

Eco-Efficiency

Task Force Report

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Executive Summary

This report of the Eco-Efficiency Task Force is a plan to realize the ideal of sustainable development in U.S. business and industry.

Adoption of the proposed goals and policies should result in the production, delivery, and use of competitively priced goods and services in a manner that protects the natural environment and increases social well-being.

The Task Force included members of the President's Cabinet, Chief Executive Officers and Senior Executives of some of the nation's largest companies, and important voices from the environmental community. Their workstyle was hands-on and reflected the business penchant for strategic thinking: goal setting should precede action, and action should be evaluated against verifiable performance measures. Their work also reflected the values of multi-stakeholder participation and consensus decision-making espoused by the President's Council.

The Task Force envisioned a sustainable U.S. economy distinguished by six characteristics: a sense of Responsibility shared throughout society for eco-efficiency; continued Economic Growth; Sustainable Resource Utilization; protection of Environmental Quality; flexible, cost-effective Government Regulatory Policy; and increased Social Well-Being. These were the goals toward which the Task Force directed its recommendations.

Task Force investigators studied demonstration projects in automobile and chemical manufacturing, the lithographic printing industry, and other real-world settings including eco-industrial parks. In addition, papers were solicited from a variety of thinkers in four relevant policy clusters: information, economics, regulatory, and money and management. The Task Force distilled its recommendations from this base of practical experience and informed conceptualization.

The policy recommendations may be considered in three subgroups: new societal approaches to achieve the goal of sustainable development, policies to implement these approaches, and realignments of the existing system.

New Approaches

Environmental Management System

Establish a new environmental management system that uses participatory decision-making to set verifiable and enforceable performance goals and allows regulated entities operational flexibility to meet those goals.

Extended Product Responsibility

Encourage the practice of shared responsibility for the environmental impact of products among the designers, suppliers, manufacturers, distributors, users, and disposers of those products.

Policy Toolboxes

Market Incentives

Market incentives, such as tradeable permits and environmental fees, should be used to achieve environmental goals and stimulate technological innovation.

Information Collection and Dissemination

Efficiently collect and disseminate high quality information to allow verification of progress toward sustainable development goals and to improve the capacity for decision-making required for successful extended product responsibility.

Integrated Accounting

Augment accounting of the gross national product by implementing a satellite system of national accounts that measures sustainable development through integrated tracking of the environment, economy, and the natural resource base.

Sustainable Development Indicators

Develop a full set of national sustainable development indicators to highlight and enable monitoring of the nation's economic, environmental, and social trends.

Access to Capital

Develop innovative financing program to improve and facilitate access to capital for small businesses and

communities so they may more easily invest in eco-efficient practices.

Realignments of the Existing System

Subsidy Reform

Redesign or eliminate federal subsidies that fail to incorporate the economic value of natural, environmental, and social resources into the marketplace and into governmental policies.

Revenue-Neutral Tax Shift

Shift taxes away from activities that promote economic progress--such as work, savings, and investment--toward activities that lead to excessive environmental damage.

The Task Force is convinced that adoption of these nine policy recommendations can help the United States transform into an eco-efficient society with an improved ability to provide economic and environmental security for all its members.

Introduction

Creation of the Task Force

The President's Council on Sustainable Development created the Eco-Efficiency Task Force in the belief that environmental protection and economic growth can, and must be, linked. As stated in the Council's report:

The paradoxical challenge that the United States and the world face at the end of the 20th century is to generate individual economic opportunities and national wealth necessary for economical healthy societies while, at the same time, lessening the environmental risks and social inequities that have accompanied past economic development... The challenge of sustainable development is to find ways to meet those needs without destroying the resources upon, which future progress depends.[1]

The Eco-Efficiency Task Force set out to resolve this paradox and to explore the means by which the U.S. economy could realize sustainable development.

What Is Eco-Efficiency?

Eco-efficiency is broadly defined as the production, delivery, and use of competitively priced goods and services, coupled with the achievement of environmental and social goals.

The Business Council for Sustainable Development, in its 1992 publication, *Changing Course*, introduced the term "eco-efficiency" to describe corporations producing economically valuable goods while continuously reducing the ecological impact associated with the production of those goods.[2] Before the term existed, these corporations had already begun to realize the advantages of eco-efficiency. Some of these business advantages are:

- An eco-efficient production system uses less material, water, and energy inputs, and thus reduces the cost of manufacturing.
- An eco-efficient product is durable, repairable, and reusable, and therefore more attractive to consumers.

- An eco-efficient business takes account of its environmental responsibilities when designing technologies, processes and products. In doing so, it finds opportunities for efficiency gains and other overhead savings.

The challenge facing the Task Force was to reveal further the factors that motivate conversion to eco-efficiency and, ultimately, to recommend a set of policies that would foster the establishment of eco-efficiency as the standard practice for businesses, individuals, and governments in the United States.

From the outset, the Task Force envisioned an eco-efficient society, in which ecological and economic values are married, producing cleaner, safer workplaces, healthy, vibrant communities, and greater economic opportunity for all Americans. In an eco-efficient society, market forces would be harnessed to protect the environment. Supply and demand would be influenced by better information about environmental impacts and by a heightened sense of responsibility among all. Price signals would incorporate eco-efficient values. The more energy and materials used to make a product and deliver it to the consumer, and the more waste generated in its manufacture and use, the higher would be the product's price tag. This is not always the case under the present system.

The Task Force also envisioned an eco-efficient regulatory system that would maximize environmental protection while enhancing economic competitiveness. Eco-efficient regulation would rely more on pollution reduction at the source rather than on costly controls. Eco-efficient regulation would foster trust and co-operation by inviting public participation and by recruiting industry partnerships in the discovery of cost-effective environmental solutions.

In short, the Task Force viewed eco-efficiency as both the end and the means. Eco-efficiency could produce a high quality environment and a robust and competitive economy; at the same time ensuring continuing improvement to both.

Scope of Work: "Cradle-to-Cradle"

The President's Council on Sustainable Development directed its Eco-Efficiency Task Force to study manufacturing in the

United States to determine how economic growth and environmental protection might be aligned in a domestic policy agenda.

The Task Force interpreted this charge to include the full range of manufacturing-related activities in the chain of commerce--not just the actual production step. So, initially, the Task Force looked at manufacturing from the time raw materials are extracted to the time consumers finish with an end-product.

The Task Force soon realized that even this view was not broad enough. It is an improvement to consider the whole process of product manufacturing, from "design-to-disposal" rather than simply to look at isolated steps in that process; but it is still not fully eco-efficient thinking.

Borrowing from our understanding of natural systems, in which waste from one process becomes fodder for the next, the Task Force began using the phrase, "from cradle-to-cradle," to describe eco-efficient manufacturing. "Cradle-to-cradle" suggests that manufacturing be treated not as a linear activity, but as circular. In eco-efficient manufacturing the waste from one process should provide feedstock for the next production activity. The products of eco-efficient manufacturing, once used, should be able to be disassembled or reassembled to become useful again. Eco-efficient manufacturing is a closed loop, sustainable system.

In crafting its workplan, therefore, the Task Force took a whole systems approach to the manufacturing sector. It looked at material flows to find opportunities to affect supply chain dynamics that influence raw material extraction and the use of recycled materials and products. It looked at product storage, shipping, distribution, and use, to see how these are affected by demand and other consumer behaviors.

Trends in business competition and strategy, environmental security, and federal-state-local government relations were also taken into account by the Task Force in setting its workplan.

Task Force Workplan and Methods

At the core of the Task Force workplan was a series of "cleaner, cheaper" demonstration projects, modeled in part on the 1993 Amoco/EPA Yorktown Project.[3] The members identified possible projects that could highlight eco-efficiency opportunities both in entire commercial systems and in a variety of industries. The Task Force recognized the growing

contribution of small businesses. For this reason, the workplan included studies of nine, small business dominated industries as well as a new wave of hybrid industrial areas called eco-industrial parks, and studies of traditional large manufacturers.

The workplan also called for an infusion of ideas from a wide range of stakeholders, academics, and analysts in four policy clusters: Information, Economics, Regulatory, and Money and Management.

The Eco-Efficiency Task Force recognized that the process used to establish goals and formulate its recommendations was as important as those end-products themselves. Consequently, the Task Force designed an open deliberative process with multiple stakeholders. Outcomes were to be based on consensus. Though not always the easiest or quickest methods for completing a job, inclusion and consensus engendered creativity and a spirit of trust among the participants.

This report is a summation of the work of the Eco-Efficiency Task Force. The goals, policies, and measures of progress put forward in the report can help to shift the US economy to one which more effectively yields environmental security, and economic vitality and social equity.

Chapter 1 discusses the goals that guided all the Task Force work. Chapter 2 contains recommendations for specific action that can be undertaken by government, the private sector, environmental groups, and individual citizens. The work of the demonstration projects and policy clusters are summarized in Chapters 3 and 4, respectively. The report concludes with a roster of Task Force membership and acknowledgment of all those who assisted in formulation of this report.

[1] The President's Council on Sustainable Development, *Sustainable America: A New Consensus* (Washington, D.C., 1996), p. 6.

[2] The Business Council for Sustainable Development, *Changing Course* (Cambridge, Mass.: The MIT Press, 1992), p. 10.

[3] In late 1989, EPA and Amoco Corporation began a voluntary, joint project to study pollution prevention opportunities at an Amoco refinery in Yorktown, Virginia. The study team, which included the Commonwealth of Virginia, explored technical, legislative, regulatory, institutional, and economic factors which impede or encourage

pollution prevention. The team learned that better environmental results could be achieved more cost-effectively at the facility if less prescriptive regulatory approaches were

used, if information collection was improved, and if additional public-private partnerships could be encouraged.

Chapter 1

Goals for an Eco-Efficient Economy

Overview

Setting goals was critical to the strategic approach of the Task Force. The goals provided a common basis for all the members from which they could assess and refine the policy recommendations and other outcomes of their work. The goals and their attendant indicators of progress will be the standard for evaluation of the effectiveness of the recommended policies as they are brought into practice.

The goals were developed through a process of discussion, negotiation, and, eventually, consensus. They derived from the vision of a sustainable U.S. economy, from the findings of the demonstration projects and the policy clusters, and from the personal beliefs and experiences of the Task Force members.

The goals are a formulation of the Task Force members' shared view of what the future could and should look like as the U.S. economy moves along the path of sustainable development. This view is summarized in the following vision statement:

The U.S. economy shall produce and use globally competitive goods and services while achieving environmental and social goals. This vision will result in a transition to an economy in which the constituents -- people and businesses--provide for their needs and those of future generations through efficient and environmentally responsible practices.

It is worth noting that each term in the vision statement was selected with care to bring out an aspect of eco-efficiency. For example:

- Produce and use underscores that responsibility for eco-efficiency is shared by those economic actors who supply goods and services, and by those who create demand for the same.
- Globally competitive recognizes that U.S. business increasingly operates in a world market and that the costs of reducing environmental impacts should not place U.S. products at a disadvantage.

- Goods and services refers to the comprehensiveness of the eco-efficient ideal, and also to the evolving nature of U.S. economic activity from primarily smoke-stack manufacturing to more diverse, service and information-age industries.
- Achieving environmental and social goals is a reminder that eco-efficient economic growth, by its nature, reinforces the drive to produce a cleaner environment and a more equitable society.

These concepts were amplified and organized within the goals of the Task Force.

Goals

The Task Force set six goals toward which its recommendations should lead: Responsibility shared throughout society for eco-efficiency; continued Economic Growth; Sustainable Resource Utilization; protection of Environmental Quality; flexible, cost-effective Government Regulatory Policy; and increased Social Well-Being.

This section contains a context statement, a summary of the goals, and suggested indicators of progress for each goal. The context statements reflect the thinking behind the goal. The indicators translate the goals into practical terms that should allow a ready measure of the nation's progress as it strives toward greater eco-efficiency.

Responsibility and Economic Growth are, in the view of the Task Force, the underpinning of the other goals.

Responsibility

Context Statement

Individuals, through their actions, choices, and decisions, are the foundation upon which our society and economy are built. In order to capture the significant societal, economic, and environmental improvements offered by sustainable development, therefore, eco-efficiency must become a widely held societal value.

Goal

To act collectively and individually in ways that contribute to eco-efficiency and sustainable development through better understanding and communication of the environmental, economic, and social consequences of our actions.

Indicators of Progress

Progress toward the goal of responsibility could be measured using indicators such as:

- school curricula which incorporate eco-efficiency; and
- adoption of environmental management systems by a majority of institutions.

Economic Growth

Context Statement

Continued, long-term economic growth is essential to the prosperity of the United States and is fundamental to sustainable development. Maintaining this economic growth as the United States transitions to sustainability is a critical challenge.

Goal

To maximize economic growth in the expanding global marketplace as measured through newly established indicators that fully account for social and environmental externalities.

Indicators of Progress

Progress toward the goal of long-term economic growth could be measured using indicators such as:

- development of a sustainable national account; and
- incorporation of externalities in existing national accounts.

From these two core principles flowed the goals of Sustainable Resource Utilization, Environmental Quality, and Government Regulatory Policy. The interaction of these three goals leads to efficient and proper use of resources and the desired state of environmental quality.

Sustainable Resource Utilization

Context Statement

In the aggregate, current use of materials and energy in the U.S. economy is not sustainable. Production and consumption of materials now account for large shares of U.S. energy use, waste, and pollution.[4]

Goal

The U.S. economy should efficiently produce and use globally competitive goods and services while reducing resource use to sustainable levels and, thereby, greatly reducing adverse impacts on natural systems.

Indicators of Progress Progress toward the goal of sustainable resource utilization could be measured using indicators such as:

- increased market share of renewable and recoverable resources; and
- achievement of commodity-specific recycling rates.

Environmental Quality

Context Statement

In the aggregate, the environmental burden created by US economic activities is not sustainable.

Goal

A safe and clean environment should be attained by making pollution prevention, waste reduction, and product stewardship standard practice. All people and ecosystems should be protected and economic and social well-being enhanced.

Indicators of Progress

In order to measure progress toward the goal of environmental quality, we would first need to:

- establish sustainability levels for all media.

Government Regulatory Policy

Context Statement

The transformation to sustainable development and eco-efficiency will occur through the actions of individuals, government, and the marketplace. Government is responsible for establishing national environmental goals and enabling progress toward those goals.

Goal

Government regulatory policies should support and enable the efforts of individuals, communities, and corporate entities to achieve their eco-efficiency objectives in the most flexible, expeditious, and cost-effective manner possible.

Indicators of Progress

Progress in the area of government regulatory policy could be measured using indicators such as:

- increased use of voluntary compliance agreements; and
- increased use of performance-based systems.

The final goal, Social Well-Being, is the net result and byproduct of a robust economy, a safe and clean environment, and the exercise of individual responsibility.

Social Well-Being

Context Statement

Social well-being is affected by the availability and quality of educational and job opportunities and by the short- and long-range environmental, health, economic, and social impacts of employers on individuals and communities.

Goal

Increase the quality and quantity of job opportunities in all communities and protect the health of all people and ecosystems through appropriate government policies and efficient economic expansion.

Indicators of Progress

Enhanced social well-being could be measured in terms such as:

- increased employment or functional literacy rates;
- increased instances of urban redevelopment; and
- reduced disproportionate environmental burdens.

The complete Eco-Efficiency Task Force goals, including context statements and all indicators of progress, are attached to this report as Appendix A.

[4] World Resources Institute, *World Resources 1994-95* (New York: Oxford University Press, 1994), p. 15 (showing enormous consumption of materials by the United States); U.S. Department of Commerce, *Statistical Abstract of the United States 1994* Washington, D.C.: Government Printing Office, 1994), p. 587, table 924 (showing industry consuming 24.2 percent of total U.S. energy).

Chapter 2

Policy Recommendations

Overview

With its six goals established, the Eco-Efficiency Task Force next developed nine policies to achieve the goals. These policies are derived from the findings of the Demonstration Projects and the Policy Clusters. They recommend new, more eco-efficient methods of operation that can be adopted by individuals, companies, regulators, and environmental organizations. Collectively, the nine recommendations offer a means of linking the nation's economic prosperity to continued protection of the environment.

The recommendations fall into three subgroups: new societal approaches to achieve the goal of sustainable development, sets of policy tools to implement these approaches, and realignments of the existing system.

Each policy is summarized below and then discussed on the following pages.

New Approaches

New Environmental Management System

Establish an environmental management system that uses participatory decision-making to set verifiable and enforceable performance goals and allows regulated entities operational flexibility to meet those goals.

The new system would replace the current practice of command-and-control regulation, which often creates adversarial relationships and results in costly litigation and delays in meeting environmental goals. The new system would encourage partnerships and participation and should yield better environmental results, for more people, while reducing costs for regulated entities.

Extended Product Responsibility

Encourage the practice of shared responsibility for the environmental impact of products among the designers, suppliers, manufacturers, distributors, users, and disposers of those products. This new practice would extend the current approach to waste reduction, resource conservation, and pollution prevention by treating products holistically, from "cradle-to-cradle."

Toolboxes

Market Incentives

Market incentives, such as tradeable permits and environmental fees, should be used to achieve environmental goals and stimulate technological innovation. Market-based approaches should be appropriately designed for specific problems to ensure that the most effective and fair solutions are achieved in a least-cost manner.

Information Collection and Dissemination

Efficiently collect and disseminate high quality information. Good information enables informed decision-making, allows the public to verify progress toward sustainable development goals, and supports the transition to a new environmental management system.

Integrated Accounting

Augment accounting of the gross national product by implementing a satellite system of national accounts that measures sustainable development through integrated tracking of the environment, economy, and the natural resource base.

Sustainable Development Indicators

Develop a full set of national sustainable development indicators to highlight and enable monitoring of the nation's economic, environmental, and social trends.

Access to Capital

Develop innovative financing programs to improve access to capital for small businesses and communities so they may more easily invest in eco-efficient practices. Existing programs within the U.S. Environmental Protection Agency (EPA) and U.S. Small Business Administration (SBA) should be coordinated in order to spawn investment in technologies and practices that improve resource efficiency, reduce waste, and add value to local economies.

Realignment of the Present System

Subsidy Reform

Redesign or eliminate federal subsidies that fail to incorporate the economic value of natural, environmental, and social resources into the marketplace and into governmental policies.

Revenue-Neutral Tax Shift

Shift taxes away from activities that promote economic progress--such as work, savings, and investment--toward activities that lead to excessive environmental damage.

ECO-EFFICIENCY TASK FORCE

POLICY RECOMMENDATIONS

POLICY RECOMMENDATION 1

ENVIRONMENTAL MANAGEMENT SYSTEM

The Eco-Efficiency Task Force recommends the design and establishment of a bold new performance-based environmental management system. The three essential principles of the new environmental management system would be: verifiable and enforceable performance goals; operational flexibility; and participatory decision-making in environmental goal setting. The new system would result in greater environmental protection than under the current system, for more people, and at a reduced cost to regulated entities. Partnerships and participation would replace the current pattern of costly litigation between adversaries.

Rational

The current regulatory system has led to substantial environmental improvement. However there is growing consensus that it is failing to maximize environmental results in the most cost-effective manner.

Current laws, regulations, and incentives focus on pollution control and clean-up. Typically, they address emissions into air, water, and land separately, and they often dictate specific technologies for treating specific waste streams.[5]

A new environmental management system would focus on prevention, would address environmental impact within a whole facility or within a whole ecosystem and would encourage better management of materials and energy flowing through product systems.

The current system focuses on achieving compliance with sometimes complicated and rigid regulatory requirements. The new system is based on the principles of sustainable development--maximizing environmental performance in a way that promotes fairness, economic growth, and competitiveness.

The new environmental management system should result in a cleaner environment, greater cost-effectiveness, and increased public participation.

A Cleaner Environment

The new environmental management system would yield superior environmental performance over the current system.

Ambitious performance goals are one mechanism to ensure superior results. The operational flexibility of the new environmental management system is another. Operational flexibility allows reallocation of limited resources into energy efficiency, resource conservation, and pollution prevention consistent with the EPA waste management hierarchy.[6] While the current system principally focuses on minimum

compliance with technical standards, the new environmental management system will induce continuous environmental improvement.

Greater Cost-Effectiveness

The new environmental management system would use economic incentives and grant participants the necessary flexibility to meet long-term performance goals efficiently and cost-effectively.

Economic incentives, regulatory flexibility, and enforcement innovations will attract business participation in the new system. Tools such as emissions reduction banking and recognition of superior performance will reduce costs and promote strategic environmental thinking in government, business, and in other regulated entities.

These tools that harness the market must be designed to minimize negative impacts on health, safety, and the environment, and prevent geographic pockets of increased pollution.

More Public Participation

Improved public participation and information dissemination will make the new environmental management system more equitable than the current system.

Multi-stakeholder, consensus-building teams would provide active and meaningful participation for individuals and communities. Interactive processes would provide the public the opportunity to help establish environmental goals and to verify progress toward those goals over time.

Information and education will play a critical role in the new system. Collection and dissemination of relevant information, with sufficient protection for proprietary information, would ensure that consumers, businesses, and government officials fully understand the impact of their decisions and actions.

Implementation

Implementation of the new performance-based environmental management system would begin with demonstration projects. During this transition period a simultaneous effort will be made to increase operational flexibility and make other improvements in the existing regulation-based system. Lessons from demonstration projects would provide valuable feedback necessary to determine whether to reconcile the current and new systems or to continue administering two parallel tracks.

Establishment of the new performance-based environmental management system

Demonstration projects would be the first step in implementing the new environmental management system. These projects would be selected based on prior environmental performance; ability to implement a new system; geographic, industrial, and size diversity; and the resource constraints of the EPA and other regulatory agencies and other key stakeholders.

A balanced, multi-stakeholder group would have an integral role in designing, implementing, and evaluating the new system.

Lessons from the initial projects will be incorporated into the system within four years and a second generation of projects will be identified.

Where administrative authority is insufficient to launch the demonstration projects, legislation would be drafted to authorize projects based on the new system.

Improvements to the existing regulatory system

The EPA and other regulatory agencies should work to achieve currently mandated environmental standards in a more cost-effective manner by providing greater operational flexibility to regulated entities and to state and local governments.

Other means of improving the current system should include enhanced public participation, administrative streamlining, and identification of opportunities and incentives to exceed regulatory requirements. Better information for all stakeholders would be a common feature of these improvements.

Changes to the current system could be reviewed by a multi-stakeholder panel. The panel could also propose better ways to achieve or exceed current regulatory requirements.

Where administrative authority is insufficient to improve the current system, legislation would be drafted to provide the needed authority.

National Research Agenda

Implementation of the new environmental management system would be supported by a national research body. This body would conduct research and provide feedback, ensuring that lessons learned through the demonstration projects would reform and improve the operation of the new system.

The research body would also analyze economic, environmental, and social issues on various scales (i.e., local, state, regional, national, and global). These analyses would help define and measure sustainable development and would help with design of future innovations in environmental management such as government/industry compacts. The analysis would also ensure that all efforts associated with the new environmental management system are predicated on sound science.

Characteristics of the New Environmental Management System

- Ambitious long-term environmental performance goals, strategically and collaboratively set on an industry, facility, agency, community, or geographic basis;
- Interim quantitative milestones which ensure that participating entities continuously improve environmental performance and make progress toward long-term performance goals
- Increased operational flexibility that maximizes innovation and cost-effectiveness in exchange for achieving improved environmental performance;
- Use of incentives to increase operational flexibility, decrease participation costs, and encourage continuous improvement in environmental performance;
- Use of information mechanisms to measure and demonstrate progress toward goals and to provide participants with information that facilitates environmental decision-making while sufficiently protecting proprietary information;
- Enhanced public involvement in setting goals for sustainability and reviewing progress toward goals at the local, regional, state, and national levels; <
- A life-cycle perspective that encourages participating entities to establish pollution prevention and product stewardship as standard business practices, and
- A multi-media approach that encourages participating entities to manage environmental responsibilities on a "Whole-facility" or "whole-ecosystem" basis.

POLICY RECOMMENDATION 2

Extended Product Responsibility

The Eco-Efficiency Task Force recommends that a unified system of extended product responsibility transform the present, dispersed approach to waste reduction, resource conservation, and pollution prevention. This new approach is based on the principle of shared responsibility.

Through a mix of incentives, information, education, and institutional support, this new approach would motivate individuals, governments, and corporations to recognize, understand, and act on their responsibility to advance the nation's sustainable development goals.

Demonstration projects should be undertaken to implement extended responsibility for several product categories. The goal of the projects should be to reduce impact in various stages of the product life cycles including manufacture, transport, and post- consumer waste.

Rational

While the past two and one-half decades have led to significant environmental improvement, further advances will remain incremental as long as progress depends on the isolated actions of a few participants involved in product design, manufacture, use, or disposal.

Extended product responsibility is an emerging practice that considers the entire life of a product, from design to disposal, to identify opportunities for resource conservation and pollution prevention. Under extended product responsibility accountability for the environmental impacts of products and waste streams is shared among manufacturers, suppliers, users (both public and private), and disposers of products.

Such a life-cycle approach captures upstream impacts associated with raw material extraction and use, effects from production and distribution, and the downstream effects associated with product use and disposal. This comprehensive analysis permits identification of the critical links in the product life-cycle where improvements could be substantial. Extended product responsibility also addresses the underlying influence of consumer needs and preferences.

A goal of extended product responsibility is to identify those actors and actions with the greatest ability to reduce the environmental and energy impact of specific products. In some cases, this may be the producer of raw materials, in other cases, the end user. Voluntary assumption of responsibility is ideal, but national legislation assigning responsibility would be drafted if sufficient progress had not occurred within four years of the program's inception.

Implementation

Implementation would occur in three phases:

Phase I - Prioritization

A multi-stakeholder advisory panel would identify and prioritize product categories for initial application of EPR policy options, taking into account lessons learned from other analyses.

The following criteria would guide the selection of product categories:

- Products that utilize non-renewable/non-recoverable resources.
- Products that pose high hazard risks and the potential for injurious exposure, or contribute significantly to environmental degradation.
- Products that contribute significantly to waste streams entering the air, land, or water.

Once product categories are selected, the panel would identify the actors and links in the chain of commerce with the greatest ability to leverage improvements. Where actors assume voluntary responsibility, the panel would work to secure sufficient protection against unjustified extension of product liability.

Concurrently, the panel would establish goals for pollution prevention, resource conservation, and waste reduction for each product category. The panel would recommend a set of policy options best suited for reaching these goals.

Phase 2 - Demonstration Projects

Demonstration projects would be undertaken in the identified product categories recognizing the need to conduct demonstrations in a variety of regions and sectors. Companion training and education programs would communicate the objectives of the demonstration project and the principles of eco-efficiency and extended product responsibility.

One initial demonstration project should include ways to reduce post-consumer waste by exploring a more eco-efficient redistribution or sharing of responsibilities among actors in the products' life-cycles.

Academic or institutional researchers would monitor the demonstration projects to provide independent analysis of the projects' successes. This feedback would be utilized in developing the national and regional scale policies of Phase 3.

Phase 3 - Development of National and Regional Scale Policies

In Phase 3, the practice of extended product responsibility would begin on a larger scale. Lessons learned from the demonstration projects would shape regional and national policies. Evaluation and policy refinement would continue in Phase 3 as the practice of extended product responsibility expands to an ever broader array of product categories and waste streams.

TOOLS FOR THE PRACTICE OF EXTENDED PRODUCT RESPONSIBILITY

A variety of tools can be used to implement extended product responsibility. Some, like labeling programs, inform. Others, like product fees, use economic signals. All help decision-makers recognize and respond to opportunities to change. These tools can be implemented voluntarily or mandatorily and may specify individual actions or a coordinated effort among multiple actors along the chain of commerce. Examples of these tools are listed below:

Product Stewardship Programs or Partnerships: Stewardship programs typically deal with the downstream environmental and safety aspects of product use. Many companies and organizations have active stewardship programs. Some examples are the EPA's Green Lights programs, Chemical Manufacturers Association's Responsible CareR program, and the Environmental Defense Fund/McDonalds partnership.[7]

Take-Back, Buy-Back, Leasing, and Reuse/Recycling: Under take-back or buy-back systems, the products, packaging, or waste materials are returned to their source for reuse, recycling, treatment, or safe disposal. This mitigates downstream environmental impacts, permits recovery of valuable materials, and fosters design of eco-efficient products. Take-back programs might not be appropriate for all product categories such as those that are extremely complex or where recycling infrastructure already exists or could be established. Under leasing systems, ownership of materials or products is never transferred, thus encouraging the manufacturer to close material flow loops and extend product life. Reuse or recycling by another manufacturer also closes material flow loops.

Education, Information and Training: Purchasers and users can be helped to make informed environmental decisions. Appropriate information can be made available through labeling, other product literature and "seal-of-approval" programs. What is important is a continuous flow of information from designer to manufacturer

to user and back to designer. A more detailed discussion follows in Policy Recommendation 3: Market Incentives.

Government Subsidies, Tax Credits or Procurement Preferences: Direct subsidies or tax credits can be used to encourage sustainable processes and products. Because a national priority is usually the justification for a subsidy or tax credit, these tools should be used sparingly and should be revenue-neutral. Federal, state, local, and tribal governments can also exert influence in the marketplace through their purchasing specifications for environmentally superior products.

Material Taxes/Fees, Product Taxes/Fees, Deposit-Refund Systems: Taxes and fees that add the value of environmental impacts to the cost of materials and products can make those with higher environmental impacts relatively less preferable in the marketplace. Taxes and fees may also be used to shift the cost of waste management to the waste generator. Examples include taxes on new automobile tires or batteries or variable pricing for municipal waste programs. A more detailed discussion follows in Policy Recommendation 3: Market Incentives.

POLICY RECOMMENDATION 3

Market Incentives

The Eco-Efficiency Task Force recommends using market incentives to achieve environmental goals and stimulate technological innovation whenever feasible.

Rational

Market forces offer a powerful means of affecting the decision-making of individuals, businesses, and governments. The use of market-based incentives to further environmental goals encourages the application of pollution control measures in the places where these controls will be most cost-effective. This is the essence of eco-efficiency: increased environmental performance at reduced cost.

Economic instruments also provide operational flexibility and account for the need of U.S. manufacturers to remain competitive in the global marketplace.

Emission Trading

Emission trading schemes are designed to allow regulated entities to meet emissions reduction obligations using reductions produced in excess of legal or other requirements or from other sources. These reductions can accrue from other sources within the environmentally relevant parameters, i.e.

airshed, watershed, and time frame. By creating market structures for environmental compliance, these systems harness private entrepreneurial energies in the search for the most efficient means to achieve environmental goals.

Two existing approaches to trading are "cap and trade" and "emission reduction credit" systems. Both have produced economic and environmental benefits. The cap and trade system is exemplified by the federal Acid Rain Control Program which allows sources to trade sulfur dioxide allowances between plants.[8] The emission reduction credit system has largely been applied to the management of smog precursors in metropolitan areas. Cities failing to meet the National Ambient Air Quality Standards have used emission reduction credit trading to allow new sources to build and operate without increasing the area's overall emissions. A third approach, termed "open market trading," has been proposed by EPA. The open market system would allow emitters to acquire surplus discrete emission reduction from other sources in lieu of existing regulatory requirements. This system is still under development and awaits experience in application.

Care must be taken to match the program's design and application to the underlying physical nature of the environmental problem in spatial and temporal dimensions. Trading systems work best when all stakeholders believe that transactions involve "excess reductions" between sources to voluntarily lower and redistribute the costs of compliance while guaranteeing that the overarching environmental goal will be met.

Emission Fees

Emissions fees use the price mechanism to provide incentives for environmental improvement by making environmentally damaging activities or products more expensive than less polluting alternatives. Firms and individuals control pollution to the level at which it is cheaper to pay the emission fee than to further reduce pollution. Emission fees can be particularly useful when pollution is due to many small sources, or where direct regulation or trading schemes may be impractical due to high transaction costs.

Information Programs

Another important market mechanism is consumer choice. Providing information to consumers about the environmental consequences of, or risks associated with, their market choices can lead to behavioral changes. Some examples of this type of program which have been used by states, localities, and other entities include radon and lead testing, seals-of-approval, and labeling programs such as required under California's Proposition 65.[9]

Another type of program relies on public disclosure of information on facilities' environmental releases and off-site transfer of certain wastes (e.g., the Toxic Release Inventory).[10] This information encourages continuous environmental improvement and also provides industry a vehicle for enhancing public image.

Implementation

The success of such programs as the sulfur dioxide trading market, lead phase-down banking and trading, and hundreds of pay-by-the-bag trash collection systems justifies the expanded use of market incentives to achieve environmental and economic objectives.

Economic instruments have their own "niches," but they can also be used effectively in combination. For example, trading or pricing approaches work better if supported by information programs -- communities that adopted pay-by-the-bag systems of trash disposal found fewer problems when households were given adequate information well in advance. Similarly, environmental tax systems can incorporate trading features; for example, taxes could be levied on net emissions after trades occur.

The way forward is not to debate the merits of various approaches in the abstract. The challenge is to design the most

appropriate market incentives to deal with particular environmental problems. These incentives should always reflect sustainable development ideals; steady progress in reducing environmental risks, cost-effectiveness, encouragement of technological innovation, shared responsibility, fairness, and administrative simplicity.

POLICY RECOMMENDATION 4

Information Collection and Dissemination

The Eco-Efficiency Task Force recommends improving the nature and means of information collection and dissemination. Environmental, economic, and social information collected should be that which is most useful to stakeholders in reaching the goals of eco-efficiency. It should be collected and made accessible in an efficient and coordinated manner. These improvements must take place with full protection for proprietary information.

Rational

Accurate and relevant information is essential to reaching the goal of sustainable development. It assists individuals, communities, governments, and businesses to understand how their actions affect the environment. It increases their sense of shared responsibility. Good information allows verification of progress toward long-term goals and enables public accountability. High quality information about product life-cycles is necessary to make sound environmental management decisions, especially within corporations. It also influences the purchasing decisions of individual consumers and organizations.

Once information is collected, it must also be made available in a form most useful and appropriate. Examples of such forms include environmental labeling, material flow reporting, full cost accounting, and integrated indicators.

Implementation

In order to ensure that information is useful and relevant for its intended audience, and developed in the most cost-effective manner, the following actions should occur:

- Review all data required by regulatory agencies for duplicative or unnecessary information, and where identified, eliminate such information.

- Consolidate useful, relevant data into single, standardized formats.
- Use inter-agency common identifiers for companies, locations, and regulated chemicals to facilitate analysis of economic and environmental trends.
- Provide data necessary to evaluate environmental and economic progress without compromising confidential or proprietary business information.
- Make data widely available to the public and other users, including government policymakers, business managers, local communities, and investors.

POLICY RECOMMENDATION 5

Integrated Economic and Environmental Satellite Accounts

Establish and implement a system of national accounting to measure sustainable development through integrated tracking of the environment, economy, and natural resource base.

Rational

One of the most common measures of our nation's economic health is the gross domestic product (GDP), an indicator that accounts for the dollar value of all goods and services produced in our economy. However, GDP is an incomplete and imperfect measure of sustainable development because it does not adequately account for environmental quality and natural resource depletion. Therefore, we need to develop a better national accounting system which reflects environmental concerns as well as traditional economic indicators.

The U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, has designed a new set of economic accounts for analysis of the interaction of the economy and the environment. The Integrated Economic and Environmental Satellite Accounts (EESA) will include measures of economic growth, natural resource use, and environmental quality. The satellite accounts will not interfere with the continued tracking of the GDP and other agreed-upon indicators.[11]

By recording the "stock" of natural resources, these satellite accounts can, in theory, provide a better measure of

sustainable product than traditional accounts. Fully implemented, the accounts could also provide an improved basis for analyzing the interaction between the economy and the environment in a number of ways -- by type of resource, industry, product, and region.

However, it is important to note that the development of the integrated accounts is a difficult and challenging task. It requires methodologies and data that are not yet available. Also, to the extent that the concept of sustainability is considered to include a wider range of social issues, indicators of change in these areas are more appropriately tracked within the proposed framework of "sustainable development indicators than in the national economic accounts.

Implementation

- The Bureau of Economic Analysis has already completed the first phase of the accounts. The overall framework and prototype estimates focus on mineral resources, including oil and gas, coal, metals, and other minerals with a scarcity value.
- Pending completion of a National Academy of Sciences study of the IEESAs -- which was requested by Congress -- the Bureau will move forward with the second phase to extend the accounts to encompass renewable natural resource assets, such as timberland, fish stocks, and water resources. Development of these estimates will be more difficult than for mineral resources because they will be based on less refined concepts and less data.
- The third phase will involve issues associated with a broader range of environmental assets, including the economic value of the degradation of clean air and water and the value of recreational assets, such as lakes and national forests. To accomplish these objectives, significant advances will be required in the underlying environmental and economic data, as well as in concepts and method.
- The Bureau of Economic Analysis will move forward in its work with international agencies -- and all other interested private and public sector parties -- to research, develop, and implement economic accounting concepts that more fully reflect the interaction of the economy, the environment, and the natural resource base.

- Progress in this work will depend upon resource availability and close, continuing cooperation with the scientific, statistical, economic, and environmental communities.

POLICY RECOMMENDATION 6

Sustainable Development Indicators

The Eco-Efficiency Task Force recommends developing a full set of national sustainable development indicators to highlight economic, environmental, and social trends. This collaborative effort will entail developing an information access system, developing analytical techniques for constructing indicators, providing regular reports on progress toward national sustainable development goals, and encouraging the development of indicators at regional, local, and industry levels.

Rationale

The assessment of progress toward sustainable development is difficult because the concept integrates three complex and dynamic systems; the social, economic, and environmental. Assessment is further complicated by multiple scales and various time frames over which development occurs. Ethics and values must also be considered. These requirements go beyond the assessment provided by national accounts. Therefore, new indicators are needed.

Implementation

Significant work on environmental policy indicators has been done by the Organization for Economic Cooperation and Development, the United Nations Commission on Sustainable Development, and the Dutch government.[12]

The Dutch have developed indicators for distinct environmental issues (climate change, stratospheric ozone depletion, acidification, eutrophication, dispersion of toxic substances, disposal of solid waste, and disturbance of local environments) and for target sectors (agriculture, traffic and transport, industry, energy, refineries, building trade, and consumers).[13]

The Eco-Efficiency Task Force recommends building on this work and expanding the scope of indicators to include economic and social dimensions as well as environmental

factors. This may require establishment of an institutional mechanism to unify the efforts of a variety of federal agencies working collaboratively with international agencies, nongovernmental organizations, academic institutions, industry, and the public.

POLICY RECOMMENDATION 7

Capital Access

The Eco-Efficiency Task Force recommends developing innovative financing programs to improve access to capital for small businesses and communities so they may more easily invest in technologies and practices that will use resources more efficiently, product less waste, and add value to local economies.

Rationale

Small businesses and communities face a variety of barriers which prevent straightforward investment in environmental improvements. Without some intervention, the capital market is unlikely to drive the transformation to a sustainable economy. At the same time, the threat of environmental liability prevents some lending institutions from supporting projects perceived to be high-risk. Addressing these access and liability barriers will speed the infusion of capital for eco-efficiency gains. It will free up capital for eco-efficient investments and it will facilitate investors' access to such capital.

Implementation

Below are three innovative techniques to improve access to capital and reduce the financial risk of environmental investments. These techniques, and others, need to be further developed and brought into use.

Initially, government may be involved to demonstrate and support methods to increase access to capital; but the use of public funds should be limited. Eventually, it is expected that the market will come to value the economic benefits of investments in sustainable development and respond accordingly.

Stimulating and Leveraging Eco-Efficient Investments in Small Business

At present, leaders evaluating the creditworthiness of environmental investments typically rely on a fixed set of

qualifying ratios that are a function of the percentages of assets, inventory, and receivables held by the applicant. As a result, high-return investments that cost-effectively improve resource utilization and reduce emissions often do not qualify for funding because their potential benefits are undervalued.

The creditworthiness of cost-effective, environmentally-driven investments, and the inherent value of "avoided costs" (e.g. reduced energy and material use) need to be demonstrated to the lending community. Market incentives should be used to internalize these real, but currently unrecognized attributes. The federal government could help reduce risk by providing loan guarantees for qualifying small business projects. On a pilot basis, the federal government should also develop alternative underwriting standards for eco-efficient investments for small businesses.

EPA-SBA Partnership

The EPA and SBA should identify existing funds that could be made available for small business eco-efficiency investment. The amount of assistance should depend on the expected level of environmental improvement resulting from the project, and the extent to which the project would meet the needs of certain target groups.

During the development of the EPA-SBA "environmental bank," the SBA should also review its existing ranking system to identify opportunities for incorporating sustainable development criteria into its granting and lending equations.

Community Environmental Investment Boards

Community boards should be established to facilitate market-based environmental trades in the private sector and help identify nontraditional sources of capital. Trade receipts could be used in a number of ways to promote community economic development.

The innovative trade package described below resulted in a win-win-win outcome for the environment, the community, and the private companies.

In 1992, the Procter and Gamble company purchased \$1.5 million in pollution credits from Minnesota Mining and Manufacturing, Inc. (3M). 3M then donated these proceeds -- earning a tax write-off -- to Ventura County Community Foundation. With the money, Ventura County established a permanent

revolving loan to fund pollution prevention programs in small industry and government. [14]

Innovative financing and trading programs have the potential to become self-financing. Until that time, funding could be drawn from existing public sources or from savings from the elimination of subsidies, as described in Policy Recommendation 8: Subsidy Reform. Donations from private sector trades could also be used.

The Sustainable Communities Task Force Report contains more detailed descriptions of techniques to increase access to capital for communities.

POLICY RECOMMENDATION 8

Subsidy Reform

The Eco-Efficiency Task Force recommends redesigning or eliminating federal subsidies that fail to incorporate the economic value of natural, environmental, and social resources into the marketplace and into governmental policies. This will help achieve the broader national goals of minimizing subsidies, reducing the deficit, and moving private investment into sustainable processes, products, and practices.

Rationale

Any federal subsidy program should provide a reasonable return to taxpayers. Many federal subsidy programs, however, no longer effectively serve valid public policy goals. Many are economically unjustified, no longer benefiting the target groups or activities that originally needed federal assistance. Many directly conflict with other federal policies and objectives including that of deficit reduction, but continue to exist because of the political efforts of well-organized interest groups. At times these subsidies promote excessive, inefficient, and environmentally damaging use of natural resources.

Eliminating subsidy programs or significantly redesigning them to more accurately target beneficiaries could reduce economic waste and environmental damage. In addition, the federal government could achieve billions of dollars of annual savings. These savings could be used to finance higher priority objectives, such as deficit reduction and tax relief.

Economically inefficient and environmentally damaging federal subsidy programs include: agricultural commodity support programs; various energy research and development programs; various energy research and development programs; investment and operating programs; many road and water public works program; irrigation subsidies; below-cost timber sales and timber road construction expenditures; underpriced mining, grazing, and recreational activities on federal lands; and subsidized flood, crop, and disaster insurance programs. Most of these programs have been the subject of repeated critiques, reform recommendations, and proposals for change by both the Congress and the Executive Branch.

Implementation

- Establish a National Commission to review all major federal subsidy programs to determine whether there is a national need to continue the subsidy. Within 18 months of its charter, the Commission would present to the President a list of subsidies which are no longer necessary. The President would submit the list to Congress and Congress would have 45 legislative days to reject the list. If the list is not rejected, all listed subsidies would be eliminated over a 3-5 year time frame.
- For those subsidies determined to still meet a national need, the Commission would set criteria to be used by the administering agency to bring the program into line with the goals of sustainable development.
- In addition, the validity of these remaining subsidies would be subject to a review every 5 years.

POLICY RECOMMENDATION 9

Revenue-Neutral Tax Shift

The Eco-Efficiency Task Force recommends shifting taxes away from activities that promote economic progress -- such as work, savings, and investment -- toward activities that lead to excessive environmental damage. Such a shift, designed to minimize adverse impacts on vulnerable segments of the population, would promote sustainable development by stimulating economic growth and protecting the environment.

Rational

Government exerts tremendous influence over the direction of economic activity through the tax code. Currently, federal and state governments raise a significant portion of their revenue through taxes on individual and business incomes -- payroll taxes further add to federal revenues.[15] Such taxes discourage work and savings, thereby reducing national income. This, in turn, reduces the ability of the economy to create new jobs, invest in new technologies, and remain competitive in the global market. Therefore, the need exists to change the tax code to advance sustainable economic goals.

It is also recognized that the free market sometimes fails to incorporate the environmental costs of economic activities. This reduces efficiency and may allow excessive levels of environmental damage. Where such activities are dispersed among millions of households and enterprises, the price mechanism may influence behavior more effectively than direct regulation.

At sufficient levels, taxes offer one way of affecting prices in order to discourage activities damaging to the environment. They are an effective way of influencing the behavior of hundreds of millions of citizens: motorists, water and energy uses, trash generators, and users of lawn and farm chemicals, whose activities result in significant environmental problems.

Implementation

Federal, state, and local governments should begin designing and implementing tax policies that better reflect environmental costs and help achieve sustainable development goals.

Although environmental taxes are not, in principle, more regressive than the existing tax structure, they should be designed to minimize adverse impacts on vulnerable segments of the population, and part of the revenue generated should also serve equity considerations. Other revenue should be used to reduce burdensome income, capital, and employment taxes.

[5] For example, see the Clean Air Act of 1970, 42 U.S.C. 7401 et seq. (1994); the Clean Water Act of 1972, 33 U.S.C. 1251 et seq. (1982); The Resource Conservation and Recovery Act (RCRA) of 1976, 42 U.S.C. 6901 et seq. (1994); and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 U.S.C. 9601-75 (1994).

[6] The Pollution Prevention Act of 1990 equates pollution prevention with source reduction and states that pollution should be prevented or reduced at the source whenever feasible, pollution that cannot be prevented or source reduced should be safely recycled, pollution that cannot be prevented or reduced or recycled should be safely treated, and any remaining waste should be disposed of in a manner which is protective of human health and the environment. 42 U.S.C. 13101-09 (1994); see also, Carol M. Browner, Administrator, U.S. Environmental Protection Agency, *Pollution Prevention Policy Statement: New Directions for Environmental Protection* (Washington, D.C., 1993).

[7] U.S. Environmental Protection Agency, *Introducing... The Green Lights Program*, fact sheet, EPA 430-F-93-050, November, 1993; Chemical Manufacturer's Association, *Responsible Care*^R, fact sheet; and Environmental Defense Fund, "Agreement on a Joint McDonald's/EDF Task Force to Address McDonald's Solid Waste Issues," 1 August 1990, reproduced in McDonald's Corporation and EDF Waste Reduction Task Force, "Final Report," April 1991.

[8] Clean Air Act Amendments of 1990, Pub. L., 101-549, 104 Stat. 2399.

[9] California Proposition 65 requires the labeling of pesticides and chemicals which cause cancer or reproductive problems. It is codified as the Safe Drinking Water and Toxic Enforcement Act of 1986, West Annotated Cal. Health and Safety Code 25249.5 et seq.

[10] The Toxic Release Inventory is required by the Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. 11001-50 (1994).

[11] See U.S. Department of Commerce, Bureau of Economic Analysis, "Integrated Economic and Environmental Satellite Accounts" and "Accounting for Mineral Resource Issues and Bureau of Economic Analysis' Initial Estimates," *Survey of Current Business*, April 1994.

[12] Organization for Economic Cooperation and Development, *Environmental Indicators* (Paris, 1994); J.A. Bakkes et al., *An Overview of Environmental Indicators: State of the Art and Perspectives* (Nairobi: U.N. Environment Program, 1994); and Albert Adriaanse, *The Development of Environmental Performance Indicators in the Netherlands* (paper presented to the President's Council on Sustainable Development, Eco-Efficiency Task Force, The Netherlands, May 1994).

[13] See Albert Adriaanse, *Environmental Policy Performance Indicators: A Study on the Development of Indicators for Environmental Policy in the Netherlands* (The Hague: Dutch Ministry of Housing, 1993).

[14] 3M Corporation, *Innovation & Partnership: The Ventura County Clean Air Fund*, fact sheet.

[15] *Statistical Abstract of the United States 1994*, p. 331, table 505 (for federal tax receipts); and p. 307, table 477 (for state tax receipts).

Chapter 3

Summary of Demonstration Projects

Overview of the Efficiency Working Teams

The following sections describe the findings of the Task Force's six demonstration projects: Automobile Manufacturing, Chemical Operations, Cleaning Product Stewardship, Eco-Industrial Parks, Lithographic Printing and other Small Business, and Pollution Prevention Pilot Projects; as well as the Task Force's four policy clusters: Information, Economics, Regulatory, and Money and Management. The work of these teams was instrumental in shaping both the eco-efficiency goals and policy recommendations described in the previous chapters. The demonstration project reports are reproduced in Appendix B.

The demonstration projects were created to supply the "real-world" experience while the policy clusters and the many study papers they produced contributed to the intellectual vitality of the Eco-Efficiency Task Force.

The findings of the demonstration projects and policy clusters do not represent a consensus of thought among Task Force members. They were used for discussion purposes only.

Demonstration Projects

AUTOMOBILE MANUFACTURING

Purpose

The Task Force established the Auto Team to study and improve the environmental performance and eco-efficiency of a key component of automobile manufacturing--auto painting (see Appendix B1). Auto painting was chosen because a significant proportion of the environmental emissions from auto assembly plants come from painting operations. Auto paint shops are also emerging as an economically vital and technologically dynamic component of the industry as the types of paints, the types of auto bodies, and the technologies used to apply the paints continually change.

Methods

A multi-stakeholder team, comprised of industry, U.S. Environmental Protection Agency (EPA), local and national environmental groups, and a national research laboratory

conducted the "life-cycle" study. Life-cycle, in this context, refers to the comprehensive look at the environmental impacts of painting from design through disposal of an auto. The analysis included the manufacture of auto body materials, manufacture of auto paint and coatings, application of paints and coatings to an auto during assembly, auto refinishing, and auto recycling and disposal.

The life-cycle methodology was applied to the General Motors (GM) Lake Orion Assembly Facility located in Orion, Michigan. The Team looked both in the paint booth at the Orion plant for improvements as well as "upstream" where the paint is actually manufactured. The Team gathered data on key environmental inputs such as raw material, energy, and water; and outputs such as air pollution, sludge and filter cakes, and water and organic solvent effluent from equipment cleaning.

Findings of the Auto Team

Through the input/output analysis, the Team confirmed that auto painting is resource-intensive and produces a substantial quantity of recognized pollutants. Up to 95 percent of the smog-producing volatile organic chemicals emitted from an entire assembly plant may come from painting and coating.[16]

Through the engineering analysis, the Team found several ways to save money and reduce emissions. For example, by using water in the painting process twice, rather than once, the cost of waste water treatment at the plant could be reduced by 8 percent and the amount of water needing treatment could be reduced significantly.[17] The Team found that substitutes to the current types of paints used could result in decreased air, water and waste emissions. Water-based, rather than solvent-based paints, and the next generation of powder paints were all investigated by the Team. In addition to the engineering analysis of material, water, and energy inputs and outputs, the Team assessed the plant's programs for environmental management, pollution prevention, chemical management systems, and vehicle design.

The Team also analyzed how much energy it takes to paint a car. GM identified opportunities to reduce energy usage and the costs and emissions associated with it. Fifteen alterations to the plant's paint shop were identified and several of these

COMPONENTS OF THE AUTO TEAM'S ALTERNATIVE REGULATORY SYSTEM

The components of the Auto Team's Alternative Regulatory System (ARS) are:

Sustainability Vision: the ARS must be oriented to achievement of sustainable development goals.
Continuous Improvement: the ARS must encourage firms to continuously improve their environmental performance beyond compliance with applicable aspects of the existing regulatory system as a standard business practice.

Multi-media Approach: the ARS must work across all environmental media to foster whole facility pollution prevention.

Measurement and Reporting Progress: the measurement and reporting tools in the ARS must minimize the generation of redundant or useless information and emphasize information that can identify pollution prevention opportunities and demonstrate that progress toward ARS goals is occurring.

Enforcement and Performance Incentives: the ARS must provide incentives to excel as well as deterrents if goals are not met.

Public Participation: the ARS must enhance public involvement in environmental goal setting.

Life-Cycle Perspective: the ARS must encourage producers to take responsibility for reducing the life-cycle environmental impacts of their products.

Flexibility and Participation Incentives: the ARS must be flexible to promote the most efficient pollution prevention and control investments

Eligibility to Participate: the ARS must be designed to encourage the participation of environmental leaders.

are now under consideration. Four of these have been projected to save enough energy to pay back the cost of making the alteration within one year. If these four changes are made, air emissions associated with acid rain and urban smog will be reduced. In this case, it is projected that 51 tons of sulfur dioxide and 75 tons of nitrogen oxide emissions will be avoided.[18]

Most compelling of the Team's findings was the need for an alternative system of environmental regulation. This system would be designed to redirect resources currently devoted toward compliance into higher return investments such as re-engineering, pollution prevention, and efficiency improvements.

The Team's Alternative Regulatory System (ARS), developed through consensus of the Auto Team, enjoyed broad support of the Task Force members and the Council members. The proposal provided the basis for the Eco-Efficiency Task Force's Policy Recommendation 1: Environmental Management System. This policy was also adopted by the full Council under the theme of "A New System for A New Century."

Recommendations

While the findings of the Auto Team were plant-specific, one can assume that the Orion facility is representative of other auto painting processes, and that the findings could be useful for other plants in the automobile manufacturing sector.

With that in mind, the Team recommended to the Task Force the following measures for improving the eco-efficiency of automobile manufacturing and improving the system of environmental policy and regulation affecting it. These recommendations represent the consensus of the Auto Team participants, including representatives from industry, citizens groups, and leaders in local and national government.

- Implement an "alternative regulatory system" on a plant-specific basis in order to redirect the resources currently devoted to compliance toward innovative re-engineering, pollution prevention, and efficiency improvements.
- Improve material use tracking and accounting mechanisms within and between companies in order to facilitate and advance pollution prevention.
- Broaden the scope of environmental management by involving a life-cycle perspective in order to understand the full impacts and costs of auto manufacturing and to arrive at an optimal plan to improve the sustainability of auto manufacturing.
- Integrate environmental management into central business planning and systems in order to facilitate "eco-efficient" manufacturing.
- Assess and improve the environmental aspect of supplier relationships.
- Develop industry-specific collaborative efforts to develop the necessary life-cycle data base and inventories.
- Combine energy planning with environmental management and merge both into existing best management practices, thereby harnessing the "efficiency" drivers at work in industry today in service of sustainable development.

CHEMICAL OPERATIONS

Purpose

The Task Force chose chemical manufacturing for study in order to learn about issues faced by a large, capital intensive, highly technical, and heavily regulated industry (see Appendix B2).

The task of the Chemical Operations Project Team was to identify opportunities to improve the environmental performance of U.S. chemical companies without thwarting innovation or competition.

Methods

The Team first sketched a profile of the chemical industry, then traced regulatory, technological, organizational, and other factors supporting or thwarting eco-efficiency in the industry. The Team drew up a number of policy options it thought could encourage the establishment of eco-efficiency in the decision-making and core business functions of the industry.

The Team planned to develop further these policy options in an experimental and highly participatory roundtable format that would include representatives of the entire chemical sector. It became apparent, however, that this generalized approach was inappropriate for such a multifaceted and diverse industry.

Instead, the Team learned, the industry could be better understood if divided and studied by type of manufacturing operation, of which there are two: continuous and batch. Continuous operations are used in chemical plants in which millions of pounds of a single commodity or of closely related products are produced annually. Batch operations are used in specialty plants which produce a multiplicity of custom products. These batch plants are typically smaller than commodity operations and are characterized by the ability to respond quickly to new customer specifications.

Understanding this basic division within the chemical industry, the Team convened two separate roundtable discussions to analyze policy options. In addition to corporate and plant-level managers, participants included representatives from government and the environmental community. The first roundtable, focusing on continuous/commodity manufacturing, took place in Houston, Texas and the second, focusing on batch/specialty operations, in Newark, New Jersey.

Findings

The roundtable discussions were very candid. "Inflexible, complex, and technology-based environmental laws and regulations" were identified as the greatest barriers to the adoption of eco-efficiency improvements by the chemical industry. Industry participants contended that the marginal benefit of certain environmental regulations fails to justify the

cost of the resulting incremental environmental gains and that these regulations drain the limited pool of resources that are available to spend on environmental improvements.

In some cases, the roundtable revealed, companies are reluctant or unable to make eco-efficient improvements because of the dominant regulatory orientation toward compliance and deadlines rather than toward overall environmental performance and risk reduction. According to one large chemical company in Texas, for every seven people working on environmental compliance, they have three people working on prevention.

In another example of regulatory barriers to eco-efficiency, a Louisiana chemical plant testified it was unable to undertake pollution prevention improvements because the only way of achieving the numerical standards in the governing regulations was through end-of-pipe treatment. The plant's own preferred approach--source reduction--would avoid a media-transfer (as contaminant is transferred from water to land) that the plant now must undertake in order to comply with regulatory standards. In this case, compliance with existing effluent guidelines for clean water prevented a cleaner and cheaper approach.

Recommendations

Such discussions clarified a number of important issues, particularly the need for performance-based goals and for increased operational flexibility. These findings, coupled with the Team's own in-depth assessment of regulatory barriers to eco-efficiency, were instrumental in shaping the final Task Force recommendation on a new Environmental Management System (Policy Recommendation 1).

The Team made the following recommendations to the full Task Force:

- Create more flexible, effective environmental standards that are based on environmental risk and sound science, focused on entities' environmental performance, written clearly and concisely, and drafted with a multi-media and facility-wide focus.
- Create environmental programs that allow more flexible implementation and operation, with a focus on promoting good environmental performance through flexible permit programs, compliance assistance, and increased delegation to the states.

- Encourage greater communication and understanding among stakeholders to build trust by establishing formal mechanisms for ongoing dialogue and public involvement.
- Establish tangible rewards for facilities that operate at high environmental performance levels, such as permit review prioritization, less burdensome monitoring and recordkeeping requirements, and public acknowledgment of facilities' high performance.
- Establish industry-wide incentives and promote the use of certain tools that encourage facilities to continuously improve their eco-efficiency through the use of marketable pollution credits and the promotion of research and development into eco-efficient technologies.

CLEANING PRODUCT STEWARDSHIP

Purpose

The Cleaning Product Stewardship Project Team was established to assess opportunities for pollution prevention and product stewardship in the design, manufacture, application, reuse, recycle, and disposal of commercial cleaning products (see Appendix B3).

Methods

The Team took an in-depth look at how cleaning products are made, how they are applied, and how these processes could be improved. It used a survey and interviews with chemical manufacturers, distributors, marketers, building cleaning contractors, building owners and managers, and cleaning personnel to find where the greatest opportunities lie for encouraging shared responsibility for environmental stewardship.

Findings

The Team uncovered a number of issues that do not typically appear in the headlines -- information flow, communication, trust, and individual responsibility. It found the lack of an easy, agreeable, and measurable definition of eco-efficiency impedes progress toward industry-wide environmental, health, and safety improvements. The Team discovered opportunities for all who operate within the cleaning products stream of commerce to improve performance. These ranged from the

way basic chemicals are formulated to the way they are mixed with water and applied to walls, floors, or windows.

Often information flow is the most significant barrier to eco-efficiency in the cleaning products industry. Within their product development units, manufacturers and methodologies to compare the environmental preferability and efficacy of alternative products and processes. Once a product is manufactured, environmental information needs to be relayed adequately between each link in the chain of commerce, from maker to purchaser to end-user. For instance, information on safe and effective use of products may not reach the cleaning personnel, or if it does, may not be in a useful form. Directions for use, pasted on bulk containers, may not be transferred to the spray bottles actually employed by staff to apply a product. Directions may be printed in a language the user does not understand.

In many industry sectors, the price signal provides a strong incentive for reducing the volume of material use. In the commercial cleaning products industry this is not so. Dollars spent on cleaning agents typically have little effect on overall profitability, so little financial incentive exists to minimize their use. It appears that in some cases greater environmental improvement comes not from reducing the amount of cleaning agents used, but in reducing hot water and other components of the cleaning process.

The Team also found that complications within the current regulatory system may stifle the adoption of eco-efficient practices. Inconsistent, confusing, or redundant regulations could be minimized with better communication and more participatory goal setting among local, state, and federal governments.

Recommendations

The findings of the Cleaning Products Stewardship Project were most influential in formulation of the Task Force Recommendation 2, Extended Product Responsibility, and also affected the full Council's policy on Product Stewardship.

The Team made the following recommendation to the full Task Force:

- Create a partnership to promote eco-efficiency. An industry-led coalition should be formed that would review the eco-efficiency of building cleaning processes in order to develop and implement a plan for extending eco-efficiency throughout the chain of

commerce. The coalition should include members from the entire building cleaning chain of commerce and should base its work on the life-cycle perspective.

- Improve communication to provide exchange of information on environmental, health, and safety issues between cleaning personnel and the rest of the chain of commerce.
- Reform regulations to promote better eco-efficiency. Regulations should be nationally consistent and performance oriented, and should lend appropriate consideration to the full product life-cycle.
- Promote the development and implementation of building maintenance manager programs to reduce the environmental, health, and safety impacts of building cleaning processes.

ECO-INDUSTRIAL PARKS

Purpose

The Eco-Industrial Park (EIP) Project Team was established to investigate the practical application of ecological principles to industrial activities and community design (see Appendix B4). In designing its project the Team assumed that economic growth, job opportunity, and global competitiveness can be enhanced through the adoption of business practices that protect the environment.

The concept of an eco-industrial park stems from the emerging discipline of industrial ecology. This new spin on old science suggests that industrial activities are interconnected just as individual organisms are in biological systems. In the industrial setting, waste from one process becomes food for the next, enabling optimal energy and material efficiency utilization throughout the system.

By collectively managing environmental and energy issues, eco-industrial park members seek to enhance their environmental and economic performance and, as a result, achieve a combined benefit that is greater than the benefits each company would realize from optimizing only its individual performance.

Methods

The Team worked with four demonstration communities in Chattanooga, Tennessee; City of Cape Charles and

Northampton County, Virginia; Brownsville, Texas/Matamoros, Mexico; and Baltimore, Maryland. These communities were selected because of their unique circumstances and differing approaches to eco-industrial park development.

Findings of the Eco-Industrial Park Team

Based on its work with the four demonstration communities, the Team found that community participation and support are perhaps the most critical determinant of successful EIP planning and development. Because each community has a unique demography, geography, and culture, community participation is vital to the development of screening criteria for potential park participants.

The Team also determined that environmental regulations regarding clean-up liability for past or present contamination may lead to the deterioration of abandoned properties rather than encourage the redevelopment of such "brownfield" sites. Liability risk was also found to be a significant concern of prospective eco-industrial park business tenants. Specifically, potential businesses are concerned that common waste treatment systems operating within a park system may give rise to joint and several liability under Superfund regulations.[19]

Other regulatory barriers to the development of eco-industrial parks stem from inflexibility in permitting procedures. A systems approach to development requires a new definition of source -- no longer is a discrete facility the unit of inquiry, but rather a system of interconnected, symbiotic facilities.

The Team also identified limited access to capital as an obstacle to the proliferation of ecologically designed industrial parks. This occurs because some of the potential benefits of investing in an ecological industrial park such as greater resource efficiencies and reduced environmental emissions are undervalued in existing loan qualification ratios. Inadequate infrastructure is also a barrier to the rapid development of these environmentally-designed business complexes.

Site Descriptions

Each of the four eco-industrial park demonstration communities are briefly described below.

Baltimore, Maryland, Fairfield Eco-Industrial Park

The Fairfield Eco-Industrial Park is a brownfield located within the Baltimore City Empowerment Zone (see Appendix

B4.1.). With seed money from the Empowerment Zone program, a recent anti-poverty initiative which granted \$100 million to nine communities across the country, the City of Baltimore leveraged an additional \$800 million from private sources to invest in the city. Development of the Fairfield eco-industrial park site is part of this promising strategy.

The park will utilize closed-loop production/operation systems to maximize resource use and minimize environmental degradation. The system's hub will be a resource recovery plant where waste tires will be removed and processed, and the steel cycled back to Bethlehem Steel, located across the harbor. Cooperating with Cornell University's Work and Environment Initiative, park management will ensure that the best human resource and industrial relations practices are used within the park.

Brownsville, Texas/Matamoros, Mexico

The Brownsville site is located on the border of Texas and Mexico in the Rio Grande Valley -- a region which has some of the hemisphere's most severe environmental problems due to rapid industrialization (see Appendix B4.2.). The eco-industrial park was envisioned as a prototype to develop and diffuse innovative, cost-effective technologies and practices that could promote sustainable industrial development along the U.S.-Mexico border. Work with the City of Brownsville has also offered the opportunity to link with the Environmental Defense Fund's eco-industrial park project in Matamoros, Mexico.

The first phase of the project is a quantitative analysis of the anticipated economic and environmental benefits of co-locating manufacturing facilities, or locating them in close enough proximity to physically share material inputs and outputs, reduce transportation costs, and jointly manage the park. The second phase involves testing the model at the site.

City of Cape Charles/Northampton County, Virginia

The Cape Charles Eco-Industrial Park Site is located on the Eastern Shore of Virginia in Northampton County (see Appendix B4.3.). The park was initiated by the local community of 1000 residents as part of an aggressive effort to overcome the region's severe poverty while protecting its acclaimed environmental resources. Among other treasures, the region includes one of the most important East Coast flyways for neotropical migratory songbirds.

The EIP will house agriculture, aquaculture, and food processing plants that will cycle the byproducts of one industry into the raw materials for another.

Chattanooga, Tennessee

The South Central Business District site is a 100-acre brownfield which now houses both abandoned and operating foundries, dilapidated and active commercial buildings, and worker housing and vacant lots (see Appendix B4.4). Plans for this site include a zero-emissions manufacturing zone, an urban ecology center, a community stadium, and an environmental technology complex. The United Nations University Research Institute has also expressed interest in locating within the Eco-Industrial Zone which will act as a catalyst for recruiting new businesses, as well as facilitate the transfer of new ideas and technologies.

In an effort to make a business out of its environmental leadership, the city has been exploring the development of eco-industrial parks in the context of an overall economic, environmental, and social revitalization plan. RiverValley Partners, the city's economic development organization, surveyed existing and prospective businesses and identified the need for a diversity of development options, which included reclaiming "brownfield" sites in the inner city, new industrial parks that reinvent the traditional notion of industrial parks, and zero emissions/eco-industrial parks that pair manufacturing facilities in an almost symbiotic relationship.

Recommendations

The EIP Team's discovery of significant liability and capital access barriers shaped the Task Force's Policy Recommendation 6: Facilitating Capital Access. The Team also helped demonstrate the need for an improved Environmental Management System (Policy Recommendation 1). Under this system, communities could be "bubbled" in a new way for flexible permitting and other regulatory matters.[20]

The Team made the following policy recommendations for consideration by the full Task Force:

- Environmental regulatory systems must be flexible enough to allow park participants to trade their waste products so that environmental goals can be reached in the most cost-effective way for the entire park.

- Federal, state, and local governments should coordinate and streamline their regulatory requirements.
- One-stop networks or centers should be established so that communities interested in developing EIPs can easily obtain regulatory, technical, and financial assistance information concerning federal, state, and local requirements.
- Environmental goals for EIPs should be developed through a participatory process involving all community stakeholders.
- Market incentives should be used widely in the encouragement and management of eco-industrial parks to enable cost-effective environmental protection within parks.
- Barriers to investment in eco-industrial parks, including liability and capital access, must be removed to promote ecologically sound park development.
- Information must flow openly between industry, government, and the community.

CHATTANOOGA'S PRINCIPLES OF SUSTAINABLE DESIGN:

Connections: Establish physical links using transit, greenways, streets, open spaces, and the river.

Catalysts: foster development through the spin-off of major projects such as the new stadium, trade center, and warehouse row.

Diversity: mix uses -- "nature loves diversity." For example, diversity in housing would include loft conversions, multi-family development, student housing, and single-family homes located in the same area.

Synergy: use land in a complementary manner. For example, stadium parking should be configured to encourage smart development and investment in the surrounding area.

Urban Character: build upon the area's unique historic character, including its industrial legacy. For example, the scale, rhythm, and craftsmanship of many buildings in the area should be treated as valuable resources and leveraged to attract investment.

Public Investment: invest in the area wisely to leverage other amenities. For example, investment in public spaces and services will make the location more desirable for new businesses.

* * *

The Small Business Job Engine

- 62 percent of the net new jobs in the United States come from firms with less than 500 workers.
- Firms with less than 20 workers employ only 21 percent of the labor force, but provide 48 percent of new jobs. [21]

LITHOGRAPHIC PRINTING AND OTHER SMALL BUSINESS

Purpose

Small businesses generally operate with both narrow profit margins and low production volumes. These factors make small businesses especially vulnerable if economic and environmental objectives conflict.

The task of the Printers/Small Business Team was to identify policy changes that could reduce such conflict and help small businesses meet or exceed their environmental and health protection responsibilities while at the same time improving their economic competitiveness.

Methods

The Team conducted three separate investigations of specific, small-business dominated industrial sectors:

The Great Printers Project, sponsored by the Environmental Defense Fund, Council of Great Lakes Governors, and Printing Industries of America, focused on the lithographic printing industry in the Great Lakes Region;

The Sustainable Industry Project, sponsored by the Environmental Protection Agency, looked at photo-imaging, metal-finishing, and thermoset plastics manufacturing; and

The Small Business Forum on Regulatory Reform, an interagency effort coordinated by the Small Business Administration and Office of Management and Budget, considered the chemicals and metals, restaurants, food processing, trucking, and environmental disposal and recycling services industries.

Despite the variety of sponsors and industries, these projects resulted in strikingly similar findings on how to improve environmental and competitive performance in all nine small business sectors studied.

Findings

Communication is often the most significant barrier to improving the environmental performance of small businesses. They have difficulty obtaining information on regulatory requirements, available technologies, and available technical and financial resources, in part because many small firms do not belong to trade associations and lack environmental staffs.

This lack of compliance assistance reduces the environmental performance of small businesses. They are often unsure about the applicability of multiple federal, state, and local regulations, and the arcane language of regulations exacerbates this problem. Businesses may simply not understand the core regulatory requirements and how to comply, much less how to exceed those requirements.

The Team found small businesses using their limited resources to decipher new environmental rules and to report redundant information. These resources could better be devoted to pollution prevention and source reduction efforts. However, a lack of technical expertise further hinders adoptions of these eco-efficient practices.

A related finding is that a piecemeal and medium-specific regulatory structure often results in piecemeal, medium-specific solutions. If firms were instead presented with their regulatory requirements simultaneously, they would be more likely to find solutions to more than one regulatory requirement at a time. This would improve the cost-effectiveness of small business compliance efforts.

One innovative compliance aid, developed by the Great Printers Project, is a software program that walks print shop owners and managers through all the regulatory requirements and illustrates possible pollution prevention options.

Access to the capital needed for environmental improvements can also be problematic for small businesses. Conventional leaders may view small businesses as inherently risky and may fear potential liabilities associated with underwriting new techniques or technologies.

The Team found that businesses often have a limited understanding of the environmental impact of their operations. Their attention is necessarily devoted to the demands of their customers, which usually are not governed by environmental considerations. At the same time, suppliers often lack an understanding of the needs of their small business customers regarding environmentally superior products.

Finally, the Team found that good environmental performance on the part of small businesses is neither recognized nor rewarded. There is a lack of positive incentives for firms to improve their environmental performance or to go "beyond compliance" (i.e., beyond the minimum environmental regulatory requirements).

Recommendations

The Team found numerous ways in which small businesses can be helped to improve environmental performance and economic competitiveness. Five priority recommendations the Team distilled from its findings directly shaped the Eco-Efficiency Task Force's Policy Recommendation 1: Environmental Management System, and Policy Recommendation 6: Facilitate Capital Access. The Team also developed an implementation action plan for its five priority recommendations.

The Small Business Team recommendations are:

- *Improve regulatory effectiveness.* Federal, state, and local officials can make the regulatory process more effective by:

- blocking piecemeal legislation designed for large facilities and focused on specific environmental media, which can hinder coordination among EPA program offices and among federal agencies on regulatory issues;

- communicating regulatory information in plain English and organizing regulations by industry operation rather than by environmental statutes; and

- avoiding redundancies, inconsistencies, and confusion in reporting and permitting requirements.

- *Use enforcement to improve performance.* Enforcement is not the end; it is the means to improve environmental performance. Federal and state enforcement efforts can be made more efficient and effective as incentives to better performance by:

- targeting the facilities with the worst problems;

- familiarizing inspectors with the industry they are inspecting;

- conducting multi-media, multi-program inspections; and

exploring innovative ways to level the playing field between states.

- *Use the customer service approach.* Federal and state agencies should adopt a customer service approach when implementing pollution prevention and compliance assistance activities. Though the product of multiple levels of government and of other interested parties, the assistance and information in small business customers receive should be provided in a unified manner.
- *Participatory goal setting.* Companies, regulators, and environmental organizations should work together to define environmental performance goals for industries. Participatory goal setting that results in consistent, accepted standards for environmental performance, is a pathway to environmental improvement, and can also be a potent marketing tool for companies.
- *Improve communication "upstream" and "downstream."* Improved communication among suppliers/distributors, manufacturers, and end-users/customers encourages environmentally sound products and practices by:

helping businesses better understand how to minimize the environmental impact of their job specifications; and

helping suppliers understand and address the environmental needs of manufacturers.

Pollution Prevention Pilot Project

A related project is the Pollution Prevention Pilot Project. This project is a joint effort undertaken by representatives of the environmental community, industry, and government. The objective of the project is to determine whether, and under what circumstances, facility-specific environmental

management can be accomplished with greater benefits at lower cost in a credible, enforceable, and predictable manner. It is examining the lessons learned and is recommending the appropriate steps that should be taken by environmental policy makers.

Core group members include the Natural Resources Defense Council, Amoco Corporation, Dow Chemical Company, Rayonier, Monsanto Company, and the New Jersey Department of Environmental Protection.

[16] See Appendix B1, *PCSD Auto Team Report*, p. 8.

[17] *Ibid.*, p. 28.

[18] *Ibid.*, p. 24.

[19] Joint and several liability under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), or "Superfund," means that companies may be found liable for entire cleanup costs even if only contributing to a portion of the problem.

[20] "Bubbling" derives its unusual name from the treatment of multiple emission points as if they were contained within an imaginary bubble, regulating only the amount leaving the bubble. Currently used in the Clean Air and Clean Water Acts, these bubbles can be extended to include not only emission points within the same facilities, but emission points in facilities owned by other entities as well.

[21] Small Business Administration Economic Research Division.

[22] US Department of Commerce, Bureau of the Census, *Census of Manufacturing* (Washington, DC: Government Printing Office, 1995), p.13.

CHAPTER 4

Summary of Policy Clusters

OVERVIEW

The demonstration projects, described in chapter 3, based their findings on studies of conditions in particular industrial sectors. The policy clusters discussed in this chapter took a more theoretical and analytical view of issues that might be common across all industrial sectors. Using this approach the Task Force sought to ensure that its final policy recommendations were both realistic, when applied to specific cases, and generally applicable.

The Task Force established four policy clusters: Information, Economics, Regulatory, and Money and Management. Option papers were solicited from experts in fields relevant to each of the four clusters.

Unlike the findings of the demonstration projects, the policy cluster papers were not the product of a balanced team of participants, nor were they indicative of Task Force consensus. Instead, the twenty-four papers were intended to provide the Task Force with provocative and diverse points of view. The ideas contained in the papers sparked discussion among Task Force members and enriched the nine policy recommendations of the Task Force.

Appendix C contains a summary of each paper and lists the authors and their organizations.

THE INFORMATION CLUSTER

The idea of information as a field of study is uniquely modern. Yet information is embedded in the most basic of social and economic activities. In the marketplace, information is an integral component of price signals. It also influences consumer decisions unrelated to price. In a regulatory context, information allows for establishment of realistic and practical goals; and through information, progress toward those goals is measured. The Information Cluster delved into these specific ideas and commissioned a number of policy options papers for more in-depth analysis.

The Information Cluster began with the thesis that information is a component of the price signal, and the price signal is important to behavior change. Improving the collection and dissemination of information about the total life-cycle costs of a product should, therefore, result in a more accurate price

signal being sent to the market. To the extent that environmental and social costs begin to be more properly accounted for by this improved information flow, the development and diffusion of eco-efficient products, processes, and practices should be triggered.

Information plays a larger role in the marketplace, because consumer behavior is not solely based on price. Emotional, philosophical, or aesthetic factors also affect choice. Therefore, providing information to consumers about the environmental benefits or risks associated with the manufacture, use, or disposal of a product may encourage a shift toward more eco-efficient consumption.

Information also emerged as a key element in performance-based environmental management. Accurate and reliable information is a prerequisite for evaluating performance. In the same way that advanced satellite technology improved US ability to be well informed about the weapons capabilities of the Soviet Union and thereby contributed to our nation's confidence in entering into arms agreements; improved information about environmental performance will strengthen the partnerships recommended under the new management regime. One member of the Task Force even borrowed from the language of arms control in noting that the next generation of environmental regulation would be based upon the principle of "Trust, but verify."

In addition to these ideas about the relationship between information and eco-efficiency the Information Cluster developed so many others that the improvement of information collection and dissemination became stand-alone Task Force Policy Recommendation 4: Information Collection and Dissemination. The theme of improved information--within manufacturing entities, between sources of supply and demand, and among regulators, the public, and business--is also threaded throughout most of the other eight recommendations.

ECONOMICS CLUSTER

The Economics Cluster surveyed the ways that market mechanisms can encourage the adoption of eco-efficiency. In some cases, the market itself produces environmental

improvements, but in others the market fails to value natural and cultural resources. When such market failures occur, governmental involvement may be necessary to assist in regulating the cleanliness of the environment or the rate of resource consumption. The Economics Cluster evaluated the thesis that intentional use of market mechanisms can be an efficient and cost-effective way to protect the environment, enhance social well-being, and safeguard competitive advantage.

The Economics Cluster examined both macroeconomic instruments--such as emissions trading, user fees, and information programs--and macroeconomic instruments--such as subsidy reform and tax shifts. It commissioned a series of papers exploring the application of economic instruments to achieve environmental goals. These papers are summarized in Appendix C.

The Economics Cluster determined that each economic instrument has its particular advantages and disadvantages--it can be effective in dealing with some aspects of a problem and less so with other aspects. For example, because economic instruments may confer property rights and allow the market to allocate responsibilities, these policies may have effect of legitimizing rather than stigmatizing pollution.

The Economics Cluster also learned that not only are efficiency gains important in the design of economic instruments, but so too are equity concerns. Preservation of economic and social equity--who pays for mitigation costs and the acceptability of risk and benefit distribution-- also had to be considered in the design and selection of economic policy options.

Recommendations

The Economics Cluster found that economic instruments can be powerful incentives and made the following recommendations for their use:

- Change the standard of economic success by improving national income accounting.
- Modify U.S. tax and spending policy.
- Promote an environmentally sensitive international development policy, adopting sector strategies to align economic and environmental objectives with particular focus on the agriculture, transportation, and energy sectors.

- Make greater use of economic incentives in environmental regulation.
- Apply an industry-specific approach to environmental protection.

These and other fruits of the Economic Cluster's discussions appear in the Task Force goals and in its final recommendations, particularly Policy Recommendation 3: Market Incentives.

REGULATORY CLUSTER

The Regulatory Cluster was a crucial breeding ground for the first two of the Task Force recommendations: performance-based environmental management system and extended product responsibility.

The Regulatory Cluster noted that although the current regulatory system has made great progress in reducing environmental pollution, it does not always operate in the most efficient and cost-effective manner. For example, the current system controls environmental pollution using a medium-specific approach, regulating cleanup of discharges into waterways separately from discharges into the air. This medium-specific approach orients decision-makers to end-of-the pipe pollution control and clean up strategies, yet such solutions are often costly and are divorced from core business functions.

In addition, the current system tends to seek compliance by using sometimes complicated and rigid regulatory requirements. An alternative system would maximize environmental performance as a potential means for gaining competitive advantage. Such an approach could produce eco-efficient pollution prevention and resource conservation opportunities that may go unrecognized under the current regulatory framework.

These Regulatory Cluster findings were corroborated by those of the Demonstration Projects, every one of which cited some aspect of the current regulatory system as an inhibitor of eco-efficiency. For example, the Auto Team reported that, absent an alternative system of environmental regulation, eco-efficiency advancements in the automobile manufacturing sector will be "incremental." The Auto Team stressed that, "to realize the full innovative potential of the industry, which is currently directed at compliance, an alternative system of environmental regulation is needed."

The Regulatory Cluster developed options papers aimed at reforming and reorienting the current regulatory system to encourage the adoption of eco-efficiency improvements such as sustainable work practices. Its goal was to define the general parameters of an alternative to the current regulatory system that would provide both a cleaner environment and cheaper compliance costs and where consistent achievement of higher environmental standards would be balanced by a more flexible and holistic regulatory regime. To that end, Regulatory Cluster members drafted five options papers which have been summarized and included in Appendix C.

Many of the options that emerged from the Regulatory Cluster were merged with the work of the Auto Team's "Alternative Regulatory System." This combined proposal in turn provided much of the basis for Task Force Recommendation 1: Environmental Management System.

MONEY AND MANAGEMENT CLUSTER

The Money and Management Cluster was established to study new models of financing and managing eco-efficient decision-making.

The Money and Management Cluster recognized that transition to an eco-efficient society will at times require larger societal intervention. In addition, it recognized that small businesses and communities suffer from a variety of capital access problems which hinder their investment in eco-efficiency improvements. As a result, one set of examined policies included those that structure alternative capital markets to provide capital for investment in eco-efficient improvements and those that facilitate entities' access to such capital.

The Money and Management Cluster also explored extended producer and consumer responsibility. Using post-consumer waste as the focal point, it explored options for shifting the cost for waste management from local governments to consumers and producers. The objective of this shift, according to its proponents, is to prompt the development of eco-efficient products and packages.

The ideas of the Money and Management Cluster translated into a number of the Task Force final recommendations, including Policy Recommendation 2: Extended Product Responsibility and Policy Recommendation 6: Facilitating Capital Access.

Eco-Efficiency Task Force Membership

The Eco-Efficiency Task Force membership consisted of eleven principal Council members each of whom was supported by a liaison and one or more staff persons. Thirteen additional members were added to the Task Force to increase its diversity and representation.* The Eco-Efficiency Task Force members also created a number of subcommittees to work on demonstration projects and policy papers bringing total Task Force participation to nearly 200 people. Task Force members are listed below. Participants on Task Force subcommittees are listed in Appendices C and D.

Council Member	Additional Members	Principal Liaison	Working Group Member
Carol Browner, Administrator U.S. Environmental Protection Agency		David Gardiner, Assistant Administrator for Policy, Planning and Evaluation U.S. Environmental Protection Agency	Lea Swanson, Special Assistant Office of Policy, Planning and Evaluation U.S. Environmental Protection Agency
	Scott Bernstein President, Center for Neighborhood Technology		
	Ben Cooper Vice President, Governmental Affairs Printing Industries of America		
A.D. "Pete" Correll Chairman and CEA, Georgia- Pacific Corp.		Susan Vogt, Director Environmental Policy, Training and Regulatory Affairs, Georgia-Pacific Corp.	Patricia Hill, Georgia-Pacific Corporation Steve Correll, Director Pollution Prevention, Georgia- Pacific Corporation Sergio Galeano, Director Environmental Management Georgia-Pacific Corporation
	Deeohn Ferris, President, D.C. Office of Environmental Justice		
Fred Krupp, Executive Director, Environmental Defense Fund		Marcia Aronoff, Deputy Director for Programs, Environmental Defense Fund	Kevin Mills, Director Pollution Prevention Alliance, Environmental Defense Fund
D. James Baker, Under Secretary, National Oceanic and Atmospheric Administration, U.S. Department of Commerce		John Ballard, Director Office of Sustainable Development, NOAA U.S. Department of Commerce	Rebecca Moser, Special Assistant to the Under Secretary of Oceans and Atmosphere, NOAA U.S. Department of Commerce

Council Member	Additional Members	Principal Liaison	Working Group Member
	Ben Henneke, President, Clean Air Action Corp.	Herb Beattie, Director of Corporate Development, Clean Air Action Corporation	
Dick Barth, Chairman and CEO, Ciba-Geigy Corporation		John Mincy, Vice President, Safety and Environmental Affairs, Ciba-Geigy Corporation	Glenn Ruskin, Manager of Federal Legislative Affairs Ciba-Geigy Corporation
	Hubert H. "Skip" Humphrey III Attorney General, Minnesota Attorney General's Office	Lee Paddock, Assistant Attorney General, Minnesota Attorney General's Office	Barbara Freese, Assistant Attorney General, Minnesota Attorney General's Office
Ronald Brown, Secretary, U.S. Department of Commerce		Jeffrey Hunker, Senior Advisor to the Secretary U.S. Department of Commerce	
	Sherri Goodman, Undersecretary for Environmental Security, U.S. Department of Defense	Carole Parker, Director Pollution Prevention Staff U.S. Department of Defense	
		Howard Klee, Director Regulatory Affairs, Environment, Health and Safety Department, Amoco Corporation	Karen St. John, Washington Office, Amoco Corporation
William Hogle, Executive V.P. (Retired), General Motors Corporation		Dennis Minano Vice President, Environmental and Energy Staff, General Motors Corporation	Robert J. Phillips Director Plant Environment, General Motors Corporation Judith Mullins Director, Environmental and Energy Policies and Programs General Motors Corporation
	Susan Maxman Former President, American Institute of Architects	Bob Berkebile, Associate, American Institute of Architects	
Samuel C. Johnson Chairman, S.C. Johnson & Son, Inc.		Jane M. Hutterly Vice President, Environmental & Safety Actions - Worldwide S.C. Johnson & Son, Inc.	F.H. "Chip" Brewer, Dir., of Government Relations, S.C. Johnson & Son, Inc. Kenneth Alston, Manager of

			Global Product Responsibility S.C. Johnson & Son, Inc.
Council Member	Additional Members	Principal Liaison	Working Group Member
Edgar Miller, Director of Policy and Programs, National Recycling Coalition			
	Mike Pierle, Vice President Corporation Stewardship, Environment, Safety & Health, Monsanto Company	Mike Berezo, Director Environmental Strategy	
David T. Buzzelli, Vice President and Corporate Director Environment, Health & Safety and Public Affairs The Dow Chemical Company		Ben Woodhouse Director Industry Issues The Dow Chemical Company	Jerry B. Martin Director Corporate & North American Environmental Affairs for Operations The Dow Chemical Company
Hazel O'Leary Secretary U.S. Department of Energy		Dirk Forrister, Special Assistant for Policy U.S. Department of Energy	Marc Chupka, Director Office of National Energy Policy Plan; U.S. Department of Energy Denise Swink, Deputy Assistant Secretary for Industrial Technologies U.S. Department of Energy
	Robert N. Stavins Associate Professor of Public Policy Harvard University		
	Tom Rogers Former Commissioner Santa Barbara County, California	Scott Halliday Santa Barbara County, California	
President INFORM, Inc.	Warren Muir Senior Fellow for Chemical Hazards Prevention INFORM, Inc.	Bette Fishbein Senior Fellow Sustainable Products and Practices INFORM, Inc.	
	Pam Reed Commissioner Texas Natural Resource Conservation Commission	Joe Youngblood Section Manager for Environmental Technology Cooperation Program Texas Natural Resource Conservation Commission	

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In addition to the efforts of the Council members, Task Force participants and their staffs, the work of the Eco-Efficiency Task Force would not have been possible without the financial and in-kind support of corporations and philanthropic organizations who contributed directly to the Keystone Center, which reported the following contributors as of October 16, 1995:

Browning Ferris Industries
Chevron Corporation
Ciba-Geigy
General Motors Corporation
Johnson & Johnson
SC Johnson Wax
Charles Stewart Mott Foundation

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Special thanks are also in order for the co-chairs of the goals committee: Jane Hutterly, Richard Morgenstern, and Warren Muir.

Finally, special thanks to the Eco-Efficiency Task Force Coordinator, Julie Frieder; writer Robert Schwalbach; key facilitator Kevin Curtis; and the many other individuals who contributed to the Task Force process and product:

Chuck Bogan	Holly Lynch
Sue Dies	Jan McAlpine
Debbie Eakin	Steve Ryan
Dawn Ehrlenson	Any Schmidt
Frank Farfone	Stewart Schwartz
Sandy Grace	Sarah Walen
Holly Henning	Greg Wedemeyer, Jr.
David Levine	Elfranko E. Wessels

APPENDIX A

GOALS AND INDICATORS OF PROGRESS

The following goals and vision statement have been developed by the Eco-Efficiency Task Force (EETF) over several months of deliberation and are presented to the President's Council on Sustainable Development (PCSD) as a consensus product of the EETF. There are several key assumptions that underlie both the document and the consensus support of the members for the goals.

- The six goals are presented as a comprehensive package. They are closely interrelated and are not designed to stand alone.
- The goals are national in scope and are designed to provide for the maximum flexibility of all parties in achieving them.
- The indicators of progress are designed to provide quantitative snapshots of the progress the country is making towards achieving the goals. They are not intended be "top-down" mandates and it is recognized that they may change over time as the country moves towards these goals and learns more about the science and policy options underlying them. Further, many of the indicators of progress are currently not measurable in any robust manner and will require a full and open developmental process to identify the measures as the necessary first step towards their utilization.*

In order to provide a context for the goals and to better define the ends they are designed achieve, the EETF developed the following vision statement:

The U.S. economy shall produce and use globally competitive goods and services while achieving environmental and social goals. This vision will result in a transition to an economy in which the constituents (e.g., people and businesses) provide for their needs and those of future generations

through efficient and environmentally responsible practices.

** Since specific targets may vary between industries, the Task Force decided not to set specific numerical targets in some cases, as indicated "[" or "%."*

RESPONSIBILITY GOAL

Context Statement

Individuals, through their actions, choices, and decisions, have been and will continue to be the foundation upon which our society and economy are built. Therefore, eco-efficiency must become a widely held societal value in order to capture the significant societal, economic, and environmental improvements offered by sustainable development. Only when each individual and each sector (business, government, environmental organizations, academic institutions, labor, etc.) understand and value eco-efficiency will the full impact of the concept be realized.

To encourage and support broad, personal commitment to eco-efficiency a number of changes must occur. AR entities and individuals must strive to identify sources of environmental, economic, and social consequences associated with materials inputs, production processes, distribution, use, and subsequent management. This will require changes in the areas of: education; the management practices of all organizational entities; individual as well as community knowledge and involvement, and governmental regulatory, fiscal, and tax policies.

Goal

To act collectively and individually in ways that contribute to eco-efficiency and sustainable development through better understanding and communication of the environmental, economic, and social consequences of our actions.

Indicators of Progress

- Primary and secondary school curriculum incorporating the concept of eco-efficiency will be developed by 2000. Such curriculum will be incorporated into the programs of [50%] of all schools by 2005 and [100%] of all schools by 2010.
- Professional and continuing education curriculum incorporating the concept of eco-efficiency will be developed by 2000 and incorporated into all appropriate programs by 2010.
- Individual consumer adoption of this goal will be aided and measured through

A standardized product information system developed by 2000.

An increase in the market share of eco-efficient products and/or those manufactured in a sustainable manner for each year through 2010 and achieving a majority of the category's market share by 2010.

- To assure a closer working relationship between facilities (public and private) and communities, appropriate communication and involvement techniques and practices will be adopted by [25%] of all facilities by 2000 and by [50%] of all facilities by 2010.
- Environmental management systems (including audits) appropriate to a facility will be adopted by [25%] of all facilities with over 10 employees by 2000 and [75%] of all facilities with over 10 employees by 2010.
- By 2000, [50%] of all adults will have a basic understanding of the environmental, economic, and social consequences of their actions; by 2010, [75%] of adults will have this understanding; and by 2025, [90%] of adults will have this understanding.

ECONOMIC GROWTH GOAL

Context Statement

Continued, long-term economic growth is essential to the prosperity of the United States and is fundamental to sustainable development. Maintaining this economic growth as the United States transitions to sustainability is a critical challenge. An important component of this transition is the inclusion of previously undervalued natural, environmental, and social resources into a new definition of economic well-being.

Goal

To maximize economic growth in the expanding global marketplace as measured through a newly established Sustainable National Product that fully accounts for social and environmental externalities.

Indicators of Progress

- A Sustainable National Product and other indices that incorporate previously undervalued natural, environmental, and social resources into our nation's system of economic measurement will be formulated using the following timetable and process:

Appropriate economic values for natural, environmental, and social resources determined by 2000.

Complete implementation of a Sustainable National Product and other indices that incorporate previously undervalued natural, environmental, and social resources into our nation's systems of economic measurement by 2010.

Contributions made to the development of internationally comparable measures of integrated economic, social, and environmental performance to be established among all nations by 2025.

- Incorporation of the economic values of the natural, environmental, and social resources into the marketplace and government policies by 2010.

- Until the Sustainable National Product and other measures are fully implemented, long-term economic growth will be measured by the Gross Domestic Product (GDP) and will be, on average, [2.5%] while simultaneously meeting the other PCSD goals.

SUSTAINABLE RESOURCE UTILIZATION GOAL

Context Statement

In the aggregate, inefficient use of materials and energy in the U.S. economy is not sustainable. Production and consumption of materials now account for large shares of U.S. energy use, waste, and pollution. For the U.S. economy to utilize resources on a sustainable basis will require efforts in the following two areas:

- A national drive to change U.S. production and consumption patterns to reduce their overall environmental impact. This will include greatly improved energy efficiency, as well as much more efficient use of virgin materials in all economic sectors. The eventual goal of a drive to increase resource efficiency would be to reduce demand for energy and both renewable and nonrenewable materials to sustainable levels. Redesigning industrial processes, consumer products, and infrastructure for greater materials and energy efficiency will lead to recycling and reusing a much greater share of materials and goods—thereby alleviating the demand on virgin material inputs.
- The practice of a strong environmental ethic that integrates economic efficiency and conservation (soil, air, water quality, biological diversity, aesthetics, etc.)

Goal

To efficiently produce and use globally competitive goods and services while reducing resource use to

sustainable levels, thereby greatly reducing the adverse impacts on natural systems.

Indicators of Progress

- **Materials**
Reduced input of virgin materials per unit of output with resources used at sustainable levels. Sustainable levels should be determined for different classes of materials taking into account the sustainability of production systems, renewability capabilities of the resource, relative levels of recyclability and reusability, and overall environmental impacts by 2000 with subsequent five year updates and reviews of the standards.

Increased market share of renewable and recoverable resources within sustainable levels: ___% by 2000, ___% by 2010, ___% by 2025.

Commodity-specific recycling and recovery rates established (for paper, plastic, metal, wood, organic materials, etc.), with careful consideration of the overall environmental impacts of replacing virgin materials in each scenario: ___% by 2000, ___% by 2010, ___% by 2025.

Per capita generation and disposal of household waste reduced from the current 4.4 pounds per person per day. (U.S. population projections for 2000, 2010, and 2025 are needed to set goals for per capita generation consistent with source reduction goals.)

- **Energy**

See the Energy and Transportation Task Force's goals document.

- **Research and Development**
Assessment of the development and application of technology that improves and accelerates the efficiency of materials production and use.

- **Water**
Adequate instream flows on major rivers and streams by 2000, and other significant

water bodies of concern by 2010, necessary to support the ecosystem.

Interbasin transfers of water discouraged by locating new projects only in areas where water resources are available to supply planned economic development within groundwater recharge rates and at rates that maintain minimum instream flows necessary to support the ecosystem.

Water-saving measures instituted by developing incentive programs in targeted areas where water use exceeds groundwater recharge capability and minimum instream flows are not maintained. Incentives should be designed to help maintain water use at current levels until 2000, lower water use 10% by 2010, and achieve sustainable levels for each aquifer and watershed by 2025.

ENVIRONMENTAL QUALITY GOAL

Context Statement

In the aggregate, the environmental burden created by U.S. economic activities is not sustainable. Improving environmental quality involves avoiding the creation of wastes and adopting practices that protect and enhance natural ecosystems. Many institutions and individuals have made significant progress in adopting environmentally responsible practices, while providing benefits to workers and communities and improving economic competitiveness. Institutions and individuals that address the environmental impacts of their activities as a priority in their decision-making processes will pave the way toward a new standard of responsibility. The approaches they have taken to reduce their environmental burdens must be encouraged, facilitated, and expanded to other institutions.

Goal

To attain a safe and clean environment by making pollution prevention, waste reduction, and product stewardship standard practice, such that all people and ecosystems are protected and economic and social well-being are enhanced.

Indicators of Progress

- **Determining Sustainability Levels**

By 2000, sustainable levels of environmental impacts shall be identified for all media and updated every five years or as required based on new scientific evidence.

- **Interim Waste Generation and Release Measures**

In the interim, existing waste reduction and environmental protection efforts shall be measured with existing mechanisms and technologies, as follows.

Total national 1995 Toxics Release Inventory (TRI) releases reduced [20- 50%] by 2000.*

Total national 1995 TRI waste generation reduced [15-30%] by 2000.*

Overall industrial solid waste disposal and generation reduced [50%] by 2000 through source reduction, reuse, and recycling.**

Overall municipal solid waste disposal reduced [50%] by 2000 through source reduction, reuse, and recycling.*

[In order to cover all major areas or measures of environmental quality, the following three Indicators of Progress were added after the last EETF meeting. They have thus not been discussed explicitly with the full Task Force.]

Conventional air pollution reduced ___% by 2000; ___% by 2010; and ___% by 2025.

Conventional water pollution reduced ___% by 2000; ___% by 2010; and ___% by 2025.

Non-TRI emissions reduced ___% by 2000; ___% by 2010; and ___% by 2025.

- **Product and Process Stewardship**
By 2000, every producer, customer, and marketer will be responsible for assessing and acting on the health and environmental consequences of their products and processes.

By the year 2000, in the absence of compelling public health or safety needs, the release of heavy metals or toxic compounds that persist in the environment or accumulate in biological organisms shall be prevented. By 2010, the use of the most toxic substances should be eliminated, by developing cost-effective, equally productive, and less toxic alternatives.

Assess the number of corporate and governmental institutions that have adopted decision-making processes and management systems, such as multimedia pollution prevention and life-cycle assessments, that minimize their overall environmental burden. [50%] of all institutions shall have such management systems by 2000; [90%] by 2010; and [100%] by 2025.

*The numbers used in metrics 2C and 2D are based on information from the following sources: Source Reduction Research Partnership, Summary Report on the Potential for Source Reduction and Recycling of Halogenated Solvents (Pasadena, CA, 1992); U.S. Congress, Office of Technology Assessment, Serious Reduction of Hazardous Waste for Pollution and Industrial Efficiency, OTA-ITE-317 (Washington, DC, Government Printing Office, 1986.)

Since specific targets may vary between industries, the Task Force decided not to set specific numerical targets in some cases as indicated by "[]" or "%."

SOCIAL WELL-BEING GOAL

Context Statement

Social well-being is affected by the availability and quality of educational and job opportunities and the short- and long-range environmental, health, economic, and social impacts of employers on individuals and communities. To improve social well-being for all citizens and ensure that negative impacts are not borne disproportionately by any segment of society, institutions and individuals should strive to: 1) eliminate existing inequities, 2) maximize the quality and quantity of job opportunities, 3) minimize negative health impacts on workers, customers, and the community, 4) maximize communication among individuals at industrial

facilities, local governments and other organizations, and the general public, and 5) include all social costs and benefits when determining the effects of facility expansions and shut-downs.

Goal

To increase the quality and quantity of job opportunities in all communities and protect the health of all people and ecosystems through appropriate government policies and efficient economic expansion.

Indicators of Progress

- Disproportionate environmental burdens reduced ___% by 2000; ___% by 2010; and ___% by 2025.
- Idled or abandoned facilities and land restored to a reusable state: ___% by 2000; ___% by 2010; ___% by 2025. (EPA, Dept. of Labor, Dept. of Commerce)
- New job opportunities available: ___% by 2000; ___% by 2010; ___% by 2025. (Dept. of Labor, Dept. of Commerce)

Employment rates increased: ___% by 2000; ___% by 2010; ___% by 2025. (Dept. of Labor, Dept. of Commerce)

- Literacy rates increased: ___% by 2000; ___% by 2010; and ___% by 2025. (Dept. of Education)
- Graduation rates in primary, secondary, and adult education programs increased: ___% by 2000; ___% by 2010; ___% by 2025. (Dept. of Labor, Dept. of Education)

Context Statement

The current compliance-based regulatory system focusing on "end-of-the-pipe" emissions has produced many environmental benefits, but often has not provided the flexibility necessary to try alternative, more cost-effective methods throughout the lifecycle to achieve the desired results. In addition, this system has created administrative

burdens for both government and industry. A new framework should be created that reorients the current system toward one that emphasizes a market-driven, incentive-based approach. It will be important to develop a positive reinforcement system to encourage all entities to reduce environmental impact throughout the lifecycle. Another key element of this framework would be a single multi-media system of regulation, with equivalent timelines for reaching goals in each medium. Under this new framework, government would set ambitious environmental performance goals and give regulated entities both adequate time to meet the goals and the flexibility to determine the most appropriate processes and technologies.

Goal

To enable government regulatory policies to achieve eco-efficiency goals in the most flexible, expeditious, cost-effective manner possible.

Indicators of Progress

- By 2000, [50]% of all facilities will operate under a variety of market-based, multimedia, and/or performance-based arrangements.
- The number of voluntary agreements between and among industrial sectors, government, and the public interest sector (including compacts, regulatory negotiations, etc.) will increase each year.
- Federal and state permit processing and product registration times will be reduced to [90] days by 2000, without compromising environmental goals and while enhancing public participation.
- By 2000, a measure shall be developed that assesses progress in increasing efficiency, decreasing the cost of complying with environmental regulations, and meeting environmental policy.