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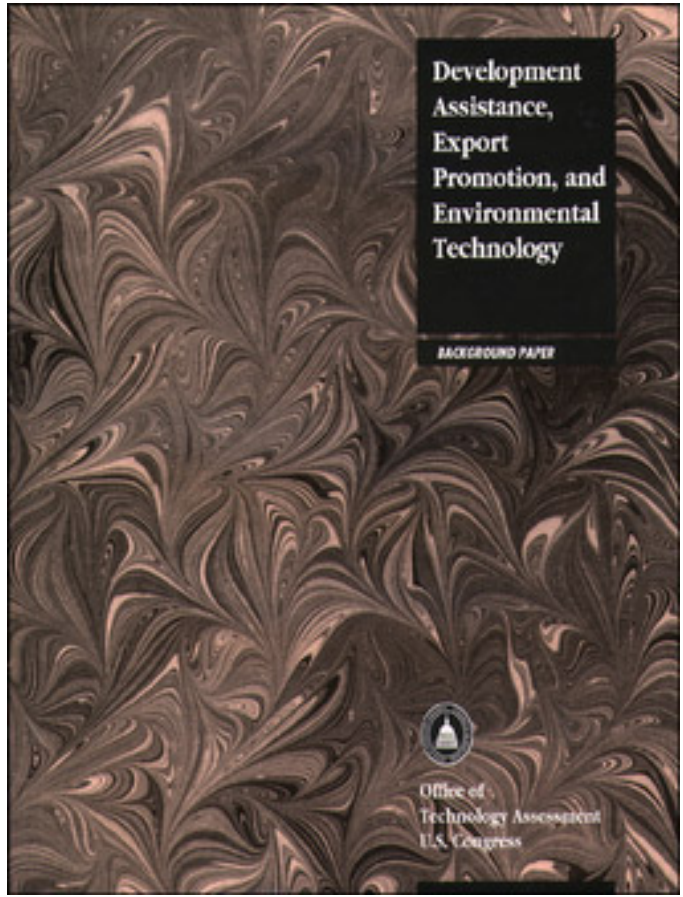

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Foreword

Policymakers--both in the United States and in other countries that provide foreign assistance-are examining possible links between environmental export promotion and foreign assistance. As developing countries address their environmental problems, sizable markets for environmental technologies and services could emerge. With their long experience in environmental management, developed country firms could be a vital source of environmentally preferable technologies and know-how.

While most resources for environmental improvement will need to come from developing country sources, U.S. foreign aid and that of other donors could serve a potentially catalytic role in fostering technology transfer, with commercial benefits to donors in the form of exports and the potential for continuing trade after such aid ends. Yet, the commercial features of foreign aid programs, if undertaken with insufficient attention to developing country needs, could promote exports of inappropriate technologies at the expense of sustainable development. The role of foreign aid in encouraging technology transfer is receiving added attention as countries consider follow up measures to the 1992 United Nations Conference on Environment and Development, a major world event attended by the heads of state from more than 100 countries.

This Background Paper provides an overview of developing country environmental problems and markets for environmental technologies and services. It discusses preliminary estimates on the amount and purposes of environmental aid provided by donor countries in 1991. The Paper discusses the commercial implications of other countries' aid for U.S. environmental firms, and the Helsinki package adopted by the OECD in late 1991 to limit commercial advantage from use of tied aid credits. Japan's aid program, which seems likely to become the largest bilateral source of development assistance and environmental aid, receives the most attention. The Paper's appendixes discuss environmental markets in developing and newly industrialized countries, and U.S. export promotion programs pertinent to environmental technologies and services.

The Background Paper is the second of three publications in OTA'S *American Industry and the Environment* assessment, which was requested by the House Foreign Affairs Committee, the House Energy and Commerce Committee and the Senate Finance Committee. The Paper was prepared to meet the specific request of the House Foreign Affairs Committee for interim information on environmental industry issues. The initial product of the assessment, *Trade and Environment: Conflicts and Opportunities,* was published in May 1992. The final report of the assessment will address U.S. environmental industry competitiveness in detail. It will also discuss interactions between environmental regulations and technology, and their implications for U.S. manufacturing industry competitiveness.



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NOTE: **OTA appreciates and is grateful for the valuable assistance and thoughtful critiques provided by the advisory panel members. The panel does not, however, necessarily approve, disapprove, or endorse this report. OTA assumes full responsibility for the report and the accuracy of its contents.**

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Summary 1

As more countries begin to address environmental problems, new markets for environmental technologies and services are emerging in the developing world. Developing countries often need technologies and expertise from developed countries in addressing their many serious environmental problems. The potential for exports of U.S. environmental technologies and services to developing (and other) countries is attracting increased attention from policymakers. One issue is whether the U.S. government should do more to promote environmental exports. A related issue is whether the Federal government should use foreign assistance to encourage environmental exports, either as a specific focus for action, or as part of a broader strategy to link aid and export policies more closely.

Developing countries vary greatly in their ability and/or willingness to pay for the costs of environmental protection. Most poorer developing countries have not chosen to use their scarce financial resources to address environmental issues without financial assistance from developed countries. The more prosperous developing countries have more resources; several fast-growing developing country economies in Southeast Asia and Latin America plan multi-billion dollar investments in environmental infrastructure in the next few years. However, some still receive bilateral aid to address global environmental problems that might not otherwise be among their priorities.

Several laws passed in the 102d Congress call for closer coordination of U.S. aid and export promotion efforts, including environmental exports. Additional export promotion measures have been proposed in the 103d Congress. (See box 1-A for discussion of recent laws and Executive Branch initiatives;

Box I-A-Recent U.S. Initiatives on Environmental Export Promotion and Development Assistance

Enactments in the 102d Congress:

. The Export Enhancement Act of 1992 (Public Law 102-429) directs the President to set up an "environmental trade working group" under the interagency Trade Promotion Coordinating Committee (TPCC) which was given statutory status. The working group-which includes, among others, the Commerce Department, the U.S. Agency for International Development (USAID), the Environmental Protection Agency (EPA), the State Department, the Department of Energy, the Trade and Development Agency (TDA), the Overseas Private Investment Corporation and the U.S. Export-Import Bank (Eximbank)-is to develop a government strategy for expanding exports of environmental technologies, goods, and services. The working group is to assess how its activities advance the goals of Agenda 21, the guiding policy and implementation document for the U.N. Conference on Environment and Development. President Clinton recently announced that he was directing the Commerce Department the Department of Energy, and the Environmental Protection Agency to develop a strategic plan for environmental trade development, promotion and technical assistance.

The law also authorizes placement of environmental commercial officers in countries that are promising markets for exports or competitors for U.S. environmental technologies and services. Another provision in the law directs Eximbank to use its programs to support "the export of goods and services that have beneficial effects on the environment or mitigate potential adverse environmental effects." in addition, the law authorizes a major expansion of the Eximbank "War Chest" a fund designed to match tied aid credits offered by foreign governments (see ch. 4).

. The Aid, *Trade and Competitiveness Act of* 1992 (Title III of Public Law 102-549), among other things, establishes an office of capital projects in USAID. One function will be to develop a program of "developmentally sound" capital projects for basic infrastructure to deviate poverty impacts or promote environmental safety and sustainability at the community level, taking account of host countrydevelopment needs and export opportunities for U.S. goods and services. Such projects include basic sanitation, water supply and treatment systems, and pollution control. Projects should have measurable, positive effects for indicators of human and environmental health. The program is to be coordinated with other agencies, USing TPCC. Congress urged the President to spend $650 million of the USAID appropriation in fiscal year 1993 and $700 million in fiscal year 1994 to implement the capital projects program

Continued

pertinent U.S. programs are described in more detail in chapter 5 and appendix B.)

This background paper, part of a larger OTA assessment of American industry and the environment,[1] provides information that maybe useful as Congress examines linkages between aid and environmental export promotion. It discusses:

- estimates of the size of the market for environmental goods and services (EGS) in developing

1 The final report in this assessment, to be completed later in 1993, will discuss the market opportunities and competitive position of U.S. firms that sell environmental technologies and services, and related export promotion issues. The final report will also discuss connections among environmental technology, environmental regulations, and manufacturing industry competitiveness.

This background paper draws in part on a contract report prepared for OTA, entitled "Environmental Export Promotion and Official Development Assistance," by Madeleine Costanza.

Another background paper prepared for this assessment examined trade and environment issues, including the developing country context; see U.S. Congress, Office of Technology Assessment *Trade and Environment: Conflicts and Opportunities,* OTA-BP-ITE-94 (Washington, DC: U.S. Government Printing Office), May 1992.

Box I-A-Recent U.S. initiatives on Environmental Export Promotion and Development Assistance--Continued

- The *Foreign Operations and Export Financing Appropriations Act for Fiscal Year 1993* (**Public** *Law* 102-391) earmarks $650 million of USAID's fiscal year 1993 appropriation to environment or energy activities related to global warming. The law also urges USAID to aim $10 million in assistance at activities related to the Committee on Renewable Energy Commerce and Trade (CORECT), the Environmental Technology Export council (ETEC), and the International Fund for Renew% Energy and Efficiency. CORECT and ETEC are bodies that attempt to coordinate government export activities with private companies and trade associations (see app. B).
- several provisions in the *National Energy Policy Act of* 1992 (Public Law 102486) emphasize energy-related environmental technology transfer to developing countries, in part to boost U.S. exports. The law directs the Secretary of Energy, through USAID, to undertake programs of technology transfer to developing countries for renewable energy technoiogies, dean coal technologies, and innovative environmental technologies associated with reduced greenhouse gas emissions. Each program is authorized at a level of $100 million per year for several years. The law also authorizes funds for interagency working groups on renewable energy and energy efficiency, as well as training for developing country officials, at an annual level of $10 million for fiscal years 1993 and 1994. Funds have yet to be appropriated for any of these initiatives.

Executive Branch Initiatives

Numerous programs and projects undertaken by one or more Federal agencies fund activities pertinent to environmental assistance or energy and environmental exports. Two of the larger initiatives (discussed further in app. B) are:

- ***The*** *United States-Asia Environmental Partnership.* This public-private partnership seeks to help Asian countries address environmental needs using U.S. technology, and participation of U.S. firms. Seed money for the partnership has been provided by USAID; other Federal, state, and nongovernmental agencies also are involved.
- The United States *Environmental Training Institute.* This nonprofit organization arranges for training of developing country public and private officials in the United States by U.S. firms and agencies. companies, which have the opportunity to demonstrate their technologies to the officials, pay for operating costs and sponsor courses. EPA, USAID, and TDA provided some startup funds for the institute.

countries and in the newly industrializing countries;

- estimates of environmental aid as a component of development assistance;
- how the aid programs of several major donors may affect environmental exports. The discussion focuses on official development assistance (ODA)[2] provided by Japan, and to a lesser extent Germany, and some other European countries which are members of the Development Assistance Committee (DAC) of the Organisation for Economic Cooperation and

[2]**"ODA" is a term used by the Organisation for Economic Cooperation and Development (OECD) to identify one type of foreign assistance. As used here and by OECD, it refers to aid given by a government chiefly to promote the recipient country's economic development and welfare that has a "grant element" of at least 25 percent. (A pure grant would have a grant element of 100 percent; a pure commercial loan, 0 percent). The term "aid," as used in this paper, may denote either ODA or some broader category of foreign assistance depending on context.**

Development (OECD).[3] While there is some discussion of U.S. aid practices, the discussion is illustrative rather than a comparison.

The background paper is not intended to be a comprehensive analysis of the many ways in which a donor's aid could promote exports, or the degree to which such export promotion is compatible with meeting recipients' environmental and development goals.[4] The export promoting effects of aid depend on many factors, including (among others) the geographic emphasis; the kinds of projects supported (whether power plants and sewage treatment plants or technical assistance for land management and training); the way in which projects are planned and approved; and whether formal policies or informal practices make it likely the aid will be spent in the donor country.

Whether export promotion is compatible with recipients' environmental and development goals depends as well on additional considerations. These include, among others, the extent to which a country's aid follows environmentally and developmentally sound criteria; whether a recipient country has the technical information and resources needed to make an appropriate choice among alternative technologies and approaches; and whether adequate provision is made for training, operation and maintenance after equipment is installed or projects are completed.

The complex administrative structure of aid and variations in aid missions further complicates analysis. For example, a single development project may be supported by several bilateral and multilateral agencies and sources. Japan's aid system involves four major policy-making agencies and two implementing agencies. Development assistance is only one of several missions for U.S. foreign assistance, and many specific objectives vie for the limited development assistance project budget of the U.S. Agency for International Development (USAID), the primary U.S. ODA agency.

Major findings and conclusions from subsequent chapters are summarized below.

AID FOR THE ENVIRONMENT

(SEE CH. 2)

While precise estimates do not exist, developing countries could need to invest amounts exceeding 1 percent of their gross domestic products (or over $50 billion annually by the end of this decade at projected growth rates) to factor environmental objectives into their development requirements.[5] Most of these investments would need to come from developing country sources, or from private investment and trade. But, as was brought out at the 1992 United Nations Conference on Environment and Development (UNCED), developed country governments could catalyze developing country environmental efforts by providing technical assistance and help with project financing. Additional aid could help

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[3] OECD members account for about 90 percent of ODA; several Arab countries account for most of the rest. The DAC, established in 1961, provides aforumforOECD donors to discuss and coordinate their bilateral aid policies. Unless otherwise stated, statistics on ODA in this paper are from the Organisation for Economic Cooperation and Development *Development Cooperation 1992 Report* (Paris: OECD, December 1992).

4 fro, environmental and energy aid and exports to Eastern Europe and the former Soviet Union are not addressed in detail in this paper. AnotherOTA assessment on these subjects is in progress; its first report is U.S. Congress, Office of Technology Assessment, *Energy-Efficiency Technologies for Central and Eastern Europe,* OTA-E-562 (Washington, *DC:* U.S. Government Printing Office, May 1993). Environmental export issues with Mexico associated with the proposed North American Free Trade Agreement also are not addressed. For discussion of U.S.-Mexican trade issues, see U.S. Congress, Office of Technology Assessment, *U.S. -Mexico Trade: Pulling Together or Pulling Apart?,* OTA-ITE-545 (Washington, DC: U.S. Government Printing Office, 1992).

[5] Such a level of investment would be roughly comparable as a portion of GDP to investments made by several advanced industrial nations for environmental protection during the 1970s.

developing countries address global issues such as stratospheric ozone depletion, greenhouse gas emissions, and loss of biodiversity-issues not necessarily perceived by developing countries as requiring their independent action.[6]

Preliminary information suggests that donors provided over $2 billion in bilateral aid in 1991 for environmental projects or projects with an environmental component as defined by the donor. (Total aid in 1991 was $57 billion.) Environmentally-related aid and loans from multilateral sources exceeded $3 billion, so that the total in bilateral and multilateral assistance exceeded $5 billion in 1991.

The two largest aid donors—Japan and the United States—probably provided over $600 million each in bilateral aid for environmental projects or for projects with an environmental component; Germany provided about $500 million in direct environmental aid.[7] Because common definitions and baseline data from other years are not available, it is difficult to know how much of the donors' environmental aid relabels or replaces pre-existing programs or constitutes "new and additional resources. "

Much of the environmental aid assists in developing human resources and institutional capacities for addressing environmental concerns. Such environmental capacity building includes technical and financial help for country studies and strategies; for training, education, and public awareness campaigns; for environmental monitoring; and for developing ways to devise and enforce regulations.[8]

Several donors help developing countries finance infrastructure, including infrastructure that can contribute to environmental objectives. Examples are basic infrastructure for public health and environmental quality (e.g., water supply and wastewater treatment systems, sanitary landfills) and pollution control equipment for factories and power plants. The United States devotes only a small share of its bilateral aid to such capital projects (whether environmental or otherwise).

To date, donors have focused little aid on helping developing countries adopt pollution prevention approaches and cleaner production processes or technologies. Even when they have greater front-end costs than conventional pollution control technologies, cleaner technologies can be less costly in the long term because they use materials and energy more efficiently and produce less waste for treatment. Pollution prevention has yet to receive much attention from development agencies, although some United Nations activities are underway and a few bilateral technical assistance projects have recently been initiated (including a major new project by USAID).

ENVIRONMENTAL MARKETS

(SEE CH. 2 AND APP. A)

The world market for environmental goods and services was estimated by OECD to be $200 billion in 1990. Developing countries now account for only a small part of this market. However, several fast-growing developing countries in Asia and Latin America may become

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[6] Some multilateral aid for addressing global environmental issues is provided through the Global Environment Facility (GEF), administered by the World Bank, the United Nations Environment Program, and the United Nations Development Programme. The GEF is not discussed in detail in this paper.

[7] The estimates for the United States, Japan, and Germany are subject to change. As is discussed in chapter 2, these donors were not among the nine DAC countries that had reported estimates of environmental aid to OECD by April 1993.

[8] For a review of DAC member activities up to 1990, see *Development Cooperation 1990 Report,* op. cit., pp. 71-82.

important markets for environmental goods and services. This has happened in some newly industrializing countries which were themselves considered developing countries a few years agog

Partly fueled by aid, environmental business opportunities in the developing world are growing. The six ASEAN nations currently represent an environmental market of about $1.8 billion per year.[10] The 1992 environmental market in six Latin American countries is estimated to be $2.4 billion.[11] Some lower income countries, including India and China, are increasing their investments in environmental protection and pollution control. China plans to spend $15 billion on environmental protection or projects that include related environmental improvements in its current five-year plan that ends in 1995.

Difficulties in obtaining financing could limit growth of developing country environmental markets. In many developing countries, government funding for environmental protection will likely remain sparse. Private or mixed public-private funding sources will be key to the growth of environmental markets. Financial packages—drawing on private funds, official assistance, and innovative approaches for project financing--can be the determiningg factor in contract awards. The opening of various developing country economies to greater foreign investment and the loosening of state controls on energy, transport, and manufacturing industries-including privatization-provide growing possibilities for environmentally favorable investment.

ENVIRONMENTAL AID IN COMPETITIVE CONTEXT

(SEE CHS. 3-5)

While a few U.S. environmental firms operate worldwide, most are inexperienced in doing business outside the United States. Many are small or medium-size businesses that have focused exclusively on the U.S. market, the largest in the world. Some other aid donors—including Japan, Germany, and several other European countries-have large environmental industries that are actively seeking export opportunities.

Environmental aid, like aid in general, can help donor country firms sell goods and services abroad, adding to their domestic employment. Aid to help developing countries with environmental monitoring, standard setting and enforcement, and training can bring commercial benefits to donor country firms while building developing country capabilities. Moreover, such technical cooperation for projects can develop into lasting business relationships that lead to future sales by donor country firms after aid ends.

Donor country consultants or citizens often conduct project feasibility studies and engineering studies. Industrialized country engineering and construction firms are often involved in project design and management, and may use personnel and engineering services headquartered in donor countries. Some environmental projects (such as wastewater treatment facilities and stack gas scrubbers) are very expensive to build. Although local materials (e.g., concrete, sheetmetal, pipes) and labor comprise a substan-

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9 Examples of the magnitude of the NIC environmental markets include about$11 billion of environmental projects in Taiwan's current Six-Year Development Plan and over $10 billion in South Korea's 1991-95 investment plans. See American Institutein Taiwan, "Listing of Taiwan's Six-YearDevelopment Plan Projects (partial List) & Status Report on Selected Major Projects," August 1991, and Republic of Korea Ministry of Environment *White Paper 1990*, 1991, as cited in Tal Woo Lee, "Perspective of Environmental Industry in Korea,'' paper presented at GLOBE '92, Vancouver, B.C., Canada, Mar. 16-20, 1992.

10 Jonathan Menes, Acting Assistant Secretary for Trade Development, U.S. Department Of Commerce, Testimony Before the 'o^we Committee on Merchant Marine and Fisheries, Subcommittee on Environment and Natural Resources, Feb. 25, 1993. ASEAN is the Association of South East Asian Nations, consisting of Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand.

11 USAID, *Environmental Market Conditions and Business Opportunities in Key Latin American Countries,* Business Focus Series, October 1992. The six countries are Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela.

tial portion of the project costs, environmental and energy infrastructure projects may use imported equipment and technology transferred from developed countries, with some return of project monies to the donor country.

Most donor countries (including the United States) seek benefits from their aid for their domestic economies and firms. Many U.S. consultants and contractors benefit from U.S. project aid, such as grants and technical assistance for institution building, education, and training. However, the United States spends a high portion of its aid on debt relief and "program assistance' (aid not linked to particular projects), which as discussed in chapter 4 have limited potential to increase exports. Moreover, since the 1970s, relatively little U.S. bilateral aid has gone to large capital projects.[12] Large capital projects often require imports of engineering services, equipment and technology, and can be conducive to building long-term business relationships. Much of the bilateral aid provided by Japan and Germany supports such capital projects.

To varying degrees, donors formally or informally "tie' the aid so that funds from the donor are used to purchase its goods and services (box l-B). Tying of aid tends to increase exports, though it is difficult to say by how much; in some cases, the recipient country would have spent the money in the donor country anyway.

Tied aid is sometimes offered not as a pure grant but with a loan component; assuming the loan is paid back, such "tied aid credits" enable more exports for a given amount of net aid expenditure. While tied aid credits can be a powerful export promotion tool, they can skew aid in ways that promote donor country commercial interests at the expense of recipient country development and environmental interests. The United States, which has used tied aid credits less than several other major donors, for many years negotiated for tougher OECD rules to lessen commercial advantage from their use. The latest OECD rules, as amended by the Helsinki Package adopted in December 1991, show promise in limiting the commercial effect of tied aid credits; however, even these rules are likely to permit substantial use of tied aid credits for commercial advantage. Some environmental projects may fall in this category (see ch. 4).

Questions are arising about how and when donors should cooperate on the environment and how and when they should act to foster business opportunities for their domestic firms. These issues are especially conspicuous in the ongoing debates about the respective trade, aid, and environmental policies of Japan and the United States—the largest donors of aid in general and environmental aid in particular. More cooperation between Japan and the United States on environmental issues could be a promising area of common interest as the two countries begin to consider possible new frameworks for restructuring their economic relationship.[13] The commercial ramifications of such cooperation for environmental firms is not clear.

Environmental aid has emerged as a key focus for Japan's aid in the 1990s. Japan has announced plans for major increases in its environmental aid in the next few years. The major Japanese aid agencies provide support for environmental research, training, and technical cooperation with developing countries and financing for environmental infrastructure. In addition, Japan's Minis-

12 AS is discussed in chapter 5, U.S. aid at one time placed major emphasis on capital projects. This changed during the 1970s, in part because of concern that some large development projects supported by U.S. loans had not made a contribution to development goals (such as alleviation of poverty) commensurate with their size and had potential to contribute to corruption. For discussion of this history, see Curt Tarnoff and Larry Q. Newels, "Foreign Assistance and Commercial Interests: The Aid for Trade Debate," *CRS Report to Congress, May* 24, 1993, p. 17, pp. 22-26.

13 Such a possibility was raised at the April 1993 meeting in Washington between President Clinton and Japanese Prime Minister Kiichi Miyazawa. See *Weekly Compilation of Presidential Documents,* Apr. 16, 1993, p. 598. For discussion of some of the issues, see Pat Murdo, "Cooperation, Conflict in U.S.-Japan Environmental Relations," *JEI Report*, Japan Economic Institute, Washington DC, May 28, 1993.

Box I-B-Aid Practices that Can Enhance Exports

Aid that is formally "tied," that is, conditioned on the funds being used to purchase goods and services from a donor country, has received a great deal of attention over the years. However, even if aid is not formally tied, many practices used by donors make it more likely that funds will be spent in the donor country. For example, donors might chose to fund projects In sectors where their firms enjoy a competitive presence.

Numerous other practices, sometimes called "informal" tying, can increase the export-enhancement effects of bilateral ODA. Recipients may m to a tacit understanding that tomorrow's aid depends on spending a good part of today's aid in the donor country. Donors may ascertain procurement intentions before aid is offered. Several countries, including the United States, at times make grants to developing country governments to fund preliminary studies (such as feasibility studies) by donor country firms. While funds for subsequent stages of the project may not be tied, the firm doing the study will tend to recommend familiar home country technologies and services. Firms doing the studies may have an advantage in bidding for the main project In the same vein, some countries have at times untied most of a construction project but tied to some extent the engineering management component; a donor country management firm could steer other components of the project to donor country firms.

Donor country governments may work with t heir national firms to identify potential aid projects and areas with promising export opportunities, and to parlay particular grants of aid (including grants for training or for research and development) into long-term business relationships. Most donors use such approaches to some extent. The U.S.-Asia Environmental Partnership and the U.S. Trade and Development Agency discussed in box I-A and appendix B are examples of American efforts to use aid to build business relations. Box 2-B gives examples from Europe and Japan.

In addition to directly promoting exports, bilateral aid can indirectly promote exports by assisting national firms in winning contracts from untied multilateral development aid. Multilateral aid is an important source of environmental assistance, involving over $3 billion in loans in 1992. Countries monitor the programs of the World Bank and the regional development banks; some have standing grant facilities for the banks to draw upon to pay for preliminary studies for multilateral projects. These grants are Sometimes earmarked for hiring donor country firms or citizens, who again are likely to recommend hem-country technologies and services.

Donors also directly contribute funds to some multilateral projects (called cofinancing), and fund related but separate projects (canal parallel financing). While not directly influencing who wins contracts for multilateral projects; these practices could make a recipient country government more receptive to a national firm's bid (in the case of cofinancing) or help familiarize national firms about the multilateral project (in the case of parallel financing).

While most multilateral funds per se are untied, there is an important exception. European Community countries offer some multilateral aid (about $3 billion worth in 1992) through a common fund that is largely tied to purchases from firms In EC countries. About 10 percent of the EC multilateral funds-or $300 million--is environmental aid.

try of International Trade and Industry (MITI) provides its own "green aid" and has launched programs for environmental technology development to address global environmental issues.

It is hard to determine the degree to which commercial considerations underlie Japan's environmental aid. The Japanese government has a history of successful promotion of exports, including use of aid to promote exports of manufactured goods. It has successfully targeted industries it considers strategic, such as automobiles and computers, substantially accelerating their growth and increasing their exports. Some see MITI's green aid and R&D measures as an early indicator that the environment could become a strategic focus for Japanese industrial policies. MITI's activities are in their early stages and are expected to grow substantially.

However, Japan's overall aid program is evolving. Japan has, at least officially, been taking steps to open up more of its ODA to participation by non-Japanese firms. A recent U.S. Executive Branch report to Congress, coordinated by the State Department, expressed cautious optimism that U.S. (and other foreign) firms "will be able to increase their participation in Japan's ODA contracts over the next few years. "[14]

Whether "cautious optimism" is in order in the case of environmental aid remains to be seen. Japan appears to be using its environmental aid both as a showcase and as a testing ground for new aid approaches. Japan's stated interest in international environmental cooperation may suggest receptivity to participation by U.S. firms. To benefit from opportunities arising from Japanese aid, U.S. firms normally would have to establish a sustained presence in Japan and make persistent efforts to understand Japan's ODA system; few U.S. firms to date have made such efforts. Some U.S. environmental firms could be in a position to benefit by focusing on areas where they provide superior goods or services pertinent to Japanese aid objectives.

Even if some U.S. firms might benefit from Japan's aid, the greater commercial benefits flowing to Japanese firms could have long-term ramifications for the competitiveness of U.S. environmental firms. Japan's environmental aid, like its aid overall, is focused on East Asia--a region with promising potential to emerge as an important environmental market independent of aid. Japanese firms are already more established in East Asian developing countries than the firms of any other industrialized country. With its emphasis on capital projects, Japan's ODA can help build long-term commercial ties and relationships for its firms that may last after aid ends. While some recent U.S. initiatives such as the U.S.-Asia Environmental Partnership (see box l-A) could help, U.S. firms seeking to compete in the East Asian market may face an uphill battle.

CURRENT POLICY CONTEXT

(SEE CH. 5 AND APP. B)

The appropriate role of U.S. aid in encouraging exports of U.S. goods and services has been a subject of continuing debate.[15] Promotion of exports of U.S. manufactured goods has not been a primary thrust of U.S. development aid. The U.S. Department of Commerce and several other government agencies administer a number of programs to promote and finance U.S. exports; these programs (discussed in appendix B) are limited in scope, especially for manufactured goods. Through enactment of several 1992 laws, such as the Export Enhancement Act, the National Energy Policy Act, and the Aid, Trade and Competitiveness Act, Congress authorized Federal agencies to place more emphasis on export promotion (including environmental export promotion).[16] The degree of emphasis will depend, of course, on funding and commitment to implementation. These and other actions, such as the United States-Asia Environmental Partnership launched by the Bush Administration in January 1992, are discussed in box l-A.

Some of these measures authorize a greater USAID role in fostering U.S. exports, especially for environmental and renewable energy or energy-efficiency technologies. Whether U.S. aid should

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14 U.S. Department of State in coordination with other executive branch agencies and departments in response to a request by the United States Senate, "Japan's Foreign Aid: Program Trends and U.S. Business Opportunities," Feb. 18, 1993, mimeo., p. 6.

15 For a more detailed discussion of issues and legislative proposals, see Curt Tarnoff and Larry *Q. Newels,* "Foreign Assistance and Commercial Interests: The Aid for Trade Debate,' *CRS Report for Congress,* U.S. Library of Congress Congressional Research Service, May 24, 1993.

16 Additional export promotion "easures have been introduced in the 103d Congress. Proposala that focusspecifically on environmental exports include H.R. 1830, the proposed Global Environmental Cleanup Act; H.R. 2112, the proposed National Environmental Trade Development Act, introduced on May 12, 1993; S. 978, the proposed National Environmental Technology Act; and S. 979, the proposed Greentech Jobs Initiative Act.

take on a more commercial orientation continues to be debated in the development community. As a practical matter, the efficacy of using aid projects to promote exports is ultimately limited by aid budgets. While the United States in some years may still be the largest overall aid donor, its ODA budget has declined as a portion of GNP over time, and is now well below the DAC average. Moreover, development assistance that part of the aid budget most relevant to direct promotion of environmental exports--counts for only part of the total U.S. foreign assistance budget.

Some question whether there is any need for direct government action to promote exports through aid. For example, a 1992 policy review by USAID states that since 1985 U.S. exports to developing countries have grown faster than that of major competitors.[17] (Data for particular sectors may differ; the USAID policy review did not discuss whether environmental exports shared in this strong growth in exports to developing countries.) Instead of direct action to promote exports, the USAID review saw continuing efforts to encourage developing countries to open markets and make other policy reforms as a better way to encourage exports, albeit indirectly.

Of course, market-opening approaches would not necessarily promote U.S. exports more than exports from other industrialized countries. And, despite the recent progress noted by USAID, the United States was still behind the EC and far behind Japan in 1990 merchandise exports to developing countries as a percentage of GNP.[18] There is also no guarantee that the United States will maintain its current market shares if other countries pursue aid practices that promote exports to a greater extent than the United States. While the precise export promotion effect is hard to determine, such practices are widely used by other major donors, many of which also provide substantial non-aid-related export promotion for manufactured goods.[19] In principle, it might be preferable for all donors to agree to change these practices-for example, to forgo tying their aid, letting development priorities and the market determine where aid money is spent. However, such an agreement is not likely to be achieved any time soon; and for the United States alone to forgo use of such practices could mean U.S. exports would suffer in time.

Opinions are divided about whether orienting U.S. aid more toward direct promotion of environmental exports would compromise or further environmental protection and development goals. There is a similar division of opinion about the aid practices of other countries.

Supporters of closer links might hold that a focus on exports could further the goals of economic development and environmental protection. Promotion of exports may create a stronger constituency for aid in donor countries, making continuation of aid more likely. Linkages between aid and exports also might encourage continuing business relationships between donor country firms and developing countries—relationships that could be conducive for transfer of environmental technology and practices. Also, involvement of donor country firms in aid planning might help screen out some projects that are ill-founded from a business sense. The prospect of exports to developing country markets may encourage donors to support research and development to adapt environmental technologies more

17 The USAID research is discussed in "Aid, Trade and Development: Implications of the Background Papers for the Trade Policy Working Group," mimeo., June 1992.

18 The percentages are: United States, 2.4; EC, 2.8; and Japan, 3.9. These figures are derived from USAID, "U.S. Trade Trends and Issues," mimeo., June 1992, p. 11, table 2 (presenting data on 1985 and 1990 merchandise exports to developing countries), and U.S. Department of Commerce, *Statistical Abstract of the United States 1992*, p. 830, table 1370 (1990 GNP data).

19 For example, as is discussed in app. B and will be addressed more fully in the final report for this assessment, U.S. government-assisted export financing appears more limited than that in Japan and several European countries; private export financing by U.S. banks is also very limited.

specifically to developing country needs, and to support training. It also could encourage more effort to evaluate the performance of environmental technologies, either by individual countries or possibly through evaluation activities undertaken with multilateral support.

Others contend that the use of aid for export promotion can compromise both environmental and developmental goals. They point to increased costs for purchases restricted to bidding only among donor country firms. This increases the costs of capital projects and reduces the amount of real aid.[20] A capital projects orientation could diminish direct aid for basic human needs, such as food, medicine, or reducing poverty. At least for some environmental projects, the division between capital projects and basic human needs is not clear; for example, capital projects may be needed to assure safe drinking water and to treat waste in order to protect against health threats. However, overemphasis on export promotion could bias projects toward overly expensive infrastructure, with more sophisticated technology than needed to meet basic human needs. Such technology can be inappropriate to a country's level of development, draining resources from more pressing problems, and can create dependency on developed countries. Furthermore, expensive capital projects paid by soft loans could aggravate developing country debt burdens or balance of payments problems. These financial difficulties could reduce a country's capacity to buy environmental goods and services without aid, and could encourage mismanagement of the environment.[21]

While use of development assistance to promote exports might in some cases hamper environmental or developmental goals, this result is not inevitable. It would be possible to pursue export promotion with safeguards to prevent compromise of environmental or developmental goals. Under such an approach, projects, however desirable from an export promotion standpoint, would still need to meet rigorous environmental and developmental standards. Some export opportunities might be lost, but it should be possible to find fully satisfactory projects.

Several steps could be taken to screen projects for adverse effects, such as might result from use of inappropriate technology, whether or not export promotion is the goal. Some of these procedures have begun to be used by donors. Among those pertinent to the environment:

1. *Environmental studies to identify real needs and priorities:* Donors increasingly fund developing country environmental studies, environmental profiles, and conservation strategies. DAC has noted a need for coordination and use of "good practices" in these assessments. USAID's approach is worthy of note: increasingly, developing country organizations undertake the studies, thus building local capabilities for environmental analysis. Additional measures could be taken to assure opportunity for public review and input from nongovernmental organizations in developing and donor countries.

2. *Use of guidelines in project reviews:* Conscientious efforts by donors to see that guidelines are applied could reduce transfers of inappropriate technology. Germany, for example, makes special efforts to assure that developing countries have trained personnel available before capital projects are funded. Public export financing agencies in the United States and in several other donor countries are developing and in some cases implementing environmental guidelines for decisionmakers. So are multilateral lending institu-

20 One survey of recent empirical studies concludes that "an average of 15 to 30 percent' increased costs is the "best aggregate estimate." Catrinus J. Jepma, *The Tying of Aid* (Paris: OECD, 1992), p. 58.

21 Developing countries with heavy burdens on their balance of payments and substantial foreign debt are mor likely to overuse (rather than sustainably manage) their natural resource base to gain foreign exchange. Overharvesting of otherwise renewable resources such as timber and fisheries are two examples.

tions. Some private lending institutions also are developing environmental criteria.

3. *Evaluation of technologies: Better* information about the performance of environmental technologies could help donors assess how projects with export potential would mesh with recipient countries' needs. It also could help recipient countries evaluate alternatives. Some evaluation programs to serve domestic objectives in donor countries exist, including several small programs administered by the U.S. Environmental Protection Agency .22 Such evaluation programs are likely to provide more objective information than would be available from firms with an interest in selling their own technology. Technology evaluations might be undertaken multilaterally, under the auspices of an agency such as the United Nations Environment Programme or the United Nations Development Programme.

In many cases, developing countries will find it preferable to use locally available technology, or to adapt developed country technologies to local needs. Some donors are working to customize developed country enviromnental technology to the specific needs of developing countries (see discussion of Japan's Green Aid Plan inch. 5). Regional centers in developing countries might be tapped to facilitate such adaptations, as well as to address training needs.[23]

4. *Provision for operation and maintenance:* Donors might also screen projects with export potential to assure that adequate provision is made for operation and maintenance of environmental infrastructure once construction is over. Projects often fall into disrepair because of inadequate budgeting for maintenance or spare parts procurement. Skimping on training for developing country personnel is often a shortcoming in development contracts. The more complex the technology, the greater the need for highly trained personnel to operate or maintain the equipment. Use of aid to support education and training can serve the environmental and developmental needs of developing countries and export promotion objectives.

Through such measures, donor countries could help strengthen developing country decisionmaking capabilities, while at the same time providing opportunities for their firms to develop commercial relationships. With stronger technical capabilities and better information, decisionmakers in developing countries will be better able to make informed choices about available options. Additional steps by donors, such as effective implementation of the environmental guidelines that are slowly being incorporated into the policies of national and multilateral lending institutions, also could help provide an appropriate balance between export promotion and environmental or developmental goals. Such efforts may in time result in more congruence among aid policies, environmental objectives, and development objectives while contributing to improved economic conditions in developing countries that will be essential for healthy long-term trading relationships.

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22 These include the Superfund Innovative Technology Evaluation Program, the Waste Reduction innovative Technologies Evaluation Program and the Municipal Innovative Technology Evaluation Programs. An EPA-sponsored organization the National Environmental Technologies Application Corporation, has evaluated bioremediation agents related to oil spills.

23 For discussion of potential roles of regional centers for energy-efficient technology, see "Relatively Advanced Developing Country Focus for Technology Cooperation Related to Global Climate Change," Conference Statement, Bellagio, Italy, Oct. 28-Nov. 1,1991 (mimeo., Energy and Climate Program of the World Wildlife Fund,Washington, DC).

Developing Country Environmental Needs and Aid

2

Recognition is growing that developing countries may not be able to achieve their development objectives without also addressing their serious environmental problems. This chapter briefly reviews developing country environmental problems and their environmental investment needs (as characterized by the World Bank and the United Nations Conference on Environment and Development). It also discusses the environmental market in developing countries, and reviews estimates of environmental aid as a component of Official Development Assistance (ODA).

DEVELOPING WORLD ENVIRONMENTAL PROBLEMS

Developing country environmental problems are serious and wide ranging. Some arise from poverty and the overuse of resources that can result from poverty. Some result from development projects and industrialization undertaken with too little concern for the environment. Some result from the environmental pressures of urbanization and population growth. Some reflect global concerns about stratospheric ozone depletion, greenhouse gas emissions, and biodiversity.

The economic and human costs of inadequate environmental infrastructure or environmental management in developing countries are vast. According to the World Bank, two million people, mostly children, die each year from diarreheal diseases spread through contaminated water. Between 300,000 and 700,000 premature deaths each year could be averted in developing countries if concentrations of dust, soot, and other suspended particulate matter from air pollution could be brought down to levels considered safe by the World Health Organization. Although only recently receiving attention from research-

ers, exposure to indoor air pollution may pose even greater health risks. Solid waste collection and disposal is inadequate in the cities of many developing countries; the common alternative of dumping refuse in waterways or public spaces can increase the likelihood of exposure to disease carrying organisms. Health risks and environmental contamination from hazardous waste can also be a problem, especially where industrial growth is rapid.[1]

Serious damage from pollution and overuse of renewable resources also challenge the developing world's fisheries, agriculture, and forests, with significant adverse effects for productivity and biological diversity. Studies in several developing countries have found that soil erosion reduced economic output by amounts equal to between 0.5 and 1.5 percent of GDP-offsetting a significant amount of annual growth (as measured by conventional means).[2] While per capita measures of resource use and environmental impact are low compared with that of developed countries, the fast climb in developing country populations and the drive to increase incomes have prompted widespread concern about sustainable levels of growth.

Estimates of the investments needed to address the environmental needs of developing countries are imprecise. Often, environmental needs and basic development requirements overlap. The World Bank estimates that as little as 2 percent of sewage in Latin America is treated. Worldwide, 1.7 billion people lack access to sanitation services; even in urban areas, the number of people without such services grew by more than 70 million in the 1980s. Roughly 170 million people in urban areas lack nearby access to potable water; in rural areas an estimated 855 million people lack safe water.[3] These families often must buy water from vendors, paying 4 to 100 times more per unit of water (with a median of 12 times more) than families connected to municipal water supplies.[4]

The World Bank, in an effort to put environmental protection costs in context, identified a sample of benefits that might arise if $75 billion per year (about 1.4 percent of the projected GDP in developing countries in the year 2000) were invested in developing countries for environmental improvement.[5] As shown in table 2-1, these benefits could be substantial. Among them: reducing child mortality by 3 million per year; reductions in respiratory diseases; and stabilizing world population at a lower level than would otherwise be expected. The costs, according to the Bank, might seem large in absolute terms, but would be small in relation to added incomes produced from "good economic management." Moreover, many of the lower cost items (e.g., family planning and costs associated with increasing education for girls) could have a high pay-off. The examples are illustrative; the Bank did not include programs to, as examples, restore degraded areas or conduct remedial cleanup of already polluted sites.

Some of the environmental programs listed in table 2-1, such as reducing emissions from power plants and industry, would require more expensive or more sophisticated technology than is

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1 Examples cited are from the World Bank, *Development and the Environment: World Development Report 1992* (Oxford University Press, 1992), pp. 44-63.

2 Ibid., p. 56.

3 Ibid., p. 47.

4 As cited in John Briscoe, "When the Cup is Half Full," *Environment,* VO1. 35, No. 4, May 1993, p.10.

5 Such investment levels would be comparable as a portion of GDP to commitments made by several advanced industrial economies during the 1970s, when environmental protection emerged as an important priority in these countries. The $75 billion figure cited above assumes rapid economic growth rates. If developing world growth occurred at the rate prevailing in th1980s, and if countries committed only 1 percent of GDP to the environment $50 billion in additional investments would be required.

Table 2-I—Estimated Costs and Long-Term Benefits of Selected Environmental Programs in Developing Countries

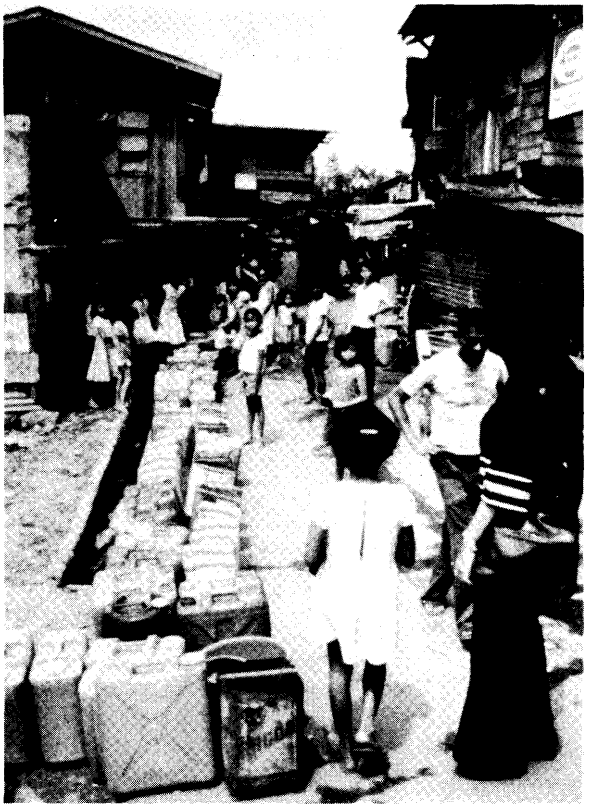
Program	Additional investment in year 2000 (in 1990 dollars)			Long-term benefits
	Billions of dollars per year	As a percentage of GDP in 2000[a]	As a percentage of GDP growth, 1990-2000a	
Increased investment in water and sanitation.[b]	10.0	0.2	0.5	Over 2 billion more people provided with service. Major labor savings and health and productivity benefits. Child mortality reduced by more than 3 million per year.
Controlling particulate matter (PM) emissions from coat-fired power stations.	2.0	0.04	0.1	PM emissions virtually eliminated. Large reductions in respiratory illnesses and acid deposition, and improvements in amenity.
Reducing acid deposition from new coal-fired stations.[c]	5.0	0.1	0.25	
Changing to unleaded fuels; controls on the main pollutants from vehicies.[c]	10.0	0.2	0.5	Elimination of pollution from lead; more than 90 percent reductions in other pollutants, with improvements in health and amenity.
Reducing emissions, effluents, and wastes from industry.	10.0-15.0	0.2-0.3	0.5-0.7	Appreciable reductions in levels of ambient pollution, and improvements in health and amenity, despite rapid industrial growth. Low-waste processes often a source of cost savings for industry.
Soil conservation and afforestation, including extension and training.	15.0-20.0	0.3-0.4	0.7-1.0	Improvements in yields and productivity of agriculture and forests, which increase the economic returns to investment. Lower pressures on natural forests. All areas eventually brought under sustainable forms of cultivation and pasture.
Additional resources for agricultural and forestry research, in relation to projected levels, and for resource surveys.	5.0	0.1	0.2	
Family planning (incremental costs of an expanded program to stabilize future world population at 10 billion rather than 12.5 billion).	7.0	0.1	0.3	Could contribute to proportionately less environmental damage resulting from natural resource use, consumption, and waste.
Increasing prirnary and secondary education for girls so that as many girls as boys enroll in primary and secondary education in low-income countries.	2.5	0.05	0.1	The World Bank maintains that improving education for girls should be seen as a critical developing world environmental priority; with the education, women are likely to have smaller families, and to manage natural resources (a critical role of many women in developing countries) more productively.

[a]The GDP of developing countries in 1990 was $3.4 trillion, and it is here projected to rise to $5.4 trillion by 2000 (in 1990 prices). The projected GDP growth rate is 4.7percent a year, significantly higher than historic rates except in Asia. If the GDP growth rate for the 1980s of 3.4 percent continued in the 1990s, developing country GDP in 2000 would total $4.7 trillion.

[b] Current developing world spending on water and sanitation was estimated by the World Bank to be $15-$20 billion per year.

[c]Costs may eventually be lowered by the use of new combustion technologies and other measures discussed in ch. 6.

SOURCE: Taken with some modifications from the World Bank, *Development* and the *Environment: World Development Report 7992* (Oxford: Oxford University Press, May 1992), p. 174, table 9.1.


UNDP AND WORLD BANK

Poor families without access to potable water typically pay 12 times as much per unit to buy water from vendors as middle-class families pay for water supplied through municipal systems.

readily available in many developing countries. Some of this technology could be obtained from foreign sources. Table 2-1 emphasizes "end-of-pipe" pollution control technologies (treatment plants, air pollution control devices, waste incinerators) for power plants and factories. In some cases (e.g., electric power plants) life-cycle costs could be reduced through use of cleaner technologies that are much more energy efficient and generate less pollution. The front-end costs of such technologies are often higher—an important barrier to their use in developing countries-but they otherwise can be an attractive option from both an economic and environmental standpoint.

ENVIRONMENTAL MARKETS IN DEVELOPING COUNTRIES

The current market for environmental goods and services (EGS) in developing countries is small compared to that of industrialized countries. However, as these countries grow, they are increasingly addressing environmental needs in their development strategies. Environmental needs associated with water supply and wastewater treatment, electric power, motorized transport, solid and hazardous waste management, industrial pollution prevention and control, and environmental monitoring could produce growing business opportunities. These opportunities are discussed in more detail in appendix A.

It is hard to say how large the developing country environmental market is or will be as few estimates separately identify this market. Several estimates have been made of current and prospective EGS demand in non-OECD countries-a grouping that includes newly industrialized countries (NICS), developing nations, and the transforming economies of Eastern Europe and the former Soviet Union. These estimates and projections vary widely. Different definitions of 'environmental goods and services' partly explain the variations in projections.

One study concluded that these non-OECD countries accounted for $36 billion out of a $200-billion global EGS market in 1990, and that these markets could grow to $55 billion by the year 2000.[6] Another estimate concluded that the non-OECD market could grow to $61 billion by 1996.[7] The International Finance Corporation (IFC), the private sector lending affiliate of the World Bank, suggests that one-third of the current

6 OECD, *The OECD Environment Industry: Situation, Prospects and Government Policies,* OCDE/GD(92)1 (Paris: OECD, 1992).

[7] Grant Ferrier, President of Environmental Business International Inc., testimony to House Committee on Merchant Marine and Fisheries, Subcommittee on Environment and Natural Resources, Feb. 25, 1993.

global environmental market is found outside the United States, Canada, Europe, and Japan.[8] The IFC believes the world market (which it estimated to be $300 billion) could grow to $600 billion by the year 2000.

Environmental business opportunities in some developing countries and regions are already appreciable. Some of these countries could become important new markets for environmental technologies and services, as has been the case with some newly industrialized countries that were considered developing countries a few years ago. Environmental markets are growing in the relatively prosperous, fast-growing countries in East Asia and Latin America, such as Mexico, Brazil, Chile, Malaysia, and Thailand. One study estimated the annual environmental market in the six ASEAN nations to be $1.8 billion.[9] Another study estimated the 1992 environmental market in six Latin American countries to be $2.4 billion.[10] Opportunities are also growing in some lower-income countries, including India and China. China, for example, plans 80 billion yuan ($15 billion) for expenditures in environmental projects or projects with an environmental component in its current five-year plan that ends in 1995.[11]

Lack of financing constrains growth of some developing country environmental markets, however. Financial packages—private funds, official assistance and credits, and innovative project financing approaches-can be the determining factor in contract awards. The opening of various developing country economies to greater foreign investment and the loosening of state controls on energy, transport, and manufacturing industries—including privatization--could provide opportunities for environmentally favorable investment.

Some innovative approaches for financing infrastructure projects have potential to ease financial strains on developing country agencies while improving project performance.[12] In one approach, called build-operate-transfer (BOT), a private company builds and operates a project, such as a water treatment facility, power plant, or road, until it achieves an agreed-upon payback. At that time, the facility is turned over to the local authority. Payments to the private company may come from revenues generated by the project (such as water fees) or from government payments. Financing is often the responsibility of the private developer, who also may assume the risks of construction cost overruns or delays, and inefficient operation. The developer thus has more incentive to build and operate the facility efficiently than would be the case with 'turnkey' projects transferred upon completion. A training component may be included in the project. However, financial risks for developers and investors can be substantial and the cost-effectiveness of the approach has been questioned. The BOT approach is new and evolving, with little track record to date.

Firms in the United States, Japan, Germany, the United Kingdom, France, Scandinavia, and other industrialized countries compete for environmental projects in developing country markets. Some firms have production operations or subsidiaries in several OECD countries. Environ-

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[8] International Finance Corporation, *Investing in the Environment: Business Opportunities in Developing Countries* (Washington, DC: The World Bank and the IFC, 1992), p. iii.

[9] Jonathan Menes, Acting Assistant Secretary for Trade Development, U.S. Department of Commerce, testimony before the House Committee on Merchant Marine and Fisheries, Subcommittee on Environment and Natural Resources, Feb. 25, 1993. ASEAN is the Association of South East Asian Nations, consisting of Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand.

[10] USAID, *Environmental Market Conditions & Business Opportunities in Key Latin American Countries*, Business Focus Series, October 1992. The six countries are Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela.

[11] As cited in Foreign Broadcast Information Service, "China Battles Hard to Clean Up Environment" *Environmental Issues*, *Nov. 12, 1992, p. 6.*

[12] These approaches are discussed in International Finance Corporation, *Investing in the Environment: Business Opportunities In Developing Countries*, op. cit., box 1, p. 14.

mental infrastructure projects often involve much locally or regionally provided labor and materials (e.g., construction labor, cement or other low-value materials, and local assembly); in such projects, prospects for industrial country exports can be limited to project management and relatively sophisticated goods and services.

The NICS and many developing nations are by no means wholly dependent on EGS imports; in some cases local firms produce major portions of their EGS market needs. The technical capabilities of environmental industries in such countries as Singapore, South Korea, Taiwan, Mexico, Brazil, India, and China are expanding. In fact, environmental goods are sometimes exported by these countries--often at lower prices than U.S., European, or Japanese firms can offer. At the same time, environmental firms headquartered in OECD countries are finding opportunities for joint ventures and licensing with local and regional companies.

As their environmental investments grow, decisionmakers in developing countries will need to choose among competing technologies. Some developing nations may be reluctant to use equipment that does not meet stringent U. S., EC, or Japanese environmental standards. Yet, the most advanced technology and equipment from the industrialized nations may not be affordable. Even if the price is acceptable, other considerations-such as lack of technically trained personnel, limited resources for maintenance, and inadequate support infrastructure--may make advanced equipment inappropriate.

Under such circumstances, less expensive but reliable equipment could be a better choice than state-of-art facilities. The appropriate mix of technologies in a given country will depend on the types and sources of pollution, physical factors such as climate and geology, availability of capital, and technical and managerial capabilities. In some cases, it makes sense to modify technologies to circumstances in developing countries. For instance, Japan is building lower cost (and lower pollution removal efficiency) flue-gas desulfurization equipment for Asian markets[13] and a number of U.S. firms have lower cost, lower efficiency air pollution control technologies available.

Developing country decisionmakers also may be able to keep costs below what they otherwise might be through use of "pollution prevention" and cleaner production processes and technologies to complement end-of-pipe approaches (see box 2-A.) Pollution prevention cannot eliminate the need for investments in conventional pollution control and equipment or of treatment facilities. But, when practiced effectively, it can lead to savings-in some cases, appreciable savings-relative to what otherwise would be required. Thus, it can contribute to sustainable development objectives and could reduce longer term costs for environmental protection.

ODA AND THE ENVIRONMENT

ODA has long been an important source of funds for developing countries. In 1991, ODA amounted to nearly $57 billion-roughly twice as much as foreign direct investment in developing countries.[14] About $42 billion of the ODA was bilateral; $14 billion was multilateral.[15] ODA serves a variety of purposes, such as meeting basic human needs, and helping lower income countries to build or rebuild economic infrastructure. The United States and Japan are the largest donors in absolute terms, although other countries

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13 *International Environment* Reporter, "Japanto Work With China In Developing Cheap Desulfurization Units For Plants,' July 29,1992, p. 497; and Kawasaki Heavy Industries, Ltd. information booklet, 1992.

14 OECD, *Development Cooperation 1992 Report* (Paris: OECD, 1992), P. 78.

15 Multilateral aid is provided by a combination of countries aad sources, through organizations such as the World Bank or U.N. agencies. Bilateral aid flows from ordy one donor country government. Private development assistance, such as from religious or wildlife conservation groups, is unofficial and generally operates outside the purview of government.

Box 2-A-Assistance For Pollution Prevention and Cleaner Production

Pollution prevention-the practice of first considering ways to prevent generation of pollution or waste, thus reducing the need for subsequent treament or disposal--accounts for a small but growing part of efforts to deal with industrial pollution and waste in industrialized countries.[1] While controlling or treating waste and pollution through remedial measures or end-of-pipe controls is often essential, pollution prevention In many cases is a less expensive and environmentally preferable option.

As pollution prevention has become more prominent, a few industrialized countries have begun to support pollution prevention and cleaner production activities through their development assistance. A modest level of support for bilateral and multilateral technical assistance for pollution prevention and cleaner production is now available.

Bilateral Programs

Although no survey has been conducted, the Scandinavian countries and The Netherlands have been leaders in promoting pollution prevention in developing countries and in Eastern Europe. For example, Denmark, Norway, and Sweden have initiated pollution prevention programs as part of their follow up to a decision by the Nordic Council of Ministers to assist Eastern European countries in improving their environment In 1991, the Danish Ministry of Environment launched its Eastern Europe pollution prevention assistance program. To date, $50 million has been spent on a variety of projects. While some support is for environmental infrastructure projects (such as wastewater and sewer systems), a pollution prevention assessment is conducted on all projects; the assessments may identify opportunities to reduce the size and cost of treatment systems. Increased funding for the program, on the order of $30 million per year, Is under discussion. Norway and Sweden also have begun programs.

The Netherlands has funded several pollution prevention projects. One is a joint project operated by the University of Amsterdam and a university in Indonesia. The objective is to build capacity In Indonesia for the implementation of cleaner production strategies.

In 1992, USAID launched its own environmental pollution prevention program (EP3). The program also involves the U.S. Environmental Protection Agency and cooperative agreements with U.S. environmental associations. These arrangements will be used to tap environmental expertise from industry, consulting groups,

[1] us, congress, Office of Technology Assessment, Serious *Reduction of Hazardous Wastes: For Pollution Prevention and Industrial Efficiency,* **OTA-ITE-317 (Washington, DC: U.S. Government Printing Office, September 1988).**

(Continued on next page

provide a larger percentage of their gross national products (see table 2-2).[16]

Donor countries vary widely in their aid priorities. For example, only about two-thirds of U.S. bilateral ODA in 1989 and one-third in 1990 was project-specific assistance--lower figures than other aid donors. The rest involved cash or commodity transfers to countries where the United States has special security interests, or debt relief (see fig. 4-1).[17] There is also considerable variation in the geographic distribution of aid (see table 2-3). The United States dispersed over 40 percent of its aid in 1991 to Egypt (a low-income country) and Israel (a high-income country).

[16] Table 2-2 gives figures **for "net disbursements," as defined by the DAC. The DAC defines net disbursements as equal to gross disbursements, minus repayments of principal on any outstanding aid loans. Interest payments are not subtracted out. Thus, net aid money flows from a donor country will in general be less than the DAC figures by the amount of interest payments received.**

[17] **OECD, *Development Cooperation 1991 Report (Paris,* OECD, 1991), p. 152. U.S. debt** relief in 1990 **was extraordinarily *high.***

Box 2-A–Assistance For Pollution Prevention and Cleaner Production--Continued

academia, and professional associations. Activities include pollution prevention audits, training, and assistance with national program development, as well as broader environmental quality assistance. Core funding of $20 million for EP3 is expected during the five-year life of the project; other agencies may buy in.

United Nations Activities

United Nations agencies---including the United Nations Environment Programme (UNEP), the United Nations Industrial Development Organisation (UNIDO), and the United Nations Development Programme (UNDP)-- have several pollution prevention and cleaner production activities underway. UNEP's Industry & Environment Programme Activity Centre established a Cleaner Production Programme in 1989 to raise awareness in developing countries about the benefits of prevention. The Centre collects and disseminates information to facilitate transfer of know-how and cleaner production techniques and technology to developing countries. Donor countries provide much of this information and often provide bilateral funding to carry out specific activities. For example, Finland's international development assistance agency supported preparation of 50 case studies on cleaner production In the pulp and paper industry, and the United Kingdom has issued a publication, called "Cleaner Production Worldwide," in collaboration with UNEP.

UNEP offers training and technical assistance, often in cooperation with other agencies. For example, it is assisting the World Bank and the Chinese National Environmental Protection Agency with a $15 million cleaner production project (with half the funds coming from the World Bank). It is anticipated that roughly 100 Chinese experts will receive training about The Netherland's systematic pollution prevention process audit procedure (originally developed by the U.S. EPA). There are also plans to install cleaner process equipment in at least 10 factories. Recommendations maybe made about changes in government environmental and industrial policies to overcome end-of-pipe biases and to add incentives for cleaner production. A dissemination phase will aim to prompt more widespread action in China. At certain stages of the project, China will hire foreign consultants as advisers, and UNEP will convene a special foreign advisory group to assist in the policy review. The project could encourage the emergence of a market for cleaner process technology in Chinese industry.

Another multilateral activity, a joint UNEP/UNIDO project begun in 1993 to establish National Cleaner Production Centers in 20 developing counties, also could encourage new markets for cleaner process technologies. The cost of the centers ($750,000 each, for five years) will be funded by UNEP and UNIDO using bilateral monies from several European countries (Denmark has pledged $1.6 million). UNIDOand UNEP will train key personnel for the centers and assist with industry demonstration projects.

Although Japan is diversifying its aid, over 30 percent of its 1991 aid disbursements went to five Asian countries.

Environmental protection emerged relatively recently as a prominent ODA issue.[18] In the 1970s and 1980s, development aid from DAC members and the World Bank was heavily criticized by environmental groups and other nongovernmental organizations (NGOs) for contributing to serious environmental problems in the developing world. Often, these problems arose from inadequate attention to the environment in large development projects (e.g., dams, power plants, and industrial facilities).

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18 Much of the groundwork for including environmental protection as a specific objective in bilateral and multilateral ODA was developed by the U.N. World Commission on Environment and Development in its 1987 report, Our Common Future. This document is best known for presenting a concept of "sustainable development" that stressed the link between economic growth and wise management of natural resources. World Commission on Environment and Development, *Our Common Future (New* York, NY: Oxford University Press, 1987). Some of the groundwork was also developed in the 1972 United Nations Conference on the Human Environment and its Stockholm Declaration of "Only one Earth."

Table 2-2—ODA Performance of DAC Countries 1991 Net Disbursements

	Million $	Percentage of GNP
Australia	1,050	0.38
Austria	548	0.34
Belgium	831	0.42
Canada	2,604	0.45
Denmark	1,200	0.96
Finland	930	0.76
France[a]	7,484	0.62
Germany	6,890	0.41
Ireland	72	0.19
Italy	3,352	0.30
Japan[b]	10,952	0.32
Netherlands	2,517	0.88
New Zealand	100	0.25
Norway	1,178	1.14
Portugal	213	0.31
Spain	1,177	0.23
Sweden	2,116	0.92
Switzerland	863	0.36
United Kingdom[b]	3,248	0.32
United States[b]	11,262	0.20
Total DAC[c]	56,709	0.33
Unweighed DAC average —		0.49

a Including overseas territories (TOMS) but not overseas departments (DOMS).
b Includes forgiveness of non-ODA debt as follows: United States, $1,855 million in military debt; United Kingdom, $17 million in debt from export credits; Japan, $7 million in debt from export credits. Exclusion of these amounts would change the 1991 ratio for the United States toO.17, but would not appreciably change the ratios for the United Kingdom or Japan.
c Excludes the amounts shown in footnote b.

SOURCE: OECD, *Development Cooperation 1992 Report,* pp. A-8, A-9, table 1.



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Energy recovery from palm oil wastewater treatment, Malaysia. Environmental projects can create business opportunities not only for environmental firms but for providers of other needed equipment, such as the engine used at this facility.

In 1976, the United States became the first DAC member to institute formal procedures for environmental review of its aid.[19] Since then, Congress has required USAID to upgrade environmental considerations in its programs on several occasions. By the late 1980s, several other donors and multilateral institutions had begun to consider ways to mitigate or reduce the adverse environmental impacts of development projects they fund. In 1992, a DAC Working Party on Environment and Development, set up in 1989, issued guidelines to help its members incorporate environmental considerations into their development assistance.[20]

In addition to seeking to avoid environmental damage from ODA, DAC members fund projects or project components specifically aimed at improving the environment and encouraging sustainable management of resources in developing countries. Many DAC members contribute bilateral or multilateral aid to help developing countries address global environmental issues such as depletion of stratospheric ozone, global climate change, and biological diversity.

19 OECD, *Development Cooperation: 1990 Report* (OECD, Paris, 1990), p. *52.* These procedures, adopted in response to the National Environmental Policy Act of 1969, can be found in 22 Code of Federal Regulations 216.

20 "Guidelines on Good Practices for Environment and Aid for Aid Agencies," "Guidelines for Environmental Impact Assessments and Surveys," "Guidelines for Aid Agencies on Involuntary Resettlement Related to Aid Projects,' and 'Guidelines for Aid Agencies on Global Environmental Rojeets.' All "Guidelines" are OECD, Development Assistance Committee, 1992.

Table 2-3—Top Five Recipients of ODA From Major Donors (Gross Disbursements, 1990-1991)

Donor and the top five recipients	Percentage of total ODA	Donor and the top five recipients	Percentage of total ODA
United States:		*United Kingdom*	
1. Egypt	32.1	1. India	5.1
2. Israel	8.3	2. Bangladesh	3.2
3. Honduras	2.4	3. Kenya	2.4
4. Nicaragua	2.2	4. Malawi	1.8
5. Jamaica	2.1	5. Zambia	1.8
France:		*Germany*	
1. Cote d'Ivoire	5.5	1. Kenya	6.1
2. New Caledonia	4.2	2. Turkey	5.1
3. Polynesia, French	3.8	3. Egypt	4.2
4. Morocco	3.6	4. Zambia	4.0
5. Senegal	3.4	5. Ghana	3.5
Japan:		*Total DAC:*	
1. Indonesia	10.8	1. Egypt	9.4
2. Philippines	7.4	2. Indonesia	3.2
3. China	7.1	3. China	2.5
4. Thailand	4.8	4. Israel	2.3
5. Malaysia	4.5	5. Bangladesh	2.0

SOURCE: OECD, *Development Cooperation 7992 Report, pp.* A-58, A-60, A-64, A-65, table 43.

This environmental aid takes several forms:

- support for institution and capacity building and training. Examples include technical assistance and cooperation for development and implementation of environmental management procedures, identification of environmental priorities, and training or education of personnel and officials (box 2-B). As is discussed in chapter 5, much U.S. environmental aid is of this sort. Although the purpose of such aid may be to build up capabilities in developing countries, much of the experience and technical background on environmental management resides in developed countries. Developed country consultants often are hired to carry out these activities.
- support for environmental infrastructure and for mitigation of environmental impacts in development projects. This can include grants for pre-project studies (such as feasibility studies), often conducted by donor country firms, and confessional financing of capital projects. While the United States routinely funds feasibility studies, its provision of confessional financing for capital projects is less frequent than many other donors.

Much environmental aid has been undertaken in rural areas, often as part of rural development programs. With increased migration and population growth in urban areas, urban environmental problems are becoming a more significant concern and focus for aid. (Most of the population and much of the aid continues to be rural, however).

In some developing countries, environmental problems associated with rapid industrialization (e.g., air and water pollution, hazardous and toxic waste) have become a focus for environmental aid. Most projects focus on treatment and control of waste after it is generated without first considering means to prevent waste or pollution in the frost place. Such means, usually called pollution prevention or cleaner production approaches, often can achieve environmental goals in a more cost-effective way than conventional treatment alone. While pollution prevention and cleaner

Box 2-B--Technology Cooperation and Technical Assistance

Bilateral Activities

Many donor countries help developing countries with training, support collaborative research and development and assist with developing environmental standards and regulations. While primarily intended to strengthen developing countrycapacities, such activities may contribute to longer term commercial relationships. Technical training may expose developing country technicians and managers to equipment sold by donor country firms. People from donor countries that are engaged in collaborative research and development may gain a better understanding of how to adapt products to developing country needs. Donor country officials or consultants, in advising on environmental regulations, may be partial to their own national environmental standards and regulations; if their advice is followed, subsequent regulations may, to some degree, favor technologies known to be able to meet the donor country's standards.

Many different public and private agencies and institutions from donor countries may engage in such cooperative activities with their developing country counterparts. {Some activities qualify as "official" development assistance; others do not). Examples from the United States, such as the United States Environmental Training Institute and the United States-Ada Environmental Partnership, are discussed in appendix B. A sampling of activities from other countries:

Germany: The German government funds the Carl Duisberg Gesellschaft (CDG), a non-governmental organization with close ties to German industry, for developing country environmental training. About half the training takes place in Germany; the remainder in the developing country. Since 1990, the CDG has been working with developing country manufacturing associations and planning or manufacturing ministries on environmental improvements in industrial processes. It also undertakes training pertinent to industrial water pollution and water use in several Saharan countries, and industrial energy efficiency in members of the Southern African Development Cooperation Countries. (Germany's environmental aid is discussed further in chapter 5.)

Japan: Several Japanese programs provide environmental training for developing country officials. Japan has provided funds for environmental management centers in Thailand, China and Indonesia, which, among other functions, undertake and provide training for environmental monitoring. Japan also is cooperating with Indonesia and China on joint projects to adapt, develop and transfer simplified desulfurization equipment for developing country use. (Japan's environmental ODA, including the "green aid plan" administered by the Ministry of International Trade and Industry, are discussed in chapter 5.)

The Netherlands: A 40-million-guilder fund (known as MILIEV) was set up in 1993 for transferring environmental technologies to developing countries. Private sector projects that would contribute to sustainable development are eligible for government financial support that could cover up to half the costs of the project. The projects must benefit the environment and in time must be managed by the recipient country.

Continued on next page

production approaches could become an important part of developing country environmental strategies, they have received little attention from development assistance agencies until very recently. Box 2-A describes recent activities by some donor nations and the United Nations Environment Programme, which has had a small program to promote cleaner production since 1990.

Estimates of Environmental Aid

The 1992 United Nations Conference on Environment and Development **(UNCED)** gave additional prominence to the role of environmental aid in development assistance. UNCED's Secretariat timated that it could take $125 billion per year in aid to catalyze annual investments of $500 to $625 billion to achieve the conference agenda

Box 2-B--Technology Cooperation and Technical Assistance-Continued

United Kingdom: A government-sponsored Technology Partnership *Initiative,* launched in March 1993, aims to give developing country business representatives better access to United Kingdom technologies and management techniques that would further sustainable development. A guide to United Kingdom environmental technology and services has unprepared. United Kingdom companies also may get help for training developing country business personnel. UK and dveloping country firms can gain access to an information network through British Embassy or High Commission commercial sections, or participating trade associations. (see chapter **5 for further** discussion of the United **Kindom's** *environmental aid.)*

Multilateral **Activities**

Multilateral agencies and funds support training, institutional development, research, and similar activities, The Global Environment Facility (GEF) was setup in 1990 to help countries with per capita incomes of less than $4000 addeess global environmental problems. GEF helps these countries deal with added costs of activitieswith global environmental benefits. Grants support investments, technical assistance and research related to climate change, ozone depletion, pollution in international **waters, and biodiversity. Administered by the** United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP)and theWorld Bank, GEF was funded at a $1.3 billion level during an initial three-year pilot phase; replenishment is now under consideration.

Several multilateral activities have been launched as follow up to the 1992 United Nations Conference on Environment and Development. A new Commission on Sustainable Development has been setup under the United Nations Economic and Social Council. Among its missions: to monitor progress in transferring environmentally sound technology and know-how to developing countries and others.

Capacity 21, an activity of the United Nation Development Programme(UNDP),was setup in 19$3 to help developing countries implement local sustainable development programs. The focus will be on institution building, human resource development, public participation, factoring environment into development strategies, and technology development, adaptation and applications. UNDP has a target of $100 million for initial funding, with 10 developing countries the focal point for the first 18 months of effort.

Another UN agency, the United Nations Environment Programme (UNEP), has provided technical assistance on the environment for many years. UNEP was recently authorized by its governing council to examine the feasibility of developing guidelines on information that exporters should provide toimporters on the environmental impacts of potentially harmful technologies. (UNEP's pollution prevention work is discussed in box **2-As)**

UNEP has setup an international environmental technology center in Japan to promote the transfer of appropriate environmental management technologies to developing countries. Initially proposed and funded by Japan, the center's organization, personnel, programs, and international advisory board are supposedtoassure international origins for technologies and expertise. It will continue to be under UNEP's supervision.

(called Agenda 21) for "accelerated and sustainable development' in developing countries. Some portion of the needed investment would be environmental, but most would not. The Secretariat also estimated an additional $15 billion would be needed to help developing countries mitigate their impacts on the global environment, and $750 million to strengthen the capacity of international institutions.[21]

UNCED provided new focus for an old debate about the appropriate level of development assistance to developing countries. In 1973, the UN General Assembly urged donors to increase their ODA to average 0.7 percent of their GNP or more.

21 **Report of the Secretary General of the conference, "Financial Resources and Mechanisms " Preparatory Committee for the United Nations Conference on Environment and Development, Fourth Sessions, New York, March' 2 to April 3, 1992, Plenary Session, *AA/Conf.151/PC/101,* United Nations General Assembly,**

However, the DAC has not adopted this goal and, of DAC members, only Norway, The Netherlands, Sweden, Finland, and Denmark have met it in recent years.[22] Of the six largest DAC donors, only France has approached this level in recent years. Japan has remained at about 0.3 percent for several years despite steady increases in the absolute amount of aid. The United States, which never committed itself to the General Assembly goal, has seldom exceeded 0.26 percent of its GNP in aid value since the mid-1970s, and now spends about 0.20 percent.

All countries at UNCED accepted Agenda 21 financing chapter, which reaffirmed commitments to the 1973 goal and called for "new and additional financial resources" to implement sustainable development.[23] As the United States had not affirmed the earlier goal, U.S. officials held that its acceptance of the financing chapter would not be a commitment. However, then-President Bush announced an increase in assistance for international forestry and indicated the United States would increase its international environmental assistance by two-thirds over the 1990 level. Japan made the largest pledge: it announced its intention to provide 900 billion to 1 trillion yen ($7.1 billion to $7.8 billion at 1992 exchange rates) over 5 years for global environmental protection (including bilateral and multilateral aid).[24]

Since UNCED, most donors have continued to acknowledge the need for "new and additional" resources, but have pointed out constraints that have slowed their response. Expanding ODA has proven difficult in a period of slow economic growth and intensifying global competition. Developing countries, meanwhile, have continued to press for "new and additional' resources, including environmental aid.[25] They are concerned that, without new and additional funding, donors will divert to the environment other aid now used for such purposes as basic health care, general education and small enterprise development.

In followup to UNCED, the DAC is attempting to track environmental assistance flows to developing countries.[26] The initial effort to develop statistics on environmental aid is still in progress. One major obstacle is that donors and multilateral agencies have yet to adopt common definitions for estimating their environmental aid. The absence of common definitions is a problem in comparing or assessing what various countries are doing with their environmental aid. For example, Japan includes some aspects of natural

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22 Three non-DAC members, Saudi Arabia, Kuwait, and the United Arab Emirates, are also important providers of ODA. During much o' the last two decades, their ODA routinely exceeded 2 percent of their respective GNPs. This proportion declined in the aftermath of the 1990-1991 Gulf war, with Saudi Arabia falling to 1.5 percent and the United Arab Emirates to 1.66 percent of their respective GNPs. The 1991 figures for Kuwait were not cited by DAC.

23 The financing chapter Stated: "In general, financing for the implementation of Agenda 21 will come from a country's own public and private sectors. For developing countries, particularly the least developed countries, ODA is a main source of external funding, and substantial new and additional funding for sustainable development and implementation of Agenda21 will be required. Developed countries reaffirm their commitments to reach the accepted United Nations target of 0.7 percent of GNP. . and agree..to augment their aid. ..to reach that target as soon as possible and to ensure a prompt and effective implementation of Agenda 21." United Nations Conference on Environment and Development, "Financial Resources and Mechanisms," Agenda 21, Chapter 33, final advance version as adopted by the Plenary in Rio De Janiero on June 14, 1992, para. 33.15.

24 Japanese Ministry of Foreign Affairs, *Official Development Assistance* 1992, vol. 1 [Wagakuni no Seifu-Kaihatsu-Enjo 19921* p.217.

25 Japan's environmental aid was reported to have increased to about 280 billion yen ($2.4 billion) in financial year 1992—an apparent tripling over the 1991 level. However, the reported information, contained in a June 1993 United Nations publication, provides few specific details about what is included in this estimate of environmental aid or how it was derived. As cited in Commission on Sustainable Development Report of the Secretary General, "Addendum: Information provided by Governments on initialfinancial commitments, financial flows and arrangements to give effect to the decisions of the United Nations Conference on Environment and Development' United Nations Economic and Social Council, E/Ch.17/1993/11/Add.1, 8 June 1993, p.15. The Commission, setup in follow up to UNCED, has established an ad hoc working group on finances to assess financial needs and monitor resource flows.

26 OECD, *Development Cooperation 1992 Report, 0p. Cit., pp.* 13, 22.

disaster relief in its estimates of environmental aid,[27] while other donors may not.

In 1990, the DAC questioned whether an apparent increase in the number of environmental projects cited by donors was real or simply the result of reclassification.[28] In the absence of common definitions, countries are free to "relabel," or reclassify, projects to claim a larger volume of environmental aid. Sometimes this may be justified: certain longstanding kinds of development assistance (such as help for building and operating wastewater treatment facilities) could be considered environmental infrastructure. Some other aid projects might fall into the environmental category if environmental protection and/or resource conservation and restoration are primary objectives. Generalization is difficult, as is suggested by the case of reforestation, which can be undertaken for many different reasons. A project to stock a logged area with commercially desirable tree species might normally be seen as forestry development. However, if the prime objectives were watershed management, control of soil erosion and introduction of good forest management on lands degraded by unsuitable logging practices, a similar activity might qualify as environmental.

Another question is how to account for development projects that have an environmental component or aspect. For example, water resource development projects may have mitigation components to reduce environmental impacts (e.g., measures for afforestation and to reduce erosion in reservoir catchment areas). What portion of project costs should be environmental before such projects are considered to have an environmental component?

Many environmental problems can be avoided if good design practices are used in planning projects; by anticipating and addressing likely environmental problems in the planning stage, project designers can reduce the need to spend as much on mitigation components. Hence, environmental spending is not always a good indicator of the environmental care taken in the project.

Further complications arise in classifying aid for "cleaner production technology" and "pollution prevention" approaches which are an integral part of production technologies. As has been mentioned, such techniques reduce the amount of waste or pollution that is generated, and thus offset the need for subsequent treatment or disposal, or require less inputs of energy and other resources. A narrow definition of environmental spending can mask environmentally favorable investment in such cleaner production technologies. Indeed, donors attempting to meet their environmental aid commitments using a narrow definition could conceivably skew resources from cleaner production to less effective and more costly investments in "end-of-pipe" pollution abatement and waste disposal equipment.

DAC members have begun to introduce "indicators' or markers of environmental aid as part of their creditor reports. The guidance for enumerators suggests that DAC members identify the environmental content of projects using one of three codes: those undertaken "specifically for environmental purposes,' those in which the content is "signKlcantly influenced by environmental considerations,' and those in which the environmental content is not applicable or known. Some specific kinds of projects are considered *prima facie* environmental.

Some donors are using these guidelines to report their own calculations for specific environmental projects, and for projects which include an important environmental component. The DAC has yet to issue an estimate of environmental aid. Nine of DAC'S 21 countries had reported their bilateral environmental commitments for 1991, the frost year to be covered, as of May 1993. These

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27 Government of Japan, *Environment and Development: Japan's Experience and Achievement, Japan's National Report to UNCED 1992,* December 1991, p. 22.

28 OECD, *Development Cooperation 1990 Report,* op. cit., p. 45.

countries estimated that their environmental or environmentally related projects accounted for over $375 million of their bilateral ODA (see table 2-4).

The major donors had yet to report to DAC; however, some information is available about spending for environmental aid by four of the five major donors profiled in chapter 5. (United Kingdom estimates are not yet available.) Preliminary information about donors' 1991 aid for environmental projects and projects with an environmental component is as follows:

Japan	$779 million[29] (includes component projects)
United States	$625-700 million[30] (includes component projects)
Germany	$511 million + (direct environmental aid only)[31]
France	$146 million + (partial report) .32

These estimates, which are further discussed in chapter 5, should be seen as rough estimates that could change. Donors do not always define "environmental' in the same way, and countries may vary in the care they have taken to avoid inflating estimates by double counting or counting the full cost of a project when only a part of it qualifies as environmental.

Despite these caveats, it is reasonable to conclude that DAC members committed at least $2.0 billion of their 1991 bilateral ODA t.

Table 2-4--Bilateral Environmental Aid, 1991 Reported to DAC by Nine Countries

(amount in millions $)

	Specifically environmental projects[a]	Integrated projects[a,b] with a substantial environmental component
Australia	$1.86	$50.3[a]
Austria	7.39	20.68
Belgium	0.13	2.68
Canada	53.63	43.11
Finland	80.10	---
The Netherlands	25.17	28.95
New Zealand	1.79	5.72
Norway	33.55	28.67
Sweden	6.70	---
Total	210.32	177.43

a As defined by donor country.
b Countries vary in how they count totals for integrated projects: some count the entire project; some count only the portion of the project that is "environmental"; some have not counted integrated projects.

SOURCE: Unpublished OECD data.

projects they define as environmental or as having an important environmental component. A fuller account of financial resources would include multilateral aid. The European Community (EC) provided 250 million ECU (roughly $300 million) in 1992 for projects or programs that were primarily environmental in nature.[33] DAC members also contribute to multilateral development banks (box 2-C), which committed over $3 billion in loans (some with close to commercial terms and some on highly confessional terms) in 1992

29 At 1991 exchange rates of 135 yen per dollar. Japan's environmental aid is further broken down in figures 5-2 and 5-3 in chapter 5. Roughly one-fourth of the environmental aid shown in figure 5-2 is for natural disaster prevention, an activity not all donors count as environmental. As noted in footnote 25, a June 1993 United Nations publication cites Japan as reporting 280 billion yen ($2.4 billion as calculated in the document) in financial year 1992 environmental aid. While Japan's overall 1992 aid level was not listed, this level of environmental aid, if confirmed, would appear to represent some "new" resources.

30 USAID is in the process of fine tuning its baseline estimates of its 1991 environmental outlays. USAID's annual obligations for implementing its environmental strategy averaged $681 million in Fiscal years 1992 and 1993 (see figure 5-1 in ch. 5 for a breakdown of obligations by activity).

31 Calculated on an exchange rate of $1 = 1.66 Deutsche Marks. Ge rmany's sizable aid for projects with an environmental component is not reflected in this estimate.

32 Estimate is for environment spending by only one of four French aid agencies. Calculated on an exchange rate of $1 + 5.66 French Francs.

33 Information provided by the Co remission of European Communities, Apr. 8, 1993. Much of the EC multilateral aid is tied to EC members. The environmental aid information provided by the Commission of European Communities, Apr. 8, represented about 10 percent of total EC multilateral aid.

Box 2-C-The Multilateral Development Banks

The World Bank and the regional multilateral development banks (MDBs) are major sources of infrastructure financing In developing countries. Their lending terms vary from close to market (in the better off developing countries)to highly concessional (in the poorest countries). Like bilateral donors, the multilateral institutions initially paid little attention to the environmental impacts of the projects they financed. This is changing; most MBDs now use environmental guidelines or assessments in project planning or review. MDBs also are working with developing countries as they prepare or revise national development plans to take Into account environmental needs. These plans may identify steps to strengthen environmental institutions or Identify environmental investment and lending needs for the coming years.

The multilateral institutions now finance many environmental projects. Like bilateral donors, they have found it difficult to define environmental aid. However, most banks now "mark" environmental projects and projects with a significant environmental component. As shown in table 2-5, these banks made at least $3 billion in bans for environmentally related projects in 1992. (This does not include assistance provided through the Global Environmental Facility or United Nations agencies discussed in box 2-B.)

While the World Bank, other MDBs and the United Nations conduct procurement under rules that generally prevent discrimination based on nationality, donor countries often supplement multilateral funding with their own aid money, through use of consultant trust funds, cofinancing, and parallel financing (described below). Some of the consultant funds and parallel financing maybe tied; cofinancing is not tied (except when provided after a contract is awarded). All three practices may have a subtle influence on multilateral procurement (see ch. 3).

Consultant trust funds can be drawn on by MDBs to finance pre-project appraisals. Several consultant trust funds are available to the World Bank. The largest, a Japanese special fund for policy and human resource development, is untied and is administered by the Bank on behalf of Japan. In 1992, the Bank committed over $100 million from the fund for feasibility studies and other project preparation work (including work related to global environmental safeguards). Although Japan signs off on proposed uses for the trust fund, t he Bank's procurement rules govern subsequent selection of consultants.

Continuedd on next page

for environmental projects or projects with an important environmental component (table 2-5). (Financing for MDB loans or credits is obtained from various sources, including world capital markets and MDB earnings, as well as contributions from donor countries). Thus, the total amount committed to bilateral and multilateral environmental assistance or assistance with an important environmental component surpasses $5 billion per year, but by how much is not clear.

Given the definitional problems discussed above, these figures should be treated with caution. Because DAC reporting on environmental ODA leaves the definition up to the donor, comparisons will be difficult. Without benchmarks or common definitions, such estimates shed little light on how much "new and additional" aid is devoted to the environment.

Not all environmental assistance would be reported to DAC. For example, Sweden's export credit agency supports a $15 million credit facility in Malaysia that provides soft loans for acquisition of Swedish environmental protection and control equipment. While offering below-market rates, this facility does not meet DAC criteria for concessionality, and thus would not be counted in DAC figures. Even counting such funds, environmental aid probably meets only a small part of the overall "catalytic" need identified by the World Bank or by UNCED.

Finally, the quantity of aid reveals little about the quality of environmental aid or whether developing country needs and priorities are adequately addressed.

Box 2-C--The Multilateral Development Banks--Continued

In some other consultant trust funds, donors maintaln more control over their contributions. The U.S. Trade and Development Agency administers a trust fund for use by the World Bank for project development and identification studies. When the Bank identifies a need for such a study, it can apply to TDA for funding. If given the go-ahead by TDA, the Bank must commission a U.S. consultant or citizen to perform the study. The aim of the fund is to get U.S. consultants involved in World Bank projects at the project planning stage. TDA only funds studies where it is dear that U.S. contractors would have **a fair chance** to compete In the bidding for the proposed project when undertaken. Initially focused on the environment and also Eastern Europe, the fund now is used for all sectors and regions. TDA has provided about $2.7 million to the fund in the last four years.

Some consultant trust funds are used only for environmental projects. Several countries have together contributed more than $15 million to the Technical Assistance Grant Program for the Environment, called the Environmental Trust Fund, since late 1990. Each country contribution is separately maintained; tying policies vary by country. Also, the Netherlands, Norway, Belgium, Canada, **and Sweden** have trust **fund for technical** assistance or studies; some of the funds are tied, although the proportion is decreasing. Another special environmental trust fund is being setup by The Netherlands with the inter-American Development Bank.

Cofinancing occurs when additional my is added to multilateral projects, raising the overall budget for project assistance. Cofinancing can come from another multilateral or a bilateral source. The World Bank increasingly uses cofinancing; over half of the Bank's 1992 projects and programs attracted some cofinancing. The financing includes ODA as well as other financing, such as export credits from export-import banks. If the additional money is given in a separate transaction (not as part of the multilateral project budget), it is called parallel financing. An example is a German GTZ (technical assistance agency) grant to China to train maintenance staff in concert with an MDB loan for bus fleet fuel conversion. With several large MDB environmental programs in the works, some countries may seek to promote environmental exports through co-or parallel financing. The subtle ways in which co- and parallel financing can help a country's firms win MDB contracts are discussed in chapter 3.

Table 2-5-1992 Environmental Lending by Selected Multilateral Development Banks

Institution [a]	Environmental and environmentally related lending
World Bank	**Loans for 19 primarily environmental projects amounting to about $1.18 billion were approved in 1992. Of these projects, 10 were concerned with better management of natural resources, and six with building institutional capacity. The other three focused on both priorities. in addition, the Bank funded 43 projects with substantial environmental components.**
The Asian Development Bank	**1992 lending for environmentally oriented projects amounted to $1.1 billion. Technical assistance for environmentally oriented projects amounted to about $19 million.**
The Inter-American Development Bank	**1992 loans for 10 projects "specifically designed to resolve environmental problems" amounted to slightly over $1 billion.**

a The European Bank for Reconstruction and Development did not provide information on the extent of its environmental lending.

SOURCE: **World Bank, Environment Department, *Environmental Assessment Sourcebook, Volume /, Policies, Procedures, and Cross-Sectoral Issues,* WorldBank Technical Paper, No. 139, and The *World Bank and the Environment,* Fiscal 1992; Asian Development Bank, Information Office, The Environments *Program of the Asian Development Bank,* April 1991, and information provided by the Office of the Environment, Asian Development Bank, May 18, 1993; Inter-American Development Bank, Environmental Committee, *Annual Report on the Environment and Natural Resources,* Washington, DC, 1992, and information provided by the Inter-American Development Bank, Feb. 16, 1992.**

How Aid Can Promote Exports 3

Aid programs normally promote national exports to some extent. One way is by "reflow," the spending of aid money on goods and services from the donor country. A second way is that a country's own aid programs can help national firms to tap into aid finding from multilateral organizations. A third way is that the recipient country's use of goods and services from the donor country can open the door to long-term commercial relationships. Certain practices tend to increase aid's export promotion effect, whether or not they are adopted for that purpose. This chapter describes such practices in the abstract; their actual use is discussed in chapter 4 (for practices increasing reflow), box 2-C (for practices that help firms tap into multilateral funding), and box 2-B (for practices increasing the chance that aid will lead to long-term commercial relationships).

PRACTICES THAT INCREASE REFLOW

Some reflow occurs naturally. The donor country may offer the best bargains in goods and services. Also, the recipient country might prefer to buy from donor country firms because of a common language, similar culture, or previous commercial relationships.[1] The recipient country might also buy from the donor out of gratitude, or out of a spontaneous belief (not encouraged by the donor) that to do so will increase the prospects for future aid from that donor.

Some donor practices can increase reflow, whether or not that is why the donor adopts the practice. Some of these practices are at times criticized on the ground that they inappropriately

[1] Catrinus J. Jepma, *The Tying of Aid* (Paris: OECD Development Centre, 1991), p. 25.

subordinate development goals to the donor's own commercial goals. One practice, which is not normally subject to such criticism, is to focus aid on projects requiring goods and services that donor country firms can supply competitively. This practice can substantially boost reflows.

Another practice, which is subject to the criticism just described, is the 'tying' of aid, i.e., restricting where the aid can be spent. In collecting statistics, the DAC distinguishes three categories of aid. First, aid that may freely be spent in all OECD countries and in substantially all developing countries is called "untied." (Aid earmarked to finance the recipient's local costs is also counted as "untied.") Aid that is not "untied" but nevertheless may be spent to procure goods and services from at least the donor country and substantially all developing countries is called "partially untied." All other aid is called "tied." Often "tied" aid is restricted so that it can only be spent in the donor country; and by "tied aid" people often mean aid so restricted, even though the DAC definition is broader, encompassing any set of conditions not meeting the definitions of untied or partially untied aid.

Tying generally increases reflow, though it is usually hard to tell by how much. In some cases, the recipient country would have spent money in the donor country even if the aid were untied.

In principle, the tying status of particular aid funds depends on the actual, practical restrictions on spending rather than on the formally declared restrictions. Thus, aid is defined to be tied when it is "*in effect* tied to procurement of goods and services from the donor country.' This situation is sometimes called "informal' tying, as opposed to the "formal" or openly announced tying. In practice, however, member countries can report figures as they wish, and the DAC does not often revise them; so informal tying might go unreported. Informal tying would occur, for example, if a donor invited bids in advance of finally deciding to fund projects, and consistently decided to fund only those projects for which its national firms would win the contract.

Sometimes donors act in ways that do not guarantee that aid will be spent in the donor country, but make that outcome more likely. This too is often referred to as "informal tying." For example, a donor might let it be known that if aid funds are not spent substantially on donor country goods and services, future aid will be diminished. Another example is an administrative system that helps national firms to influence project selection (see ch. 4).

Sometimes formally tying only a small amount of aid can informally tie a much larger amount. One example is tied grants for consultation services in the pre-project phase. Large social or capital projects are not normally undertaken without some preliminary examination of the project's context, scope, planned methods of implementation, and likelihood of success. This preliminary phase can go by the name of pre-project studies, scoping studies, pre-feasibility and feasibility studies, and (for capital projects) engineering studies.

The results of these early studies can have a ripple effect on the entire project. The firm performing the study might itself be capable of doing or at least managing the construction; its work in the pre-project stage would often give it a substantial advantage in bidding on the project.[3] Even if the firm performing the pre-project study cannot bid on the project, if the project requires technology (such as for air pollution control equipment), that firm is likely to be more familiar with donor country technologies than with for-

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[2] OECD, "DAC Adopts Revised Guiding Principles For Associated Financing and Tied, Partially Tied, and Untied ODA," Press Release A(87)23, Paris, 1987 (emphasis added).

[3] The Japanese International Cooperation Agency (JICA), for example, "recommends that the recipient country employ the same consulting firm [to manage a JICA project] that took charge of the Basic Design work [a preliminary study]," in order "to secure technical consistency of the project design, etc." JICA, "Grant Aid and JICA," undated, p. 12.

eign ones and to recommend technical specifications that can be met by donor country vendors. This could steer the main project to national firms even if the main project is not formally tied.

Similarly, once a construction project goes ahead, a donor could tie just the aid for hiring an engineering consulting firm to manage the project. A national firm in charge of setting specifications, and in a position to advise the recipient government on procurement, would tend to steer business toward other national firms.

Another practice that can increase reflow is to give aid not as a pure grant, but with some loan component. Assuming the loan is paid back, if the aid is spent in the donor country, then the amount of reflow will actually exceed the net cost of the aid to the donor. The aid can be given in various forms. For example, the donor might give the developing country a grant, plus a loan on terms similar to those for commercial loans.[4] Or the donor might give a "concessiona1 loan," that is, a loan at terms better than those available in the markets Other possible forms include giving both a grant and a concession loan, or both a confessional loan and a loan on close to commercial terms. Aid with a loan component is often used for major projects (such as wastewater treatment plants), which are normally too expensive to fired by grants alone.

When aid with a loan component is tied it is called a "tied aid credit. "[6] (The term "tied aid credit" is commonly used to include both tied and partially untied aid; it is so used in this background paper.) Assuming the loan is repaid, tied aid credits can leverage a given net cost to the national treasury to yield substantially larger amounts of exports. Tied aid credits also have the potential to skew aid in directions that serve donor country commercial interests over recipient country development and environmental interests, and their use is limited by international rules (see ch. 4).

PRACTICES THAT HELP FIRMS TAP MULTILATERAL FUNDING

A nation's own aid programs can help its firms in two ways to win contracts from multilateral aid sources. First, a nation can provide tied or untied grants to perform preliminary studies for projects being considered by a multilateral aid source. If a national firm does the preliminary study (which is assured if the grant for it is tied), it may steer the main project to a national source, as discussed above in the context of bilateral aid. (However, multilateral sources normally have strict and effective competitive bidding rules that could limit the influence of the firm doing the preliminary study.)

Second, a nation can provide cofinancing or parallel financing for multilateral projects. Cofinancing is money contributed directly to the multilateral project. Competitive bidding is run under the normal rules of the multilateral organization, so in principle the cofinancing gives donor country firms no advantage. However, especially if the cofinancing represents a large part of the total project cost, the recipient country will likely be especially receptive to bids by firms from the country giving the cofinancing. Parallel financing is tied or untied financing for a project separate from but closely related to the multilaterally funded project; for example, parallel financing could be for a training program on how to operate a facility whose construction is financed multilaterally. Parallel financing cannot directly influence the procurement for the multilateral project; however, national firms that bid on the parallel

4 Government guarantees of commercial loam are also sometimes used.

5 Such a loan can be thought of conceptually as equivalent to a commercial loan (with a face value equal to the present value of the required repayment stream) combined with a grant, and might in fact be built out of those two components by the donor government.

6 The term "aid" signifies there is a grant component, while the term "credit" signifies there is a loan component (some amount must be repaid).

financing can thereby learn about the multilateral project, for which they might then bid as well.

PRACTICES THAT ENCOURAGE LONG-TERM COMMERCIAL RELATIONSHIPS

In the long run, continually giving out aid is an expensive way to promote exports. A more profitable way is to let particular aid efforts mature into long-term, self-sustaining commercial relationships. One practice that can encourage such relationships is to focus aid on countries with promising markets.

Another practice that can encourage long-term commercial relationships is "technology cooperation. This includes technology demonstrations, research and development centers, training programs, and technical assistance to nascent institutions, such as a government environment agency. Aid for these activities is often tied or partially untied.[8] Technology cooperation may over time both increase a developing country's desire and ability to protect the environment, and increase its awareness of how the donor country's technology can help with that task. Technology cooperation can reach different groups within the recipient country, including government policymakers, universities, industry, and nongovernmental organizations. While technology cooperation can have significant commercial benefits for donors, it can also be essential to achieving broader environmental and development goals.

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[7] The term "technology cooperation" as used here is broader than the term "technical cooperation" used by DAC.

[8] To the extent that aid is offered in goods and services (e.g., training, equipment) rather than in cash, it is by definition tied if the goods and services are produced in the donor country.

Aid and Exports: Selected Country Practices

4

It is hard to say how important aid is in promoting exports. One study found that 14.6 percent of OECD exports to developing countries during 1987-1990 were aid-financed.[1] But what does this mean? On the one hand, some of these exports would have occurred without the aid financing.[2] On the other hand, exports directly financed by aid can lead to other exports not using aid financing, so over time aid could have a cumulative effect that far exceeds its export coverage in a given year.

We can, however, examine countries' practices that tend to increase or decrease the exports resulting from foreign aid. This chapter examines practices of the United States, Japan, France, Germany, and the United Kingdom[3] in four areas: the composition of aid (cash transfer, projects in particular sectors, etc.); geographic focus of aid; tying of aid, both formal and informal; and the use of loans (especially tied loans). Much of the data is available only for aid as a whole; but, where possible, environment-related aid is discussed. A fifth area of practice, the building of long-term relationships (such as through technology cooperation), was discussed in box 2-B; and a sixth area, use of a country's aid that can help national firms to win contracts under multilateral aid projects, was discussed in box 2-C.

Among the foreign countries examined, Japan's aid may pose the greatest commercial challenge to the United States, and

[1] This figure is derived from a restricted OECD document, which gives an analysis by Professor Catrinus J. Jepma. The OECD plana to publish this analysis in a publicly available form.

[2] How much this happens is explored in Catrinus J. Jepma, "EC-Wide Untying," IDE Foundation, University of Groningen, The Netherlands, 1992, p. 10.

[3] The largest aid donors are, in order, the United States, Japan, France, Germany, Italy, and the United Kingdom. Italy is not discussed here.

receives the most attention below. Japan is, with the United States, the largest donor of aid and probably of environmental aid, and it has made a commitment to expand its environmental aid substantially. Japanese aid continues to be focused on East Asia, with its potentially large market for environmental goods and services (EGS), and where Japan has a strong commercial presence. Japan also may view the environment as a strategic industry, and has given the environment special attention in its aid programs. While the competitiveness of the U.S. environment industry is not discussed in this background paper (it will be discussed in the final report in this Assessment), it is worth noting that Japan has a long history of promoting industries that it considers strategic through coordinated use of R&D, export promotion, import restrictions, tax policy, and other policies.[4]

At the same time, Japan's ODA could benefit some U.S. environmental firms. Japan has, at least officially, been taking steps to open up more of its ODA to participation by non-Japanese firms. A recent Executive Branch report to Congress, coordinated by the State Department (referred to below as the "State Department" study), says, "we are cautiously optimistic" that U.S. and other foreign firms "will be able to increase their participation in Japan's ODA contracts over the next few years. "[5] It remains to be seen whether this cautious optimism will be justified. Even if more opportunities exist in a formal sense, U.S. firms seeking to participate in Japanese ODA normally will need to make the effort to understand Japan's ODA system, and will need to be persistent.

COMPOSITION OF AID

Figures 4-1 through 4-3 show patterns in the composition of aid for 1989 and 1990.[6] Compared with other major donors, the United States spends more on debt relief and program assistance (fig. 4-l). Debt relief constitutes forgiveness, rescheduling, and refinancing of debt, including debt on an ODA loan or a non-ODA loan.[7] Debt relief is not normally associated with any particular purchases and thus does not directly promote exports.[8] Program assistance is a general category for aid not linked to specific projects. It is often given as a simple cash payment, which again does not directly promote exports.[9] A small portion of U.S. program assistance is given as a grant that can be spent only to purchase U.S. commodities. However, this restriction does not necessarily increase U.S. exports. The recipient country

4 U.S. Congress, mice of Technology Assessment, *Competing Economies: America, Europe, and the Pacific Rim*, OTA-ITE-498 (Washington, DC: U.S. Government Printing Office, October 1991), ch. 6.

5 U.S. Department of State in coordination with other Executive Branch departments and agencies in response to a request by the United States Senate, "Japan's Foreign Aid: Program Trends and U.S. Business Opportunities" (Feb. 18, 1993), mimeo., p. 6.

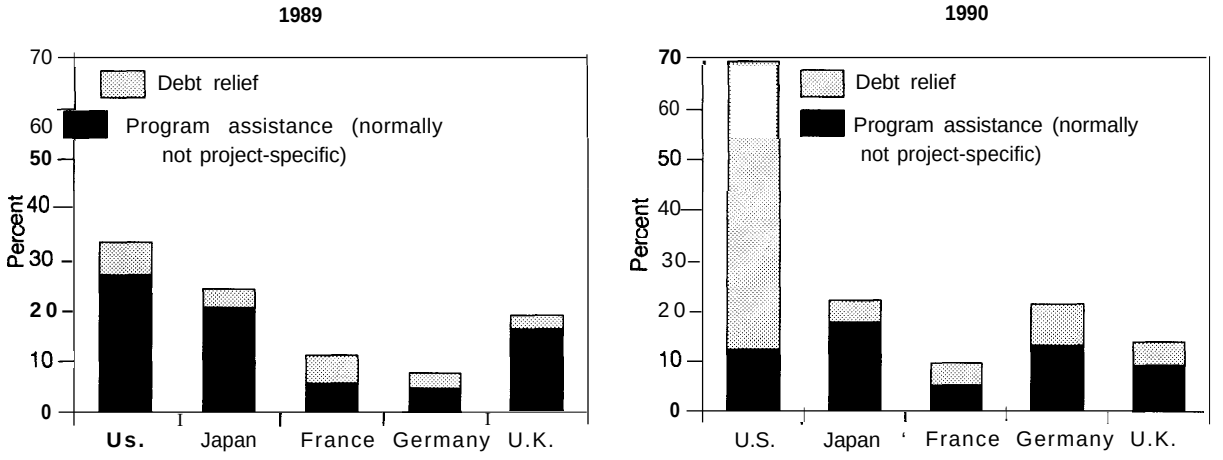
6 The terms used in these figures for different types of aid, some of which are explained below, are defined precisely in OECD, "DevelopmentAssistance Committee Statistical Reporting Directives," Note by the Secretariat, Dec. No. DAC(88)1O, drafted Feb. 22,1988. This document has unrestricted distribution.

7 Starting with 1991 figures, relief of military debt will not be counted as ODA at all, and therefore will not show up as debt relief. This changed accounting will probably reduce U.S. aid figures significantly.

8 Debt relief could indirectly promote exports in various ways. The recipient country might buy from the donor out of gratitude, or out of a perception (not necessarily encouraged by the donor) that future aid will depend on current spending patterns. The recipient country would have increased spending ability (although any extra spending that resulted would not necessarily be made in the donor country). The recipient country might buy more than it normally could afford from the donor on credit because it anticipates debt relief in the future.

9 As with debt relief, exports could be indirectly promoted because of gratitude, increased spending power, or a perception that spending in the donor country will increase future aid. This third factor may have recently become more important in the case of U.S. aid. Recently, USAID has in many cases set up special accounts to track how aid money is spent. In these cases, because it must tell USAID how it is spending the money, the recipient may feel pressure to spend it in the United States, even though USAID does not demand this. However, because the recipient can choose what particular goods and services to spend the money on, spending the special fund on U.S. goods and services would not necessarily increase its total purchases from the United States, as discussed in the text below.

Figure 4-l-Percent of ODA Commitments Devoted to Debt Relief and Program Assistance



SOURCE: OECD, Development Cooperation 1991 Report (Paris: OECD, 1991), pp. 202-203, table 30.

SOURCE: OECD, *Development* Cooperation 1992 *Report* (Pans: OECD, 1992), pp. A-40, A-41, table 30.

normally is permitted a very wide choice of what commodities on which to spend the aid. Given this flexibility, in many cases a recipient can use up its commodity grants on purchases that it would on its own have chosen to make from the United States.

In 1990 U.S. debt relief aid was abnormally large. However, even if debt relief is omitted entirely, the United States spends a higher proportion of its aid on program assistance than the other donors (fig. 4-2).

The United States spends much less of its aid on large capital projects than several other major donors. Figure 4-3 compares aid spending in several sectors (such as energy and water treatment) that could involve environmental equipment and services. Figure 4-3 presents percentages that are adjusted to omit debt relief, which in 1990 was so large for the United States that it skewed all other percentages (such as for capital projects) downward; even so, the United States falls clearly at the low end.

U.S. aid (including environmental aid) emphasizes technical assistance.[10] Much of this aid is provided as grants used to hire U.S. consultants and service providers. Provision of these services could indirectly promote export of capital goods, by familiarizing recipient countries with U.S. products.

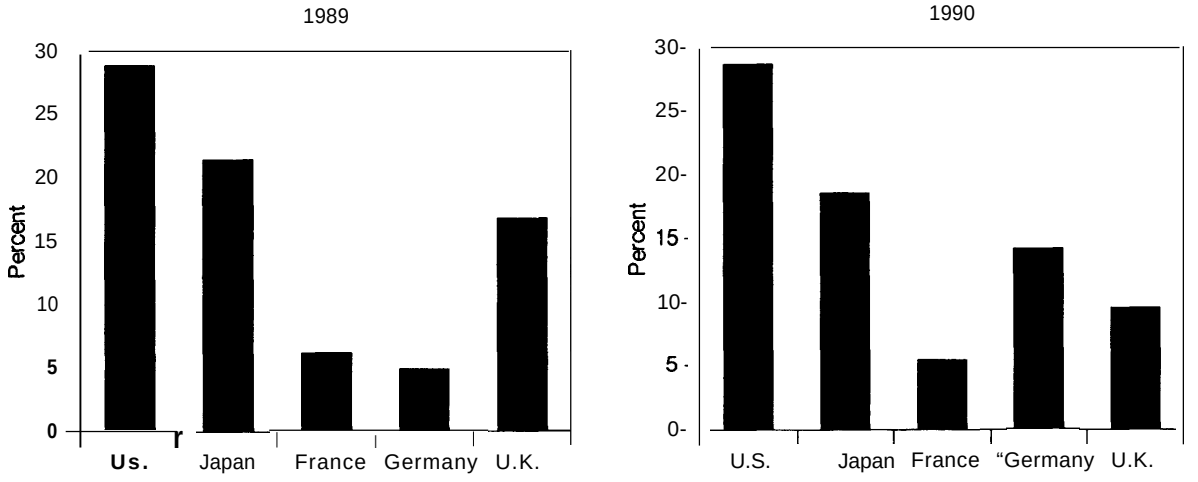
GEOGRAPHIC FOCUS

Aid tends to increase exports to a greater extent when it is focused on countries with substantial markets for the donor's exports. Japan's aid, despite geographic broadening in recent years, is still heavily focused on Asian countries. In 1990, 59.3 percent of Japan's ODA went to Asia, compared with 70.5 percent in 1980.[11] Some Asian developing countries have relatively large and fast-growing markets for capital goods, and could become important markets for environmental goods and services. Moreover, Japanese firms already have a strong commercial presence in these countries, which should help them to pursue aid-related export opportunities. More

10 A few large capital projects have been supported through USAID, including major water and wastewater treatment and power sector support projects in Egypt.

11 Japanese Ministry of Foreign Affairs, *Official Development Assistance 1991*, p. 63.

Figure 4-2-Percent of Non-Debt Relief ODA Commitments Devoted to Program Assistance



SOURCE: OECD, Development Cooperation 1991 Report (Paris: OECD, 1991), pp. 202-203, table 30.

SOURCE: OECD, Development Cooperation 1992 *Report* (Paris: OECD, 1992), pp. A-40, A-41, table 30.

than half of the water purifying and filtering units exported from Japan in recent years have gone to Southeast Asian countries.[12]

TYING OF AID

How do the United States, Japan, France, Germany, and the United Kingdom compare in the extent to which they tie their aid? This question has no easy answer. DAC statistics on tying have shortcomings that make comparisons difficult; also, one can look at the available data in different ways. In addition, certain circumstances can make tying either more or less likely to promote exports. Some comparisons for 1990 and 1989 are presented in figures 4-4 and 4-5,[13] but they must be understood in this light:

- The statistics are based on aid commitments made-rather than actual funds disbursed—during a given year. Some commitments never ripen into disbursements,[14] and the percentages of each that are tied could differ.
- Debt relief is counted as untied because it is not linked to any purchases,[15] thus, the abnormally high level of debt relief in the U.S. aid program for 1990 skews tying statistics downward. For this reason, the 1989 figures probably provide a more representative comparison; these show the United States roughly even with Germany and France (the United States tending to have slightly less tied aid, but more partially untied aid), and tying more than Japan but less than the United Kingdom. (Japan's tying statistics are discussed further below.)

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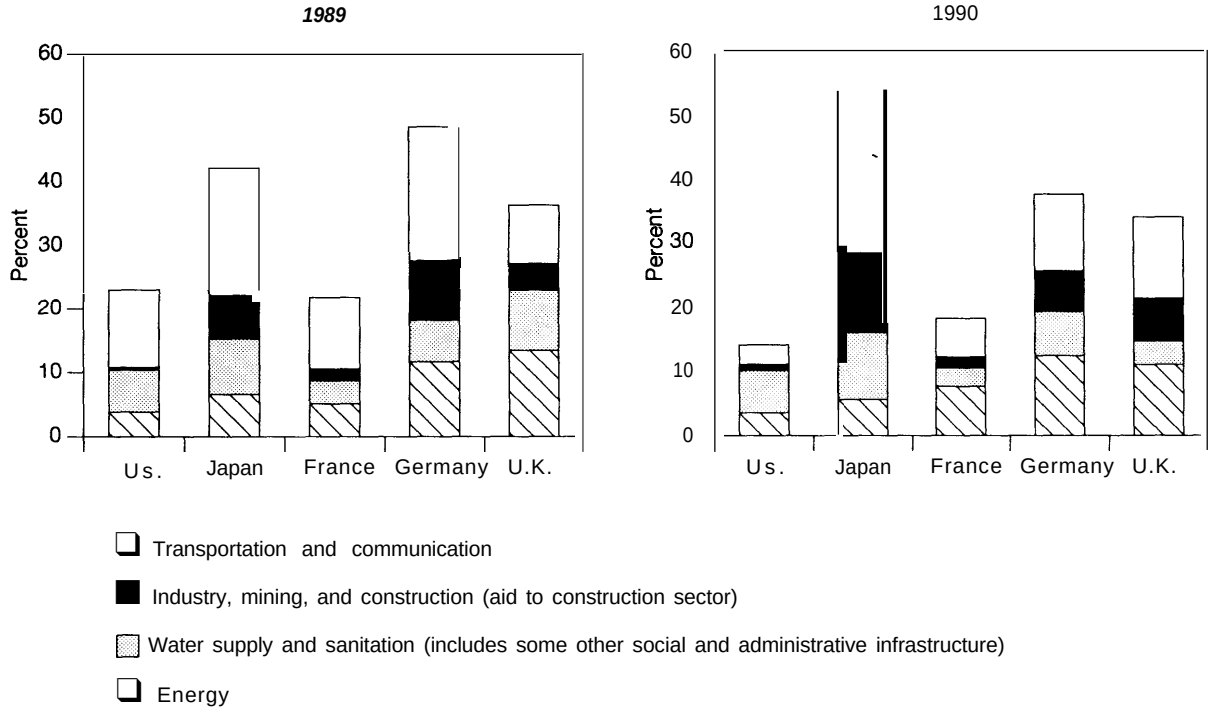
12 As cited in Pat Murdo, "Cooperation Conflict in U.S.-Japan Environmental Relations," *JEI Report,* Japan Economic Institute, Washington DC, May 28, 1993, pp. 10-11.

13 The reader should note that the *tying* statistics presented in figures 4-4 and 4-5 are different from *procurement* statistics. Generally, the percentage of aid spent on goods and services from the donor country will be greater than the percentage of tied aid, because some untied aid (in addition to all tied aid) will be spent on goods and services from the donor country.

14 For example, 1988 commitments ran about 15 percent higher than disbursements. Catrinus Jepma, *The Tying of Aid* (Paris, France: OECD, 1991), p. 22.

15 The original loan might have been conditioned on purchases from the donor country, either as tied aid or as non-aid export credits. If the original loan was aid, it would have been counted in the DAC statistics for the year it was given.

Figure 4-3-Percent of Non-Debt Relief ODA Commitments Devoted to Transportation and Communication; Industry, Mining, and Construction; Water Supply and Sanitation; and Energy



SOURCE: OECD, *Developmenf Cooperation 1991 Report* (Paris: OECD, 1991), pp. 202-203, table 30.

SOURCE: OECD, *Development Cooperation 1992 Report* (Paris: OECD, 1992), pp. A-40, A-41, table 30.

- Impressions about tying among countries will vary, depending on whether one examines just bilateral aid or total aid, which would include aid given through multilateral organizations. (During 1990-1991, the United States, Japan, and the United Kingdom each gave 22 percent of ODA to multilateral organizations, Germany 16 percent, and France 10 percent[16]) Normally, multilateral aid is effectively untied.[17] However, there is one important exception: the EC has a multilateral fired of aid that normally must be spent in the EC. The EC now spends about $3 billion annually on such tied aid; about 10 percent of this is environmental aid. Figure 4-4 shows tying of bilateral aid; figure 4-5, which shows tying of total aid, shows slightly less tying by the United States and Japan, which are not EC members.[18]
- The extent to which tying promotes exports depends not only on *how much* is tied, but also on *what* is tied. OECD tying statistics do not separate grants versus loans. Tied aid loans have greater export promotion potential and are restricted by OECD rules.[19] As discussed

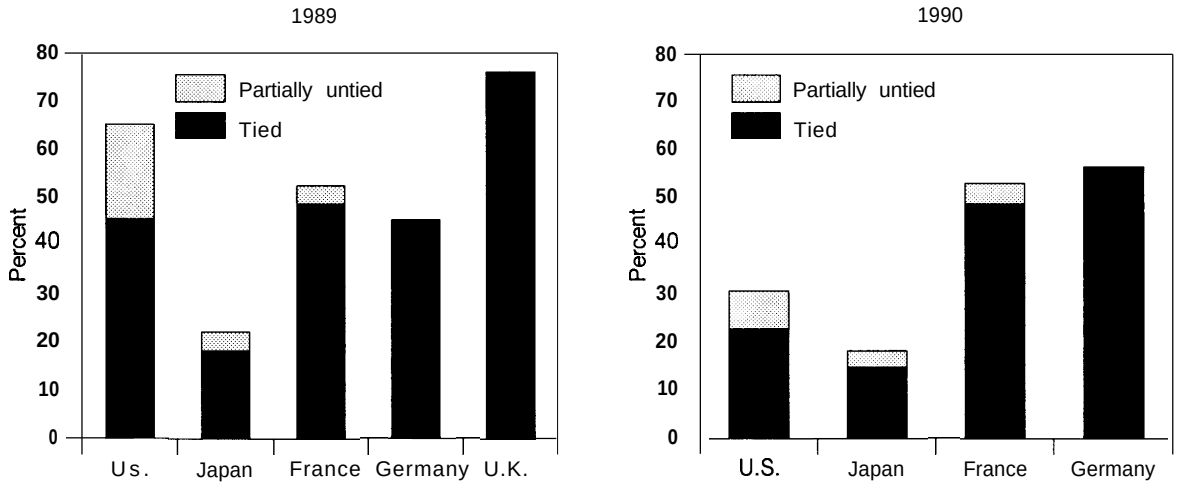
16 OECD, *Development Cooperation 1992 Report* (Paris, France: OECD, 1992), p. A-16, table 7.

17 Several MDBs restrict procurement to member countries, but membership is very wide.

18 In figure 4-5, the EC multilateral fund (which is reported separately in DAC statistics) is counted as tied, and all other multilateral aid is counted as untied.

19 At issue here are only loans that are part of ODA. Ordinary (non-aid) official export credits, which are by definition tied to purchases from *the* country *granting the* credit, are not part of the DAC statistics.

Figure 4-4-Formal Tying of Bilateral ODA Commitments



SOURCE: OECD, *Development Cooperation 1991 Repent* (Paris: OECD, 1991), p. 206, table 33.

NOTE: 1990 Figures for U.K. not available.

SOURCE: OECD, *Development Cooperation* 1992 *Report* (Paris: OECD, 1992), p. A-44, table 33; and unpublished OECD data (minor corrections to table 33).

below (under "Use of Loans"), the United States has given less tied aid loans than some other major donors.

- OECD tying statistics also do not separate aid by purpose (e.g., food, economic infrastructure). For example, the United States ties its food aid to the purchase of U.S. agricultural commodities. In 1990, food aid comprised 6.3 percent of U.S. ODA commitments.[20] This substantial chunk of tied aid means that the United States ties a smaller proportion of its aid in other areas than its overall average.[21] (Some other major donors might have similar tying patterns.)
- Tying practices can vary geographically, and tying of aid is most likely to promote exports when the aid is given to countries with the most promising markets. For example, as discussed below, Japan has provided substantial untied grant aid to African nations; this suggests that Japan's tying statistics for Asia, which holds the most commercial interest for Japan, might be higher than Japan's overall tying statistics reported in figures 4-4 and 4-5. Other nations also might tend to tie aid more in markets of more interest.

Tying of aid does not always increase exports; sometimes the recipient country would have bought the items from the donor even in the absence of tying. As discussed above (under "Composition of Aid"), when the recipient country has a wide choice of what goods or services to purchase with the tied aid, it often will be able to spend the tied aid on items that it would have bought from the donor anyway. This is true for U.S. commodity aid, and may be true for some aid offered by other donors.

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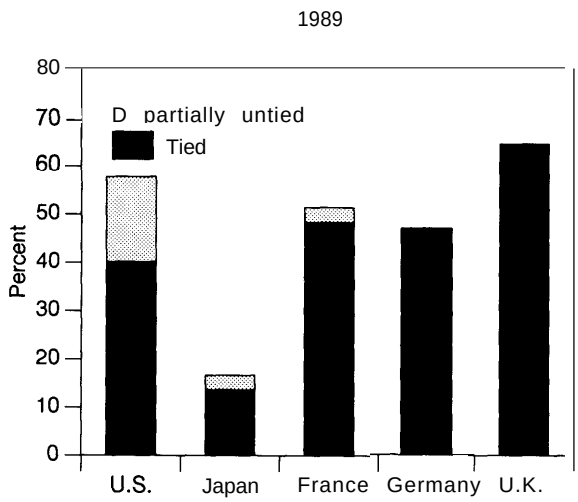
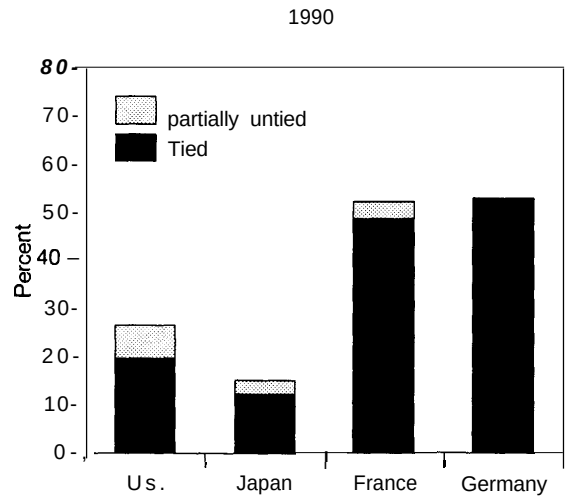
20 OECD, *Development Cooperation 1992 Report,* op. cit., p. A-41, table 30. In fiscal year 1991, U.S. food aid obligations were $1.87 billion, or 15 percent of U.S. aid commitments (excluding military aid, which is not counted as ODA by the DAC). Derived from Curt Tarnoff, Library of Congress, Congressional Research Service, "Foreign Aid: Answers to Basic Questions," Mar. 2.5, 1992, pp. 1-3,9.

21 The United States also ties almost all of its military aid, which in 1991 amounted to $4.8 billion, or 28.3 percent of total foreign aid obligations. Curt Tarnoff, Library of Congress, Congressional Research Service, op. cit., p. 3. However, military aid is not counted as ODA under DAC rules, and is therefore not reflected in the DAC data presented here.

Figure 4-5--Formal Tying of Total (Bilateral and Multilateral) ODA Commitments



SOURCE: OTA. Derived (see text) from OECD, *Development Cooperation 1991* Report (Paris: OECD, 1991), p. 206, table 33.



NOTE: 1990 Figures for U.K. not available.

SOURCE: OTA. Derived (see text) from OECD, *Development Cooperation 7992 Report* (Paris: OECD, 1992), p. A-44, table 33; and unpublished OECD data (minor corrections to table 33).

- The DAC statistics omit an unknown amount of informal tying. The DAC defines loans and grants to be tied when they are "in effect tied to procurement of goods and services from the donor country."[22] In practice, however, member countries can report figures as they wish, and the DAC does not often revise them, The quoted language is susceptible to different interpretations, and countries would normally wish to describe their aid as untied to the extent possible.[23] Also, some practices, while perhaps not rising to the level of "in effect" tying, at least make it more likely that purchases will be made in the donor country. Hence, while figures 4-4 and 4-5 show Japan with the lowest percentage of tied aid, Japan's recent reduction informal tying does not necessarily indicate an equivalent reduction in the extent to which its aid program promotes exports.

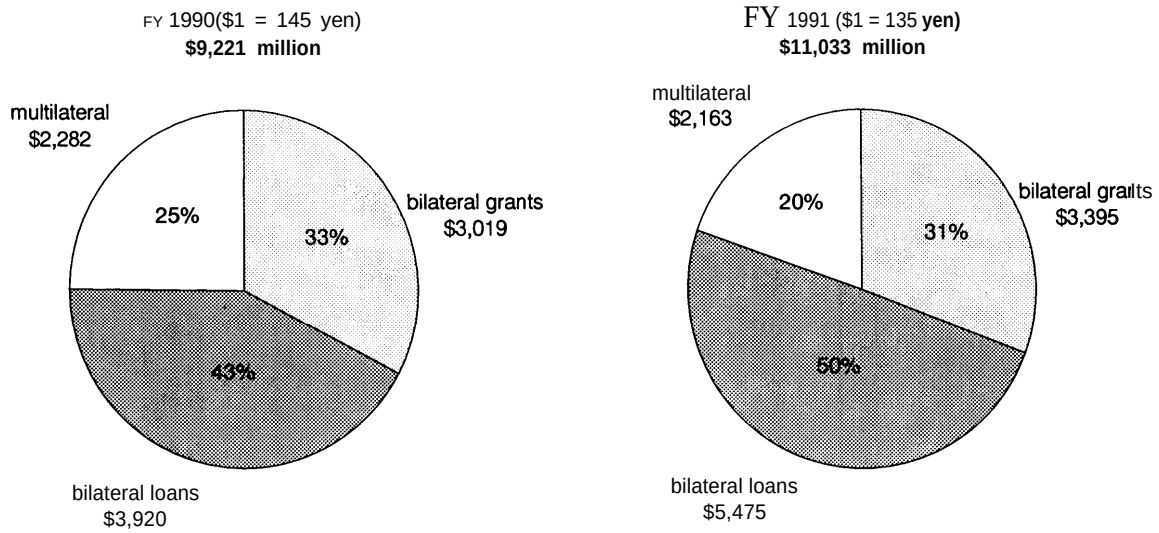
Partly because Japan's aid has been expanding rapidly, the commercial implications of its aid are receiving much attention. Figure 4-6 breaks Japan's aid into multilateral aid, bilateral grants, and bilateral loans. The multilateral aid, the smallest portion, is untied; in this regard Japan resembles the United States but differs from France, Germany, and the United Kingdom, which give roughly half of their multilateral aid to a tied EC fund. Overall statistics on tying of Japan's bilateral grant aid do not appear to be available, though there is some indication that Japan ties less of this aid than several other major donors.[24] Japan's bilateral grant aid, which is focused on the poorest developing countries, is

22 OECD, "DAC Adopts Revised Guiding Principles For Associated Financing and Tied, Partially Tied, and Untied ODA," Press Release A(87)23, Paris, 1987.

23 Catrinus Jepma, op. cit., p. 21.

24 Statistics on tying of grant aid tend to be confusing, and terms are sometimes used in different senses. In this paper, "grant aid" denotes any aid not involving a loan. This would include debt relief and simple cash transfers, which are untied because they are not linked to any purchases; technical assistance, which is often given directly as services from the donor country (e.g., training classes) rather than in c@ in which case it is tie@ and cash grants to be spent on some particular purpose, which could be tied or untied.

Figure 4-6--Japan's ODA: Multilateral, Bilateral Grants, and Bilateral Loans Net Disbursements



NOTE: Numbers do not add because of rounding.

SOURCES: Ministry of Foreign Affairs (Japan), *Wagakuni no Seifu-Kaihatsu-Enjo 1992, Jyokan [Official Development Assistance 1992],* p. 101; Ministry of Foreign Affairs (Japan), *Japan's ODA: Official Development Assistance 1991* (Annual Report), p. 62.

mostly administered through the Japan International Cooperation Agency (JICA); however, some of the untied aid is administered by non-Japanese agents. For example, Japan gave $500 million of untied grant aid for structural adjustment to African countries during its fiscal years 1987-1989, administered in large part by the British Crown Agents and the United Nations Development Programme.[25]

Bilateral loans, the largest category, are issued through Japan's Overseas Economic Cooperation Fund (OECF). Of the bilateral loan commitments, Japan's tying figures show a dramatic move toward more untied aid. For its fiscal years 1986, 1990, and 1991, Japan reported no fully tied aid. Partially untied aid declined from 51 percent in fiscal year 1986 to 15 percent in 1990 to 10 percent in 1991, with the rest untied.[26]

While Japanese statistics may show little is formally tied, there continues to be skepticism about the degree to which U.S. and other non-Japanese OECD firms will, as a practical matter, be able to participate in projects funded by OECF loans. The recent State Department study noted that "fairly consistent" impressions from published sources and from U.S. government personnel in the field indicate a pro-Japan bias in awarding OECF loans, but the evidence is "incomplete and often purely anecdotal," and "not systematically documented."[27] The report also noted that "it is not clear that other donors do not engage in similar practices."[28] Of course, to the

[25] Japanese Ministry of Foreign Affairs, *Official Development Assistance 1991*, p. 78. Japan continued with another $600 million program of untied grant aid for structural adjustment during its fiscal years 1990-1992, this time including also some Asian and Latin American countries. Ibid., p. 79.

[26] *OECF Annual Report 1992*, p. 13; Japanese Ministry of Foreign Affairs, *Official Development Assistance 1991*, p. 100.

[27] U.S. Department of State in coordination with other Executive Branch agencies and departments in response to a request by the United States Senate, "Japan's Foreign Aid: Program Trends and U.S. Business Opportunities," op. cit., pp. 26, 34-35 (emphasis in original).

[28] Ibid., p. 35.

extent that other non-U.S. donors engage in such practices, that too poses a greater commercial challenge to the United States than the formal tying statistics would suggest.[29] To the extent that the United States engages in such practices, the United States could be reaping commercial advantages beyond what its tying statistics would suggest. However, such practices would probably be primarily for grant aid (since the United States gives very little loan aid), which has less potential to promote exports for a given amount of net aid expenditure.

As is evident from the following discussion, some Japanese ODA practices that tend to favor Japanese firms continue to be widely used, while other practices that once conferred such favor appear to be changing.

Feasibility Studies[30]

As discussed in chapter 3, when a firm from a particular country does a feasibility study, that tends to make it more likely that a firm from the same country will win the contract for the main project. This is a rationale for the United States' Trade and Development Agency (TDA), which ties grants for feasibility studies to help U.S. firms win contracts for the subsequent development projects (see app. B). Japan's practices encourage the selection of Japanese firms to do feasibility studies for proposed OECF loan projects, all of which require a feasibility study before they can go ahead. Whether intended or not, the use of Japanese firms to do feasibility studies probably tends to steer the main projects to Japanese firms.

Feasibility studies for OECF projects can be done by JICA, the recipient country, or international organizations. JICA studies are paid for by Japan and constitute grant aid. JICA'S annual budget for these studies is about $200 million—many times larger than TDA's present budget for feasibility studies (though increases in TDA's budget have been proposed).[31] JICA hires consultants to do these studies. JICA will hire only Japanese fins; some participation by non-Japanese nationals is permitted but rare.[32] For some studies not done by JICA, the use of Japanese firms is probably encouraged by subsidies given to consulting firms by the Japanese government. For example, in its 1991 fiscal year, MITI provided 420 million yen (roughly $4 million) to various associations of consulting firms, for distribution to their members for use on pre-project studies for possible aid projects.[33]

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29 For example, in lg89 the Export-Import Bank of the United States reported, "Advance bidding, whereby public tendering precedes the final conclusion of an aid agreement, allows the German government to conclude an agreement only if the contract is won by a German firm." Export-Import Bank of the United *States, Report to the U.S. Congress on Tied Aid Credit Practices,* April 1989, p. 63. As well as permitting cancellation (or downsizing) of jobs not won by a German firm, this practice could encourage potential aid recipients to seek out and favor German suppliers.

30 The information about Japanese practices in this section is derived primarily from *OECF Annual Report 1992,* P. 140; JICA, "Japan's Grant Aid Budget for PY 1992"; JICA, "General Information for the Participation Of Non-Japanese Consultants," undated (given out by JICA in March 1993); U.S. Department of State in coordination with other Executive Branch departments and agencies in response to a request by the United States Senate, "Japan's Foreign Aid Program Trends and U.S. Business Opportunities," op. cit.; and other information from JICA. OTA could not obtain information from OECF's Washington office for this report, because OECF insisted on preconditions that OTA could not accept.

31 JICA's fiscal year 1992 budget fo, "development studies" was $226 million ($66 million of which came from MITI). JICA, "Japan's Grant Aid Budget for FY 1992." This budget includes not only feasibility studies for particular projects, but "master plan" studies to set development priorities for a country as a whole. The amount spent just on feasibility studies is not given.

TDA's fiscal year 1993 budget is $40 million, most of which goes to feasibility studies and related, preliminary "definitional missions."

32 The team manager must be Japanese; Japanese nationals must constitute at least half the team members and perform at least half the person-months of effort. JICA must approve any use of foreign nationals. From June 1988, when use of foreign nationals was first permitted, through August 1992, 132 foreign consultants were used for development studies. JICA, "General Information for the Participation of Non-Japanese Consultants," op. cit. For comparison, in fiscal year 1988 JICA development study teams used more than 3,000 people.

33 Ministry of Finance (Japan), *Hojokin Soran [Subsidies Digest] FY 1991,* p. 386.

Tying of a Project's Engineering Management

In the last several years, OECF often has reported projects in several East Asian countries as untied, except that "consulting services," which includes project management, are reported as partially untied, so that only Japanese and LDC firms are eligible. Since relatively few LDC firms possess the necessary experience for management of a sophisticated engineering project, partial untying can at times be tantamount to full tying. Even if some LDC firms win contracts, the rest go to Japanese firms; U.S. or other OECD country firms would not be eligible. The presence of a Japanese firm managing a project could make it easier for Japanese firms to win other parts of the project, even if the managing firm did not consciously try to favor Japanese fins. Some analysts report that Japanese consulting firms often write detailed project specifications that favor Japanese firms.[34] OECF maintains that under its guidelines project specifications "cannot" be drawn to favor particular firms, but has not cited specific language in those guidelines.[35]

Japan is reducing its use of LDC-untied project management; the practice was relatively rare in its 1992 fiscal year except for Indonesia (which accounted for 14 percent of loan commitments), for which it was still the norm.[36] According to the State Department study, the Indonesian government has successfully pressed for award of a substantial portion of engineering service contracts to domestic Indonesian firms.

Request-Driven Aid System

Traditionally, Japan has made aid decisions based largely on specific requests from recipient governments. In the past, it would evaluate each project on its own, without considering how it fit into the country's overall development needs. (The United States has traditionally worked with developing countries to prioritize projects within an overall country plan. USAID has more people in the field than JICA and OECF, making that dialogue more feasible.)

Japan's aid appears to be changing to give more attention to a country's overall priorities. Increasingly, Japanese and developing country officials meet to discuss the country's development strategy and its relation to Japanese aid. As of March 31, 1991, Japan had sent missions to ten developing countries to establish overall development priorities, and had sent missions to nine developing countries to establish environmental priorities.[37] Also, JICA now sends study teams to evaluate proposed projects in the context of the overall development plan. Environmental aid may be serving as a testing ground for Japan's new approach. MITI has stated that its $2.5 billion Green Aid Plan (ch. 5) will rely on "policy dialogue' between Japan and the recipient country to prioritize projects, rather than evaluation of requested projects in isolation.[38]

However, Japanese aid is probably still largely request-driven; this may be true even for environmental aid. The request-driven approach lets Japanese firms encourage projects of their choosing, if they establish close ties with firms in a

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34 For example, Fujimura Manabu, a former employee of the Japan External Trade Association (JETRO), wrote, "If Japanese consultants are employed for yen-loan projects, they often draw up specifications that only Japanese contractors can meet." "The Untying of Japanese Aid: New Opportunities for Trade and Investment," Private Investment and Trade Opportunities (PITO) Economic Brief No. 9 (Honolulu: East-West Center Institute for Economic Development and Policy, May, 1992), p. 22. Mr. Fujimura noted, however, that because of "yen appreciation, Japanese consultancy does not always guarantee procurement from Japan."

35 U.S. Department of State in coordination with other Executive Branch agencies and departments in response to a request by the United States Senate, "Japan's Foreign Aid: Program Trends and U.S. Business Opportunities," op. cit., p. 35.

36 *OECF Annual Report 1992*, pp. 87-117.

37 MITI, *Wagakuni no Seifu-Kaihatsu-Enjo* 1992, *Jyokan* [*Official Development Assistance 19921*, pp. *6*-69.*

38 MITI, *Kankyo Gijutsu Iten ni Kakaru Sogoteki Shien (Green* Aid Plan) *No Suishin ni Tsuite (Promotion of Comprehensive Assistance Concerning Environmental Technology Transfer "GreenAidPlan")*, March 1992.

developing country that can influence that government's requests.[39] The State Department has observed that "in practice recipient countries are frequently ill-equipped to set priorities, prepare realistic proposals, and oversee implementation. Japanese trading firms often step into the vacuum to assist in project identification and design."[40] Even under the policy dialogue approach, Japanese firms may influence project selection by influencing the Japanese government's position;[41] U.S. firms similarly might be able to influence USAID'S project selection process.

Other Factors

The State Department study states that "recipient country governments often believe that while Japan's aid is formally untied, they are obliged to select Japanese suppliers, either as a gesture of gratitude or as a pragmatic means of ensuring the continued flow of Japanese ODA commitments.' '[42] The same might be said of the United States and other donors' ODA. Another factor is accessibility of information on upcoming projects: it is hard for U.S. firms to learn of opportunities without having a presence in Japan. Again, the effect is not limited to Japanese ODA; it takes effort for non-U.S. firms to learn about U.S. ODA.

Despite the difficulties and apparent barriers, some U.S. firms could benefit from Japanese ODA. There have been several recent examples of successful efforts by U.S. firms to participate in Japanese ODA, and Japanese contract procedures are becoming more competitive, according to the State Department study.[43] The U.S. government, with assistance from the Japanese government, is providing information to U.S. firms about how to compete for Japanese ODA.44

Statistics from the Japanese Government seem to suggest that in fact large quantities of Japanese aid are spent outside of Japan (and thus to suggest that the concerns raised above regarding opportunity for non-Japanese firms are misguided). For example, of its 1990 untied bilateral loans, Japan reports that only 20 percent of the procurement went to Japan, with 55 percent going to developing countries and 25 percent going to other OECD

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39 In principle, firms *from* other countries could similarly develop ties with the developing country to influence its requests to Japan. However, in practice Japanese firms have advantages. Firms from other countries might not understand Japan's request system, and thus not appreciate the need to form such ties to influence requests. Japanese firms might also appear more credible in helping the recipient government to frame a request in a way likely to gain approval from Tokyo. Also, the system favors incumbent donors, those already with strong ties to developing countries; Japan is already the incumbent in several promising East Asian markets.

40 U.S. Department of State in coordination with other Executive Branch agencies and departments in response to a request by the United States Senate, "Japan's Foreign Aid: Program Trends and U.S. Business Opportunities," op. cit., p. 15.

41 The State Department study states:

> [P]rivate Japanese firma reportedly "lend" short-term employees to short-staffed JICA and OECF. When seconded to LDC ministries as "technical experts," these employees often advance proposals in which their firms have au interest. For example, in 1991, a JICA official indicated that private employees comprised some 30% of JICA experts in Indonesia. Meanwhile, an OECD/DAC survey found that seconded Japanese experts strongly influenced Indonesi ODA project requests, indeed originated some projects, and an OECF official echoed that fact to U.S. government visitors to Tokyo in 1991.

Ibid., pp. 34-35.

42 Ibid., p. 32.

43 Ibid., pp. 1, 6, 54-57. The State Department report identified many sales as over $5 million; almost all of those were fOr locomotives, locomotive parts, or locomotive rehabilitation by General Electric and General Motors (sometimes by their foreign subsidiaries). In some cases, General Electric and General Motors were subcontractors. The report also identified other types of contracts, including several consulting contracts.

4 4 @ example is a guide to Japanese ODA for U.S. firms that is part of the State Department study; another is the Japan Official Development Assistance Conference in Tokyo, Nov. 9-11, 1992, sponsored by the Department of Commerce, in which Japanese officials (among others) spoke to *72* U.S. firms about Japanese ODA.

countries.[45] Of its total fiscal year 1991 loan commitments, Japan reports that only 31 percent went to Japan, with 48 percent going to developing countries and 21 percent to other OECD countries.[46]

However, the State Department study reports that it is impossible to verify such statistics, though this problem is not unique to Japan.[47] Some skepticism has been expressed about Japan's prior statistics on procurement. An American researcher, after extensive efforts to verify statistics on procurements from non-Japanese firms during 1986-1990, was left with large gaps between Japan's reported statistics and the actual projects that could be accounted for, and concluded that the gaps could not be explained by the fact that certain types of data were Withheld.[48]

Also, Japan counts as non-Japanese any purchases from joint Japanese-LDC joint ventures with majority LDC ownership, even though much of the procurement in such cases might ultimately come from Japan. OECF'S 1992 annual report shows many such joint ventures.[49]

USE OF LOANS

As discussed in chapter 3, for a given amount of net aid expenditure, giving aid not in pure grant form, but with a loan component, increases the aid's potential to promote exports. Loan aid is typically used for large capital projects (such as power plants and waste water treatment plants), which are most often too expensive to fund by grants alone. Of the five major donors considered here, Japan uses loan aid the most, and the United States and the United Kingdom the least (fig. 4-7).[50] While loan aid may tend to increase exports, export promotion is not necessarily the prime motivation. Japan states that use of loans rather than grants benefits aid recipients by making them take more responsibility for their development, and that loans for inrastructure are central to economic development (based in part on its own rebuilding experience after the Second World War).

Aid loans have the most export potential when they are tied, in which case they are called "tied aid credits." As used in this background paper and OECD statistics, the term "tied aid credits" includes partially untied as well as tied loans. While OECD collects statistics from most member countries on tied aid credit offers, these statistics are publicly available for recent years only as a total for all countries combined, and not on an individual country basis. For the period 1984-1987, the total U.S. notifications of offers ($1.1 billion) were far less than for Japan ($8.0

45 MITI, *Keizai Kyoryoku no Genjo to Mondaiten, Heisei 4* ("Present Situation and Issues in Economic Cooperation, 1992"), p. 28. This source does not specify whether these percentages refer to commitments or disbursements.

46 *OECF Annual* Report 1992, p. 13.

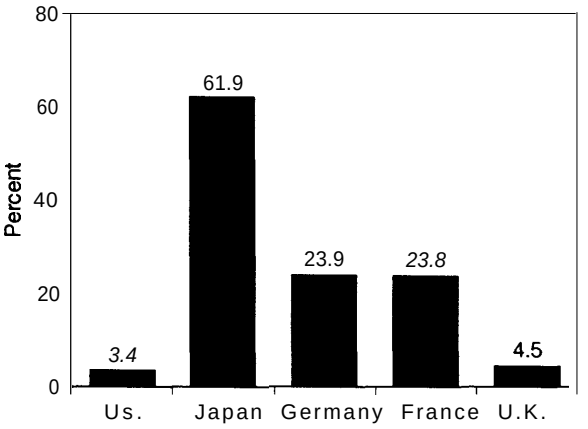
47 Japan and the aid recipients are reluctant to reveal certain &~ because they wish to protect business proprietary data; also, recipients do not always adequately record the data. These problems occur with most donors. Also, recipient countries could be reluctant to reveal information that might reflect poorly on a major aid donor. U.S. Department of State in coordination with other Executive Branch agencies and departments in response to a request by the United States Senate, "Japan's Foreign Aid: Program Trends and U.S. Business Opportunities," op. cit., pp. 1,25.

48 Margee Ensign, Doin, Good *or Doing Well: Japan's Foreign Aid Program* (New York, NY: Columbia University Press, 1992), ch. 3.

49 *OECF Annual Report 1992*, pp. 136-139. OECF does not list all of its contractors. However, of 54 parties listed as doing construction work, 6 were such joint ventures (including 4 joint ventures involving firms from Japan, a developing country, and another OECD country); and of 51 parties listed as doing consulting work, 15 were such joint ventures. (For this tally, the same party working on two contracts is counted as two parties.)

50 The percentage of ODA given in pure grant form is computed by taking the 1991 "Share of Grants in total ODA," *Development Cooperation 1992 Report,* p. A-43, Table 32 (the figure for France, missing from that table, was supplied separately by DAC), and subtracting the portion of that grant share that (based on O'IA's interpretation of unpublished DAC data) was combined together with other financing (e.g., a commercial loan) in an "associated financing" package (also called "mixed credits"). Figure 4-7 gives the reverse percentage, i.e., the percentage of ODA *not* given in pure grant form.

Figure 4-7-Percent of Total ODA Commitments Not in Pure Grant Form 1991

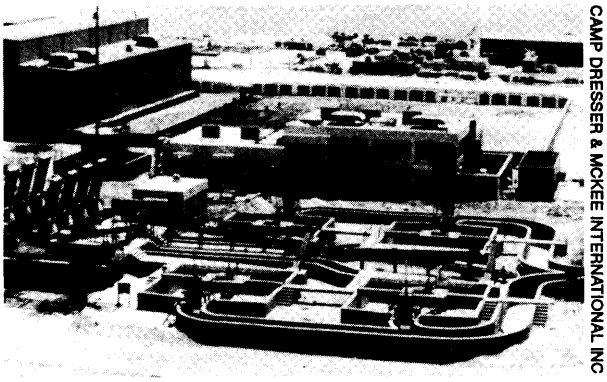


NOTE: Excludes debt relief and reorganization.
SOURCE: OTA, derived from DAC data (see text).

billion), France ($6.4 billion), Germany ($5.8 billion), and the United Kingdom ($5.9 billion).[51] (Notifications do not precisely correspond to credits actually disbursed, as noted in the next section in this chapter.) It is widely believed that the United States in recent years has used tied aid credits much less than Japan, Germany, and France.[52] Some donors give tied aid credits in a form called 'mixed credits," which typically are a combination of grant and loan funds. Some foreign examples are discussed in chapter 5; a U.S. response (the use of "War Chest" grant money with Eximbank loans) is discussed in the next section of this chapter.

TIED AID CREDITS AND THE HELSINKI PACKAGE

The U.S. government has long sought to reduce use of tied aid credits to gain commercial advantage, arguing at OECD that tied aid credits decrease economic efficiency when they distort normal trade patterns. OECD'S "Arrangements on Guidelines for Officially Supported Export Credits" (or "Arrangement") has restricted the use of tied aid credits (whether or not they count as ODA as defined by the DAC), largely by making them more expensive, though it has not yet reduced the overall volume of tied aid credit offers. The latest amendments-the Helsinki Package agreed to at the end of 1991—further restricted use of tied aid credits for projects deemed "commercially viable, " and strengthened the mechanisms for reporting credit offers and for resolving disputes. While these amendments appear to have given the rules more teeth, the rules are still not all-inclusive; in particular, the "commercial viability" test may be interpreted so as to permit tied aid credits for

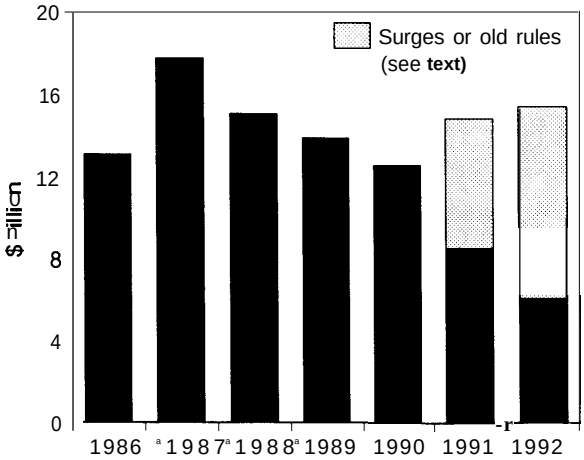


Abu Rawash Wastewater Treatment Plant, Egypt. Donor country firms often provide equipment and engineering services for water and wastewater treatment projects, even though much of the material and labor may be locally provided.

51 Export-Import Bank of the United States, *Report to the u.S. Congress on Tied Aid Credit Practices,* April *1989,* p. 7.

52 Some partial *1992* figures for particular countries have been published *in* an April 1993 Eximbankreport. Of $3.8 billion totalnotifications potentially subject to challenge and consultation under the Helsinki Package (see the next section), $1.1 billion, or 3percent, each came from France and Spain. Other significant providers, in order, were Finland,Japan, Austria, Australia, and Italy. Of $1.7 billion in notifications not subject to challenge and consultations because they were too small, of too high concessionality, or made to least developed countries, the largest amounts were made by Italy ($667 million or 39 percent) and Finland ($559 million or 3percent). Export-Import Bank of the United States, "Report to the Congress under Section 15(g) of the Export-Import Bank Act of 1945, as Amended," Apr. 26, 1993, p. 9.

Figure 4-8--OECD Tied Aid Credit Notifications



a Twelve months starting July of the year indicated.
SOURCES: Eximbank's Apr. 26, 1993, report to Congress on tied aid credits, pp. 8-10; Eximbank's June 18, 1882, report to Congress on tied aid credits, Attachment 1.

many environmental projects or components of projects.[53]

Despite the attention focused on tied aid credits, it is difficult to quantify their use and still more difficult to determine their effect on U.S. trade. The main source of information on volumes of tied aid credits comes from the operation of the OECD Arrangement. Almost all OECD members participate in the Arrangement: the EC on behalf of its members, and Australia, Austria, Canada, Finland, Japan, New Zealand Norway, Sweden, Switzerland, and the United States. Each Arrangement participant is required to notify other participants when it makes an offer of tied aid credits, to allow other participants the opportunity to match the offer. Figure 4-8 gives total notifications since 1986.[54] (As mentioned earlier, recent country-by-country figures are not publicly available.) However, these statistics should be interpreted with caution. The notification data differs in many ways from the actual tied aid credits disbursed.[55]

Also, it would be a mistake to extrapolate future trends from this data, because of the tightening of the rules on tied aid credits in the Helsinki Package. The 1991 and 1992 figures include surges of notifications in advance of the need for funds, as donors hurried up their notifications to take advantage of the old rules. U.S. Eximbank estimated that this surge accounted for $6.3 billion of the $14.9 billion in total 1991 notifications.[56] Some $9.3 billion of the $15.4 billion in 1992 notifications were made under the old or transitional rules, with only the remaining $6.1 billion made under the new rules.[57] The future trend under the new rules is difficult to predict; it probably lies in between the slight increase shown by the total bars in figure 4-8 (which include all notifications) and the dramatic decrease shown by the solid portions (which do not include the 1991 estimated surges and the 1992 notifications under old or transitional rules).

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53 The Arrangement, as amended by the Helsinki Package, is printed as OECD Document OCDE/GD/(92)(5) (1992). The Arrangement was first promulgated in 1978. The Arrangement gives guidelines for non-aid government-supported export credit terms and conditions, to ensure that they are close to those of commercial loans; it also gives guidelines for tied aid credits. Generally, any government-supported export credits should conform to one or the other of these sets of guidelines. The Helsinki Package strengthened both sets of guidelines.

54 As this paper went to press, a question arose concerning whether (and if so, to what extent) these Statistics include offers that are grants or close to grants (concessionality level of at least 80 percent). Such offers are of relatively little commercial concern and are largely exempt from the Arrangement's restrictions.

55 Upward biases exist. The figures include some planned projects that are never carried out, and some duplicate notifications by two Or more countries for the same project, Downward biases also exist. The figures omit financing of ships, military equipment, agricultural products; members reportedly do not always notify as they should; and members do not have to notify transactions in which the ODA is only for technical cooperation amounting to less than both 3 percent of the transaction's total value and $1 million. Also, countries are permitted to report transaction amounts as falling in ranges, rather than the precise figure; the OECD statistics use the midpoint of the range.

56 Export-Import Bank of the United States, "Report to the Congress under Section 15(g) of the Export-Import Bank Act of 1945, As Amended (Section 19 of the Export-Import Bank Act of 1986, Public Law 99472)", June 18, 1992, Attachment 1.

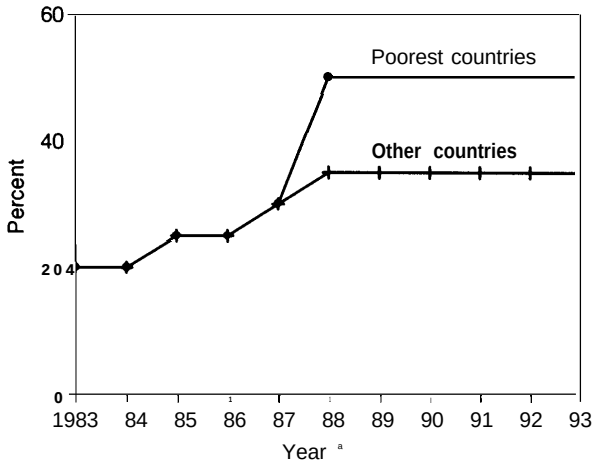
57 Export-Import Bank of the United States, "Report to the Congress under Section 15(g) of the Export-Import Bank Act of 1945, as Amended," Apr. 26,1993, pp. 9-10. Because of peculiarities in the statistics, some items maybe double-counted, in the $6.3 and $9.3 billion.

Tied aid credits on balance probably have lessened U.S. exports, though it is difficult to say by how much. In the mid- 1980s the United States probably lost billions of dollars in exports because of foreign tied aid credits, though the figure is quite uncertain.[58] The losses will likely be less under the latest OECD rules: even if the volume of total tied aid credit offers does not decline, the latest OECD rules will likely shift tied aid credits to projects with less overall commercial effect (as discussed below).

Since 1983, the Arrangement has imposed certain minimum "concessionality levels" on tied aid credits.[59] The idea was to make these credits more expensive for donors, thus decreasing their use and limiting their power to leverage aid dollars into exports.[60] Also, packages with higher concessionality levels were thought less likely to distort trade.[61] The minimum levels have been raised three times since (fig. 4-9). However, the tied aid credits notifications stayed in the $10 to $15 billion dollar range into the 1990s.

In 1988, the DAC (whose membership does not correspond precisely to the participants in the Arrangement) adopted Guiding Principles urging donors to limit use of tied aid credits to "priority projects and programmes which are carefully appraised against developmental standards.' '[62] In addition to serving development goals, such limits could, if followed, prevent the use of trade-distorting tied aid credits in cases where the project did not meet the developmental standards. However, these Guiding Principles were nonbinding and had no provision for enforcement,

Figure 4-9-Minimum Concessionality Levels for Tied Aid Credits



aMinimum levels shown are those in effect as of July of the given year.

SOURCE: OTA, derived from Eximbank reports and information from the Treasury Department.

58 A 1989 report by the Export-Import Bank of the United States (Eximbank) estimates that U.S. firms lost $400-$800 million in exports annually during 1985-1988 because of foreign tied aid credits. Export-Import Bank of the United States, *Report to the U.S. Congress on Tied Aid Credit Practices*, April 1989, p. 142. This estimate considers only sales lost directly to offers supported by tied aid credits; it does not consider any losses in follow-on work. Also, one expert argues that the data presented in tbat report instead support a much higher estimate of directly lost sales, $2.4-4.8 billion. Ernest Preeg, *The Tied Aid Credit Issue: U.S. Export Competitiveness in Developing Countries* (Center for Strategic and International Studies Washington, DC, 1989). Whichever figures are used, this export loss was much greater than the export gain from U.S. use of tied aid credits, which averaged, according to the Eximbank report, at most $250 million annually during this period ($250 million is the average annual value of *all* exports made using tied aid credits, whether or not the exports would have been made without them).

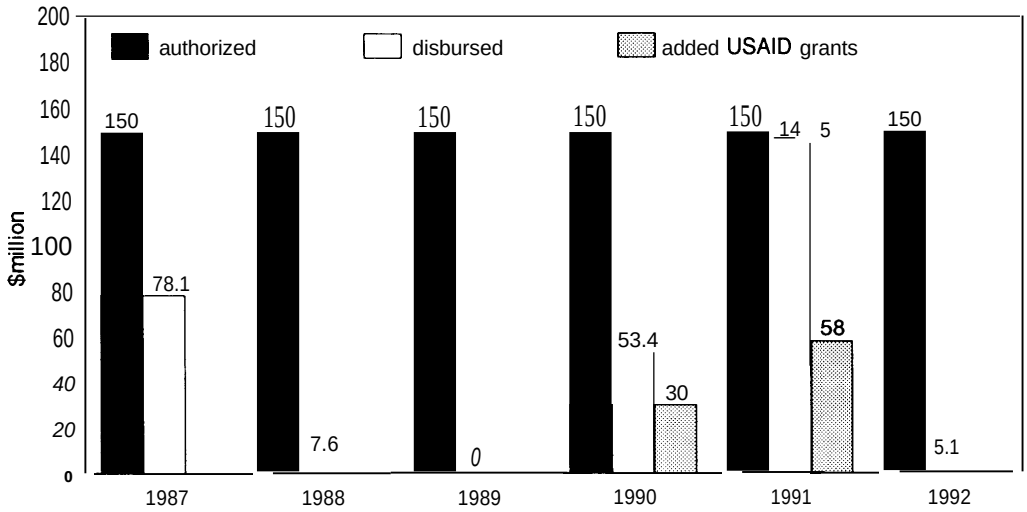
59 Conceptually, the concessionality level represents the extent to which the aid is a grant as opposed to a loan. A pure grant would have a concessionality level of 1(K) percent, and a loan on terms deemed commercial a concessionality level of O percent. Technically, the concessionality level of a soft loan equals the face value of theloan, minus the present value of the future repayment stream (using a reference discount rate to represent commercial rates), all divided by the face value of the loan.

60 For example, with a concessionality floor of 25 percent, each dollar of aid can be leveraged at most into 4 dollars of exports; with a concessionality floor of 50 percent, each dollar of aid ean be leveraged into at most 2 dollars of exports.

61 The higher a package's concessionality level (i.e., the closer it is to a pure grant), the more likely it is that the package will fund purchases that otherwise would not have been made, rather than divert purchases from one supplier to snother. John Ray, "Commercial Viability In the Helsinki Package'' (mimeo., undated), pp. 4-5.

62 "DAC Guiding Principles for Associated Financing and Tied and Partially Untied Official Development Assistance," adopted Apr. 24, 1987, attached to press release, "DAC Adopts Revised Guiding Principles for Associated Financing And Tied and Partially UntiedOfficial Development Assistance," PRESS/A(87)23, Apr. 28, 1987.

Figure 4-10--U.S. Eximbank War Chest Grant Funds



SOURCE: Eximbank's June 18,1992, report to Congress on tied aid credits, Attachment 3; U.S. Congress, General Accounting Office, Export *Finance: The Role of the U.S. Export-Import Bank,* GGD-93-39 (Washington, DC: U.S. Government Printing office, Dee. 23, 1992), pp. 48-49.

and in fact development priorities have not always been observed.

To provide leverage for U.S. negotiations to restrict the use of tied aid credits, Congress in 1986 established a "War Chest" of grant money to be combined with Eximbank loans. The War Chest was intended to let the United States respond in kind to foreign tied aid credits.[63] However, the War Chest's effectiveness has been limited by its size and manner of use. In its initial five years, the War Chest was authorized at only $150 million per year (fig. 4-10), much less than the corresponding sums used by several foreign countries, so that only a small fraction of foreign offers could be matched.@ In three of the six years, the War Chest was used relatively aggressively to gain leverage in negotiations concluded in 1987 and 1991. In the other years, the War Chest was used sparingly if at all, and then only when a foreign country violated or derogated from the recently concluded agreement. Recent legislation has increased the War Chest authorization to $500 million annually for FY 1993-1995,[65] though again the amounts authorized will not necessarily be spent. Eximbank's stated intention is to use the War Chest "selectively,' with the "focus" on enforcing the new rules.[66] Eximbank points out that War Chest use can disproportionately reduce the funds available for ordinary export credits. The reason is that the subsidy component of each Eximbank loan is counted against Eximbank's overall appropriations; loans using War Chest funds are subsidized much

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63 12 U.S.C. 635i-3.

64 War Chest funds are not separately appropriated; War Chest funds are charged against Eximbank's overall appropriation levels. In some years, as shown in figure 4-10, some USAID grant funds were added to the War Chest to support additional tied aid credits.

When combined with Eximbank loans, $150 million in War Chest grant funds would typically yield about $430 million in tied aid credits. This assumes a 35 percent concessionality level.

65 Export Enhancement Act of 1992, Public Law 102-429, Sec. 103.

66 Export-Import Bank Of the United States, "Report to the Congress under Section 15(g) of the Export-Import Bank Act of 1945, as Amended,'' Apr. 26,1993, pp. 13-14.

Figure 4-11 Helsinki Rules

Recipient country's economic level	Type of project	Tied aid eligible?	Minimum concessionality level
Wealthiest (1991 per capita GNP over $2,555)	All projects	No	—
Middle group	Commercially viable projects	No	—
	Projects not commercially viable	Yes	35%
Least developed	All projects	Yes	50%

NOTE: Conditions apply to funding of at least 2M SDR with under 80 percent concessionality.

SOURCES: Summary of OECD rules provided by Eximbank; OECD, *Arrangements on Guidelines for Officially Supported Export Credits* (OECD: Pans, 1992), paragraph 8(a).

more heavily than Eximbank's ordinary export credits.

While retaining the previous minimum concessionality levels,[67] the 1991 Helsinki Package further limits use of tied aid credits (fig. 4-11). The additional provisions, given in paragraph 8(a) of the Arrangement, apply only to tied aid credits with a concessionality level under 80 percent (which is fairly close to a pure grant), and only to financial packages worth at least SDR 2 million (roughly $2.8 million).[68] Paragraph 8(a) distinguishes three classes of LDCS: the wealthiest, defined in 1993 as those countries that had 1991 per capita GNP above $2555;[69] the "least developed countries" as defined by the United Nations (sometimes referred to as "LLDCS"); and a residual middle group. The division between the middle group and the least developed group is not strictly on the basis of per capita income. The United Nations' definition of "least developed' considers not only per capita income but also other factors that can affect development, such as literacy rate and frequency of natural disasters;[70] also, countries are not automatically reclassified as their conditions change. The wealthiest group includes, for example, Brazil, Mexico, and Venezuela; the middle group, China, Indonesia, Thailand, and the Philippines; and the least developed group, Chad, Haiti, and Yemen.

For the wealthiest LDCS, tied aid credits within the scope of paragraph 8(a) are prohibited. The rationale is that those countries should be able to attract investment for commercially viable projects, and should be able to finance non-

67 However, the Package did change the way in which concessionality is calculated, in order to better represent the actual market terms used for comparison. In addition, the requirements for non-aid export credits were tightened somewhat, requiring them at times to be closer to commercial terms.

68 A Special Drawing Right (SDR) is an international money unit based on a weighted average of 16 national currencies. In April 1993 an SDR was worth about $1.40.

69 The wealthiest LDCs are technicall, defined as "countries whose per capita GNP would make them ineligible for 17-or 20-year loans from the World Bank." Because of lags in collecting da@ the World Bank bases eligibility in a given calendar year on a country's per capita GNP two years earlier. In 1992, when the Helsinki Package first took effect, the wealthiest LDCs consisted of those with 1990 per capita GNP over $2,465.

70 United Nations, Committee for Development Planning, *Report on the Twenty-Seventh Session (New York, 22-26 April 1991)*, Doc. E/1991/32, Economic and Social Council, Official Records, 1991, Supplement No. 11 (New York, NY: United Nations, 1991).

commercially viable projects on their own. For the least developed group, tied aid credits within the scope of paragraph 8(a) are (as before) permitted with a minimum concessionality level of 50 percent. Thus, tied aid credits would be a particularly expensive way to promote exports to these poorest countries; and these countries' poverty limits the opportunity for follow-on business.

The rules are more complex for the middle group. For these countries, tied aid credits within the scope of paragraph 8(a), when permitted, must (as before) have at least 35 percent concessionality. But such tied aid credits are permitted only if the project is not "commercially viable." To be commercially viable, a project must be able to get financing from the commercial market, and must be able to generate income sufficient to pay back the loan. The rationale for this restriction is that tied aid for commercially viable projects is unnecessary (since commercially viable projects could presumably go forward without any aid), and is more likely to distort trade.[71] This provision is considered a key feature of the agreement. The middle group of countries to which it applies includes some East Asian countries with promising environmental markets, such as Thailand and Indonesia. The effect of this requirement is difficult to predict. The precise meaning of "commercially viable' is only gradually becoming clear, as countries consult about specific cases (see below).

The strengthened notification and consultation process set up under the Helsinki Package[72] is also a key feature of the agreement. As before, countries participating in the Arrangement must notify other participants about contemplated tied aid credit offers.[73] However, there are some new features. On request of any other participant, the notification must be supplemented with detailed information about the project's development function, the project's technical preparation and appraisal, and the procurement procedures. Also, notifications are now required more often for aid credits that the donor considers untied. Other Arrangement participants can then request information to verify the untied status.

The consultation process has also been strengthened. Consultations among members must always be held for notifications exceeding SDR 50 million (about $70 million) with concessionality level less than 80 percent. Consultations are also required if any country objects to an offer on the ground that it does not meet the requirements of paragraph 8(a) concerning commercial viability. The consultations are face to face; and if a particular proposed aid offer is challenged, the potential donor must justify its position. In the consultation, the participants consider "first, whether an aid offer meets the requirement of the rules in [paragraph 8(a)]," and "if necessary, whether an aid offer is justified even if the requirements of the rules in [paragraph 8(a)] are not met." Unless its position receives "substantial support," the potential donor is advised to withdraw the offer; if it wishes to proceed, it must submit a written justification citing the "overriding non-trade-related national interest that forces this action.' "[74]

In 1992, there were 824 notifications of tied aid credit offers, totaling $15.4 billion.[75] Of these, 137 totaling $3.8 billion were potentially subject

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71 Tied aid credits might add a project that would not otherwise go forward, or might divert a project from One supplier to another; the latter distorts trade more. For commercially viable projects, which can go forward on their own without aid, the latter alternative seems more probable for noncommercially viable projects, which cannot go forward without aid, the former alternative seems more probable.

72 Arrangement, par. 14 and Annex VII.

73 Arrangement, par. 15.

74 Arrangement, par. 14.

75 The information in this paragraph is from Export-Import Bank of the United States, "Report to the Congress under Section 15(g) of the Export-Import Bank Act of 1945, as Amended," Apr. 26, 1993, pp. 5-8.

to the consultation process.[76] For many of these, additional information was requested by the United States or other participants. In four cases, the country in question withdrew its offer rather than have to provide the information and face a possible formal challenge. Formal consultations were requested on 41 offers. The United States initiated or otherwise endorsed all of these consultations; even when no U.S. firm was bidding on the project, these cases were important to the United States because they would become precedents as to how "commercially viable" is defined. Of these 41 cases, 36 were completed as of April 1, 1993. In 13 of these cases, the projects were deemed not commercially viable. An additional seven projects received "substantial support" primarily because they were each part of an ongoing project. In the remaining 16 cases, the project was deemed commercially viable and the offering country failed to get substantial support. Of these, in seven cases the country went ahead with the offer, obligating it to explain in writing its "overriding non-trade-related national interest" in making the offer. The U.S. Administration expected such derogations to be concentrated "in the early stages of the implementation of the new rules,' and is not alarmed by the number; nevertheless, it 'is signaling its intention that the current pace of derogations should not continue beyond the early implementation phase." In the only derogation in which a U.S. firm bid on the project, Eximbank authorized use of the War Chest to provide matching financing.

Based on the limited sample of completed cases, it seems that projects in the manufacturing, power, and telecommunications sectors are deemed commercially viable except in special circumstances (such as a local facility serving a remote area, where operating the facility at a loss is cheaper than providing a good or service by long distance). No completed cases have focused on environmental projects or components of projects, and it is not always clear when such projects or components would be deemed commercially viable. It is possible that some environmental projects will be deemed not commercially viable and thus eligible for tied aid credits. Some types of projects, such as water and wastewater treatment facilities serving very poor communities, often might not generate enough revenue to pay for themselves. New projects with environmental components (such as a factory with a stack gas scrubber) will be judged on the commercial viability of the project as a whole; so the project could be deemed commercially viable unless the environmental requirements made the whole project unprofitable. In the case of a retrofit, such as a stack gas scrubber put onto an existing factory, the United States expects that the commercial viability standard will be the same (e.g., whether the factory with the scrubber is commercially viable), though there is not yet a precedent addressing this sort of case; it is possible that commercial viability would instead be judged for the retrofit in isolation, in which case a finding of non-commercial viability would be common (scrubbers do not normally bring in revenue).[77]

If, as the precedents from OECD consultations evolve, some types of environmental projects or components tend to be regarded as not commer-

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76 Every other offer was exempt for at least one Of these reasons: it was made before Feb. 15, when the new rules took effect; it was covered by transitional rules; it was an offer to match a previous offer by another country, and thus not independently subject to consultation; it was made to a least developed country, and thus permitted as long as the concessionality level was at least 50 percent; it had at least 80 percent concessionality; it was for under 2 million SDR; it was for ships (credits for ships are excluded from coverage under the Arrangement and are covered by a special agreement).

77 Even in isolation, such environmental modifications might more often be considered commercially viable if environmental costs and benefits were internalized. Thus, a scrubber in isolation could generate revenues if a mechanism existed such as tradable emissions permits. Similarly, the modifications to make a plant more energy efficient would more often pay for themselves if the cost of the energy reflected the environmental costs of its use. Tradable permits, input pricing, and other economic measures to provide incentives to pollute less will be discussed further in the final report of this Assessment.

cially viable, donors could shift aid into those types of projects, in order to retain the freedom to usw tied aid credits. In this case, aid could play a greater role than it does now in international competition in environmental goods and services.

Donor Country Profiles 5

Briefly discussed below are the bilateral aid programs of five major donors—the United States, Japan, France, Germany, and the United Kingdom. Emphasis is placed on their bilateral environmental aid. None of these countries had reported estimates of their environmental ODA to OECD'S development assistance committee as of May, 1993. Hence, all of the cited environmental aid figures should be considered preliminary and subject to change.

Although not discussed in detail here, large projects can include several bilateral donors and multilateral agencies or lending institutions (see box 2-C). Donors sometimes coordinate bilateral aid with other donors on different components of specific projects.[1] Donors also may provide cofinancing or parallel financing to complement multilateral environmental aid through such mechanisms as the Global Environment Facility or Capacity 21, a recently established facility of the United Nations Development Programme (see box 2-B).

UNITED STATES

Bilateral development aid is only one of several priorities in the overall U.S. foreign assistance program. It accounted for about $4.2 billion (25 percent) of overall U.S. foreign aid

[1] For example, the United States and Japan are cooperating in establishing an Indonesian Biodiversity Protection Center. The possibility of greater United States-Japan cooperation on environmental matters in general is a subject under consideration for possible joint discussions between the two countries, as mentioned by President Clinton at his news conference with Japanese Prime Minister Miyazawa on Apr. 16, 1993. For discussion of recent developments, see Pat Murdo, "Cooperation Conflict in U.S.-Japan Environmental Relations," *JEI Report* Japan Economic Institute, Washington, DC, May 28, 1993.

obligations in fiscal year 1991. Other budget priorities include multilateral aid, food aid, economic support funds (ESF), and military aid.

The U.S. Agency for International Development (USAID), established by the Foreign Assistance Act of 1961, has the major responsibility for administering and coordinating U.S. bilateral aid. Some other agencies share aid responsibilities or undertake closely related activities; these include the State Department (for ESF allocations), the Department of Agriculture (for food aid), and the Trade and Development Agency (support for development project feasibility studies in developing countries).

USAID's budget and priorities reflect U.S. strategic and political goals. Israel (with a per capita income of over $10,000) and Egypt (with a per capita income of about $600) have headed the annual list of U.S. aid recipients since 1980, and together have accounted for close to half the entire bilateral foreign aid budget in recent years.[2] USAID's program reflects numerous objectives added by Congress over the years.[3]

U.S. development assistance, as administered by USAID, has undergone several shifts in emphasis over the last three decades that have a bearing on its commercial effects. From 1961 until 1973, U.S. development assistance tended to finance large capital projects with foreign exchange components. In 1973, USAID took on a new direction; priority was given to human development and institution building as preconditions for self-sustaining economic growth in the developing world. More emphasis was given to issues of equity, alleviation of poverty, and meeting basic human needs. USAID's efforts became more rurally oriented, with small-scale activities focusing on agriculture, nutrition, health, and education. In 1981, aid policy shifted again to place added emphasis on policy dialogue, promotion of the private sector in developing countries, institution building, and technology transfer. In recent years, USAID also has placed much emphasis on policy reforms in developing countries.

The portion of USAID's budget for large-scale capital projects (projects which often entail major imports of engineering services and capital goods from developed countries) has declined over the years.[4] In the early 1960s, 25 percent of USAID's budget was devoted to capital projects. That share had declined to 6.5 percent in the 1980s.[5] Loans, which are primarily used for capital projects, have accounted for a decreasing portion of U.S. bilateral aid, dropping from almost half in the 1960s to less than 5 percent in 1989. Since 1989 almost all new commitments for bilateral aid have been grants rather than confessional loans.

Congress has authorized the U.S. Export-Import Bank to combine loan funds with a special "War Chest" of grant money in order to match confessional financing by foreign governments. However, the War Chest is not large and has been used sparingly. (USAID has occasionally contributed grant funds to be combined with Eximbank's loan funds to the same end.)

While Buy American limitations on procurement have been a feature of U.S. foreign assistance since its inception, waivers are permitted

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2 OECD, *Development Cooperation 1992 Report,* table 43, p. A-64.

3 A 1992 Presidential commission on the management of USAID programs found 39 "central" objectives affecting USAID's mission.

4 One factor contributing to this change was concern that U.S. aid loans sometimes supported large, highly visible, costly infrastructure projects that were unsuited to the needs of the developing country. For discussion of this history, see Curt Tarnoff and Larry Q. Nowels, *Foreign Assistance and Commercial Interests: The Aid for Trade Debate, CRS* Report for Congress, 93-528-F, U.S. Library of Congress Congressional Research Service, May 23, 1993, p. 23.

5 Export-Import Bank of the United States, *Report to the U.S. Congress on Tied Aid Credit Practices* April 1989, p. 15, and OECD, *Development Cooperation 1992 Report,* table 30, p. A-41. While capital projects accounted for just 2.8 percent of USAID's 1990 budget, this number is skewed downward by the abnormally high debt relief in the 1990 figures.

under some circumstances.[6] Much of USAID'S grant assistance is used to hire U.S. firms, nongovernmental organizations or citizens, or developing country participants. According to USAID, a majority of U.S. aid (62 percent in fiscal year 1992) buys goods and services produced in and shipped from the United States.[7] However, the portion of aid going to U.S. procurement has apparently declined since the early 1970s, when it exceeded 90 percent. At the same time, USAID has encouraged developing countries to undertake policy reforms that may make them more open to trade and investment in general. Its 1992 policy office review of these reforms (discussed in ch. 1) found increases in U.S. exports to developing countries.

Several USAID activities facilitate U.S. business involvement (see table B-2 in app. B). Those pertinent to environmental export promotion include, among others: the United States-Asia Environmental Partnership (described in app. B); the Project in Development and the Environment (which is focused on the Near East); the Environmental Credit Program (which helps finance environmentally preferable projects involving exports of U.S. technology);[8] and the Environmental Improvement Project, aimed at reducing urban and industrial pollution in the ASEAN countries. The Environmental Enterprises Assistance Fund aims to promote dissemination of environmental technologies in developing countries. USAID is also a statutory participant in the Federal interagency Trade Promotion Coordination Committee and its working group on environmental trade (both described in app. B).

Some other U.S. government agencies (also discussed in app. B) support activities that may encourage exports of U.S. technologies and services, including environmental exports, to developing countries. Trade and Development Agency grants to developing countries for project feasibility studies are used to hire U.S. consultants. As they are likely to be more familiar with U.S. technologies and products, the consultants may encourage procurement of U.S. goods and services for subsequent stages of the project. The agency estimates that each grant dollar returns over $25 to the U.S. economy in follow on exports. (Some portion of those exports is financed by other U.S. government agencies.) The program is small but growing: $40 million was appropriated for TDA in fiscal year 1993; the Clinton Administration is seeking $60 million for fiscal year 1994.

Many Federal agencies (as well as state and private bodies) participate with USAID in the United States-Asia Environmental Partnership, which is designed to involve U.S. firms in solutions to Asian environmental problems. The Department of Commerce, USAID, and several other agencies are involved in environmental and energy assistance to Eastern Europe. Partly to boost U.S. exports, in 1992 Congress authorized (but has not yet funded) three new U.S. Depart-

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6 See Curt Tarnoff and Larry Q. Newels, *Foreign Assistance and Commercial Interests: The Aid for Trade Debate*, op. cit., pp. 26-28, for discussion of this history. For discussion of the evolution of waiver policies, see U.S. Department of Commerce International Trade Administration, *International Financing Programs and U.S. International Economic Competitiveness*, (U.S. Government Printing Office, Washington, DC, 1990), pp. 2-3.

7 U.S. Agency for International Development, "Buy American Report: October 1991 through September 1992," Dec. 31, 1992. USAID excluded from this calculation $1.56 billion in cash transfers that were used to repa debt, of which $1.43 billion was debt owed to the United States. USAID states that, if debt relief were included, the reflow percentage would increase to 70 percent. However, this is so only if relief of U. S.-held debt is counted as purchases of U.S. goods and services. But U. S.-held debt relief would only promote such purchases under certain circumstances, such as purchases made with freed up funda or in anticipation of future debt relief. If the relief of U.S.-held debt is not counted as purchases of U.S. goods and services, then including debt relief in the calculation reduces the 62 percent figure to 45 percent, as observed in Curt Tarnoff and Larry Newels, Congressional Research Service, "Foreign Assistance and Commercial Interests: The Aid for Trade Debate," op. cit.

8 U.S. Environmental Protection Agency, Global *Markets for Environmental Technologies: Defining a More Active Role for EPA Within a Broader U.S. Government Strategy*, EPA 160-R-92-001, Washington, DC, EPA, December 1992, p. C-8.

ment of Energy programs (to be carried out through USAID) for transfer of environmentally preferred energy technologies to developing countries.

Major changes in the scope and nature of U.S. foreign assistance could be in the offing, reflecting adjustment to the end of the Cold War, concerns about the Federal budget, and the emergence of new priorities (such as economic competitiveness and environmental protection).[9] Despite the reflow from grant aid, the U.S. development assistance program still seems less commercial in orientation than programs run by most of the United States' largest trading partners and primary competitors. As discussed in chapter 4, other leading donors maintain an emphasis on capital projects, and continue to use soft loans as a substantial part of their ODA. Some of the measures discussed in box 1-A and appendix B would, in theory, give a more commercial cast to U.S. foreign assistance if fully funded and aggressively implemented. Given budgetary constraints and continuing debate about development assistance objectives, such an outcome is by no means certain.

U.S. Environmental Aid

Although USAID paid little attention to environmental needs in its early years, the United States was among the first major donors to begin to address the environmental impacts of its development assistance. As early as 1976, USAID had environmental assessment procedures in place. For several years it has also supported and/or carried out environmental or environmentally related projects. USAID's environmental effort, like its approach to aid in general, tends to focus on small-scale projects, often in rural areas. Recent projects support training of public and private decisionmakers; environmental *institu*tion building; and cooperative research on climate change, biodiversity, and other global environmental problems. USAID also supports small-scale technology demonstration projects on alternative fuels and energy efficiency. It has not usually funded large capital projects for environmental infrastructure; exceptions include U.S. aid for water and wastewater treatment facilities in Egypt.

In the last few years, USAID has retie increasing efforts to develop an environmental strategy. Its most recent environmental strategy document identifies five priority problem areas:

- loss of tropical forests and other habitats critical for biological diversity;
- unsustainable agricultural practices;
- environmentally unsound energy production and use;
- urban and industrial pollution; and
- degradation and depletion of water and coastal resources.[10]

USAID'S bureaus have issued regional environmental strategies within this overall focus.[11] Priorities differ by region. In Africa, for example, most environmental aid is for sustainable agriculture, tropical forestry, and biodiversity. These priorities shape much of the environmental aid for Latin America and the Caribbean region, although energy and urban and industrial projects have priority in some areas. Latin America also has been a focus for USAID's activities carried out under a global climate change initiative mandated by Congress in 1990. In Asia, tropical forest conservation is a key objective, but energy efficiency, water and coastal resource manage-

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9 As this paper was prepared for publication in June 1993, the Clinton Administration was said to be nearing completion of a report on U.S. foreign assistance reform. See J. Brian Atwood, "Don't Write Off AID Yet," *Washington Post*, June 17, 1993, p. A23. Atwood is the Administrator of USAID.

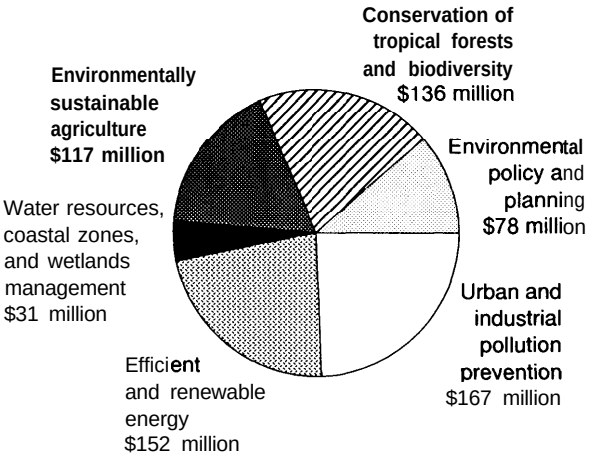
10 U.S. Agency for International Development, *Environment Strategy USAID Policy*, June 1992, p. 1.

11 Much of the discussion in this paragraph is taken from "F-on the Environment," All). *Evaluation News: A Newsletter on Recent Evaluation Findings and Methods*, 1992, vol. *4, No. 2.*

ment, and urban and industrial pollution prevention also receive some priority. In Central and Eastern Europe, energy efficiency and urban and industrial pollution prevention are key priorities. In the Near East Bureau, priorities are energy, urban and industrial pollution, with sustainable agriculture also an important objective.

USAID is preparing baseline estimates on the amount of environmental aid corresponding to these five problem areas. It faces the dilemma of determining g which projects and portions of projects to designate as environmental aid. Preliminary lists for fiscal year 1991 identify over 300 projects that are pertinent to the five problem areas in the strategy. Depending on kinds of projects included, 1991 outlays would range between $625 and $700 million. USAID has supported environmental projects in more than 60 countries, mostly in the poorer developing countries. However, USAID is providing some limited assistance to middle-income developing countries (including Mexico and Brazil) through the global climate change initiative mandated by Congress. As shown in Figure 5-1, USAID's annual obligations (as distinguished from outlays) for implementing its environmental strategy averaged $681 million for fiscal years 1992 and 1993.

Figure 5-1—USAID Environment Funding
Fiscal Years 1992-1993
Average Annual Obligations in Millions



Total = $661 million

SOURCE: USAID.

JAPAN[12]

While Japan and the United States provide roughly the same amount of foreign assistance, Japan has become the largest provider of project-related bilateral development assistance. This reflects both the growth in Japanese aid and the high portion of U.S. aid devoted to debt relief and cash transfers. Japan began providing financial assistance to other countries in 1955 when it entered into reparations agreements with Southeast Asian countries. These reparations, paid in goods and services, helped open markets in Southeast Asia to Japanese suppliers. Japan views aid more as economic "cooperation" than development assistance.[13] Although no basic law governs Japan's foreign assistance, a June 1992 ODA Charter adopted by the Japanese Cabinet set out a philosophy and principles for Japanese aid. The frost of four guiding principles is that "environmental conservation and development should be pursued in tandem.' '[14]

Japan's aid has a complex administrative structure. The ministries of Foreign Affairs (MoFA), Finance (MoF), International Trade and Industry

12 For more detailed discussion of Japan's ODA system, see Nancy J. Hankes, *Japan's Foreign Aid*, CRS Report to Congress, 93-494-F, U.S. Library of Congress Congressional Research Service, May 5, 1993.

13 Adrian Hewitt of the UK's overseas Development Institute, writes, "A pertinent sign is that the normal Japanese term for aid, 'enjo,' (or 'Kaihatsu enjo,' meaning development assistance) is hardly ever used. In discussions and publications in Japanese the foreign concept acronym 'ODA' will be customarily used. Recently the phrase 'keizai kyoryoku' has been used more to convey the concept of cooperation with equal but poorer and needier foreign partners in development." Adrian Hewitt, "Japanese Aid," Overseas Development Institute Briefing Paper, March 1990 (London: ODI, 1990), p. 2.

14 Ministry of Foreign Affairs, "Japan's ODA Charter," June 30, 1992, unofficial translation.

(MITI), and *the* Economic Planning Agency all oversee development of ODA policy and implementation; several other ministries (e.g., the Environment Agency) play smaller roles. Bilateral ODA is implemented by two agencies: the Overseas Economic Cooperation (OECF), the confessional lending arm, and the Japanese International Cooperation Agency (JICA), which undertakes technical assistance and administers grant aid (as does the MoFA).

Japan's bilateral aid has roughly doubled every five years since 1961. Although its aid is becoming more geographically diverse, Asian countries received nearly 60 percent of its aid in 1990. The majority of Japanese ODA has still gone to support economic infrastructure and development of basic industries. Japan devoted 41 percent of its 1991 ODA to economic infrastructure activities, and 17 percent for production, including agriculture, manufacturing industry, mining, and the construction sector.

Japanese ODA tends to finance large projects. It accounted for more than half of DAC aid projects over $50 million in 1990-1991. Japan offers confessional loans for the majority of its ODA. Historically, these loans were provided on harder, more commercial terms compared with other donors. Since 1988, Japanese loans have been offered with terms closer to those of other DAC members.

In 1990-1991, grants accounted for only 27 percent of its bilateral (and 39 percent of its total) ODA. The Japanese aid system tends to be centralized; about 500 people are stationed in field offices outside of Japan-relatively few people given the size of Japan's aid program. Lack of field personnel may partly explain some of the difficulties Japan has had in developing country-specific programs.

JICA, OECF, and Eximbank of Japan operate financing programs that provide loans to Japanese companies for investments in developing countries related to their development needs. Examples are public facilities or experimental projects that might not otherwise be undertaken without innovation or improvements. The total value of outstanding JICA loans is $30 million; OECF and Eximbank of Japan operate larger programs.

Like other donors, Japan has faced criticism about the adverse environmental impacts of its loans and projects.[15] Since the mid-1980s, it has taken several administrative steps to incorporate environmental considerations into its aid.[16] It has also announced several dramatic plans to increase support for environmental ODA and to develop and transfer environmentally preferable technologies to developing countries. While lower-income developing countries will be the recipient of most of this aid, middle-income developing countries will receive some environment-related ODA.[17] These are part of a broader, technology-

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15 For an overview of the way in which Japan's aid system addresses environmental issues, see Richard A. Forrest, "Japanese Aid and the Environment" *The Ecologist,* Vol. 21, No.1, Jan.-Feb. 1991, pp. 24-32. See also Pete Carey and Lewis M. Simons, "Japan lamed for aid projects that scar the land: Tokyo's environmental record rouses objections across Asia," *San Jose Mercury News,* Apr. 21, 1992; and Edmund Klamann, "Aid Machine Struggles With Ecology Issues," *Japan Economic Journal,* Tokyo, June *30,* 1990, p. 1.

16 JICA established a panel in 1986 to consider measures to deal with environmental considerations in ODA. Guidelines on dam construction were issued in early 1990. JICA has placed environmental officials in each overseas office. In August 1989, JICA set up an environment office in its planning department and designated an official in charge of environmental issues in each operational department. In May 1991, JICA made its environmental office part of the Environment Women in Development, and Global Issues Division. OECF has also taken some steps to give more prominence to environmental concerns. The Export-Import Bank of Japan has created an environmental post. For an overview of these steps, see Government of Japan, *Environment and Development: Japan's Experience and Achievement,* Japan's National Report to UNCED 1992, December 1991, pp. 15-30.

17 Examples of Japanese environmental aid to middle-income developing countries include: a 69.3 billion yen ($540 million) OECF loan for a sulfur dioxide emission reduction project in Mexico City; an additional 10.4 billion yen ($8.1 million) loan to the Government of Mexico for afforestation; and a pledge of 99 billion yen ($77 million) in ODA to Brazil for water quality conservation. Japan also provides technical assistance to Eastern Europe for environmental improvement. The Overseas Economic Cooperation Fund, *The Overseas Economic Cooperation Fund Annual Report 1992* (OECF, Tokyo, October 1992), p. 7.

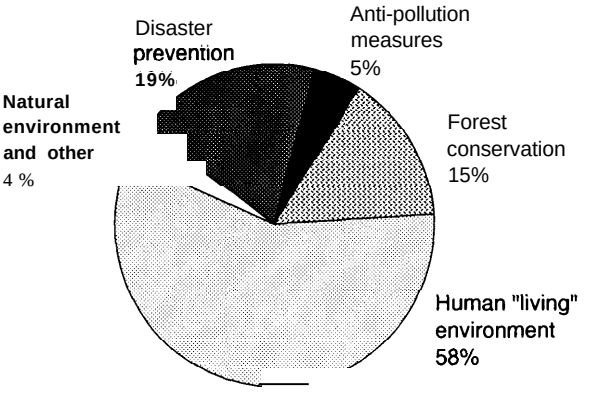
based approach to address environmental problems at home and abroad that could hold opportunity for its environmental industries. Two aspects of Japan's environmental aid are discussed below: (1) the New Environmental ODA Policy, and (2) the Green Aid Plan, and other activities under the broad direction of the Ministry of International Trade and Industry (MITI).

New Environmental ODA Policy

Japan's new environmental aid policy, announced at the London Economic Summit in 1991, is administered by the Ministry of Foreign Affairs. The policy calls for cooperation and collaboration between developed and developing countries on global environmental problems. It indicates that the technologies and know-how Japan used in dealing with its own environmental problems will be actively used to help developing countries. The policy emphasizes the importance of dialogue with developing countries to understand their needs and formulate projects. The policy identifies several environmental priorities for ODA: conservation of forests and afforestation, energy conservation and development of clean energy technology, antipollution measures, wildlife conservation, soil conservation, and enhancement of developing country capacities to address environmental issues.

Figure 5-2 shows disbursements of Japan's bilateral environmental aid by major priority in 1991. Disbursements for environmental infrastructure fluctuate from year to year. For example, "anti-pollution' measures accounted for nearly half the environmental aid disbursed in 1990, but very little in 1991. Disbursements for the human "living" environment (e.g., water and wastewater treatment, solid waste disposal) also fluctuate. The portion of funds allocated to forest conservation and afforestation has grown.[18] As shown, Japan considers natural disaster prevention an environmental priority, and in some years this item has accounted for a fifth or more of its environmental aid.

Figure 5-2—Purposes of Japan's 1991 Environmental ODA (Bilateral Disbursements)



Total = 105 billion yen ($779 million)

Dollar-to-Yen exchange rate: $1=135 yen (1991).

Percentages do not add due to rounding.

SOURCE: Ministry of Foreign Affairs(Japan), Wagakunino Seifu-Kaihatsu-*Enjo 1992, Jyokan [Official Development Assistance 1992],* p. 101.

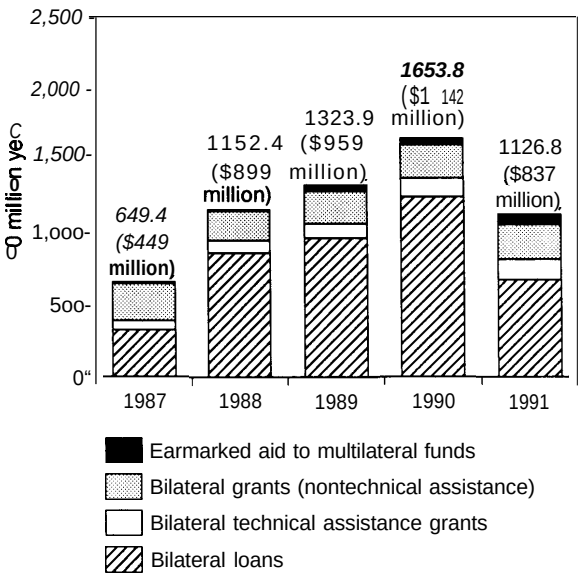
Figure 5-3 shows changes in the amount of Japan's environmental aid going to bilateral grants and bilateral loans between 1987 and 1991; it also shows aid specifically earmarked by Japan to multilateral environmental programs or agencies. Japan's overall ODA grew rapidly during this period; hence, the increase in environmental aid probably represents some new and additional resources rather than relabeling of existing programs. (Disbursements declined in 1991; however, commitments apparently increased).

At the United Nations Conference on Environment and Development in June 1992, Japan announced that it intended to extend 900 billion yen to 1 trillion yen ($7.1 to $7.8 billion)[19] in bilateral and multilateral environmental aid to developing nations over five years. A June 1993

18 Ministry of Foreign Affairs, *Official Development Assistance 1991,* Annual Report (Tokyo, Japan: Association for Promotion of International Cooperation, 1992), p. 142.

19 At the 1992 exchange rate of about 127 yen per dollar.

Figure 5-3--Japan's Environmental ODA: 1987-1991



Dollar-to-Yen exchange rate: $1 = 145 yen (1987), 128 yen (1988), 138 yen (1989), 145 yen (1990), 135 yen (1991).

SOURCE: Ministry of Foreign Affairs, Official Development Assistance 1992, p. 221

United Nations report cites an estimate that Japan's environmental aid increased to about 280 billion yen ($2.4 billion at the exchange rate used by the report) in financial year 1992.[20] (The report does not discuss the basis for this estimate. It also does not provide a breakdown of how this aid was spent.)

B Green Aid Plan

MITI announced this plan in August 1991.[21] If carried out as planned, 300 billion yen (roughly $2.2 billion at 1991 exchange rates) would be spent over a 10-year period on grants and loans to transfer antipollution measures to developing countries and to support international joint R&D projects for the global environment. The two main measures for technology transfer will be environmental grant aid, and the training of foreign engineers. The plan is administered by the Japan External Trade Organization; some other MITI affiliated organizations, such as the New Energy and Industrial Technology Development organization (NEDO) and the Research Institute for Innovative Technology for Earth (RITE), also play roles.

Table 5-1 summarizes Green Aid Plan activities for Japan's 1992 fiscal year, when 2.7 billion yen (about $20 million) were available. As shown, roughly half the funds flowed from the general account for ODA, which is under the overall control of the Ministry of Foreign Affairs. The other half flowed from special accounts more directly controlled by MITI. Funding for the plan in Japan's 1993 fiscal year may increase to 12.9 billion yen (over $100 million) if a MITI proposed budget is approved.

The Green Aid Plan has some noteworthy features. First, environmental and energy-related issues will be reviewed with recipient country officials before aid requests are made. (This contrasts with Japan's traditional request-driven approach to ODA discussed in chapter 4 under "Tying of Aid.") Second, the technological emphasis in the Green Aid Plan is prominent, especially for activities funded through the "special accounts" budget under greater MITI control. As shown in table 5-1, the special account funds are used for intermediate development (adaptation of technology to developing country needs) and transfer of environmentally preferable energy technology (such as for energy-efficiency projects, renewable energy, and clean coal technology).

In early 1992, MITI announced plans to lease antipollution equipment to developing nations to

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[20] As cited in, Commission on Sustainable Development "Report of the Secretary General: Addendum: Information provided by Governments on initial financial commitments, financial flows and arrangements to give effect to the decisions of the United Nations Conference on Environment and Development," United Nations Economic and Social Council, E/Ch.17/1993/11/Add.1, 8 June 1993, p. 15.

[21] "Japan Unveils Aid Plan For Developing Countries," The Reuters Library Report, Aug. 16, 1991.

Table 5-l—Ministry of International Trade and Industry's (MITI) Green Aid Plan, 1992 Activities (budget figures are shown in parentheses in millions of yen)

Policy Talks/Dialogue Between the Japanese Government and Recipient Country

Activities Funded From General Account for ODA (1,397):
- Technical Cooperation (1,298)
  - Project Planning (672)
    1. Feasibility study and project needs assessment
       - . Environmental Measures Assessment [JICA] (474)
       - • Environmental Improvement [Japan Consulting Institute] (34)
       - . Comprehensive study on environmental issues [Asia Economic Institute] (34)
       - . Energy conservation technology promotion manual [with UNIDO] (19)
    2. Master planning
       - . Comprehensive environmental preservation project in Asia and Pacific region *(98)*
  - Personnel Training (163)
    1. Dispatching specialists [JODC] (26)
    2. Accepting and training engineers (137)
  - R&D Cooperation (463)
    - . Development of de-sulfurization equipment for coal-fueled boilers: Indonesia (261)
    - . Development of super-absorbent polymer for desert land forestation: Egypt [Japan Desert Development Association] (128)
    - . Development of industrial wastewater treatment system: Thailand (15)
    - . Global Environmental Technology Research Cooperation (59)
      - China (urban industrial pollution and acid rain from coal combustion)
      - Brazil (pollution caused by mining in tropical forests)
      - India (forestation in dry areas)
- Energy & Environment Technology Center (99)
  - China, Thailand (99)
  - (after 1992 projects are planned for Indonesia, Malaysia Philippines)

Activities Funded From Special Accounts (1,294):
- Intermediate Technology Development and Technology Transfer (1 ,294)
  - • De-Sulfurization Technology (570) [Electric Power Development Co.; Mitsubishi Heavy Industry, contractor]
  - • Energy Efficiency Technology [NEDO] (324)
  - • Clean Energy Technology (380) (Solar Sell Generation System) [NEDO]
  - . Clean Coal Technology (20)

NOTE: Agencies other than MITI and JETRO that are involved in particular programs are shown in brackets.

SOURCE: MITI, JETRO, Nihon Keizai Shimbun.

limit acid rain.[22] The funding will be provided through NEDO. The program will help developing country governments and private firms with low foreign exchange reserves make use of imported equipment. Japanese ODA has been offered for installing equipment to control sulfur emissions from coal-powered thermal stations in China.

22 "Japanese Trade Ministry Plans to Lease Anti-pollution Devises to Developing Countries, " The Reuters Library Report, July 15,1992. This is not the first time that MITI has used a leasing system to facilitate use of Japanese equipment. MITI previously setup domestic leasing systems to promote its computer and machine tool industries. U.S. Congress, Office of Technology Assessment, *Competing Economies: America, Europe, and the Pacific Rim,* OTA-ITE-498 (Washington, DC: U.S. Government Printing Office, October 1991), pp. 261-62; U.S. Congress, Office of Technology Assessment, *Making Things Better: Competing in Manufacturing*, OTA-ITE-443 (Washington, DC: U.S. Government Printing Office, February 1990), p. 155.

In 1990, Japan put forth "New Earth 21," a proposal to the world community about the need for a comprehensive and long-range vision to address global environmental and energy issues. An associated "action program" proposed a variety of near- and long-term responses to global environmental problems. Many of the long-term responses would require extensive technological breakthroughs (e.g., nuclear fusion, solar power generation from space, reversing desertification through biotechnology). MITI recently issued 14 proposals to further "New Earth 21" through domestic and international actions to better integrate energy, environmental, and economic concerns. These include: technological development for protection of the global environment and international cooperation in energy and environmental fields, including the Green Aid Plan and ODA.[23]

FRANCE

The third largest aid donor is France. Its aid structure has two main parts: aid to former colonies and current French Overseas Territories (TOMS), and aid to other low-income countries. *The Directorate de RelationsEconomiques Extériures* (DREE), a division of the Ministry of Finance, develops "protocols", longer-term (18-month) financing plans with lower-income countries. The *Caisse Culturale de Cooperation Économique* (CCCE), the central bank for economic cooperation under the Ministry of Cooperation and Development, works with former colonies and TOMs.[24]

Aid that is oriented toward the poorest countries and TOMS in Sub-Saharan Africa, the Caribbean, and the Indian Ocean, tends to be grant-based and has a human development emphasis. Assistance for education, health and population, and planning and public administration together account for 40 percent of total French aid. France's ODA for education and training supports programs in recipient countries and in universities and technical programs in France.

Aid to the better off developing countries tends to be commercially oriented, focusing on economic infrastructure development, and often involving aggressive use of mixed credits (see discussion of "Use of Loans" inch. 4). In 1991, France targeted 16.9 percent of its ODA to economic infrastructure projects, and 10.1 percent to productive industries (as defined by DAC). Roughly 25 percent of French aid is in the forms of loans and mixed credits. The Treasury and the Ministry of Finance are integrally involved in the use of mixed credits.

French Environmental Aid

France has only recently begun to integrate environmental considerations (such as environmental impact assessment and energy and natural resource conservation) in its aid program. However, French firms are among the world leaders in water management technologies, and French aid to the environment is focused on the provision of potable water and sanitation.

In January 1993, the *Caisse Culturale de Dévelopement* (which is a technical assistance arm of CCCE) estimated its environmental ODA commitments to be 825 million French francs ($146 million) for 1992.[25] Nearly 60 percent of this aid was for provision of drinking water. The rest was for sanitation and water purification, public health risks associated with household wastes, industrial pollution control, public awareness and management of natural resources, and agroindustry irrigation. An additional 80.4 million French francs ($14.2 million) in "environmental' aid went to the TOMS, where 46 percent

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23 Special Committees on Energy and Environment, *Fourteen Proposals for a New Earth,* Executive Summary, mimeo, Nov. 25, 1992.

24 The Ministry of Cooperation and Development was the successor to the former Ministry of Colonies.

25 Calculated at $1 = *5.66* French francs.

of the aid went for repairs to sources of potable water, 22 percent went to sanitation, and 31 percent of funding was devoted to restoration of the natural environment.[26] It is unclear whether these figures are indicative of French environmental aid, as CCCE'S aid accounts for only a relatively small portion of total French aid.

The Government of France uses a combination of grants, confessional loans, and mixed credits to provide its aid. Larger infrastructure programs are usually formed in association with French industry and provided for through a basket of mixed credits. A consequence of this policy was to increase aid recipients' foreign debt; however, the French government began a series of debt forgiveness at the Paris Club in 1988, and is continuing that process currently.

France opposed making OECD'S Helsinki Package mandatory. (The Package, discussed in ch. 4, tightened restrictions on use of tied aid credits for commercial advantage). It also has resisted efforts by the DAC Working Party on Environment and Development to impose more stringent environmental requirements among aid donors and to improve collective environmental policies. However, France was one of the strongest early supporters for the European Community program for Eastern Europe, called PHARE/EEC, contributing 3 billion French francs ($500 million) over the first three years. This program provides some support for environmental management, with priority placed on technical assistance and training, particularly for water resources, regional water management agencies, institutional planning, legislation, and implementation of cooperative agreements with industry, local authorities, and environmental groups.[27]

GERMANY

Germany remains the fourth largest aid donor, and has increased its ODA while undertaking reunification.[28] Since adopting "Basic Guidelines on Development Policy" in 1986, German aid has emphasized sectoral and structural adjustment. Germany uses strict development criteria to review its ODA. For example, countries that do not receive German technical assistance are not eligible for projects involving mixed credits. This policy lessens the chance that large projects will be funded in countries without the technical capabilities to manage them. German aid is mindful of the potential for mutual benefits from ODA for both recipient and donor. These export intentions are clearly articulated in the introduction to the Basic Guidelines: "In cases where a nation's development program requires it to obtain goods from industrial countries, we try to ensure that, if we are the suppliers of assistance, our own economy and workers benefit. "[29]

The ministry of economic cooperation (BMZ) oversees development policy for its two implementing arms, the German redevelopment bank (KfW) and the technical assistance agency (GTZ).[30] The use of two agencies is meant to deliver the widest possible base for support. According to DAC statistics, Germany spends slightly more on social program aid than on economic infrastructure spending, 24.7 percent versus 22.8 percent in 1991. However, if water supply projects are counted as economic infrastructure, those figures

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26 Caisse Francaise de Développement, "Reparation Thèmatique des Opérations: A Haute Valeur Ajoutée Environementale Engagées Par la CFD en 1992 (Hors DOM-TOM et hors adjustment)" Jan. 19, 1993, Paris.

27 Friends of the Earth of the u.K., 1991 *Enviro Summit: A Critical View of the Environmental Performance of the G7 Countries* (London: Friends of the Earth U.K. and International, 1991), vol. 2.

28 For an overview Of German development assistance see Burghard Claus and Hans HLembke, "The Development Cooperation Policy of the Federal Republic of Germay," German Development Institute, Berlin, March 1992.

29 German Federal Ministry of Foreign Affairs, as quoted in ibid.

30 KfW is the Kreditanstalt für Wiederaufbau, and the GTZ is the Deutsche Gesellschaft für Technische Zus ammenarbeit. Both are considered agencies under the Ministry of Economic Cooperation.

could change to put infrastructure spending in the lead.[31]

German Environmental Aid

An early proponent of DAC environmental guidelines, Germany has pledged to continue to stress the environment in developing countries as it works with neighboring countries in Central and Eastern Europe where power plants and chemical storage facilities pose an imminent threat to public health in Germany itself. Germany provides a significant amount of aid for environmental protection and conservation of nature. In 1990 and 1991, more than one-fifth of all German aid was devoted directly to the environment.[32] Environmental aid is expected to account for over 25 percent of its total aid in 1992 and 1993. The GTZ estimates disbursements of 1,020.7 DM million ($614.9 million) in 1990 and 847.8 DM million ($510.7 million) in 1991, and commitments of 996.0 DM million ($600 million) for 1992 and 1,001.6 DM million ($603.4 million) in 1993.[33]

To count as environmental aid, projects must have protection of the human environment and/or the conservation of nature as primary objectives. This includes support to countries for managing and rationalizing their use of natural resources or protection of the environment. Examples of projects include conservation strategies, institution building, sludge and waste management, environmental impact assessment studies, and support for recipient country development of environmental action plans.

Germany's estimate of its environmental aid, unlike many other donors, excludes projects that are undertaken for other purposes that have an environmental component. For example, a livestock production project with a sub-activity to train farmers to protect hillsides from erosion would not count as an "environmental" project.

In general, large inrastructure projects are not considered environmental, with the exception of sludge or waste management projects, and some cases of "necessary" infrastructure. Depending upon the level of development in the recipient country, such infrastructure projects will be supported through grants in the form of technical cooperation, confessional loans, and through mixed credit offerings through the financial cooperation arm, the KfW.

German aid has standing programs for collaborative technical R&D and for training. Since the early 1980s, the technical research has been concerned with the development of technology appropriate for developing countries. Such technologies often happen to be better at protecting the human environment or reducing destruction of natural resources. One example is a low-smoke or alternative-fuel cookstove, which reduces or eliminates demand for charcoal and thus lessens pressures of deforestation. R&D for this technology is carried out in developing countries and Germany.

Germany is investing in environmental training and awareness for the staff of its aid programs. It also offers environmental training for developing country personnel in Germany and locally in recipient countries. It provides financial support and technical assistance for environmental institution building in developing countries.

Germany recently launched several environmental initiatives pertinent to sustainable development. These include programs on tropical

31 In DAC statistics, "water supply and sanitation" are included in social spending under a category called "other." For 1991 Japan and Germany had the highest shares in this "other" category among the major donors presented, 9.9 percent of total ODA commitments for Japan and 6.3 percent for Germany. If the whole "other" category in Germany's case were water and water were counted as economic infrastructure, Germany would have spent 29.1 percent for economic infrastructure.

32 This includes KfW and GTZ technical and financial assistance, but not aid provided by German nongovernmental organizations that is funded through its aid structure.

33 Calculated on an exchange rate of $1=DM 1.66.

forestry, household energy supplies, and institution building for the environment. In cooperation with Brazil and as a complement to several World Bank environmental projects, Germany is contributing approximately $172 million (DM 285 million) to an international pilot program for the conservation of Brazilian tropical rainforests.

UNITED KINGDOM

The United Kingdom aid program is similar in philosophy and structure to that of the United States. Administration and policy formulation are, for the most part, under the auspices of one agency, the Overseas Development Administration (UK ODA), whose minister reports to the Foreign Secretary .34 British aid makes use of its own regional missions[35] and takes a country-specific approach to aid policy formulation. The UK places a high premium on promoting sustainable development and working to help low-income countries.[36]

The Overseas Development Administration provides external assistance under three programs: aid to developing countries, assistance to Eastern Europe and the former Soviet Union, and (the smallest by far) "global environmental assistance. "[37] British aid supports numerous small-scale training programs in developing countries. The UK ODA also makes use of a mixed credit facility, the Aid and Trade Provision (ATP), to aid capital projects in developing countries. British aid supports water and waste treatment facilities, power production, and infrastructure projects through loans and **associated financing.**

British Environmental Aid

British aid officials have resisted classifying their projects and programs as "environmental" and a meaningful estimate of British environmental aid is not yet available.[38] The label is thought to marginalize concern for the environment, which aid officials see as a cross-cutting issue which all UK ODA projects must account for. The UK ODA'S *Manual of Environmental Appraisal*, first published in 1989 and revised in 1992, is meant to guide officials in addressing environmental issues early in the decision cycle for all projects and programs. The manual provides environmental checklists that could be used in project conception, formation, planning, implementation, and appraisal. "Policy information markers" are being put in place to identify aid projects and programs that are primarily environmental or that have major environmental components. These markers will adhere to UK ODA policy and will cover poverty, women in development, good government, and other issues as well as the environment. Thus, a clearer enumeration of UK aid for the environment may soon be available.[39]

UK bilateral aid supports a range of programs to promote environmental protection and more efficient use of resources in developing countries. One focus has been sustainable forestry, with over $200 million in forestry projects underway or in

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34 In the UK, this agency is generally referred to ss "the ODA." However, internationally ODA refers to Official Development Assistance. For purposes of clarity, the British agency is referred to here as "UK ODA."

35 Unlike the expansive country mission structure of USAID, however, UK ODA has only five regional missions and relies on the extensive in-country diplomatic missions, British Council offices, as well as the Crown Agents for Overseas Governments and Administrations.

36 British aid, including large capital projects, goes to countries with very low per capita incomes. Overseas Development Administration, "British Overseas Aid: 1991 Annual Review," London, October 1991.

37 UK Overseas Development Administration, "British Aid Statistics 1987/88 - 1991/92," a publication of the Government Statistical Service, 1992, p. ii.

38 'l'he only clearly identified component of its environmental aid is for "global environmental assistance." In 1991/92, this amounted to $7.1 million(L 4.9 million), or O.25% of total UKODA external assistance programs. Thissupports the GEF and Montreal Protocol Fund and is completely separate from funding for the environment in its bilateraODA programs.

39 This &~ should be available from the UK ODA in 1993.

preparation in early 1992. The UK ODA'S scientific agency, the Natural Resources Institute (NRI), works with developing countries on pesticide management and control, and training for users of pesticides and other potential sources of hazardous waste. A "Renewable Natural Resources Strategy, ' first published in 1989, covers programs in agriculture, fisheries, forestry, livestock, land resources assessment, integrated pest management, and post-harvest technology. British aid finds $49 million (34 million pounds Sterling) worth of research in the renewable resources sector.[40]

British aid also funds large capital projects. In 1989, it provided $53 million (39 million pounds Sterling) for water and sanitation projects, of which $25 million (17.4 million pounds Sterling) was devoted to providing clean drinking water in some 40 developing countries.[41] It funds many huge infrastructure projects through its mixed credit facility, the Aid and Trade Provision, or ATP. ATP proposals in principle are subject to the same appraisal criteria and environmental considerations as all other aid.[42] However, a study by the National Audit Office (roughly the UK equivalent of the United States' General Accounting Office) found abuse of the ATP facility and subsequent damage to the environment and public health associated with several large water projects.[43] These projects were planned and carried out before UK ODA issued its 1992 *Manual of Environmental Appraisal. The* manual, as well as other efforts to integrate ATP proposals into the country's priorities system, may help bring ATP projects in line with environmental standards applied to other UK ODA projects.

Through its research programs and via the British Council, the UK ODA funds collaborative cleaner technology R&D, and environmental training and institution building. The British Council manages the UK's Technical Cooperation Training Programme. In 1990-91, roughly 485 persons were trained in environmental subjects at either the technician or higher degree level (out of a total of 12,600 trainees). The program works with trainees from developing countries who are trained at local institutions in their own countries. Subjects include environmental awareness, impact assessment, environmental law, engineering, management and planning, wildlife management, and pollution control.

The British Council also provides fellowships and training in Britain for professionals from overseas. A series of high-level international seminars for senior officials on a range of issues such as environmental policy and management and environmental law took place in 1992. Programs are also already underway to increase environmental awareness in ODA recipient countries, including environmental protection councils and public awareness campaigns in Ghana and Guinea Bissau.[44]

In March 1993, British Prime Minister John Major announced the United Kingdom Technology Partnership Initiative.[45] The Initiative will seek to encourage firms in developing countries to use British technologies and expertise that might contribute to improved performance and reduced environmental impacts. The 3-year program will foster partnerships between British companies and private sector firms and associations in developing countries. A network of key

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40 UK Overseas Development Administration, "Actionfor the Environment" May 1992 brochure, p. 38.

41 Ibid., pp. 30-31.

42 According t. UK ODA, ATP applications for large power-generation projects might be "expected" to include an environmental impact assessment or equivalent measure, as ATP projects "often involve industrial developments which may require special measures to mitigate pollution problems." UK Overseas Development Administration, "Manual of Environmental Appraisal," April 1992, p. 15.

43 National Audit Office, *Overseas Aid: Water and the Environment (report by the* Comptroller and Auditor General, HMSO).

44 UK Overseas Development Administration, "Action for the Environment" May 1992 brochure, p. 40-41.

45 Technology Partnership Secretariat, "Technology Partnership: the Initiative," brochure, n.d., n.p.

officials from government and industry will help business personnel in developing countries obtain information about, among other matters, the best practices employed by British companies, new technologies under demonstration in the UK, and sources of financing and other help. Some assistance will be provided to help UK companies provide hands on training for key developing country business personnel. UK firms also can obtain specific information on the needs of developing country businesses. British and developing country firms can access the network through participating trade associations, British embassy or High Commission commercial offices, or the Partnership's Secretariat in London.

Appendix A: Environmental Markets in Developing and Newly Industrialized Countries[1,2]

The largest markets for environmental goods and services (EGS) lie within the industrialized nations that are members of the Organisation for Economic Cooperation and Development (OECD). These countries will continue to account for most EGS expenditures for the next 10 or 20 years. However, there is likely to be rapid growth in EGS demand in non-OECD (developing, newly industrialized, and Eastern European and former Soviet) countries. Estimates of the current and prospective size of this non-OECD market vary widely. One study concluded that non-OECD countries accounted for $36 billion out of an estimated $200 billion global EGS market in 1990; by the year 2000, their EGS markets could grow to $55 billion (with the world total projected to be $300 billion).[3] Another source concluded that non-OECD markets amount to $37 billion (of a $270 billion world market); in 1996, the non-OECD market could reach $61 billion (the world total was projected to be $408 billion).[4] Yet, another source, the International Finance Corporation, suggests that one-third of the current global EGS market of $300 billion, which it projects will reach $600 billion in 2000, is found outside the United States, Canada, Europe, and Japan.[5]

Differences in the estimates reflect in part different definitions of the environmental industry. Some analyses include only goods and services for end-of-pipe control of air and water pollution and disposal and recycling of wastes (although some pollution prevention consulting may be included). Others include renewable energy and some energy-efficiency opportunities. Some estimates encompass markets for water supply, mobile source controls (such as catalytic converters), noise control, or construction work associated with environmental projects, while others do not.

Perhaps the greatest variable concerns so-called "cleaner technologies," including pollution prevention and energy-efficient equipment. These technologies are generally integrated into processes-such as industrial production processes, transportation systems, or heating or cooling systems for buildings. Yet cleaner production and improved energy-efficiency opportunities are often the most effective and most

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[1] This appendix draws on preliminary research from the OTA assessment, *Amen"can Industry and the Environment: Implications for Trade and Competitiveness. While this* appendix focuses on developing and newly industrialized country markets, the final report of the assessment will contain more in-depth analyses of global markets and U.S. competitiveness in the environmental goods and services sector.

[2] This appendix discusses environmental markets related to the industrial and utility sectors, including water supply, wastewatreatment, and refuse management. Environmental needs--and market possibilities-associated with land use management, agriculture, forestry, fisheries, biodiversity conservation, and ecotourism development are not addressed here.

[3] OECD, *The OECD Environment Industry: Situation, Prospects and Government Policies*, OECD/GD(92)1 *(Paris:* OECD, 1992).

[4] Grant Ferrier, President of Environmental Business International Inc., testimony to House Committee on Merchant Marine and Fisheries, Subcommittee on Environment and Natural Resources, Feb. 25, 1993.

[5] International Finance Corporation, Investin *in the Environment: Business Opportunities in Developing Countries* (Washington, DC: The World Bank and the IFC, 1992), p. iii.

cost-effective options for addressing pollution and waste. While often needed, end-of-pipe and remedial environmental controls are, by contrast, almost always a net cost to business and frequently shift pollution from one medium to another. (Per instance, wastewater treatment and some air scrubbing generates solid wastes that require disposal, while incinerators turn solid wastes into air emissions that require control).

Although now only a modest part of the global market, the environmental business opportunities in specific developing countries and newly industrialized countries (NICs) can be quite large. (Environmental technology opportunities in Eastern Europe and the former Soviet Union are not addressed here. They are the subject of a separate OTA assessment.)[6] As developing countries begin to address their environmental problems, environmental business opportunities could grow quickly. Of particular interest to environmental technology vendors are the middle-income and fast-growing countries in East Asia and Latin America such as the four NIC "tigers" (Hong Kong, South Korea, Singapore, and Taiwan), Mexico, Brazil, Chile, Malaysia, and Thailand. Opportunities are also growing in some lower-income countries, including India, Indonesia, and China.

In many developing countries, government funds for environmental protection will likely remain sparse. The availability of financing from private or mixed public-private sources could be a critical determinant for growth of environmental markets. The opening of various developing country economies to greater foreign investment and the loosening of state controls on energy, transport, and manufacturing industries-including privatization-provide growing possibilities for environmentally favorable investment.

Examples of the magnitude of developing country and NIC environmental markets include about $11 billion of environmental projects in Taiwan's current Six-Year Development Plan,[7] over $10 billion in South Korea's 1991-95 investment plans,[8] an annual environmental market of $1.8 billion (1993) in the six ASEAN nations? and a $2.4 billion annual market (1992) in six Latin American countries.[10]

The NICS and some developing nations produce some of their EGS market needs. The technical capabilities of EGS industries in Singapore, South Korea, Taiwan, Mexico, Brazil, and some other countries can be expected to increase. In fact, environmental goods are sometimes exported by these countries--often at lower prices than offered by firms in the United States, Europe, or Japan. Environmental firms from OECD countries face increased competition from developing country and NIC companies as well as from each other. However, OECD firms also are finding opportunities for branch operations and joint ventures in developing and newly industrialized countries.

SECTOR TRENDS

There are several trends in developing and newly industrialized countries which present vendors of EGS and cleaner technologies with growing markets:

- development of water and wastewater treatment infrastructure;
- electrification;
- growing transportation needs;
- development of solid and hazardous waste disposal capacity;
- increased industrial production; and
- development of environmental monitoring, standard making, and enforcement capability.

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6 The fist report of this other assessment is: U.S. congress, Office of Technology Assessment, *Energy-Efficiency Technologies for Central and Eastern Europe, OTA-E-562* (Washington, DC: U.S. Government Printing Office, May 1993).

7 American Institute in Taiwan, "Listing of Taiwan's Six-Year Development Plan Projects (Partial List) & Status Report on Selected Major Projects," August 1991.

s Republic of Korea Ministry of Environment, *White Paper 1990,1991,* in Tal Woo Lee, "Perspective of Environmental Industry in Korea," paper presented at GLOBE '92, Vancouver, BC, Canada, Mar. 16-20, 1S92.

9 Jonathan Menes, Acting Assistant Secretary for Trade Development, U.S. Department Of Commerce, testimony before the House Committee on Merchant Marine and Fisheries, Subcommittee on Environment and Natural Resources, Feb. 25, 1993. ASEAN is the Association of South East Asian Nations consisting of Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand.

10 USAID, *Environmental Market Conditions and Business Opportunities in Key Latin American Countries*, Business FOCUS Series, October 1992 (available through USAID, Arlington, VA). The six countries are Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela.

Water Supply and Wastewater Treatment Infrastructure

LDCS and NICS are expected to make major expenditures in the next few years to build and upgrade water supply and to provide sanitary services (see table A-l). As is discussed in chapter 2, hundreds of millions of people in the developing world lack potable tap water. Sewage treatment is rare. Both municipal and industrial wastewater treatment demand is growing. A market for smaller treatment systems serving individual apartment buildings and small groupings of businesses, and for improved septic tank systems, can arise in areas where centralized sewage treatment remains too costly. There may also be opportunities for developing "engineered wetlands" and similar biological systems as low-cost sewage treatment for smaller communities. Firms from many countries are involved in providing architecture/engineering and construction services, water and wastewater treatment equipment and chemicals, and control and monitoring instruments to meet these needs.

However, most expenditures in this sector will pay for locally provided goods and services. Construction labor and low-value materials like cement are obtained locally. Relatively simple equipment, such as pipes and sheetmetal products, can often be provided in-country or by regional low-cost international suppliers. Thus only a modest portion of water and wastewater related expenditures-primarily those dealing with project management and relatively sophisticated goods and services-would likely be significant for U.S. exports.

The export performance of U.S. and foreign competitors in this sector varies by country and subsector. The small size of the current market means that a few sales may substantially change the picture. In Brazil, American firms accounted for 20 percent of a $35-million (1991) industrial wastewater import market, edging out Germany (19 percent), Sweden (15 percent), the United Kingdom (15 percent), and Japan (7

Table A-l-Selected Water and Wastewater Markets and Expenditure Plans

Argentina[a]	
National water supply and sewerage program improvements	$250 million
Estimated 1992 water pollution control market	$100 million
Brazil:[a]	
Major water modernization projects (1992-97)	$3,105 million
Estimated 1992 water pollution control market	$345 million
Mexico:[a]	
Water supply and sanitation sector (1990-94)	$4,504 million
Estimated 1992 water pollution control market	$400 million
South Korea:	
Water pollution investments planned (1991 -95)[b]	$4,230 million
1991 Water pollution control expenditures by business[c]	384 million
Taiwan:[d]	
Taiwan six-year plan wastewater projects (1992-97)	$4,700 million
China:[e]	
Estimated 1991 water pollution control market	$433 million
Indonesia:[f]	
Multilateral development bank water/wastewater projects	$2,500 million

SOURCES: [a]USAID, *Enviromental Market and Business Opportunities in Key Latin American Countries, 1992;* [b]Rep. of Korea Min. of Env. *White Paper 1990;* [c]Yonhap (South Korean news agency) Mar. 9, 1992, in *JPRS Report: Environmental Issues,* May 5, 1992; [d]American Institute in Taiwan; [e]U.S. Department of Commerce; [f]U.S.-ASEAN Council for Business and Technology.

percent).[11] In Brazil's municipal sector, U.S. producers held 60 percent of a $135-million import market, ahead of Swedish and Japanese competitors. Complicating matters are a variety of licensing and joint venture arrangements between Brazilian and American, British, Finnish, French, Swedish, and Swiss firms. Mexico's water pollution control imports seem dominated by the U.S. with a 60 percent share (1989) versus 14 to 15 percent shares for Japan and Germany.[12] In contrast, Japan is the biggest player in China's water pollution control import market of $48.9 million (1991), accounting for 40 to 45 percent, while U.S. sales were 8 percent, behind Austria's 25 percent.[13] Austrian, Danish, and Canadian exports of water pollution control equipment to China have been supported by grants and credits from those countries. The U.S. is the largest exporter of water-related equipment to Egypt (36 percent in 1991), surpassing Japan (21 percent), Germany (17 percent), and Italy (15 percent) .14 But in Morocco, France dominates with 65 percent of the import market, high above U.S. and other European suppliers.[15] The point of this snapshot is that it is hard to say who dominates world trade in the water and wastewater sector except to note that the United States, Japan, and several European countries are the key players.

Electrification[16]

The World Bank estimates that electric power sector capital investment in developing countries, Eastern Europe, and the former Soviet Union during the 1990s may reach $1 trillion.[17] An analysis done for the 1991/1992 U.S. National Energy Strategy projects that during the years 1990 to 2010, electric power investments of over $1 trillion for 624 gigawatts of new capacity will occur in the developing countries (not including Eastern Europe or the former Soviet Union).[18] Whether or not growth in electricity demand and production occurs at this rapid pace, there is increasing recognition of the need for mitigating or preventing environmental impacts. Business opportunities will arise from the need for pollution abatement equipment, more efficient and cleaner power generating technologies, and improved energy end-use efficiency. Demand for architecture/engineering, construction, and project management services-areas in which U.S. firms are strong contenders but face growing foreign competition-will be increasing.

In the area of air pollution abatement, a relatively inexpensive initial option is particulate removal by electrostatic precipitators or fabric filters. U. S., Japanese, and European manufacturers are competitive in developing country markets and local environmental industry capacity is growing. End-of-pipe controls for sulfur dioxide and nitrogen oxides are more sophisticated and expensive and perhaps too expensive for some developing countries. U. S., Japanese, and German companies appear to be in the lead for these gas-cleaning technologies, although multinational arrangements can make national comparisons difficult. For instance, ASEA Brown Boveri (ABB), considered a Swiss-Swedish conglomerate, owns Combustion Engineering, a U.S.-based maker of air pollution control equipment, and Flakt, a Swedish provider of pollution controls. At the same time, ABB and various U.S. companies license Japanese technology for selective catalytic reduction (SCR) of nitrogen oxides. A variety of U.S. companies license or have adapted sulfur and nitrogen oxide control technologies from Japan and Europe. In fact, some U.S. air pollution control firms are concerned about the growing strength of German and Japanese gas-cleaning technology

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11 Ibid., p. 49.

12 Ibid., p. 112.

13 U.S. Department of Commerce National Trade Data Bank.

14 Ibid.

15 Ibid.

16 The OTA assessment *Fueling Development: Energy Technologies For Developing Countries*, OTA-E-516 (Washington, DC: U.S. Government Printing Office, April 1992) provides an extensive analysis of developing country energy and related environmental issues.

17 World Bank, "Capital Expenditures for Electric Power in the Developing counties, " IEN Energy Series Paper No. 21, February 1990, in World Bank, "The Bank's Role in the Electric Power Seetor," draft, Industry and Energy Department., box 5, p. 10.

18 U.S. Department of Energy, "National Energy Strategy Technical Annex 5: Analysis of Options to Increase Exports of U.S. Energy Technology," 1991/1992, DOE/S-0096P (Springfield, VA: National Technical Information Service).

suppliers. At the same time, some U.S. firms have their own proprietary technologies.

American firms are major providers of air pollution control equipment (for power generators and industrial facilities) in a number of markets. U.S. firms garnered a quarter of Brazil's 1992 air pollution control imports (Sweden, Germany, and France together accounted for half). U.S. firms also accounted for over 25 percent of 1989 Mexican air pollution control imports (versus 20 percent for Germany, 14 percent for Japan, and 7 percent for Switzerland) .19 In Singapore, American products earned nearly 40 percent of the 1991 import market share, with less than 15 percent from Japan and under 10 percent from Germany .20

Making environmental technologies affordable is critical to gaining markets in developing countries. Japan has embarked on a program to adapt power plant pollution control equipment to meet less rigorous emission requirements of developing countries at far less cost than would be required in Japan, America, or Western Europe.[21] Japan also plans to lease air pollution abatement equipment in Asian developing countries.[22]

Cleaner generation technologies can offer more cost-effective environmental performance than the use' of add-on pollution abatement technologies. A variety of ''clean coal''[23] technologies and combustion turbines (gas turbines) can allow developing countries to use their fossil fuel resources more cleanly and efficiently. In the clean coal area, the Department of Energy notes that the United States is at the technological forefront but that U.S. vendors have not been leaders in marketing abroad. DOE points to German, Japanese, French, Swedish, and Italian suppliers as the strong competitors.[24] Increasing competition to American suppliers is found in the combustion turbine business. General Electric is a major supplier in this sector. GE and its business associates abroad (various European and Japanese firms) who assemble turbines using key GE components supply roughly half the world's gas turbine market.[25] ABB, Siemens (Germany), Westinghouse, Pratt & Whitney, Rolls-Royce (UK), and Mitsubishi (Japan) are among others competing for this market. Licensing and joint ventures among competing manufacturers make competitiveness assessments difficult.

In the renewable energy sector, U.S. companies also face tough Japanese and European competition.[26] While the market is now small, it is likely to grow as renewable energy costs decrease and if increasing concerns about global climate change force changes in energy sources. Furthermore, some renewable energy technologies are well suited to developing country circumstances where settlements are far from existing electricity grids. German, Japanese, and Korean firms are among America's competitors in photovoltaic cell production. Siemens of Germany, which recently purchased ARCO Solar in the United States, is reportedly the world's largest photovoltaic cell manufacturer. Siemens exports 75 percent of its U.S. production.[27] Danish, Dutch, Japanese, and German companies are among those who make utility-scale wind turbines. U.S. Windpower has been active in seeking developing country markets.[28] Japan is noted

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19 USAID, *Environmental Market Opportunities. . . .* Op Cit., pp. 44,105.

20 U.S. Department of Commerce National Trade Data Bank.

21 ''Japan to Work with China in Developing Cheap Desulfurization Units for Plants,'' *International Environment Reporter,* July 29, 1992; Kawasaki Heavy Industries, Ltd., informationbooklet, 1992.

22 "JapaneseTradeM inistry To Lease Anti-Pollution Devices To Developing Nations, '' *InternationalEnvironmentReporter,* July 15,1992, p. 469.

23 Clean coal technologies refer to a variety of technologies including precombustion cleanin g of coal to remove polluting components, cleaner combustion technologies, andpostcombustion clean-up of stack gases. Stack gas clean-upwas referred to in the previous paragraph.

24 U.S. Department of Energy, "National Energy Strategy Technical Annex 6: Clean Coal Export Programs," 1991/1992, DOE/S-0095P (Springfield, VA: National Technical Information Service), p. 2. DOE's usage of the term "clean coal" also refers to end-of-pipe controls.

25 Eugene Zeltman, General Electric, personal communication, Feb. 3, 1993.

26 A forthcoming OTA assessment, *Renewable Energy Technology: Research, Development, and Commercial prospects,* will analyze technological and commercial aspects of renewable energy.

27 Mark Crawford, ''Seven Companies Awarded DOE Solar Grants,'' *Energy* Daily, Apr. 24, 1992, p. 3.

28 Jim Clarke, ''U.S. Firms Seek to Market Wind Power in LDCs,'' Energy Daily, Nov. 18, 1992, pp. 1-2.

as a leader in the hydroelectric sector.[29] Biomass, geothermal, and solar thermal are other renewable energy options for electricity production.

Improving energy end use efficiency through better motors, lights, appliances, controls, heating, cooling and ventilation, and insulation may lead to other environmentally preferable business opportunities. Improving energy efficiency can offer a "least-cost" option for meeting energy service demand by allowing countries to avoid installation of expensive additional electricity generation capacity as well as future fuel costs. As such, improved energy efficiency can present lower up-front costs and conserve capital for a country or utility.[30] However, efficiency investments often have a high first cost for consumers which dissuades investment. Innovative financing for improved energy or electricity use efficiency can help overcome the consumer first cost problems. Pioneered in the United States by utilities, regulators, "energy service companies,' and environmental organizations, such 'demand-side management" approaches are being adopted by developing country utilities (e.g., the Electric Generating Authority of Thailand) .31 The potential for exports of energy-efficient products to developing and NIC markets is large-perhaps $4.2 billion annually over the years 1990-2000 (for both electrical and nonelectrical energy conservation) .32 However, U.S. firms may not now be well positioned to tap this market because of tough competition from Japanese and European vendors already positioned in developing countries and low-cost Korean and Taiwanese competition.[33] In fact, the United States is a net importer of some energy-efficient products such as compact fluorescent bulb ballasts.[34] Efforts by American manufacturers and government export promotion officials to target energy efficiency export opportunities are in their early stages.

Transport

The growth of motorized transportation in developing and newly industrialized countries provides another business opportunity for U.S. environmental technology. The United States was the first major nation to institute strong vehicle emissions controls. The removal of lead from gasoline, installation of catalytic converters, and desulfurization of fuel were undertaken in the United States in the 1970s. Japan quickly adapted some of its requirements to U.S. standards, in part to qualify its automotive exports to U.S. markets. Several European countries, Australia, Canada, and South Korea followed in the 1980s.[35] However, only in 1993 has the European Community (EC) required the types of vehicle controls the United States has had for nearly two decades. As the United States continues to strengthen vehicle emission standards and several industrialized nations research electric, fuel cell, and hydrogen-powered vehicles, several countries in the developing world also appear to be following the initial U.S. path.

Mexico, Brazil, Taiwan, and South Korea are among fast-industrializing countries that are requiring catalytic converters on new gasoline-powered cars. Argentina, Chile, Venezuela, Egypt, Turkey, India, Singapore, and Thailand are expected to follow suit later in the 1990s. Brazil, South Korea, and Taiwan are projected to join the U. S., Canada, Japan, and Western Europe in requiring stricter control-including the use of filters and catalysto--of diesel vehicle emissions.[36] These requirements create markets for catalytic comverters and diesel emissions control devices. The

29 U.S. Department of Energy, "National Energy Strategy Technical Annex 5: Analysis of Options to Increase Exports of U.S. Energy Technology," 1991/1992, op. cit., p. 47.

30 U.S. Congress, Office of Technology Assessment, *Fueling Development: Energy Technology For Developing Countries*, OTA-E-516 *(Washington DC:* U.S. Government Printing Office, April 1992), p. 7.

31 International Institute for Energy Conservation, Seizing *the Moment: Global Opportunities for the U.S. Energy-Efficiency Industry*, December 1992, p. 4.

32 Ibid., p. 69.

33 U.S. Department of Energy, "National Energy Strategy Technical Annex 6," op cit.

34 International Institute for Energy Conservation op cit., p. 64.

35 H&W Management Science Co@@@ *International Mobile Source Emissions* Controls *Market Study: Update* No. *1*, prepared for the Manufacturers of Emission Controls Association August 1990.

36 Ibid.

largest producers of catalysts used in vehicle catalytic converters are Johnson Matthey (British headquartered with extensive U.S. operations) and U.S. companies Allied-Signal and Engelhardt; Degussa of Germany and a number of Japanese and Taiwanese firms have smaller shares of the market.[37] Allied-Signal has recently expanded operations in France and Mexico and has a joint venture in Japan. W.R. Grace may enter the market as it researches electrically heated catalysts to meet future California standards. The substrates on which catalysts lie inside catalytic converters are made by a number of U. S., Japanese, and European firms. Coming is a major manufacturer with manufacturing facilities in Germany and licenses to Japanese manufacturers.[38] American firms are competitive in the mobile source controls market.

Catalytic converters require unleaded gasoline. The technology for producing low-sulfur fuels and unleaded, reformulated, and oxygenated gasoline can also be a source of revenue for U.S. firms. For instance, Mexican refineries are being adapted to make less-polluting fuels. The U.S. companies HRI, Texaco, and Foster Wheeler are under contract to provide technologies for three Mexican refineries.[39] Refurbishment and replacement of public transit vehicles—including vehicles powered by natural gas-are yet another export chance created by environmental concerns; and another area where U.S. manufacturers face strong foreign competition.

Solid and Hazardous Waste Management

Many developing nations have limited capabilities for safe and efficient waste collection and disposal. For instance, there are no sanitary landfills in Pakistan.[40] Turkey, an OECD member, has neither sanitary landfills nor incinerators, and Mexico's landfill capacity is sufficient to meet the needs of only 21 percent of the population.[41] Modem facilities for the management of hazardous and specialized (for instance, medical) wastes are often lacking; these wastes frequently end up being left at municipal dumps if not in wetlands, quarries, or along roads. Recycling, however, can occur at relatively high rates within the informal sector of developing country economies as poor people salvage materials from the discards of others.[42]

As countries seek to develop waste handling infrastructures, business opportunities arise for architecture/engineering and construction firms to design and build landfills and incinerators; for suppliers to sell a range of products, from landfill liners and trash handling equipment to incinerator/waste-to-energy technologies and monitoring instruments; and for service companies to operate disposal sites and recycling centers. Among larger national waste management programs are Taiwan's plans to spend $3.5 billion on 23 solid waste disposal projects during the current Six-Year Development Plan and South Korea's 1991-95 plan to invest $2.6 billion by 1995 on waste management projects, including 55 incinerators.[43] South Korea also plans to construct 34 sanitary landfills over the next 20 years. Energy recovery and pollution abatement for existing refuse incinerators in places like China also present market opportunities.

American and European firms are establishing hazardous waste treatment facilities in developing countries. Waste Management International, subsidiary of Waste Management, Inc., operates hazardous waste facilities in Hong Kong and Singapore and is in the process of building such a facility in Java,

37 Stephen Lipmann, "U.S. Environmental Companies' Competitive Strategies: Eleven Case Studies," OTA Contractor Report, March 1993.

38 Clifton L. Smith, Corning Inc., presentation at "The Clean Air Marketplace," Tysons Corner, V' Apr. 22-23, 1992.

39 USAID, *Energy and Environment Market Conditions in Mexico*, Business Focus Series, March 1992 (available through USAID, Arlington, VA), p. 27.

40 Aban Marker Kabraji, Pakistan's representative to the International Union for the Conservation of Nature and Natural Resources, Presentation at GLOBE '92, Vancouver, BC, Canada, Mar. 16-20, 1992.

41 International Finance Corporation, *Investing in the Environment. . . .* Op cit., p. 16.

42 Ibid.

43 American Institute in Taiwan, Op cit.; Republic of Korea Ministry of Environment, Op Cit.

Indonesia.[44] The Danish company I. Kruger has won the contract to develop in Malaysia an integrated hazardous waste treatment and disposal facility along with three regional collection centers; facilities are expected to be on-line by 1995.[45] In Brazil, a $60-million facility featuring a $30-million Finnish incinerator will be built by Ecoclear (Italy) and Gestao de Empreendimentos (Brazil) in Rio de Janeiro.[46] American firms account for over 70 percent of Mexican imports of solid and hazardous waste equipment (1989).[47] U.S. opportunities in waste-to-energy facilities and hazardous waste incineration are strongly challenged by German, Japanese, Swiss, and Scandinavian firms.

As in the case of water and wastewater treatment infrastructure development, most expenditures for nonhazardous and hazardous waste management are likely to be spent on locally obtained labor and materials and on lower-technology components for which U.S. firms may not be the low-cost supplier. American companies can be competitive in design, management, and operation of private or govemment-contracted facilities, and in the supply of relatively sophisticated materials handling, treatment, incineration, and monitoring equipment. Incinerators and waste-to-energy plants present opportunities for supply of air pollution control equipment, while water pollution treatment technologies may be required for sanitary landfills.

Industrial Production

The success of the NICS, which other developing nations are trying to replicate, depended on rapid growth in manufacturing industries. Industrial growth brings increased pollution but also can contribute to the prosperity needed that can be used to battle pollution. Polluting industrial activities found in the NICS and developing countries are too numerous and heterogeneous to discuss succinctly. They range from myriad small metal shops and tanneries to large chemical, petroleum refining, and steel complexes. Textiles, primary metals, food products, electronics, automobile assembly, plastic and rubber products, paper and pulp, cement, and manyotherproducts made for domestic markets and for export generate varying levels of pollution when made.

These sectors are increasingly regulated or coming under other forms of pressure to control wastes and pollution. Thus, opportunities arise for purveyors of environmental goods and services to help retrofit, modernize, and develop newer and cleaner industrial facilities. For instance, state oil companies plan to make investments to improve the environmental performance of their refineries in Brazil, Mexico, and Taiwan.[48] Private and state-owned mining and smelting companies in Chile are making or plan to make investments in scrubbers and new smelting equipment to lower sulfur dioxide emissions.[49] Some U. S., European, and Japanese multinational corporations bring home-country or stricter-than-local corporate environmental standards to their developing country operations. Developing countries share with the U. S., Europe, and Japan the industrial challenge of phasing out chlorofluorocarbons (CFCS).

In many cases, the environmental equipment and services required is similar to that described above for wastewater, electric power, and waste handling. Dust and particulate control is often the initial air quality priority, as standard sewage treatment is for water. Scrubbing of sulfur and nitrogen oxides, odor and hydrocarbon emissions control, and control of heavy metals and other hazardous substances are other priorities. Designing and equipping wastewater and solid and hazardous waste facilities for industrial parks is a promising area. Such environmental facilities serving numerous industrial waste and effluent generators can effect pollution control at lower costs to enterprises than if each one had its own treatment facility.

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44 Patrick Heininger, waste Management International, presentation to the U.S. Environmental Technology Seminar, Jakarta, Indonesia, Oct. 27, 1992.

45 Environmental Management and Research Association of Malaysia (ENSEARCH) Briefing to U.S. Environmental Technology and Business Mission Participants, Oct. 30, 1992.

46 USAID, Environmental Market *Opportunities*. . . . Op. cit., p. 51.

47 Ibid., p. 118 and U.S. Department of Commerce National Trade Data Bank.

48 American Institute in Taiwan, "Listing of Taiwan's. . .", op. cit.; and USAID, *Environmental Market Conditions. . . . op. cit.*

49 USAID, ibid.

Despite certain economic advantages in centralized treatment and disposal of industrial wastes and effluents, there are also environmental business opportunities at the enterprise level. For instance, metal finishers and electronic plants generate wastewater containing heavy metals. Where effluent standards exist and are enforced facilities typically use chemicals to precipitate metals into a sludge which is then removed for disposal. In developing countries, as in the United States, Canada, Europe, and Japan, there is the possibility of removing and recovering metals from water by means of ion exchange. American, European, and Japanese firms produce ion exchange resins and apparatus and could be competitive suppliers to the NIC and developing nation markets. The first reported vendor of an ion exchange effluent control system in Malaysia is RMC Dornier, a subsidiary of Deutsche Aerospace (which is owned by Daimler-Benz).[50] Ion exchange is just one example of pollution control and prevention equipment applicable to particular industries at the plant level. Solvent and aqueous bath recovery, volatile organic compound recovery or destruction, odor control, and particulate control are among others.

U. S., European, and Japanese firms are also the leading actors in the development of cleaner industrial production approaches. Often pollution prevention approaches can save money and improve quality, whereas end-of-pipe control and disposal is almost always a cost to business. Opportunities arise for architecture/engineering firms to design and for American industrial firms to invest directly in cleaner production facilities in developing countries.

Finally, past industrial activities have resulted in contaminated sites from which a hazardous substance remediation market may arise. The United States is a leader in this area because of strict requirements under Superfund and the Resource Conservation and Recovery Act. Underground storage tank requirements and attention to contaminated Defense and Energy Department sites further propel the U.S. EGS industry. European and Japanese concerns over their contaminated lands have stimulated remedial activities in those countries, sometimes using American developed technologies but sometimes employing their own technologies (e.g., Dutch soil washing technology). However, remediation markets in developing and NIC economies are likely to remain quite modest for some time. Developing country environmental priorities generally lie in limiting additional environmental insult through establishment of wastewater treatment and waste disposal infrastructure, and requiring environmental controls on new and existing industrial facilities. Furthermore, many developing countries have had a relatively short history of activity in toxic chemical-intensive industries. Although there may be individual circumstances where contaminated sites present an extraordinary hazard or where leaked chemicals and fuels might be recovered for use, generally remediation will be a lower priority.

Environmental Monitoring

Although relatively small, the market for environmental monitoring and testing can be the linchpin for the development of environmental regulations, standards, and enforcement. As such, the use of development assistance and export promotion programs to target developing and NIC markets in environmental monitoring and testing instruments may yield long-term commercial dividends.

Countries developing an environmental regulatory capability need to be able to monitor the state of the environment, establish quantifiable standards, and monitor compliance. Pollution-monitoring devices, analytical instruments, fine chemicals and chemical test kits, and various laboratory supplies are required to perform such functions. Instruments and laboratory protocols adopted by a country's environmental agency might determine the types of instruments that will be used by state or provincial officials, municipalities, water and sewer authorities, private laboratories, and regulated industries. American instrument manufacturers compete with Japanese, German, and other European manufacturers. In southeast Asia, Australian instruments also compete. Cost as well as precision are important, so the best technology may not be the best seller. American technologies are often perceived as too expensive and overengineered. An advantage the United States does have is the good reputation the U.S. EEA and its standards have abroad, and the widespread

50 Malaysia Department of the Environment Briefing to U.S. Environmental Technology and Business Mission Participants, Kuala Lumpur, Oct. 29, 1992; and EnviroPro '92 Conference and Trade Show display, Kuala Lumpur, Oct. 30, 1992.

use of American Water Works Association, Water Environment Federation, and other U.S. industry and professional standards internationally. America's European and Japanese competitors are interested in promoting the use of their standards in developing country markets.

Japan's funding of environmental management centers in several Asian countries has the potential to strongly influence the choice of instruments and standards in those countries. For instance, Japan is financing and equipping the central reference laboratory for the Indonesian environment agency BAPEDAL.[51] The use of Japanese manufactured equipment for official standard-setting and monitoring may influence provincial and local authorities and private companies to purchase like equipment from Japan. The provision of equipment to standard-setting and enforcement agencies can be a gateway to further sales.

CONCLUSION

The trends point to increased environmental concerns in developing countries. Improvements in infrastructure, expanding industry, and growing environmental administrative capacity point toward an expanding market for environmental technologies and services. While much of the environmental expenditures will flow to local and regional providers of labor, materials, and lower-technology products, there will be important opportunities for American companies to export their equipment, instruments, and technical and managerial expertise. U.S. environmental companies face considerable competition from foreign firms, chiefly from Europe and Japan but also from developing and newly industrialized country companies with growing capabilities.

[51] BAPEDAL, Briefing to U.S. Environmental Technology and Business Development Mission Participants, Jakarta, Indonesia, Oct. 26, 1992.

Appendix B: U.S. Export Promotion Activities and Environmental Technologies

COORDINATION OF FEDERAL ACTIVITIES

Federal export promotion and financing responsibilities are divided among many agencies. The agencies with primary or major missions to promote U.S. exports and interact with and provide services to U.S. companies are the Department of Commerce, the Export-Import Bank of the United States (Eximbank), the Overseas Private Investment Corporation (OPIC), and the Trade Development Agency ('IDA). The Office of the U.S. Trade Representative, the Department of State, and the U.S. Treasury are all important in developing trade policy and conducting the United States' policy agenda and negotiations. The Department of Agriculture plays a critical role in promoting U.S. agricultural exports. Other agencies may be active in some trade promotion activities, but this is not their main mission. Encouraging U.S. private sector involvement in development assistance is a feature of several U.S. Agency for International Development (USAID) programs and activities. The Department of Energy (DOE) and the Small Business Administration (EPA) are involved in export promotion to further specific agency missions. Other agencies, such as the Environmental Protection Agency @PA), may become involved because of their special expertise or responsibilities.

With so many programs and agencies, there has been growing recognition that Federal programs are poorly coordinated, often duplicative, and that an overall strategy to guide Federal activities has been lacking. Recent initiatives by Congress and the executive branch aimed at improving program coordination and developing a more strategic emphasis are discussed below. Some of the initiatives focus on environmental goods and services. Table B-1 shows selected Federal programs pertinent to promotion of environmental exports.

Trade Promotion Coordinating Committee

The interagency Trade Promotion Coordinating Committee was set up in May 1990 by former President Bush with the aim of consolidating and streamlining Federal export promotion activities. Congress, in the Export Enhancement Act of 1992, gave statutory status to the TPCC, which is chaired by the Secretary of Commerce.[1] The Export Enhancement Act also gave statutory direction for an Environmental Trade Working Group under the TPCC to develop a strategy to expand U.S. exports of environmental technologies, goods and services, and to address all issues related to export promotion and financing of environmental technologies.[2]

The Export Enhancement Act identifies 12 permanent members of the TPCC (see table B-2). Box B-A

[1] Export Enhancement Act of 1992, Public Law 102-429, Sec. 201. TPCC's predecessor was the Interagency Task Force on Trade. U.S. General Accounting Office, *Export Promotion: Federal Programs Lack Organization and Funding Cohesiveness*, NSAID-92-49 (Gaithersburg, MD: U.S. General Accounting Office, Jan. 10, 1992), p. 7.

[2] Export Enhancement Act, 1992, op.cit., SeC. 204(a).

Table B-I-Selected Federal Programs That Can Promote EGS Exports

Activity	Export Education	Market Info.	Financing & insurance	Trade Missions & Travel	Feasibility Studies	Overseas Presence	Technology Training & Cooperation
Department/Program*							
AGENCY FOR INTERNATIONAL DEVELOPMENT							
American Business Initiative		x			x		
Bureau for Private Enterprise		x					x
Market and Technology Access Project							x
U.S.-Asia Environmental Partnership		x		x		x	x
Energy Technology Innovation Project				x	x		x
Energy Training Project					x		x
Environmental Credit Program			x				
Environmental Enterprises Assistance Fund			x				
Energy Efficiency Centers in E. Europe						x	x
Private Investment and Trade Opportunities		x		x		x	x
Project in Development & the Environment		x			x		x
Environmental Improvement Project		x			x	x	x
Capital Development Initiative		x			x		x
DEPARTMENT OF COMMERCE							
U.S. & Foreign Commercial Service	x	x		x	x	x	
Eastern Europe Business Info. Centers		x		x		x	x
L. Am./Carib. Business Development Center		x		x		x	x
E. Europe Enviro. Business Consortium		x					
Natl. Enviro. Technologies Trade Initiative		x		x			x
DEPARTMENT OF ENERGY							
Export Initiative Program		x					x
Coal and Technology Export Program		x		x	x		x
Support to Energy Efficiency Centers						x	x
Committee on Renewable Energy Commerce and Trade (CORECT)		x		x	x	x	x
Federal International Trade and Development Opportunities Program					x		
ENVIRONMENTAL PROTECTION AGENCY							
Office of International Activities		x		x		x	x
U.S. Environmental Training Institute				x			x
Regional Environment Center (Budapest)		x				x	x
Caribbean Environmt. & Developmt. Instit.		x				x	x
Clearinghouses		x					x
Technical Information Packages							x
EXPORT-IMPORT BANK			x		1		
OVERSEAS PRIVATE INVESTMENT CORP.		x	x	x			
Environmental Investment Fund (not yet capitalized)			x				
SMALL BUSINESS ADMINISTRATION	x		x	x			
TRADE AND DEVELOPMENT AGENCY		x		x	x		x

● Programs in italics have substantial interagency, state, or private sector participation in managing the program.

SOURCE: Office of Technology Assessment.

discusses responsibilities of several key agencies pertinent to promotion of environmental exports.

The Export Enhancement Act calls on TPCC to, among other things, propose to the President "an annual unified Federal trade promotion budget" to support priority activity and improved coordination and eliminate funding for areas of overlap and duplication.

Implementation of the new mandate by the Clinton Administration was just beginning when this paper was completed in the spring of 1993. In its initial two years under the Bush Administration, TPCC functioned through 13 area, sector, or activity-based working groups that were chaired by a senior Commerce Department official, and were sometimes co-chaired by an official of another agency.

The TPCC also setup a one-stop information center, called the Trade Information Center. The Center directs inquiries from new-to-export and new-to-rnarket firms to Federal agency programs for assistance. Firms must still apply separately to the individual agencies for assistance; consequently, one-stop shopping is far from fully achieved. (Another referral service, the Center for Trade and Investment Services administered by USAID's Bureau for Private Enterprise, focuses specifically on developing countries.)

Table B-2—Members of the TPCC

The Department of Commerce
The Department of State
The Department of the Treasury
The Department of Energy
The Department of Agriculture
The Department of Transportation
The Office of the United States Trade Representative
The Small Business Administration
The Agency for International Development
The Trade and Development Agency
The Overseas Private Investment Corporation
The Export-Import Bank of the United States
and other agencies at the discretion of the President[a]

a Although the Export Enhancement Act does not list EPA as a member agency, it does stipulate that EPA will partcipate in the Environmental Trade Working Group.

SOURCE: Export Enhancement Act of 1992, Public Law 102-429, section 201.

Working Group on Environmental Trade Promotion

The 1992 Export Enhancement Act declared that it is the "policy of the United States to foster the export of United States environmental technologies, goods, and services. In exercising their powers and functions, all appropriate departments and agencies of the United States Government shall encourage and support sales of such technologies, goods, and services. "[3]

Toward this end, the law directs the President to establish an Environmental Trade Working Group as a subcommittee of TPCC. Its purposes are to: 1) "address all issues with respect to the export promotion and export financing of United States environmental technologies, goods and services"; and 2) "to develop a strategy for expanding United States exports of environmental technologies, goods and services. "

Membership is to include representatives from TPCC agencies and the Environmental Protection Agency. The working group chair, to be a senior Department of Commerce employee, is to assess the effectiveness of current programs, recommend improvements, and ensure effective coordination of existing programs. The chair is also to assess, with the EPA representative, the extent to which the working group's environmental trade promotion activities advance the environmental goals of Agenda 21, which was adopted by most nations at the UN Conference on Environment and Development, held in Rio de Janiero in June 1992. Agenda 21 includes specific action plans for cooperation between the developed and developing world for addressing environment and development needs in a more integrated fashion.

In April 1993, President Clinton announced that he was asking the Department of Commerce, DOE, and EPA to "assess current technologies and create a strategic plan" for environmental trade development and promotion, and technical assistance. An Interagency Working Group on Environmental Technology has been established to work on these tasks. It has three subgroups: the international (export promotion) subgroup; the technology development subgroup; and the business development subgroup (developing the internal market). The aims of the international subgroup

`b United States-Asia Environmental Partnership, *Annual Report 1992,* p.3.

Box B-A-Federal Agencies and Environmental Export Promotion

Agencies with Major Export Promotion Responsibility

The Department of Commerce (DoC)

The secretary of Commerce chairs the Trade Promotion Coordinating Committee. DoC's International Trade Administration (ITA) is a principal agent of export promotion. ITA runs the U.S. and Foreign Commercial Service (US&FCS) which gathers data through foreign posts, and distributes the data through several communication media and 47 district offices (and 21 branch offices). The US&FCS provides export education, market/sector reports, and trade leads, and organizes a range of activities including individual company visits to foreign markets, trade missions, and trade fairs.

U.S. Export-Import Bank (Eximbank)

Eximbank aims to promote U.S. exports by accepting credit risks not accepted by the private sector. It also administers a small "WarChest" to neutralize the effects of foreigngovernment tied aid credits (ch. 4). The bank provides the following services: guarantees to repay commercial lenders should foreign buyers fail to pay for Us. exports; direct and Intermediary loans to foreign buyers of U.S. exports to match officially supported foreign credit competition; export credit insurance to protect exporters against nonpayment by foreign buyers; working capital guarantees to encourage lenders to make bans to small companies that need funds to produce and market goods for export.[1] Eximbank is further discussed in the text.

The Overseas Investment Corporation (OPIC)

This Federal agency promotes U.S. private Investment In over 120 developing countries. OPIC assists U.S. investors to finance investment through direct bans and ban guarantee% insures investment projects against abroad range of political risks, and provides a range of other investor services.[2] OPIC has recently been attempting to establish an International Environmental Investment Fund to stimulate U.S. Investment in developing countries in environmentai areas. However, the fund has not been capitalized, Kidder Peabody has terminated its management of the fund, and OPIC is looking for a new fund manager.

The Trade and Development Agency (TDA)

The mission of this small, commercially oriented foreign assistance agency is to encourage project managers in developing and middle-income countries to use U.S. goods, services, and technologies for major capital infrastructure projects. TDA grants support studies to establish the economic, financial, and technical feasibility of proposed projects. Grants go to the host country, which must select (through a competitive process) a U.S. firm to carry out the study. Other support includes technical assistance grants; orientation visits (reverse trade missions); helping developing country officials attend symposia displaying U.S. technologies; grants to train workers and technicians; and grants to multilateral development banks for feasibility studies and other planning services. TDA's role is further discussed in the text.[3]

Other Agencies

U.S. Agency for Internatinal Development (USAID)

While not an export promotion agency, many USAID activities may promote U.S. exports in the broader context of its development assistance mission. USAID supports project development activities such as feasibility

[1] Export-Import Bank of the United States, Descriptive Information Sheet.

[2] OPIC, "Investor Services", Informational Brochure.

[3] U.S. TDA, *U.S. Trade and Development Agency, 1992 Annual Report*, February 1993.

Continued on next page

Box B-A-Federal Agencies and Environmental Export Promotion--Continued

studies, reverse trade missions, and energy and environmental training. In addition, the Bureau for private Enterprise works to develop relationships between USAID and the private sectors of the United States and developing countries, encouraging participation in both publicly and privately financed development projects.

Several USAID activities focus on EGS activities. Those most pertinent to EGS export promotion include, among others: the U.S.-Asia Environmental Partnership (described in the text); the Project in Development and the Environment (which provides technical assistance to the Near East on environmental and natural resource management); the Environmental Credit Program (loans and loan guarantees for environmentally preferable projects that promote export of U.S. technology);[4] and the Environmental Improvement Project, setup in the fall of 1992, which aims to reduce urban and industrial pollution in the ASEAN countries. The Environmental Enterprises Assistant Fund receives USAID funding to promote direct loans and equity to promote the dissemination of environmental technologies in developing countries. USAID's role in environmental ODA and environmental export promotion is discussed in more detail in chapter 5.

Departmenf of Energy (DOE)

Several DOE programs promote exports of U.S. energy efficiency technologies and dean energy technologies. These include the CORECT progam to promote export of renewable energy technologies (see later), and the Coal and Technology Export Program. DOE also provides support to the Energy Efficiency Centers in Eastern Europe. The Export Initiative Programs (in DOE's Offices of International Affairs) promotes the export of energy-related goods, helping firms identify export opportunities and financing, and coordinating activities with other agencies. DOE also cooperates with developing and middle-income countries to transfer dean energy and energy-efficiency technologies. The 1992 Energy Policy Act authorized major new DOE/USAID efforts to transfer innovative U.S. energy-efficiency and environmental technologies to developing countries, but funds for these programs have not been appropriated.

Environmental Protection Agency (EPA)

Although not an export promotion agency, EPA is a member of the Environmental Trade Working Group of TPCC and several EPA offices are involved in technology cooperation activities pertinent to export promotions EPA was Instrumental in the launching of the U.S. Environmental Training Institute (USETI, discussed subsequently). Foreign companies can use EPA's Vendor Information System for Innovative Treatment Technologies (VISITT), a database containing information about 154 U.S. companies' technologies to treat contaminated groundwater, soils, sludges, and sediments.

EPA, USAID, and DOE cosponsor the Environmental and Energy Efficient Technology Transfer Clearinghouse (managed by a nonprofitt business organization, the World Environment Center). EPA helped set up three energy-effiency centers in Eastern Europe; with DOE, it will jointly fund and administer a new center in Moscow. EPA also helps support the Caribbean Environment and Development Institute and the Regional Environment Center for Central and Eastern Europe, which promote technology and policy cooperation. EPA provides funds for the only current environmental attache (export promotion is not the main thrust of this person% responsibilities, however).

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[4] EPA, *Global Markets for Environmental Technologies*, op. cit.

[5] From discussion with Julia Gallagher, Office of International Activities, U.S. Environmental Protection Agency, Feb. 5, 1993; and U.S. Environmental Protection Office, Task Force on Technology Cooperation and Export Assistance, *Global Markets for Environmental Technologies; Defining a More Active Role for EPA Within a Broader U.S. Government Strategy*, EPA 160-R-92-001, December 1992.

appear similar to the environmental trade working group called for in the Export Enhancement Act.

The United States-Asia Environmental Partnership (USAEP)

USAEP is an export promotion and development assistance program aimed at helping countries in the Asia-Pacific region to solve environmental problems using U.S. environmental goods and services. It is intended to be a partnership on at least three levels: between different government agencies, between government and the private sector, and between Asia and the United States. It is too early to measure USAEP'S success.

So far, USAEP is funded primarily by discretionary funding from USAID. USAID plans to contribute $100 million in core funding over 5 years,[4] although this commitment can be withdrawn any time. USAEP also is in the early stages of identifying alternative sources of funds and other resources, both public and private.

On the government side, USAEP includes over 20 U.S. government agencies. During the Bush Administration, coordination was facilitated through a special TPCC working group, co-chaired by USAID and the Department of Commerce. USAEP is intended to provide "one-stop shopping" for all areas of U.S. government assistance, including technology showcasing, training and technology transfer, export financing and risk insurance, and feasibility study funding. A small secretariat provides technical assistance and facilitates public-private interaction.

USAEP activities are intended to encourage technology cooperation between U.S. firms and Asian businesses. By promoting sales, licensing, and joint ventures, it hopes to help Asian firms meet environmental requirements while achieving operating efficiencies. It also seeks to transfer U.S. technology and know-how about environmental and energy-efficient infrastructure for publicly sponsored infrastructure projects in Asia. It aims to support training and other human resource development, as well as institutional development related to environmental technology transfer and networking between Asian and American organizations. USAEP in addition is seeking to support protection of biodiversity.

By late 1992, the Secretariat had 10 projects on-line and 10 in the planning process.[5] For example, it plans to set up an Infrastructure Advisory Service to coordinate U.S. government financing, providing one-stop financing to help U.S. companies participate in development infrastructure projects. It is also planning a service to gather, organize, and disseminate information about Asian environmental trade and investment opportunities, in conjunction with other business information services.

USAEP is in the process of placing "business representatives" in nine Asian countries to identify opportunities and contacts for U.S. companies. It also may support the personnel costs of placing an environmental infrastructure specialist in the Asian Development Bank and perhaps the World Bank to monitor Asian environmental projects.

USAEP also has an arrangement with the National Association of State Development Agencies (NASDA) called the USAEP/NASDA Technology Fund, launched Oct. 1, 1992. Through NASDA, state agencies and local trade organizations may apply to USAEP for matching funds ($10,000-$30,000) for U.S. businesses to develop trade opportunities in Asia. Proposals that target specific commercial opportunities in less developed Asian nations, including participation of several companies, and involving small or medium-size enterprises, will be given greater consideration. Use of the funding is flexible and can include shipment of demonstration equipment, travel expenses, training, technology adaption, etc. As of March 1,1993, the new environmental fund awarded grants totaling $383,000 for 18 projects. (See subsequent discussion of State coordination.)

Committee On Renewable Energy Commerce and Trade (CORECT)

CORECT was setup in 1984[6] to coordinate Federal policy and programs to promote exports in the renewable energy field. Chaired by the Secretary of Energy, CORECT includes 14 Federal agencies and

4 United States-Asia Environmental Partnership, *Annual Report 1992*, P. 3.

5 "US-AEP Program Review and Status Report, cable *transmitted Nov.* 30, 1992, from USAID Asia Bureau to all posts in Asia.

6 Renewable Energy Industry Development Act of 1983, Public Law 98-370, amended by the Renewable Energy and Energy Efficiency Technology Competitiveness Act of 1989, Public Law 101-218.

industry (often represented through the Export Council for Renewable Energy (ECRE)).

CORECT's structure encourages a close relationship between Federal agencies and industry. Industry representatives influence the priority setting and program planning processes of CORECT through frequent "Focus Group Meetings" with Federal agency officials. Once a task is identified as meriting support, each agency can commit resources depending on its own mission and expertise. Although Congress has given funds to DOE for administering the process,[7] each agency maintains control of its own resources.

It is difficult to evaluate the impact of CORECT on exports of U.S. renewable energy technologies because public trade data is incomplete and the industry reveals little about its trading activities.[8] A recent U.S. General Accounting Office report[9] notes that CORECT did not meet a congressional deadline to formulate a plan for increasing renewable energy exports. Still, CORECT has identified barriers to exporting, investigated markets, and sponsored trade promotion events, which could comprise basic components of a trade plan. CORECT and ECRE have established a uniform application form to make it simpler for firms in the renewable energy field to apply for financing from USAID, Eximbank OPIC, and TDA. GAO also concluded that CORECT had been successful in pulling financial resources from Federal agencies and industry for trade development activities, as well as from multilateral institutions, and has been instrumental in developing new financing mechanisms. U.S. renewable energy technology firms must still, however, compete against very competitive foreign financing and subsidization schemes.

Recently, there has been interest in extending CORECT's approach to include energy efficiency, and DOE is planning to establish a parallel committee or a subcommittee of CORECT for this purpose.

TRADE DEVELOPMENT AND TRAINING

Trade development programs cultivate the potential for trade through such activities as trade missions, feasibility studies, reverse trade missions, and training. The Federal government is encouraging U.S. firms to provide training to developing country officials as a way to "promote the transfer of environmentally sound technologies and management principles."[10] Such training can help establish commercial relations between U.S. firms and developing countries, and may help promote sales of U.S. technologies.

U.S. Trade and Development Agency[11]

As discussed in Box B-A, TDA supports feasibility studies for development projects. TDA funds must be used to hire U.S. firms to carry out feasibility studies and other planning services. The host country chooses the U.S. company, however. Because TDA-funded feasibility studies are conducted by U.S. firms, there is abetter possibility that the firms will steer their clients to U.S. technologies for the subsequent development contract, than if foreign firms conducted the study.

TDA does not fund a study for a project unless U.S. goods, services, and technology in the sector are considered internationally competitive. It relies on consultations with technical advisers, other agencies and private sector groups to make this judgment. TDA-funded studies focus on infrastructure development in such sectors as energy, wastewater treatment, transportation, and telecommunications. In fiscal year 1992,33 percent of TDA's funding went to energy and natural resources projects; 12 percent went to water and environmental projects.[12]

TDA's approach can be advantageous to U.S. firms in the energy/environmental sector. In 1987, Black and Veatch International of Kansas City won a contract for a study for a power plant in Bang Pakong, Thailand. The Electric Generating Authority of Thailand (EGAT) had received a grant of $350,000 from TDA for the study. This led to an additional $30 million revenue for

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7 Congressional appropriations for CORECT administration were $1.48 million in 1991,$2 million in 1992, and $2.5 million in 1993.

8 This section is drawn from U.S. General Amounting Office, *Export Promotion, Federal Efforts to Increase Exports of Renewable Energy Technologies, GGD-93-29* (Gaithersburg, MD: U.S. General Accounting Office, Dec. 1992).

9 Ibid.

10 U.S. Environmental Training Institute, "U.S. *Environmental Training Institute: Catalogue of Courses, 1992".*

11 Formerly *the* Trade Development Program.

12 U.S. Trade Development Agency, 1992 *Annual Report, Washington* DC, 1993.

Black and Veatch in further engineering services contracts with EGAT, and because of pro-U.S. engineering specifications, a $64.6-million contract was awarded to General Electric for two 300-MW combined cycle gas turbine power plants. This further led to GE winning a similar contract in Rayong, Thailand. Black and Veatch was also selected as project management consultant for an integrated pulp and paper mill project funded at $200 million.[13]

The TDA funds reverse trade missions. This gener-m ally means paying for foreign procurement officials to travel to the United States and visit U.S. companies and plants, where they are exposed to U.S. technology. TDA also provides funds for foreign officials to come to U.S. trade and technology shows, and provides grants for training. These grants, which amounted to $2.7 milion in fiscal year 1992, can sweeten U.S. bids for development projects.

TDA's fiscal year 1992 appropriation was only $35 million, operating with a staff of under 40 people. For 1993$40 million was appropriated. Considering its small size, the program is judged by many to yield high returns in terms of exports per tax payer dollar. TDA estimates that for every dollar of TDA program expenditure, over $25 are returned to the U.S. economy in export income.[14] However, some of those exports (it is not known what percent) are themselves financed by other U.S. government agencies such as USAID and Eximbank, so the ratio of outlays received to U.S. government program expenditures would be lower. The General Accounting Office is currently conducting an assessment of the effectiveness of TDA's activities.

U.S. Environmental Training Institute

This organization encourages U.S. firms to provide training courses to qualified public and private sector officials from developing countries. Companies are responsible for funding operating costs and sponsoring courses. EPA, USAID, and TDA provided some start-up funds for the Institute, which is a nonprofit organization. EPA estimates that when in-kind contributions are counted, the Federal government support exceeds $1 million.[15]

The company that provides the training has an opportunity to showcase its technology and promote its adoption in developing nations. Companies are chosen on the basis of their technological track record and training capacity. Their technologies must be proven. EPA and other Federal agencies advise the Institute. If the course is approved, it is listed in a brochure and circulated through embassies and commercial offices. For 1993, 16 training courses are planned, including such topics as environmental remediation of nuclear sites, industrial wastewater treatment, clean air technologies, air pollution control technologies.[16]

EXPORT FINANCING FOR EGS EXPORTS

Exporting imposes heavy demands on cash flow. Small and medium-sized EGS firms may not be able to finance their own exports. Without a strong cash flow and collateral base, private banks will not finance export transactions. Comparatively few U.S. banks or private sector institutions are involved in export financing. The reasons for their lack of interest maybe similar to those that prevent companies from export-

13 Priscilla Rabb Ayres, Director, Trade and Development Program, testimony at hearings before the House Committee On Foreign Affairs, Subcommittee on International Economic Policy and Trade on "Reauthorization of the Trade and Development Program," Mar. 5, 1991, printed in *Foreign Assistance Legislation for Fiscal Years 1992-1993 (Part 6)*, p. 82.

14 Unpublished information provided by TDA, Feb. 8, 1992, and TDA 1992 Annual Report. The Annual Report gives the estimate Of OVer 25:1 (p. 2). TDA program expenditures through fiscal year 1990 were $160 million (Annual Report, p. B1.) TDA reports $4.6 billion in sales by U.S. companies throughfiscal year 1992 that were associated with TDA projects (AnnualReport, p. 2); TDA has informed OTA that $4.3 billion of those sales were associated with TDA projects funded no later than fiscal year 1990. If the sales associated with projects funded through 1990 ($4.3 billion) are divided by program expenditures through 1990 ($160 million), the ratio is about 27:1. It is likely that as additional pre-1991 projects mature, additional U.S. sales associated witb such projects will occur, thus increasing the ratio of sales to program expenditures for expenditures through 1990.

In fiscal year 1992, TDA obligated a total of $42.9 million, of which $39.4 million, or 92 percent, was for program activities (including $8 million in funds transferred from other agencies), and $3.5 million, or 8 percent, was for operating expenses.

15 U.S. Environmental Protection Agency, *Global Markets for Environmental Technologies: Defining a More Active Role for EPA Within a Broader Government Strategy*, December 1992, p. D-5.

16 photocopy sheet from US-ETI, "1993 USETI Schedule of Training Courses."

ing: a large domestic market, geographic location, and risk and complexity of financing foreign transactions. Also, many banks closed their international divisions in the 1980s in response to the debt crisis in the Third World.[17]

While European SMES have considerable access to export financing, public financing programs in this country are limited.[18] Federal export financing is comparatively small and difficult to access, especially for small companies. Efforts are being made, though, to make federal export financing more available to SMES.

Export-Import Bank of the United States

U.S. government assistance for nonagricultural exports is provided primarily by the Export-Import Bank of the United States (Eximbank). In fiscal year 1992 Eximbank assisted $14 billion in exports.[19] As will be discussed in more detail in the final report of this assessment, U.S. firms get less government help with export financing than firms in many major competitor countries.[20]

Firms have complained that Eximbank is slow in processing applications and disbursing approved financing, that it is difficult to apply for Eximbank loans, and that financing coverage in some cases is inadequate.[21] Eximbank has been trying to address these concerns, especially for small business.[22] Eximbank traditionally relied on commercial banks to reach small business. However, U.S. banks have been cutting back on international lending, thus lessening access to small business. In recent years perhaps about 13 percent of Eximbank's assistance (by volume of exports assisted) has gone directly to small business.[23]

Eximbank has (among other things) set up a high-level administrative unit responsible for small business, streamlined approval of working capital loan guarantees of less than $2.5 million, and improved financing coverage in some cases. Under its city/state program, set up in 1987, state and city development and finance agencies can help firms to apply for Eximbank assistance and can add their own financing to Eximbank's. Eximbank plans to expand its five regional offices (which now handle only export credit insurance) to full-service offices (which would also handle loan guarantees and direct loans).

In the past, Eximbank did not give special attention to EGS exports. However, the Export Enhancement Act of 1992 specifically requires Eximbank to encourage "the use of its programs to support the export of goods and services that have beneficial effects on the environment or mitigate potential adverse environmental effects. " Eximbank is also to report annually on this effort.[24] Pursuant to the statute, the Bank's board has appointed an officer to advise it on ways to use Eximbank programs to support EGS exports.[25]

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17 Martha E. Mangelsdorf, "Unfair Trade, " *INC.*, vol. 13 (April 1991), p. 33.

18 William E. Nothdurft, Going *Global: How Europe Helps Small Firms Export (Washington, DC: Brookings Institution,* 1992) PP. *55-57.*

19 Eximbank, *Annual Report 1992,* p. 2.

20 One indicator is difference in volume of exports supported. One report for 1989 showed U.S. coverage at about 7 percent of total exports, compared with 32 percent for Japan, 4 percent for Germany, 21 percent for France, and 20 percent for the United Kingdom. First Washington Associates, Ltd. (Arlington, VA), "ComprehensiveD irectory of the World's Export Credit Agencies" (October 1991). Another indicator might be numbers of offices. Eximbank has five regional offices in the United States; by contrast, France has 22, and Canada *8,* domestic offices. Eximbank has no overseas offices. Japan, in contrast, has 16, including Washington DC, and New York City.

21 Access to Eximbank programs is also impeded, especially for small business, because, as already discussed, there is no "one-stop shopping" for export services; firms must seek assistance individually from Eximbank and other agencies involved in export promotion.

22 The information in this and the next paragraph is taken from U.S. Congress, General Accounting Office, *Export Finance: The Role of the U.S. Export-Import Bank, GOD-93-39* (Gaithersburg, MD: U.S. General Accounting Office, Dec. 23, 1992), pp. 22-29; and Export-Import Bank of the United States, *Report to the U.S. Congress on Export Credit Competition and the Export-Import Bank of the United States for the PeriodJan. 1,1991 through Dec. 31,1991* (July 1992), pp. 27,32-35.

23 GAO reported figures of 12, 14, and 13 percent, respectively, for 1989, 1990, and 1991, with the qualification that some of the data was not verified. U.S. Congress, General Accounting Office, *The U.S. Export-Import Bank: The Bank Provides Direct and Indirect Assistance to Small Businesses, GGD-92-105* (Gaithersburg, MD: U.S. General Accounting Office, Aug. 21, 1992), pp. 2-5, 10. GAO excluded financing provided to small business subcontractors working through larger businesses that receive Eximbank financing. Eximbank's figures, which include indirect financing, are 16, 19, and 18 percent, respectively, for the same years.

24 The Export Enhancement Act of 1992, Public Law 102-429, Sec. 106.

25 Eximbank, *Annual Report* 1992, p. 8.

PRIVATE SECTOR ATTEMPTS TO COORDINATE SERVICES

The U.S.-ASEAN Council for Business and Technology

The U.S.-ASEAN Council for Business and Technology aims to promote trade and investment between the United States and member states of the Association of Southeast Asian Nations (ASEAN).[26] The Council, which is a private nonprofit organization, works with Federal government agencies to help them strengthen their support to U.S. business, and does receive some funding from the Federal government to pursue some of its activities. It also provides trade information for and facilitates contacts between U.S. and ASEAN firms. The Council has identified environmental goods and services as a major opportunity for U.S. business in the region and as a result has targeted many of its activities toward this.

Among other activities, the Council has issued a publication on available export assistance[27] and has conducted environmental business development seminars to educate companies about U.S. government assistance programs. It has run several EGS trade missions to ASEAN countries, involving the participation of several Federal agencies in the missions and follow up.

The Environmental Business Council

The Environmental Business Council seeks to developers trade opportunities for its members. EBC was started in 1990 as a regional organization, based in New England where it has sought to expand trade opportunities by combining the resources of local EGS firms, academic and technological institutions, and governments (especially the State of Massachusetts).[28] The Council plans to become a national organization, operating through chapters in regions where environmental businesses are clustered. To that end, an Environmental Business Council of the United States was formed in February, 1993. In June of 1993, EBC-US hosted a meeting to discuss possible strategies and directions for such an organization.

In March of 1992, EBC signed an agreement with the Confederation of Mexican Industrial Chambers (CONCAMIN), formalizing technology cooperation between Mexican industry and EBC. EBC hopes to duplicate this arrangement in other markets, such as Eastern Europe. EBC has used the U.S. Environmental Training Institute (discussed previously) to help organize Environmental Risk Assessment Training for Mexican officials and plans to expand its cooperation with DOC, DOE, EPA, and other agencies.

The Environment Technology Export Council

ETEC is a nonprofit business association of over 30 corporations, six national laboratories, and four trade associations. Established in 1992, it aims to help the U.S. pollution prevention industry better exploit global market opportunities. It plans to do this by developing innovative export financing programs for developing country markets; ''synthesizing' both public and private sector market studies to help exporters learn about business opportunities; partnering with government agencies to enhance research and travel support for U.S. firms; and initiating pilot projects in countries to obtain and distribute environmental policies and regulations. A primary function of ETEC is to serve as a network for its members. In its nascent form, it is too early to assess what sort of impact ETEC will make.

STATE PROGRAMS

States are increasingly helping local businesses gain access to federal export promotion programs and are providing their own export promotion services to these businesses. States are assuming greater responsibility for helping companies that are new to exporting. With cooperation from SBA and the US&FCS, state and local governments have taken on a larger share of responsibility for export awareness and education. The states now provide a wide range of export promotion services to businesses. In 1990, they had over 335

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26 ASEAN member states are Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, and Thailand.

27 *Environment Money: The International Business Executive's Guide* to *Government Resources*. This publication provides information on U.S., foreign and multinational programs of use to exporters.

28 Discussion with Donald Connors, Chairman, Board of Directors, Environmental Business Council, Jan. 5, 1993.

representatives in overseas offices-an average of 6.5 representatives per state.[29]

A few states have special export promotion efforts focused on environmental goods or closely related sectors. Several states have prepared directories of their environmental companies that can be made available to overseas representatives, the US&FCS, and potential customers.[30]

The Minnesota Trade Office has its own environmental trade specialist who organizes trade events, and counsels local environmental companies on export marketing, export opportunities, and export financing. A primary responsibility of this person is to coordinate with the local US&FCS district office and other Federal trade promotion programs. The MTO'S environmental trade specialist has visited most of the 200 companies listed in its Environmental Trade Directory, which is targeted at foreign markets. The fact that states can have such close relationships with companies, and often get to know their capabilities and interests, means that they can both help them directly with their own export promotion programs, and perhaps better connect them to Federal services.[31]

The State of California has separate programs to promote and finance exports of both energy and environmental technologies, as well as an export financing office that is not sector specific. The California Energy Technology Export Program, administered by the State's Energy Commission, promotes exports of energy technologies, including renewable energy technologies and energy efficiency technologies. By focusing on narrowly defined markets, both technologically and geographically, the program seeks to help California's energy firms fill niche demands.[32] It conducts detailed studies of markets,[33] organizes trade and reverse trade missions and other customer-buyer forums, and offers technology cooperation to developing middle income countries.

The California Environmental Technology Partnership, which is administered by the State's Environmental Protection Agency, was initiated in November 1992. The program aims to promote environmental technologies both nationally and internationally. The partnership will identify markets and provide export assistance to environmental firms located in California.

In addition to these sector specific programs, the California Export Finance Office helps companies[34] finance exporting; it is not sector specific. The export finance office states that it has supported over $500 million of trade since 1985 through its export financing office.[35] It offers loan guarantees and short term loans.

As gateways to Federal export promotion, states either make bilateral arrangements with federal agencies, or they can access Federal resources through such organizations as the National Association of State Development Agencies. In a 1990 review of state export promotion programs, all states reported having good relationships with their US&FCS counterparts; over a quarter said they had developed specific Federal/state cooperative plans and memoranda of understanding.[36] States said they were cooperating with district offices in the following areas:

- recruiting for Federal and state-sponsored events, such as trade fairs and trade missions;
- cosponsoring trade shows, export seminars, conferences and meetings, and cohosting foreign buyer missions, etc.;
- calling on potential and active exporters;
- exchanging trade leads, opportunities, and market information;
- cooperating on newsletters and publications;

29 The National Association of State Development Agencies, *Introduction and Analysis; State Export Program Database, 1990*, (NASDA: Washington, DC, 1990), pp. 12-13.

30 E.g., Colorado, Maryland, Massachusetts, Minnesota, Oregon.

31 Discussion *with* Karin Nelson, Oct. 13, 1992, Minnesota Trade Office.

32 Personal Communi_ca_tio_n% Tim Olsen, Program Manager, Energy Technology Export Program, September 31, 1992.

33 ETEP either hires a contractor or sends its own staff to research a market and uncover project opportunities, and then disseminates this information to relevant companies.

34 Not specifically EGS companies.

35 California World Trade Commission, *Newsletter*, Winter '92-' 93, p.1.

36 National Association of State Development Agencies, *Introduction and Analysis; State Export Program Database, 1990* (NASDA: Washington, DC, 1990), pp. 12-13. NASDA is currently updating this material.

- developing new programs;
- legislation and trade policy analysis;
- collocating trade specialists and sharing mailing lists.[37]

States also cooperate with Eximbank to bring Federal export financing to local businesses. In 1987, Eximbank developed the City/State Program, in which participating states assist Eximbank in marketing its programs and carry out pre-application processing to expedite turnaround times.[38] As of May 1992, this program had been extended to 22 states.[39]

National Association of State Development Agencies

States also cooperate with USAID through the National Association of State Development Agencies. In September 1992, as mentioned previously, NASDA jointly established the Environmental/Energy Technology Fund with US-AEP. As of March 1, 1993, the fund had approved 18 projects. For example:

THE MONTANA MAPPING TECHNOLOGIES PROJECT IN SOUTH AND SOUTHEAST ASIA

The NASDA/US-AEP fund is providing $20,000 out of a total cost of $51,200 for three workshops to introduce integrated digital mapping technologies to Asian countries. Montana company GeoResearch is the organizer of the workshops and has already conducted two of the workshops in Malaysia and Nepal, of which the former resulted in the immediate sale of two receivers, software, and other equipment.

STATE OF UTAH/TERRATEK, INC. PROJECT IN MALAYSIA AND PHILIPPINES

The fund is providing $20,150 to Utah for two workshops in the above countries to promote the sale of Terratek's test kits for environmental contaminants in food crops.

Other projects involve grants to promote mid-American waste management and recycling technologies in the Philippines; Alaskan and U.S. energy technology to Mongolia; and U.S. textile technologies to Indonesia and Thailand.

In 1988 NASDA also established a Business Development Seed Fund with USAID ''to encourage state development agencies. . .to undertake innovative projects that promote business activity with firms in developing countries and Eastern Europe.[40] The seed fund operates along the same lines as the US-AEP fund, except that cooperation is directly with USAID, and it is neither Asia, nor EGS specific. Through NASDA, USAID provides grants of up to $20,000 on a matching basis to state and sub-states for business development projects.

NASDA is also currently working with USAID and the Trade and Development Agency to disseminate to U.S. companies information about procurement opportunities through NASDA and the states.

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37 Paraphrased from the National Association of State Development Agencies, *Introduction andAnalysis; State Export Program Database, 1990* (NASDA: Washington DC, 1990), pp. 12-13.

38 Ibid., p. 37.

39 Telephone inquiry to Eximbank marketing division, Feb. 2, 1993.

40 NASDA, ''NASDA/USAID Business Development Seed Fund, '' Information Sheet.

Appendix C: List of Acronyms

ASEAN — Association of Southeast Asian Nations (members are: Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand)
ATP —Aid and Trade Provision (United Kingdom)

BMZ — Ministry of Economic Cooperation (Germany)

CCCE — Central Bank for Economic Cooperation (France)
CONCAMIN— Confederation of Mexican Industrial Chambers
CORECT — Committee on Renewable Energy Commerce and Trade

DAC — Development Assistance Committee (OECD)
DoC — Department of Commerce
DoE — Department of Energy
DREE — Directorate for External Economic Relations (France)
DTI — Department of Trade and Industry (United Kingdom)

EBC —Environmental Business Council
EC — European Community
ECRE —Export Council for Renewable Energy
EGAT —Electric Generating Authority of Thailand
EGS — environmental goods and services
EPA — Environmental Protection Agency
ESF —Economic Support Fund
ETEC —Environment Technology Export council
Eximbank — Export-Import Bank of the United States

GAO —U.S. General Accounting Office
GDP — gross domestic product
GEF —Global Environmental Facility
GNP — gross national product
GTZ — Agency for Technical Cooperation (Germany)

ICETT — International Center for Environmental Technology Transfer (Japan)
ITA — International Trade Administration (part of DoC)
JETRO — Japan External Trade Organization
JICA — Japanese International Cooperation Agency
KfW — German Redevelopment Bank

LDCS — less developed countries
LLDCS — least developed countries

MDB — multilateral development bank
MITI — Ministry of International Trade and Industry (Japan)
MoF —Ministry of Finance (Japan)
MoFA —Ministry of Foreign Affairs (Japan)
MTO — Minnesota Trade Office

NASDA — National Association of State Development Agencies
NEDO — New Energy and Industrial Development Organization (Japan)
NGOS — non-governmental organizations
NOAA — National Oceanic and Atmospheric Agency

ODA — Official Development Assistance
OECD — Organisation for Economic Co-operation and Development
OECF — Overseas Economic Cooperation Fund (Japan)
OPIC — Overseas Private Investment Corporation

RITE — Research Institute of Innovative Technologies for the Earth (Japan)

SBA — Small Business Administration
SDR — Special Drawing Right (an international currency unit used by the World Bank and the International Monetary Fund)
SMES — small- and medium-sized enterprises

TDA — Trade and Development Agency
TPCC — Trade Promotion Coordinating Committee

U.K. ODA — Overseas Development Administration, U.K.

UNCED — United Nations Conference on Environment and Development
UNDP — United Nations Development Programme
UNEP — United Nations Environment Programme
UNDO — United Nations Industrial Development Organisation

USAEP —United States - Asia Environmental Partnership
USAID —U.S. Agency for International Development
US-ETI — United States Environmental Training Institute
US&FCS — U.S. and Foreign Commercial Service (part of ITA)
USTR — United States Trade Representative

VISITT — Vendor Information System for Innovative Treatment Technologies (an EPA database)

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