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OFFICE OF
INTERNATIONAL ACTIVITIES

January 11, 1991

Mr. James Sullivan
Director, Office of Energy
U.S. AID
SA-18, Room 508
Washington, DC 20523-1811

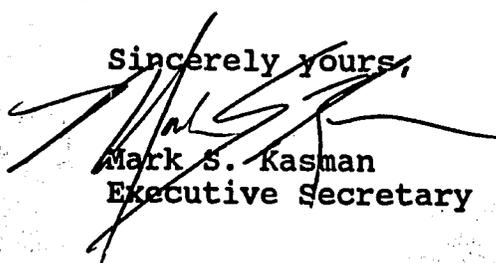
Dear Mr. Sullivan,

We are pleased to provide you with the enclosed copy of the final report from the International Environmental Technology Transfer Advisory Board (IETTAB) to the Administrator of the Environmental Protection Agency (EPA). Chairman William D. Ruckelshaus presented this report to EPA Administrator William K. Reilly at the concluding IETTAB meeting on December 6, 1990. We have also included a copy of the summary report from this meeting for your information.

With the submission of its final report, IETTAB completed its mission and tenure. We are reviewing the recommendations in concert with other agencies and will shape an action plan to build on the framework IETTAB has provided.

We appreciate the interest you have expressed in the work of IETTAB and hope you will continue to be active in these issues. Please call me at (202) 475-7424 if we may provide you with additional information.

Sincerely yours,



Mark S. Kasman
Executive Secretary

Enclosures

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**Fifth and Final Full Meeting of the
International Environmental Technology Transfer
Advisory Board**

National Press Club
Washington, DC
December 6, 1990

SUMMARY REPORT

On December 6, 1990, William Ruckelshaus chaired the fifth and final meeting of the International Environmental Technology Transfer Advisory Board (IETTAB). The Board presented the draft final report to EPA Administrator William Reilly, approved the draft final report, with minor changes, and instructed the IETTAB rapporteur to prepare the IETTAB Final Report for release.

WELCOME

IETTAB Chairman William Ruckelshaus opened the meeting by stating that its purpose was to present the Board's final report to the EPA Administrator. He then welcomed and thanked participating Board members before introducing Terry Davies, EPA Assistant Administrator for Policy, Planning and Evaluation.

Mr. Davies thanked the Board members for their hard work and pointed out that although the purpose of the meeting was to approve the Board's final report, it was not too late to make changes.

Mr. Ruckelshaus then introduced Mr. Atkeson, EPA Assistant Administrator for the Office of International Activities, who expressed agreement with the points made by Mr. Davies and then added that he believed it would be possible to translate some of the Board's recommendations into action in the near future.

INTRODUCTION

Mr. Ruckelshaus underscored Mr. Davies' point that the Board's report was still open for discussion and that changes could still be made. Mr. Ruckelshaus then thanked EPA Administrator William Reilly for his leadership and support, Mr. Atkeson, Mr. Davies, and Mr. Kasman for their help, the members of the Board for their work, and Mr. Fri, IETTAB Vice-Chairman, and his staff for their work in preparing the draft final report.

Mr. Ruckelshaus briefly reviewed the history of IETTAB, beginning with its inception in October, 1989, through the interim report released in May, 1990, and the first draft final report in September, 1990, to the report now before the Board. He affirmed that many of the recommendations and emphases presented in the interim report are echoed in the final report, including:

- o The distinction between technology transfers aimed at local problems and those aimed at global problems.

- o The need to identify and mobilize funding for technology transfer efforts.
- o The importance of creating indigenous demand for technology transfer.
- o The importance of addressing issues such as international competitiveness, intellectual property rights, and court liability.
- o The need for the U.S. to become actively involved in and provide leadership for international environmental technology transfer.

Mr. Ruckelshaus then spoke about sustainable development, which was a central theme of the Brundtland Report issued by the World Commission on Environment and Development, of which Mr. Ruckelshaus was a member. He concluded that the IETTAB report's recommendations are aimed at providing a framework whereby environmental technology transfer can play its part in ensuring that sustainable development can become a reality. Mr. Ruckelshaus then asked Mr. Fri to present the report to Mr. Reilly.

Mr. Fri agreed with Mr. Ruckelshaus' summation, adding that the Board's activities had proceeded in two phases. First, the interim report addressed the issue of what constitutes a successful program of international environmental technology transfer. Second, the final report addresses the issue of whether the United States has such a program and what can be done to ensure a successful program. Mr. Fri emphasized that the interim report was not simply a way station to the final report; the two deal with somewhat different aspects of the overall problem.

Mr. Fri thanked Mr. Cooper and his staff for their work in researching and preparing the various drafts of the report and then stated that he believed the report to reflect the views of the members of the Board. He reaffirmed earlier statements that the report was still open to revision and then asked Mr. Cooper to provide an overview of the report.

DISCUSSION OF REPORT

Mr. Cooper thanked his staff for their assistance in preparing the report and then pointed out that the report was prepared under time, funding, and length constraints. Mr. Cooper then provided a brief summary of the report, highlighting its structure and major emphases.

Mr. Ruckelshaus then called for discussion by the Board. Board members suggested several changes, mostly of emphasis and wording, which Mr. Cooper was asked to incorporate into the final version of the report.

At the end of the discussion, Mr. Ruckelshaus declared the report ready for final changes and then introduced Mr. Reilly, EPA Administrator.

ADMINISTRATOR'S COMMENTS

Mr. Reilly started by thanking the Board members and stated that he believed the report was timely, constructive, and practical. Mr. Reilly said that he believes the report will have a significant influence and that others will build on it, according to the organizational structure recommended.

Mr. Reilly related that the report not only addresses many of the issues that have been raised in his meetings with Eastern European ministers, but has also served to stimulate interest in technology transfer throughout the Federal government and even in the private sector.

Mr. Reilly asserted that the report's recommendations would be reviewed in concert with other agencies and that an action program will be shaped based on this review.

By way of expressing his appreciation for their work in leading and supporting the Board, Mr. Reilly presented commemorative plaques to Mr. Ruckelshaus, Mr. Fri, Mr. Cooper, and Mr. Kasman.

ADJOURNMENT

Mr. Ruckelshaus concluded the meeting by briefly reemphasizing the importance of environmentally sustainable development in meeting the needs of the world's population. Mr. Ruckelshaus concluded by thanking Mr. Reilly for the opportunity to serve on the Board and thanked the members for their service. He then adjourned the meeting.

NEXT MEETING

No further meetings of IETTAB will be held.

**Fifth (and final) Full Meeting of the
International Environmental Technology Transfer
Advisory Board (IETTAB)**

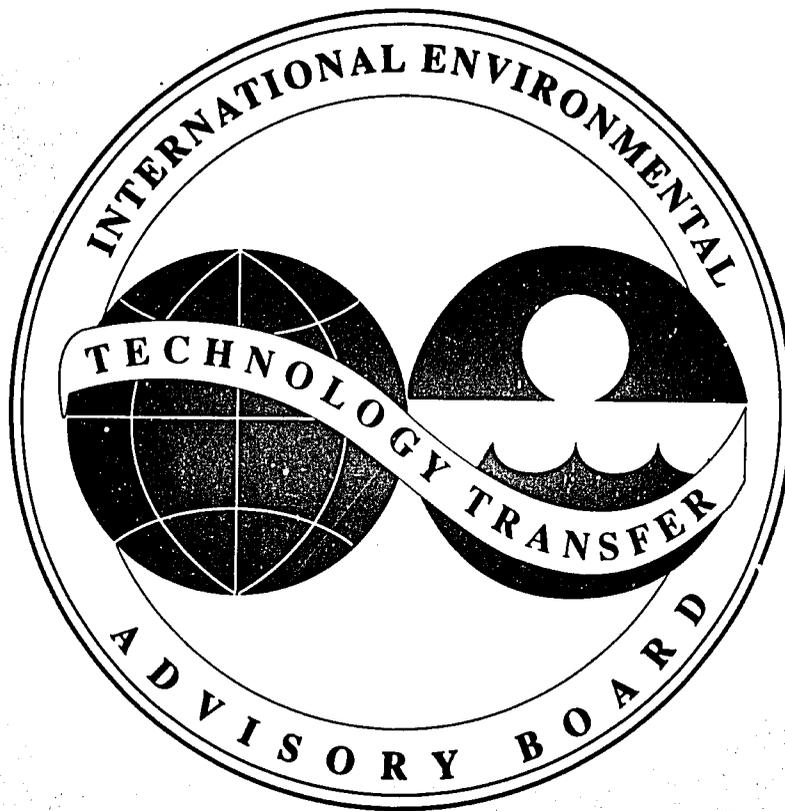
National Press Club
Washington, DC
December 6, 1990

Participants

William Reilly (EPA Administrator)
William Ruckelshaus (IETTAB Chairman)
Robert Fri (IETTAB Vice Chairman)
Betsy Ancker-Johnson
Timothy Atkeson
Harry Barnes
Chester Cooper (Rapporteur)
Terry Davies
John Gibbons
KathryDavid Hopper
Mark Kasman (Executive Secretary)
Fred Krupp
Alexander McLachlan
John Petty
John PettyJohn Sewell
Eric Zausner

Final Report to the
Administrator of the
U.S. Environmental Protection Agency

from the
International Environmental Technology Transfer
Advisory Board



December 1990

The International Environmental Technology Transfer Board (IETTAB) was established on October 31, 1989 by U.S. Environmental Protection Agency Administrator William Reilly at the request of President George Bush. Administrator Reilly charged the Board, chaired by William Ruckelshaus, to "provide advice and counsel to the Administrator of EPA and other concerned agencies on the transfer of environmental technology and information to developing and centrally planned economies...." [Annex I provides the full text of the IETTAB Charter and Annex II provides a list of IETTAB members.] In May 1990, the Board published its Interim Report.¹ With the submission of this, the Board's Final Report, the IETTAB's mission and tenure are completed.

Summary of Recommendations

Structural Recommendations

- 1) **An Overall Market Orientation:** For environmental technology transfer to succeed, there must be an indigenous demand for the technology. Since this demand is best expressed through the marketplace, the United States should promote mechanisms that bring market forces to bear on every aspect of the technology transfer process.
- 2) **The U.S. Government Role:** The U.S. Government should exert more active leadership in defining and integrating the goals of international environmental technology transfer as an established national policy. The various government activities in this arena should be brought under some form of organizational umbrella that can provide sharper focus and direction within the federal government and also more effective tapping of private sector resources.
- 3) **The EPA Role:** EPA should play a leading role in bringing cohesiveness to the government's international environmental technology transfer activities. It should be consulted and its expertise utilized by all government agencies whenever such transfers are likely to have environmental implications. For its part, the Agency should take internal steps to strengthen its own ability to contribute to international environmental objectives. In this connection, EPA should establish, in cooperation with other agencies and the private

sector, an information clearinghouse on the availability of environmental technologies and programs.

Thematic Recommendations

- 4) **Local Programs and Global Concerns:** In order to attack global environmental threats and build local support for international action, the United States should give special attention to ways in which solving domestic environmental problems of developing and transforming countries can assist in solving global problems.
- 5) **Energy Efficiency:** The United States should give high priority in international environmental technology transfer to technologies that increase energy efficiency and minimize the net release of greenhouse gases.
- 6) **Population Stability:** Population stabilization should be acknowledged as a necessary condition for sustainable development; family planning technical assistance should be an important component of U.S. international environmental technology transfer.
- 7) **Targeting of Effort:** U.S. environmental technology transfer activities should focus (although by no means exclusively) on those countries where the potential impact is greatest and where there is an indigenous capability to utilize the technology.

Operational Recommendations

8) International Environmental Standards:

The United States (possibly in connection with the 1992 United Nations Conference on Environment and Development) should encourage the harmonization and consistent enforcement of environmental standards for both exporters/donors and importers/recipients of technology. Failing success, however, it should introduce standards on its own, and consider necessary steps to maintain the competitive advantage of U.S. suppliers.

9) Finance: A concerted effort should be mounted to exploit more effectively the existing funding resources of appropriate United States Government agencies for financing environmental technology transfers. The United States should act energetically to have the World Bank, regional development banks and other bilateral donors do more, and should mobilize international consortia to finance and facilitate the transfer of environmentally benign technology. If and when additional resources to support international development become available, a high priority should be given to programs furthering environmental goals, and the U.S. Government should provide leadership in this regard.

10) Training: The U.S. Government should stress and support training as an essential element of the transfer of environmental technologies abroad. In the same vein, the United States should encourage the building of institu-

tions in recipient countries that can oversee the planning and implementation of indigenous environmental strategies and projects. The capabilities and experience of EPA and AID in these areas should be fully tapped.

11) Commercial Considerations: Arrangements should be devised to improve communications between the public and private sectors regarding legal constraints that affect environmental technology transfer. This could be part of the mission of an umbrella entity established along the lines of Recommendation 2.

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A Concerted U.S. Effort for International Environmental Technology Transfer

Introduction

This is the final report of the International Environmental Technology Transfer Advisory Board (IETTAB). IETTAB was established by EPA Administrator William Reilly on October 31, 1989, to advise him and other government officials on the transfer of environmental technology to developing and transforming (i.e., Eastern European) economies.² The Board published an Interim Report in May 1990,³ and the judgments and conclusions in the Interim Report have provided a foundation for what follows here.

Technology transfer covers a host of activities, commercial and otherwise, involving the international flow of technical research, knowledge, training, studies, processes, equipment, and hardware. These activities cut a wide swath through foreign trade, international economic assistance, and global environmental protection.

The IETTAB's mission confines the Board's attention to "technology" directed toward environmental protection and "transfer" to developing and Eastern European countries. This somewhat narrows the scope of the Board's concerns, but, even so, the enterprise at hand is broad indeed. Every agency of government with responsibilities touching on diplomacy, trade, foreign economic and social

assistance, science, engineering, international finance, and global environmental protection is engaged. Moreover, thousands of private organizations are directly and continuously involved in technology transfer transactions. Finally, the technology of interest ranges from the very simple to the very complex — local schooling for pollution-control equipment workers, graduate fellowships, institution building, management training, research and development, provision of energy efficient equipment, reforestation advice, family planning techniques — all requiring (or at least deserving of) careful planning, appropriate funding arrangements, and assiduous follow-up.

The matter we are seized with is not new; much of the economic recovery of Europe and Japan after World War II reflects U.S. technology transfer in the broadest context. But changes in the international perspective for viewing environmental technology, fresh opportunities for both private sector firms and public sector agencies, and evolving federal responsibilities for global environmental protection all provide new opportunities for the government to develop technology transfer into an important tool in achieving sustainable international development.

For EPA, in particular, there is a growing demand from both Eastern Europe and the

²The IETTAB charter can be found in Annex One

³The Executive Summary of the Interim Report can be found in Annex Three.

developing world for information on environmental technologies and for technical expertise. There will be increasing pressures on EPA to address a broad range of international environmental problems related to sustainable economic progress and requiring technology assistance and transfer.

Several types of technology transfer can affect environmental quality, even though that may not be their primary goal. These include those that are:

- conducted by the private sector in response to an indigenous demand and ranging from strictly commercial sales to the pro bono provision of advice and services;
- intended to meet economic, health, environmental, or social development needs which, although provided by the private sector, involve considerable U.S. Government/host-government negotiation and some U.S. Government assistance; and
- explicitly directed toward international environmental protection, which often entails a prominent U.S. Government role in defining the need and in facilitating financing and implementation.

Although both commercial trade and economic assistance frequently have an impact on local, regional or global environments, it is this third category of transactions involving international

environmental technology transfers which calls for EPA to play a leading policy role.

Rationale for a Cohesive International Technology Transfer Program

Global priorities have shifted dramatically in the last few years. During most of the post-World War II period many countries were preoccupied with national security and obsessed by East-West tensions, but during the decade of the Nineties the world is more likely to focus on considerations of economic development and environmental protection. Thus, the leaders of the industrialized world, meeting in Houston in the summer of 1990, declared, "Environmental challenges such as climate change, ozone depletion, deforestation, marine pollution, and loss of biological diversity require closer and more effective international cooperation and concrete action. We as industrialized countries have an obligation to be leaders in meeting these challenges."⁴

Clearly the task of planning for international economic development, as illustrated by these concerns, is more complicated than it was only a generation ago when environmental protection, even at the local level, hardly received attention. Compounding present complexities is the need to address not simply an array of discrete, albeit knotty, problems, but rather a troika of intertwining, mutually reinforcing issues: environment, economic development, and population growth. As if this were not

⁴Houston Economic Declaration, 1990 Economic Summit of Industrialized Nations, July 11, 1990.

enough, it has become starkly clear that the development path taken by any particular country can affect, for better or worse, the inhabitants of other nations, that "No man is an Island... every man is.. a part of the maine...."⁵

Industrialized and industrializing nations, alike, are facing a challenge of Wagnerian dimensions: to contrive and implement development strategies that will maintain robust economic growth without exacerbating already serious national and local environmental problems, and without increasing the risk of grave, irreversible regional and global ecological changes. What is involved here, in short, is a quest for "sustainable development."

Sustainable development, according to the Brundtland Commission, "meets the needs of the present without compromising the ability of future generations to meet their own needs."⁶ In his reiteration of the Commission's call for sustainable development, Secretary of State James Baker referred to the "greening of American foreign policy."⁷ Fundamental to the IETTAB's mission is a conviction that, for decades to come, the transfer of developed-world technology to transforming and developing economies will be a key to global environmental protection and, thus, to sustainable international development.

But, while technology can play an essential role in global environmental protection, it can also

become a thorny issue in North-South discourse. Developing countries want access to technologies to address environmental problems, but only on terms compatible with their continued economic growth. In the case of ozone depletion, an international solution is evolving. In the case of climate change, formal international negotiations on a framework agreement are about to begin. As for global environmental issues generally, preparations are now underway for the U.N. 1992 Conference on Environment and Development (UNCED). These negotiations, together with the possibility that the next GATT round will be a "green" round, provide further justification for reviewing the current U.S. Government philosophy and strategy of international environmental technology transfer.

In this respect, the United States has three principal goals: to promote global environmental protection, to assist in the economic and social development of foreign countries, and to facilitate U.S. exports and investments. The pursuit of these goals takes many forms, from arrangements between the U.S. and recipient governments, to a mix of public and private sector activities, to transactions between private entities. In the last analysis, much will depend on the willingness and ability of the American private sector to perform. In this regard, there are commercial constraints that impede the flow of technology which should be eliminated or at least mitigated.

⁵ John Donne, "Devotions," 16th Century.

⁶ The World Commission on Environment and Development (Chairman: Gro Harlem Brundtland), *Our Common Future* (Oxford University Press: New York), 1987.

⁷ Secretary of State James Baker, Address to National Governors Association, February 26, 1990, "Diplomacy for the Environment," *U.S. State Department Bulletin 1254*.

In its effort to come to grips with this complicated process, the IETTAB canvassed government agencies on their programs, met with industry leaders to discuss the commercial opportunities, listened to briefings on the developing international situation, and deliberated on possible recommendations. Several policy themes ran through these discussions:

- An indigenous demand for and capability to utilize environmental technologies are necessary conditions for successful technology transfer. Of course, technology transfer itself can help create or improve the capability to utilize technologies.
- Technology transfer can help solve many of the pressing regional and global environmental and economic problems in the developing world. There are, moreover, considerable commercial and trade opportunities for the United States in promoting environmental technologies, but federal and industry collaboration toward this end could be substantially improved.
- Increasing emphasis on environmental technology transfer challenges EPA to become more actively involved in appropriate aspects of trade and finance policy. This will require better integration of EPA's internal activities.
- Translating "sustainable international development" from a lofty precept to a practical and high-priority government program of environmental technology

transfer will imply greater efforts to match the needs of developing countries with appropriate technologies, especially technologies to achieve increased energy efficiency. In particular, the United States should take the lead in bringing about greater international coordination and cooperation among developed countries in the transfer of environmental technology.

- Focusing on local and regional environmental problems can be an effective means to address global environmental concerns. For example, improving energy efficiency is beneficial to the local economy and environment, while reducing greenhouse gas emissions.

When all is said, environmental technology transfer, as it is currently conducted, cannot be properly regarded as a "program;" rather it is a multitude of individual transactions and activities carried on by various government and private sector entities. The Board believes that U.S. goals in trade, economic development assistance, and environmental protection could be more effectively met if, in fact, the government's role in this process were more cohesive and better coordinated.

Several recommendations which we think will help accomplish this are put forward in the next section.

Findings and Recommendations

The Board's findings and recommendations range from those concerned with the broad context in which environmental technology transfer should take place to those involving specific organizational, strategic, and operational issues.

Structural Issues

In what follows here, the Board first focuses on the setting for an effective technology transfer program. It then shares its thoughts on how the government as a whole can improve the cohesiveness and direction of international environmental technology transfer activities and on EPA's role within that effort.

An Overall Market Orientation

Findings: As the Board noted in its Interim Report, the existence of an indigenous demand for environmental technology is an essential condition for launching and sustaining a successful transfer effort. There is widespread interest and concern about environmental problems around the globe, cutting across cultures and regions. Several steps can be taken to create the economic setting to nourish this demand. To this end, international environmental agreements can play an important role in encouraging the use of economic incentives for technology transfer.

Recommendation 1: *For environmental technology transfer to succeed, there must be an*

indigenous demand for the technology. Since this demand is best expressed through the marketplace, the United States should promote mechanisms that bring market forces to bear on every aspect of the technology transfer process.

Discussion: Creating an economic atmosphere which enhances indigenous demand for environmental technology within developing and transforming countries will challenge the industrialized world as it attempts to curtail global ecological threats. Innovative arrangements and multilateral cooperation will be essential in this endeavor. Several mechanisms can be employed at the national and international levels to help create such an economic setting; most promising among these are marketable emissions permit systems and a price structure that reflects environmental impacts.

Marketable emissions permit systems, designed in conjunction with environmental standards, could cause prices of fossil fuels and other polluting substances to rise, resulting in conservation, less demand, increased efficiency, and greater use of substitutes. Once an overall target of acceptable emissions was established, emitters would receive permits covering their share of total allowable discharges. If they reduced emissions below their allocations, they could sell the excess to other emitting sources. Such devices would encourage innovative ways to sustain energy output with decreased emissions.

Another potentially valuable economic innovation is the restructuring of pricing frameworks to include environmental costs. Incentives to adopt environmentally sensitive technologies are often lacking because of the difficulties of placing an economic value on ecological and aesthetic impacts and of reflecting in production costs the depletion of natural resources and the degradation of the environment. If environmental costs were included, the prices of environmentally damaging products would almost certainly exceed those produced with benign technologies.

Marketable emissions permit systems and environmental pricing can create economic incentives, and hence encourage indigenous demand for environmental technology. International environmental and trade agreements are logical vehicles for introducing these mechanisms. Many international agreements enunciate policies with potential environmental impacts, but do not explicitly consider such impacts. International agreements should be assessed for their environmental impact and for their potential to provide economic incentives for technology transfer.

The U.S. Government Role

Findings: The process of international environmental technology transfer is the sum of many activities carried out by a number of government entities and private sector elements, rather than a sharply defined program in its own right. The question arises of whether there *should* be such a program. Identifying *environmental* technologies among the

myriad of individual technologies and isolating environmental technology transfers within the vast number of transactions, principals, countries, and financial modalities that comprise all international technology transfers by the government and private sectors would be a Herculean, and probably counterproductive, task. But this does not detract from the need for high-level enunciation of coherent government policies and priorities, interagency coordination and effective public sector/private sector cooperation with regard to environmental technology transfers.

Recommendation 2: *The U.S. Government should exert more active leadership in defining and integrating the goals of international environmental technology transfer as an established national policy. The various government activities in this arena should be brought under some form of organizational umbrella that can provide sharper focus and direction, within the federal government, and also more effective tapping of private sector resources.*

While the Board has no preference, it puts forward some possible organizational arrangements, including two that give EPA primary responsibility and two that place the responsibility in the Executive Office of the President:

- An interagency council modeled along the lines of the Committee on Renewable Energy Commerce and Trade (CORECT),⁸ but chaired by a senior EPA official assisted by a small staff.

⁸ CORECT is an interagency committee, chaired and staffed by DOE, which seeks to promote renewable energy and energy efficiency technologies by bringing together potential buyers and sellers.

- A senior EPA official with a small staff of seconded representatives from AID, DOE, Commerce, and other appropriate agencies.
- An existing, but expanded, Executive Office entity, such as the Council on Environmental Quality; the Economic Policy Council; or the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET);⁹
- A new Executive Office Council on Environment, Energy, and the Economy.¹⁰

As an alternative to an overall umbrella organization, another course might be to create several interagency committees similar to CORECT to promote specific categories of environmental technology and to facilitate the export of such technologies.

Discussion: A dozen U.S. Government agencies and perhaps thousands of entities from industry, academia, and other non-government organizations engage in international technology transfer for one purpose or another, including protection of the environment, economic and health assistance, and commercial profit. Their activities in pursuit of one objective often have an impact on another, requiring constructive interaction among various key players.

Within the government, international environmental technology transfer has become an

increasingly important element in the missions of EPA, AID, the Departments of State, Commerce, Energy, Agriculture, and Treasury, the U.S. Trade Representative, the Export-Import Bank, the Overseas Private Investment Corporation (OPIC), the Peace Corps, and others. These agencies have become, in effect, the government's environmental technology transfer community; their operations, together with Congressional mandates, shape U.S. international environmental policy.

International environmental technology transfer covers a wide range of programs and projects carved out by an enormous number of participants. The environmental aspect is often an incidental element of a program that does not have international (or local) environmental protection as its primary goal. Of concern to the Board, therefore, is how to ensure that those responsible for furthering economic development or for promoting increased American exports consciously consider environmental impacts, and that those concerned with the environment are mindful of commercial or economic development aspects.

The Board is impressed by the high professional quality and motivation of the staff-level personnel in the various U.S. Government agencies that make international environmental technology transfer happen. We note that a great deal of informal, working-level cooperation takes place among them, and with the

⁹ FCCSET operates within the Office of Science and Technology Policy.

¹⁰A Council on Environment, Energy, and the Economy has been recommended by the Carnegie Commission on Science, Technology and Government in its report, "Organizing for Environment, Energy and the Economy in the Executive Branch of the U.S. Government."

private sector. Impressive, as well, are a few formal interagency committees (such as CORECT) and some private sector groups, including the Industry Cooperative for Ozone Layer Protection (ICOLP) which works with EPA to facilitate the spread of information worldwide about alternatives to CFCs for electronic solvents.

Nevertheless, it is also true that many major government programs for the transfer of technology abroad continue to be carried out with little attention being given to their environmental consequences — and sometimes with active opposition to incorporating environmentally protective features. The situation is exacerbated by ill-defined delineation of responsibilities among EPA, AID, USDA, and DOE with regard to technology transfers abroad that might affect the environment. In this connection, we were struck by the absence of sharp focus and policy-level guidance being provided to Washington's environmental technology transfer community. This is in contrast with the approaches in Germany and Japan, where there is close coordination among officials responsible for finance, trade, and international environmental projects. The Board believes that the Government should heed these examples.

The Board encountered considerable sentiment within both the government and the private sector favoring a stronger high-level leadership role by the government. Many industry representatives, while optimistic about the overseas market opportunities for environmental tech-

nologies, believe there is much more the government can do to facilitate market access. Finally, we could find no place within the Executive Branch that could claim knowledge of the overall range and scope of U.S. — or other donor — environmental technology transfer projects in foreign countries, or on the amount of U.S. and other donor funds available or being spent for this purpose. Since many environmental projects are but one aspect of a broader program, some individual agencies even have trouble breaking out such data.

The EPA Role

Findings: EPA engages in a number of international environmental activities in Eastern Europe and developing countries, but is not routinely consulted by other agencies in matters that do, or could, have an impact on the environment. Although it has a well-established Office of International Activities, EPA's international technology transfer operations are organizationally dispersed throughout the Agency.

Recommendation 3: *EPA should play a leading role in bringing cohesiveness to the government's international environmental technology transfer activities. It should be consulted and its expertise utilized by all government agencies whenever such transfers are likely to have environmental implications. For its part, the Agency should take internal steps to strengthen its own ability to contribute to international environmental objectives. In this connection, EPA should establish, in cooperation with other agencies and the*

private sector, an information clearinghouse on the availability of environmental technologies and programs.

Discussion: The Board has given considerable thought to the role of EPA in the overall scheme of international technology transfer. As the official U.S. entity for setting domestic environmental standards and monitoring compliance, EPA's expertise should be consulted regarding the international protection standards desired by the United States and the likely environmental impacts of certain U.S. Government and private sector technology transfer activities abroad.

EPA engages in a variety of international technology transfer activities and is under pressure from foreign countries to do more. It already has a variety of joint assistance projects with AID and other agencies and participates in a number of interagency groups concerned with environmental technology transfer. It could play a more active role in helping recipient countries to strengthen their capabilities in such areas as risk assessment, risk management, integrated environmental planning, and developing environmental technology options. In addition, EPA's current and potential access to many large and small U.S. companies whose operations and technologies have an impact on the environment is unique within the U.S. Government.

The Board believes that EPA should participate as a matter of course in all interagency research, planning, and working groups on

technology transfer abroad that might have an impact on the environment. But EPA's expertise and experience are not routinely tapped by other government agencies in connection with such transfers, especially if environmental implications are not readily apparent. When consultation does take place, it is frequently inspired by informal networking at the staff levels rather than by policy considerations. This approach is essential, but needs the nurturing and clout provided by supportive high-level policy officials.

One reason for this situation may be EPA's relatively recent emergence as a relevant actor in the international arena. Another may be that, despite the growth of its International Activities office, EPA personnel who address policy and program aspects of international technology transfer are dispersed throughout EPA offices responsible for specific environmental issues. While this arrangement may suit EPA's internal operating requirements, it blurs the responsibility within the Agency for its various international activities. Moreover, it hampers an understanding of the range of EPA's international activities, especially by persons outside the Agency who have difficulty locating the appropriate office to contact on a given matter. A high-level focal point, preferably within the Office of International Activities, that is cognizant of all activities of an international character conducted by other EPA offices, is needed to assist other government agencies, the private sector, and foreign counterparts in interfacing with EPA on international environmental matters.

The Board has become aware of the need for a "clearinghouse" or database to help match specific country needs and specific industry technologies. Such a service would be especially useful for smaller U.S. companies with little foreign experience. A logical place for such a clearinghouse would be EPA, which could draw upon its own resources, as well as those of other relevant government agencies, the private sector, and international organizations.

As a related measure, the Board believes that EPA should develop procedures for more regular and effective liaison, exchange of information, and substantive cooperation with AID and the Departments of Commerce and Energy. EPA should also strengthen its communications and cooperation with private firms that are developing or marketing environmental technologies.

Thematic Issues

This section addresses the establishment of priorities for the commitment of U.S. resources in terms of problems addressed, technologies used, and recipient countries targeted. In our Interim Report we noted that "environmental problems at the global, regional and local levels stem from several sources, but energy sources and population growth are the most important." Several of the following recommendations flow from this observation.

Local Programs and Global Concerns

Findings: Most of the developing countries, as well as the transforming countries of Eastern Europe, recognize that they have grave environmental problems, but urgent, unmet economic and social needs compete for attention and action. Environmental technology transfers can help them attack problems which are purely domestic (e.g., air and water pollution) as well as others having international consequences. Effective local environmental projects, in turn, can assist in building a national constituency for dealing with world environmental problems requiring international cooperation.

Recommendation 4: *In order to attack global environmental threats and build local support for international action, the United States should give special attention to ways in which solving domestic environmental problems of developing and transforming countries can assist in solving global problems.*

Discussion: The enormous economic expansion and the concomitant increase in consumption of the developed world has caused much of the environmental degradation that now threatens the earth's biodiversity and climate. For example, developed countries (including the Soviet Union and Eastern Europe) consume almost three-fourths of the world's energy and have contributed more than three-fourths of the increased CO₂ in the Earth's atmosphere over the past century. But developing countries are likely to become the major sources of greenhouse gas emissions sometime during the next fifty to one hundred years.

Many developing countries recognize this and acknowledge that they could be seriously affected by the consequences. They are aware of their pressing domestic environmental problems, but feel compelled to deal first with the politically more urgent and sensitive issues of economic and social development. As for global climate change and ozone layer depletion, the leaders of these countries contend that rich, developed nations should bear the cost of dealing with these threats, particularly since they were largely responsible for causing these problems.

The industrialized world has a selfish as well as an altruistic interest in helping developing and transforming countries come to grips with local environmental problems. Assisting nations in the Southern Hemisphere and Eastern Europe to improve energy efficiency, increase agricultural productivity, and renew forests would serve the goal of international sustainable

development. Technologies that mitigate local environmental problems may also foster development of expertise, awareness of the need to consider the environment in economic planning, and increased commitment to global environmental protection.

Energy Efficiency

Findings: The energy requirements of the developing and transforming countries will increase substantially during the next few decades. The net amount of greenhouse gases that these countries emit into the Earth's atmosphere will also rise markedly, but can be reduced significantly by improving their energy efficiency and lessening their dependence on fossil fuels, especially coal.

Recommendation 5: *The United States should give high priority in international environmental technology transfer to technologies that increase energy efficiency and minimize the net release of greenhouse gases.*

Discussion: In the next 20 years alone, the energy needs of developing countries will more than double, and those of transforming countries will probably rise by almost two-thirds. The rates of increase in CO₂ emissions by these countries may be only slightly less, but could be sharply lowered if steps are taken to increase energy efficiency and encourage use of more benign fuels to produce energy.

Many of the developing and transforming countries are heavily dependent on coal or oil,

which release high amounts of CO₂. Moreover, existing power plants in these countries are often outmoded or poorly maintained. Efficiency can be increased, often with considerable cost saving, by improvements in the method of power generation, including better managerial, operational, and maintenance practices; by increasing the use of renewable energy technologies and less-polluting fuels; and by introducing new equipment, appliances, and building or manufacturing designs that entail less energy consumption. Eliminating energy price subsidies by some countries would also lead to greater energy conservation and efficiency.

Population Stabilization

Findings: Population growth, coupled with the way people use resources, has been a major cause of environmental deterioration. Continued expansion will cause accelerated damage during the next century as well as frustrate efforts to achieve sustainable international development.

Recommendation 6: *Population stabilization should be acknowledged as a necessary condition for sustainable development; family planning technical assistance should be an important component of U.S. international environmental technology transfer.*

Discussion: Population pressures, which have been one of the major underlying causes of environmental degradation, may become even more damaging if present demographic trends

continue. The Earth's population currently stands at 5.3 billion. A recent study by the World Bank projects that, even assuming considerable additional international family planning assistance, the world population will grow to 8.4 billion in 2025, 10 billion in 2050, and 11.3 billion in 2100. Over 90 percent of the projected increase will occur in developing countries.

Changes in human behavior can, of course, bring about quite different outcomes. Support for family planning in the developing countries increased rapidly after the UN-sponsored world conference on population in 1974; by 1981, about 93 percent of the developing world's population lived in countries with pro-family planning policies. Although several countries — notably China, Thailand, South Korea, Colombia, and Mexico — have reduced their fertility rates, a gap between policy and reality persists in most countries. A 1987 survey indicated that as many as 75 percent of fertile women in developing countries do not want more children or wish to extend the interval before another birth, but yet are not protected from pregnancy.

About \$2.5 billion annually is spent worldwide on assistance to family planning services. Estimates of the additional amount necessary to fulfill "unmet need" range from \$1 to 2 billion annually, but this amount will undoubtedly increase as more couples enter their reproductive years in developing countries. Even "medium" projections will require several times this level of support. The costs of stabi-

lizing world population at less than 10 billion before 2100 could be substantial; the costs of lost per capita economic growth and of trying to repair damage to the environment from unchecked population growth would be much greater. U.S. participation in expanded family planning assistance to developing countries would be an important, if not essential, contribution to overall U.S. international environmental technology transfer activities.

Targeting of Effort

Findings: Both national and international interests argue strongly for environmental assistance to the transforming and developing societies. But the chances for success will be greater if these resources are focused.

Recommendation 7: *U.S. environmental technology transfer activities should focus (although by no means exclusively) on those countries where the potential impact is greatest and where there is an indigenous capability to utilize the technology.*

Discussion: It is in the self-interest of industrialized countries to help developing countries acquire and use the most environmentally benign technologies available in order to mitigate risks to the environment. But the resources that industrialized nations can devote to this endeavor are finite. The most successful results may therefore come from concentrating on a few key countries.

The Board suggests that a process for targeting countries should include the following criteria:

- countries which have great population pressures and/or prospects for rapid economic growth and are thus likely to contribute significantly to the world's environmental problems;
- countries such as those in Eastern Europe, which have severe environmental problems but are in a position — particularly because of major structural changes in their economies — to establish creative approaches for addressing the problems;
- countries eager to receive technologies and assistance on terms compatible with the protection of intellectual property rights and ready to work with the United States to ensure their effective implementation;
- countries in which the United States has promising prospects because of its comparative advantage in dealing with particular environmental problems or because of an established program of technology transfer activities that can be strengthened to address environmental goals; and
- countries addressing environmental problems with innovative programs or a high degree of indigenous technical skills that can serve as useful models to other countries in the region.

Key candidates might be:

Developing Countries

Brazil	Nigeria
China	Pakistan
Egypt	Philippines
India	Thailand
Indonesia	Turkey
Mexico	Zaire

Transforming Countries

Bulgaria
 Czechoslovakia
 Hungary
 Poland
 Romania
 Yugoslavia

22

Operational Issues

In this section we concern ourselves with the matters of international environmental standards, finance, training, and commercial constraints.

International Environmental Standards

Findings: Internationally agreed environmental standards for exports and imports would be a substantial step toward the goal of global environmental protection. Such standards could provide an opportunity for the U.S. private sector to take a lead in international environmental commerce.

Recommendation 8: *The United States (possibly in connection with the 1992 United Nations Conference on Environment and Development) should encourage the harmonization and consistent enforcement of environmental standards for both exporters/donors and importers/recipients of technology. Failing success, however, it should introduce standards on its own, and consider necessary steps to maintain the competitive advantage of U.S. suppliers.*

Discussion: Internationally accepted standards to limit the exchange and use of polluting products and technologies could clearly help to achieve the goal of global environmental protection. The Board believes that the United States should spearhead a movement toward the adoption of environmental standards, both health and performance-based, by all nations, covering imports and exports of products, equipment, and processes. The

United States should have specific proposals ready for presentation at the 1992 U.N. Conference on Environment and Development (UNCED), which is slated to include a round of discussions on environmental trade. The U.S. Government should also stress the need to incorporate sound environmental standards in the agenda for the next GATT round. An effective first step toward a leadership role would be the imposition of such standards on American suppliers.

At a minimum, products and practices that are potentially hazardous to health or to the environment and are thus banned from commercial marketing inside the United States should not be considered eligible for export. Although EPA is only one of several U.S. Government or international agencies active in setting health and performance standards, its experience in this area and in broader areas of air and water quality, toxic substances, and pesticide usage argue for its playing a leading role in advising on and determining acceptable environmental standards for U.S. international commerce.

For the private sector, the venture into more environmentally benign technologies offers commercial opportunities and risks. Certainly, globally accepted standards would spawn growth in the industries using such technologies by ensuring that competitors who are less responsible would not hold an advantage in international trade.

Some argue that implementing environmental standards on exports would shackle American private industry vis-a-vis foreign competitors.

Others are more optimistic about the ability of United States industry to adapt to and develop environmental markets around the world, believing that if the United States takes the lead in setting environmental standards, other nations will follow and international financing institutions will be supportive.¹¹ The Board agrees with this latter view.

Finance

Findings: A significant amount of U.S. Government financial support for the transfer of environmental technology is available from a number of sources by way of appropriated funds or guarantees. This situation is likely to continue, although a great deal of initiative and energy will be required to exploit the funding available. Substantial multilateral and bilateral donor support exists, but is difficult to quantify. In addition, the U.S. private sector finances a multitude of transfers and can avail itself of U.S. Government incentives.

Recommendation 9: *A concerted effort should be mounted to exploit more effectively the existing funding resources of appropriate United States Government agencies for financing environmental technology transfers. The United States should act energetically to have the World Bank, regional development banks, and other bilateral donors do more, and should mobilize international consortia to finance and facilitate the transfer of environmentally benign technology. If and when*

additional resources to support international development become available, a high priority should be given to programs furthering environmental goals, and the U.S. Government should provide leadership in this regard.

Discussion: U.S. Government appropriations which can be used to finance international environmental projects are made to AID, EPA, and the Departments of Energy and State. The Ex-Im Bank and the Overseas Private Investment Corporation (OPIC) have Congressional authority to make loans or issue guarantees to finance American environmentally oriented exports and investments. The United States also provides assistance in certain situations to purchase discounted developing country foreign debt to help finance in-country costs of environmental projects.

Multilateral development institutions and other bilateral donors have substantial financial resources which could be used to promote environmental protection. The U.S. Government should continue to press the former to increase their funding. Similarly, the United States should be energetic and resourceful in devising means to realize the potential of bilateral funding.¹²

Training

Finding: As noted in the Board's Interim Report, training of recipient-country personnel

¹¹Indeed, the Chemical Manufacturers Association (CMA) in September 1989 developed its own guidelines for the transfer of technology, declaring that the "provider should give high priority to the health, safety and environmental aspects..." of the transfer and urging that the responsibilities of both the providers and the recipients be spelled out.

¹²See Annex Five for a more detailed discussion of funding sources.

at all levels (including the training of project planners) is a vital aspect of technology transfer, both for gaining local acceptance and support and for assuring the necessary expertise to maintain the effectiveness of the technology.

Recommendation 10: *The United States Government should stress and support training as an essential element of the transfer of environmental technologies abroad. In the same vein, the United States should encourage the building of institutions in recipient countries that can oversee the planning and implementation of indigenous environmental strategies and projects. The capabilities and experience of EPA and AID in these areas should be fully tapped.*

Discussion: The transfer of technologies between nations frequently involves the sharing or selling of experience, know-how, and techniques rather than simply the transfer of equipment. Even when new equipment or processes are involved, training of indigenous personnel in administration, operation, and maintenance are essential if the technology is to survive and achieve its purpose. The advantages of "teaching one to fish rather than giving one a fish" are apparent in many aspects of the technology transfer process, but most strikingly so in analysis and planning. Training indigenous decision makers and researchers to plan, develop, and implement environmental projects could be a valuable means of building recipient-country demand for related technologies.

Much of this training can be done by sending U.S. experts abroad or by bringing foreigners to the United States for training in companies, laboratories, and universities. Indeed, some U.S. Government agencies and private sector institutions already have considerable experience in this regard.

An important training objective should be the encouragement or creation of an indigenous capacity to utilize environmental technology. This, together with indigenous demand for such technology (see Recommendation 1), provides promise for an effective transfer program.

Commercial Considerations

Findings: For the most part, commercial constraints require no special attention in cases of environmentally related technology. Intellectual property rights protection does not appear to be a major obstacle since appropriate technology that is non-proprietary is often available. Commercial arrangements can be made which will protect patent rights, copyrights, and "know-how" packages that are not in the public domain. Liability and antitrust issues, however, may be restraining factors in particular cases.

Recommendation 11: *Arrangements should be devised to improve communications between the public and private sectors regarding legal constraints that affect environmental technology transfer. This could be part of the mission of an*

umbrella entity established along the lines of Recommendation 2.

Discussion: Much environmental technology is "soft" (e.g., training and energy-efficiency consulting) and much is non-proprietary. This, obviously, reduces the importance of the intellectual property rights issue. Indeed, considerable information now in the U.S. public domain would be of tremendous value if made available to analysts and planners elsewhere. At the same time, there are information and processes accepted elsewhere that could be useful to American enterprises.

In the case of a country with inadequate property rights safeguards, one option would be to offer technology already in the public domain. After all, a great deal of environmental protection has been achieved in the United States using technologies which are no longer proprietary. Joint ventures between U.S. and foreign entities are another option for bypassing the property rights issue, by giving indigenous groups a vested interest in the success of a project and the protection of property involved. Joint ventures also allow an infusion of indigenous cultural, technical and political understanding to reinforce the provider's technical, and commercial know-how. Finally, as noted in the Interim Report, the intellectual property rights obstacle may further diminish as a result of the continuing efforts of the United States Trade Representative and Department of Commerce to establish international standards of protection.

Liability can also be a thorny problem in technology transfer. Although no unique problems of tort liability are presented by most environmental transfers, entities that share technology without restrictions (such as broadcast technology) find reason for concern because these transfers occur outside the bounds of normal commercial transactions, leaving the provider little control over potential misuse. Provision of special federal liability insurance for such broadcasters of environmental technology might relieve anxiety over initiatives of this kind.

Antitrust considerations are another potential legal barrier to environmental transfers. A violation of the Sherman Antitrust Act can occur when U.S. companies unite to solve a specific problem or when firms which normally compete are brought together to handle separate portions of a project. The National Cooperative Research Act and the Export Trading Company Act offer exemptions from antitrust liability, although neither has been widely utilized.

The private sector should have easy access to information available in government agencies concerning commercial constraints to international environmental technology transfers. Such access would be especially useful to U.S. companies with little experience in foreign markets. This could be one of the missions of an umbrella organization such as recommended by the Board.

Concluding Observations

The United States has an enormous stake in, and a special responsibility for, reducing the risks to the global environment. Its political influence, economic power, and technological capabilities dictate that the United States can and should assume a leading role in the exercise of global stewardship. To this end it is urgent that the government in general and EPA in particular face up to the lack of high-level focus and policy guidance that now characterizes the conduct of United States international environmental technology transfer. In particular, steps should be taken to ensure that activities having an impact on the environment are mutually supportive and that their goals are integrated, achievable, and achieved.

In a world of decreasing international tension, the United States has an opportunity to focus its attention and resources on such positive objectives as sustainable international development and the enhancement of global environmental quality. A good start could be made in this regard by proceeding in the spirit of the Montreal Protocol. Although the Protocol applies specifically to the transfer of CFC-substitute technology, its fundamental principle should serve as a global guideline for U.S. environmental policy-makers as they plan for the start of negotiations on a climate convention in February of 1991 "to take every step... to ensure... that the best available, environmentally safe substitutes and related technologies are expeditiously transferred to developing countries and that [such] transfers occur under fair and most favorable conditions."

Annex I

IETTAB Charter

United States Environmental Protection Agency Advisory Committee Charter

Organization and Functions - Committees, Boards, Panels, and Councils

International Environmental Technology Transfer Advisory Board

1. Purpose and Authority. The purpose of the International Environmental Technology Transfer Advisory Board (IETTAB) is to provide advice and counsel to the Administrator of EPA and other concerned agencies on the transfer of environmental technology and information to developing and centrally planned economies which cannot afford the science and technology involved, and may need assistance in using such environmental technology effectively. It has been determined that the establishment of this Board is in the public interest in response to the President's instruction to the Administrator of EPA on July 6, 1989, to establish such a board. The Board is being established in accordance with the provisions of the Federal Advisory Committee Act, 5 U.S.C. App. Section 9 (c).

2. Duties and Scope of Activity. The Board shall advise, consult with, and make recommendations on a continuing basis to the Administrator, or his designee, on issues related to the development, transfer, and utilization of environmentally related technology and information to developing countries and centrally planned economies. The Board shall address these issues as they apply to both receiving and contributing countries. The Board will provide analysis, conduct reviews, obtain relevant testimony and information, perform studies,

produce reports, make necessary recommendations, and undertake other activities necessary to meet its responsibilities.

3. Objectives. Developing countries and the centrally planned economies are a rapidly growing source of national and global pollutants. Helping these countries curtail their pollution, as well as avoid creation of pollution, is a high priority in efforts to provide a cleaner world environment. Better access to appropriate environmental technologies and to the financial resources to deploy them will be necessary to fulfill these objectives. Particularly with respect to helping developing and centrally planned economies avoid technology that depletes stratospheric ozone and the emission of greenhouse gases, such technology transfer will be important to protecting the global environment. The Board is assigned the role of advising EPA and other concerned agencies. The Board's goals include advising the Agency by providing assessments of the following:

- environmental technologies needed by developing and centrally planned countries;
- legal and institutional barriers to the transfer of environmental technology to such countries;
- economic barriers to the transfer of environmental technology to developing countries and centrally planned economies;
- need for assistance in developing appropriate environmental technology for such countries; and

- market opportunities for U.S. suppliers in connection with such technology transfer.

4. Composition. The Board will consist of approximately 15 members appointed by the Deputy Administrator for a term of two years and may be reappointed to consecutive terms. A Chairperson will be appointed by the Deputy Administrator. Members will be appointed in a balanced representation from the following sectors: industry and business; academic, educational, and training institutions; government agencies; international organizations; environmental groups; and non-profit entities. Most members will be appointed as representatives of non-Federal interests. The Board may constitute itself into such specialized committees on an ad hoc or standing basis as it finds necessary to carry out its responsibilities. Such subgroups will report back to the Board.

5. Meetings. The Board will meet four times a year or as necessary as determined by the Administrator or his designee. A full-time employee of the Agency, who will serve as the Designated Federal Official, will be present at all meetings and is authorized to adjourn any meeting whenever it is determined to be in the public interest. Each meeting will be conducted in accordance with an agenda approved in advance of the meeting by the Designated Federal Official. Support for the Board shall be provided by the Office of International Activities. The estimated annual operating costs total approximately \$85,000 including 0.25 work year of staff support.

6. Duration. The Board shall be needed on a continuing basis and may be renewed beyond

its initial two-year period, as authorized in accordance with Section 14 of the Federal Advisory Committee Act.

Agency Approval Date: September 1, 1989

GSA Consultation Date: September 15, 1989

Filed with Congress: October 31, 1989

Signed by the Deputy Administrator

Annex II

Members of IETTAB

Mr. William D. Ruckelshaus (Chairman)
Chairman of the Board
Browning Ferris Industries

Mr. Robert Fri (Vice-Chairman)
President and Senior Fellow
Resources for the Future

Mr. Alvin Alm
Senior Vice President and Director
Science Applications International Corporation

Dr. Betsy Ancker-Johnson
Vice President of
Environmental Activities Staff
General Motors Corporation

Ambassador Harry Barnes
Senior Fellow
World Wildlife Fund

Ms. Kathryn Fuller
President
World Wildlife Fund

Dr. John Gibbons
Director
Office of Technology Assessment
U.S. Congress

Mr. W. David Hopper
Senior Vice President
Haldor Topsoe, Incorporated

Mr. Fred Krupp
Executive Director
Environmental Defense Fund

Dr. Gordon MacDonald
Research Director for Environmental Studies
Institute on Global Conflict and Cooperation
University of California - San Diego

Dr. Alexander McLachlan
Senior Vice President of Technology
E.I. DuPont de Nemours & Co.

Mr. John Petty
Chairman
Hydro-ICONA

Dr. Wesley W. Posvar
President
University of Pittsburgh

Mr. John W. Sewell
President
Overseas Development Council

Mr. Bruce Smart
Senior Counselor
World Resources Institute

Mr. Eric Zausner
President
Strategic Performance Management

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Rapporteur:

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Coordinator, International Programs
Resources for the Future

Contributing Staff

Ms. Mary S. Kreimer
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Mr. Thomas B. Carter

Annex III

IETTAB Interim Report (May 1990) Executive Summary

This document is the interim report of the International Environmental Technology Transfer Advisory Board (IETTAB). It reflects the Board's present sense of direction and priorities as it considers a technology transfer program.

The Board's report strongly urges that technology transfer programs designed to protect the global environment should be undertaken in the context of sustainable development. In this regard, the report stresses that population stabilization programs in both developing and industrial societies are a necessary condition for sustainable development. The Board gave its endorsement to Secretary of State Baker's commitment to ensure that environmental issues are fully integrated into U.S. diplomatic initiatives.

The report notes that "global environmental problems" should distinguish among global atmospheric change, ozone depletion, ocean pollution, and the preservation of global biodiversity. Within most of these categories, technology transfer projects can produce consequential local benefits as well as important contributions to global environmental protection. Such projects could be funded and administered through already existing bilateral and multilateral economic assistance and environmental protection arrangements. On the other hand, some projects — such as those mitigating ozone depletion through CFC reduction — may produce only minor local benefits. Those projects are unlikely to be undertaken by developing countries unless financial assistance through additional or

concessionary funding is made available. The Board notes that scarce funding should be targeted to countries that make the most difference, and that the amount of assistance should correspond to expected global benefits. The Board also urges that efforts be made to harmonize assistance guidelines among all donor countries.

The IETTAB puts great stress on the importance of building indigenous demand and creating capabilities to utilize the transferred technologies within recipient countries. Otherwise, a technology transfer program is unlikely to be sustained or effective.

The creation of an indigenous demand will obviously be accomplished by market opportunities. These, in turn, raise such important implications as American international competitiveness, the protection of patent rights and the issue of liability. Such commercial considerations, however, are already being addressed elsewhere within the Executive Branch. The Board urges EPA, as a general policy, to coordinate its technology transfer programs with other appropriate Federal agencies and private sector programs.

Finally, the Board endorses a multilateral approach to address environmental technology transfer issues, and notes four upcoming, significant international meetings where the United States will participate and these issues will be raised.

Annex IV

Entities Contacted by IETTAB Staff

U.S Government Agencies:

Agency for International Development
Department of Agriculture
Department of Commerce
Council of Economic Advisors
Council for Environmental Quality
Department of Energy
Environmental Protection Agency
Office of Science and Technology Policy
State Department
US Trade Development Program
US Trade Representative
Treasury Department

National Academies:

National Academy of Engineering
National Academy of Sciences

U.S. Congressional Offices:

Office of Technology Assessment
Representative John Porter (staff)
Representative Claudine Schneider (staff)
Senate Committee on Commerce, Science, and
Transportation
Senator Al Gore (staff)

Financial Institutions:

Export/Import Bank
Overseas Private Investment Corporation
The World Bank

Non-Governmental Organizations:

Conservation International
Debt for Development Foundation
World Environment Center

Laboratories:

Pacific Northwest Laboratories
Tata Energy Research Institute (New Dehli,
India)

Multilateral Organizations:

North Atlantic Treaty Organization-Science
Committee

State Governments:

California Energy Commission

Foreign Governments:

Mexico City, Mexico
Sweden

Private Sector:

AER-X, Inc.
Allied Signal
AT&T
Crowell and Moring
DuPont
E. Bruce Harrison Company
General Electric
IBM
Kaiser Aluminum
Martin Marietta
Union Carbide

Annex V

Financing for Environmental Technology Transfer

U.S. Government financial activity takes the forms of:

- (1) appropriated funds — most prominently through the Foreign Assistance Act (FAA), in large part administered by AID;
- (2) loans, guarantees, and insurance of the Export-Import Bank and the Overseas Private Investment Corporation (OPIC);
- (3) assistance in debt swap transactions such as "Debt for Nature;"
- (4) dedication of P.L. 480 generated local currency resources to environmental activities;
- (5) pressure on multilateral lending institutions such as the World Bank to finance or facilitate environmental programs; and
- (6) commitment to international initiatives such as the proposed ozone layer fund.

Appropriated funds are available for technology transfer in the following agencies:

Agency for International Development. AID finances:

- (1) bilateral and regional environmental projects and programs;
- (2) the operational costs of the Debt-for-Development Foundation;
- (3) debt conversion transactions by non-governmental organizations (NGOs) to carry out environmental projects;
- (4) debt reduction, so far only in sub-Saharan Africa by way of debt forgiveness, although authority exists to accept local currencies in payment; and
- (5) part of the activities of the Committee on Renewable Energy, Commerce and Trade (CORECT).

Department of Energy. DOE provides the staff director and coordination for CORECT, and funds CORECT on the order of \$1 million a year. With AID, DOE sponsors a fossil fuel technology (Clean Coal Initiative) program.

Environmental Protection Agency. EPA provides staff specialists for technical assistance to environmental projects funded by AID (e.g., in Thailand and Indonesia). It has also furnished technical assistance to Poland. In addition, the Poland-U.S. and Hungary-U.S. Private Enterprise Funds are supported by U.S. Government appropriations. While not primarily focused on the environment, they might be sources of finance for environmental technology transfer projects.

Department of State. The Trade and Development Program (TDP) administered by the State Department finances feasibility studies in developing countries for large-scale infrastructure projects such as dams and power stations. State is also responsible for making U.S. Government contributions to environmental activities such as the United Nations Environment Programme (UNEP).

Other. The Peace Corps, the Forest Service of USDA, and perhaps other agencies carry out environmental activities in developing countries.

U.S. Government loans and credits, not funded by appropriations, are available from the following sources:

Export-Import Bank. The Bank can use its lending authority to support environmental projects, but does not appear to have done so

as a policy thrust. Ex-Im has not met its Congressionally mandated target to utilize at least 5 percent of its resources to assist renewable energy projects, primarily because the Bank does not consider itself an originator of financing proposals but rather the recipient of proposals submitted on the initiative of prospective borrowers.

OPIC. The Corporation has the authority to make loans up to a total of about \$20 million per year to small business, with a maximum of \$6 million allowed per company. Environmental ventures are eligible.

U.S. Government export and investment guarantees are provided through:

Export-Import Bank. The bank issues guarantees and insurance to support U.S. exports.

OPIC. The Corporation was the major mover in the recent creation of the Central and Eastern European Growth Fund and is playing a similar role in bringing an Environmental Investment Fund into being. OPIC also provides political-risk insurance to U.S. investors in developing countries and Eastern Europe. Environmental ventures are eligible for such insurance.

Debt reduction/forgiveness/conversion which can be used for environmental purposes:

AID. AID presently provides appropriated funds to assist debt-for-nature transactions. Further, the FAA of 1989 authorizes the forgiveness, or acceptance of local currencies in payment, of FAA debt in the "relatively least developed" countries, but so far the authority has been used only in sub-Saharan Africa and then solely for debt forgiveness.

"Enterprise for the Americas". Announced on June 27, 1990 by the President, this initiative for Latin America and the Caribbean provides, first, for reduction of FAA and P.L. 480 Act debt. Interest on the reduced debt, payable in local currency, would flow into an environmental fund in the eligible country. Second, the proposal would authorize the sale of Ex-Im Bank and Commodity Credit Corporation (CCC) debt to facilitate debt-equity or debt-for-nature activities. Legislation is required to implement this initiative.

Multilateral sources of finance are also available:

The Treasury Department has aggressively pushed the World Bank and the regional development banks to become more active in making loans for environmentally oriented projects and to support debt-for-nature proposals.

A multilateral fund, to be administered by the World Bank, UNDP and UNEP, is to work on the ozone layer depletion problem.

The table on the following pages tabulates U.S. Government financial support for environmental programs in the developing world and Eastern Europe. Because information is not readily accessible, the substantial amounts of local currency generated under P.L. 480 are not tabulated. To give an idea of the probable magnitude of this resource, it is useful to note that in FY87 U.S. Government-generated local currency expenditures for forestry alone in developing countries were several times AID's appropriated fund obligations for the same purpose.

OECD has done a study of what other donors are doing but has not published any financial data. Some fragmentary statistics are available but not enough to report on with confidence.

Actual and Potential Sources of U.S. Government Financing for Environmental Programs

	FY 90 (in millions of dollars, by funding source)	FY 91 (in millions of dollars, by funding source)
I. Foreign Assistance Act		
1. AID ¹		
A. Line item: Private Sector, Environment, and Energy	\$151.8	
(1) FY91 Adm. Request		\$142.2
(2) FY91 House Appropriations Cmte. (HAC) Markup		152.2
(3) FY91 HAC Environment Earmark		(75.0)
(4) FY90 Statutory Earmark: Krakow Air, Water Quality; Budapest Center	(3.3) ^{2,3}	
(5) FY90 Statutory Earmark: Krakow Power Plant Retrofit	(10.0) ^{2,3}	
B. Other Earmarks		
(1) FY91 HAC: AID Office of Energy		20.0
(2) FY91 HAC: Global Warming Initiative		30.0
(3) FY91 HAC: Montreal Protocol Seed Money for LDCs		10.0
C. AID Environmental Obligations ⁴ - All line items	287.0	368.0 (est.)
D. Central and Eastern Europe ³		
(1) FY91 Adm. Request - All Activities		230.0
(2) HAC Markup		418.7
(3) HAC Environment Recommendation		(75.0)
(4) Private Enterprise Funds -		
(a) FY90 Poland	45.0	
(b) FY90 Hungary	5.0	
(c) FY91 HAC Recommendation- Both Funds		113.7
2. Ex-Im - All Purposes ⁵		
A. Loan Authority		
(1) FY90	612.4	
(2) FY91 Adm. Request		500.0
(3) FY91 HAC Markup		750.0
B. Guarantee Authority		
(1) FY90	10,191.4	
(2) FY91 Adm. Request		10,599.0
(3) HAC Markup		10,599.0
3. OPIC ⁵		
A. Direct Loan Authority -All Purposes		
(1) FY90	20.0	
(2) FY91 Adm. Request		23.0
(3) FY91 HAC Markup		40.0
B. Loan Guarantees - All purposes		
(1) FY90	211.5	
(2) FY91 Adm. Request		185.0
(3) FY91 HAC Markup		250.0
C. OPIC Sponsored Investment Funds - Partially Supported by OPIC		
(1) Eastern Europe Growth Fund ^{3,6}	150.0	
(2) Environmental Investment Fund ^{3,6}	60.0	
4. State Department - Trade and Development Program ¹		
A. FY90	32.0	
(1) FY90 Eastern Europe	(2.0) ³	
B. FY91 Adm. Request		30.0
C. FY91 HAC Markup		35.0

	FY 90 (in millions of dollars, by funding source)	FY 91 (in millions of dollars, by funding source)
5. State Department - International Organizations and Programs ¹		
A. UN Environment Programme		
(1) FY90	11.8	
(2) FY91 Adm. Request		10.0
(3) FY91 HAC Markup		15.8
B. Others: Intl. Tropical Timber Org.; Tropical Forest Action Plan; WMO Special Fund for Climate Studies; Convention on Intl. Trade in Endangered Species; Intl. Union for Conservation of Nature; Inter-governmental Panel on Climate Change; World Heritage Fund ⁷		
(1) FY90	1.0	
(2) FY91 Adm. Request		2.6
(3) FY91 HAC Markup - all earmarks		3.4
6. Debt for Development ⁵		
A. FY HAC Endorsement for Mexican Environment Fund	20.0	
II. EPA ¹ No Breakdown Available		
III. DOE ¹ DOE, CORECT	1.0	

Notes:

- ¹ Appropriated funds.
- ² The same amount of funding will be provided in FY91.
- ³ Authorization of all activities in Central and Eastern Europe is contained in the authorizing legislation, "Support for Eastern Europe Democracy." Countries presently eligible are Czechoslovakia, Hungary, Poland, and Yugoslavia.
- ⁴ Developing countries only; excludes Central and Eastern Europe. Activities are financed under a number of line items, including Private Sector, Environment, and Energy.
- ⁵ Non-appropriated funds.
- ⁶ Spread over four FYs.
- ⁷ Numbers are for entire group; individual programs vary in terms of inclusion, exclusion in FY90, FY91 Administration request, and FY91 HAC markup.

Annex VI

Glossary of Acronyms

AID	U.S. Agency for International Development
CEQ	Council on Environmental Quality
CMA	Chemical Manufacturers Association
CORECT	Committee on Renewable Energy, Commerce, and Trade
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FAA	Foreign Assistance Act
FCCSET	Federal Coordinating Council for Science, Engineering, and Technology
GATT	General Agreement on Tariffs and Trade
GSA	U.S. Government Services Administration
HAC	House Appropriations Committee, U.S. Congress
ICOLP	Industry Cooperative for Ozone Layer Protection
IETTAB	International Environmental Technology Transfer Advisory Board
NACEPT	National Advisory Council for Environmental Policy and Technology
NGO	Nongovernmental Organizations
OECD	Organization for Economic Cooperation and Development
OPIC	Overseas Private Investment Corporation
TDP	Trade and Development Program
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USDA	United States Department of Agriculture
USTR	United States Trade Representative
WMO	World Meteorological Organization



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