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INDUSTRY STUDIES
2000

Environment

ABSTRACT

The U.S. environmental industry is at a crossroads. With the slowdown of growth in the domestic market and the dominance of European and Japanese firms in the expanding non-U.S. markets, the U.S. industry and the U.S. government face some difficult choices. It is necessary to make these choices at a time of increased awareness that global environmental challenges pose a long-term threat to U.S. national security. Nonetheless, there is as yet no shared view in the United States on how to meet these challenges. Although the U.S. environmental industry's success may not be critical to U.S. national security interests, the United States has a stake in the industry's developing a greater global role in the period ahead.

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INTRODUCTION

Conceived three decades ago out of new public concern for the environment, the U.S. environmental industry was born and raised in the regulatory framework that the U.S. government created. With the newly formed Environmental Protection Agency (EPA) at the head, the body of environmental regulations, laws, and standards shaped the character of that industry. Also during this time, global concerns raised the environment to an important place among foreign policy issues. The 1999 National Security Strategy identified the environment as a key element of U.S. national security.

At the beginning of the 21st century, the environmental industry is at a crossroads in the United States. Industry and municipalities are largely in compliance with environmental standards, and the quality of the domestic environment is generally considered “good.” A major change in regulations—the driver of the industry for 30 years—is highly unlikely unless or until the health of the U.S. public suffers from contaminated air and water, the greenhouse effect, or reduction of the ozone layer. Indeed, there is a sense that the political process in the United States has stalled on environmental policy, even as the issue gains greater currency in the international arena.

Within some U.S. companies and in parts of the nongovernment organization (NGO) community, a change in the philosophy of economic growth is now beginning to evolve. The basis for this new approach, “sustainable development,” is the concept that the path to competitive advantage is resource productivity. Those who subscribe to the sustainable development

philosophy view pollution as an inefficiency; value land and resources at their real, rather than accounting, cost; and recognize the economic return to be obtained from waste minimization. They understand the interconnected global economy and appreciate the importance of industrial and community integration. This philosophy has the potential to revitalize the environmental industry. If it takes hold and enters the mainstream of economic thought in the United States, there will be a revolution in the environmental field. If not, the U.S. environmental industry will stagnate further.

The Clinton Administration embraces the philosophy of sustainable development. The most recent National Security Strategy promotes sustainable development, especially through development assistance efforts. At the same time, however, the United States is reluctant to accept restrictions on its own economic activities from international environmental agreements.

ENVIRONMENTAL SECTORS

The environmental industry is a collection of very diverse companies. At \$190 billion in revenues and more than 1.3 million employees, it is larger than the automobile industry. The environmental industry includes more than 30,000 private companies, which account for 67 percent of revenues, and more than 80,000 public entities. Small firms dominate: a large majority of firms produce less than \$10 million in annual revenues, and many of these produce less than \$5 million. The industry does include very large water and waste management companies and engineering giants such as Bechtel, however. In recent years, a trend toward consolidation of companies has left the sector with relatively few middle-sized firms.

As the U.S. Department of Commerce defines the industry, it includes all revenue-generating activities associated with

1. Compliance with environmental regulations
2. Environmental assessment, analysis, and protection
3. Pollution control, waste management, and remediation of contaminated property
4. Provision and delivery of the environmental resources of water, recovered materials, and clean energy
5. Technologies and activities that contribute to increased energy and resource efficiency, higher productivity, and sustainable economic growth^[i]

CURRENT CONDITION

After heady growth in the two decades following the first Earth Day and the birth of the EPA in 1970, the environmental industry has now reached a “mature” state in the United States. Slow growth, lack of innovation, and increased consolidation characterize this state. The market for environmental services and equipment in the United States is likely to remain fairly stable over the next several years, but given the diversity within this industry, considerable differences among subsectors exist.

Overall, the U.S. environmental industry recorded \$189.8 billion in revenues in 1998; this was a 2 percent rate of growth over 1997, following a 3 percent rate of growth in 1997 over the rate of growth in 1996. The global market grew 2.7 percent in 1997 to a total of \$478 billion.^[ii] Entities involving wastewater treatment, new energy sources, process and prevention technology, as well as instrumentations and information systems, experienced higher growth rates.^[iii] Since 1991, the average annual return on investment, according to the *Environmental Business Journal (EBJ)* index of 240 environmental companies, is 6

percent—compared to that reported by the National Association of Securities Dealers and Quotations (NASDAQ; 22 percent), Dow Jones (16 percent), and Standard & Poor's 500 (14 percent). Environmental Business International (EBI) predicts 3.7 percent growth in the United States for 1999–2002. In contrast to more “dynamic” industries, the environmental industry has difficulty attracting new capital. In 1996, it attracted less than \$20 million in venture capital, down from \$200 million only 5 years earlier, compared to the billions raised by “dot com” start-ups.^[iv] Consequently, the industry has limited funding available for research and development (R&D) investment.

The United States has followed a prescriptive approach to environmental regulation that not only sets environmental standards, but also dictates the way that industry must meet those targets. Most industry analysts believe that this form of regulation now produces diminishing returns. It leads those in the industry to consider preserving the environment as only a “cost”—not an opportunity to increase revenues or reduce expenditures. It creates no incentive for innovation or any actions beyond compliance. Some blame this approach for the U.S. industry's lack of overall competitiveness in overseas markets.

To some extent, regulatory agencies have begun to move to economics-based regulatory instruments, such as emission credits trading. A few individual states (e.g., Massachusetts and Virginia) have become more innovative and have begun to work cooperatively with those in the industry to help them achieve compliance. The EPA's preference for the status quo over the more flexible and internationally accepted environmental management systems, such as the International Organization for Standardization (ISO) 14000, suggests that the regulatory system is still mired in the past, however. The European Union, in contrast, has taken a more flexible approach to regulation.

Solid Waste Management

One of the subsectors of the environmental industry in which demand is expected to remain strong is solid waste management (i.e., the collection, processing, and disposal of municipal and commercial waste). The waste management industry experienced rapid growth in the 1980s as the U.S. population became more attuned to the environmental problems caused by waste. The U.S. government responded to the public's concerns with tight regulations covering hazardous and solid wastes, such as the 1976 Resources Conservation and Recovery Act (RCRA) and subsequent amendments. Revenues grew 153 percent for 1980–1988, compared to 22 percent for 1988–1990. Growth slowed, but was still a strong 8

percent for 1990–1992, 9.9 percent for 1992–1994, and 9.4 percent for 1994–1996.^[v] Although consolidation and acquisition have changed the structure of the industry, the increasing population, the strong economy, and the maintenance of tough regulations ensure continued growth. Total revenue is expected to exceed \$45 billion by 2010.^[vi]

As a result of environmentally unfriendly practices in the past, the potential market for remediation of contaminated sites and buildings is large. While the needs are great, resources are limited. The greatest demand for this service is from the U.S. government, which is responsible for the cleanup of former military and Department of Energy (DOE) installations. Smaller customers include those seeking cleanup of petroleum leaks in storage tanks and private industry brown fields. Approximately 217,000 sites remain to be cleaned. According to 1996 estimates, the cleanup bill—under current federal and state regulations—totals \$187 billion. Remediation takes 10–30 years; remediation of some DOE sites could take up to 70 years.^[vii] Government funding for cleanup is tight and expected to drop by 36 percent over the next decade, however. To a great extent, the demand for real estate development will drive the expenditures of private funds.

Water Treatment

Increasing demands of a growing population for the finite supply of water will ensure a strong market for the water treatment sector of the environmental industry. The U.S. government is likely to toughen environmental water quality regulations aimed at establishing stricter compliance standards for permissible levels of waterborne microbes and viruses, as well as minimizing public exposure to disinfection by-products, over the next several years. As recently as May 2000, the EPA proposed strict new regulations on arsenic in tap water. The Appropriations Committee of the House of Representatives recently approved funding for the Clean Water State Revolving Funds for fiscal year (FY) 2000 and \$775 million for Safe Drinking Water State Revolving Funds.

The trend toward privatization is also transforming and revitalizing the water treatment sector. In most of Europe, municipalities have been privatizing water treatment facilities over the past two decades, but U.S. facilities have remained largely in the hands of local governments. Recently, U.S. municipalities have begun turning to the outright privatization of facilities or the granting of concessions for water treatment services in order to find the means to modernize infrastructure. At this time, however, private companies are not

purchasing water treatment and distribution systems; thus, they are not injecting funds into the area most in need of modernization and upgrading. New tax laws support privatization, as does the availability of long-term tax-exempt municipal bonds. French and British companies, with their much longer experience in the operation and management of water services, dominate this industry globally. In fact, French and British companies have recently acquired several major U.S. water treatment companies.

Air Pollution

Although tougher standards on air pollution are not expected unless or until the Kyoto Protocol on global warming enters into force, compliance with existing legislation will keep this market alive for the next several years. For example, under the 1990 amendments to the Clean Air Act, each state has or will soon develop an implementation plan for reducing pollutants in areas that are not yet in compliance with existing regulations. If a state does not submit a plan by May 2001, the federal government may withhold highway construction funds. Further amendments in December 1999 target automakers and oil refiners by requiring cuts in nitrogen oxide tailpipe emissions of more than 77 percent and reductions in the sulfur content of gasoline by 90 percent. For the first time, trucks and sport utility vehicles will come under the same regulations as cars.

CHALLENGES

The fragmented U.S. environmental industry faces a growing number of challenges that it seems ill equipped to handle. Among the reasons for this situation are the absence of any unifying trade group, the unwillingness of many firms to take risks in the global marketplace, a lack of incentive to move toward the next level of technology development in order to meet the environmental challenges of the new century, and inadequate government leadership.

Perhaps the greatest challenge in the near term is to preserve and increase the U.S. environmental industry's global market share. With domestic demand for environmental

products and services generally stable, opportunities for growth in the U.S. environmental industry lie mostly abroad. Yet U.S. firms, for the most part, have not met this challenge; in fact some seem to actively avoid it. At present, U.S. firms' share of the non-U.S. market is only about 6 percent. European and Japanese firms continue to dominate these markets; in addition, they have in recent years begun to buy U.S. firms in sectors still experiencing growth in the U.S. market, particularly in the water treatment sector. This trend reflects U.S. companies' relative financial weakness, unwillingness to assume the added risk of exposure to export markets, and unfamiliarity with foreign regulations and business practices. Moreover, many companies have not taken advantage of U.S. government programs designed to reduce these risks.

European firms have moved ahead in some areas of environmental technology, reflecting the more stringent environmental requirements established by European governments and the European Union. In the United States, although the government continues to fund basic research into new technologies, environmental companies invest little. Many U.S. engineering, environmental infrastructure, and service companies make no investments in technological R&D and product development. The number of equipment-manufacturing companies that are investing in research continues to decline because of market uncertainties.^[viii] In short, to meet the environmental challenges of the new millennium and to compete effectively with foreign firms, U.S. companies will need to invest more in research and development.

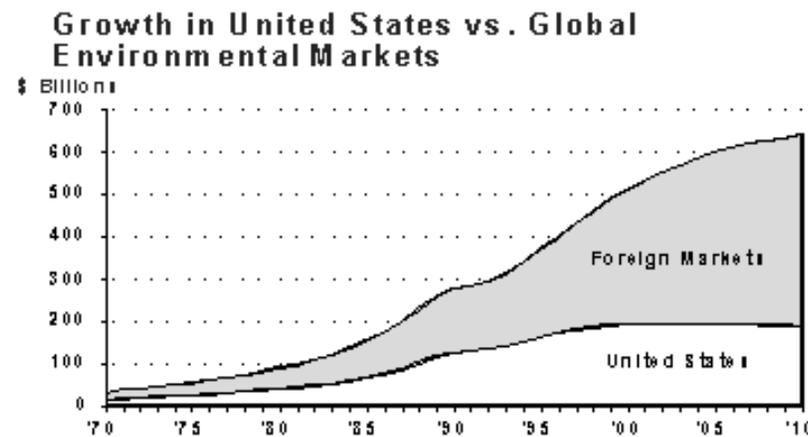
Beyond the issues of R&D, perhaps the greatest long-term challenge facing the industry and government is forging the partnership that will be necessary to surmount new environmental challenges, particularly global warming. The task is as much political as technological. Not only will new technologies be required to reduce harmful emissions further, but also the government and the private sector will need to accept a new philosophy of economic growth—sustainable development. To be effective in meeting long-term challenges, government will need to shift from a system based on compliance and backed by enforcement to a system based on continuous process improvement. The environmental industry will play a crucial role in this evolution, but it cannot succeed without government leadership.

OUTLOOK

The future of the environmental industry is mixed. Innovative technology and existing system enhancements make it possible for the industry to grow and improve the environment, but political will and economic drivers lag behind. In the first instance, U.S. environmental companies could expand their business in emerging overseas markets.^[ix]

Figure 1 reflects the generally accepted growth forecast for the environmental industry. Growth rates will range 3–4 percent in the developed countries, but will exceed 16 percent in Asia.

Figure 1: Growth in U.S. vs. Global Environmental Markets



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Table 1 presents data on the domestic environmental industry by segment, year, and probable percentage of growth in the near future. Most industry sectors show a continued, but modest, increase in revenue. Environmental

energy sources, resource recovery, and process and prevention technology show the strongest growth trends in the near future.

The National Science and Technology Council strategic plan provides a longer term prognosis.^[x] According to this forecast, the requirement for new technology for domestic remediation and control will peak in the first 5 years of the millennium and then rapidly decrease. Requirements for the avoidance and monitoring of future pollution will not peak until approximately 2010 and will then gradually decrease until beyond 2040.

Competitiveness in overseas markets and sustainable development are keys to the future of the U.S. environmental industry. Clearly, the U.S. market under the current regulatory framework offers little possibility for significant expansion. As noted earlier, the overseas potential is vast, but U.S. companies are not currently well placed to exploit that market.

Table 1: Growth of Environmental Industry Subsectors (Revenue in Billions)

		1996	1997	1999	99-02
Services	Subsectors				
	Analytical services	1.12	1.14	0.6%	

Waste Water Management	24.0	24.74	25.58	3.7%
Solid Waste Management	33.9	34.9	36.1	3.2%
Hazardous Waste Management	6.0	5.8	5.67	0.5%
Remediation/industrial services	11.1	11.02	11.01	0.9%
Consulting and Engineering	15.2	15.31	15.78	1.2%
Equipment				
Water equipment & chemicals	17.5	18.21	19.1	5.6%
Instruments and Information Systems	3.1	3.26	3.30	3.6%
Air pollution control equipment	15.3	15.79	16.53	2.7%

Waste management equipment	9.7	9.52	9.54	3.8%
Process & prevention technology	0.8	0.9	0.96	7.0%
Resources				
Water Utilities	26.4	27.52	28.83	3.8%
Resource recovery	14.3	15.27	13.25	8.0%
Environmental energy sources	2.5	2.71	3.04	10.0%
Totals	181.0	186.1	189.8	3.7%

Source: 2000 Environmental Business International Inc. (San Diego, CA)

GOVERNMENT GOALS AND ROLE

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Three decades ago when environmental concerns rose to the fore, local, not global, issues dominated the agenda. Those in the United States viewed these concerns more in terms of their potential to damage public health and wildlife than in broader economic and national security terms. The fall of the Berlin Wall and the subsequent abrupt shift in focus away from the former Soviet Union as the overriding threat to U.S. national security created the opportunity for new ways of thinking about other factors that affect national security.

In this context and in the face of growing evidence that environmental problems are contributing to global climate change and could lead to strife in some regions, U.S. political leaders from both parties began to redefine national security to include environmental issues that threatened U.S. economic and political interests. Policymakers developed the concept of “environmental security”—a policy focus through which solutions to environmental problems could contribute to national security. There soon emerged a consensus that international cooperation on issues of environmental security could add to world political stability, economic development, and peace.

The Clinton Administration has translated this focus on the environment as a component of national security into a range of initiatives. At the national level, the Administration has proposed new funding to encourage R&D and to spur U.S. environmental industry exports. Internationally, the Administration negotiated the Kyoto Protocol (which the U.S. Senate has still not ratified) aimed at reducing levels of greenhouse gases in the decade ahead.

Despite these efforts, there has been little headway in reducing greenhouse gas emissions, strengthening the U.S. environmental industry vis-à-vis foreign competitors, or improving the industry’s technological base. The approach of many U.S. companies has evolved from simply demonstrating compliance with regulations to promulgating a “greener” image and expressing support for sustainable development. That said, however, the U.S. private sector must move toward forging an alliance with government on future environmental policy. The basis for this policy should be a mutual recognition that, unless emerging environmental issues are dealt with effectively, the U.S. economy and the companies that comprise it are likely to lose a great deal.

In short, the recognition of the emerging environmental threats as legitimate national security issues has not yet led to the development of a clear and robust environmental strategy and the allocation of resources to support such a strategy. The U.S. government should develop a coherent, broad-based strategy. Elements of such a strategy could include the following:

- Restructuring the U.S. government agencies concerned with environmental issues to place greater emphasis on support for R&D and global issues.
- Reexamining the way in which the government encourages R&D in the environmental industry. Both industry and NGOs point to the disincentives for industry R&D inherent in the current regulatory system. While government research has supplanted much of industry’s research, the commercialization of government findings has proven problematic. One sensible alternative is for the government to provide incentives to companies that achieve technological breakthroughs and apply them in the marketplace—in effect, a rewards program.
- Making environmental factors (e.g., environmental management systems, pollution prevention, total life cycle cost reductions through the use of “green” materials) part of the evaluation process in the award of government contracts, where appropriate.
- Working toward environmental management systems for all government contractors.
- Doing more to encourage U.S. firms’ competitiveness in the global marketplace by consolidating and making more coherent the array of the government’s trade promotion programs across all industries, by supporting effective R&D, and by promoting the adoption of ISO 14000 standards by U.S. companies.

Formulating a more flexible regulatory system. Government should set environmental targets and develop standardized metrics, but give industry greater leeway in achieving these targets. Continuous process improvement with various types of incentives should be the focus of the nation's environmental regulatory system.

· _____ Assuming a leadership role in plans for dealing with the climate change, including Senate ratification of the Kyoto Protocol. Domestic politics places obstacles in the path of early achievement of this goal, but the next administration should work to build a public and business coalition in support of ratification. To dampen the impact of the adoption of the Kyoto norms on the U.S. economy, the government should press for an emissions trading regime.

· _____ Developing a public education strategy to underscore the message that environmental policies are not a cost and inconvenience, but rather are essential to the U.S. economy, health, and national security.

CONCLUSION

The U.S. environmental industry is at a crossroads. Created by domestic demand for products and services stemming from the environmental legislation of the last 30 years, the rapid growth that the environmental industry enjoyed for two decades is now slowing. Indications are that the U.S. market may soon begin to shrink. Traditionally, the U.S. environmental industry has focused on the domestic market and has neglected global markets, which are expected to show strong growth in the period ahead. That neglect has put the industry at a competitive disadvantage. European and Japanese companies now supply most of the non-U.S. market for environmental goods and services, and they are making inroads in the U.S. market. Underlying European leadership in key sectors are technological advantages created in part by greater political interest in "green" policies and regulatory systems that do not discourage innovation.

While the U.S. environmental industry faces important questions about its future, there is little question that the impact of environmental issues on U.S. national security continues to grow in importance. A growing number of policy statements from the Clinton Administration underscore the link between environmental challenges around the globe and long-term U.S. national security. Although few disagree with this view, there is little consensus on what this means in practical terms. The Administration and Congress are divided on the Kyoto Protocol, a key international agreement intended to limit the "greenhouse" gas emissions that contribute to global warming; there is friction over federal funding for R&D in the environmental field; and many in the industry perceive the U.S. regulatory system as static and prescriptive, thereby discouraging innovation in the industry.

Although the U.S. environmental industry may not be critical to U.S. national security per se, it will be advantageous in the long run for U.S. interests if the U.S. industry prospers and develops a leadership position in the global environmental industry. To foster such a role, the U.S. government should (1) restructure federal agencies to place greater emphasis on R&D and to promote a more flexible regulatory system; (2) provide incentives to the industry to achieve technological breakthroughs; (3) make environmental factors a part of the evaluation process in the award of government contracts; (4) consolidate and make more effective programs to promote exports of U.S. environmental goods and services; (5) play a leadership role on ways to cope with climate change and other global environmental challenges; and (6) promote a public consensus in the United States on the link between national security and the environment.

ESSAYS ON MAJOR ISSUES

GLOBAL DEMAND FOR THE ENVIRONMENTAL INDUSTRY

Werther Araya, Jacques Bayet,

and Melissa Daston

International Markets

Although not insignificant, the market represented by even the most promising environmental sectors in the United States is limited. The growth potential is clearly in overseas markets. Already, some 10 percent of U.S. environmental revenues are derived from exports. In Central Europe, Africa, Latin America, and Asia, the demands are vast. The U.S. Department of Commerce estimates that the global environmental market will total \$554 billion in 2005. Even in the European Union (EU), because of tough European Commission regulations, average market growth is 5 percent. The EU applicant countries of Central and Eastern Europe represent immense demand as they strive to reach EU standards, especially in the areas of water purification, waste disposal, and air quality. Emerging markets such as those in India, Mexico, Brazil, and China are projected to grow in excess of 10 percent.

In the transition and developing countries, domestic resources for the environment are minimal. The explosion in global private direct foreign investment could help to compensate for domestic shortfalls, especially as multinational companies are increasingly concerned about their environmental image. The adoption of corporate policies to implement global environmental management systems (such as ISO 14000), as well as the adoption of environmental standards by the World Trade Organization, would reinforce this trend. Bilateral and multilateral assistance is useful, but falls far short of meeting the need. In Central and Eastern Europe, Western governments and development banks have provided more than \$3 billion in environmental aid to date and will contribute 10 percent of the future environmental budgets. Increased concern by the multilateral development banks for the environment, such as that shown by the World Bank's 1994–1995 specification of environmental standards that a project must meet before it can receive funds, provides some money for this sector. The Clinton Administration has also responded to such concerns by proposing to spend \$4 billion on the environment. The proposal includes incentives to increase the involvement of the U.S. environmental industry in developing countries and to stimulate exports of U.S. environmental technology.

Table 2: Global Market for Environmental Industry (billions of \$)

	1998	2002	2005
United States	183.4	193.5	196.4
Western Europe	145.5	155	157.8
Japan	87.9		

	91.0
	91.6
Rest of Asia	
	19.9
	27.5
	33.7
Latin America	
	9.9
	13.7
	16.3
Canada	
	12.9
	14.2
	15.1
Australia/New Zealand	
	7.9
	9.9
	9.9
Eastern Europe	

	8.0
	12.2
	18.0
Middle East	
	5.8
	7.5
	9.5
Africa	
	2.2
	4.2
	5.5
TOTAL	
	484
	528
	554

Source: U.S. Department of Commerce.

Factors in the Global Market

A wide variety of factors affect the demand for environmental goods and services in the global market:

· _____ Demographic factors focus on the population: size, fertility, net migration, longevity, education, employment, and health. They are the dominant factors in the demand for basic services, such as potable water, wastewater treatment, and waste management.

The physical conditions and stage of development of a country influence demand. Developed nations are increasingly focused on environmental challenges as they respond to the concerns of their citizenry, while developing nations are more focused on basic human needs and must place a greater emphasis on economic growth than on environmental considerations.

Political and legal structures create the basis for demand in the developed world. In the developing world, where the enforcement of legal requirements is less stringent, this factor is less central.

Sociocultural factors cover a broad spectrum of human behaviors related to the environment. Conservation and environmentalism, for example, reflect sociocultural values that influence public policy and spur environmental demand.

· _____ Economic factors include the emerging recognition that “green” production methods can have a positive financial impact on a firm’s bottom line. Sustainable resource productivity is also an emerging economic factor. Finally, international trade agreements directly influence the demand for environmental services.

· _____ Transnational cooperation is a growing factor in the increasing demand for environmental goods and services. Globalization has sensitized leaders and nations to the impact that environmental concerns in one country or region can have on another.

Latin America. Mexico City (Mexico), Santiago (Chile), and Sao Paulo (Brazil) are among the world’s top ten most polluted cities. Latin America also suffers from high levels of industrial toxic waste and, in Mexico and Venezuela, hydrocarbon emissions from the petroleum industry. Continued depletion and destruction of forest resources exacerbates the greenhouse effect, contributes to the reduction of biodiversity, and increases soil erosion. Wastewater management is limited. Rising incomes and political forces are likely to spur demand for solutions to environmental problems over the next decade.

European Union. Acutely aware of the transboundary nature of pollution and the effects of a high population density, the Europeans have adopted an aggressive approach to environmental protection. In contrast to the United States, however, the EU has adopted a flexible approach to regulation, setting standards that industries can achieve by the best available technology. The EU emphasizes voluntary acceptance of environmental management systems, such as ISO 14000. The three pillars of EU environmental protection are (1) precautionary measures, (2) pollution prevention, and (3) polluter liability. The first of these, which has created some tension between the United States and the EU, calls for taking action on a continuum that includes an outright ban—before the scientific evidence has established that a clear environmental risk is present.

Central and Eastern Europe. Environmental degradation—from highly polluted water to hazardous waste dumps—is one of the legacies of 50 years of Communist rule in Central and Eastern Europe. Most of the countries in this region have set the provision of clean drinking water as their number one priority. Those countries seeking membership in the EU face a daunting task to reach EU environmental standards. The World Bank and the Organization for Economic Co-operation and Development (OECD) estimate that it will cost \$80–\$85 billion for the EU applicant countries to bring local wastewater up to EU standards. Poland alone will need to spend \$240 billion to comply with all EU environmental standards in the next 25 years. Air quality has improved considerably with the collapse of heavy industry after the fall of communism. Also, Western vehicles are slowly replacing the highly polluting Soviet-made cars. As all of these countries have instituted rigorous environmental regulations, new industries will need to adopt environmentally friendly practices. Remediating former military and industrial sites will be a very costly and long-term venture, however.

Russia. Over the course of 70 years, the Soviet Union pursued military and industrial development with nearly total disregard for the environment. Consequently, Russia, as well as other former Soviet republics, faces nearly insurmountable environmental problems that threaten the health of its citizens. Russia's aging nuclear power plants also pose risks to neighboring countries. Problems run the gamut from water and air pollution to solid and hazardous waste generation. Russia estimates that 200 metric tons of highly toxic wastes are dumped illegally each year. Contamination of nuclear and chemical munitions is probably too extensive to permit full remediation.

Although international organizations and domestic NGOs have raised environmental issues, the Russian government is still placing the environment behind economic development—as seen by the recent presidential action to abolish the Russian environmental agency and subsume it under the Ministry of Natural Resources. Economic survival is Russia's number one priority.

The potential Russian market for environmental services and equipment is vast, but Russia has neither the funds nor the political will to devote attention to the environment. To a great extent, this market will remain untapped for at least the next decade—or until Russian economic recovery takes hold.

Africa. The major environmental challenges in Africa are deforestation, soil degradation, desertification, declining biodiversity, water scarcity, deteriorating water and air quality, and urbanization. Twenty-five African countries will suffer from water shortages by 2025. Because of food scarcity, there were 200 million undernourished Africans in 1995; shortages are likely to increase in the coming years. In less than three decades, Africa's population will double from the current level of 750 million, thus exacerbating existing environmental problems. Furthermore, some of the conflicts taking place across the region originate in environmental stresses. In sum, the environmental problems are enormous and growing. Without outside intervention, however, African nations cannot afford the solutions.

Middle East. Water scarcity and degradation are the most pressing environmental problems in the Middle East. Nations are intensifying this problem through the overpumping of aquifers. Additional issues include the degradation of the marine and coastal areas, industrial pollution, the appropriate disposal of hazardous waste, and rapid population growth.

These issues are already the source of regional tension and conflict, although governments are beginning to recognize their importance and devote some resources to addressing these issues.

Asia. Rapid urbanization, unbridled economic development, and population growth are creating the world's greatest environmental problems for Asia over the next decade. The exploding population places tremendous pressures on land and water resources. Rapid industrialization has exacerbated acid rain, greenhouse gases emissions, and transboundary air pollution. Energy use is expected to increase 100 percent during 1990–2010 with fossil fuels (i.e., coal,

oil, and natural gas) continuing to be the primary energy sources. A resumption of economic growth will provide the resources for environmental protection, but it is not clear whether the environment will assume a high priority on Asian political and economic agendas.

ISO 14000: TAKING HOLD

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Background

As a worldwide federation of national bodies that promotes standardization across the globe, the ISO is committed to determining and subsequently institutionalizing ways to support the concept of “sustainable business development.” The Brundtland Commission Report defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”[\[xi\]](#)

The concept of ISO 14000 was spawned in June 1992 during the United Nations Conference on Environmental Development held in Brazil. Technical Committee 207 was formed in 1993 to develop the ISO 14000 series of standards. More than 50 countries voiced their national views as they participated in this lengthy consensus development process. The ISO 14000 series comprises 16 standards and covers environmental management systems, performance auditing, labeling of processes and equipment, environmental performance evaluation, terms and definitions, and assessment of systems’ life cycles.

The purpose of ISO 14000 is to establish a consistent worldwide approach to environmental management. Its goal is not to prescribe specific compliance or performance requirements; rather, its goal is to ensure that all business decisions take into account the value of the environment through pollution prevention and compliance with regulations and directives. In short, ISO 14000 is a tool that enables public and private sector organizations to adopt an internationally recognized framework, an environmental management system that protects the Earth’s environment and promotes international trade and commerce.[\[xii\]](#)

ISO 14000 offers a “certification” (i.e., registration) option. Specifically, ISO 14001, the “requirements” document, is the sole standard in the series that is auditable. ISO 14001 is the foundation document that details all major elements of a structured system for environmental management.[\[xiii\]](#)

ISO 14000 World Perspective

In general, the global response to ISO 14000 standards has been positive and optimistic. The degree of support is related to a nation's familiarity with the content, background, and level of participation in the development of the standards, however. Although most developing countries have adequate environmental legislation, their regulatory enforcement infrastructure is generally very weak. These countries have had minimal involvement in the development of worldwide standards. Consequently, they have concerns and uncertainties regarding applicability within their borders, economies, and markets.[\[xiv\]](#)

There is generally more movement toward the implementation of ISO 14000 standards in developed countries where those in the industry view the global marketplace as more important than the domestic market. Moreover, throughout the developed world, industry and government share an interest in moving away from costly and inefficient command-and-control environmental management systems. The new paradigm is a partnership between industry and government in a voluntary and comprehensive program of environmental management. Flexible, innovative solutions result, leading to improved environmental quality.[\[xv\]](#)

U.S. Perspective/Policy

Historically, regulations have driven environmental programs within the United States. Although founded on compliance, inspections, and fines, the EPA is beginning to move away from mandatory programs toward more voluntary programs that promote self-enforcement, multimedia approaches, and performance.[\[xvi\]](#)

Benefits of ISO 14000 Implementation. Those U.S. companies with an international presence are much more likely to implement ISO 14000 than are purely domestic companies. Multinational companies more closely mirror European and Asian companies in their approach. In addition to direct cost savings, these companies seek ISO 14001 registration for three primary reasons:

1. Recognition. The ISO requirement that companies communicate their environmental policy with employees and the public is good public relations. Compliance with ISO requirements is also perceived as a unique selling point that competitors may not have.
2. Trade. Companies obtain ISO 14001 registration in order to gain or maintain a competitive advantage in world marketplaces.[\[xvii\]](#) Since the fall of 1999, for example, Ford has required its suppliers with manufacturing facilities to have at least one facility ISO 14001-registered by the end of 2001. General Motors will have all suppliers conforming to ISO 14000 requirements by 2002.[\[xviii\]](#)

3. Regulatory compliance. Industry leadership is beginning to recognize the value of ISO 14001 registration in facilitating legislative compliance. A “certified” company should be more compliant than one that is not. For example, Lockheed Martin stated, “Our reviews indicate that business units which implement this approach to management of Environment, Safety, and Health (ESH) issues have cost-effective programs that can ensure long-term compliance.”^[xix] Although the EPA promotes ISO certification and believes that it will increase the rates of compliance, it does not advocate certification alone. The agency stipulates that compliance with regulations must continue and that inspections are the only method to ensure companies’ meeting minimum standards.

Another benefit for U.S. companies may materialize as the Department of Justice and the EPA work on guidelines for prosecutorial and sentencing flexibility for organizations that have implemented ISO 14000.^[xx]

Department of Defense (DOD) Domestic Policy. Recent ISO 14000 pilot studies at a variety of continental U.S. military installations (which included participants from the U.S. Navy, the U.S. Army, the U.S. Air Force, and the U.S. Marine Corps) substantiate increased DOD interest in environmental management systems.^[xxi] Although the DOD has historically taken a passive stance in environmental management system-related activities, Executive Order 13148, signed by President Clinton on April 26, 2000, shifts the DOD away from a posture of indifference to one that promotes environmental management systems.^[xxii]

Results of the pilot program were mixed. In general, senior management tended to support environmental management systems much more than subordinates did. Many felt that the advantages accruing from the certification process did not fully justify the costs. Proponents of ISO 14000 identified the following benefits as a result of the DOD pilot program:

- Tightens document control and records management
- Fosters environmental impact analyses
- Increases environmental understanding and awareness
- Parallels “green” constituents’ views
- Transfers environmental ownership to operational levels, ensuring compliance
- Integrates environmental concerns/behaviors into strategic decision making, promoting “due diligence” by senior managers
- Improves resource allocation, especially for pollution prevention projects, through systematic risk management and prioritization
- Institutionalizes progress tracking and reporting of environmental objectives

Economic benefits are difficult to quantify because of the infancy of U.S. efforts. It seems likely, however, that institutionalizing a disciplined management approach will produce benefits not exclusively tied to ISO 14001. Installations with a less structured environmental program will realize greater benefits.^[xxiii]

Findings

More than ever before, we live in a world without boundaries. Global markets have little tolerance for poor performers and, increasingly, for poor environmental performers. Environmental leadership and committed environmental management are essential for success in the global economy.^[xxiv] ISO 14000 standards are rapidly becoming the recognized market-driven benchmark for environmental management simply because “better environmental management will lead to better environmental performance, increased efficiency, and a greater return on investment.”^[xxv]

Savvy businesses implement ISO 14000 because it saves money, reduces liability, enables international trade, and projects a “green” image. Driven by resource efficiencies and the desire for a good public image, the DOD has adopted a more positive, proactive position on comprehensive environmental management as mandated by Executive Order 13148. Both public and private enterprises that plan to operate internationally will find it increasingly necessary to incorporate fully a recognized environmental management system such as ISO 14000.

[i] U.S. Department of Commerce, Office of Technology Policy, *The U.S. Environmental Industry Executive Summary* (Washington, DC: 1998), 8.

[ii] “Environmental Industry Evolution Sets up the Next Industrial Revolution,” *Environmental Business Journal* no. 5/6 (1999): 1.

[iii] “Environmental Industry Evolution,” 3.

[iv] David Berg and Grant Ferrier, *Meeting the Challenge: U.S. Industry Faces the 21st Century*, U.S. Department of Commerce, Office of Technology Policy (September 1998), 10.

[v] Berg and Ferrier, *Meeting the Challenge*, 28.

[vi] U.S. Department of Commerce, *Environmental Technologies Industry and Exports; A Reference Guide* (1998), 1–6 (original source Environmental Business International, Inc.).

[vii] Environmental Protection Agency, *Cleaning up the Nation’s Waste Sites: Markets and Technology Trends*, NTIS: PB 96–178041 (Washington, DC), 1–2.

[viii] Berg and Ferrier, *Meeting the Challenge*, 28.

[ix] Environmental Export Council (EEC) World Wide Web site, November 1999, <http://www.eec.org/2000>.

[x] National Science and Technology Council, *Technology for a Sustainable Future*.

[xi] The World Commission on Environment and Development (Brundtland Commission), *Our Common Future* (London: Oxford University Press, 1987), 43.

[xii] ANSI On Line, *Frequently Asked Questions about ISO TC 207*, American National Standards Institute, 1997–1999, http://web.ansi.org/public/iso14000/faq_3.html.

[xiii] Kevin Hersey, “A Close Look at ISO 14000,” *Professional Safety* 43, no. 7 (July 1998): 26–29.

[xiv] Philip A. Marcus and John T. Willig, *Moving Ahead with ISO 14000* (New York: John Wiley & Sons, 1997), 3.

[xv] Marcus and Willig, *Moving Ahead with ISO 14000*, 3.

[xvi] Paulette L. Stenzel, “Can the ISO 14000 Series Environmental Management Standards Provide a Viable Alternative to Government Regulation?” *American Business Law Journal* 37 (1999): 237–298.

[xvii] Joseph Cascio, GETF—Chairman of the US/TAG for ISO/TC 207, *ISO 14000: Acceptance in the U.S.A.*, 2.

[xviii] Amy Zuckerman, “Ford, GM Set ISO 14000 Requirements,” *Iron Age New Steel* 16, no. 3 (2000): 58–60.

[xix] Lockheed Martin, “What Every Company Needs to Know about Environment, Safety, and Health Management Systems,” A Reference for Senior Managers, <http://www-cesh.ast.lmco.com/cesh>.

[xx] Cascio, *ISO 14000: Acceptance in the U.S.A.*, 1.

[xxi] Eric Spillman, *ISO 14000 EMS Pilot Study Results and Recommendations*, Office of the Deputy Undersecretary of Defense (Environmental Security), ESOH Policy Board (9 March 2000).

[xxii] Executive Order 13148, “Greening the Government Through Leadership in Environmental Management,” *Federal Register* 65, no. 81 (26 April 2000), 24595–24606.

[xxiii] Spillman, *ISO 14000 EMS Pilot Study*.

[\[xxiv\]](#) Marcus and Willig, *Moving Ahead with ISO 14000*, 9.

[\[xxv\]](#) Tom Tibor, and Ira Feldman, *ISO 14000: A Guide to the New Environmental Management Standards*, (Chicago: Irwin Professional Publishing, 1996), 4.

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