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**The Independent Technical
Review Panel
United States - Asia
Environmental Partnership**

by

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by

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Foreword

Asia, with one-half the world's population and some of the fastest growing economies, will have a significant impact on the global environment. Almost every country in the region faces serious urban and rural pollution problems.

An independent technical review panel, comprised of four senior experts on Asia and Asian environmental matters, was established to briefly review the current environmental problems facing Asia and to assist the Secretariat of the USAEP in making the strategic choices necessary to achieve its objectives. Properly focused, USAEP can play an important role in working with U.S. and Asian institutions in determining the environmental consequences of Asia's rapid population and economic growth and developing strategies to enable Asian countries to realize both their growth potential and environmental objectives.

The cost of preparing and printing the report is estimated to be about \$8000.

This report is directed at those working in and with the Secretariat of the USAEP. The panel hopes that it will assist USAEP as it makes important choices concerning where, and on what issues it will focus over the next several years.



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I. Introduction

In September 1994, the Secretariat of the United States - Asian Environmental Partnership (USAEP) created an independent technical review panel of Asian and environmental experts to complement a mid-term evaluation of the USAEP. The "re-view" panel was charged with (a) assessing the potential of the program and (b) making recommendations for future directions.

Support for the panel was provided through core resources of, and a buy-in to, the Environmental and Natural Resources Policy and Training (EPAT) project implemented by the Winrock International Environmental Alliance (WIEA). The work of the panel was facilitated by Owen Cylke of the USAEP Secretariat and Douglas Clark, EPAT/WIEA Chief of Party.

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The panel quickly realized that the USAEP program has functioned outside the boundaries of normal USAID-supported activities. The purview of the program is vast. It has the mandate to work in 34 countries in Asia and the Near East. It has been free to explore all aspects of the environment-development interface. It enjoys a high level of administrative autonomy. It is unconstrained by a detailed project design. It is based on the concept of a collaborative partnership between American and Asian individuals and institutions. And it is predicated on an assumption that the U.S. has a strong comparative advantage in environmental technology that could be of great value to Asians.

These characteristics provide an unparalleled opportunity for creativity and innovation. But unless creativity and innovation are circumscribed by a coherent vision and accompanying strategy, there is little likelihood that USAEP will reach its full potential. As the panel interacted with members of the USAEP Secretariat, the Environment Center in USAID's Global Bureau, and the Asia Near East Bureau of USAID, this tension between creativity and purview on the one hand and lack of focus on the other hand came to be seen by the panel as a central issue facing USAEP.

This concern was manifested by repeated calls among knowledgeable observers for greater geographic and sectoral focus. These calls implied development of criteria by which to make

choices. Choices about the countries in which USAEP might most profitably operate. Choices about which environmental problems USAEP might most usefully tackle. Choices about how to productively build partnerships between American and Asian individuals and institutions.

The panel's deliberations regarding focus were wide ranging and guided by two fundamental considerations. First, USAID's commitment to promoting sustainable development¹ is taken as the *raison d'être* of USAEP. Second, the panel is acutely aware that the strength of USAEP is largely its ability to promote environmental technology transfers through trade to ameliorate Asian urban and industrial pollution.

The well-being of people is a central objective of efforts to protect the environment. Experience clearly indicates that more efficient and less polluting industrial regimes result in substantial and enduring human health benefits which affect both urban and rural populations.

Given these considerations, the panel asked: How could a limited (\$100 million) environmental trade and technology transfer program be designed to have the greatest impact on sustainable development in Asia? Working everywhere in Asia and the Near East would only dissipate resources. An effective USAEP needs to work in fewer countries. But which few? We answered this question by arguing that USAEP should work in those countries in Asia where environmental technology transfer has the greatest possibility of impacting on particularly severe urban/industrial problems. This drove the panel to focus on the environmental consequences of rapid industrial growth in the high performing economies of East/Southeast Asia.

The panel ultimately characterized this choice-- one that focuses on the urban/industrial problems in high industrial growth East/Southeast Asia--as one that promotes a "clean industrial revolution". A revolution that could build on the success of an earlier "export revolution" in manufactures. The panel realizes this organizing vision requires substantial refinement to give it precision. That refinement must ultimately be made by those responsible for shaping the future of USAEP but this report (a) spells out the case for a focus on a clean industrial revolution in the high performing countries of East/Southeast Asia which plays to USAEP's strengths, and (b) outlines the broad details of a clean technology program. In short we believe a focus on a "clean industrial revolution" provides the needed focus to allow USAEP to utilize its demonstrated capabilities and existing work components to achieve program objectives.

The decision by the panel to recommend a strategy that focuses on the urban/industrial environmental problems implies recognition that the Biodiversity Conservation Network (BCN) component of USAEP, with its many redeeming features, might best become autonomous from USAEP during the next phase of the program.

II. The Case for a USAEP Program in the HPEs of East/Southeast Asia

A. Development Performance in the HPEs

The high performing economies (HPEs) of East/Southeast Asia represent the one group of countries in the world that have experienced broad-based or widely shared economic growth during the last three decades. The high performing economies of East/Southeast Asia include South Korea, China, Hong Kong, Singapore, Taiwan, Malaysia, Indonesia, and Thailand. Exceedingly rapid economic growth has been combined with low income inequality and rapid declines in the incidence of poverty. These countries have convincingly demonstrated that not all growth bypasses the poor or is inequitable.²

The differences in performance between the HPEs of East/Southeast Asia and the rest of the developing world are enormous. The doubling time for average living standards in East/Southeast Asia has been 13.5 years, for Latin America the comparable figure is 40 years, for sub-Saharan Africa it is 360 years. Given these differences, it is not surprising that countries in East/Southeast Asia have surpassed their counterparts in Latin America. Per capita income in Brazil in 1966 was 2.15 times that of Korea, by 1991, income per capita in Brazil (\$2,940) was only 46% of that in Korea (\$6330).³ Similar differences can be found for others.

Differences in inequality and the incidence of poverty are equally striking. To take but one example, the poorest 20% of income recipients in Brazil received 2.1% of national income in 1989, their counterparts in Indonesia received 8.7%. This fourfold difference in income shares of the poorest 20% of the population has a profound impact on the incidence of poverty. Brazil with an income per capita (\$2,020) in 1987 4.5 times larger than Indonesia (\$450) had an incidence of poverty 40% higher (24%) than Indonesia (17%). If the poorest 20% of income recipients in Brazil received the same share of national income as their counterparts in Indonesia, there would, in theory at least, be no poverty in Brazil.⁴

How have the HPEs of East/Southeast Asia achieved shared growth outcomes? To begin with, governments in the HPEs have demonstrated an extraordinary capacity to sort through difficult political circumstances to transform their economies. The HPEs have successfully weathered internal and external threats to political stability. But governments did much more than maintain political stability. They managed macroeconomic policies to ensure low inflation, competitive exchange rates, and sustainable current account deficits. They engineered the transition from low productivity agriculture to high productivity Green Revolution agricultural technologies. They managed trade policies to take advantage of traditional comparative advantage in primary exports while diversifying exports to include light manufacture.⁵ They invested in their peoples-- particularly in primary education and primary health care but also in secondary and tertiary education.⁶

B. The Environment in the HPEs

Unfortunately, broad-based growth in the HPEs has come at great expense to the environment. Urban environments in particular have suffered from wide-spread environmental degradation. Second generation Green Revolution environmental problems are particularly problematic. The natural resource rich HPEs (Thailand, Malaysia, and Indonesia) suffer from rapid depletion and severe degradation of their natural resources.

High performing East/Southeast Asia's pressing environmental problems, are largely a consequence of rapid economic growth, high population densities, and weak and late developing public sector environmental regulations. Fortunately each of the HPEs is now turning attention to environmental protection. This provides USAEP with a unique opportunity. Before describing that opportunity, high growth East/Southeast Asia's environmental problems are briefly outlined.

1. Urban-industrial growth and the environment

Twelve of the fifteen cities in the world with the highest level of particulate matter are in Asia. Seven of these are in the HPEs of East/Southeast Asia. Three of the seven most polluted cities in the world are also in the HPEs of East/Southeast Asia. These outcomes are not surprising. East/Southeast Asian economic expansion has been fueled by high rates of growth in manufacturing. And manufacturing sectors in East/Southeast Asia continue to grow much faster than elsewhere.⁷

This extremely rapid rate of growth of manufacturing has been accompanied by an even more rapid rate of growth in the pollution intensity of production (see table 1). Growth in the HPEs of East/Southeast Asia also is energy intensive and, because of reliance on coal, equally polluting.⁸ The high coal based energy sector in East/Southeast Asia generates significant local, primarily through air pollution, environmental health problems and regional ecological degradation, e.g. acid rain.

Not surprisingly, per capita CO₂ emissions in the HPEs are among the highest in the developing world. The growth rate of emissions is equally high. If the OECD countries meet their UNCED pledges to scale back CO₂ emissions to 1990 levels, Asian production of CO₂ emissions from fossil fuels will equal that of the OECD sometime between 2010 and 2015.⁹ Except for India, most of the increase in CO₂ emissions in Asia will come from the HPEs in East/Southeast Asia.

Table 1
Growth Factor of Toxic Intensity
of Production

<u>Country</u>	<u>Period</u>	<u>Growth Factor</u>
Indonesia	1976-86	5.40
Malaysia	1974-84	3.17
Korea	1977-87	3.05
Thailand	1976-86	2.48
China	1977-87	2.12

Notes: (1) Toxic intensity is a measure of toxicity per unit of output. (2) Source: C. Brandon and R. Ramankutty, Toward an Environmental Strategy for Asia (Washington, D.C.: World Bank, 1993): 74.

2. The environmental consequences of the green revolution¹⁰

Along with India, the large HPEs of East/Southeast Asia led the developing world in adoption of Green Revolution technologies in agriculture. As a result, the HPEs are now experiencing the negative environmental consequences of chemical and water intensive agricultural strategies.¹¹

Waterlogging and salinity problems resulting from poorly designed and managed irrigation systems and practices have damaged millions of hectares in Asia. Although most of Asia's salinization and waterlogging problems are in South Asia, East/Southeast Asia has its share of these problems.¹²

Agro-chemicals pose a serious risk to the East/Southeast Asian environment. In 1961 fertilizer use in East Asia averaged 3.5 kilograms per hectare. In 1990 that figure increased to 172.2 kilograms per hectare, more than a 49 fold increase. East Asian farmers now use about two times as much fertilizer per unit area as U.S. farmers. The overapplication of fertilizers is polluting surface water and causing the accumulation of phosphorus and heavy metals in the soils.

Increasing use of pesticides has led to growing pest resistance and reduction of the pests' natural predators, forcing a vicious cycle of stronger and more frequent applications. Poorly managed pesticides have health impacts through direct contact or through the ingestion of contaminated food or water. In Indonesia the widespread use of endosulfan in rice is believed to cause significant problems of fish kill, and the growth of vegetation in ponds and rivers has significantly altered fisheries and habitat.¹³

It is extremely important for environmental (human health), ecological, and food production reasons to find ways to increase yields to meet the future food needs of a more populous and

prosperous East/Southeast Asia in more environmentally sustainable ways. The HPEs of East/Southeast Asia will almost certainly lead the search for high yielding environmentally sustainable agriculture.

3. Deforestation and loss of biodiversity

Among the developing regions of the world, forests are disappearing most rapidly in East Asia. Between 1965 and 1989, forest loss in East Asia averaged 7/10 of 1% per year. This was 1.4 times that in Latin America, 1.75 times higher than sub-Saharan Africa, and 3.33 times higher than that in South Asia.¹⁴ This trend has subsequently worsened. The rate of deforestation during 1981 - 1990 was 1.4% per year. This increase in deforestation rates stands in marked contrast to the other tropical regions of the world. Commercial logging, conversion of forests to agriculture, and demand for fuelwood and fodder contribute to the problem.¹⁵

High rates of deforestation have contributed to significant habitat loss and degradation. Rough estimates suggest that 30% of China's land area, 34% of Thailand's, and 24% of Indonesia's have been seriously degraded. Because of the continuation of the forces underlying these trends, it is estimated that East Asia, along with the rest of Asia, will lose a higher proportion of its species and natural ecosystems than any other region during the next 25 years.¹⁶

C. Conclusions

The stark contrast between economic development in the HPEs-- high growth, low income inequality, rapid decline in the incidence of poverty-- and rapidly deteriorating environments makes the HPEs of East/Southeast Asia the foremost test of sustainable development. Because others are trying to emulate the HPEs, assisting them in a transition to more sustainable development offers the prospect of extending what is learned there elsewhere.

III. Making Strategic Choices in USAEP

A. Assessing Alternatives

Given this diverse list of environmental problems in the HPEs of East/Southeast Asia, which one or ones should USAEP address? In which specific countries should they be tackled? Answering these questions is not easy. Each environmental problem is exceedingly important. Unless ways are found to reduce the energy intensity of GDP, shift from dirtier to cleaner fuels, and reduce the pollution per dollar of energy use, air pollution will rapidly grow and millions of Asians will suffer the health consequences. The global environment may also deteriorate as a result of the increase in greenhouse gas emissions. Unless ways are found to increase agricultural yields in East/Southeast Asia with less chemical pollution, it will be impossible to meet future food needs without further contamination of water supplies and degrading of natural resources. Unless East/Southeast Asia's rapidly dwindling forests and bio-diversity is protected, humankind may lose one of its largest storehouses of genetic material. In each instance, the human health costs are unacceptable.

The panel's answers to these questions are guided by pragmatism and simplicity. Practical political pragmatism demands that USAEP define and distinguish its mission. This requires making hard choices about program and country focus. As currently organized, USAEP's mandate is simply too large and encompassing for the resources available.

B. Choosing Problems

USAEP's primary programmatic focus has been on transferring industrial (and energy) technologies to the Asian private sector. Because of this precedent, and because U.S. agricultural technologies are unlikely to be easily adapted to East/Southeast Asia's conditions, we believe that USAEP should focus on industry rather than agriculture. Because the Environment Center in the Global Bureau of USAID has a large and comprehensive energy program, a USAEP program in this area is not needed. Because many others are committed to protecting Asia's forests and bio-diversity, little new can be gained by transfers of U.S. technology to Asians in this area.

Because of East/Southeast Asia's high rate of manufacturing growth the capital stock in manufacturing is being replaced at a rapid rate. Assuming a constant ratio between output growth and the capital stock in manufacturing, a rate of growth in manufacturing of about 12% translates into a doubling of the equipment stock of manufacturing plants every 6 years. In less than one generation, the HPEs in East/Southeast Asia will virtually replace their entire capital stock.¹⁷ This provides a unique one time opportunity to affect a clean technology revolution in manufacturing.

The high level of professional competence within East/Southeast Asian governments and their willingness to support innovative approaches provides additional opportunities for positive change. To build enduring partnerships between government and industry will require flexibility

and creativity on the part of government agencies and a willingness to work with environmental and policy groups in shaping effective institutions and incentives.

For all of these reasons, the panel believes that USAEP should focus on facilitating the transfer of cleaner technologies in manufacturing in the HPEs of East/Southeast Asia.

The panel also recognizes that centralized command and control project interventions have largely failed to sustain Asia's rural resources. There is growing interest among Asian planners and researchers in using new collaborative institutional mechanisms and incentives to better utilize and conserve forests, water, and soils. It is hoped that, in the long-term, learning from the USAEP "brown" policy initiatives will have relevance for both aquatic and terrestrial resource management strategies.

C. Choosing Countries

An equally difficult question is: In which of the HPEs should USAEP focus? The two city-states-- Singapore and Hong Kong-- have had rapid rates of expansion in manufacturing output, but how does USAID justify working in countries with per capita incomes above \$13,000? China is the largest and most rapidly growing HPE, but USAID is not permitted to work there. The planned closing of several USAID missions will impact how and where USAEP operates. The mission closings afford USAEP the opportunity to develop partnerships which could endure as models for other "non-presence" countries.

Some in USAID and the USAEP believe that selected non-HPE Asian economies also deserve consideration. India, which is not a HPE, suffers from a high energy intensity of GDP and from the use of dirty fuels (coal). It also suffers from second stage Green Revolution environmental problems. Bangladesh, like India, is not a HPE, but there is some evidence that it has benefitted from the transfer of cleaner technology.

There are compelling reasons why USAEP and the Asia Near East Bureau of USAID rightly want to expand USAEP's scope beyond the HPEs. The globalization of capital and Asia's economic openness makes the transfer of production and technology across countries in Asia both possible and highly probable. We have already witnessed this transfer in the "gray goods" textile sector from the high wage countries (Japan, Korea, Taiwan, and Hong Kong) to lower wage countries (Thailand and Indonesia). There is evidence that comparative advantage in this sector is shifting to even lower wage economies (Bangladesh and Vietnam). By broadening its scope USAEP would be positioned to affect clean technology revolutions earlier in these countries than has occurred in the HPEs through early "ground-floor" interventions. This could facilitate avoidance of the urban/industrial environmental mistakes in the HPEs of East/Southeast Asia.

There are other reasons why USAEP might chose to operate outside the HPEs. As the low income economies of Asia begin to grow faster, there is a strong possibility that the total urban pollution load will exceed the capacity of governments to assimilate toxic wastes and emissions. This is likely to be particularly severe with the expansion of local small scale, low wage industries

such as tanneries and leather, textiles, and metal working. Under these circumstances, severely strained safe drinking water and sanitation facilities could easily be overtaxed provoking serious human health problems, particularly among the urban poor. Given USAID's historic commitment to improving the health and well-being of the poor, these environmental threats provide strong justification for extending USAEP's reach. In several notable instances, such as Bangladesh, the dependence on agriculture has spawned the development of a particularly dirty industry--fertilizer.¹⁸ Evidence from Bangladesh suggests that it may be possible to promote a clean technology revolution in this pollution-intensive industry.¹⁹

How did the panel weigh these considerations? Although the panel recognizes the obvious advantages to expanding USAEP's country coverage, it remains deeply concerned about over-reaching. For this reason, the panel strongly urges USAEP to focus its efforts on those HPEs of East/Southeast Asia where expected growth rates in manufacturing are the highest and where the potential for effective intervention is large. This is where the environmental problems of rapid industrial growth are most severe and where the capital stock in manufacturing is doubling every 6 years.

Concentration on East/Southeast Asia during the next phase of USAEP need not preclude productive exchanges of knowledge through support of a continuing inter-regional discourse with those countries outside this region when appropriate. As incentive based strategies demonstrate their effectiveness in the HPEs, the principles derived from "proof of concept" examples should be actively shared with leaders from other areas of Asia.

IV. USAEP: An Intervention Strategy

A. A Model of Effective Intervention

The transition to environmentally superior production methods in East/Southeast Asia -- the Clean Revolution -- hinges, in large measure on changing attitudes, incentives and institutions that affect resource use. It also requires government intervention to overcome market failures. These changes and actions are similar to those experienced earlier in East/Southeast Asia when governments and the private sector worked together to promote the export of manufactures.

Prior to the 1960s there was a prevailing assumption within government and the private sector that Asians could not compete in international manufacturing markets. South Korea is a good example of this.²⁰ Prior to Korea's export miracle, the Korean government, USAID/Korea, and the Korean private sector assumed that the Korean private sector would have great difficulty exporting manufactures-- even for the lowest cost products within particular markets. Quality control problems, the difficulties of meeting on-time delivery specifications at competitive prices, and lack of market information were all thought to hamper private sector exporters. It was assumed that it was not easy for Korean producers to acquire the highly specialized industry information for narrowly specified markets. To overcome these market failures, the government, with donor support, altered incentives, developed new institutions, and fashioned new private-public sector relationships.

The shift in incentives was wide ranging. Initial devaluation of the exchange rate was followed by a crawling peg exchange rate that continuously rewarded exporters. Access to subsidized credit for plant expansion was based on a firm's export performance. Tax holidays, duty free imports used in export production, and rebates on indirect taxes for exporters increased the incentive to export.

Increased incentives for exporters were complemented by important institutional innovations. The government established 35 commodity specific (such as men's dress shirts) public-private sector work groups to address production problems. Industry wide quality control issues were tackled via an Industrial Standardization Act which resulted in a Korean industrial standards system (the KS mark). Eight public-private export inspection institutes were established to test and inspect export products prior to shipping. Industry-wide export marketing problems were addressed through the establishment of a public sector export marketing agency (KOTRA) which matched foreign buyers with Korean producers and collected samples of goods in Western markets. The government also created a public sector science and technology institute to facilitate the transfer and development of foreign technology. While there is some disagreement over whether each individual sub-component of this incentives and institution building approach to promoting manufactured exports worked, there is little doubt that taken together they contributed to a rapid rate of growth in manufacturing and manufacturing exports.

What role did external donors play in assisting Koreans in constructing their new system? Donors provided technical advice, they cajoled, they counseled, they funded long- and short-term

training to increase the capacity of the new export services institutions, they financed the development of these new institutions, and they financed the development of new relationships between the public and private sector. Finally, to overcome market failures, they brokered new relationships between buyers in the U.S. and Korea's nascent exporters of manufactures.²¹

Concern for the environment emerged later in the HPEs of East/Southeast Asia than it did in the OECD countries, resulting in both business and governments in East/Southeast Asia producing and exporting manufactures without much concern for the environment. Just as in OECD countries earlier, these behaviors have to be unlearned. USAEP can assist in this by providing technical advice, cajoling, counseling, funding short- and long-term training, financing the development of new institutions and new relationships between the public and private sector, and correcting market failures by brokering new relationships between the manufacturing firms in the HPEs and suppliers of cleaner technologies in the U.S.

B. The Opportunity for Intervention

Two recent developments provide USAEP with an excellent opportunity to assist the HPEs of East/Southeast Asia develop new attitudes, institutions and incentives affecting resource use. First, citizens and organized groups (NGOs) in the HPEs are demanding that governments and private sector firms clean up and protect the environment. It is no longer possible for either to ignore the environmental consequences of high speed manufacturing growth. Second, soon (1996) the International Standards Organization (ISO) in Geneva will establish international environmental management standards (EMS). These new standards are fashioned on the ISO 9000 quality standards to which firms worldwide (including in the U.S.) subscribe. Even though the EMS standards (ISO 14000) will be voluntary, they will include guidelines for (1) developing environmental management systems within manufacturing facilities; (2) carrying out independent environmental audits and environmental performance evaluations of those facilities; and (3) environmental labeling of products. Many believe that these standards will supplant existing national standards and become the standards governing export products. Interest in ISO 14000 is particularly intense in several of the HPEs in Asia as firms there are becoming concerned that access to developed country markets may depend on ISO 14000 certification.

C. An Incentives Based Industrial Strategy (IBIS)

Local citizen action and ISO 14000 create a unique opportunity for USAEP to assist the HPEs in a clean industrial revolution. But in broad terms, what should USAEP do?

A successful clean revolution in the HPEs must be thoroughly grounded in Asian institutions and the uniquely East/Southeast Asian pattern of government-business relations. In the U.S., relationships between the public and private sectors are often arms length, adversarial, rooted in distrust, and based on litigation. These relationships fostered a command and control approach to environmental management whereby the public sector set standards and rigorously monitored and enforced them. In East and Southeast Asia relations between the public and private sector are based on collaboration and consensus rather than confrontation and litigation. Dispute resolution is through informal, administrative and non-judicial processes. These differences mean that the American style command and control approach to environmental regulation is not likely to be well suited to the way East/Southeast Asians do business.

This different way of doing business provides an opportunity to look beyond command and control regulations which we now know will not ensure industrial eco-efficiency.²² Performance-oriented (versus technology-defined) standards met through voluntary, incentive-based, collaborative (versus mandated and adversarial) mechanisms such as ISO 14000 are likely to be critical to better environmental management in the HPEs of East/Southeast Asia. For these reasons, USAEP should look for opportunities to engage Asians in a dialogue about approaches - both hardware and software (management systems) -- that offer opportunities to adopt an incentives based approach to environmental management.

Both approaches also provide an opportunity to meet one of USAEP's other objectives, to expand U.S. exports. Experience in the U.S. suggests that a combination of hardware/software changes can reduce the pollution intensity of production.²³ Thus, it should be possible for USAEP to do good (assist in pollution reduction) by doing well (increasing U.S. exports).

Doing good will also require USAEP to support the strengthening of the public sector's capacity to regulate private sector environmental behavior. The U.S. has much to offer Asian governments in this regard. The U.S.'s experience with pollution prevention, risk assessment, and public disclosure are examples of regulatory "know-how" that USAEP could help make available to Asian institutions.

But if USAEP's assistance is to be effective it must not only be grounded in the way East/Southeast Asian governments and the private sector do business, it must be guided by several other principles:

1. USAEP's Asian partners in both the public and private sector in East/Southeast Asia must play a lead role in shaping the clean revolution. Unless this happens, USAEP's effort will not outlast its assistance.

2. USAEP's financial and technical support must foster collaboration between East/Southeast Asian institutions-- national (and regional such as ASEAN) environmental agencies, research institutes, private sector firms, and private sector trade associations.
3. USAEP's support for training must focus on training key individuals in key institutions. Unless this is done, there is a high potential that the program's training resources will be dissipated.
4. USAEP's support for development of U.S.- Asian partnerships must be focused on fostering the development of enduring partnerships between American and Asian institutions.

D. Examples of an Incentives Based Industrial Strategy (IBIS)

Effective incentive based initiatives that build on collaborative relationships between the public and private sector share in common a market-oriented, non-mandatory approach to advancing eco-efficient practices. Specific examples of activities that USAEP could support include:

1. Develop and demonstrate methods for "true" resource pricing

Environmental assets-- clean air, clean water, biodiversity -- are systematically underpriced everywhere in the world including in the HPEs. The World Bank, and the World Business Council for Sustainable Development (WBCSD), which comprises most of the world's largest manufacturing firms, have identified distorted price signals as one of the most critical obstacles to advancing eco-efficient production.²⁴ Consistent with the principle of "polluter pays", these institutions advocate country-specific mixes of environmental charges, taxes, deposit/refund schemes, tradable permits, and subsidy-removals so that prices incorporate "true" environmental costs. These "green charges" are important because they send the right price signals to resource users about the true social costs of materials and production process choices.²⁵

USAEP could play a key role in helping governments bring prices more in line with the actual costs incurred by industry's use of environmental resources. A wide spectrum of approaches are available and some have already been demonstrated in East/Southeast Asia. These include use of pollution discharge fees in Beijing and pollution charges on palm-oil and rubber factories in Malaysia.²⁶ But a concerted effort to implement pollution charges requires sound analysis and political will. USAEP could assist East/Southeast Asian governments, research institutes and the private sector in developing guidelines, disseminating analytical tools, and arranging working and focus groups to assess what approaches would be most viable in specific country contexts. It could also assist them in organizing pilot projects to provide real world examples of actual industry responses to different green charges.

2. Create and promote clean technology financing

Lending institutions and conventional lending practices are ill-suited to exploit the investment needs of clean technology investments. Commercial lenders are more comfortable with loans for hardware than with software-hardware combinations that typically define clean technology practices. Moreover, the benefits of clean technology investments tend to be more indirect and longer-term than the benefits of other industrial investments, making commercial lenders unwilling to finance these investments.²⁷

By working to strengthen local analytical capacity and positioning institutional partners to interact constructively with governments and lenders, USAEP could provide support for the creation of new financing mechanisms. Several alternatives exist. Because financial markets in the HPEs are increasingly sophisticated, USAEP could encourage, through local partners, governments to negotiate risk-sharing arrangements with banks and industrial development corporations. USAEP might facilitate this by contributing a small amount of capital to get the process started. Alternatively, USAEP could work with host governments to stimulate financing for dedicated Environmental Technology Investment Corporations which could serve as incubators for cleaner technologies.²⁸ Either of these mechanisms could be strengthened by participation of other donors, including the World Bank and Asian Development Bank. USAEP could work with host governments to accompany new financing mechanisms with time-limited tax incentives or low-interest loans. These would be aimed at "jump-starting" investments in bona fide eco-efficient technologies.

3. Build capacity to respond to international voluntary environmental management standards

In 1996 the International Standards Organization (ISO) in Geneva will publish a set of international (ISO 14000) environmental management standards (EMS). This new standards series will be fashioned after the ISO 9000 standards to which firms worldwide (including 700 in the U.S.) subscribe. These new standards will include guidelines governing environmental management systems within manufacturing facilities; independent environmental audits and performance evaluation of those facilities; environmental labeling of products; and life-cycle assessment of products. Though voluntary, it is highly likely that these standards will supplant national standards and emerge as the standard for firms operating in the global economy.

Many firms in East/Southeast Asia are acutely aware of the potential impact of this new standards series on their ability to export to developed country markets. In anticipation of these new requirements, USAEP could support (1) an information dissemination and training program and (2) development of guidance documents to prepare East/Southeast Asian firms for ISO certification.

The latter could be particularly important because the new ISO series will require each country to empower a "registrar" to oversee the certification process and regular site inspections by certified auditors. USAEP could work with Asian governments to develop a registration and

certifications process. This opportunity also represents a chance to deepen U.S. - Asian partnerships if USAEP works to strengthen Asian institutional and professional capacity in these critical areas.

4. Design and disseminate model facility cleaner technology accounting methods

One barrier to adoption of cleaner technologies is the absence of materials and cost accounting systems that make transparent the inefficiencies and opportunities to improve production methods. As business people often observe, what gets measured gets managed.

USAEP could play a key role by supporting efforts of governments, research institutes, and the private sector to compile and disseminate new materials and cost accounting procedures. This could include support for development of user-friendly guidance documents, software, training, and demonstration projects. Part of this could well include support for partnerships between American and Asian business trade groups.

In this - as throughout USAEP - there are opportunities for greatly improved performance monitoring mechanisms. Models evolved can serve as prototypes for broader application throughout the environmental field.

5. Promote information management and disclosure

Public disclosure of individual firm's environmental performance has become fundamental to holding firms accountable for their environmental practices. It has also been an important vehicle for encouraging more eco-efficient production processes. In the U.S., the U.S. EPA Toxics Release Inventory (TRI) is a compelling example of the role of public disclosure in environmental management. Though industry initially opposed TRI, it is now regarded as a routine part of doing business and a vehicle for providing valuable data to communities, NGOs and firms themselves. Such information disclosure would deliver comparable benefits in Asia.

USAEP is well positioned to work with governments and the private sector on approaches to public disclosure of environmental information. This collaboration could involve a program to compile, analyze, and report to the public current figures and trends in emissions, effluents, and solid/hazardous wastes.²⁹

E. Organizational Implications for USAEP

Pursuit of an incentives based industrial strategy (IBIS) will require major organizational changes within USAEP. The role of the Secretariat needs rethinking. A smaller central body with enhanced capacity for analysis and performance monitoring is critical. Mechanisms need to be established for tracking, documenting and assessing program activities. Substantial decision-making power and increased authority needs to be devolved to country or regionally-based field offices. Asian partners should be given a substantial role in shaping and guiding program development if

they are expected to bring resources to the table. And program sub-components such as the Professional and Organizational Development (POD) and the "tech reps" system will have to be rethought and integrated into the new strategy. POD supported capacity building can be a major element in strengthening partnership institutions and stimulating them to play increasingly influential roles at the policy interface between industry and government. Such national level institutions will be crucial to the effective implementation of IBIS.

V. Conclusions and Recommendations

The panel believes that USAID and USAEP still have an important role to play in Asia. But all of Asia and the Near East is too large a region for USAEP to address in its entirety. Unless USAEP narrows its focus-- on both countries and environmental problems, there is the danger that it will attempt much and accomplish little. With severely limited resources USAEP (and USAID) is likely to make a significant difference in a few important long-term environmental outcomes only if it elects a disciplined approach which addresses a clearly defined set of problems in a few places. Learning and experience that is obtained in these "core" countries could then be disseminated through regional networks.

Narrowing focus requires making clear strategic choices-- about which countries to work with on what environmental problems. Making these strategic choices is not easy. It requires foregoing working on some attractive problem areas.

After examining options, the Independent Technical Review Panel recommends that USAEP focus on a clean technology revolution in urban/industrial areas in the HPEs of East/Southeast Asia. This does not suggest that there are no other worthy options. But the panel does believe that such a focus holds the promise of achieving significant results by building on the best of USAEP past contributions and moving forward in a coherent, targeted fashion.

Weighing the range of intervention strategies, the panel recommends a strategy built around performance-oriented environmental standards met through voluntary, incentive-based collaborative mechanisms. This imposes the need for performance monitoring and documentation.

A major effort will need to be invested in building more dynamic, equal partnerships with Asian institutions, agencies and industries. This is slow, long-term work and will require careful selection and sustained support of both Asian and U.S. partners.

If an Incentives Based Industrial Strategy is to be successful, the role of Asian partners, including the appropriate governmental agencies, will be crucial. Unless the strategy becomes their strategy, it will fail. The USAEP, as a flexible program with USAID support, enjoys a unique opportunity to play a creative and supportive role. But the program strategy suggested is one which is dependent for its success upon the strong commitment of Asian partners.

The Incentives Based Industrial Strategy should not be seen as a short-term, quick payoff activity. The IBIS strategy requires persistence and a sustained commitment to the partnership process. It will take years before changes in policies and incentives result in significant environmental improvements. While the level of financial commitment need not be high, it should be seen as a ten year program strategy. The up-side of this approach is that there is little chance of USAEP having a significant long-term impact with the limited resources available unless it is prepared to make a sustained partnership commitment, and the flow of benefits from successful pursuit of this strategy, as they accumulate over the next thirty years, will be enormous.

For all these reasons, the pursuit of this strategy will require major organizational changes within USAEP. The role of the Secretariat needs rethinking. A smaller central body with enhanced capacity for analysis and performance monitoring is critical. Mechanisms need to be established for tracking, documenting and assessing program activities. More authority will need to be devolved to country or regionally-based field offices. Asian partners will have to be given a substantial role in shaping and guiding program development. Program sub-components such as the POD and the "tech reps" system will have to be integrated into the new strategy. USAEP leadership will need to draw upon the best U.S. and Asian talent available and provide them with sustained support in an atmosphere which affords them the freedom to innovate. The Panel believes that USAEP has the opportunity to play a constructive role in enhancing Asian capacity to manage its environmental future.

ENDNOTES

1. The panel recognizes that there are many definitions of sustainable development. The panel defines sustainable development as development that makes it possible for the current generation to meet its needs without endangering the prospects of future generations to meet their needs.
2. For a fuller discussion of what follows see M. Rock, "Twenty-five Years of Economic Development Revisited," World Development vol.21, No. 11 (1993): 1787-1801.
3. Ibid., p. 1793.
4. Ibid., p. 1794.
5. It is important to note that export success occurred with wide ranging differences in policies. Some countries (Hong Kong) achieved export success by following a *laissez faire* model, while others (Korea) achieved it with a very statist model.
6. World Bank, The East Asian Miracle (New York: Oxford University Press, 1993).
7. Between 1980 and 1990, manufacturing grew at an annual average rate of 12.4% in East Asia compared to 1.7% per year in Latin America, 3.1% per year in sub-Saharan Africa, and 3.3% per year in OECD countries (World Development Report, 1992, pp. 220-221).
8. Coal accounts for 58% of energy consumption in East Asia. Between 1980 and 1990 energy consumption increased at an annual rate of 6% per year, electricity consumption increased even faster. This was more than two times faster than anywhere else in the world. Over the same time period, Latin America's demand for energy grew by only 2.6% per year; sub-Saharan Africa's by 2.5% per year; while demand in OECD countries increased by only 1% per year. Ibid., p. 226-227.
9. C. Brandon and R. Ramankutty, Toward an Environmental Strategy for Asia (Washington, D.C.: World Bank, 1993): p. 93.
10. For an indepth discussion of green environmental issues in Asia see Annex 1, Mark Poffenberger, "USAEP, USAID and the Asian Green Sector."
11. See for example, A. Rola and P. Pingali, Pesticides, Rice Productivity, and Farmers' Health (Manila: IRRI, 1993).
12. Brandon and Ramankutty, 1993, p. 117.
13. Ibid., p.119.
14. World Development Report, 1992 (New York: Oxford University Press, 1992): 201.

15. Brandon and Ramankutty, p. 120-121.
16. Braatz, Susan, "Conserving Biological Diversity - A Strategy for Protected Areas in the Asia-Pacific Region." World Bank Technical Paper 193. Washington, D.C. World Bank, 1992.
17. That stock will also be roughly eight times larger.
18. A ranking of industries by toxic intensity shows fertilizers to be among the dirtiest (alongside pesticide production, Brandon and Ramankutty, p. 73).
19. M. Huq and D. Wheeler, "Pollution Reduction without Formal Regulation: Evidence from Bangladesh," Background paper for the World Development Report, 1992.
20. What follows draws from M. Rock, "Public Sector Marketing and Production Assistance to South Korea's Manufacturing Exporters: Did It Make a Difference," Development Policy Review, Vol. 10 (1992): 339-357.
21. For discussion of the role of buyer seller links in export marketing see M. L. Egan and A. Mody, "Buyer-Seller Links in Export Development," World Development Vol. 20, No. 3 (1992): 321-334.
22. A more elaborate definition is the "delivery of competitively-priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with the Earth's estimated carrying capacity." See Nick Robins, Getting Eco-Efficient. Report of the Business Council for Sustainable Development. First Antwerp Eco-Efficiency Workshop, November 1993.

A related concept is "dematerialization", the decline in weight over time of the materials contained in a manufactured product. Provided the service quality of a product is unchanged -- e.g. the safety of a car, the durability and performance of a refrigerator or computer -- dematerialization likely will lead to environmental benefits over the product life-cycle. For an introduction to the dematerialization concept, see Robert Herman, Siamak A. Ardekani, and Jesse H. Ausubel, "Dematerialization," in Jesse H. Ausubel and Hedy E. Sladovich (eds.), Technology and Environment, Washington, D.C. National Academy Press, 1989, 50-69.
23. Hardware changes include equipment or technology modifications that eliminate or reduce wastes. When embodied in new equipment they provide an opportunity for expanded U.S. trade. Software changes can expand trade in services. Software changes include processes or procedure modifications, (such as changing operating temperatures) and operational innovations (improvements in housekeeping, maintenance, or inventory control) that reduce waste.
24. Roberto de Andraca and Ken F. McCready, Internalizing Environmental Costs to Promote Eco-Efficiency, Geneva: The Business Council for Sustainable Development 1994 and World Development Report, 1992 (New York: Oxford University Press, 1992).

25. The price mechanism alone may not ensure long-term sustainability. This is because the carrying, or assimilative, capacity of any environmental resource -- a water body, fishery, or airshed -- may be exceeded well before prices signals prevent such exceedances that may cause potentially irreversible damage. This is the basic argument of ecological economics, and points to the essential need for environmental regulations to ensure sustainable ceilings on pollutant loadings. Whatever market-based or other incentive initiatives USAEP undertakes should be accompanied by a clear statement that incentives are a complement to, not a substitute for, sound science-based regulations to cap total pollutant loadings in an urban area, region, country or other relevant geographic area.

26. Brandon and Ramankutty 1993.

27. Allen L. White, Monica Becker, James Goldstein, "Total Cost Assessment: Accelerating Industrial Pollution Prevention Through Innovative Project Financial Analysis," Report prepared for USEPA, Office of Pollution Prevention, December 1991; Deborah E. Savage and Allen L. White, "New Applications of Total Cost Assessment: An Exploration of the P2-Production Interface," *Pollution Prevention Review*. Winter 1994-95. p. 7-15.

28. George R. Heaton, Jr., R. Darryl Banks, Daryl W. Ditz, "Missing Links: Technology and Environmental Improvement in the Industrializing World." Washington, D.C. World Resources Report, October 1994.

29. Though confidentiality was an expressed concern of businesses in states where aggressive information disclosure requirements are in place (e.g., Massachusetts and New Jersey), such concerns have largely faded. However, confidentiality has re-emerged recently as the debate over chemical use (versus release) information reporting appeared on EPA's agenda. This history suggests a phased approach by USAEP would work best, thereby allowing for data gathering and reporting systems to attain a degree of reliability and credibility while respecting the legitimate confidentiality concerns of business.