1 of 2

CLEAN COAL TECHNOLOGY EXPORT FINANCE PROGRAMS

**REPORT TO THE UNITED STATES CONGRESS
by the
UNITED STATES DEPARTMENT OF ENERGY
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GLOSSARY OF ACRONYMS

CCT - clean coal technology

U.S. Government Agencies and Programs

A.I.D. - Agency for International Development

DOE - United States Department of Energy

EPDF - Energy Project Development Fund

Eximbank - Export-Import Bank of the United States

FIETOP - Federal International Energy Trade and Development Opportunities Program

FINESS - Financing Energy Services for Small Scale Energy Program

NTDB - National Trade Data Bank

OPIC - Overseas Private Investment Corporation

PEFCO - Private Export Funding Corporation

SBA - Small Business Administration

TDA - Trade and Development Agency

TPCC - Trade Promotion Coordinating Committee

Multilateral Development Agencies and Programs

ADB - Asian Development Bank

ADF - African Development Fund

AfDB - African Development Bank

EBRD - European Bank for Reconstruction and Development

ECO - Expanded Cofinancing Operation

IBRD - International Bank for Reconstruction and Development

IDA - International Development Association

IDB - Inter-American Development Bank

IFC - International Finance Corporation

MIGA - Multilateral Investment Guarantee Agency

OECD - Organization for Economic Cooperation and Development

UNDP - United Nations' Development Programme

Terms Related to Project Finance

BOO - build, own, operate

BOT - build, operate, transfer

BTO - build, transfer, operate

ROT - rehabilitate, operate, transfer

EXECUTIVE SUMMARY

Participation by U.S. firms in the development of Clean Coal Technology (CCT) projects in foreign countries will help the United States achieve multiple national objectives simultaneously -- addressing critical goals related to energy, environmental technology, industrial competitiveness and international trade. U.S. participation in these projects will result in an improved global environment, an improvement in the balance of payments and an increase in U.S. jobs. Meanwhile, host countries will benefit from the development of economically- and environmentally-sound power facilities.

The Clean Air Act Amendments of 1990 (Public Law 101-549, Section 409) as supplemented by a requirement in the Energy Policy Act of 1992 (Public Law 102-486, Section 1331(f)) requires that the Secretary of Energy, acting through the Trade Promotion Coordinating Committee Subgroup on Clean Coal Technologies, submit a report to Congress with information on the status of recommendations made in the U.S. Department of Energy, Clean Coal Technology Export Programs, Report to the United States Congress, February 1992. Specific emphasis is placed on the adequacy of financial assistance for export of CCTs. Section 1331 of that Act states:

Within 180 days after the Secretary submits the report to the Congress as required by section 409 of Public Law 101-549, the Secretary, acting through the CCT subgroup, shall provide to the appropriate committees of the House of Representatives and the Committee on Energy and Natural Resources of the Senate, a plan which details actions to be taken in order to address those recommendations and findings made in the report submitted pursuant to section 409 of Public Law 101-549. As a part of the plan required by this subsection, the Secretary, acting through the CCT subgroup, shall specifically address the adequacy of financial assistance available from Federal departments and agencies and international financing organizations to aid in the financing of prefeasibility and feasibility studies and projects that would use a clean coal technology in developing countries and countries making the transition from nonmarket to market economies.

This report fulfills the requirements of the Act. In addition, although this report focuses on CCT power projects, the issues it raises about the financing of these projects are also relevant to other CCT projects such as industrial applications or coal preparation, as well as to a much broader range of energy and environmental technology projects worldwide.

The recent emergence of project finance as the most likely method of financing for these projects poses new challenges to Federal agencies involved in export promotion. Resolution of these challenges is the first step the U.S. Government will need to address to provide adequate financial assistance.

IMPLEMENTATION OF THE PREVIOUS REPORT TO CONGRESS (Chapter 2)

The earlier report to Congress found that U.S. industry has a substantial opportunity to export CCTs. The report noted that international markets for CCTs already exist and are growing rapidly. It further explained that U.S. industry has been a leader in the development of CCTs and has the basis to become a leader in worldwide CCT development. The report concluded that improved coordination of U.S. Government efforts is necessary to increase the effectiveness of current Federal export promotion and assistance programs for CCTs.

Recommendations Made in the Previous Report

The report made eight specific recommendations:

- 1) Create a permanent CCT Subgroup to the Energy, Environment and Infrastructure Working Group of the Trade Promotion Coordinating Committee to focus interagency efforts on CCTs.
- 2) Implement a one-step export assistance program for CCTs.
- 3) Develop innovative financing packages for CCTs that crosscut agencies.
- 4) Develop a CCT Export Information Base to support the Trade Promotion Coordinating Committee's Trade Information Center.
- 5) Develop an ongoing and integrated interagency program, in cooperation with industry, to bring U.S. CCTs to the attention of potential foreign customers.
- 6) Federal agencies need to work together and with industry to develop foreign demonstrations of U.S. CCTs.
- 7) Conduct an interagency study to characterize the competitive status of the international CCT industry.
- 8) Coordinate with multilateral development banks to ensure that U.S. technologies are properly represented in their projects.

Plan and Actions Taken to Address the Recommendations

Since the submission of the report, the first recommendation was implemented through the establishment of a Trade Promotion Coordinating Committee Subgroup to focus existing U.S. Government programs on exports of CCTs. Its first action was to develop an interagency strategic plan that established the overall mission, goals and objectives of the Subgroup. The strategic plan included five initiatives: Market Information, "Door Opening" Programs, Project Development Teams, Feasibility Studies/Foreign Demonstrations and Financial Support for Projects. These initiatives all relate to the recommendations in the previous report, as is shown in Figure ES-1.

REPORT TO CONGRESS RECOMMENDATION	CCT STRATEGIC PLAN INITIATIVE				
	MARKET INFORMATION	DOOR OPENING	PROJECT DEVELOPMENT TEAMS	FEASIBILITY DEMONSTRATIONS	FINANCIAL SUPPORT
1. CREATE CCT SUBGROUP	X	X	X	X	X
2. ONE-STOP ASSISTANCE	X				X
3. INNOVATIVE FINANCING			X		X
4. EXPORT INFORMATION BASE	X			X	
5. FOREIGN CUSTOMER AWARENESS	X	X		X	
6. JOINT DEMONSTRATION PROJECTS			X	X	
7. COMPETITIVE STATUS OF INTERNATIONAL CCTs	X				
8. COORDINATION WITH MULTILATERAL DEVELOPMENT BANKS	X	X	X	X	X

Figure ES-1. Relation of Report to Congress Recommendations to CCT Strategic Plan Initiatives

Implementation of the strategic plan is now proceeding, with progress on all five initiatives. Activities completed to date include trade missions to China, Indonesia and Thailand and a preliminary assessment of the worldwide demand for CCT exports. Ongoing activities include the establishment of an industry dialogue, initiation of activities under the Market Information Initiative, reverse trade and study missions from China, Indonesia and Thailand, and the Federal International Energy Trade and Development Opportunities Program (as discussed on page 2-14).

FINANCING OF PREFEASIBILITY AND FEASIBILITY STUDIES (Chapter 3)

A sequence of studies is usually performed before a new international power development project is ultimately financed in order to establish the financeability of the project, as well as to develop the project's technical, operational and financial structure.

Types of Studies

Four types of studies are conducted:

- **Market Studies** provide a broad understanding of potential projects,
- **Prefeasibility Studies** review the major country and technical risk factors,
- **Feasibility Studies** determine whether to proceed to financing, and
- **Design Studies** complete the final decisions required for closing.

Each study is designed to evaluate the opportunities, costs and risks of power projects, in order to determine whether, and how, to proceed further. Potential investors will only provide funds to projects that are found to be viable. Market, prefeasibility and feasibility studies are designed to identify good projects, eliminating from consideration projects that cannot be easily financed. Feasibility studies are the best method for companies to become involved early in a project and to demonstrate their interest in the project to the potential customer. The earlier a U.S. firm becomes actively involved in a power project in a developing or transitional country, the greater the chance that U.S. CCTs will be chosen to play an active role in design, construction or operation. Analyses in countries with developing and transitional economies differ from those in developed countries in three basic respects:

- The political risks can be extremely high,
- It is more difficult to assess the technical, economic and financial risks, and
- Potential operators and customers may be new or reorganized and have no established track record as commercial entities.

Adequacy of Financing for Prefeasibility and Feasibility Studies

In order for developers to be willing to develop projects overseas, the risks and rewards of the projects in developing and transitional countries must be at least comparable to those of domestic projects. Without U.S. government assistance to help keep pace with foreign competition and to reduce the high front-end risks, private industry can be expected to underinvest in prefeasibility and feasibility studies for these foreign CCT projects.

Currently, five U.S. agencies are involved in feasibility study financing. They include the Trade and Development Agency, the Export-Import Bank of the United States, Overseas Private Investment Corporation, Agency for International Development and the Department of Energy. All of these agencies can create opportunities for U.S. exporters by financing feasibility studies. Other major sources of prefeasibility funding available to U.S. firms are international multilateral development banks, but U.S. firms are less likely to perform a significant role in projects when the feasibility study is performed by these multilateral development banks instead of by a U.S. agency.

The U.S. Government funds available for these studies are currently adequate, as discussed in Chapter 3, and several agencies have indicated an ability to increase their funding for these studies if growth in demand occurs. The delivery of this assistance could be improved through a more proactive approach to providing these services and better coordination of the various application processes. Competitor countries such as Germany and Japan are generally better at helping their companies make use of the multilateral development banks through cofinancing, by getting their banks more involved in the support of these projects, and in seeking out early information on potential projects worldwide.

FINANCING INTERNATIONAL POWER PROJECTS (Chapter 4)

Once the decision has been made to build a power plant, it is necessary to determine the type of financing mechanism that will be used. A major source of hard currency credit for power projects in developing countries (and now in transitional countries) has been loans from the multilateral banks and loans, loan guarantees, and grants from individual developed country governments. This credit is generally referred to and reported as official credit. It is likely to remain a major hard currency credit source for future developing and transitional country power projects. Official credit is preferred by developing countries because: (1) the effective interest rates and payment terms are usually more attractive than those for the two other forms of hard currency credit; and, (2) this type of credit frequently is required before other lenders will become significantly involved in power projects. Currently, official credit levels for power lending to qualifying countries is annually approximately \$6 billion.

In addition to official credits, two options are available for obtaining funds from the private sector: general credit and project finance.

General Credit Finance

The first alternative, general credit (full recourse) financing is generally preferred by the utility because it is both a less expensive and a generally more expeditious method of financing. It is available to international borrowers with excellent credit histories and good economic prospects, and in cases where the country has adequate currency reserves.

General credit finance is, for all intents and purposes, no longer available to most developing and transitional countries, especially for large CCT infrastructure projects. This is due to the large number of defaults that occurred in the early 1980s. For a number of years, the World Bank filled the financing gap by increasing its lending to power projects. The World Bank and the other multilateral development banks are now searching for new ways to improve the financeability of these projects. As a result of this shift in financing availability, many power plants listed as "planned" in these countries will not be built. While some will not be built for technical reasons, many others will be blocked because financing may not be available.

International Project Finance

The emergence of independent power and privatization of government controlled power generation operations, combined with the application of project finance to these international projects, has continued to enable power plants to be built in the absence of adequate long-term sovereign credit. Project finance involves setting up an independent company to replace the host country as the builder, owner and/or operator of the power facility. Project finance uses the same principal players and many of the same contractual elements as a general-credit-financed project, but it must accomplish a more thorough job of documenting and allocating risks because none of the involved parties individually are willing to guarantee the entire project risk. Project finance is predicated upon contractually delegating portions of the risk to the appropriate parties, making sure that all of the risk is covered, so that the transaction as a whole has a reasonable set of overall risk/reward characteristics and a manageable dollar amount of exposure for each of the specific participants. No financial risk

can be left uncovered, because unlike a general credit transaction, the lenders cannot look to any other assets or revenues as sources of repayment.

Needs for Assistance

Since availability of financing is often the critical component of international project development for CCT power plants, support from financial organizations, both public and private, is crucial. With the exception of a period in the 1970s, U.S. banks have generally not been aggressive in the financing of exports, an attitude that was reinforced by the losses on loans that resulted from sovereign defaults in the early 1980s. At the same time, financing advantages are enjoyed by competitors from a number of foreign countries. These competitors benefit from targeted financial assistance, including subsidies that reduce their cost of capital. In some cases, U.S. firms have entered into joint ventures with foreign firms in order to gain access to these benefits. To be more competitive, U.S. firms need access to U.S. Government assistance that will make the projects more financeable and level the playing field for U.S. developers.

In general, public and private financial assistance to developing and transitional countries for CCT power plants is not sufficient to finance all of the planned projects. CCT projects are highly capital-intensive, many countries and their utilities lack credit ratings for long-term general credit finance, and only a few financial institutions make loans available. Moreover, multilateral development banks are pressed to meet all kinds of needs for infrastructural development in many countries. International project finance is an attempt to overcome these problems.

Project finance transactions, however, often require changes to a country's legal system, regulatory framework and local capital markets. As a result, investment bankers can only raise funds to meet the needs for the strongest power projects, unless the U.S. government or the multilateral development banks are able to absorb some of the risks by providing assistance and helping to increase the credit-worthiness of viable projects. By absorbing some of the risks, the U.S. Government will make more projects financeable and will help level the playing field for U.S. developers.

Adequacy of Federal Assistance

Four U.S. agencies have been actively involved in international project finance arrangements involving CCTs. The Overseas Private Investment Corporation and the Export-Import Bank of the United States provide a variety of services including direct loans, loan guarantees and various types of insurance. The Agency for International Development has not been active in financing energy projects for a number of years, but does support infrastructure development. The Small Business Administration has programs that help smaller exporters of goods and services to these projects but, for the most part, the companies it assists are too small and the Small Business Administrations's mission is too limited in scope for it to be a major resource contributor to CCT projects.

Not all potential power projects in every developing and transitional country can be economically successful. The goal of U.S. Government financial assistance should be to ensure that U.S. CCT project developers have adequate access to funds so that they can be successful in developing viable projects in the international marketplace. The agencies involved must be able to evaluate, in a timely and reliable manner, whether infrastructures are adequate and projects are viable, and also provide competitive financial support that will adequately complement private financing from U.S. sources.

Ability to Evaluate Projects. Project finance transactions are relatively new to U.S. Government export finance agencies, particularly for CCT projects. As a consequence, their current methods for evaluating these foreign loans may have to be altered, as is explained below:

- Both the Export-Import Bank and the Overseas Private Investment Corporation may require additional resources to respond effectively if the volume of project finance transactions increases as expected. They are not staffed to handle the financing levels required to support CCT transactions. In addition, project finance of CCT transactions—which involves making large, complicated loans to project entities—requires a different approach and set of skills than does making loans directly to governments or to established firms.
- U.S. Government financial support to project developers has tended to be reactive. This contrasts with the activities of the governments of many foreign competitors, which actively seek out projects for their companies.

- Many project developers feel that obtaining U.S. government assistance can be a confusing and time-consuming process. It can be difficult to learn where to go for help.
- U.S. Government participation in project-financed activities differs from conventional export loans or guarantees. U.S. Government agencies may need to accept prudent and manageable levels of risk consistent with their respective charters. This will require considerable analysis of projects on a case-by-case basis.

Ability to Provide Competitive Financial Assistance. To enable U.S. project developers to win foreign projects and obtain financing on a level playing field with foreign competitors, a number of financial issues must be addressed:

- Sufficient appropriations may not be available to the Export-Import Bank if the volume of project finance transactions increases as expected.
- In instances where other countries are able to take actions that effectively bypass the Organization for Economic Cooperation and Development Arrangements on Guidelines for Officially Supported Export Credits (OECD Arrangements on Export Credits), U.S. financial assistance may not meet the terms offered by firms from several competing countries. Thus, U.S. firms may not be price-competitive with these foreign firms, which hampers the ability of U.S. firms to be chosen as project developers.
- Greater coordination of U.S. agencies with multilateral development banks would allow all parties to better leverage their assistance.
- U.S. banks are more reluctant to make international loans than are European and Japanese banks. Foreign banks are more active in these projects than U.S. banks, who are not currently providing an adequate flow of funds to U.S. firms. While some U.S. banks have already become very interested in the energy field, more are needed since these transactions are large, and the amount that any one bank wants to lend has decreased.
- Currency conversion is not always available for repayment of debt and equity. Increasing the availability and expanding the scope of this type of protection, where this can be done prudently, would reduce the repayment risks substantially.
- Unlike for domestic CCT projects, financing for CCTs on foreign soil is only supplied on a medium-term basis. Expanding the financial terms on international CCT transactions to construction and permanent financing could potentially increase the availability of private funds.

RECOMMENDATIONS (Chapter 5)

The U.S. Government should adapt its export finance programs to balance the evolving needs of the transitional and developing countries against the requirements of project finance. The resources of multiple agencies must be drawn upon in a coordinated manner, with decision-making processes that screen out poor prospects. Success in these projects will set the stage for expanded U.S. industrial involvement in other major foreign infrastructure projects. The U.S. Government efforts to assist the export of U.S. CCTs to developing and transitional countries should focus on the strategies that follow, which will help U.S. firms compete in project finance transactions.

Helping Project Developers Focus Efficiently on Key Markets

The first strategy involves helping U.S. firms identify specific countries, where project developers can profitably focus their efforts and provide assistance for the funding of feasibility studies, based on the following—

- Power projects have been identified as a priority need by the host government,
- CCT is technically feasible and economical,
- The host government is willing to create a positive business environment, and
- U.S. firms can compete on a level playing field.

To accomplish this, the following steps may be taken by the U.S. Government:

1. Work with private industry to monitor high-potential markets for U.S. goods and services for CCTs.
2. Ensure that the Trade and Development Agency, the Export-Import Bank and the Agency for International Development continue to finance an adequate number of feasibility studies for specific CCT projects.
3. Make sure that U.S. firms play a major role in the first private power project in each targeted country.
4. Expedite consideration of potential "showcase" projects in developing and transitional economies, but keep financing, technical and environmental standards high to ensure outstanding projects.
5. Identify financing assistance offered by competitive foreign governments.

Helping Host Countries Adapt to the Requirements of Private Power

As a precursor to substantial private financing for CCT projects in most developing and transitional countries, U.S. agencies should concentrate efforts on helping foreign governments effectively develop a private power sector through the following means:

1. Continue to expand training/information programs on private power development and include information on the requirements of project finance.
2. Help host countries develop the legal and regulatory infrastructure that will eliminate barriers to private power development.
3. Help host countries establish a viable capital market that would aid in the financing of these and other infrastructure projects.
4. Help these countries and their electric utilities develop institutions and methods for evaluating new power generation and environmental control options in a consistent and unbiased manner.

Encouraging Funding from Private Sources

Private funding sources must be attracted to these projects in order to maximize market potential through the leveraging of U.S. Government efforts:

1. Work with the banking sector to establish the basis for U.S. banks' long-term participation in project finance transactions in the power sector.
2. Continue the ongoing dialogue between the CCT subgroup and investment and commercial bankers.
3. Coordinate U.S. agency efforts with multilateral development banks, including the World Bank Group and all of the various regional development banks.

Making U.S. Government Assistance Programs More Effective

Several actions could improve the ability of U.S. agencies to fund project finance transactions:

1. Create one-stop shopping for U.S. government assistance for project finance, especially for CCT projects.

2. Both the Overseas Private Investment Corporation and the Export-Import Bank will need additional trained staff and funding to support the anticipated growth in the number of project finance transactions.
3. Increase the Overseas Private Investment Corporation's loan guarantee limit of \$50 million on these types of transactions, in order to provide an adequate level of assistance on these large financings.
4. Consider negotiating structural changes to the OECD Arrangements on Export Credits that will allow these projects to perform better under project finance requirements.
5. Further develop U.S. Government expertise and capability in international power project finance.
6. While currency convertibility is still the primary responsibility of the host government, on a limited, prudent basis using existing mechanisms, help ensure that funds for the repayment of debt and equity can be converted to dollars and then be repatriated.

Chapter 1

INTRODUCTION

The Clean Air Act Amendments of 1990 (Public Law 101-549, Section 409), as supplemented by a requirement in the Energy Policy Act of 1992 (Public Law 102-486, Section 1331(f)) requires that the Secretary of Energy, acting through the Trade Promotion Coordinating Committee Subgroup on Clean Coal Technologies (TPCC), submit a report to Congress that describes the status of recommendations made in the U.S. Department of Energy, Clean Coal Technology Export Programs, Report to the United States Congress, February 1992. Specific emphasis is placed on the adequacy of financial assistance for export of Clean Coal Technology (CCT). Section 1331 of that Act states:

Within 180 days after the Secretary submits the report to the Congress as required by section 409 of Public Law 101-549, the Secretary, acting through the CCT subgroup, shall provide to the appropriate committees of the House of Representatives and the Committee on Energy and Natural Resources of the Senate, a plan which details actions to be taken in order to address those recommendations and findings made in the report submitted pursuant to section 409 of Public Law 101-549. As a part of the plan required by this subsection, the Secretary, acting through the CCT subgroup, shall specifically address the adequacy of financial assistance available from Federal departments and agencies and international financing organizations to aid in the financing of prefeasibility and feasibility studies and projects that would use a clean coal technology in developing countries and countries making the transition from nonmarket to market economies.

This report fulfills the requirements of the Act. In addition, although this report focuses on CCT projects, the issues it raises about the financing of these projects are equally relevant to a much broader range of energy and environmental technology projects worldwide. The recent emergence of project finance as the most likely method of financing for these projects poses new challenges to Federal agencies involved in export promotion. These challenges must be resolved in order to provide adequate assistance.

ORGANIZATION OF THIS REPORT

This report is divided into five chapters.

Chapter 1 introduces the report and gives a brief background of the key issues to be discussed.

Chapter 2 describes a strategic plan developed to implement the recommendations of the previous Report to Congress. In addition, the status of actions under this plan are detailed.

Chapter 3 provides an overview of the prefeasibility and feasibility stages respectively, and discusses the adequacy of the existing Federal programs to assist U.S. developers in countries with developing and transitional market economies.

Chapter 4 describes the methods used to finance CCT projects in foreign countries and evaluates how well current U.S. Government programs provide assistance to U.S. project developers in these countries. As noted above, emphasis is placed on non-recourse project finance.

Chapter 5 presents additional recommendations.

THE IMPORTANCE OF CLEAN COAL TECHNOLOGY EXPORTS

Many countries with domestic coal resources are planning to increasingly use their reserves to satisfy growing energy needs. Others plan to import coal to meet some or all of their power generation and industrial energy needs. Coal provides an abundant, secure and economic resource for these countries.

At the same time, environmental concerns about the impacts of coal are growing. CCTs allow coal to be utilized economically, efficiently and with very low levels of pollution, and will play an important role in world energy markets. CCTs include both advanced state-of-the-art technologies in use today (i.e., Flue Gas Desulfurization, Atmospheric Fluidized Bed Combustion, Integrated Gasification Combined Cycle) and technologies under development (i.e., Pressurized Fluid Bed Combustion). Increased coal consumption coupled with environmental concerns will work together to increase demand for CCTs throughout the world. This report focuses on the market for CCTs in power generation markets because power generation is, by far, the largest market and power generation projects tend to be financed individually.

A recent report by the U.S. Department of Energy found that the potential cumulative CCT market for new facilities, retrofit installations and follow-on work outside of the U.S. for 1992-2010 is projected to be between \$270 billion and \$750 billion, with \$422 billion as the base case.¹ This represents a potential \$23.4 billion per year market. This investment could result in between \$68 billion and \$225 billion (with \$109 billion expected) of exports for CCT-exporting nations, as well as creation of between 53,000 and 173,000 jobs in these nations, with about 84,000 jobs as the expectation. Nevertheless, the U.S. often does have a competitive edge in certain types of services and this

The Department of Energy report found that aggressive action by U.S. companies to capture a share of this market could lead to significant environmental benefits, reduction in the trade deficit, and increased employment, especially in high technology engineering and manufacturing. Bringing to the U.S. a large share of the estimated 84,000 new export-related jobs would strengthen the U.S. competitive position by increasing aggregate demand for domestic goods and services, thus benefitting sectors of the economy not directly related to the clean coal or energy industries. These benefits would be realized not only through the export of U.S. goods and services, but through direct foreign investment by U.S. companies. In addition, U.S. industry will remain more competitive in both foreign and domestic markets, and the economic, energy and environmental benefits to our foreign trade partners will contribute to a more stable environment in which to conduct U.S. foreign policy.

Development of a CCT project will benefit both the U.S. and the host nation for the project. A CCT project is a large and complex undertaking involving many different suppliers of goods and services and these may be provided over many years during the planning, construction and operation of the project. U.S. firms typically only provide a portion of these goods and services. Other goods and services are provided from local sources and even from third countries. The goods and services that would be imported from countries such as the U.S. for CCT projects tend to be of high value and to fall into five basic categories:

- Architect, engineering and construction services to design and build the projects,

¹U.S. Department of Energy, "Working Paper: Market Potential For Clean Coal Technology Exports," September 1992.

- Project development services including securing investments in the project and managing the development and operation on the project,
- Fabricated equipment which is normally high-value and custom-designed for the specific project,
- Components which may be standardized (e.g. pumps, fans and metering equipment), and
- Other services (for example, financial, environmental and training services).

A variety of other goods and services related to the project tend to be obtained locally or from a competitive source unrelated to the specific technology of the project:

- Construction and operating labor,
- Materials and supplies,
- Fuel and transportation services,
- Equipment and supplies, and
- Some fabrication activities.

The exact mix of imported and domestic goods and services varies with the location of the project and the degree of skills and infrastructure development in the host country. Some countries may already have extensive engineering and manufacturing capability and may participate more in the project; others may have less. Typically, local content rises as a country develops and becomes more capable of providing more sophisticated goods and services -- especially when the need for these services is large and is expected to continue to grow. In addition, the operation of CCT powerplants will require the training and utilization of local personnel and the development of local sources for many types of supplies and services, which will further assist the development of the country.

Local laws, tariffs and customs regarding imports for a project vary and will also affect the import content. Even so, specific companies--and countries--tend to have comparative advantages in specific goods and services. These advantages may arise by virtue of history, economics, technical expertise or industry structure. Exporting countries can expect to retain at least some of this comparative advantage over time, and this serves to keep them in the forefront of the provision of their goods and services. The U.S., with its substantial expertise in project development and finance; utility planning, construction and operation; and

technological development of CCT, should be able to maintain a comparative advantage in the CCT industry for many years.

Various types of partnering arrangements also provide an additional basis for economic growth of developing and transitional countries. These arrangements could include joint ventures, licensing or other cooperative ventures that help develop local manufacturing and industrial service.

CCT projects can also provide numerous benefits to the countries in which the projects are built:

- **Environmental Advantages.** CCTs minimize the environmental impacts associated with growth or previous environmental neglect by reducing potentially harmful emissions.
- **Energy Self-Reliance.** CCTs offer developing nations increased fuel flexibility by accommodating low-grade domestic coal, lignite or peat reserves while increasing energy self-reliance.
- **Economic development.** Nearly all overseas CCT projects utilize large quantities of local labor and supplies, thus increasing local employment. CCTs can also encourage the use of local coal, facilitating the development of domestic mining industries, further expanding employment in developing countries. In some of these countries, especially ones with large power needs, a domestic industry to support power plant development and operations may evolve.
- **Electrification.** By allowing for the use of local resources, CCTs help to make electrification economically feasible in developing countries. Electrification offers modernization, economic growth, improved quality of life, job growth and increased industrial efficiency and domestic output.
- **Access to capital.** Importing U.S. CCTs to meet required environmental standards enables foreign countries to qualify for a wide range of assistance from multilateral development banks and U.S. government export assistance programs.
- **Debt reduction.** Equity participation by U.S. firms in new projects offers developing countries an opportunity to raise capital without increasing their often substantial foreign debt, or sacrificing hard currency.
- **Political stability.** Economic growth is brought about by domestic and U.S. investment, jobs and the benefits of electrification.

OPPORTUNITIES IN COUNTRIES WITH DEVELOPING AND TRANSITIONAL ECONOMIES

Worldwide coal use is expected to increase by 23 percent between 1990 and 2010, from 5.2 to 6.4 billion short tons.² This increase in coal consumption will be accompanied by a corresponding increase in the demand for CCTs, which will allow these countries to use coal economically, efficiently and with greatly reduced emissions. By far the greatest opportunities for CCTs lie in developing countries and countries with transitional economies (that is, formerly communist countries moving toward a free market economy).

Developing and transitional countries differ in two ways. In the transitional countries, past energy strategies have promoted inefficiency and caused serious damage to the environment. These countries also require enormous infrastructure improvements at a time when their economies are rapidly declining. Many developing countries, on the other hand, have inadequate power plant infrastructure but are experiencing strong growth in their economies. No two countries, however, have exactly the same problems, and the distinctions between developing and transitional countries are ones of degree. Each of these countries shares the basic need to use coal cleanly and efficiently.

In China, the former Soviet Union and Eastern Europe, coal has long been the dominant energy source, providing 77 percent of primary energy consumption in 1990 in China and 61 percent in Eastern Europe. Coal also accounts for 20 percent of primary energy use in the countries of the Newly Independent States. Economic growth will continue to be dependent on coal in all of these countries. In the Newly Independent States, oil production is forecast to decline, and oil and gas will be exported to earn hard currency, leaving much of the domestic energy growth to be served by coal. Movements toward a market economy system in China, Eastern Europe and the Newly Independent States should create incentives for more efficient use of coal resources. Other countries such as Chile, Indonesia, Pakistan, the Philippines and Thailand are embarking on a path toward increased energy self-reliance by developing domestic coal mining industries.

²Energy Information Administration, International Energy Outlook 1992, DOE/EIA-0484(92), Washington, D.C., April 1992, p.30.

Developing Countries

Many developing countries have domestic coal resources and are looking to these resources to satisfy rapidly growing energy needs. Others plan to import coal. While approaches vary by country, new power plant construction will be the main focus. In some countries, repowering and/or retrofit emission controls may also be needed to increase the efficiency and/or environmental performance of existing power plants. The developing countries with the most significant potential for CCTs include--

<u>Asia/Pacific</u>		<u>Latin America</u>	<u>Africa</u>
China	Pakistan	Argentina	Zimbabwe
India	Philippines	Brazil	
Indonesia	Taiwan	Chile	
S. Korea	Thailand	Columbia	
Mongolia	Vietnam	Mexico	

China is the world's largest coal consumer, having consumed 1,014 million metric tons in 1989, and expects the greatest growth in coal use (see Table 1-1). The Energy Information Administration forecasts a 66.4 percent increase in China's already substantial coal consumption between 1990 and 2010. China also faces environmental problems similar to those faced by the transitional market economies, partially as a result of government-established price controls on domestically produced coal supplies. Increasing utilization of CCTs will allow the Chinese to slow or even reverse the harmful effects of coal combustion upon the air, water, buildings and citizens.

Elsewhere in the Asia-Pacific region, rapid economic growth coupled with substantial indigenous coal supply combine to create a large potential CCT market. The International Energy Agency expects this rapidly industrializing region to continue to lead overall growth in coal consumption among nations who are not members of the Organization of Economic Cooperation and Development. In Thailand, for example, coal is expected to increase its share of total energy required from 10 to 25 percent by the year 2000. Similarly, during the same period coal demand will grow significantly in South Korea, Taiwan and Indonesia. Countries such as India, Pakistan and the Philippines also present good opportunities for the application of U.S. CCTs.

Table 1-1
COAL PROFILES: DEVELOPING COUNTRIES (1989)

Region/ Country	Percent Coal Use By Sector			Total Consumption (Thousand Metric Tons)	Reserves (% of Total World)
	Power Gener- ation	Industry	Other		
Asia-Pacific					
China	25	9	66	1,014,000	44.9
India	52	13	37	202,020	3.8
Indonesia	62	36	2	5,488	0.2
Korea, S.	18	35	46	43,266	0.0
Pakistan	0	100	0	3,524	0.0
Philippines	51	31	19	2,085	—
Taiwan	49	41	10	17,809	0.0
Thailand	76	14	10	8,965	0.1
Vietnam	33	0	67	4,900	—
Latin America					
Argentina	18	75	7	1,673	N.A.
Brazil	17	77	6	16,067	0.1
Chile	62	14	23	3,422	0.1
Columbia	25	47	28	5,041	0.6
Mexico	54	46	0	5,886	0.1
Africa					
Zimbabwe	51	8	41	5,081	0.0

* Based on 1971-1989 data
N.A. - Not Available

Source: Organization of Economic Cooperation and Development/International Energy Agency, Energy Statistics and Balances of Non-OECD Countries, 1988-1989 and Department of Energy/Energy Information Administration, International Energy Annual 1989, DOE/EIA-0219(89).

In Latin America, sustained economic growth requiring more electricity generation will drive the market. Many Latin American countries present long-term opportunities for U.S. CCT exports. The Dominican Republic has strong interest in coal-fired power generation and has existing and planned units. Bolivia, Brazil, Chile, Columbia, Ecuador, Guatemala, Honduras,

Jamaica, Panama and Peru also offer export opportunities. Many of these countries have already expressed interest in American technologies.

Countries with Transitional Market Economies

These include the countries of the former Soviet Union and Eastern Europe. Those with the greatest potential include--

Former Soviet Union

Belarus	Lithuania
Estonia	Moldova
Kazakhstan	Russia
Latvia	Ukraine

Eastern Europe

Bulgaria
Czech Republic
Hungary
Poland
Romania
Slovak Republic

Coal use for power generation and industry in these countries is already high, but growing environmental pressures will increase the demand for CCTs (see Table 1-2). Emissions from the combustion of coal and other fossil fuels have been cited as a major contributor to several environmental problems, ranging from smog to acid rain and global climate change. While debate continues as to the actual threat posed by these environmental issues and the role played by fossil fuels, several organizations -- including the United Nations and the European Community -- have begun to take steps to limit emissions from coal combustion. For example, in an effort to prevent potentially dangerous climate change, more than 140 countries signed a global climate change treaty at the 1992 United Nations Conference on Environment and Development. The treaty requires each country to implement a national program that aims to reduce carbon dioxide emissions to 1990 levels.

Environmental concerns are particularly pressing in Eastern Europe and the Newly Independent States. Years of reliance upon low-quality, heavily polluting indigenous coal resources have taken a heavy toll upon the land and the people of these regions. As these nations seek to form business and economic alliances with other nations, they will come under increasing pressure to conform to international environmental standards.

Table 1-2
COAL PROFILES: TRANSITIONAL MARKET ECONOMIES (1989)

Region/ Country	Percent Coal Use By Sector			Total Consumption (Thousand Metric Tons)	Reserves (% of Total World)
	Power Gener- ation	Industry	Other		
USSR*	50	21	30	707,669	14.8
E. Europe					
Bulgaria	74	4	23	40,500	0.2
Czechoslovakia	63	12	25	116,799	0.3
Hungary	59	6	22	21,832	0.3
Poland	57	12	31	223,031	2.5
Romania	54	12	35	66,543	N.A.

* Based on 1971-1989 data

* Data for newly-independent states which formerly comprised the Soviet Union and Czechoslovakia are unavailable.

N.A. - Not Available

Source: Organization of Economic Cooperation and Development/International Energy Agency, Energy Statistics and Balances of Non-OECD Countries, 1988-1989 and Department of Energy/Energy Information Administration, International Energy Annual 1989, DOE/EIA-0219(89).

Large-scale coal utilization in Eastern Europe is expected to continue, driven by electric utility requirements. Only CCTs provide a means to limit emissions, while allowing these countries to increase their use of coal to satisfy their energy needs. The challenge will be to correct the damage of decades of environmental neglect without adding to already-considerable economic disruption. The transitional market economies should be a particularly strong export opportunity for retrofit technologies.

For transitional countries, CCTs offer a way to minimize the environmental impacts associated with growth or previous environmental neglect. They reduce particulate, sulfur dioxide and nitrogen oxide emissions; use less water; produce lower quantities of waste products; and create more reusable by-products.

Advanced CCTs have higher efficiencies than conventional coal-fired equipment with post-combustion controls, and therefore reduced carbon dioxide emissions. In addition, CCTs offer developing nations increased fuel flexibility by accommodating low-grade domestic coal, lignite or peat reserves while increasing energy self-reliance. CCTs under development can also upgrade these low-rank coals for export markets. Both of these benefits can facilitate the development of domestic mining industries, expanding employment in developing countries.

ASSISTANCE PROVIDED BY U.S. GOVERNMENT AGENCIES

A number of U.S. agencies provide assistance for prefeasibility and feasibility studies and/or financing of international CCT power projects in developing and transitional countries. They include the Trade and Development Agency, the Export-Import Bank, Overseas Private Investment Corporation, the Agency for International Development and the Small Business Administration. In addition, cooperative efforts are performed by the Federal International Energy Trade and Development Program through the Department of Energy.

Two types of assistance are provided by these agencies. The first type includes funding for a full range of feasibility studies, definitional missions and training. This is the initial "seed capital" that helps find the projects that can be successfully financed. The second type includes direct loans, guarantees and insurance for projects that are in the financing stage, to supplement multilateral development bank funding and to help attract private funds. Coordination among these agencies is a significant concern and was the primary focus of the previous Report to Congress.

APPROACH

This report examines the progress made to implement the recommendations of the earlier Report to Congress. It also examines the adequacy of U.S. Government financial assistance for prefeasibility and feasibility studies and in the financing of CCT projects in developing and transitional economies. A four-step approach is used:

1. **Identify the progress to implement recommendations of the previous Report to Congress.** The most important action taken to implement recommendations of the Report to Congress was the establishment of a CCT Subgroup to the Energy, Environment and Infrastructure Working Group of the Trade Promotion

Coordinating Committee in June 1992. The CCT Subgroup's first step was to develop a strategic plan identifying specific activities to implement the various recommendations of the Report to Congress. The implementation of these recommendations is assessed.

2. **Describe existing financing programs for countries with developing and transitional market economies.** This report delineates the programs available for both the prefeasibility/feasibility studies and the financing. Profiles are developed for the relevant program at U.S. government agencies and multilateral development banks. The role of private providers of capital is also considered. This report specifically addresses non-recourse project finance, the type of financing likely to be used for most CCT projects in developing and transitional economies.
3. **Assess the adequacy of these programs.** The report evaluates how well existing U.S. government, multilateral development bank programs and private sources meet market needs and foreign competition.
4. **Recommendations.** Recommendations are made to facilitate further implementation of recommendations made in the earlier Report to Congress and to improve financial assistance available to countries with developing and transitional economies.

Chapter 2

PLANS AND ACTIONS TAKEN TO IMPLEMENT THE RECOMMENDATIONS AND FINDINGS

Section 409 of the Clean Air Act Amendments of 1990 (PL 101-549) required the U.S. Department of Energy to submit a report to Congress on U.S. Government programs related to the export of Clean Coal Technology (CCT). That section of the Act states-

The Secretary of Energy in consultation with the Secretary of Commerce shall provide a report to the Congress within one year of enactment of this legislation which will identify, inventory and analyze clean coal technologies export programs within United States Government agencies including the Departments of State, Commerce, and Energy and at the Export-Import Bank and the Overseas Private Investment Corporation. The study shall address the effectiveness of interagency coordination of export promotion and determine the feasibility of establishing an interagency commission for the purpose of promoting the export and use of clean coal technologies.

A report fulfilling this requirement was submitted to Congress on February 28, 1992¹. This chapter first summarizes that prior report to Congress and then describes the actions that have been taken to implement the recommendations of that Report to Congress.

SUMMARY OF THE PRIOR REPORT TO CONGRESS

The Report to Congress found that U.S. industry has a substantial opportunity to export CCTs. It noted that international markets for CCTs exist and are growing rapidly. The report further explained that U.S. industry has been a leader in the development of CCTs and has the basis to become a leader in worldwide CCT development. Nonetheless, it pointed out four significant barriers that face potential U.S. exporters of CCTs:

- Greater assistance to foreign competitors from their governments;
- Lack of U.S. vendor presence in foreign CCT markets;
- Insufficient demonstration of U.S. CCTs overseas; and
- Antitrust law/intellectual property concerns.

¹U.S. Department of Energy, Clean Coal Technology Export Programs, February 1992.

The report presented a number of U.S. government export assistance programs that could help American CCT manufacturers overcome these hurdles, but it found that, for the most part, these programs are not coordinated in any ongoing or comprehensive fashion. The Report recommended utilizing an existing coordination mechanism, the Trade Promotion Coordinating Committee, to take a proactive role in overseeing export assistance efforts of the U.S. government. Other recommendations included implementing a one-stop export assistance program for CCTs, developing innovative financing packages, helping to facilitate overseas demonstrations, and working closely with multilateral development banks to ensure proper representation of U.S. technologies in their projects.

Findings

The Report noted that the Energy Information Administration projects that coal consumption will increase worldwide and that this increase will be most rapid in developing and newly industrialized nations where the greatest economic growth will occur. It found that countries planning to increase coal use face a considerable challenge in doing so in a cost-effective manner while, at the same time, reducing and minimizing environmental impacts. CCTs offer utility and industrial planners the opportunity to meet this challenge. Environmental concerns are growing in parallel with the anticipated rise in coal use and this has expanded the market for CCTs. Countries throughout the world are acting to reduce pollution from existing and planned coal-fired electric generating facilities. Advanced technologies are cleaner and, in many cases, more efficient than conventional coal combustion equipment. Such technologies may also be crucial to some countries' ability to finance new energy investments, where sufficient internal financial resources do not exist, because major international lending institutions such as the World Bank require that advanced environmental standards be met as a condition of financial assistance.

According to the Report, the U.S. is well-positioned to be at the forefront of the emerging CCT market, as American companies design, manufacture and construct some of the most advanced technologies available for the preparation and utilization of coal. In addition, the U.S. Government and industry's commitment to these advanced technologies through the U.S. Department of Energy's Clean Coal Technology Demonstration Program has been unparalleled.

Yet despite these advantages, the Report noted that U.S. CCT vendors do not command a large share of overseas markets, and often trail behind German, Japanese, French, Swedish and Italian companies. These companies market similar products, have traditionally been very active in international markets and have received substantial assistance from their home governments.

According to the Report to Congress, while gaining an increased share of the world's CCT market offers numerous benefits to American companies, doing so will also require significant efforts on the part of both the companies and the U.S. government. Effective and coordinated export assistance efforts will allow U.S. CCT vendors to overcome such barriers as high market entry costs and difficulties in arranging for financing. Market entry costs include assembling and training an overseas support staff, acquiring and analyzing country-specific market data (export/import regulations, foreign marketing, distribution and service networks), researching business opportunities, maintaining important marketing contacts, and overcoming language barriers. In addition, increased U.S. government assistance to American manufacturers can help to overcome the actions of several foreign governments which strongly encourage their domestic companies to focus on coal technology exports, and provide extensive financial and direct export assistance.

The Report inventoried Federal programs which can be used to promote the export of CCTs. It found that a number of Federal agencies have export assistance programs which could help U.S. firms compete in the international CCT marketplace (see Figure 2-1). These programs offer support ranging from market information to financial assistance. While many of the programs could be beneficial, few are specifically oriented toward CCTs, and greater coordination is required to ensure that exporters can readily obtain the mix of assistance best suited to their needs and ensure that there are no gaps or duplication in Federal activities. The Report found that despite the broad range of the programs, none has the authority to implement coordination with regard to CCT exports. Only limited efforts are devoted to CCTs. The Report concluded that improved coordination of U.S. Federal Government efforts would increase the effectiveness of current Federal export promotion and assistance programs and would most efficiently leverage available Federal funds.

Agency/ Organization	Types of Assistance							
	Trade Missions	Loans	Insurance	Guarant.	Exporter Information	Trade Policy Development	Technology Demonst/ Assistance	Feasibility Studies
Agency for International Development	O	X			●		●	O
Dept. of Commerce/Int'l. Trade Admin.	X				X		X	
Department of Energy	●				●	X	X	●
Department of State					X	X		
Environmental Protection Agency	O				O		X	
Export-Import Bank		X	X	X				
Foreign Credit Insurance Association			X					
Private Export Funding Corporation		X						
International Trade Commission						X		
Overseas Private Investment Corp.	X	X	X	X	X			
Small Business Administration	X	X		X	X			
U.S. Trade and Development Agency					X			X
U.S. Trade Representative						X		
U.S. Executive Director Office (MDB)*					X	X		

KEY: X - Broad export assistance program
O - Environmental export program that includes CCTs
● - International CCT program

* Denotes information updated since previous report to Congress

Figure 2-1. Summary of Federal Export Assistance Programs

Recommendations

The Report recommends an active role for the Trade Promotion Coordinating Committee (TPCC) in promotion of CCT exports. The TPCC is an interagency organization created initially by Presidential memorandum in May 1990, and established in statute by the Export Enhancement Act of 1992 (PL 102-249). TPCC's mandate is to coordinate the export assistance activities of the Federal government. The TPCC is chaired by the Secretary of Commerce and member agencies are the Departments of State, the Treasury, Defense, Agriculture, Labor, Transportation and Energy; the Office of Management and Budget; the Office of the U.S. Trade Representative; the Council of Economic Advisors; the Environmental Protection Agency; the Small Business Administration; the U.S. Agency for International Development; the Export-Import Bank of the United States; the Overseas Private Investment Corporation; the Trade and Development Agency; and the U.S. Information Agency. The TPCC is organized into twelve interagency working groups focusing on specific regions, sectors and issues. The Energy, Environment and Infrastructure Working Group is the working group whose responsibility is most closely related to CCT export promotion.

The Report recommends that TPCC activities specifically address three of the barriers to CCT exports: the greater financial assistance by governments of foreign competitors, a lack of

presence by U.S. CCT vendors in foreign markets and the need to demonstrate U.S. CCTs abroad. The TPCC could focus existing programs and already-available resources within Federal agencies without additional funding.

Eight specific recommendations were made in the prior report:

- 1) **Create a permanent CCT Subgroup to the Energy, Environment and Infrastructure Working Group of the TPCC to focus interagency efforts on CCTs.** This Subgroup would serve as a mechanism for ongoing interagency communications and the development and implementation of coordinated activities to support CCT exports and be chaired by a representative of the Department of Energy. The Subgroup should maintain ongoing communication with other TPCC working groups focusing on issues affecting CCTs or on regions where CCTs could be important.
- 2) **Implement a one-step export assistance program for CCTs.** The complexity of obtaining financial assistance for large CCT projects could be greatly simplified through the creation of a one-step process for information collection/dissemination and program application. The Committee on Renewable Energy, Commerce and Trade has developed a universal application form suitable for all member agencies that could serve as a model for this one-step process.
- 3) **Develop innovative financing packages for CCTs that crosscut agencies.** Government export organizations must work together to design comprehensive packages of financial assistance tailored to the CCT marketplace. In addition, financial and performance guarantees by the U.S. government would help considerably to offset perceived CCT project risks and would also demonstrate Federal commitment to these technologies and exporters.
- 4) **Develop CCT Export Information Base to Support TPCC's Trade Information Center.** This information base would serve the needs both of our own exporters and their potential customers overseas, and would support more targeted and proactive efforts. Ongoing information on potential CCT projects and markets worldwide should be assembled for use by U.S. firms. Information of this type would also be useful for assisting a wide range of U.S. exports in the energy and environmental areas.
- 5) **Develop an ongoing and integrated interagency program in cooperation with industry to bring U.S. CCTs to the attention of potential foreign customers.** A long-term program consisting of trade exhibitions, trade missions, reverse trade missions and training programs is essential. These activities should have three objectives: to learn more about potential customer needs; to sensitize U.S. industry to those needs; and to make potential foreign buyers aware of U.S. CCT products and services.
- 6) **Federal agencies need to work together and with industry to develop foreign demonstration of U.S. Clean Coal Technologies.** These projects would showcase U.S. technologies for potential foreign buyers, bring U.S. firms to enter the export market

and reduce perceptions of technical and economic risks. Emphasis should also be given to adapting U.S. CCTs to foreign conditions, with emphasis on smaller scale and modular construction.

- 7) **Conduct an interagency study to characterize the competitive status of the international CCT industry.** Federal agencies with an interest in CCTs should cooperate in the development of a study to analyze the CCT industry worldwide--its markets, participants and competitive practices. The results of this study could be used by both the U.S. government and CCT industry as a basis for strategic planning.
- 8) **Coordinate with multilateral development banks to ensure that U.S. technologies are properly represented in their projects.** At a minimum, this will require monitoring of the relevant activities of these institutions. Possibly, it may also involve technical and financial participation in the energy and environmental programs of these organizations. These institutions should be encouraged to use U.S. firms in the preinvestment and feasibility stages of their work.

IMPLEMENTATION OF THE RECOMMENDATIONS OF THE PRIOR REPORT

The two most important accomplishments since the submission of the Report to Congress are the establishment of the Subgroup on Clean Coal Technologies and the development of a Strategic Plan. The establishment of a CCT Subgroup to the Energy, Environment and Infrastructure Working Group became reality shortly after the Report's submission. The CCT Subgroup met formally, as a whole, twice during 1992 and has adopted a plan of regular meetings under the chairmanship of the Department of Energy. The CCT Subgroup is comprised of representatives of the thirteen agencies belonging to the Working Group (see Table 2-1).

Table 2-1
Agency Members of the Clean Coal Technology Subgroup

Department of Energy	Department of Defense
Department of State	Department of Commerce
Department of Labor	Department of Transportation
Agency for International Development	Small Business Administration
Overseas Private Investment Corporation	Environmental Protection Agency
National Oceanic and Atmospheric Administration	Export-Import Bank of the U.S.
Trade and Development Agency	

The first action taken by the CCT Subgroup was the drafting of a Strategic Plan, intended to serve as a framework for meeting the recommendations identified in the Report to Congress. The Strategic Plan was designed to establish the overall mission, goals and objectives of the

Subgroup, along with guidelines for agency responsibilities for the various plan components. The Draft Strategic Plan was discussed by the members of the Subgroup at the organizational meeting on June 5, 1992, and was later approved by the Subgroup as a whole. The Strategic Plan was also presented to officials of organizations with interests in CCT exports, who were unanimous in their endorsement.

Strategic Plan Initiatives, Goals and Activities

The CCT Subgroup Strategic Plan developed five initiatives:

- Market Information,
- "Door Opening" Programs,
- Project Development Teams,
- Feasibility Studies/Foreign Demonstrations, and
- Financial Support for Projects.

The relationship between the recommendations and initiatives is illustrated in Figure 2-2. The intended goals of each of these initiatives are highlighted below, as well as future steps to be taken toward achieving these goals.

REPORT TO CONGRESS RECOMMENDATION	CCT STRATEGIC PLAN INITIATIVE				
	MARKET INFORMATION	DOOR OPENING	PROJECT DEVELOPMENT TEAMS	FEASIBILITY DEMONSTRATIONS	FINANCIAL SUPPORT
1. CREATE CCT SUBGROUP	X	X	X	X	X
2. ONE-STOP ASSISTANCE	X				X
3. INNOVATIVE FINANCING			X		X
4. EXPORT INFORMATION BASE	X			X	
5. FOREIGN CUSTOMER AWARENESS	X	X		X	
6. JOINT DEMONSTRATION PROJECTS			X	X	
7. COMPETITIVE STATUS OF INTERNATIONAL CCTs	X				
8. COORDINATION WITH MULTILATERAL DEVELOPMENT BANKS	X	X	X	X	X

Figure 2-2. Relation of Report to Congress Recommendations to CCT Strategic Plan Initiatives

Market Information. The goals of the Market Information Initiative are to focus and increase the effectiveness of current programs, develop ongoing interagency activities and procedures for information collection in foreign countries and tie in all government information sources; to establish information bases needed by exporters and their customers; to develop materials and programs for effective information dissemination; and to identify, analyze and prioritize overseas markets and assess information and assistance needs of potential exporters and customers. The CCT Subgroup is currently developing a CCT newsletter, to be published on a regular basis and distributed to government agencies, CCT vendors, U.S. embassies and potential foreign customers. The Subgroup is also working with the Commerce Department to add timely CCT export data to the National Trade Data Bank, a monthly compact disc read-only-memory subscription service.

"Door Opening" Programs. This initiative is intended to assist and enable U.S. firms to bring their technologies to the attention of foreign customers and ensure that they are actively considered -- and to increase awareness by potential customers of export opportunities and provide for follow-up. In order to address this initiative, the TPCC Subgroup will support trade missions and reverse trade missions, conferences, workshops and meetings; expand technology training/exchange programs; and focus research and development cooperation to support successful U.S. projects and export trade abroad. The first steps taken toward aggressively utilizing U.S. embassies and the U.S. and Foreign Commercial Service will also serve as an important part of satisfying this initiative.

Project Development Teams. Organization of project development teams would aid U.S. coal and technology projects to gain acceptance by foreign customers; and would demonstrate to U.S. electric utilities the potential benefits of serving as "quarterback" for project development teams. This initiative will require the Subgroup to make efforts toward encouraging turn-key operating systems in project proposals; to encourage programs to facilitate equity ownership by U.S. partners; and to provide training at operating U.S. facilities and on-site.

Feasibility Studies/Foreign Demonstrations. The goal of this initiative is to provide government assistance and support for commercial deployment of U.S. CCTs in projects that include a significant export component for U.S. equipment and services to high-risk areas such as

developing countries and countries in transition. Support for projects is provided through cost-shared feasibility studies. The U.S. Federal International Energy Trade and Development Opportunities Program provides the means to accomplish this objective. This program is described in detail on page 2-14. The TPCC Subgroup needs to encourage other government agencies to support cost-shared feasibility study programs; demonstrate assurance of acceptable project performance through feasibility studies; and encourage CCT projects in major markets to serve as a showcase and focus for these technologies in major export markets. Several Subgroup member agencies have existing programs in this area. These programs are described in Chapter 3.

Financial Support for Projects. Better-organized financial support for U.S. projects would help overcome barriers such as concessional financing incentives offered by U.S. competitors, would augment U.S. government trade finance programs to reflect the realities of coal technology projects and would develop alternatives to grant assistance programs that recognize fiscal constraints, assure financial viability of projects, and eliminate financial risks to U.S. taxpayers. While the Federal International Energy Trade and Development Program offers financing for feasibility studies, additional efforts are needed in the areas of insuring continued U.S. government support for cost-shared feasibility studies, encouraging decisions based on life-cycle costs with credit for environmental improvements and providing support for education and training.

STATUS OF ACTIONS TO IMPLEMENT STRATEGIC PLAN OF CLEAN COAL TECHNOLOGY SUBGROUP OF THE TRADE PROMOTION COORDINATING COMMITTEE

Much of the work completed to date to implement the Strategic Plan has been to plan and organize future activities. While several of the mechanisms necessary for accomplishing the goals set forth in both the Report to Congress and the TPCC Strategic Plan are now in place, further progress will require both the continued support and coordinated efforts of the member agencies.

Activities Initiated

Several activities to implement the Strategic Plan have occurred to date: CCT trade missions have travelled to the People's Republic of China, Indonesia and Thailand; and a preliminary international market assessment for CCTs has been completed.

Trade Missions. A U.S. coal technology trade mission visited Indonesia and Thailand in June 1992, and another trade mission visited the People's Republic of China in July 1993. The objective of these missions was to promote U.S. CCTs in markets deemed to hold exceptional potential for U.S. goods and services. The missions were led by officials from the Department of Energy and the Department of Commerce. Representatives from the Trade and Development Agency, the Agency for International Development, the Export-Import Bank, the U.S. Association of Southeast Asian Nations Council for Business and Technology and representatives from U.S. companies also participated. These missions identified specific trade opportunities and defined follow-on activities to be carried out by the CCT Subgroup to capture these opportunities. A series of reverse trade and study missions have been initiated following on the original CCT trade missions. In April 1993 representatives from Thailand visited U.S. CCT facilities; reverse missions from the People's Republic of China and Indonesia are planned for late 1993. Representatives from the Environmental Protection Agency will take part in these missions.

Market Assessment. As a first step toward assessing the competitive status of the international CCT industry, the CCT Subgroup, through the Department of Energy, commissioned two studies of the potential world market for CCTs through 2010. The first study² described broad trends in international coal use within the major foreign markets, and explained how these trends, coupled with growing environmental concerns, will create a major global market for CCTs. The study also identified the benefits that would accrue to the U.S. and other countries participating in CCT markets. U.S. involvement in the export markets would provide a number of benefits to foreign trading partners. These benefits include environmental advantages, energy self-reliance, economic development, electrification and access to capital. According to the study, American industry must seize the initiative to take

²U.S. Department of Energy, "World Markets for U.S. Clean Coal Technologies," Washington, DC, September 1992.

full advantage of this opportunity. Federal government assistance will be crucial to allow U.S. industry to fully realize the CCT export potential.

The second study³ sought to quantify the potential worldwide market potential for CCTs through 2010. The findings were dramatic: the potential CCT market outside of the U.S. for 1992-2010 was projected to be between \$270 and \$750 billion, with \$422 as base case--a potential \$23.4 billion per year market. The potential benefits to exporting nations are huge: between \$68 and \$225 billion (\$109 base case, \$6 billion per year) of CCT imports worldwide, and a potential for the creation of between 53,000 and 173,000 new jobs (84,000 jobs base case). The major export markets, according to the study, will be China (between \$18 and \$46 billion by 2010), the former Soviet Union (between \$9 and \$35 billion), and Eastern Europe (between \$10 and \$32 billion). Other significant markets include Other Developing Asia (between \$3 and \$20 billion), Developing Pacific Rim (between \$8 and \$20 billion), Developed Pacific Rim (between \$6 and \$16 billion), and Latin America (between \$0.4 billion and \$2 billion). This report helped underscore the findings of the Report to Congress and dramatically documented the importance of the CCT Subgroup's mission.

In Progress/Ongoing

Several activities designed to carry out one or more of the Strategic Plan's initiatives are currently underway. These include an industry dialogue, the initial activities of the Market Information Initiative, and CCT activities by the Federal International Trade and Development Opportunities Program.

Industry Dialogue. One activity is the initiation of dialogue with industry through face-to-face meetings between representatives of the CCT Subgroup and representatives of organizations with interests in CCT exports. To date, six such meetings have taken place--with the Clean Coal Technology Coalition, the National Coal Association, the Council of Industrial Boiler Owners, the Edison Electric Institute, the American Boiler Manufacturers Association and the Electric Power Research Institute. Several more such meetings are planned. The need for

³U.S. Department of Energy, "Working Paper: Market Potential for Clean Coal Technology Exports," Washington, DC, September 1992.

industry/subgroup communication is noted throughout the Strategic Plan. For example, the Plan identifies industry involvement as a requirement for success of the TPCC Subgroup. Further, the Plan specifically identifies the implementation of two-way communication with industry as a priority. The goal of these meetings between industry groups and the TPCC Subgroup is both to keep the Subgroup members informed as to the needs and activities of industry groups, as well as to ensure that industry groups are aware of the activities and potential assistance offered by the TPCC Subgroup, with the ultimate aim of facilitating cooperation and joint activities between the TPCC Subgroup and relevant industry organizations.

In February 1993, representatives from the Department of Energy and other Federal Agencies involved with the promotion of CCT exports met with representatives of project development and international finance organizations to discuss issues pertinent to international project development and finance. Topics discussed at the meeting included specific project financing issues, and areas for industry/government cooperation. Speakers highlighted the various risk factors that affect project developers in developing countries and how inherent risk is magnified when viewed in the context of a developing country or Eastern Europe; these risks are examined in detail in Chapters 3 and 4. Further, the industry representatives see a need for U.S. interests to work together to achieve the export of environmentally positive U.S. CCTs. Industry felt that the U.S. government can play an important role by providing timely information to U.S. exporters, streamlining the application process for prefeasibility and feasibility study funding, providing one-stop shopping and coordinating with the multilateral development banks. This initial meeting is the first step in what will be an ongoing process of communications between the government and industry.

Market Information Initiative. A detailed plan for the Market Information Initiative has been developed. The preliminary stage of the initiative will involve identifying the major potential and current players in the CCT export arena and their information needs; what current information exists and who is responsible for its collection; and who should serve as primary

coordinator of a proactive information exchange process. Subsequent goals of the Information Initiative include—

- Providing U.S. firms with the information they require, including adding to a computer databank, a newsletter and other information dissemination vehicles as soon as possible;
- Generating information on a country-by-country basis in order to generate substantial involvement by private U.S. CCT vendors and project developers;
- Encouraging financial institutions to provide effective private financing;
- Keeping U.S. firms' capabilities constantly in the view of foreign customers;
- Fostering communication about export opportunities among U.S. firms, thus facilitating effective teaming arrangements; and
- Developing export synergies between the CCT industry and related industries, such as pollution control, power generation equipment and services, and coal.

The Information Initiative will rely heavily upon the U.S. and Foreign Commercial Service, U.S. embassies worldwide and the Agency for International Development as information sources. These sources could monitor opportunities on a country-specific level by tracking relevant energy development projects, regulations, specific technical requirements, contacts, local decision factors and political and financial risks; monitoring activities of foreign competitors on an ongoing basis; monitoring changes in intellectual property laws; and following potential trading partners' political stability and credit worthiness. Other sources, such as local U.S. government agencies, could keep track of the latest import/export regulations. Potential recipients of collected data would include U.S. vendors (architects, engineers, attorneys, other consultants, construction firms, project management firms, manufacturing companies, and pollution control and power equipment industries), trade associations, customers, foreign governments, the U.S. government and financial organizations worldwide. Though currently still in the planning stage, work on the project continues.

Clean Coal Technology Export Database. An important step toward fulfilling the Market Information Initiative is the development and maintenance of a database for use by exporters and customers. Rather than duplicating previous government efforts, this is being done in

conjunction with the National Trade Data Bank (NTDB), a previously-existing monthly electronic source of data containing over 100,000 documents from 17 government agencies and one private organization. The NTDB includes current data on overseas markets and exporting, as well as U.S. and international economic data. NTDB was created in response to the Omnibus Trade and Competitiveness Act of 1988 which required Commerce to provide "reasonable access, including electronic access" to vital international and export-related data. NTDB is issued monthly on two compact data discs, and is available for \$360 a year or \$35 per month. The compact data disc technology allows for rapid access to any data appearing on the disc, as well as convenient browsing of data of interest. The information contained in the NTDB changes frequently, as the Commerce Department continues to refine the database in an effort to best serve its users. The CCT Subgroup plans to include relevant CCT export data, such as foreign market information and U.S. government assistance availability, and then distribute the compact data discs to subscribers including those CCT manufacturers interested in export opportunities.

Federal International Clean Coal Technology Activities. Ongoing activities intended to address Strategic Plan initiatives are feasibility studies and technology promotion activities funded by the U.S. Trade and Development Agency (TDA), the U.S. Agency for International Development (A.I.D.), and the Federal International Energy Trade Development Program (FIETOP). The latter is a cooperative program involving the Department of Energy, TDA, and A.I.D. Both TDA and A.I.D. have assessed the application of a range of CCT's in developing countries and have initiated such assessments in transitional countries. A.I.D. also operates the Energy Project Development Fund which cost-shares feasibility studies with U.S. energy companies.

FIETOP is intended to establish a formal cooperation and sharing of resources to support commercial development of international trade opportunities for U.S. industry and environmentally sound economic development worldwide through funding assistance for feasibility and planning studies for projects that contain a significant export component for U.S. equipment and services. The three participating agencies have issued a joint announcement of program interest in receiving proposals for international energy trade and development opportunities for CCT projects. Proposals meeting program requirements and

technical review may be eligible for cost-shared funding support by one or more of the participating agencies. CCT Subgroup support of FIETOP falls within the following initiatives: Market Information, Feasibility Studies/Foreign Demonstrations, and Financial Support for Projects.

Financial. The United States-Asia Environmental Partnership Program has provided grants to improve the availability of information on sources of project finance and will aid in the financing of CCT demonstration projects. The United States-Asia Environmental Partnership Program has also initiated the Infrastructure Finance Advisory Service which is a cooperative effort of the U.S. Agency for International Development, U.S. Export-Import Bank, Overseas Private Investment Corporation, Trade Development Agency, and the Small Business Administration. The Infrastructure Finance Advisory Service helps promote U.S. environmental and energy infrastructure projects, including CCT exports, to Asia and the Pacific. This service is also creating a universal application for financing from the five agencies listed above.

To Be Started

The CCT Subgroup has already started to address the current needs of CCT exporters.⁴ A great deal of the implementation is planned but yet to be started. The CCT Subgroup's Strategic Plan identifies three priorities: begin dialogue with industry; develop means to overcome financial barriers; and identify, analyze and prioritize potential overseas markets. Industry dialogue and analysis of overseas markets are underway. Activities to address financial barriers are currently being planned. Issues and recommendations relating to these concerns are discussed in subsequent chapters of this report.

⁴The Trade Promotion Coordinating Committee is currently being reconstructed in accordance with the Export Enhancement Act of 1992 in order to mobilize and integrate overall U.S. trade and export promotion activities. The Department of Commerce is also leading an inter-agency initiative to respond to the President's Earth Day request of April 21, 1993, directing EPA and the Department of Commerce and Energy to "...create a strategic plan to give our companies the trade development, promotional efforts, and technical assistance they need to turn these advances into jobs here in America, as well as to help promote a better environment". These initiatives are currently in progress and the activities of the CCT subgroup will be adjusted accordingly.

Chapter 3

FINANCING OF PREFEASIBILITY AND FEASIBILITY STUDIES

A sequence of studies is usually performed before a new international power development project is ultimately financed in order to provide a basis for both establishing the financeability of the project as well as to develop its technical, operational and financial structure. These studies are the initial "seed capital," used to confirm the projects that can be developed successfully. Positive results from these studies can identify potential benefits to the U.S. public, such as increased exports and job creation, as well as new and profitable business for the private sector. The host country will benefit by the construction of economically and environmentally sound power projects.

Some of these studies are funded by U.S. government agencies, others by private interests or by a mix of public and private funding. Four basic types of studies are usually conducted:

- Market Studies,
- Prefeasibility Studies,
- Feasibility Studies, and
- Project Design.

Each study is designed to evaluate the opportunities, costs and risks of power projects, in order to determine whether, and how, to proceed further. Each successive analysis involves more detail and specificity and, consequently, requires more time, effort and money. By performing these studies in sequence, potential investors -- whether independent developers or utilities -- can most efficiently determine their best options. Financial risk can be limited, because as projects are measured against the criteria of each study, potential investors move forward only with those projects that remain viable. These studies are particularly complex and vital to perform for Clean Coal Technology (CCT) projects because of the following:

- **CCT projects often have long lead times, especially those requiring project finance.** CCT projects generally take two to five years to be financed and then require up to 4 years for construction. Depending on the financial structure, the principals can be at substantial risk for an additional ten to fifteen years after the facility comes on-line. Thus, the country-risk portion of these studies must attempt to forecast the viability of these projects over at least a 20-year period.

- **These projects typically require greater initial investment than other power projects.** An investment in CCT of more than \$500 million in construction and development costs is not uncommon.
- **Choosing an appropriate CCT is vital to the successful financing and operation of a project.** The CCT must be matched with the type of coal that is available and must be a technology that has already been proven commercially viable and cost-effective.

This sequence of studies is performed by investors in power-generating projects regardless of whether they are in the United States, other developed nations or countries with developing and transitional economies. Analyses in countries with developing and transitional economies differ from those in developed countries in three basic respects:

- **The political risks can be extremely high.** Frequent, costly updates on the evolution of the political risks may be required during the analysis of the project. Often this requires the hiring of in-country consultants or consultants who are familiar with the prospective host country. Feasibility studies relating to country risk are not required in domestic CCT programs, and therefore such assessment is costly because it requires resources not internally available to the typical potential CCT exporter.
- **It is more difficult to assess the technical, economic and financial risks of the project.** Differing accounting standards and business practices add complexity and nuance. In addition, it is sometimes necessary to evaluate the problems inherent in the transition of the power projects from a state-owned utility to independent power.
- **Potential operators and customers may be new or reorganized and have no established track record as commercial entities.** Financial institutions need assurance that the operators and customers will be able to perform according to their obligations.

The less experience investors have with a country, the more likely a market or prefeasibility study will be performed prior to the full feasibility study. When a country's power needs and political risks are well-known and are felt from the outset to be acceptable and controllable, then the first formal appraisal of the project is often a feasibility study. Project design, the final activity before full project financing is completed, is when project developers complete the elements of the project that are necessary for successful financing to occur.

It is crucial for U.S. firms to be actively involved at the earliest possible stage of prefeasibility or feasibility assessment of power plant development in each high-potential country. Early involvement greatly increases the likelihood that U.S. CCT vendors or developers will be chosen, and that U.S. firms will subsequently be strong contenders for key roles, such as that of project developers. Relationships established at this phase may continue throughout the life of the project. Early decisions shape all subsequent ones, and early involvement provides information that is otherwise unavailable. It is particularly important at this stage to establish relationships of mutual trust with potential customers. This requires proactive efforts to seek out and define projects which are, or may become, available.

DESCRIPTION OF STUDIES

Market and prefeasibility studies are performed to screen candidate countries and projects, and thereby limit the amount of time and money spent evaluating projects that are least likely to succeed. The criteria for project selection start out broadly in the first studies, becoming highly specific and detailed in the later studies. The studies seek to identify when market, technical/economic or financial barriers exist, and no practical solutions are available:

Market

- Low priority of the project to host country,
- Lack of market for the power, or
- Absence of an adequate legal, institutional or commercial framework.

Technical/Economic

- Technical or economic infeasibility,
- Inadequate availability of coal or other vital skills or resources,
- Lack of workable sites,
- Inappropriate technology for the application,
- Lack of development or operational management expertise, or
- Excessive environmental costs.

Financial

- High risk without commensurate returns,
- Insufficient investor interest in the project, or
- Inability to structure the project in a way to obtain the necessary financial commitments.

If any of these conditions are found at any stage, further effort is abandoned.

Market studies focusing on country characteristics are undertaken to acquire a broad understanding of potential projects, including the degree of risk specific to a certain country, the priority to the host government, the project's likelihood of being financed and the export potential for U.S. firms. These studies can be undertaken by the prospective developers themselves; especially if they have some prior experience with the country and can perform the assessment internally.

This preliminary study may also be funded by Federal agencies such as the U.S. Trade and Development Agency (TDA) to help it determine whether to provide grant funds for the feasibility stage of the project. Generally these studies involve a country visit and can be completed in two to three months by experts in the particular sector involved. The parameters from the TDA program (shown below) are often used in market studies done by other agencies or the private sector, and are used internally by the TDA. These studies are performed by small and minority-owned contractors to TDA, who are then excluded from competing for the feasibility study work.

TRADE AND DEVELOPMENT AGENCY DESK STUDY OR DEFINITIONAL MISSION

After identifying a promising project, the next step performed by the TDA is a Desk Study (performed in their offices) or a Definitional Mission (which involves hiring an outside consultant who travels to the host country) to ascertain whether a project is viable and warrants U.S. government participation in a feasibility study. Several criteria are assessed:

- Priority to host government,
- Likely cost of the project,
- Likelihood of obtaining financing,
- Likelihood that the project will be considered by foreign competitors,
- Need for a prefeasibility or feasibility study,
- Scope of the work for feasibility study,
- U.S. export potential, and
- U.S. firms that could become involved in the project.

At the conclusion of the private and/or public market studies, the potential need for power plant construction has been identified. On the private side, some of the first barriers to participation by U.S. firms have been reduced or eliminated through the collection of specific information on the project, identification of the specific opportunity and determination of the

U.S. and host government's interest in the project. On the public side, the U.S. government has established a relationship with the host government, has had the opportunity to showcase U.S. interest in these CCT projects and to position U.S. firms as potential project managers. If concrete opportunities are identified, further analyses are undertaken. Normally, at this point, only the concept of a project has been addressed.

Prefeasibility studies are the initial studies for some CCT projects. They vary greatly in both purpose and scope, depending both on the needs of the project and the agency performing the studies. As shown in the following box, prefeasibility studies normally involve a review of the major country and technical risk factors. The general outlook for a project is evaluated to ensure that no major impediment is obvious. Prefeasibility studies can also be used to show the host country the advantages of hiring U.S. firms and using U.S. technologies. The studies can also enable U.S. firms to determine their own interest in implementing the project.

Many prefeasibility studies focus heavily on country risk factors. Generally, these can be broken down into political, financial and economic categories. Preliminary technical, financial and environmental evaluations of the project are also performed in the more comprehensive prefeasibility studies. In general, while not all questions are answered in a prefeasibility study, the major issues remaining to be studied should be highlighted, and the scope of the feasibility study should be established. Prefeasibility studies can range from a simple study of \$15,000 to a comprehensive study of \$100,000 or more. They generally take from six to nine months to complete. Studies from this stage on are usually performed by companies interested in being the project manager for the power plant.

In order for a U.S. firm or agency to progress to a full feasibility study, they normally try to establish the following:

- A strong potential exists for U.S. firms to be involved either as a project manager or as an exporter;
- Important technical, economic and political issues have been identified, with the various options that need to be addressed; and
- The cost of the project has been roughly established as being within an acceptable order of magnitude.

PREFEASIBILITY STUDY

OBJECTIVES:

1. Thoroughly prescreen a number of promising projects.
2. Make sure no obvious factors preclude project success.
3. Identify possible alternatives within each area of the project, postponing most of the detailed analysis of these alternatives for the feasibility study.
4. Confirm the project manager's interest in the project.
5. Set the stage for further participation by potential investors.

AREAS COVERED:

- **Technical**
 - Type of technology,
 - Type of coal available,
 - Identification of alternative technical solutions, and
 - Identification of areas for further study.
- **Siting**
 - Availability of potential sites,
 - Accessibility of required resources, and
 - Availability of in-country resources: labor and basic materials.
- **Economic**
 - Order of magnitude of the size of the project and the likely costs, and
 - Estimate of likely financial return available.
- **Political**
 - Likely political problems in the host country that need to be overcome.

Feasibility studies evaluate virtually all of the technical, financial, economic and environmental questions associated with a specific project and present not only whether the project should be implemented, but also the proposed structure. Sometimes, feasibility studies follow a prefeasibility study, incorporating the prior work. Often, a feasibility study is the first formal study performed on a project. Feasibility studies are detailed enough that final project costs can be estimated with sufficient accuracy to form the basis for major investment decisions.

These studies, an overview of which can be found in the following box, can also be used to showcase U.S. firms, their capabilities and the benefits of U.S. CCT technology. Full feasibility studies for individual projects often cost in excess of \$350,000 and can take six

to twelve months to complete. More complicated studies, which link a number of projects to assess the host country's medium- to long-term power needs, can easily cost more than \$1 million to prepare, and are often conducted in stages. It is financially risky to perform these studies unless the funder has strong reason to believe that the firm performing the study has a high probability of obtaining the contract, and can therefore provide an adequate return.

FEASIBILITY STUDY

OBJECTIVES:

1. Determine the technical, economic and financial feasibility of the project, including project management team, country and specific project risks.
2. Set the basis for investment in the project.

AREAS COVERED:

- **Technical**
 - Technology and configuration,
 - Overall facility design,
 - CCT system or process,
 - Coal considerations,
 - Environmental compliance, and
 - Operating plan.
- **Siting**
 - Site plan,
 - Absence of prohibitive siting constraints, and
 - Permitting.
- **Economic**
 - Capital costs,
 - Operating and maintenance costs,
 - Cost of capital,
 - Fuel prices, and
 - Project development timetable.
- **Financial**
 - Financing plan, including payback analysis,
 - Financial ratios.
- **Other**
 - Country analysis,
 - Project management evaluation,
 - Project risk analysis, and
 - Definition of commercial agreements.

Project design studies are accomplished when the feasibility has been established, but the total financing package has not been put into place. As shown in the following box, all of the final organizational, construction-related and financing decisions are completed to prepare for closing on the financial package and for the start of construction. U.S. government feasibility study financing is extended to cover these preconstruction design and engineering services through the Export-Import Bank of the United States with funding of up to \$10 million. This stage can solidify the selection of a U.S. project manager, since once the design incorporates U.S. CCT technology, it can be expected that U.S. firms will play a primary role in the project. Detailed design studies can allow the project to proceed, without losing momentum while waiting for the closing on the complete financial package. This additional design work can also be important for obtaining financing.

PROJECT DESIGN

OBJECTIVES:

1. Make the technical and economic choices that balance capital and operating costs to achieve the lowest expected cost of generation.
2. Resolve all outstanding issues in order to be able to close on the financing.
3. Finalize the project structure, timetable and participants.

AREAS COVERED:

- **Organizational**
 - Organization of structure and project entity,
 - Finalize privatization issues,
 - Establish development timetable, and
 - Solidify all project development agreements.
- **Pre-construction**
 - Complete site selection,
 - Finalize all power plant design decisions,
 - Finalize equipment specifications and engineering construction drawings,
 - Select contractor,
 - Develop equipment procurement and delivery schedules, and
 - Obtain final permits.
- **Financing**
 - Finalize both the capital and operating budgets,
 - Finalize underwriting parameters,
 - Select syndicate, and
 - Obtain financial commitments

By this point in a project, the speculative risks have been reduced significantly, and the country risk issues have been resolved. Project developers generally have a high comfort level and a high level of confidence in a project's ability to be successfully financed. During this stage, however, the required financial commitment from the project sponsor will increase dramatically, in order to bring the project to a final design, with all of the permits and agreements required to obtain financing:

- Manpower resources for architecture and engineering need to be mobilized. (For example, this stage can include the preparation of 1,500 to 2,000 engineering drawings.) To support this effort, millions of dollars are being committed to develop the architecture and engineering elements needed for a project to be successfully financed.
- Yet the risk that the financing will not be successful is still real, potentially leaving the project sponsor on the hook for the millions of dollars spent during this phase.

PRIVATE FUNDS AVAILABLE

The internal capital available for early project evaluations is often limited for both large and small U.S. firms. Even large firms may be unwilling to risk, especially under current economic conditions, the hundreds of thousands of dollars that each feasibility study costs. This is due to the high risk inherent in these projects. Of course, because government funds have been available, there is no way to concretely determine whether private companies would be willing to bear these costs alone. In all probability it would depend not only on total capital availability, but also on the risk/reward parameters of these projects versus other available business alternatives. A major component of these studies involves developing background information to help reduce the outstanding business risks in foreign countries, a public benefit that will accrue to other companies both in the power and other infrastructure industries. The balancing of public and private benefits and risks suggests that the financing of these studies is an appropriate role for the U.S. government. An additional benefit of U.S. government aid is that it allows U.S. firms to compete on a more level footing with companies from both Japan and Germany, which receive aid from their governments.

Since U.S. companies seem to be minimizing their equity risks at this time, only limited private funds for investment spending on new projects is generally available for these studies from the earnings of project development companies or equipment vendors. Companies are more

likely to fund the earlier feasibility stages, which have a much lower cost and can be categorized as ordinary business instead of investment risk. The decision to use internally generated funds will depend on a number of factors in addition to the cost, including the likelihood of earning a return on the investment, the budget that a manager has available for the investigation and the relative risk/reward ratios of alternative projects available to the firm.

If additional funds are needed in the future, possible sources might be U.S. venture capitalists, or institutional investors who provide venture capital, who could conceivably take an early equity position in these power facilities. This would not only open up new private sources of funds for feasibility studies, but also sources of equity capital for project financing of the CCT power plants that proceed to development. For venture capitalists or institutional investors to become involved, they need to:

- Understand and feel comfortable with the industry and country risks,
- Foresee the ability to make a high rate of return on their equity capital, and
- Feel highly confident that they can achieve liquidity in their investment within a three- to five-year time period.

Neither venture capitalists nor institutional investors are currently involved in such overseas development to any great degree.

MULTILATERAL DEVELOPMENT BANK FUNDS AVAILABLE

Financial resources are available from the major multilateral development banks and from the regional development institutions for prefeasibility and feasibility studies. Institutions such as the World Bank have traditionally performed these services for three reasons. First, the host country lacked the money and the technical ability to have the studies done properly. Next, the studies are usually necessary to get foreign companies interested in looking at projects in the lesser developed countries. Finally, the leadership of the multilateral development banks provided credibility that the studies had been correctly and objectively prepared. The multilateral development banks also fund non-project-specific programs to enhance the ability of developing countries to run an efficient, environmentally-responsible, economically-sound utility sector.

The U.S. is a major shareholder, playing a key role, in the largest multilateral development banks reviewed below. The client base of these organizations, however, is far broader than the U.S. For this reason, multilateral development bank funds are advanced to a project regardless of which country's company will ultimately be awarded the consulting assignments or the construction project. As a result, even though the U.S. government does not bear the direct cost of preparing the feasibility study, there is a lower likelihood that the project will subsequently be performed by a U.S. firm. In other instances, countries including France and Germany co-fund studies with the multilateral development banks, requiring that their consultants perform these studies. This can give their project developers, who are often the consultant preparing the study, a later competitive advantage.

As a rule, the U.S. does not fund any of these types of programs. However, the U.S. Department of Energy (DOE) has initiated a program which transfers money to the TDA which in turn provides a lump-sum grant to the World Bank. The goal of the program, known as the FINESS¹ Fund under the Trade and Development Agency Trust Fund, is to "mainstream" alternative energy technologies into World Bank projects to complement the use of conventional technologies. The initial transfer, which took place in July of 1992 and provided the World Bank with \$200,000, was used mainly to formalize the program and lay the groundwork for future activities. A second transfer of \$250,000, currently awaiting final approval, would be used to begin operations.

The multilateral development banks tend to want to control a project from the time that they are introduced to it. This control adds considerable time delays to the project, which can be problematic for a project in the early stages. The multilateral development bank programs discussed below are summarized in Table 3-1.

U.S. policy regarding participation in the multilateral development banks is overseen by the Department of the Treasury through the Office of Multilateral Development Banks, which assists U.S. firms in dealing with these banks. In addition, U.S. consultants and project developers can be assisted by the U.S. Executive Director's office at each of the

¹ Financing Energy Services for Small Scale Energy Program

banks—staffed by both Presidential appointees and Commerce Department employees—obtaining information on appropriate contacts at the banks to learn the procedures for bidding on projects and protesting projects that are not structured fairly to U.S. interests.

Table 3-1
PREFEASIBILITY/FEASIBILITY STUDIES AND PROJECT FINANCE: MULTILATERAL DEVELOPMENT BANKS

INSTITUTION	PROGRAMS	AMT. AVAILABLE: TOTAL 1993	PER PROJECT	PERCENT PAID BY INSTITUTION	QUALIFICATIONS	OTHER PROVISIONS	PARTY REQUESTING FINANCING	REPAYMENT UPON SUCCESS?
World Bank Group*	Direct Loans IDA Credits	\$22 B	N/A	up to 85%	Environmental impact statement required Positive rate of return required Sufficient technical personnel in host country; if not, Bank establishes training program	Local costs paid by host country Bank can bring in other sources of finance	Host Country	Y
Inter-American Development Bank	Ordinary Capital Resources Fund for Special Operations	\$6 B	N/A	50-90%	Environmental Committee classifies program according to environmental impact Environmental impact assessment performed, if necessary	Bank cofinances programs with other organizations	Host Country	Y
European Bank for Reconstruction and Development	Technical Cooperation Funding	\$100 M	N/A	N/A	Funds used for feasibility studies, advisory services, tech. assistance	Environmentally sound project	Host Country	N
	Bilateral Trust Funds Merchant Bank Development Banking	\$12 B	N/A	35%	Bank must assess merits of proposed project Minimum financial assistance \$5M	Bank participates in cofunding with World Bank	Host Country	Y
Asian Development Bank	Ordinary Capital Resources Concessional Loans	\$5 B	N/A	<100%	Project must have high developmental priority Bank funds may only be used for procurement of goods/services from other Bank member nations	Local currency cost paid by borrowing country	Host Country	Y
African Development Bank	Project Lending Policy Based Lending Technical Assistance	\$2 B	\$100 G - \$10 M	33%	Project must contribute to economic development and social progress of host country	Bank is actively promoting cofinancing operations	Host Country	Y
Other Regional Development Banks							Host Country	Y/N

*includes International Bank for Reconstruction and Development, International Development Association, International Finance Corporation, and Multilateral Investment Guarantee Agency

The World Bank Group is comprised of the International Bank for Reconstruction and Development (commonly referred to as the World Bank), the International Development Association (IDA), the International Finance Corporation (IFC) and the Multilateral Investment Guarantee Agency. Together, these organizations have over \$22 billion in funds available to worthy projects, but no funds specifically earmarked for prefeasibility or feasibility studies. The main mechanisms through which the Group funds feasibility studies are Direct Loans and IDA Credits. IDA Credits, which are available to nations with a per capita gross national product of \$610 or less, have a 10-year grace period, a 30-year repayment period, and are interest free. The World Bank Group will finance up to 85 percent of the total costs of a feasibility study; usually, local costs of the project must be paid by the host country. The World Bank Group can also recommend other sources of financing. The World Bank Group

is so decentralized that private industry feels the bank is hard to work with on obtaining comprehensive information regarding available assistance programs for projects.

The World Bank's Expanded Cofinancing Operation (ECO) program provides partial guarantees in the hopes of improving the access of eligible World Bank borrowers to private sector funds. The maximum guarantee available through the program is 50 percent of the total project cost for public sector projects, and up to 100 percent for private sector projects. Total World Bank cofinancing operations in fiscal year 1992, including ECO, were in excess of \$13.2 billion. The largest source of cofinancing is bilateral and multilateral development banks, at 67 percent of total cofinancing. Fifty-three percent of all World Bank projects include some form of cofinancing.

The World Bank has played a role in numerous activities in conjunction with the United Nations' Development Programme (UNDP). UNDP's mission is the advancement of multilateral development bank technical and pre-investment cooperation, and the mobilization of capital for investment purposes. The majority of UNDP assistance is directed toward countries with low per capita incomes. In 1992, a World Bank-appointed task force examined the Bank's technical assistance role in world development and how the Bank might better coordinate its efforts with those of other agencies and donors. The task force recommended that coordination of technical assistance be strengthened, particularly with the UNDP. As a result, the Bank is expanding its cooperation with the UNDP and the United Nations' Environmental Programme, the United Nations' environmental action and awareness program.

Energy projects fall within the jurisdiction of the Bank's Industry and Energy Department. At IFC, these projects are handled by the Infrastructure Department. Obtaining financing from the World Bank Group can take between 18 months and several years. All aspects of the proposed project are carefully reviewed, such as the project's rate of return, and whether the host country has sufficient technically trained personnel to support the project. (If not, the Group may establish a training program.) An environmental impact assessment must also be performed on any CCT projects. Finally, the proposed project is considered and approved by the executive board of directors of the World Bank.

The **European Bank for Reconstruction and Development (EBRD)** was established in 1991. The Bank is owned by its 53 member nations, the European Economic Community and the European Investment Bank. EBRD operates in Albania, Estonia, Latvia, Lithuania, Bulgaria, the Czech Republic, the Slovak Republic, Hungary, Poland, Romania, Slovenia, Croatia and the former Soviet Republics.

EBRD funds feasibility studies through its Technical Cooperation Program. In excess of \$100 million is available through the program, which also funds project startup costs, advisory services, and technical assistance. The funds made available to a particular project vary according to the project's scope of work. Of all the multilateral development banks, EBRD is most likely to have a large proportion of these funds restricted to being used for consultants from the countries that provided the grant money to these funds. Technical Assistance funding is grant funding and need not be repaid.

The **Asian Development Bank (ADB)** is comprised of 52 member nations, 36 of which are from the Asia-Pacific region and 16 which represent non-regional countries in North America and Europe. ADB gives priority to aiding the poorest nations in the region. ADB finances feasibility studies through Ordinary Capital Resources and Concessional Loans. In 1992, for example, ADB provided over \$5.0 billion in government and government-guaranteed loans, and \$50 million in unguaranteed private sector loans. Twenty-nine percent of total lending went to projects in the energy sector. Technical assistance programs, which include both grants and loans, totaled \$464 million, 24 percent of which were within the energy industry.

To consider providing financial assistance, ADB must receive assurance that the project is being undertaken along policies which meet the host country's development strategies and priorities. In addition, ADB requires that an environmental assessment study be undertaken. The proposed project must have a high developmental priority. Funds provided by ADB may only be used to procure goods and services from other ADB member nations.

The **Inter-American Development Bank (IDB)** was created in 1959 to facilitate development in the Latin America region. IDB is owned by its 45 member nations, which include regional

and non-regional countries. IDB's stated priority is assisting low-income nations in the region. IDB examines every proposed project for potential environmental impact.

IDB provides financial assistance to public sector projects only. Typically, the host government initiates contact with IDB's field office to discuss the need for the proposed project. In addition, IDB officials regularly meet with government representatives to discuss their needs and priorities. IDB does not make specific recommendations, but rather helps the host country officials analyze their situation in light of available IDB assistance programs.

IDB funds projects from Ordinary Capital Resources and from the Fund for Special Operations. IDB makes two different types of loans--sector-specific loans (25 percent of total loans) and project-specific loans (75 percent of total). In 1990, IDB authorized loans for \$665 million worth of energy sector projects. Between 1961 and 1990, 27 percent of all IDB loans went to energy-related projects.

The **African Development Bank (AfDB)** was established in 1963 by 23 African nations. AfDB operations formally commenced in 1966. As of December 31, 1992, AfDB membership included 51 independent African states and 24 non-African states. AfDB's goal is to promote the economic and social development of African member nations through the financing of investment projects and programs, as well as to mobilize resources through cofinancing with bilateral and multilateral development banks. In 1992, total AfDB loan approvals totalled \$1.8 billion, 25.9 percent of which were for projects in the public utility sector, which includes energy sector projects.

The **African Development Fund (ADF)**, made up of the African Development Bank plus 25 non-African countries, was created in November of 1972 to provide development finance on concessionary terms to the poorer African nations. ADF operations commenced in August 1974 with an initial subscription of \$244 million. ADF funds are used mainly for projects and technical assistance financing, as well as for studies. ADF's Technical Assistance Fund is used to finance studies which are prerequisites to project preparation, as well as to meet the cost of employing short-term consultants for project-related activities. ADF approved 106

loans and grants in 1992, for a total of \$1.1 billion. Of that total, 14.9 percent (\$163.9 million) went to projects in the public utility sector.

NEED FOR FINANCIAL ASSISTANCE FOR PREFEASIBILITY AND FEASIBILITY STUDIES

U.S. developers have project development opportunities both in the U.S. and overseas, many of them in developing and transitional economies. In order to be willing to develop projects overseas, the risk and rewards of the projects in developing and transitional countries must be at least comparable to those of domestic projects. Without U.S. government assistance to match foreign competition and to reduce the high front-end risks, private industry can be expected to underinvest in prefeasibility and feasibility studies for these foreign CCT projects. If the early studies are not performed by U.S. firms, they are much less likely to be awarded the contracts for the projects themselves.

The risk inherent in the prefeasibility and feasibility studies makes it economically infeasible for U.S. private firms to fund these studies based solely on the hope of becoming the project manager. Not only are the business risks greater, but it is also less likely that the project can be financed. These expensive studies are considered to be very risky to perform, even by the larger companies, because the potential for coming up empty-handed is large. There is strong reluctance to perform a feasibility study without substantial financial aid unless a firm is certain that they, and not a competitor, will win the project.

Listed below are some of the most difficult deterrents to private funding of feasibility studies in foreign markets.

- **For projects in developing and transitional countries, the initial groundwork covered by the government or parastatal is often incomplete and there is no reliable commitment that a plant will be built.** In contrast, for an independent power project in the U.S. or most developed countries, the utility determines needs for new power plants through detailed capacity expansion plans and thus can make a firm commitment to a new utility-owned or independent power capacity. Large-scale foreign power plants have the potential to stay in limbo for years and may never be built by the original developers.
- **Foreign projects are more difficult to evaluate, and thus their studies are more expensive to perform, because of the foreign risk analysis component.** These country risks are difficult even for experienced multinational corporations to

analyze, yet an incorrect analysis can result in an abrupt cancellation of a project, a loss of credibility in the international marketplace for the project developer, as well as a large financial loss. A project manager facing this possibility will probably not pursue overseas projects.

- **Studies funded by foreign governments on behalf of their companies may offset the U.S. technical edge on CCTs.** These studies are either subsidized directly by a government entity or by cofunded multilateral development bank grants. Once the foreign companies are awarded the feasibility study, they will work to position their technologies as the best solution for the project.
- **These studies are too speculative for commercial or investment banks to fund.** Those lending institutions do not provide initial, speculative capital especially for these high-risk transactions.

Of course, from a public policy perspective, the benefits of providing financial assistance need to be greater than the cost. By helping increase the export of CCTs and providing U.S. project developers with more opportunities, such funds are extremely cost-effective:

- **A public expenditure ranging from \$5,000 to \$500,000 to \$5 million can result in contracts to U.S. firms in excess of \$100 million.** Due to the large total size of these CCT projects, often worth in excess of \$500 million, a U.S. firm can get substantial benefits from becoming the project developer. A tremendous multiplier effect occurs from these early investments in feasibility studies. Helping U.S. firms win these contracts will result in jobs, exports and a subsequent improvement in the U.S. trade balance.
- **The cost of the studies is repaid once the U.S. firm has been awarded the project and the financing is completed.** Initial studies are low in cost. The only time that incremental sums continue to be spent by the U.S. government on the various levels of feasibility studies is when the project feasibility continues to hold up. Only the funds spent on studies for which no project results become a true cost to the U.S. government.
- **The public benefits can extend to far more than CCT projects.** Since power projects are the first infrastructure project to be developed by many of these countries, successful participation by U.S. firms can position other U.S. firms to capitalize on export opportunities in all sectors of a country's infrastructure. This would include other types of power projects, infrastructure projects and manufacturing facilities.

U.S. GOVERNMENT FUNDS AVAILABLE

The U.S. government resources available for prefeasibility and feasibility studies come primarily from the Trade and Development Agency, Agency for International Development, the

Export-Import Bank, and the Overseas Private Investment Corporation. They are summarized in Table 3-2. The Trade and Development Agency has market study programs involving

Table 3-2
PREFEASIBILITY/FEASIBILITY STUDIES: FEDERAL DEPARTMENT/AGENCY

DEPT./ AGENCY	PROGRAMS	AMT. AVAILABLE: TOTAL PER 1993 PROJECT	PERCENT PAID BY USG	QUALIFICATIONS	OTHER PROVISIONS	PARTY REQUESTING FINANCING	REPAYMENT UPON SUCCESS?
Federal International Energy Trade and Development Program	A.I.D. DOE TDA (Cooperative Effort)	Allocated by participating agencies	50	Qualifications set by individual member agencies		Project manager	
Agency for International Development	Energy Project Development Fund	In excess of \$3M	\$200K	50	Project must be in developing country Applicant must share cost of project Project > 50% U.S. owned Project must meet World Bank environmental standards or environmental assessment must be performed	Repayment due if deal closes on financing within 3 years; no interest due	Project manager Y
Trade and Development Agency	---	\$35M feasibility: \$150K feasibility: \$500K +	100	Developmental priority U.S. export potential Project finance availability Foreign competition	Feasibility and feasibility funds are grants	Host country	N
Export-Import Bank of the United States	Engineering Multiplier Program Direct Loan and Guarantee Programs	not applicable not applicable	up to \$10M (typically \$1- \$3M) not applicable	85	U.S. export value (contract price) up to \$10M Well-defined host gov't. role Capable/experienced project sponsors/developers U.S. content in export value must be 50% or more	Cost of feasibility study can be rolled over into loan; otherwise repayment (with interest) due within six months Only agency providing funding for preliminary design stage	Project manager Host country Y Success not required for repayment obligation
Overseas Private Investment Corporation	Project Development Program	E. Europe: \$3M Newly Independent States: \$3M	\$150K	Large business 50 Small business 75	Positive impact on U.S. employment and host country economy/environment Project Development Program only available in E. Europe & NIS	Repayment due at time of project finance commitment; no interest due	Project manager Y

definitional missions, technical symposia and orientation visits that meet some of the goals of, and may even negate the need for, some prefeasibility and feasibility studies. Sometimes these funds are in the form of loans to U.S. firms, which are expected to be at least partially repaid if the U.S. firm is awarded the project. In other instances, the funds are considered outright grants to the host country as a form of economic aid.

Federal International Energy Trade and Development Opportunities Program (FIETOP)

Objective:	To establish a formal cooperation and sharing of resources, to support commercial development of international energy trade opportunities for U.S. industry and environmentally sound economic development worldwide, through funding assistance for feasibility and planning studies.
Rationale:	By pooling resources, participating agencies seek to fund feasibility and planning studies on specific projects, which could result in the applicant's export of substantial amounts of U.S. goods and/or services, as well as further the purposes of the agency's respective programs.

FIETOP is a cooperative effort of the U.S. Department of Energy, the Agency for International Development and the Trade and Development Agency for the identification and promotion of

U.S. energy export opportunities worldwide. FIETOP facilitates several cooperative activities, such as organizing and issuing joint program announcements for opportunities for U.S. exporters, and providing both financial and non-financial support to exporters, joint review of proposals received, and providing both financial and non-financial support to those projects selected. Participation in FIETOP entails no financial commitment, and no funds are exchanged among the member agencies. Project developers must meet the specific criteria of each member agency from which they would like assistance.

Trade and Development Agency

<u>Objective:</u>	To help position U.S. companies to compete successfully as suppliers of goods and services for major capital projects in developing countries, to assist economic growth in the developing and middle-income world by increasing access to U.S. private sector expertise, to serve as a front-line agency for implementing U.S. trade and foreign assistance objectives by rapidly and effectively mobilizing U.S. technical expertise and to maximize the reciprocal benefits of U.S. foreign assistance.
<u>Rationale:</u>	By carrying out a TDA-funded study, a U.S. company establishes a presence in the country and is able to develop long-term relations with host country officials and project managers, which can lead to additional business opportunities. By providing assistance during the earliest stages, TDA increases the U.S. involvement in a project and serves as a catalyst to open markets for U.S. firms.

TDA assists U.S. exporters seeking to become involved in major capital projects overseas. TDA funds definitional missions, desk studies and prefeasibility and feasibility studies. Definitional missions are performed by small and minority-owned businesses and include a visit to the host country. The goal of the definitional mission is to analyze the nature of the project, its priority to the host country, its likely cost, chances of obtaining project financing, the need for a feasibility study and the U.S. export potential. While a definitional mission can cost up to \$25,000, definitional missions typically fall within the \$8,000 to \$10,000 range. A desk study differs from a definitional mission in that enough information about the project exists that a country visit is not required. Consequently, a desk study typically costs between \$1,000 and \$2,500.

Before agreeing to fund a prefeasibility or feasibility study, TDA must be satisfied that the proposed project possesses developmental priority, a U.S. export potential, project finance availability, and foreign competition for the U.S. exporters. Typical TDA funding for a

prefeasibility study ranges from \$50,000 to \$150,000, though additional funding is available if needed. A trend noted by TDA has been from prefeasibility studies to feasibility studies, which are a full review of the technical, financial and environmental aspects of an individual project. While a typical sum provided by TDA for the performance of a feasibility study is in the vicinity of \$500,000, additional funding (up to \$1 million) is available if TDA believes that the proposed project warrants it. TDA awards funds directly to the host nation (with the stipulation that they be used for feasibility studies performed by U.S. companies) and does not require repayment.

TDA has no formal application process. Rather, procedures are established by TDA's regional staff. Timing varies according to project criteria. Typically, when a U.S. company is on a foreign government's short list of project developers, a definitional team is dispatched to assess the project, its economic criteria and how well it meets TDA criteria. The team then submits a report. The decision to fund the project is largely based upon these findings. Typically, this process takes between six and nine months.

TDA publicizes its programs in a number of ways. The Definitional Mission Hotline is a voice mail system which describes currently available opportunities and allows callers to request any bid packages they might find interesting. A bulletin board in TDA offices also lists these opportunities. TDA projects are listed in the "Commerce Business Daily" as well. For the past 18 months the "TDA Biweekly," a subscription publication, has contained information about upcoming orientation visits, technical symposia, recent definitional mission reports on specific projects, feasibility study bidding opportunities and recent TDA feasibility study reports (which are available from TDA).

Agency for International Development (A.I.D.)

<u>Objective:</u>	To provide financial assistance for prefeasibility and feasibility studies that evaluate public and private energy projects in the developing world, with priority on those that involve proven, environmentally acceptable and clean technologies.
<u>Rationale:</u>	A.I.D. funding for prefeasibility and feasibility studies assists private companies from the United States and public sector entities from A.I.D.-assisted countries to identify and develop projects that support sustainable and environmentally acceptable economic development and promote U.S. trade and investment.

A.I.D.'s Energy Project Development Fund is comprised of a private sector window and a public sector window, making funds available to both private developers and host governments. Through its programs, A.I.D. seeks to offer feasibility study support to U.S. developers looking to invest in overseas projects. The goal of A.I.D.'s efforts is to use these studies to help U.S. exporters take advantage of greater financial resources offered by other organizations. The maximum feasibility study funding available from A.I.D. is currently \$250,000. Approximately \$1 million has been earmarked for the Energy Project Development Fund in the current fiscal year.

Parties interested in A.I.D. assistance must complete an application package, which includes a detailed description of the proposed project. The application is reviewed by a four-member panel, who may request additional technical assistance, if needed. The panel then submits follow-up questions by mail to the project developer. Depending upon the number of unanswered questions and the speed with which the applicant responds to the panel's requests for additional information, the entire application process can take between one and six months, with 45 days a representative length of time.

In order to be considered for A.I.D. assistance, a project must be located in a developing country and the applicant must contribute at least 50 percent of the overall project cost. In addition, the majority of the proposed project must be owned by U.S. parties. Any matching funds must come from a private source. Aggregate government funding for a particular project must not be more than 75 percent. Finally, if the project does not meet World Bank environmental standards, an environmental assessment must be performed. If the project succeeds in obtaining financing within three years of the prefeasibility/feasibility study, then the developer will be responsible for repaying A.I.D., though no interest will be charged. If the project developer is unable to secure financing within that time, then the A.I.D. funding will be considered a grant. Repayment is typically made in a lump sum.

A.I.D. conducted three regional conferences in 1992--in Boston, Los Angeles and Miami. At these conferences, A.I.D. officials made presentations, answered questions and handed out applications. The next round of conferences is currently in the planning stage. In addition,

A.I.D. produces a quarterly newsletter, "Private Power Reporter," which informs potential exporters about available resources.

Since its inception in 1989, the Energy Project Development Fund has received applications for funding assistance from over 50 firms. Of these, 14 were approved, 9 rejected, 21 withdrawn, and 6 are still under review. Of the 14 that were approved, 10 have subsequently completed or are currently in the process of conducting studies. A total of \$1.5 million has been disbursed under this program.

In addition to funding prefeasibility and feasibility studies, A.I.D. also seeks to play a role in contributing to policy reform and institutional development in overseas markets. A.I.D. seeks to accomplish these goals through information exchange in the form of workshops and conferences held in foreign countries, and by arranging for tours of U.S. power facilities by representatives of foreign governments and utilities. A.I.D. has also arranged to have U.S. technical experts sent abroad to advise foreign energy agencies and utilities.

Export-Import Bank of the United States (Eximbank)

<u>Objective:</u>	To help stimulate exports of U.S. architectural, industrial design and engineering services, and thus increase the potential for future U.S. exports.
<u>Rationale:</u>	Prefeasibility and feasibility studies funding generates additional overseas sales of U.S. goods and services, since a foreign buyer is more likely to order U.S. equipment and services for a construction project on which U.S. engineers, designers and architects did the feasibility and design work.

Eximbank finances feasibility studies through its Engineering Multiplier and Direct Loan Programs. Eximbank offers fixed-rate, medium-term loans or guarantees to help finance feasibility studies and pre-construction design and engineering services. Eximbank assistance can cover up to 85 percent of the U.S. export value. Up to \$10 million dollars of U.S. export value can be financed through the Engineering Multiplier program criteria. Work in excess of that amount can be financed through regular direct lending or guarantee programs. Eximbank does not give preferential treatment to any U.S. product, company or industry, nor does it allocate specific sums of money to countries or geographic regions. Eximbank responds to requests for financing from foreign buyers and U.S. exporters.

Eximbank has a single application form for all of its assistance programs. Depending upon the current work load at Eximbank, and the financial and technical information available for the transaction, the entire procedure can take one to eight weeks from application to approval.

In order to be considered for Eximbank assistance, under the Engineering Multiplier Program, the services must relate to projects which have the potential of generating U.S. export orders for at least \$10 million or double the amount of Eximbank support (whichever is greater). The host government's role must be well-defined before the project begins, and the project's sponsors must have a proven record of capability and experience. While Eximbank will only finance a maximum of 85 percent of the total engineering services incurred by the U.S. exporter, it will guarantee a commercial loan obtained by the host country for up to 15 percent of the local costs incurred. If the project manager successfully obtains Eximbank financing assistance for the subsequent project, the outstanding Eximbank debt from the feasibility study can be rolled over into the project's financing term. Repayment begins six months after the study's completion. Typically, the foreign borrower must repay both principal and interest semiannually, and the term of the repayment period may range up to 5 years.

Eximbank's Marketing Division is responsible for publicizing the availability of Eximbank assistance. Through the Marketing Division, Eximbank holds seminars, sends speakers to functions such as trade shows and environmental conventions and issues news releases.

Overseas Private Investment Corporation (OPIC)

<u>Objective:</u>	To promote economic growth in developing and transitional nations by encouraging U.S. private investment in these nations.
<u>Rationale:</u>	Encouraging American overseas private investment in sound business projects improves U.S. global competitiveness, creates American jobs, and increases U.S. exports.

OPIC's Project Development Program provides prefeasibility and feasibility study funding for those projects thought to have a potentially positive impact on U.S. employment and the host country's economy and employment. In addition, proposed projects must fall within the demonstrated competence of the proposed management, and those proposing the project

must undertake significant financial risk in the project. Currently, the Project Development Program only assists projects located in Eastern Europe and the Newly Independent States.

OPIC funds feasibility studies up to \$150,000. For large businesses, OPIC will fund up to a maximum of 50 percent of the study cost; for small businesses, 75 percent. Total available funding within the Project Development Program is \$3 million for Eastern Europe and \$3 million for the Newly Independent States. OPIC assistance is not grant funding--repayment is due at the time of project finance commitment. OPIC charges no interest on these funds. Typically, repayment is made in a lump sum. If the project manager is unable to obtain project financing, the funding is considered a grant. OPIC generally avoids "double funding" projects--providing assistance to projects that are also receiving funding from other government sources. Exceptions may be made, however, in the case of extremely large projects with unusually good prospects.

To begin the application process, the project manager must complete a three-page form, which includes a scope of work and a proposed budget. The form is then sent to an OPIC contractor for review. If the proposal is not deemed feasible, a rejection letter is sent immediately. Otherwise, the contractor notifies the project manager and performs additional review, such as reviewing credit reports and examining overseas factors. This entire process usually takes between two and three months. The contractor then returns a summary report and recommendations to the OPIC review committee, which meets monthly. If the committee decides to recommend the project, a draft contract is drawn up. (At a recent committee meeting, four out of seven projects presented were approved.)

OPIC publicizes its programs in a number of ways. It regularly distributes newsletters, sends cables to U.S. embassy posts and attends industry conferences. In addition, the Commerce Department and TDA often send project managers to OPIC if it seems that OPIC is a more appropriate source of assistance.

ADEQUACY OF THE EXISTING U.S. GOVERNMENT PROGRAMS

The fundamental question is whether U.S. CCT vendors and project developers are obtaining the financial assistance they need for prefeasibility and feasibility studies in order to compete

successfully in the international marketplace. While requests for assistance have picked up recently due to the needs in the transitional countries, it is rare for all funds for these studies to be fully committed in any given year. As the international market potential for private power, including CCTs, continues to expand, it may be necessary to identify specific markets in which to maintain selective adequacy with existing programs. Other countries are still better at helping their companies make use of the multilateral development banks through cofinancing, by getting their banks more involved in the support of the projects, and in seeking out early information on most potential projects worldwide. The support by the U.S. government seems to be especially evident in the Asian market.

The adequacy of financing for prefeasibility and feasibility studies for developing and transitional countries can be assessed in a number of different areas:

U.S. Government Funds Available

U.S. government funds for prefeasibility and feasibility studies are available for all types of projects and are generally not specifically earmarked for power projects or, even more specifically, for CCTs. Historically, ample funds have been available for all categories of power project prefeasibility and feasibility studies for which application has been made. In the future, if program funding is not increased, it may be necessary to focus these funds on the higher-probability projects, both as the U.S. builds up its export capabilities and as more and more power plant opportunities from countries with developing and transitional market economies complete the structural changes that make them good candidates for assessment. As long as good prescreening procedures such as the TDA Market Study are utilized, so that the studies are performed only on projects that appear to be viable and available to U.S. firms, existing funds should be sufficient under current (reactive) program goals. In addition, TDA and A.I.D. have both shown an ability and willingness to provide even higher levels of funding as the demand for these studies has increased.

Finally, if demand for these studies were to increase substantially, it would probably be due to a lessening of the perceived risk of a number of these power plants. If this happens, the U.S. government should attempt to further focus the funding on projects that are on the higher end of the risk spectrum, where the public and private needs for assistance are the

greatest--such as the first project in each country, where the costs of obtaining information and the need for information is higher, while the chance for success is still highly uncertain. As the projects register success, the costs of previous studies will be repaid to the U.S. government; these programs are partially self-funding.

The specific funds available for any given study also appear to be adequate. Most of the agencies contract directly with the company that will be doing the study and have been responsive to the specific project needs.

Timing Issues

The U.S. government may not be proactively, and on a timely basis, discovering and disseminating information about potential opportunities to U.S. industry. The next step of the process, the time from application to approval, has not been highlighted as a problem in industry interviews. The time to complete the study is not an issue in most cases, because the study is performed by the company that is attempting to become the project manager; they are expected to complete the studies on a timetable acceptable to themselves and the host government or utility.

Information, Qualification and Application Requirements

According to project developers, general program information is relatively easy to obtain, although numerous contacts must still be made within each agency to obtain help on a specific project.

Coordination among agencies is an area that needs additional attention. Not only is one-stop shopping at any single agency for information not yet a reality, but also the differences in information required by the various agencies appears to cause additional work, especially for sections of the application such as environmental information.

The mission of each agency varies, which often results in different qualification requirements. It is easier to get funded for these studies by TDA than by the Eximbank, for instance, because the export criteria requirement is less stringent. Also, the various agencies are more likely to grant assistance to countries, or parts of the world, that are of particular importance

to them; it would help the project developer to make sure they match their request appropriately.

Applying for prefeasibility or feasibility funds does not appear to be difficult. The TDA and the Eximbank, which fund the majority of these studies, have a very straightforward and responsive application process.

Burden Placed by Repayment Requirements

Financing of prefeasibility and feasibility studies is meant to cover the higher risk during the early project stages. Hence, the requirement to repay government agencies for financing of studies performed on projects that are successful at getting financing is not a hardship. With any project that is successfully financed, the cost of the studies is effectively added to the overall project and is then covered by the long-term financing. No interest is charged, even though repayment may be as long as three years after the completion of the study. This is an additional benefit to the borrower.

Once a project has gone beyond the feasibility study stage, the requirement for repayment is a normal business risk for private project development firms.

Eximbank, which funds project design, must still be repaid if a project has incurred expenses in the project design stage and is not successful in completing the financing.

Chapter 4

FINANCING OF CLEAN COAL TECHNOLOGY PROJECTS IN COUNTRIES WITH DEVELOPING AND TRANSITIONAL MARKET ECONOMIES

Clean Coal Technology (CCT) power projects are vital infrastructure improvements for many developing countries and countries with transitional economies because affordable electric power is needed for sustainable economic development in all other sectors of a national economy. Coal is an abundant and reasonably priced fuel in many of these countries, and it is expected to continue to be a major fuel source for power generation.

Developing countries currently have the most rapidly growing power needs and an urgent requirement for power plants. In 1990, it was estimated that the developing countries—which import all of their power plant equipment—account for 20 percent of new power generation capacity, one half of which will be conventional thermal plants.¹ This share is anticipated to grow in the future.

In transitional countries, the short- to medium-term growth in generation requirements will be small, but the potential benefits from improving the efficiency and environmental performance of the existing power plants are tremendous. A number of unsafe and dangerous nuclear power plants will be decommissioned in the transitional countries. A number of these countries feel that they cannot abandon nuclear energy "since the main alternative available—high-sulfur coal/lignite for electricity generation—is becoming increasingly unacceptable on environmental grounds."² However, many of these nuclear plants could be replaced, in an environmentally acceptable manner, with new CCT power plants.

Development of environmentally sound power projects is a major focus of the world community. The World Bank has set environmental standards, subsequently adopted by most

¹ Thomas, Steve and Francis McGowan, The World Market for Heavy Electrical Equipment, Quadrant House, UK, 1990, p. 59

² Richter, Joerg-Uwe, "Energy Issues in Central and Eastern Europe: Considerations for the World Bank Group and Other International Financial Institutions", The World Bank, March, 1992, Annex 8, p. 2

bilateral export financing agencies, that must be met by most international power projects in the developing and transitional countries. Meeting this standard is the only way that these power plants can be financed. CCT is the best method for coal-fired power plants to meet these standards.

CONVENTIONAL UTILITY FINANCE

Once the decision has been made to build a power plant, it is necessary to determine the type of financing mechanism that will be used. A major source of hard currency credit for power projects in developing countries (and now in transitional countries) has been loans from the multilateral banks and loans, loan guarantees, and grants from individual developed country governments. This credit is generally referred to and reported as official credit. It is likely to remain a major hard currency credit source for future developing and transitional country power projects. Official credit is preferred by developing countries because: (1) the effective interest rates and payment terms are usually more attractive than those for the two other forms of hard currency credit; and, (2) this type of credit frequently is required before other lenders will become significantly involved in power projects. Currently, official credit levels for power lending to qualifying countries is annually approximately \$6 billion.

In addition to official credits, two basic options are available to obtain funds from the private sector: general credit and project finance. The first alternative, general credit (full recourse) financing is generally preferred by the utility because it is both a less expensive and a generally more expeditious method of financing. It is available to international borrowers with excellent credit histories, good economic prospects, and in cases where the country has adequate currency reserves. In the international CCT industry, general credit is most often used by a strong entity that will build, own and operate the power plant. The entity is usually a state-owned utility, building a power plant for itself or retrofitting a project with pollution control technology. In these cases, no discrete revenue source can be applied to the repayment of the financing for the project. Thus, in general credit finance—

- The funds supplied by the commercial and investment banks are a general obligation of the borrower.

- The financing entity must look solely to the overall operating revenues and assets of the borrower, which may be the utility and/or the government, for repayment.
- In some circumstances, the banks might also be granted liens on specific major pieces of equipment or other assets of the utility, which they may attach if payments are not made. This is not always a practical solution for the bank, because seizing assets could jeopardize all future payments.

General credit finance usually requires an equity component on the part of the utility. For strong borrowers, the debt/equity ratio primarily depends upon the cost of capital to the utility for the various sources of funds. For less credit-worthy borrowers, the provider of the debt will require the equity portion to be a certain percentage (ranging from 20 to 30 percent) of total cost to provide a safety margin for the debt.

Potential lenders look at the overall operating and financial history of the utility to see whether it can afford to service the debt on the new facility. If the utility is not expected to have a sufficient cash flow to safely service the debt incurred to retrofit an existing plant or build a new power plant, then the first place the lender looks for additional financial assurances is the government of the host country. In the absence of adequate cash flow from the utility, the host government must be willing to provide the necessary guarantees of additional payments to allow for financing of the transaction to occur.

If the country is weak financially, or lacks currency reserves, then the risk is higher since specific revenues are not attachable to secure the payment of the debt, and funds may not be available for the payments. In fact, at that point the only security is the good faith and credit of the host utility or government, perhaps supplemented by the ability to repossess some of the assets. In current economic times, for developing and transitional economies, this is usually insufficient to obtain financing, especially where seizure of assets is not a realistic alternative.

DIFFICULTIES IN FINANCING NEW OR UPGRADED POWER PLANTS

Starting in 1982, an escalating international debt crisis caused substantial reductions in sovereign lending from private sources—such as international bankers—to developing countries. Voluntary medium- and long-term general purpose financing from commercial banks

to highly indebted countries all but ended.³ Thus, many developing countries and countries with transitional market economies currently have significant problems financing new or upgraded power plants through conventional borrowing. There are several reasons:

- **Sufficient capital from within the developing countries is unavailable.** These countries usually do not generate sufficient internal capital to support all of their infrastructure needs, and they lack viable capital markets in which adequate additional funds can be raised. A recent World Bank study found that although in some developing countries one-quarter to one-third of the public resources available for investment are being devoted to electric power projects, these investments are still inadequate.⁴ While some of the stronger developing countries can partially finance power projects with bonds, in other countries, no formal capital markets exist to provide funds. In some of these countries, private industry and/or private capital does not legally exist; in many transitional countries risk-taking is still too new a concept for easy implementation of viable capital markets. The development of these markets, while important to the growth of their economies, will not be a quick or simple task. Not only must the market be created, but the buyers of the securities must understand and gain confidence in both the stock and bond markets, as well as in the companies in which they would be allowed to invest.
- **The countries lack adequate sovereign credit to finance utility-owned power projects.** This is a result of the repudiation of loans by a large number of the developing countries during the early 1980s. Commercial and investment banks and their regulators throughout the world are wary of loans made to these countries. In addition, risk levels increase proportionately with the amount of time the risk is outstanding; developing and transitional countries have very uncertain medium- to long-term risk profiles. Thus, what little sovereign credit they do have tends to be short term, while the debt repayment requirements for CCT projects almost always exceed 15 years.
- **Many utilities owned and operated by government agencies do not have adequate credit ratings and are burdened with poor financial and operational track records.** Thus, they can not be financed in the same way that a utility in the U.S., or other developed countries, is financed. They cannot go to international credit markets because they do not have internally generated funds for repayment. As further evidence of the importance of this problem, the World Bank instituted, in September of 1992, a program of "Commitment"

³ Paul, Nirmaljit Singh, "Beyond Syndicated Loans: Promoting Limited Recourse Project Finance to Developing Countries", The World Bank, Washington, DC, January, 1992, p. 49

⁴ Beyond Syndicated Loans: Energy Efficiency and Conservation in the Developing World: The World Bank's Role; Washington, DC: The World Bank, September, 1992, p. 54

Lending which requires the bank to channel funds only to countries that are clearly improving their utility sector's performance.⁵

- **Due to losses suffered in this sector, multilateral development banks (which are faced with growing requirements for financial assistance) are re-evaluating the amount of funds they are willing to put directly into individual power projects without participation from private investors. They realize that the sector's needs are far greater than their own resources. In addition, as the energy sector in many countries continues to privatize, entities such as the World Bank Group may structurally need to cut back on energy lending because the World Bank's charter does not allow it to lend money to private entities without a host government guarantee. As discussed later, it is questionable whether the International Finance Corporation, a sister organization to the World Bank which does have the charter to lend to private companies, can fill in the gap.**

Financing Clean Coal Technologies

CCT projects are typically larger, take more time to build and are more capital intensive than power projects fueled by oil- and gas-fired plants. They are thus riskier to finance. In addition, the sheer size of these projects (often \$500 million +) means that the funds have to come from multiple sources, complicating both the financing process and the financial structure. Thus, financing has become an especially important determinant in the selection of a project manager for CCT projects.

To hold the risk to an acceptable level, the CCT that is selected in these countries must be commercially proven. The newer, experimental technologies raise questions in the financial sector about profitable operation of the power plant. This concern is exacerbated when these developing and transitional countries are considering operating the facilities themselves.

Implications of Changes in Credit Availability

A World Bank Study that examined electric utility expansion in 70 developing countries (including five transitional countries) found a need to spend \$100 billion per year, in current

⁵ "The Bank's Role in the Electric Power Sector: Policies for Effective Institutional, Regulatory and Financial Reform", The World Bank, September 15, 1992, P. 5

dollars, on system expansion during the 1990s. This implies an energy growth in these countries of 6.6 percent yearly.⁶ Another World Bank study found that—

About 40 percent of these projected financing requirements, up to about US\$40 billion annually during the 1990s, is in foreign exchange. Developing countries as a group have little prospect under current conditions of mobilizing foreign resources on this scale, however and official financing agencies are unlikely to increase their commitments for power development--now around US\$7 billion annually--because of claims on their limited funds to assist other sectors.⁷

Thus, a minimum of US\$33 billion annually must be obtained from foreign government agencies and private providers of capital to meet all the needs of the developing and transitional countries. This assumes that they can raise the other US\$60 billion internally, which is not a certain prospect. Some analysts have therefore concluded that the number of projects that these developing countries desire is far higher than the amount that can be financed under current conditions.⁸

Many power projects listed as "planned" in developing countries may not be built in the foreseeable future. While some will not be built for technical reasons or lack of demand, possibly due to demand-side management or other energy conservation programs, many others will be blocked because they can not be financed. Only the best projects, with the best project developers, as defined by financial criteria, will proceed. Many of those built will be "independent power projects" that, as viable economic entities, can secure limited recourse financing. Projects in the stronger developing countries, being built directly by in-country, government-owned utilities, will probably accomplish this by operating under the same free-market economic discipline that is followed by independent power projects.

⁶ Moore, Edwin and George Smith. "Capital Expenditures for Electric Power in the Developing Countries in the 1990s", IEN Energy Series Paper No. 21. Washington, DC: The World Bank, February 1990

⁷ The World Bank, September 15, 1992, P. 12

⁸ Thomas, p. 108

THE EMERGENCE OF INTERNATIONAL INDEPENDENT POWER DEVELOPMENT

The emergence of the independent power concept in the U.S. has provided the only viable alternative to many countries with little credit available for what are acknowledged to be risky projects:

- **U.S. practices provide a proven, working model for the emerging focus on overseas projects.** This is true for every technical and financial aspect of utility construction, operation and finance.
- **Project finance has been demonstrated as a viable form of financing CCT power projects.** More than \$30 billion worth of independent project financings had been completed through 1990, and annual growth has averaged 20 to 30 percent.⁹ These power projects are large enough in scale to be attractive to major project developers and investment bankers.
- **Multilateral development banks, such as the World Bank, see independent power as a way to leverage their investments.** As a result they are taking steps to encourage project-finance-based independent power development as a way to meet the growing energy needs in developing countries.

Experienced entrepreneurial project development and operating companies have evolved in the U.S. over the past fifteen years. They have substantial experience financing, building and operating environmentally sound power plants including those using CCT. Many of them are active in overseas markets and are thus uniquely qualified to act as project managers in developing and transitional countries.

U.S. firms, however, are not alone in the international private power market. Foreign developers have also emerged to compete with U.S. companies. In many cases they have benefitted from substantial aid from their governments. This includes government-to-government assistance on project feasibility and tied-aid or other methods to provide low-cost funds for their companies. Several governments have then extended low-cost financial aid to their companies either directly, through quasi-governmental agencies, or by persuading their banks to lend at below-market interest rates.

⁹ "Looking Back: The First 20 Years", Independent Energy, May/June 1991, p. 25

The independent power alternative has already changed the international market for power plant equipment. The independent power sector is emerging worldwide and will probably be the fastest-growing market segment in the world's power supply sector over the next five to ten years.

U.S. firms have an advantage in the independent power arena. The Public Utility Regulatory Policies Act of 1978 (Pub. L. No. 95-617) and the evolution of the independent power project concept in the U.S. created an entrepreneurial industry to build and own independent power projects ahead of most international competitors. Independents are either already involved overseas or are capable of making the transition, since their experience levels are second to none. Financing mechanisms for independent power projects also evolved in the U.S., putting U.S. financial firms on the forefront of understanding and defining the operational requirements of these specialty financings. These advantages will not, however, survive a concentrated effort by foreign firms to compete in this marketplace.

INTERNATIONAL PROJECT FINANCE FOR PRIVATE POWER PROJECTS

Project finance has been a viable financing mechanism for a number of years. It is now being used to allow power plants to be built by developing and transitional countries in the absence of adequate long-term sovereign general credit. In a "pure" project finance transaction, the host country would not bear any of the risks of the power project. Rather, the lenders would look solely at the assets and earnings of the borrowing entity for repayment of the loans. Most of these CCT power plant transactions in developing and transitional countries are actually considered to be "quasi" project finance transactions, because the host country is still required by the lenders to assume a limited portion of the risk through various undertakings.

Developing the structure and gaining agreement on all of the requirements of each specific project is usually the job of the investment banker, who is hired as an advisor by the project manager. The investment banker's goal is to cover all of the financing requirements while managing the outstanding risks and minimizing the need for equity (versus debt) in the project. They perform the "due diligence" on the transaction to make sure that the interests of the investor are protected. They are also instrumental in raising the funds from investors.

Since short-term finance is unacceptable for financing CCT power projects, project finance will be the preferred method for independent power development. By spreading risks to those parties willing and able to assume them, and requiring a thorough job of setting up and documenting the transaction, project finance can actually be less risky to both the financial institutions (public and private) and the host government than are sovereign financings where the entire risk is assumed by the host country. This is especially true when project finance results in bringing outside, highly-qualified operators into these countries to run the new and, perhaps, other existing power plants. Where this happens, the power plants generally operate more efficiently and economically, further lessening the risk. In many countries, there will be strenuous objections to the hiring of outside operators, but this will often be necessary in order to finance the project.

Participants in Project Finance Transactions: Sharing of Risks

Project finance involves setting up an independent company to replace the host country as the builder, owner and/or operator of the power facility. It may be part of a "privatization" of the utility industry in a given country, which would allow this financing format to be used for new or repowered facilities. The intent is to create a project entity that is able to operate profitably under market economy conditions, without interference by the host country.

Project finance uses the same principal players and many of the same contractual elements as a general credit-financed project, but it must accomplish a more thorough job of allocating risks because none of the involved parties has the "deep pockets" to backstop the transaction. Project finance is predicated upon contractually delegating portions of the risk to the appropriate parties, making sure that all of the risk is covered, so that the transaction as a whole has a reasonable set of overall risk/reward characteristics and a manageable dollar amount of exposure for each of the specific participants. No risk can be left uncovered, because unlike a general credit transaction, the lenders cannot look to any other revenues or assets as a source of repayment. In a typical project finance transaction, the following participants can be required by the project developer or the lender to cover their allocated risk:

- **Architecture and engineering firms** assume the risk of proper design of the facility.

- **The constructor** assumes the completion risk, to include the actual completion of the plant, as well as meeting the construction schedule and delivering the project at the contracted cost of construction.
- Various **equipment vendors** take on the risks associated with delivering components to the project.
- **The project manager** assumes the risk for operating the plant to agreed-upon efficiency and economic parameters.
- **Various financial entities**, including the host country, multilateral development banks, bilateral development agencies and private capital, take on a specified portion of the financial risk so that the revenues from all sources will cover both operating costs and debt service. This may be provided in the form of direct investment, guarantees or political risk insurance.
- **Fuel suppliers and transportation companies** agree to supply fuel to the plant under specified parameters.
- **The utility customers** (off-takers) accept the risk that they will be able to pay for the power that is provided.

This approach means that no one party must assume risks that they have not been compensated for, and it allows the project manager to finance the project on a limited-recourse basis once the project is on-line and meeting specified operating criteria.

Financial and Operating Structures

Three basic types of financial and operating structures have been developed for use in project finance transactions. In every case, they involve initial ownership of the project by a private entity, normally the project developer(s). The actual ownership structure is usually very complicated, as the owners try to take advantage of the optimal tax and financial structure.

As shown in Table 4-1, operating structure alternatives differ primarily in the amount of time that the project is owned and/or operated by the project manager prior to the potential transfer of the facility back to the host government or utility, or other entity. In general, the investors want the ownership to remain with the qualified private operator for as long as possible in order to maximize their potential return. The host country, as discussed previously, wants to regain ownership as soon as possible for political reasons. The deciding factor is normally the

time at which the host country will have the ability to take financial responsibility for the project. The following three structures are most commonly utilized:

- The **Build, Own, Operate (BOO)** scenario is utilized when the investor maintains long-term ownership and operational control of the project. This structure provides the investor with the greatest control, the longest time to achieve a return on investment, and therefore, potentially the lowest risk.
- The **Build, Operate, Transfer (BOT)** method is, in effect, an installment sale to the host government or its utility. It allows a country to gain ownership of the project once the debt and equity is repaid. For any remaining financing to stay in place upon the transfer, the financial parties must have a strong comfort level with the ability of the host country or its utility to efficiently and profitably operate the facility. In most cases, this will be a very difficult case to make because the utility will often either have an unsatisfactory operating history or will have an insufficient operating history to evaluate properly. **Rehabilitate, Operate, Transfer (ROT)** is a variation of the BOT used for rehabilitation of existing generation plants. A ROT is similar to a BOT except that it adds a preliminary operating stage to allow the operator to become familiar with the facility in order to best identify potential improvements.
- **Build, Transfer, Operate (BTO)** is essentially a "turnkey" construction contract. The project developer assumes the construction risk and then transfers the project to the host country or its utility as soon as the power plant is placed into service. Often the original project developer will continue to operate the plant on a contractual basis. It is unlikely that developing or transitional countries, lacking both short-term currency availability and long-term sovereign credit large enough to cover these massive projects, will be able to utilize this structure under current credit conditions.

Decisions Facing Host Governments

Host countries have historically refused to give up control of these projects for political reasons. Many developing countries subscribe to the philosophy that people should have power available to them at low prices in order to improve the quality of life. The power plants are often overstaffed and seen as a way to provide employment. The host government may also want to control which industries receive power at subsidized prices to spur economic development. The host country will often want the prestige of owning the facility.

Table 4-1
COMPARISON OF FINANCING STRUCTURES FOR INTERNATIONAL POWERPLANT DEVELOPMENT

	PROJECT FINANCE			GENERAL CREDIT
	BUILD, OWN, OPERATE	BUILD, OPERATE, TRANSFER	BUILD, TRANSFER, OPERATE	
Initial Ownership	Project Developer	Project Developer	Project Developer	Host Country
Finances Project	Project Developer	Project Developer	Project Developer	Host Country*
Builds Project	Project Developer	Project Developer	Project Developer	Host Country*
Operates Project	Project Developer	Project Developer	Host Country*	Host Country*
Ownership Transfers	Not Applicable	Upon Repayment of Debt & Equity	Upon Completion of Construction	Not Applicable
Project Developer Risk	Low	Medium	Medium	Not Applicable
Financial Rating of Host Country	Low	Medium	Medium	High
Average Time to Complete Financing	1-3 Years	1-3 Years	1-3 Years	6-12 Months

* Project developer may be hired by host country to perform these roles.

With project finance, risk distribution dictates the structure of the transaction, not just the wishes of the host country. Thus, for many countries that have utilized sovereign credit in past transactions, project finance leaves them in far less control of the project than they are used to or would like to be. The financial aid to help build this type of project is now focused more closely on the economics of the transaction and the social gains for the country. If these countries want to build power plants and need to utilize international capital markets, and multilateral development banks and bilateral financing organizations, they will need to

relinquish some control. Often, it is the investment banker who must convince the host country of this requirement.

Figure 4-1 shows the sequence of decisions typically faced by utilities in developing and transitional economies. The first one is the decision to build a power plant. The utility starts with an investigation of general credit financing. In many cases the utility will find that this option is not currently available. Then, the host country needs to perform a feasibility study to determine whether project finance may be viable and to identify any barriers and solutions. Assuming that a project passes the feasibility stage, the host country, in conjunction with the project developer and their investment bankers, will determine which financial structure will work best for their project.

Figure 4-1. Financing Options and Decisions for International Clean Coal Technology Projects

REQUIREMENTS OF PROJECT FINANCE

A number of structural a priori conditions must be met for project finance methods to be used. The intent of these prerequisites is to mitigate the major risks so that private parties will be able to earn a fair return and thus will be willing to provide the various levels of financing. Money will only flow to those projects that have appropriate risk/reward characteristics. This is especially true for equity, the most difficult component of the financing to obtain. A viable internal capital market is strongly preferred as a source of capital for the transaction, and even more importantly, as a source of capital from the local entities who want the power plant.

Then, as investors, the local entities have a stake in making sure that the host government does not act in a manner contrary to the best interests of the project and the investors. This gives tremendous comfort to prospective foreign investors (in the same way that investors have a greater comfort level when the World Bank is involved in the financing), and can tilt the balance on borderline projects toward approval. The following list of conditions is typical for project finance transactions:

Allocation of Risks

- **All of the economic risks of the project must be addressed.** Normally, between 20 and 30 percent of the project funds must be in the form of equity in order to result in an adequate positive cash flow. Under current market conditions, this entails achieving a debt service coverage (cash flows available to service debt after all operating expenses have been paid) of at least 150 percent.¹⁰ This debt service would also lead to an internal rate of return resulting in the free flow of private capital to these projects. The maturity structure of the financing must be correctly matched to the cash flows of the project, with longer terms entailing greater risks. The potential for interest rate fluctuations must be addressed, and a substantial portion of the debt may need to be funded at fixed interest rates to keep the repayment risk at an acceptable level.
- **Political risks must be mitigated, with political risk insurance, if necessary.** These risks include the potential for changes in the sovereign government that would result in repudiation of existing contracts and obligations: war, insurrection or other political instability that could physically damage the project; and changes in tax policy, royalty or government-controlled inputs that would dramatically alter the economic feasibility of the project. A fee is charged at the loan-closing for this insurance.

¹⁰ Burr, Michael T.; "Structural Evolution", Independent Energy, March 1993, p. 21

- **Strong documentation is necessary to segregate the risks while making sure that each risk is covered by the specific parties most capable of bearing that risk.** In each case, these risks must also be the ones that each party is used to assuming in their day-to-day business transactions. They must also be a dollar amount that each party is capable of handling. Some of the major formal documents are the power purchase agreement, the fuel supply agreement, the implementation agreement with the host country government, insurance policies, the construction agreement, the operating and maintenance agreement, owner's agreements and a variety of escrow and trust agreements.

Ensuring Generation of Revenues

- **A market for the output must be available.** The need for the power that will be supplied by the project must first be established. The output of the power plant must be for a customer or group of customers who are willing to pay for the power provided, and who are credible in terms of their ability to pay for the purchased power. Often this is established by an analysis of the earnings potential of the goods and services that will be produced by the customers of the power plant. Other times it can be determined by investigating the general credit-worthiness of these key customers.
- **A viable long-term source of revenue must be created by a strong power purchase agreement.** This agreement ensures that there is a revenue stream available at a fair economic price to ensure the servicing of the debt. Many investment bankers feel that this strong power purchase agreement, which defines the amount of power to be purchased and sets the formula for the price to be paid for both capacity and energy charges, is the heart of the transaction; without a well-conceived and-drafted agreement, project finance can not be successful.
- **Mechanisms to assure repayment of the loans and repatriation of profits must be implemented.** One of the largest investment decisions that a developing or transitional country can make is to order a power station. The country's balance of payments will be significantly impacted both by the magnitude of the initial investment and the ongoing considerable fuel needs for this plant.¹¹ Therefore, there must be an expectation that reasonably unrestricted conversion of the local currency (the basis of the revenue stream) will be allowed at a market exchange rate, and that sufficient foreign reserves will be available to repay the loans and repatriate profits into the specified foreign currency over the term of the loans. This may include utilizing a combination of host government guarantees, hedging strategies, political risk insurance, and/or shifting the problem to the host country by denominating the debt repayment in dollars. Figure 4-2 shows a typical currency flow and conversion example for these projects. During the construction phase, a large flow of dollars comes into the host country, much of which immediately leaves the country in the form of costs for the power plant or purchases of non-related goods and

¹¹ Thomas, p. 5

services. During the operations phase, dollars are needed to pay for debt service. If dollars are not available, countries must be able to borrow dollars or earn them from exports.

Figure 4-2. Currency Flows from U.S. Dollars to Local Currencies and Back to U.S. Dollars

Ensuring a Viable Legal Structure

- **The host government must make a legal commitment and give its binding assurance not to interfere in any fundamental aspects of the project.** This is necessary to prevent government actions which could result in either outright or creeping expropriation of the project. An example of this would be the imposition of an extraordinary tax, license renewal conditions or import/export permit requirements that destroyed the economic well-being of the project, resulting in its inability to provide funds for servicing of the debt. The government regulation of the utility must be well-defined and transparent, so that both the project and the utility are free from interference or intervention by a host government with political motives. This is necessary to let market forces determine appropriate power policies in areas such as pricing, tariff policies, required environmental safeguards, etc.
- **The legal system must enable the investors to confirm that the contracts are valid and binding.** Since project finance transactions substitute specific written agreements for general sovereign credit, investors must also have redress within the framework of international laws in the event that the host

government attempts to change the contracts and/or agreements unilaterally. This protection is still not readily available in the majority of developing and transitional countries.

Addressing Technical and Resource Considerations

- **The project must be viable from siting, engineering and fuel supply standpoints.** These technical considerations center on an appropriate level of CCT for the project and an analysis of the type(s) of coal that will be available. The wide range of U.S. CCTs gives U.S. industry a competitive advantage in this area. Care must be taken to obtain all of the numerous permits and agreements required to build and operate the plant. A bad project cannot be transformed into an acceptable one through the use of project finance.
- **Multilateral development banks and bilateral financing institutions will insist that environmental considerations be adequately addressed by the project.** CCTs will meet these requirements. When repowering existing plants in the transitional countries, or locating plants in existing heavily industrialized locations in developing countries, it will also be important to recognize that there may be existing environmental problems that might have to be solved prior to the project manager's taking title to the property.
- **A supply of coal and other inputs to the project must be assured at fair market prices throughout the financial life of the project.** The imposition or threat of undue tariffs, import controls or other restraints by the host government can easily sink a project. These costs and risks must be fully assessed during the feasibility stage and protected by long-term contracts.

If a country can not meet these requirements, therefore qualifying for project finance, it is unlikely that it will be successful in getting power plants built under current and forecasted medium-term economic conditions.

PROBLEMS FOR PROJECT FINANCE IN DEVELOPING FOREIGN MARKETS

Developing and transitional countries often have major problems meeting the conditions just enumerated. The barriers posed to project finance in those countries are significantly higher than those posed in developed countries.

Conflicting Priorities

The overriding problem is that developing and transitional countries have many more development needs than can be funded with their limited capital reserves. These needs include, not only electric power, but other energy sector needs, and non-energy infrastructure. This non-energy infrastructure includes such important items as agriculture, education,

industry, rural and urban development, transportation, water supply and sewage, and health and nutrition.

The ability to understand and work with the concepts of risk and profit, especially in the transitional countries, cannot be taken for granted. Until they gain this understanding, it is difficult to develop the various financial, legal and regulatory safeguards that must be put into place.

Legal and Institutional Issues

Many of these countries also suffer from a lack of adequate legal framework and transparent regulatory environment. It is important to ascertain whether the numerous contracts will be legal, binding and enforceable, and whether there will be redress in international courts if abrogation by the host government or utility occurs. There needs to be regulatory framework for the construction, ownership and operation of generating facilities by foreign and private entities.¹²

The developing and transitional countries are also more susceptible to other major political risks, which include war and insurrection, expropriation, change in government, and currency availability and convertibility. Local capital markets are usually not developed enough to provide an important local financing component that can offer both a partial replacement for host government financing and also show the commitment of the local business base to the power project.

Cultural differences and customary practices in the countries themselves can often impede progress. For example, local financial institutions may only want to make short-term commitments because they are not used to underwriting long-term loans. In some countries, all interest payments are viewed as usury, a problem that is extremely complicated to bypass. Local legal counsel and government officials may not be used to documenting the various elements of the financing in writing. Government attitudes toward the power sector, and

¹² Wigmore, Gary S. "Private Power Financing in the Pacific Rim: an Evolving International Market", Proceedings, Infocast, Inc. Conference on Private Power in the Pacific Rim, Los Angeles, January 25-26, 1993

resulting utility management practices, may need to be changed to allow the power plants to operate profitably. Price controls must also sometimes be lifted for power, although this is not a politically popular step for the governments to take.

Convertibility of Currency

Currency convertibility and repatriation of funds can be a major obstacle to pursuing projects in developing and transitional countries. Unlike other types of project-financed investments which produce goods for export (e.g., oil and gas development and manufacturing facilities) resulting in dollar inflows, electric power projects sell their output for local currency in the host country. As shown in Figure 4-2, revenues from power plants are in local currencies, yet the loans must be repaid in dollars. When a clear expectation of repayment is not evidenced by the facts, these projects will not be financed. If the mechanisms to reduce currency risk (which were highlighted earlier in this chapter) are not sufficient, an additional solution could be to attempt a barter exchange agreement. This would be complicated to arrange, however, where local electric power is the item offered for barter. Delays in convertibility can also subject developers and investors to devaluation risks.

Role of the Host Government

While one of the primary objectives of project finance is to move financial responsibility from government to the private sector, government ownership of utilities and less developed economic institutions in many developing and transitional countries may mean that the host government must still make some commitments to providers of capital. Examples include:

- That government approvals for the project are binding;
- Acknowledgement of the project and the lender's participation;
- Non-interference and non-expropriation;
- Foreign exchange assurances to the lenders;
- Tax treatment (e.g., tax holidays or relief for imported equipment);
- Incentives for export for the project if applicable; and
- Commitments to the off-take or power purchase agreement.

The specific undertakings required of the host government vary with the circumstances of each financing: the country and its legal system, power company ownership and financial strength, and the perceived ability of the private parties to perform. Many financial institutions are involved—private, government (both U.S. and foreign) and multilateral development banks—in large transactions of the size required for CCT projects. The exact

terms are subject to negotiations and the commitments gained by one lender on the host government are often required by all. Due to the newness of international power project finance transactions on this scale and the lack of private infrastructure in these countries, the undertakings required of governments may be extensive. Host government commitments to off-take or power purchase agreements may potentially lead to substantive financial involvement in the project itself and therefore may be the most controversial of these commitments. Governments may wish to avoid such undertakings, citing the stand-alone nature of project finance entities. In addition, even though the current treatment is as "off balance sheet", there is a risk that this treatment could change. Financial institutions, in contrast, may see such undertakings as necessary for government-owned utilities, or in countries with weak legal and regulatory protection. As experience with these types of transactions increases and as countries establish institutional infrastructures that mitigate more of the risks, fewer commitments may be necessary from the host governments.

Implications for Developers

In most of these countries, privatization is still an untested transitional concept and "shakedown" problems are substantial on first-time project finance transactions in each country. The legal and regulatory framework is being changed to solve known problems, but not all problems are revealed until the financing of a project is attempted. Fundamental issues, such as deciding who will be the operator of the plant, can be major roadblocks to being able to complete the financing.

Project developers are especially constrained by the absence of conditions necessary for project finance transactions in these countries. A high initial project development cost and long-term commitment is required of the project developer, yet financing is often available for only 10 to 12 years—not sufficient for these long-life assets. Just the process of financing the project can take up to five years. Substantial time, effort and money is needed to pursue these projects due to the substantial number of agreements and permits required and the difficulty in obtaining them. The risk of coming up empty-handed at the end of the process is also higher than in developed countries. Yet, a developer interested in the international market must make an up-front, long-term commitment in terms of setting up an international department. As a result, a developer must have a number of projects in progress in a number

of different countries to be assured of winning at least one contract, thus participating in the international market. At the same time, project developers today continue to be affected by the worldwide recession. As a result, capital budget restraints have been widely instituted and manpower cutbacks have been extensive.

Project developers must find ways to overcome the ongoing challenges posed by countries with developing and transitional market economies if they want to participate in the development of these countries' power sectors. These are not simply U.S. projects with an international flavor; due to a wide range of new political and economic risks, they are entirely different in character and require credible, internationally experienced developers.

PROBLEMS FOR U.S. FIRMS IN FOREIGN MARKETS

Two types of U.S. firms are active in this international CCT project development industry. The first is multinational construction and project development firms headquartered in the U.S., most of whom are currently in this marketplace. The second group consists of independent power subsidiaries of utility holding companies, only a few of whom have international experience.

Corporate Culture

Multinational project development firms are entrepreneurial by nature and have substantial experience in the power industry. Many have honed their skills in the rapidly expanding independent power environment in the U.S., which was initiated by the Public Utility Regulatory Policies Act of 1978 and competitive bidding. As excellent "dealmakers", they expanded into the international segment when it became viable. They are well-positioned to pursue the current international opportunities.

Some U.S. electric utility holding companies have set up successful project development companies that already operate both in the U.S. and in overseas CCT power markets. A major reason for their success is that they have set up independent power affiliates with their own entrepreneurial culture.

The U.S. electric utility industry has a well-deserved reputation as the international leader in utility operation skills. This reputation, by itself, is insufficient to enter the international market because these companies generally lack experience in international projects. Many also tend to have an operational business culture—which characterizes a highly regulated and relatively structured industry—instead of the necessary entrepreneurial spirit. Those that have succeeded overcame this problem by joint-venturing their first international power projects with companies with the required international experience, hiring the right people to run a separate international unit, and involving good investment bankers.

Reluctance of U.S. Banks

Today, many U.S. banks are reluctant to finance foreign entities. They do not place the same level of importance on international trade as Japanese and European banks, which have historically needed to be more international in their scope and outlook. In addition, the losses sustained from loans made in the 1970s and early 1980s, when the banks actively lent to developing countries, are a powerful reminder of the risks of international lending without careful underwriting.

The worldwide reduction of credit available to companies in many industries, including construction, has also reduced the availability of project funds for cross-border loans. International departments at many U.S. money center banks have been cut back or eliminated in recent years due to losses in developing countries stemming from aggressive international lending practices to these countries in the 1970s and early 1980s, when transactions funded 100 percent with debt were common. An equity component of up to 30 percent is now required by the banks and other sources (versus 10 to 20 percent for domestic projects), but few sources of equity funds are available. At the same time, the costs of international power projects have increased dramatically in recent years, due, in part, to the necessity for more environmentally sound facilities.

Taking all of these factors into account, U.S. bank regulators, in the past few years, have instituted detailed reporting and reserve requirements, effectively penalizing institutions that have booked cross-border loans and uncovered loans to less developed countries. This is especially significant with CCT power plant loans which need to be long-term both to reflect

the long life of a power plant and for the competitive need to keep yearly debt service as low as possible. Developers complain that the bank regulatory environment is both stricter and less certain, in terms of continuity, for U.S. banks than for Japanese and European competition.

Reverse Political Risk

Another concern of U.S. firms operating in foreign countries is "reverse political risk". There is the concern that the U.S. government might pass new tax or other laws that would impact the feasibility or profitability of these projects. Also, political relationships could change between the U.S. government and some of these developing or transitional countries, thus jeopardizing the ability of U.S. firms to continue working with them.

Financing Advantages of Foreign Competitors

The international project developer who can offer the most attractive financing package to customers will enjoy a competitive advantage:

The ability of the supplier [project developer] to arrange 'soft loans' may be crucial, and the rise in influence of Japanese suppliers, where the government encourages such measures, and the decline of U.S. suppliers, where there are strict controls on the terms of such loans, may be connected to this factor.¹³

In the previous Report to Congress by the Department of Energy on CCT Exports (February 1992), it was concluded that direct assistance from foreign governments to their domestic companies, utilizing tied-aid and other targeted financing assistance—including subsidies that reduce the competitive company's cost of capital—has given foreign companies great advantages in this price-sensitive marketplace. Recently, the combination of generally lower worldwide interest rates (especially in the U.S.) with the relatively higher structural interest rates in a number of competitor countries (such as Germany) has somewhat leveled the playing field for U.S. companies by lowering the differential between U.S. rates and those below-market interest rates^{14,15} commonly offered by some competitive countries'

¹³ Thomas, p. 28

¹⁴ Thomas, p. 90

development agencies or state-supported banks. In addition, the Japanese/European recession has resulted in a reduction in the credit available to many companies in a number of the competitive countries. The costs of reunification of Germany have become the first priority, for example, for German and some other European investment capital. A number of practices, however, including foreign tied-aid or other low-cost financing methods, foreign government policies of actively coordinating and promoting CCT exports and pursuing "door-opening" programs, still leave U.S. firms at a competitive disadvantage. In addition, the mitigating factors noted above may prove to be transitory if the world economy gains strength, and interest rates in the U.S. start to rise.

To help minimize these foreign advantages, U.S. firms may sometimes find utilizing foreign financing sources (private and public) advantageous, even though U.S. firms may be forced to partner with the foreign project management firms in order to obtain this financing. The new program between the Export-Import Banks of the United States and Japan, for example, is an effort by the Export-Import Bank of the United States to take full advantage of the resources of the Export-Import Bank of Japan. The goal of the program, which is the result of an agreement between the Export-Import Banks of the United States and Japan to support U.S./Japanese joint ventures in Asia, is to avoid an expensive and counterproductive cost-of-capital war between the two nations. The program works as follows: a U.S. firm applies to the Export-Import Bank of the United States for assistance for support of U.S. exports, and notifies them of the presence of a Japanese company on the proposed project team. The Export-Import Bank of the United States then notifies the Export-Import Bank of Japan. Together, the two agencies develop a coordinated assistance program that most effectively utilizes the individual resources of the two agencies.

The shift from Government-to-Government primary contacts to private (or parastatal)-to-private primary contacts for these projects may have additionally helped level the playing field and opened more opportunities to U.S. firms. This is primarily because foreign governments have fewer opportunities to intercede on behalf of their companies:

¹⁵ "Summary of Key Issues and Recommendations intended to Address Federal Government Actions that Will Assist U.S. Industry in Overseas Private Power Development Projects", International Energy Development Council, February 8, 1993

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- Some foreign countries do a better job of utilizing their government resources, such as embassies for trade purposes, than the U.S. government does. More private-to-private contacts means less advantage to such key foreign countries.
- There is less opportunity for tied-aid/concessionary financing programs when the discussions are between private companies, and not between governments (or state-owned utilities).
- U.S. firms, who are extremely capable in international project management and finance, benefit from being able to directly showcase their abilities to the actual customer without having to work through a number of government intermediaries.

One concern of U.S. firms is that they feel that the Japanese government is better at providing timely information to their project developers and at persuading Japanese banks to proactively participate in the funding of these projects—especially in the Asian markets. This head start and easier access to financing is difficult for U.S. firms to overcome. Japanese banks in the Asian market will underwrite larger loans, and for longer terms, than the Western banks. Predictably, they look for the presence of Japanese companies when financing these transactions.¹⁶

Unless U.S. firms act now, aggressive competitors from Germany and Japan will dominate the market despite the U.S.'s technical edge. This market is extremely price-sensitive, and the financing advantages enjoyed by foreign companies give them a major competitive advantage. Their relative market shares also give them an advantage. Even though the size of the U.S. world trade in the power equipment industry, in Megawatts, has almost doubled from the 1955-64 to the 1985+ time period, the U.S. share of exports has actually dropped in half, from 21 percent to 10 percent. During this same time period, Germany's share has remained roughly level at 21 percent, and Japan's share has risen (mostly by expanding sales in the Pacific Rim and South America) from 5 percent to 16 percent (after peaking at 27 percent in 1975-84). Even Switzerland (13 percent) and Great Britain (11 percent) currently have larger shares of the export market.¹⁷ Even though much of the U.S. decline in market

¹⁶ Sakai, Toshihiko, "Private Sources of Financing Project Financing and Commercial Banks," Proceedings, Infocast, Inc. Conference, Private Power in the Pacific Rim, Los Angeles, January 25-26, 1993

¹⁷ Thomas, p.69

share can be linked to the previous trade emphasis on providing nuclear energy plants to the Pacific Rim, it still represents a loss of influence for the U.S. power equipment industry.

NEEDS FOR FINANCIAL ASSISTANCE IN DEVELOPING AND TRANSITIONAL COUNTRIES

The needs for financial assistance for project development are related to, but different from, the prefeasibility and feasibility needs outlined in Chapter 3. Here the key risks are long-term structural investment risks, which are an outgrowth of economic and political uncertainty. Risks derive from the large size of these projects, the inability of the host country or utility to obtain financing based on sovereign credit, and the general difficulty that investment bankers say they are having in obtaining both debt and equity funds from the private marketplace. These CCT power projects need the discipline brought on by the presence of qualified operators as well as the multilateral development banks, bilateral financing agencies and private investors. Often, the presence of U.S. government and/or multilateral development bank financial assistance lends credence to the necessary assumption that the host country will not purposefully take action to cause the project to go into default, because that would be causing negative consequences not just to a private entity, but also to a governmental one. The political reality is that a country may not need help from the private entity in the future, but it probably will need assistance from the multilateral development banks and/or government entities.

Thus, U.S. government assistance makes the projects more financeable and levels the playing field for U.S. developers both to be hired as the project developer and as the long-term operator. Financial assistance also enables the financing to close by helping alleviate and allocate the investment, and therefore the risks.

Figure 4-3, an illustration of the financial structure of a CCT project finance transaction, shows how the following three levels of U.S. government aid are needed:

- **Direct U.S. government financial assistance** starts with agencies committing to fund a share of the total loan requirements. These loans are expected to be repaid and also function as a catalyst to get private funds involved.
- **Guarantees and insurance programs** are the second level of involvement, which additionally leverages the total cash available by backstopping the private

sector financing institutions. Bank loans backstopped by U.S. agencies receive favorable treatment from bank regulators.

- **U.S. agency involvement** also helps provide better coordination, with the multilateral development banks, in the quest for additional financial assistance from them.

Figure 4-3. Elements of a Typical Project Finance Transaction

U.S. GOVERNMENT RESOURCES AVAILABLE

For international project finance CCT transactions, only four U.S. agencies have been actively involved in providing financial assistance to project developers. The Overseas Private Investment Corporation (OPIC) and the Export-Import Bank of the United States (Eximbank) provide a variety of services including direct loans, loan guarantees, and various types of

insurance. The Agency for International Development has not been active in financing transactions for energy projects for a number of years, but does support infrastructure development.¹⁸ The Small Business Administration (SBA) has programs that help small business exporters of goods and services to these projects but, for the most part, these companies are suppliers to primary contractors. SBA has no direct role in project financing, thus it is not a major resource contributor. The programs of all four agencies are summarized in Table 4-2. U.S. export finance agencies are not yet organized to deal effectively with large international project finance transactions because of their limited experience with them. These projects are larger, more complex and different than the typical exporting program that might just require the use of U.S. agency guarantees. The role of the agency is thus as an involved party to the transaction, not just a guarantor. In addition, U.S. agencies are often more conservative than financiers of domestic independent power projects.¹⁹ They are used to relying on host country guarantees as the ultimate repayment source for a transaction, but now they must spend considerably more time and effort evaluating all of the parties and the agreements between them used in these limited-recourse transactions. And, they must become experienced with the different structures for risk reduction, since they are not primarily relying on the sovereign guarantees. U.S. export credit agencies adhere to the Organization for Economic Cooperation and Development Arrangements on Guidelines for Officially Supported Export Credits (OECD Arrangements on Export Credits), which puts limits on the form and term of the assistance they can provide. Eximbank and other export credit agencies, for example, must adhere to the 10-year term limit (12-year limits can be considered if the offering country complies with a notification process) except in the case of tied-aid offers. Eximbank has limited "war chest" funds available for matching foreign concessionary financing. The OECD Arrangements on Export Credits permit tied-aid for projects that are not commercially viable. The determination of commercial viability is done on a case-by-case basis, and CCT sales may be viable or non-viable. Other countries may classify demonstration projects as "experimental" regardless of the commercial status of their

¹⁸In addition, the Agency for International Development has financed energy projects in Egypt.

¹⁹ Roberts Jr., Edward V., "The Bilateral and Multilateral Agencies, Sources of Financing or Financing Support", Proceedings, Infocast, Inc. Conference, Private Power in Latin America, Acapulco, April 23-24, 1992

technologies and are thus of lower viability. This classification gives them a competitive edge. Eximbank should challenge any of these offers that seem contrary to the spirit of the agreements. Other actions -- such as direct government subsidy of a corporation to lower the company's cost of capital and allow it to bid a project for a lower price, or giving sums of money to the multilateral development banks as directed funds for feasibility studies to be performed by developers from the donor country -- can effectively have the same anti-competitive effect. A strategy to discover and overcome these problems must be developed.

Table 4-2
PROJECT FINANCE ASSISTANCE OFFERED BY FEDERAL AGENCIES

DEPT./ AGENCY	PROGRAMS	ASSISTANCE	QUALIFICATIONS	DETAILS	PERCENT FINANCED BY INSTITUTION
OPIC	Investment Finance Program Investment Insurance Program	Direct loans Loan Guaranties Equity and equity participation Currency inconvertibility Expropriation Political violence	Commercially/financially sound Proposed mgmt. has proven record of success Project approved by host country Insurance available for new venture privatizations or expansions of existing enterprises Insurance covers equity investments, loans, leases and other exposures	Direct loans: \$500K-\$6M Guaranties: \$2M-\$50M Equity participation: \$250K-\$2M Insurance premiums vary with risk profile of project Once rates are established, they are fixed for life of coverage	New venture: 50 Existing business: 75
EXIMBANK	Long-Term Loans and Guaranties	Direct loans Loan Guaranties	Capable/experienced proj. sponsors Proven project technology Well-defined host gov't. role	U.S. content at least \$50M Edm significant lender Cash equity at least 25% Non-completion guarantee	85
A.I.D.	Energy Project Development Fund (EPDF)	Policy Reform/ Institutional Development	Project in developing country U.S. export potential	EPDF sponsors worksh., etc./conferences Arranges tours of U.S. powerplants Sends U.S. experts overseas	N/A
SBA	Regular Business Loan Program Export Revolving Line of Credit Program International Trade Loans	Loan Guaranties	Loan proceeds used to expand existing export market or create new one Applicant facing competition from foreign companies Must possess sufficient collateral	Max. \$250K for working capital, \$1M for facilities/eqpt.	85

U.S. government assistance is not additive. That is, individual programs may be used under conditions which would preclude other programs from being available. The process of weaving government and multilateral development bank support with private sources of capital is not an easy process because some agencies and/or multilateral development bank programs are meant to benefit sovereign nations, and some are to be used in the private sector. In addition, qualification criteria vary, and some are mutually exclusive.

The **Overseas Private Investment Corporation** provides project finance assistance to qualified overseas ventures with significant U.S. participation. OPIC loans and loan guaranties are available to projects which have met OPIC's standards for technical, economic, marketing and

financial soundness. OPIC's loan guaranties range from \$2 million to \$50 million. Direct loans typically range in size from \$500,000 to \$6 million. OPIC limits its participation in a new project to 50 percent of total costs, and 75 percent of total costs for the expansion of an existing business. OPIC investment insurance protects U.S. investors, contractors, exporters and financial institutions against three types of risks: currency inconvertibility, expropriation and political violence. The maximum term of an OPIC investment policy is 20 years, and OPIC's coverage is limited to 90 percent of the total loss. Insurance premiums range from \$0.25 to \$0.60 per \$100 of coverage.

Another way in which OPIC can participate in funding a project is through equity participation, in which OPIC is authorized to make capital stock investments and/or purchase a project's debentures convertible to stock. By allowing OPIC to share in the project's equity, the project managers can increase their capital base and improve their chances of obtaining outside financing. OPIC's equity participation in a project typically could range from \$250,000 to \$2 million, although additional funds may be made available for projects with exceptional prospects. OPIC equity participation can take the form of capital stock investments and the purchase of a project's debentures convertible to stock. In addition to limiting its investment operations to the first few years of a project's life, OPIC would not become a project's majority shareholder, nor will OPIC become involved in a project's day-to-day operations.

To begin the application process, the sponsor of a proposed project must submit a detailed business plan to OPIC. To be considered for OPIC assistance, the project must be commercially and financially sound, the proposed management team must have a proven record of success, and the project must be approved by the host country. Following OPIC's initial review, the project sponsor will be requested to provide additional information regarding the economic, technical and financial aspects of the proposed project.

The **Export-Import Bank of the United States** offers a number of programs of support for U.S. Exporters. Eximbank is an independent agency of the U.S. Government whose objective is to aid in financing and facilitating U.S. exports. Eximbank assumes risks that the private sector is unwilling or unable to accept. It supplements and encourages but does not compete with private sources of capital.

Eximbank may offer guarantees for short-term working capital loans for U.S. exporters. Eximbank also offers a comprehensive export credit insurance program to support U.S. exporters and commercial banks. Finally Eximbank also offers a medium-term and long-term loan and guarantee program to up to 85 percent of the U.S. export value. Eximbank is open in many but not all markets; it is prohibited by law from assisting U.S. exports to certain Marxist-Leninist countries unless the President determines that such support would be in the U.S. national interest. Eximbank may be closed in certain countries because of poor economic conditions which would not offer a reasonable assurance of repayment.

As part of Eximbank's long-term loan and guarantee program, the Bank considers "limited recourse project risk financing" (project finance) type applications. In project finance applications Eximbank may provide loans or guarantees for new projects of substantial size (involving more than \$50 million U.S. export value) in which the Bank would rely for repayment on the cash flows of the project itself without full recourse to a third party guarantor in the form of a government or commercial bank. Eximbank's project finance approach is primarily to assume or share risks in order to mobilize scarce sources of capital which otherwise would not be available.

Project finance is a highly specialized area and Eximbank's application criteria are strict and comprehensive. Eximbank does not play a lead role in structuring projects, a task for investment bankers, sponsors or investors. As such, applications should be well-developed and structured, with feasibility studies prepared prior to an approach to Eximbank.

Eximbank has recently authorized project finance support for a refinery and electric power plant in the Philippines. Financing offers in addition have been made for petroleum refineries in Indonesia and Thailand. Further, project finance applications are under review for various industrial projects in Indonesia and other countries.

Eximbank's approach to project finance is evolving, and joint participation with Eximbank by other official export credit agencies and such multilateral development banks as the Asia Development Bank and the International Finance Corporation is encouraged. Eximbank's review of the submitted information and assumptions of the project participants by

Eximbank's professional staff should result in a well-structured project, on both a financial and technical basis, providing the host country with an economically viable project that can contribute to the economic growth of the country.

In 1991, Eximbank reached an agreement for cooperation with financial institutions of the Government of Japan to advance mutual objectives. Cooperative application of financing support by Eximbank and the Japanese agencies are enabling projects to be financed that otherwise could not proceed due to lack of adequate capital sources. The Japanese agencies include the Export-Import Bank of Japan, the Export-Import Insurance Division of the Ministry of International Trade and Industry and the Japan Development Bank. Eximbank offers all its programs for loans, guarantees and insurance in these efforts. A number of projects are currently being co-financed by Eximbank and the Government of Japan in such countries as Indonesia, Thailand, China, Philippines, Venezuela and Chile.

The **Agency for International Development (A.I.D.)** plays a role in project finance through the Energy Project Development Fund (EPDF), which has an annual budget of \$10 million. The goal of EPDF is "to accelerate the sustainable social and economic development of A.I.D.-assisted countries by increasing the supply of reliable, affordable energy, particularly electric power, for productive purposes."²⁰ The program addresses this goal by promoting policy reform and institutional development and by coordinating environmental reform and energy development.

EPDF helps to spur policy reform and institutional development in developing countries by providing technical assistance to host governments and electric utilities. The goal of EPDF is to establish the necessary legal, institutional, financial, technical and environmental infrastructure to attract private capital for project finance transactions. Toward this end, EPDF sponsors private power conferences and workshops, arranges for study tours to the U.S., provides private power training and internships, supplies expert assistance in private power training (on such topics as avoided cost pricing and contracting issues) and undertakes special studies on issues related to private power. Recent examples of EPDF activities include

²⁰U.S. Agency for International Development, "Private Sector Energy Development Program," Washington, DC, p. 2.

two conferences on private sector participation in the Colombian and Guatemalan energy sectors; a private power study tour for senior energy officials in El Salvador; technical assistance to the government of Indonesia on establishing rules and regulations for private power; a special study on private power options in Kenya; and a conference entitled "Private Sector Power in Asia," held in Kuala Lumpur, Malaysia.

EPDF seeks to coordinate environmental reform and energy development by pursuing the goal of increasing private sector participation while maintaining a satisfactory level of environmental safeguards. This is accomplished by assisting host country governments and utilities to perform cost/benefit analyses on the addition of environmental equipment and controls to new and existing power plants; helping to establish regulatory frameworks for environmental protection; and providing advice as to the best methods of incorporating environmental impacts into future energy capacity decisions.

The **Small Business Administration** provides a limited amount of financial support to potential U.S. exporters. As its name implies, SBA directs its energies toward serving the needs of smaller exporters. SBA financial assistance may only be used for facilities and equipment or as working capital. SBA offers assistance through three programs, the Regular Business Loan Program, the Export Revolving Line of Credit Program and the International Trade Loan Program. Through the Regular Business Loan Program, SBA offers guarantees for a maximum of 90 percent of a bank loan of up to \$155,000, or the lesser of 85 percent of a larger loan or \$750,000. SBA loan guarantees for acquisition of fixed assets under this program have a maturity of 25 years, while guarantees for working capital have a maximum maturity of seven years.

Under the Export Revolving Line of Credit Program, SBA guarantees a line of credit to the exporter for a period of 36 months. Loans made under this program mature within 12 months. Export Revolving Line of Credit-guaranteed funds are intended to be used for three purposes: to pay for labor and materials to be directly used in export manufacturing, to develop new foreign markets and to finance foreign accounts receivable. Applicants for Export Revolving Line of Credit funding must have been in business for at least one year.

The International Trade Loan Program provides loan guaranties to small businesses seeking to enter into or expand foreign export operations. This guarantee program is limited to financing domestic facilities and equipment. SBA will guarantee a maximum of 85 percent of the loan amount (for loans of \$155,000 or more), with a maximum total exposure of \$1 million for facilities and equipment and an additional \$250,000 for working capital. Loans guaranteed under the International Trade Loan Program must mature in 25 years or less. To be eligible, applicants must demonstrate that SBA-guaranteed funds will allow the applicant to expand existing export markets or create new ones, or that the applicant's business is being harmed by competition from overseas. SBA-guaranteed funds may not be used for debt repayment.

INTERNATIONAL FINANCE ORGANIZATION RESOURCES AVAILABLE

Multilateral development banks are heavily involved in providing loans and guarantees for project finance transactions in the energy sector. In many cases, the programs are the same as the ones used to fund prefeasibility and feasibility studies. These institutions specifically target both developing and transitional countries with this aid, but do not care which country the project management firm comes from. The multilateral development banks, through competitive bidding, attempt to obtain the best product at the best price. Since U.S. CCTs and project developers are among the best, this can be an advantage for U.S. firms if the playing field for costs is level. Of the multilateral development banks, five are most relevant to CCT projects due to available financial resources, geographic mandate, or both: the World Bank Group, the European Bank for Reconstruction and Development, the Asian Development Bank, the Inter-American Development Bank, and the African Development Bank. They are highlighted in Table 3-2.

Greater coordination between U.S. agencies and the multilateral development banks will lead to more effective overall assistance. Coordination would eliminate some duplication of efforts and increase the flow of information to U.S. firms, hopefully resulting in more U.S. firms bidding on multilateral development bank projects. The coordination would thus result in an increase in the total assistance available to U.S. firms. The office of the U.S. Executive Director, staffed with employees of the Department of Commerce, and the Office of

Multilateral Development Banks at the Department of the Treasury are available to provide assistance to U.S. firms attempting to obtain contracts from the World Bank.

The World Bank Group, which includes the International Bank for Reconstruction and Development (IBRD), commonly referred to as the World Bank, the International Development Association (IDA), the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA), has in excess of \$22 billion in funds available to worthy projects. The IBRD and IDA provide debt financing either to the governments of developing and transitional countries or to those agencies that are able to obtain government guarantees. The IFC, on the other hand, does not require government guarantees for its financing and thus targets its assistance toward private sector entities seeking financial assistance. The IFC also provides equity capital in addition to making loans. Both IBRD and the IFC attempt to bring in other sources of funding from the international capital markets in order to leverage their assistance programs. The component units of the World Bank Group provide a variety of project finance assistance to energy sector projects: direct long-term loans, co-financing and guarantees. In 1992, IBRD and IDA's combined foreign and local disbursements totaled \$11.7 billion. Of this total, \$3 billion was allocated to energy sector projects. IFC's total disbursements in 1992 were \$1.1 billion. At the same time, MIGA issued 21 guarantees with a maximum liability of \$3.3 million, representing total investments of \$1.1 billion. The World Bank Group can also recommend other sources of financing and act as a catalyst in obtaining these funds.

The World Bank's Expanded Cofinancing Operation (ECO) program provides partial guarantees in the hopes of improving the access of eligible World Bank borrowers to private sector funds. The maximum guarantee available through the program is 50 percent of the total project cost for public sector projects, and up to 100 percent for private sector projects. World Bank total cofinancing operations in fiscal year 1992, including ECO, were in excess of U.S.\$13.2 billion. The largest source of cofinancing is official bilateral and multilateral development banks, at 67 percent of total cofinancing. In 1992, 53 percent of all World Bank projects included some form of cofinancing.

Obtaining financing from the World Bank Group can take between 18 months and several years. All aspects of the proposed project are carefully reviewed, such as the project's rate of return, and whether the host country has enough technically trained personnel to support the project. An environmental impact assessment must also be performed. Finally, the proposed project is voted upon by the Executive Board of Directors of the World Bank.

While the World Bank Group has a large dollar amount of aid available, it is often criticized by developers and investment bankers as being difficult to work with. Their approval process is very lengthy, as they insist on conducting their own internal analysis of each project. Their goal is to do a better job of making loans. The World Bank Group has so many programs that it is often difficult for project developers to get help, even from case officers dealing with them on a specific program, in order to successfully coordinate the potential various programs and their benefits. Finally, the World Bank has larger funding than the IFC, but the mandate of the World Bank--to loan to government entities--is structurally incompatible with the current shift to private power. The World Bank's response to this problem, establishing the Private Sector Group, has put them in conflict with the IFC. Finally, some of the practices of the IFC, providing financial advisory services and requiring that the IFC occupy the position of lead lender, puts it in conflict with investment bankers and may serve to reduce, rather than increase, the availability of private funding in some cases.

The European Bank for Reconstruction and Development (EBRD) is owned by its 53 member nations, the European Economic Community and the European Investment Bank. EBRD operates in Albania, Estonia, Latvia, Lithuania, Bulgaria, the Czech Republic, the Slovak Republic, Hungary, Poland, Romania, Slovenia, Croatia and the former Soviet Republics.

EBRD offers a variety of different types of project finance, including loans, equity funding, guarantees and underwriting through Bilateral Trust Funds, Merchant Banking and Development Banking. Through these programs, the Bank has in excess of \$12 billion in funding available to worthy projects. A minimum of 60 percent of the Bank's lending must be concentrated in the private sector. To be considered for EBRD assistance, private sector projects must submit a detailed business plan to the Bank. Public sector projects often evolve as a result of discussions between the Bank's field offices and host government officials.

EBRD's minimum level of assistance is \$6 million, and their overall level of assistance in a particular project will not exceed 35 percent. CCT projects considered for EBRD assistance must pay for themselves, and must be shown to improve the local economy. In addition, an environmental impact assessment must be performed before EBRD will commit to financing. In evaluating potential private sector projects, EBRD weighs the developmental merit of the project versus the financial risk involved. EBRD assesses public sector projects in light of the Bank's development strategy for the particular host country. As well as providing financing itself, EBRD actively promotes co-financing by seeking to attract public and private capital to central and eastern Europe and the former Soviet Union. The Bank works with private financial institutions to create financing structures that promote the development of private sector projects. By participating in EBRD's loans, private commercial banks may benefit from the EBRD's status as an international institution.

The **Asian Development Bank (ADB)** is comprised of 52 member nations, 36 of which are from the Asia-Pacific region, and 16 that are non-regional countries in North America and Europe. The Bank gives priority to aiding the poorest nations in the region. ADB finances power projects through Ordinary Capital Resources and Concessional Loans. Ordinary Capital Resources, which are available to the better-off developing countries, carry interest rates between 6.36 and 10.5 percent (depending upon ADB's cost of funds) and must be repaid within a 15- to 30-year period, with a grace period of between 3 and 7 years. Concessional Loans, which are made to the poorest developing countries, carry a service charge of 1 percent and have repayment periods of 35 to 40 years and grace periods of up to 10 years.

In 1992, 35 percent of total ADB lending was devoted to energy sector projects. In 1992, ADB provided loans to 13 energy and power sector projects at a total cost of \$1.4 billion, which accounted for 29 percent of total lending. In 1993, ADB is considering loans to 18 projects in the energy and power sector, totalling \$2.4 billion.

In assessing a public sector project, ADB examines the host country's economy, access to other funds, its needs, priorities and development plans. ADB private sector project participation is based upon ADB's assessment of the project's developmental, employment and economic outlook. In addition, ADB requires that an environmental assessment study be

undertaken. The proposed project must have a high developmental priority. ADB makes three kinds of loans--project loans, for individual projects; sector loans, made for a series of subprojects within a geographic area or over a period of time; and program loans, made to governments to support a specific sector development program. ADB pursues co-financing opportunities in its efforts to provide maximum assistance to worthy projects. ADB assists borrowers in obtaining co-financing from official, commercial and export credit sources.

The **Inter-American Development Bank (IDB)** was created in 1959 to facilitate development in the Latin America region. IDB is owned by its 45 member nations, which include regional and non-regional countries. IDB's stated priority is assisting low-income nations in the region. IDB examines every proposed project for potential environmental impact.

IDB provides financial assistance to public sector projects only. Typically, the host government will initiate contact with IDB's field office to discuss the need for the proposed project. In addition, IDB officials meet with government representatives on a regular basis to discuss the host country's needs and priorities. IDB does not make specific recommendations, but, rather, helps the host country officials analyze their situation in light of available IDB assistance programs.

By taking full advantage of co-financing opportunities, IDB is able to maximize the funding available for worthy projects in the region. IDB is currently involved in cofinancing projects with a number of organizations, including the World Bank, the Special Fund of the Organization of Petroleum Exporting Countries, Kreditanstalt für Wiederaufbau, German Technical Assistance Agency, Andean Development Corporation and Government of the Netherlands.

IDB funds projects from Ordinary Capital Resources and from the Fund for Special Operations. IDB makes two different types of loans—sector-specific loans (25 percent of total loans) and project-specific loans (75 percent of total). In 30 years of operation, IDB has approved 1,846 loans, totalling \$46.9 billion. In 1990, IDB authorized loans for \$665 million worth of energy sector projects. Between 1961 and 1990, 27 percent of all IDB loans went to energy-related projects.

The **African Development Bank (AfDB)** was established in 1963 by 23 African nations. AfDB operations formally commenced in 1966. As of December 31, 1992, AfDB membership included 51 independent African states and 24 non-African states. AfDB's goal is to promote the economic and social development of African member nations through the financing of investment projects and programs, as well as to mobilize resources through co-financing with bilateral and multilateral development banks.

AfDB utilizes a number of lending instruments, including project loans, lines of credit, sector investment and rehabilitation loans, and structural adjustment loans. In 1992, total AfDB loan approvals totalled \$1.8 billion, 25.9% of which were for projects in the public utility sector, which includes energy sector projects. Interest on AfDB loans varied from 8.03 to 8.09% in 1992. Repayment periods varied from 12 to 20 years, with grace periods of up to 8 years. AfDB actively seeks to encourage co-financing operations with multilateral development banks and bilateral agencies and private financial institutions. In addition, AfDB works closely with other organizations, such as the African Business Round Table, which promotes private enterprise in Africa.

ADEQUACY OF CURRENT U.S. GOVERNMENT EXPORT ASSISTANCE RESOURCES

The U.S. Government already provides assistance to CCT project developers in developing and transitional countries. Four U.S. agencies, an interagency task force and a Trade Promotion Coordinating Committee Subgroup all address these assistance needs. While more work must be done, the central question that remains is what the U.S. government should be doing in order to ensure that U.S. firms are competitive with firms from other countries. Many of the issues raised by this question apply not just to CCTs, but to all international power projects involving U.S. developers -- and to project-financed transactions in general.

The question of adequacy has no simple answer because a number of factors, many of which are outside the control of the U.S. government, influence the adequacy of this assistance. CCT projects are highly capital-intensive. Many of the countries and their utilities lack long-term credit ratings. Only a few financial institutions make loans available. Moreover, multilateral development banks are pressed to meet needs for the entire range of infrastructural development in many countries. International project finance has developed

as a means to overcome these problems. Even so, the legal systems, regulatory frameworks and local capital markets in these countries often cannot support project finance transactions. As a result, investment bankers can only raise funds to meet the needs for the strongest power projects.

Not all potential power projects in every developing and transitional country can be economically successful. Developers and other interested parties will be constantly pushing to have others assume the risks that they do not themselves want to bear. U.S. Government financial assistance for a CCT project will only be successful, in the long run, when that project has a sound technical, economic and infrastructural basis.

The goal of U.S. Government financial assistance should be to ensure that CCT project developers have necessary access to project financings, so that they can be successful in developing viable projects in the international marketplace. Financial resources to assist the private sector are available from Eximbank and OPIC. These two organizations, however, must continue to improve their ability to evaluate these types of transactions on a timely basis in order to be able to focus on the best projects. In addition, the demand for financing from Eximbank has exceeded its budget resources for the past two years and has forced it to defer transactions to the following year. The deferral from fiscal year 1992 to fiscal year 1993 was \$300 million.

The ability to provide adequate capital is heavily dependent upon policies of the host country and the participation of private capital:

- **Capital availability depends on the host governments creating the conditions necessary for viable projects.** These governments can greatly influence availability of funds to a project in a project finance structure. With the appropriate legal, regulatory, financial and cultural environment, project financing of CCT projects could succeed in many of the developing and transitional economies that have adequate availability of coal.
- **Private investment by participants willing to share the risks is the key to a successful project.** U.S. Government funds should be a supplement to banks and other private sources participating in international CCT projects. Without the leverage of private funds, neither the U.S. government nor the multilateral

development banks can meet more than a fraction of the capital needs for these transactions.

This report identifies and recommends a number of ways to define and ensure more effective targeting of U.S. resources. For U.S. government financing assistance to be adequate, the agencies involved must: 1) be able to evaluate in a timely and reliable manner whether projects are viable and the infrastructures are adequate for success, and 2) provide financial support which adequately complements private financing from U.S. sources to render these projects competitive.

High visibility, success and early presence are crucial to market penetration by U.S. firms. This requires timely and effective evaluation of potential "showcase" projects. Such projects must not only be clearly viable, but outstanding, thus increasing even more the need for responsiveness by U.S. export finance programs.

The recommendations in Chapter 5 reflect the factors shown below, which influence the ability to evaluate projects and provide competitive financial assistance.

Ability to Evaluate Projects

Project finance transactions of this magnitude and type are new and different for U.S. Government export finance agencies. As a consequence, their current methods and institutional capability for evaluating these foreign loans may have to be altered.

- **Both Eximbank and OPIC may require additional resources to respond effectively if the volume of project finance transactions increases as anticipated.** These transactions are extremely complicated, lengthy and difficult to evaluate. The shift in the international financial markets from sovereign finance to project finance will significantly increase the amount of time which must be spent by U.S. Agencies both to perform due diligence and to oversee the progress of a loan until it is successfully brought to closing. Neither agency is staffed to handle the financing levels required by CCT transactions.

CCT project finance involves large and extremely complex financial and legal transactions in which numerous parties with very diverse interests must work together. Evaluating these transactions requires different and sometimes more specialized approaches and skills than are usually required for typical government or business loans. While neither U.S. nor foreign export credit agencies currently have much experience in power project finance transactions

(especially in developing or transitional countries), those agencies that build the relevant skill base quickly will establish credibility and more easily help their companies capture early opportunities. Increased cooperation and information sharing among and within the U.S. Government agencies will help speed the development of the required skills and allow U.S. project developers to compete more effectively in the evolving CCT private power market.

- **U.S. Government financial support to project developers has tended to be reactive.** That is, U.S. agencies wait for developers to bring fully structured projects to them rather than find projects for developers or assist them in the development of the overall financial structure. This contrasts sharply with the activities of the governments of foreign competitors, which actively seek out projects for their companies and then help finance them. The effectiveness of U.S. government assistance is limited because foreign firms find out about projects earlier.
- **Communication between the U.S. Government and developers needs to be improved.** These transactions require much more documentation and coordination than sovereign finance because of the numbers of parties and agreements required. Project developers are relatively new to international finance and must be better able to understand Federal requirements. Many developers currently find obtaining U.S. government assistance confusing and time-consuming. Often they don't understand the rules of Federal agencies: that Eximbank, for instance, does not offer any investment banking assistance. Instead of focusing on the development of the project, the developers must spend time learning the bureaucracy, including what types of assistance are available. They are not able to have all their questions answered by meeting with a single person, and it remains difficult to learn where to go for help.
- **U.S. Government participation in project-financed activities differs from conventional export loans or guarantees.** The U.S. Government would become one of the risk-taking parties, rather than just a passive lender or holder of host-government guarantees. As a lender or guarantee holder, the assumption is that the guarantee provides adequate protection. By contrast, in project finance, only the project and key project participants provide the real security for the transaction.

Ability to Provide Competitive Financial Assistance

To enable U.S. project developers to win foreign projects and obtain financing on a level playing field, a number of financial issues must be addressed:

- **Both Eximbank and OPIC will need expanded appropriations and/or lending authority.** If the number and average cost of CCT projects increase as expected, sufficient appropriations may not be available to Eximbank to meet the needs of a sizeable number of future, anticipated CCT project finance transactions. This shortfall could limit participation by U.S. developers in the CCT export market.

Lending authority for OPIC must also be addressed. OPIC is experienced in project finance because its mission is to assist the financing of private investment. Its loan ceiling of \$50 million per project must be increased substantially, however, in order to be effective with large CCT transactions. Eximbank has a higher loan ceiling but still needs to finish adapting to the requirements of project finance.

- **In instances where other countries are able to take actions to bypass the OECD Arrangements on Export Credits, U.S. financial assistance may not meet the terms offered by firms from several competing countries.** This means that U.S. firms are not price-competitive with these foreign firms, which hampers their ability to be chosen as project developers, because competitive countries may provide support for loans at below-market interest rates. The U.S. has taken a position of strict adherence to the OECD Arrangements on Export Credits, and Eximbank has a policy of maintaining the bulk of its "War Chest" authority in reserve to enforce compliance by other countries. Any unused War Chest funds are expected to be reallocated to standard export credits near the end of each fiscal year. Eximbank has been selective in committing funds for these purposes because the use of grant war chest funds actually reduces the number of projects that Eximbank can support on its standard terms.
- **Greater U.S. agency coordination with multilateral development banks would allow all parties to better leverage their assistance.** Assistance in the financing of international CCT power projects is provided both by U.S. government agencies and by various multilateral development banks. Project developers and all financing agencies and institutions would benefit from a coordination of the assistance available, instead of the current situation where project developers often attempt to choose between bilateral agency and multilateral development bank support. The benefits of coordination would include reducing the duplication of feasibility reports, increasing the ease of matching the differing program requirements with the needs of the specific projects and providing the additional protections to the developers and banks that accrue from multilateral development bank participation in a project.
- **U.S. Banks are more reluctant to make international loans than are European and Japanese banks.** Banks in foreign countries have traditionally considered international finance a necessity because international trade is a vital part of their economies. By contrast, U.S. banks view it more as an optional part of their investment portfolio, due to the large size of the domestic U.S. market—a view reinforced by the losses to U.S. banks that have occurred in exporting in recent years. As a result, foreign banks are more active in these projects than the U.S. banks, who are not currently providing an adequate flow of funds to U.S. firms. Following the international lending problems that surfaced in the 1980s, necessary regulatory restrictions have placed major constraints on the ability of over-extended U.S. banks to participate in international CCT transactions.

If banks do not participate in these transactions, they will lose potential revenues. In addition, lacking better access to these banks, the U.S. firms will have a weaker competitive market position. Many developers have a reasonable concern that requirements will again be changed retroactively by the banks to penalize these types of transactions. The ongoing problems in the banking industry makes it difficult for banks to plan for these types of loans in their portfolios and to price them correctly.

While the banks themselves are cautious when lending internationally because of past losses, they recognize the differences between— 1) lending money with the sole security being the host country guarantees, and 2) the risk-sharing by qualified parties that occurs in project finance. With the greater variety of indemnification and the large potential fees available, savvy U.S. banks have already become very interested in the energy field. More are needed, however, since these transactions are large, and the amount that any one bank wants to lend has decreased.

- **Currency conversion is not always available for repayment of debt and equity.** This type of protection would be very important to financial institutions because it would reduce the repayment risks substantially. While this would be extremely helpful to project finance, it could also be expensive for the U.S. government to implement. More U.S. funds should be made available only if the risks assumed are appropriate.
- **Unlike domestic CCT projects, financing is only supplied on a medium-term basis.** Since no construction financing for CCT projects on foreign soil is available, the entire transaction must be financed with permanent financing. A change to a mix of construction and permanent financing for these international transactions could potentially increase the supply of private funds available.

These findings outline the complicated nature of project finance transactions and the complexities within which the financing adequacy question must be answered. Recommendations for addressing these challenges are presented in Chapter 5.

Chapter 5

RECOMMENDATIONS

Clean Coal Technology (CCT) projects offer the opportunity to achieve multiple national objectives simultaneously by addressing critical goals related to energy, the environment, industrial competitiveness and international trade. These projects can be crucial to countries with developing and transitional economies. Such projects often present the best opportunity to develop rational market mechanisms for major infrastructure projects.

U.S. Government and industry involvement in CCT projects will demonstrate credibility, and position the United States to leverage this success into a broader range of activities worldwide. Establishing a leadership position in international CCT projects will reaffirm our country's interests and its ability to work with developing and transitional countries for the common good.

IMPLICATIONS OF THE SHIFT TO PROJECT FINANCE

Supporting project finance of CCTs in developing and transitional economies is more difficult than the trade finance normally supported by the Export-Import Bank of the United States (Eximbank) and the foreign investments typically supported by the Overseas Private Investment Corporation (OPIC). These financing transactions require changes in the way that host countries, U.S. agencies and project developers approach building new power plants because of the following—

- **The transactions are larger, more complex and riskier than transactions financed through general credit finance to countries with strong borrowing power.** They involve more parties and require substantially more documentation, resulting in a greatly expanded project evaluation and different types of relationships among more parties. Major energy and infrastructure projects, such as CCTs, require a different type of support, offering new opportunities, but imposing new responsibilities and risks. Non-recourse project financing for these large, stand-alone, capital-intensive projects requires a new set of operating standards, procedures and controls, which are different from those established for general finance transactions.
- **U.S. government agencies and host countries have little experience in project finance.** Federal agencies have extensive experience in export finance, which supports product development and marketing of specific U.S. products in foreign markets. Significant

experience has also been developed in supporting direct overseas investment by U.S. firms, in which U.S. companies are able to leverage U.S. funds directly. The method of assessing these transactions is not the same as the way that U.S. government agencies typically examine financing transactions, and they will require additional training and staff resources.

The U.S. Government must adapt its feasibility study and export finance programs to the evolving needs of the transitional and developing countries, and to the changing requirements of project finance. The resources of multiple agencies must be drawn upon in a coordinated manner, with decision-making processes that move sound projects forward and screen out poor ones. The recommendations presented in this chapter provide a basis for success in CCT project finance transactions. This success will set the stage for expanded U.S. industrial involvement in other major foreign infrastructure projects.

The change to project finance has not only affected U.S. Government agencies. Multilateral development banks are also grappling with the best way to react to these changes, especially in light of the poor energy sector results the World Bank has experienced in recent years.

U.S. Government efforts to assist in the export of U.S. CCTs to developing and transitional countries should focus on policies that will help U.S. firms be competitive in project-finance transactions. This entails four related strategies:

- **Helping project developers focus efficiently on key markets,**
- **Assisting host countries to adapt to independent power,**
- **Encouraging funding from private sources, and**
- **Making U.S. Government assistance programs more effective.**

Project-financing results in a sharing of political and credit risks by a number of private and public parties. Some of these risks may be borne by the U.S. Government in order to enable private industry to provide the public benefits that will come from increased development of U.S. CCT projects overseas. The risk levels for these projects, which are due to their larger size, may be higher than private financial institutions are willing to accept. The nature of the

involvement and the risks assumed, as they are in existing Eximbank and OPIC programs, must be manageable and prudent. While some financial risks will be incurred while establishing feasibility, the major credit risks will result from the financing of the projects themselves.

HELPING PROJECT DEVELOPERS FOCUS EFFICIENTLY ON KEY MARKETS

The first strategy requires helping U.S. firms identify specific countries where project developers can profitably focus their efforts and provide assistance for the funding of feasibility studies in these countries. Primary emphasis will then be placed on key market countries where--

- Power projects have been identified as a priority need by the host government,
- CCT is technically feasible and economical,
- The host government is willing to create a positive business environment through privatization and legal and regulatory reform, and
- U.S. firms can compete on a level playing field.

To accomplish this, the following steps may be taken by the U.S. Government:

1. **Work with private industry to monitor countries that are high-likelihood markets for U.S. goods and services for CCTs.** An initial political risk analysis should be performed for each of these countries to determine the viability of completing a project finance transaction in each of them. This will set the stage for developers to respond to potential CCT opportunities in each target country.
2. **Ensure that the Trade and Development Agency, the Export-Import Bank, the Agency for International Development, and the Department of Energy continue to finance adequate levels of feasibility studies for specific CCT projects.** These studies can be invaluable in positioning U.S. firms as potential project developers.
3. **Help ensure that U.S. firms play a major role in the first private power project in each targeted country.** Groundbreaking is difficult, but the first transaction sets up the pattern that will be followed both for future power plants and other major infrastructure needs. This will include not only helping position U.S.

firms as preferred providers, but also encouraging more qualified U.S. firms to participate in the export market.

4. **Expedite consideration of potential "showcase" projects in developing and transitional economies.** These are necessary in order to gain attention and prove the technologies under actual conditions. Financing, technical and environmental standards for these projects, however, must be high, to ensure that only outstanding projects become showcases.
5. **Identify financing assistance offered by competitive foreign governments.** This will help ensure that U.S. firms are operating on a level playing field. The Government should utilize U.S. Embassies to gather this information.

HELPING HOST COUNTRIES ADAPT TO THE REQUIREMENTS OF PRIVATE POWER

As a precursor to substantial private financing participation for CCT projects in most developing and transitional countries, concentrate efforts on helping foreign governments effectively develop a private power sector:

1. **Continue to expand training/information programs on private power development, and include information on the requirements of project finance.** This would include explaining the reasons for extensive paperwork, why most contract terms must remain negotiable until closing has occurred, the typical problems with host country laws (e.g., usury), etc.
2. **Help host countries develop the legal and regulatory infrastructure that will eliminate barriers to private power development.** While utility regulatory issues can be provided by the Department of Energy, some issues, such as legal ones, may need to be addressed by non-Trade Promotion Coordinating Committee (TPCC) agencies such as the Department of Justice.
3. **Help host countries establish a viable capital market that would aid in the financing of these and other infrastructure projects.** This would potentially involve both the Department of the Treasury and the Securities and Exchange Commission. Their efforts should be coordinated with the International Finance Corporation, which is currently providing assistance in this area.
4. **Help these countries and their electric utilities develop institutions and methods for evaluating power generation and environmental control options.** These should evaluate the technical, economic and environmental aspects of technologies on a consistent and unbiased basis and help ensure a level playing field for all options and suppliers.

ENCOURAGING FUNDING FROM PRIVATE SOURCES

Private funding sources must be attracted to these projects to maximize the market potential by leveraging U.S. Government efforts.

1. **Work with the banking sector to establish the basis for long-term participation by U.S. banks on project finance projects in the power sector.** This will allow developers to commit to these long-term projects without having to worry about the rules changing in midstream. This would have the additional advantage of creating some parity between U.S. and foreign financial institutions.
2. **Sustain a dialogue between the CCT subgroup and investment and commercial bankers.** This dialogue has already been initiated as part of the TPCC strategic plan. The objective should be to appraise the financial community of the evolving political risk situation in targeted countries, and to discuss financing methods for reducing exposure and risk to both project developers and financial institutions.
3. **Coordinate U.S. agency efforts with multilateral development banks, including the World Bank Group and all of the various regional development banks.** Co-funding feasibility studies, working to obtain loans, guarantees or insurance for projects, or simply staying abreast of any new industry developments worldwide will be an asset to U.S. firms. Continued Eximbank cooperation with foreign institutions like the Japanese Export-Import Bank would also help counter the soft loan problems. This coordination can help ensure that private industry will be able to leverage the assistance provided by these government financial institutions.

MAKING U.S. GOVERNMENT ASSISTANCE PROGRAMS MORE EFFECTIVE

The following actions will streamline U.S. Government assistance to CCT project developers:

1. **Create one-stop shopping for U.S. government assistance for project finance, especially for CCTs.** This was one of the original recommendations of the 1992 Report to Congress. It has been discussed as part of the TPCC strategic plan, but is not yet operational. As part of this effort, consider cross-training key U.S. agency personnel in project finance issues.
2. **Both the Overseas Private Investment Corporation and the Export-Import Bank need additional trained staff and funding to support project finance transactions, if, as expected, the number of these complicated, time-consuming transactions increases.** The number of transactions that Eximbank will need to evaluate is certain to increase for all types of infrastructural programs. Consideration should be given to funding an increase of Eximbank staffing, or

hiring outside consultants, in order to help meet the increased demand for project finance funding.

3. **Increase the Overseas Private Investment Corporation's loan guarantee limit from \$50 million to a level adequate to support these types of transactions.** This would allow U.S. firms to be effective in their mission by pursuing these projects in transitional countries. The new limit may need to be in excess of \$100 million.
4. **Consider negotiating structural changes to the Organization of Economic Cooperation and Development Arrangements on Guidelines for Officially Supported Export Credits Arrangements (OECD Arrangements on Export Credits) that will apply to all parties and will allow these projects to perform better under project finance requirements.** For example, longer repayment terms are needed on the debt to recognize the long useful life of these projects. These projects cannot perform financially on less than a 15- or 20-year repayment basis, yet the OECD Arrangements on Export Credits restrict lending to a 10- to 12-year maximum. In addition, continue to monitor potential loopholes, such as classification of projects as experimental in the OECD Arrangements on Export Credits, so that they may not be used by foreign competitor countries to evade the intent of these agreements.
5. **Further develop U.S. Government expertise and capability in international power project finance.** Federal agencies are proficient in trade finance, direct investment to sovereign governments and small project finance transactions. They are not as experienced in assisting these large, stand-alone, private projects. Multiple agencies will be required to change their operational requirements and reorient resources. Some of this will develop simply by being involved in more transactions. Since power projects are the first to significantly increase their use of this financing technique, the Department of Energy will need to play a role in coordination and communication, being proactive instead of reactive, and integrating the needs of the developers with the assistance programs offered by the various U.S. agencies. Information needs to be shared within and among government export finance agencies on the evolving requests for the transactions.
6. **While ensuring that the convertibility of its currency is the role of the host government, the U.S. Government may want to increase the utilization of a number of existing mechanisms on a limited, prudent basis to help ensure that funds for the repayment of debt and equity can be converted to dollars and then be repatriated.** This will help ensure the timely repayment of the debt and equity provided to these projects as well as profits to U.S. developers and operators. This could include broadening the scope of coverage of OPIC's currency inconvertibility insurance program where that could be accomplished along financially sound parameters.

RELATIONSHIP TO THE STRATEGIC PLAN

The TPCC Strategic Plan, developed in response to the earlier Report to Congress, has already provided the initial focus for implementation of some of these strategies. Table 5-1 shows how the additional research performed for this report both incorporates and expands upon the actions set forth in the strategic plan and the earlier Report to Congress.

Table 5-1

RELATIONSHIP OF RECOMMENDATIONS TO THE TRADE PROMOTION COORDINATING COMMITTEE
STRATEGIC PLAN

RECOMMENDATIONS	STRATEGIC PLAN INITIATIVE	EXTENDS STRATEGIC PLAN INITIATIVE	NEW
Focusing on Key Markets			
1. Work with private industry to monitor CCT markets	X		
2. Ensure adequate feasibility study financing	X		
3. Ensure role for U.S. firms in initial project	X	X	
4. Expedite consideration of "showcase" projects			X
5. Identify foreign government assistance	X		
Helping Host Countries Adapt to Private Power			
1. Continue to expand training/info. programs	X		
2. Help countries develop legal/regulatory infrastructure to eliminate barriers			X
3. Help countries develop viable capital markets			X
4. Help in development of project options			X
Encouraging Private Funding Sources			
1. Work with banking sector to establish basis for long-term U.S. participation			X
2. Sustain dialogue between CCT Subgroup and investment/commercial bankers			X
3. Coordinate U.S. agency efforts with multilateral development banks	X	X	
Making U.S. Assistance Programs More Effective			
1. One-stop shopping for U.S. gov't. assistance	X		
2. Additional OPIC and Eximbank staff and funding			X
3. Increase OPIC's guarantee limit of \$50 million			X
4. Negotiate changes to OECD Arrangements on Export Credits			X
5. Further develop U.S. Government expertise and capability in international power project finance			X
6. Help ensure the ability to convert and repatriate foreign currency			X

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