for the turbines. The total value of the equipment supplied by ABB and its subcontractors is approximately US$78 million (£42 million). Now that ABB's work has been more or less completed and the site organisation is in the process of being disbanded, the power station has been taken over by the customer, the Central Electricity Board.





Battery chargers to Thailand

Erskine Systems Limited has recently started to ship battery charger systems to Thailand. In a bid to improve national communications, Telephone Organisation of Thailand (TOT) has undertaken a massive modernisation programme which includes providing standby power to several hundred microwave stations throughout Thailand.

For this latest contract, Erskine is supplying equipment to its associate company, Dale Electric Power Systems, based in Bangkok. Dale is responsible for the installation and commissioning of the standby power equipment together with local manufacture of power distribution equipment.

Delivery schedules for the project are tight. The first shipment of 40 chargers, including some large triple charger systems, left the Erskine factory within 8 weeks of the order being received.

$71m Italian loan to West Java

The Italian government will give a soft loan of US$ 71 million to finance the construction of a geothermal power plant on Mount Salak in West Java as a follow up to the visit of the Italian prime minister to Indonesia last January. The soft loan will consist not only of foreign exchange but will also include a rupiah fund (local cost) worth the equivalent of US$8.2 million.

The geothermal plant to be built on Mt. Salak will be made up of two units each with a capacity of 55 MW. The construction of the plant will be started this year and is scheduled to be completed in four years. Construction of the geothermal power plant will be carried out by a contractor of the Italian government but potentials available in Indonesia will also be taken.

Pacific isle to receive new engine

A 12RK270 engine now nearing completion is destined for an oval shaped speck in the Pacific Ocean, only 3¼ miles long and 2¼ miles wide. As the Republic of Nauru (the island became independent in 1968) it is one of the smallest sovereign states in the world, and one of the loneliest. Only 37 miles south of the Equator, it is in the Western Pacific, north east of the Solomon Islands, and its nearest neighbour is Ocean Island 190 miles to the east, while the main Gilbert and Ellis Group is another 200 miles away. The main source of wealth on the island is from the mining of phosphate from what is one of the world's richest and highest quality deposits.

Ruston, in association with GEC Australia, has negotiated a contract with the Nauru Phosphate Corporation for up-grading and up-dating the power station and the 12RK270, which is to run on heavy fuel, is the first stage of the on-going contract.

Nauru islanders should be no strangers to Ruston engines as the present power station is equipped with four 16CSV and four 16RK3C engines. This site has traditionally used engines which had their origins at Rugby. The first engine, a slow speed "A" frame 2B, running at 200 revs/min, was built by William and Robinson, which later became the Rugby works of English Electric. Between 1914 and 1928 a total of six of this type of engine were supplied to the then British Phosphate Commission. In 1936 the first of the English Electric Fullager engines was installed. This was a 4Q producing 750 bhp at 250 revs/min. A total of five Fullagers were installed between 1936 and 1956. The installation of the first 16CSV took place in 1960 with others following to bring the total to four by 1968. The first 16RK3C was installed in 1977.

The island is shaped like a hat, with a narrow coastal "brim", and the crown, a low plateau some 200 feet above sea level, formed mostly of phosphate rock. The power station is on the west of the island, alongside the narrow coastal road which runs right round the island. Most of the population live in homes nestling among coconut palms on the narrow coastal belt which ranges in width from 100 to 300 yards. The total population of Nauru is estimated to be about 6800 of whom 600 are Europeans.

Figure 5-5. Announcement of New Geothermal Power Plant in Indonesia Financed by Italian Government

For the most part, the U.S. geothermal industry is technically superior to its competitors. Although the number of domestic suppliers has been reduced (e.g., General Electric is out of the business, Elliott and DeLaval could potentially provide up to 50 MW, Geothermal Power can provide wellhead turbines up to 15 MW), the capabilities of the industry are just as good if not better than most foreign competitors. This is a cause of extensive and continued frustration in the industry.

5.3.4 Perceived Role of Government

Most of the industries were aware of the assistance offered by TDP, OPIC, and Eximbank. However, many industries do not seek assistance from U.S. government programs. Various reasons were given for this, the most frequent is:

- Lack of confidence
- Time constraints
- Lack of knowledge
- No need for assistance; company provides its own marketing.

The perceived role for the U.S. government in helping to develop a national competitive policy and posture was, overall, paradoxical. Consistently throughout the discussions, two perceptions were communicated.

First, the government should not play a stronger role in developing a national policy even though most representatives mentioned the disadvantages of this. The U.S. industry interviewed believes in the basic philosophy of the open market system, and, yet, they realize this system does not apply fairly in the international marketplace. Expressed was the need for mechanisms that would equalize the scenario when U.S. companies are competing in the international market against companies that are backed by their governments.

Second, government money is being wasted on feasibility studies and preliminary work because most of the geothermal business goes to foreign competitors when the time comes for bidding on the project.

In order to attempt to rectify these problems, the following must be strongly considered:

- Offer financial backing for projects so that U.S. firms are not at a competitive disadvantage.
- Help form industrial liaisons between U.S. industry and overseas government representatives.
- Account for the money spent on prefeasibility and feasibility studies. If a government agency such as TDP gives money for a feasibility study, then it should be stipulated that a U.S. firm should have priority in the bidding.
- Encourage policy measures that would remove the investment risks faced by the geothermal industry when dealing with developing countries. Work towards removing the institutional/legal barriers to development (e.g., tariff policy and lack of government assurances to the private sector).

A detailed description of the discussions held are included in Appendix B.

CHAPTER 6. CONCLUSIONS AND RECOMMENDED STRATEGY

The U.S. government is far less effective than the governments of the other industrial economies in supporting their industries, particularly the geothermal industry, because of the very limited use of mixed credits by the U.S.. Although there is a mixed credit program available to the U.S. industry through the Warchest of Eximbank and a tied-aid program administered by Eximbank and A.I.D., the restricted level of funding and the difficulty in swiftly responding to bids by other countries has severely limited the effectiveness of the U.S. government in supporting the U.S. geothermal industry in foreign markets, particularly Latin America.

The essential tool in addressing the fierce international competition in the 1980s has become the mixed credit that, in effect, reduces the interest rate on project loans making the project very attractive financing. However, under the current policy, the U.S. government provides mixed credit on such a restricted basis that the U.S. industry (in this case the geothermal industry) cannot effectively compete in the international marketplace.

Unlike many competing nations such as Japan, Italy, and France, the U.S. has no central coordinating body for its export assistance, investment assistance, and foreign assistance programs. In fact, the U.S. government has frequently avoided the interconnection of trade and investment with foreign assistance. Private U.S. companies and, in particular, those in the geothermal environment, have expressed a clear dissatisfaction with the apparent lack of coordination among U.S. government agencies.

There has been a substantial amount of discussion and attention paid to the importance of reconciling the trade and bilateral aid activities of the U.S. government. The President's Task Force on International Private Enterprise in 1984 recognized the need to clarify government policy to combine national interests in trade and bilateral aid. At the meeting of the Task Force, it was recognized that the U.S. government must develop an effective, consistent trade policy that mixes aid and trade resources, thereby,

enabling U.S. firms to be more competitive in world markets and to meet the challenges posed by the growing governmental role in world competition.

Instead, the U.S. government is taking alternative steps by tightening the OECD regulations. The U.S. has successfully put pressure on the OECD to increase the minimum permissible grant element for tied and partially untied aid credits from 25 to 35 percent for developing countries. This was done to discourage continued use of export credits by making it more expensive to the governments to subsidize their industries. (Since the last increase was in July 1988, it is too early to evaluate the impact.) However, OECD countries are able to circumvent the percentage increase by providing parallel financing, an alternative to tying aid and financing (without any requirements) which further reduces the impact of the U.S. initiative.

At the December 1987 DAC ministerial meeting of OECD, the U.S. made various proposals to encourage the balancing of international competition; for example:

- A general untying of capital projects.
- Strengthening development criteria in terms of project selection and implementation.
- More flexible availability of technical support for such projects.
- More coordinated transition for middle-income countries to develop criteria for phasing down concessionary-funded bilateral projects. In parallel, greater scope would be provided to export credit agencies and multilateral development banks for appropriate capital projects.

The initial reactions by the donors on the U.S. proposal were mixed and not encouraging. Some donor countries explained that their domestic constituency for such projects (e.g., through the country bilateral assistance program) is based largely on tying the projects to domestic procurement requirements.

Ambassador Ernest Preeg (Chief Economist and Deputy Assistant Administrator for Program and Policy Coordination, A.I.D.) noted at the hearing held on May 4, 1988 before the Subcommittee on International Finance, Trade, and Monetary Policy that A.I.D. may in fact be at a crossroad in the orientation of development strategies. He indicated that A.I.D. faces growing concerns and pressures to change these priorities

and move toward capital intensive projects more directly supportive of U.S. export interests.

At the same hearing, the Chairman and President of Eximbank (John A. Bohn, Jr.) noted that the Warchest is no longer an effective way to end the problem and that an effective response to the mixed credit issue must come from U.S. government policy moves. The solution must be found within the context of a cohesive and coherent national trade and bilateral aid policy. Eximbank has elected to initiate an analysis of the markets in which mixed credits are being used.

In the recently passed Trade Bill, Congress wants to give exporters a boost in their ability to respond quickly to tied-aid offers by other nations through a substantially enhanced and reorganized TDP. The legislation would transfer to TDP the authority to issue mixed credits using U.S. aid funds with oversight from a new advisory board which includes representatives from international engineering and construction industry associations.

However, this has received strong opposition from the current administration (though this could change with the new administration). In a jointly signed letter to Senator Claiborne Pell, Treasury Secretary James Baker and Commerce Secretary W. William Verity opposed any strengthening of the TDP to meet the objectives of the U.S. exporting community. The letter states: "We object to any further reduction of foreign assistance funding through earmarks and transfers to TDP at a time when scarce funds have already forced curtailment of aid programs. Furthermore, the administration opposes transferring to TDP the authority to issue mixed credits." The reason for this, the letter continues, is that giving TDP the power to issue mixed credits would result in "complex, new procedures which would impede effective management of U.S. aid resources."

With the passage of the Trade Bill, the aid funds available were actually ESFs which, as previously indicated, are limited because of political and strategic reasons. The main constraint to this initiative has been the lack of funding since no additional money was provided to A.I.D. Therefore, there was little incentive to agree to have the aid tied to a specific U.S. sale through ESFs.

The Miravalles project clearly points out the critical situation the U.S. geothermal industry now faces in developing its market internationally. The fact that it is a public sector project makes it even more difficult to obtain the necessary financing and commercial risk insurance from the U.S. government. A potential of about $400 million in U.S. exports for the Miravalles project in the next few years alone will be lost

The fact that Eximbank, which is the key U.S. lending agency for the U.S. industry is closed to the public sector in Costa Rica is a major obstacle.

Recommended Strategy

A well formulated, balanced, and attainable strategy must be developed to accelerate business opportunities for the U.S. geothermal industry as it seeks to participate effectively in the development and construction of not only Costa Rica's Miravalles field, but others in Latin America as well. Potential markets must be identified at an early stage and backed with attractive financing.

As has been heavily emphasized, the U.S. industry, though a leader in geothermal development worldwide, faces severe competition from Japan, Italy, France, and, more recently, New Zealand. To meet these challenges from foreign competitors, the U.S. geothermal industry must mount a concerted and sustained effort and act as one unified body to:

- Foster, encourage, and promote the development and utilization of geothermal resources for developing countries' application
- Present united industry views to Congress, governmental bodies/agencies, and funding institutions
- Provide a forum for the industry to discuss the international competition
- Develop and support legislation that is favorable to the industry (through Eximbank, OPIC, A.I.D., U.S. Trade Representative, and OECD) in the international competitive arena.

However, the industry cannot act alone in its conscientious role to meet foreign competition on equitable terms. It must actively coordinate its strategic efforts with that of the U.S. government, clearly keeping in mind, that as the U.S. is putting pressure

on the OECD to reduce the use of mixed credits, the U.S. government must also develop its own effective strategy in successfully promoting its industry while assisting the developing countries in their economic development process.

As the U.S. government agency providing bilateral aid, A.I.D. is the major tool to effectively support the industry while assuring that projects are compatible with the country's economic priorities. The question of providing new funds for A.I.D. is a political question; budgetary reallocations and policy directives will be necessary if the bilateral aid is to become effective. Providing a stronger link between aid and trade is essential.

Considering the myriad of political, regulatory, monetary, and policy issues at hand surrounding mixed credits and tied-aid mechanisms, the scenario to identify a progressive and effective strategy to be developed is extremely bleak. This scenario recommends an approach through which the U.S. geothermal industry can participate in the Miravalles project and in other geothermal related activities in Latin America.

Currently, because of the existing U.S. position on foreign competition and export credit subsidies, the ability of the U.S. industry to positively position itself in addressing the public and private sector needs of the geothermal community in Costa Rica and other developing countries, is nonexistent. Basically, the industry has been closed out of the international marketplace. Strategically, it can do nothing in the short term to change its competitive position.

Yet, a new administration assuming responsibility in January 1989 will present an excellent *window of opportunity* for the geothermal industry to commence an extremely aggressive thrust (with Congress and pertinent federal aid agencies) in formulating a coordinated industry-government competitive strategy.

In order that the industry be able to potentially compete in mid- to long-term, this coordinated strategy addresses four elements:

- Define a cohesive and coherent national trade and bilateral aid policy
- Establish an energy grant and export credit program

- Strengthen the industrial liaison between the U.S. industry and governments of developing countries.
- Reopen the DOE Geothermal Loan Guaranty Program.

Define a Cohesive and Coherent National Trade and Bilateral Aid Policy

The U.S. geothermal industry must apply extensive pressure on the administrative and legislative governmental bodies in order to define, establish, and implement a uniform trade and bilateral aid policy. Earlier chapters of this report have gone into extensive detail as to what major impediments are faced in the international trade arena by the U.S. and what logically needs to be accomplished if the U.S. government and the U.S. geothermal industry are to attempt to open the U.S. industry market in Miravalles and in Latin America.

A cohesive and coherent national trade program cannot be developed and implemented by the geothermal industry alone. Rather, the industry must act as the primary catalyst with the respective legislative committees that oversee and direct the major international and U.S. trade-related organizations involved in the promotion of U.S. exports and technologies.

In addition to initiating and implementing this first element of the strategy with the following key committee and subcommittee members, it is imperative the industry as a whole must further interact with those key U.S. government representatives identified in Appendix C, paragraph 3. There needs to be a consortium developed consisting of industry, government, and congressional decision makers that can, as a representative body, help define and establish a cohesive and coherent national trade and bilateral aid policy.

The key congressional members (as referenced) are listed on the next two pages.

House

House Appropriations Committee

- Subcommittee on Commerce, Justice, and State, the Judiciary and Related Agencies
  - Focus of the Subcommittee
    - -- DOC
    - -- Office of the U.S. Trade Representative
  - Key Members
    - -- Neal Smith, Chairman
    - -- John Osthaus, Senior Staff

- Subcommittee on Foreign Operations, Export Financing, and Related Programs
  - Focus of Subcommittee
    - -- A.I.D.
    - -- Eximbank
    - -- U.S. Trade and Development Program
    - -- OPIC
  - Key Members
    - -- David Obey, Chairman
    - -- Terry Peel, Senior Staff

Senate

Senate Appropriations Committee

- Subcommittee on Commerce, Justice, and State, the Judiciary, and Related Agencies
  - Focus of the Subcommittee
    - -- DOC
    - -- Office of the U.S. Trade Representative
  - Key Members
    - -- Ernest F. Hollings, Chairman
    - -- Dorothy Seder, Senior Staff

- Subcommittee on Foreign Operations
  - Focus of the Subcommittee
    - -- A.I.D.
    - -- Eximbank
    - -- U.S. Trade and Development Program
    - -- OPIC
  - Key Members
    - -- Daniel Inouye, Chairman
    - -- Rand Fishbein, Senior Staff

Establish an Energy Grant and Export Credit Program

In consideration of establishing and implementing the second element of the strategy, the geothermal industry must take a primary role in voicing strongly the need to initiate an energy export credit program. Those key industry decision makers (Appendix C, paragraph 1) who have emphasized the necessity to expand into the international arena, must establish a structured dialog not only with A.I.D. and Eximbank, but also with those financial institutions who have demonstrated the desire to support a competitively structured, internationally focused, export finance program (Appendix C, paragraph 2).

For example, an energy grant and export credit program would be developed for capital projects that support legitimate development objectives. This would be similar to the combination of grants and concessionary loans to developing countries which are used by industrialized countries to improve the position of their firms. Because there is a need for increased funding, a revision in mixed credit policy (or an increase in appropriation) new funding, and authorizing legislation would be necessary. Since the link between economic growth and energy has been demonstrated in developing countries, a pilot grant and export credit program must be established for geothermal development in Central America. Specifically, two programs could be considered:

- **Energy Guaranty Loan Program.** For the near term, A.I.D. could help geothermal project developers and suppliers. In conjunction with targeted developing countries, A.I.D. could work with the existing loan guaranty programs in Eximbank. This A.I.D./Eximbank endeavor needs to collectively study the financial and administrative details of implementing an energy guaranty loan program at A.I.D. that could be modeled along the lines of its ongoing Housing Guaranty Program within the Bureau for Private Enterprise. To date, this program has issued over $1.3 billion in guaranteed loans. Under this program, the U.S. government provides a full guaranty against default on loans made by private U.S. financial institutions to host country governments for investments in their housing sectors.

  This guaranty program, which serves both the public and private sector, needs to be thoroughly investigated by the U.S. geothermal industry for potential application to its international competitive needs. Since the program is in place and has proven beneficial in protecting other U.S. interests, it is conceivable that a similar effort could be undertaken by the industry as a pilot so as to initially compete with Japan, Italy, and France in this international technology area.

- **Energy Direct Loan Program.** Through the ESF and the Eximbank, A.I.D. could pool their financial resources to provide part of the financing of the project with the help of a financial intermediary (e.g., a development bank in a given developing country.) (Of course, the credit worthiness of the county is a key element.) A direct project loan of this nature adds scarce financial resources to the project which tends to reduce the perceived risk. For private sector projects, additional funds could be provided by pooling the financial resources of the A.I.D. Private Sector Revolving Fund and the OPIC's direct loan program. The U.S. Trade and Development Program would play a stronger and more effective role where feasibility studies would be backed with a readily available and competitive financing package for the industry.

  Again, a concerted effort on the part of the geothermal industry is essential in raising the levels of awareness for this type of direct loan program. The formalization of the concept and potential application will not occur without direct pressure from a unified industry.

Strengthen the Industrial Liaison Between the U.S. Industry and Governments of Developing Countries

Apparently, a great deal of success has been realized in international competition as a result of the strong in-country networks that have been developed by the Japanese, Italians, French, and New Zealanders in developing countries, particularly Costa Rica. The U.S. geothermal industry must, as the third element of its overall mid- to long-term strategy, establish a recognized/active presence in Latin America if it seriously expects to compete internationally.

As demonstrated earlier, the DOC does play an informational role in keeping the industry apprised of the varied geothermal activities being considered; however, for all practical purposes, that critical information is *old news* by the time it reaches key industry decision makers. The U.S. is unable to impact any developing country decision process or enhance its technical position by merely reviewing cable messages sent by DOC.

Coupled with intense dialog with Costa Rican officials and local geothermal representatives (Appendix C, paragraph 4), investigative assessments is a key element to technological application and project implementation.

Industry should choose the representation scheme that would be followed. The recommendation is that strategically, the U.S. must be united and in synchronization with its own goals and objectives so as to represent itself in a consistent manner. If the U.S. geothermal industry is committed to being competitive in Costa Rica, it must move forward with aggressiveness. Ongoing, face-to-face interaction is necessary.

Of course, it is critical that the industry be able to position itself at the cutting edge of geothermal developments taking place. However, this alone does not guarantee success or even the opportunity to competitively bid on activities in the Miravalles field (or in other locales) unless the industry in concert with the U.S. has defined a cohesive and coherent national trade and bilateral policy and has established an energy grant or export credit program.

Each of the three strategic elements must be addressed in an integrated manner so that they all work in harmony and, therefore, not independent of the other.

Reopen the DOE Geothermal Loan Guaranty Program

As the fourth element of this strategy, the U.S. geothermal industry must address the rationale, applications, and benefits derived from the reopening of DOE's Geothermal Loan Guaranty Program.

The Geothermal Loan Guaranty Program was established by Public Law 93-410 on September 3, 1974 in order to:

- Encourage and assist the private and public sectors to accelerate the development of geothermal resources
- Minimize a lender's financial risk that is associated with the development of new geothermal reservoirs
- Develop borrower-lender relationships that will encourage the flow of credit for geothermal projects
- Enhance competition.

The Act authorized the Secretary of Energy to guarantee loans, and, under certain circumstances, to make interest payments on loans for activities related to the development, construction, and operation of facilities for the production of energy from

geothermal resources. The Act also established the Geothermal Resources Development Fund to carry out the loan guaranty and interest assistance programs, including the payment of administrative expenses.

Even though the program was designed to assist the industry, it was administratively closed on March 1, 1982; DOE has not reopened the program for new applications.

As a new administration will be in office in January 1989, there is an opportunity for the geothermal industry to pursue the revitalization of the guaranty program in order to provide federal protection against financial loss usually demanded by private lenders for projects in developing countries. This can be accomplished by a simple notice in the Federal Register rescinding the closure notice of March 1982. In this connection, it is important to note that the program's implementing regulations (but not the Act itself) limit assistance to geothermal projects in the U.S. It would, therefore, also be necessary to amend the regulations to eliminate this limitation.

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CHAPTER 8. ACRONYMS AND ABBREVIATIONS

-A-

A.I.D.	U.S. Agency for International Development

-C-

CIDA	Canadian International Development Agency
CIP	Commodity Import Program
CORECT	Committee on Renewable Energy Commerce and Trade

-D-

DAC	Development Aid Committee
DOC	Department of Commerce
DOE	Department of Energy

-E-

ESF	Economic Support Fund
Eximbank	U.S. Export-Import Bank

-I-

ICE	Instituto Costarricense de Electricidad
IDB	Inter-American Development Bank
INDE	National Utility in Guatemala

-L-

LANL	Los Alamos National Laboratory

-M-

MRNEM	Ministry of Natural Resources, Energy, and Mines

-O-

ODC	Overseas Development Council
OECD	Organization for Economic Cooperation and Development
OECF	Overseas Economic Cooperation Fund
OPIC	Overseas Private Investment Corporation

-P-

PLN	The national utility in Indonesia

-T-

TDP	U.S. Trade and Development Program

-U-

U.K.	United Kingdom

APPENDIX A

U.S. COMMERCIAL BANKS' PERSPECTIVE

APPENDIX A: U.S. COMMERCIAL BANK'S PERSPECTIVE

Due to the proprietary nature of the extensive discussions with officers and managers of leading U.S. commercial banks, no written summaries regarding their position on financing geothermal exports is provided. Please refer to Appendix C--Paragraph 2 which lists financial institution representatives contacted.

APPENDIX B

U.S. GEOTHERMAL INDUSTRY PERSPECTIVE

APPENDIX B: U.S. GEOTHERMAL INDUSTRY PERSPECTIVE

Due to the proprietary nature of the extensive discussions with officers, managers, and engineers of U.S. geothermal industry-related organizations, no written summaries regarding their position on developing international geothermal markets is provided. Please refer to Appendix C--Paragraph 1 which lists geothermal industry representatives contacted.

APPENDIX C. KEY DECISION MAKERS CONTACTED

1. GEOTHERMAL INDUSTRY REPRESENTATIVES:

Geyers Geothermal

Tom Box, Manager of Geology and Reservoir Engineering

Oxbow Geothermal

Dick Benoit, Chief Geologist

Stone & Webster

David Gonsalves, Assistant Engineering Manager

Stone & Webster

Albert Ferrer, International Marketing Representative

Chevron Geothermal

I.J. Epperson, Supervising Engineer

Elliott Turbines

Allan R. Vitalis, Marketing Manager

GeoProducts Corporation

Ken Boran, President

DeLaval Turbines

Bob Streilein, Senior Sales Engineer

Geothermal Power Company, Inc.

Gary Shulman, President

National Geothermal Association

Lanier Lohn, President

Geothermal Resources Council

Dave Anderson, Executive Director

2. FINANCIAL INSTITUTION REPRESENTATIVES

Bank of Credit and Commerce International S.A.,

Ron Sutliff, Deputy Manager

National State Bank (a subsidiary of Constellation Bank)

Karl Blum, Vice President, International

Security Pacific National Bank

Glenn Coleville, Vice President, Marketing

Security Pacific Corporation

Robert Stebbins, Vice President, Marketing

Imperial Bank

Perry Ritenour, Senior Vice President

Lloyds International

Alejandro Crespo, Territory Executive/Latin America

Chase Manhattan Bank

Allan Delsman, Deputy Credit Officer for Western Hemisphere

CitiBank

Kenneth Campbell, Vice President, International

Bankers Trust

Tara Kenney, Country Credit Officer/Latin America

3. U.S. GOVERNMENT REPRESENTATIVES

Office of the U.S. Trade Representative, Office of the President

Robert Reinstein, Director Energy and Natural Resources
Matt Gallivan, Director, Trade and Finance
Jon Rosenbaum, Assistant U.S. Trade Representative

U.S. TDP

Nancy Frame, Deputy Director
Dwight Johnson, Regional Director, Latin America

U.S. A.I.D.

Doug Tinsler, A.I.D. Costa Rica Desk Officer
John Hammond and Robert Grimshaw, Office of Energy

Eximbank

Richard Crafton, Vice President, Latin America

U.S. DOE

Ralph Burr, Geothermal Technology Division
Robert Annan, CORECT Staff Director

OPIC

Harvey Himberg, Latin American Investment Group
Ed Copola, Latin American Investment Group
Mike Delia, Latin American Investment Group

U.S. DOC

Janice Mazur, Office of International Major Programs

U.S. Embassy in Costa Rica

Judy Henderson, Commercial Attache

4. OFFICIALS FROM COSTA RICA AND OTHERS

Ministry of Natural Resources, Energy and Mines

Alvaro Umana, Minister
Teofilo de la Torre, Vice Minister
Jorge Blanceo, Director
Ana Lorena Leon, Coordinator

Instituto Costarricense de Electricidad (ICE)

Herman Robles, Technical Advisor
Luis Bujan, Chief, Financial Department
Manuel Corrales, Deputy Chief of Planning
Oscar Vargaz, Training Department
Fernando Preinfalk, Chief, Training Department
Agustin Rodriguez, Chief, Training Division
Fernando Moya, Head, Quality Control
Alfredo Manieri, Chief, Geothermal Division
Alexis Alvarado, Geothermal Division/Technical Specialist

Local Geothermal Representative

Mario Cantillo

Inter-American Development Bank

Jose Villegas, Resident Representative, Costa Rica
Eduardo Marquez, Energy Sector Specialist/Power Engineering, Costa Rica
Jorge Montero, Local Energy Specialist, Costa Rica
Gustavo Calderon, Chief, Non-Conventional Energy Section, Washington, DC