Innovating

for Better Environmental Results:

A Report on EPA Progress
from the Innovation Action Council
April 2004

About EPA's Innovation Action Council

The Innovation Action Council provides leadership for advancing innovative approaches within EPA's national programs, regional offices, and research laboratories. Comprised of Deputy Assistant and Regional Administrators, this senior group guides EPA's innovative initiatives and resolves key policy issues that inevitably arise in the course of exploring new ideas. As the authors of EPA's innovation strategy, *Innovating for Better Environmental Results: A Strategy to Guide the Next Generation of Innovation at EPA*, the Innovation Action Council also oversees and reports on innovation progress.

To the Reader

In 2002, EPA released a comprehensive strategy to drive innovation in environmental programs. *Innovating for Better Environmental Results: A Strategy to Guide the Next Generation of Innovation at EPA* builds upon past successes with innovative approaches to environmental protection and lays out how EPA will continue to advance new ideas to improve the quality of our work.

This report describes the progress made to date and reaffirms our commitment to advancing innovative approaches in the future. Indeed, sustaining a focus on innovative approaches is as important as ever. Today we are challenged by increasingly complex environmental problems that defy conventional regulatory solutions, budget constraints that require doing more with less, and the expectations of an American public that looks to EPA for leadership in ensuring environmental progress.

Innovation is key to meeting these and other challenges. Indeed, asking the question "Is there a better way?" is one of the hallmarks of EPA Administrator Mike Leavitt's leadership. Today we are asking that question much more routinely. And by searching for the answer, in partnership with other organizations that share our interests, we are moving toward a stronger, more cost-effective environmental protection system for the country.

We are pleased to share this progress report, and we hope it will inspire our staff and other environmental professionals outside of EPA to pursue innovative approaches for improving environmental results.

The Innovation Action Council

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Introduction

Imagine a future where companies achieve environmental results that exceed government requirements, where the same market forces that drive the economy create incentives for better environmental results, where green technology and manufacturing practices are widely utilized, where environmental considerations are routinely factored into consumer choices, and where governments, businesses, and communities work together to solve environmental issues in new ways. EPA envisions an environmental protection system that enables these and other benefits, and is harnessing the power of innovation to achieve it.

Innovation has and will continue to play a key role in advancing environmental protection for the United States. Our current system of environmental protection, comprised of environmental regulations, policies, and initiatives at the federal, state, and local levels,

> "Innovation will help launch the American people to a whole new level of environmental protection. Powerful technologies, market incentives, collaborative partnerships, and a focus on results must guide our approach to environmental protection now and in the future."
>
> —EPA Administrator Mike Leavitt

is now in its third decade. While some of its roots can be traced to federal laws passed in the early part of the twentieth century, for the most part, its "architecture" was designed in the 1970s. As Congress began passing laws to address what had become a national environmental crisis, EPA got to work developing regulations to carry them out. Initially, the focus was on controlling pollution from the biggest and most obvious sources, such as industrial and municipal facilities. And by all measures, those controls have proven highly effective, significantly cutting pollution to our air, water, and land.

Today, the basic architecture is still strong, but EPA and others recognize future progress will not come easily. There is a growing concern about our ability to address an increasingly complex set of problems that defy conventional regulatory solutions. EPA is addressing this concern by supplementing the current regulatory system with innovative environmental strategies and developing new non-regulatory approaches to achieve better environmental results. Finding ways to advance environmental progress—to enable continuous improvement—is the driver behind EPA's innovation interests.

EPA released *Innovating for Better Environmental Results: A Strategy to Guide the Next Generation of Innovation at EPA* in April 2002. It focuses on solving a set of priority environmental problems, developing new tools to enhance environmental problem-solving, strengthening partnerships with states and tribes, and fostering innovation in EPA's culture and organizational systems.

EPA offers this report to describe the Agency's progress in each area. Spanning the breadth of EPA's work, it provides numerous examples of how environmental programs are changing to meet the increasingly complex demands of today's world. Some of the examples describe newly developed approaches. Others show how familiar concepts, such as market-based trading, are being adapted for other purposes. These examples are particularly encouraging, as they show innovation taking hold and creating value on a much larger scale.

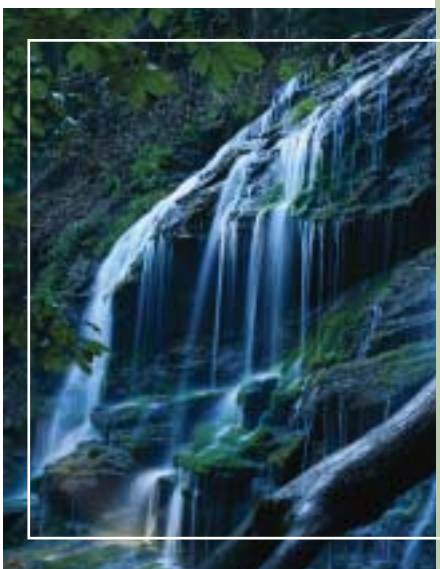
Focusing Innovation on

Priority Environmental Problems

With broad-ranging responsibilities and a workforce that is particularly passionate about its mission, EPA has spawned numerous innovations over the past three decades. The emissions trading program created to control acid rain, for example, is now in its 10th year and continues to be a model for applying market-based incentives to environmental goals. Likewise, voluntary programs, such as 33/50, which was created to reduce emissions of 17 priority chemicals, and Green Lights, which focused on improving energy efficiency, spawned a new generation of voluntary initiatives that have enabled progress more quickly and cost effectively than regulation alone.

In considering new innovation investments, EPA honed in on a set of environmental issues that are serious in nature, national in scope, and in need of new approaches to achieve more progress. They are impaired water quality, funding for water infrastructure, smog, and greenhouse gas emissions. The following sections highlight some of the innovative approaches being used to address these issues as well as several other concerns.

Improving Water Quality



With about 40 percent of all waters assessed in the United States not meeting uses designated for them by states, such as fishing and swimming, EPA is embracing watershed principles to create a more comprehensive framework for achieving water quality goals. A watershed approach takes into account natural hydrology and other

factors that ultimately affect water quality, leading to more tailored and integrated strategies for improving conditions. Watershed approaches also emphasize stakeholder involvement, which means more perspectives and resources are brought to bear to enhance problem-solving.

EPA promoted a watershed approach through core water quality programs, in particular, programs that focus on monitoring, assessment, and development of total maximum daily loads (TMDLs)—the pollution limits required for impaired waters.

Monitoring is the first step to improving water quality, providing data to assess conditions. EPA is encouraging states to develop monitoring strategies in collaboration with other government agencies, volunteer monitoring organizations, and academic interests to leverage resources and improve coordination. Many states have now set up monitoring councils, and as more information is obtained, EPA is in a better position to report on actual water quality conditions. In 2002, EPA reported on 1,980 watersheds—90 more than in 2000. The additional information is also accelerating TMDL development. In 2003, states prepared nearly 2,400 TMDLs and EPA prepared more than 170. While developing TMDLs can be resource-intensive, these results show steady progress toward putting them in place wherever they are needed to achieve water quality goals.

Recognizing that most water quality problems are best solved at the watershed level and that the number of citizen-based watershed organizations continues to grow, EPA established a grant program in 2003 to support locally driven watershed protection efforts. Twenty organizations received a total of $15 million to implement a variety of watershed protection activities. In the Meduxnekeag River Watershed in Maine, for example, the Houlton Band of Maliseet Indians is setting up a cost-share program with local potato growers to reduce agricultural runoff from farmland. This grant is also being used to identify and address improper sewage connections, which can pollute local waters. In addition to addressing the unique concerns in each watershed, these 20 projects are creating models for addressing water quality challenges in many other parts of the country.

EPA also promoted watershed protection by issuing a final policy on water quality trading. EPA's *2003 Water Quality Trading Policy* describes common elements of credible trading programs and provides guidance on how trading can be conducted in accordance with the federal Clean Water Act. It also emphasizes the need for accountability and safeguards to ensure strong water resource protection.

> "Water quality trading provides the kind of incentives and flexibility required to allow the nation's cities to work with other parties to achieve the goal of protecting watersheds . . . We applaud EPA for developing and adopting this policy."
>
> —Douglas Palmer and David Wallace, co-chairs, U.S. Conference of Mayors Urban Water Council

Increasingly viewed as an efficient and cost-effective method of achieving water quality goals, trading programs allow one source, such as a factory, to meet water quality requirements using pollutant reductions created by another source that has lower pollution control costs. After a water pollutant cap is set for a watershed, each source is given performance requirements. If a source reduces pollution loads below the level required, it creates a "credit" that can be sold. Some sources find that buying credits is more cost-effective than making the reductions necessary to meet their requirements. A study of three Midwestern watersheds, for example, found that trading could reduce the cost of controlling phosphorus loadings from point and nonpoint sources substantially—by 40-80 percent. An EPA analysis found the total potential savings from all types of trading ranges from $658 million to $7.5 billion annually.

EPA's trading policy has garnered much support from key stakeholders. According to Paul Faeth of the World Resources Institute, "The guidance will help create markets that will provide incentives for improvements in water quality. Ultimately, we believe this change will help to clean up the nation's waters." Similarly, Douglas Palmer and David Wallace, co-chairs of the U.S. Conference of Mayors Urban Water Council, stated, "Water quality trading provides the kind of incentives and flexibility required to allow the nation's cities to work with other parties to achieve the goal of protecting watersheds . . .We applaud EPA for developing and adopting this policy."

Connecticut is using a trading program to reduce nitrogen loadings, the primary pollutant impacting Long Island Sound. Publicly owned wastewater treatment plants are the biggest source of nitrogen, and 79 facilities have come together to reduce nitrogen levels by nearly 60 percent by 2014. In the western United States, Oregon has set up a trading program to meet temperature requirements on the Tualatin River. The state's largest sewage treatment plant operator, Clean Water Services, will be able to save over $40 million in capital costs by restoring riparian habitat along tributary streams and creating natural shade cover for spawning salmon, rather than installing costly equipment to cool its discharge less than 2 degrees Fahrenheit. Based on successful experiences with this and other trading projects, EPA Region 10 created a handbook to help other states determine whether trading is the right approach for achieving their water quality goals. This product is now being modified for use nationally.

EPA's new policy and implementation guidance on watershed-based permitting represents another important step in reorienting water quality programs around watersheds. Under a watershed permitting program, permits are issued to the sources within a watershed in a coordinated manner. This approach makes it easier for the permitting authority—usually a state—to consider watershed goals and the impact of multiple pollutant sources and stressors *before* permits are issued. Putting this approach into practice can require permitting authorities to undertake a variety of changes, such as synchronizing permit issuance cycles within a watershed and developing pollution limits that take multiple dischargers into account.

While EPA is working with states and permit holders to document different watershed permitting approaches, some useful models are already available. For example, in North Carolina, the Neuse River Compliance Association—a nonprofit organization comprised of public and private sector permit holders—developed a single permit for reducing nitrogen loadings into the river that supplants the need for individual permits. Similarly, in Michigan, the Department of Environmental Quality developed a single permit to cover multiple stormwater discharges from communities in the Rouge River watershed.

Meeting Water Infrastructure Needs

Another important priority for achieving the nation's clean water goals is protecting and sustaining investments in water infrastructure. Communities across the country are challenged to find the fiscal resources needed to replace aging drinking-water and wastewater systems, build new

capacity to allow them to keep up with growth, and implement proper security measures. A 2002 EPA analysis found that with no growth in revenue, the shortfall for capital and operation and maintenance costs for wastewater infrastructure will exceed $270 billion over the next 20 years. For drinking water, the shortfall is nearly $265 billion for the same period.

> "Innovation will either reduce the need for infrastructure or bring down the cost of infrastructure, and hence, close the gap."
>
> —Tracy Mehan, EPA Assistant Administrator for Water

In 2003, EPA hosted a national forum with leading experts to discuss options for meeting the United States' critical water infrastructure needs. In opening remarks, the EPA Assistant Administrator for Water, Tracy Mehan, highlighted the need for innovative approaches, stating, "Innovation will either reduce the need for infrastructure or bring down the cost of infrastructure, and hence, close the gap." Four innovative strategies dominated that discussion, and together they provide a framework for addressing infrastructure needs nationally.

One of those strategies involves managing infrastructure needs on a watershed basis. As the preceding section described, watersheds provide the optimal framework for addressing water-related issues, including those related to infrastructure. A second strategy focuses on improved management approaches for water infrastructure, such as environmental management systems, system consolidation, and public-private partnerships. Based on their usefulness in helping drinking water and wastewater facilities improve operational efficiency, save money, and extend the life of infrastructure investments, EPA is providing training and other resources to promote their use within the water infrastructure industry.

A third strategy being promoted is full cost pricing, which refers to billing customers for the actual quantity of water used rather than charging a flat rate. When used effectively, this approach can raise

revenue and increase awareness of water use. In 2003, EPA took steps to encourage full cost pricing in hundreds of thousands of rental properties by revising a drinking-water policy that has inadvertently discouraged water metering and conservation for years. Under the Safe Drinking Water Act, any public water system that has its own water source or treats or sells water is subject to federal drinking-water regulations. As a result, building or property owners who receive water from a public water system and then provide and bill tenants separately for water have been regarded as sellers and subject to regulations. The revised policy addresses this scenario, allowing limited sub-metering and direct billing without triggering drinking-water requirements.

Promoting efficient water use on a broader scale is the fourth priority. In 2003, EPA began developing a new voluntary program to inform a variety of water users about the advantages of water-efficient products; to motivate manufacturers to add more water-efficient options to their product lines; and to encourage distributors, retailers, and water utilities to promote water-efficient choices to consumers. In addition to reducing demands on water infrastructures, EPA believes better efficiency can help protect water quality and ecosystems, help mitigate the effects of droughts, and save homeowners money on water and energy bills without compromising convenience or performance.

Reducing Greenhouse Gas Emissions

EPA is focusing on incentives and the growing interest in environmental stewardship to reduce greenhouse gas emissions, such as carbon dioxide and methane. These emissions are an environmental concern because they trap heat in the atmosphere and contribute to global climate change. Given that the leading source of greenhouse gases—burning of coal and other fuels—is also the nation's leading energy source, EPA has worked with a variety of organizations to promote energy efficiency.

Building on past success, EPA and the Department of Energy chose to expand one of the country's most widely recognized energy efficiency programs—ENERGY STAR®. Through this program, last year, Americans saved $9 billion on their energy bills, saved enough energy to power 20 million homes, and reduced greenhouse gas emissions equivalent to taking 18 million cars off the road. New energy performance rating tools created for schools, hospitals, hotels, and other building sectors should boost future benefits even more. On average, buildings that achieve improved energy efficiency and earn the ENERGY STAR label use about 40 percent less energy than conventional buildings.

ENERGY STAR also added ceiling fans, water coolers, and other consumer goods to its list of qualified products. Since the program's inception, 28,000 products—from 1,400 different manufacturers—have earned the ENERGY STAR label. More than 1 billion of these energy efficient products have been sold. In an effort to connect directly with consumers, EPA launched the Change a Light, Change the World campaign in 2003 to challenge all Americans to convert to energy-efficient lighting products. If every American converted the five most frequently used light fixtures (or bulbs) in their home to ENERGY STAR qualified products, the United States could prevent 1 trillion pounds of greenhouse gas emissions annually.

While encouraging action from individuals, EPA also challenged businesses to become part of the greenhouse gas solution. Through the Climate Leaders program, businesses and other organizations develop a greenhouse gas emissions inventory for their activities and then set aggressive emissions reduction goals to be achieved in five to 10 years. In the first two years of the program, 54 organizations—with combined revenues representing

Hydrogen Fuel Cell Vehicles Become A Reality

Opening the door to a new generation of cleaner vehicles, in 2003, the *EPA National Vehicle and Fuel Emissions Laboratory* became the first federal facility capable of testing and certifying a hydrogen fuel cell vehicle for emissions and fuel economy. Hydrogen fuel cell vehicles mean zero air emissions and less reliance on foreign sources of energy. The first certification was given to Honda for its 2003 FCX model vehicle. To further promote this clean technology, EPA joined with DaimlerChrysler and UPS to put package delivery vehicles powered by hydrogen fuel cells into commercial service. This initiative marks the first time these vehicles have been introduced as a part of a commercial fleet in North America.

6 percent of the U.S. Gross Domestic Product—have joined. To date, pledging companies have agreed to greenhouse gas emissions reductions that are the equivalent of taking 5 million cars a year off the road.

Several initiatives for reducing greenhouse gas emissions focus on the transportation sector. For example, in 2003, EPA launched SmartWay Transport, a voluntary partnership that focuses on improving fuel efficiency and reducing greenhouse gas emissions from ground freight transportation. Truck and rail transport now consume 20 percent of all energy used by the transportation sector. While burning fuel is necessary to move goods efficiently by truck and rail, some of that fuel is wasted due to inefficient practices such as excessive idling and using trucks with poor aerodynamic design. That wasted fuel translates to wasted money for freight transport companies and increased emissions released into the environment.

The Best Workplaces for Commuters program focuses on another source of greenhouse gas emissions—drive-alone commuting. In the United States, three-quarters of all trips made to and from work are in single-passenger vehicles. Through this voluntary initiative, EPA aims to minimize the environmental impacts of drive-alone commuting while also helping employers address parking issues, traffic congestion, and other employee commuter concerns. So far, more than 600 employer partners and 10 commuter districts—covering 1.2 million individuals—have earned the Best Workplaces for Commuters distinction for offering subsidized transit, telework options, and other similar benefits. EPA expects the number of employees covered under this program will triple in the next two years.

The power of Best Workplaces for Commuters, SmartWay Transport, ENERGY STAR, and other voluntary initiatives for reducing greenhouse gases was highlighted in a 2002 EPA annual progress report. This report found that EPA's partners voluntarily reduced greenhouse gas emissions by 43 million metric tons. Preliminary results for 2003 are even higher. Reductions in greenhouse gas emissions rose to 48 million metric tons—the equivalent to eliminating emissions from more than 30 million cars.

Reducing Smog

EPA is pursuing a number of innovative approaches to combat ground-level ozone, sometimes referred to as smog. Ozone occurs naturally in the Earth's atmosphere, providing protection from the sun's ultraviolet rays. However, high concentrations at ground level can be unhealthy, aggravating respiratory illnesses such as asthma. Ground-level ozone forms when emissions of nitrogen oxides and volatile organic compounds from vehicles, power plants, refineries, and other sources react chemically in the presence of sunlight, and is of greatest concern in the summer months. The same sources that contribute to ground-level ozone also contribute to particle pollution, either emitting particles directly or contributing to their chemical formation. In addition to limiting visibility, particles can have serious health effects for people with lung and heart disease, causing hospital admissions and even premature death.

In 2001, EPA acted to reduce ground-level ozone and particle pollution by decreasing air emissions from a major source—diesel engines. A new standard requires lower emissions from diesel engines and lower sulfur content in the fuels used to power them. Scheduled to take effect in 2007, these standards are expected to decrease emissions of particles and nitrogen oxide by 90 percent and 95 percent, respectively, compared to 1990 levels. While the new standards will mean cleaner emissions from future vehicles, many existing diesel-powered vehicles will be on the road long after the 2007 deadline passes. One way of addressing older vehicles is to retrofit them with new emission control technologies.

Through the Voluntary Diesel Retrofit Program, EPA works with state, local, and industry partners to evaluate and install new technologies on older vehicles. To date, public fleet owners and operators have committed to 160,000 retrofits nationwide. In 2003, FedEx Freight—the first private company to sign up—committed to retrofitting and using low-sulfur fuels in one-third of its national fleet.

EPA's Region 6 office in Dallas launched a retrofit program specifically for older school buses. Air pollution from diesel vehicles has health implications for everyone, but children are more susceptible to this pollution because they breathe at a faster rate than adults. The Adopt-A-School Bus Initiative was established through a partnership with the American Lung Association, state agencies, local officials, and corporate sponsors to help the Dallas-Fort Worth area comply with air quality standards. Together, these partners are working to replace 500 older buses over the next three years, a move that will eliminate about 200 tons of emissions annually and give children a healthier ride to school.

This program is now being picked up in other cities—in fact, more than 20 school bus retrofit projects are underway. In 2003, EPA established the Clean School Bus USA program to promote school bus retrofitting nationally, awarding $5 million to help America's school districts clean up their fleets. With a goal of upgrading the nation's entire school bus fleet by 2010, this program will help ensure that school buses—the safest transportation choice for getting to school—are also the cleanest. For example, EPA Region 2 and the New York Association for Pupil Transportation recently signed a groundbreaking agreement to reduce emissions of harmful pollutants from the thousands of diesel buses that transport more than 2 million children to and from school. This agreement marks the first time a statewide industry organization has committed to clean up its entire diesel school bus fleet.

EPA also promoted use of new technology to reduce emissions from diesel trucks and locomotives specifically when idling. In addition to increasing maintenance costs and engine wear, EPA estimates that long duration idling of trucks and locomotives consumes 1.2 billion gallons of fuel and emits over 200,000 tons of nitrogen oxides annually. Earlier this year, EPA provided guidance to state and local environmental agencies that promotes new idling reduction technologies as an additional way of meeting national air quality standards.

Market-based trading offers a proven method for reducing air emissions from another major source—power plants. In 2004, EPA proposed a trading program that would cap emissions of nitrogen oxide, sulfur dioxide, and mercury at levels that would never increase. Under this approach, states could set up trading programs that would allow power plants to buy or sell emission credits. Modeled after the trading program successfully used to control acid rain, this approach gives power plants firm emission reduction requirements and an opportunity to find the most innovative ways of meeting them. It would be phased in over time, and would apply in 28 eastern states and the District of Columbia, where smog levels are higher than air quality standards allow. When the proposed rules are fully implemented in 2015, EPA estimates power plant emissions of nitrogen oxides and sulfur dioxide will fall by 65 percent and 70 percent, respectively, compared to current levels.

Despite these and other initiatives, some parts of the country are not expected to achieve compliance with the new standard for ground-level ozone—the "eight-hour standard" taking effect this year. This spring, EPA will formally designate those areas as non-attainment areas. In addition to letting the public know that air quality is unhealthy, these designations can affect environmental, transportation, and other public policy options at the state and local levels. Recognizing the importance of innovation and early planning to meet the tighter standard, in 2002, EPA announced Early Action Compacts as a voluntary, proactive approach for areas currently meeting the "one-hour ozone standard," but projecting non-attainment for the eight-hour standard. With this option, states, community leaders, and local industry develop a plan for reducing ground-level ozone three years earlier than would otherwise be required, while also agreeing to meet other obligations that allow the non-attainment designation to be deferred.

Reducing Waste

EPA's approach to waste management is undergoing a fundamental change. Traditionally, EPA's cleanup programs have focused on managing waste after it has been produced, such as disposing of hazardous materials properly and operating landfills safely. While those issues are still important, EPA is now focusing more on preventing waste and reducing and reusing resources and materials when creating products.

In 2002, EPA launched the Resource Conservation Challenge to find flexible, yet protective, ways to reduce waste and conserve natural resources. This multimedia program challenges all Americans to prevent pollution, promote recycling and reuse of materials, reduce the use of toxic chemicals, and conserve energy and materials. Many industries are taking up this challenge and finding environmental and economic benefits along the way. For example, work with the electronics industry has focused on reusing and recycling outdated computers, cell phones and other electronic products. In 2000, more than 2 million pounds of "e-waste" was generated in the United States, but less than 10 percent was recycled. To raise public awareness about the value of reusing and recycling these products and to provide more reuse and recycling opportunities, in 2003, EPA—along with electronics manufacturers and

> "By the year 2020, I believe. . .reusing waste products will become the norm, and the demand for virgin natural resources will be reduced dramatically. This transition from disposal to resource recovery will be driven, in part, by what we're learning today in the Resource Conservation Challenge."
>
> —Marianne Horinko, Assistant Administrator for Solid Waste and Emergency Response

retailers—launched the Plug-In To eCycling campaign. In the first year, partners collected more than 26 million pounds of used equipment.

The healthcare industry is also taking up the Resource Conservation Challenge. Hospitals and other health-related organizations are working with the Joint Commission on Accreditation of Healthcare Organizations to strengthen environmental performance through the industry's accreditation standards. In an effort to help facilities achieve continuous environmental improvement, this initiative emphasizes waste minimization and, in particular, eliminating mercury—a priority chemical of concern and routine component of many medical waste streams.

Reducing Packaging in E-Commerce

Internet-based companies ship millions of books, CDs, DVDs, and videos each year, and a large portion of the packaging waste ends up in the trash. In 2003, EPA and McDonough Braungart Design Chemistry, an international design firm, launched a design challenge focused specifically on the packaging associated with the online sale of books. The premise of the challenge was to re-think and re-design e-commerce packages for a cradle-to-cradle life cycle. A team from Microsoft, Allen Schluger Company, and Shorewood Packaging won in the professional category, and a team from the Art Center College of Design in Pasadena, California won in the student category. The winning designs have many environmental advantages compared to conventional packaging, and exemplify how the public and private sector can work together to find innovative solutions to environmental problems.

Another important shift in EPA's waste program is a new focus on revitalization as part of cleanup actions. Revitalization has been one of the key objectives behind the success of EPA's Brownfields Program, which cleans up and redevelops sites that have been abandoned because of real or perceived contamination problems. Since 1995, this program has enabled assessments at more than 4,400 properties, helped to create 25,000 jobs and leveraged $5.2 billion for cleanup, construction, and redevelopment. From the start, stakeholders have been able to see the benefits of jobs and an expanded tax base, as well as recreation and other benefits that enhance quality of life in the community. This understanding has fostered public support and hastened cleanup and redevelopment activities.

In 2003, EPA announced a new Land Revitalization Agenda to bring these same benefits to Superfund and other cleanup programs. In addition to emphasizing cleanup and reuse as mutually supportive goals, this agenda focuses more attention on the needs of neighboring communities in cleanup efforts—regardless of whether the property is a brownfields site, a Superfund site, a petroleum facility, or a former gas station.

Integrating revitalization objectives into EPA's cleanup programs will be easier because of another change—a decision to consolidate individual cleanup programs into one new program. While Superfund and other cleanup programs were created for distinct purposes, the differences among them have sometimes led to confusion, redundancy, and inconsistency. From the public's perspective, the program name is unimportant. The One Cleanup Program is designed to break down barriers between separate programs and simplify cleanups for everyone. EPA expects this move toward integration will achieve a number of benefits, including improved efficiency and effectiveness of cleanup efforts, better sharing of lessons learned from individual projects, development of more consistent policy and guidance, and quicker and wider use of new cleanup technologies. This consolidated approach will also enable communities to gain a better understanding of all the contaminated sites in their neighborhoods and the progress in cleaning them up.

Reducing Chemical Risks

The same pollution prevention mindset that has EPA focusing on the origin of waste can also be seen in a new approach for reducing risks from new chemicals. Each year, the chemical industry develops new chemical substances, and the Toxic Substances Control Act gives EPA authority to regulate them. Before a company manufactures a chemical for commercial purposes, however, it must first submit a pre-manufacture notice to EPA, and EPA has 90 days to review it. EPA receives between 1,500 and 2,000 pre-manufacture notices annually. In most cases, the decision to commercialize a product is driven by issues such as efficacy, yield, and cost. Companies are not required to test products and provide data to EPA, but if product testing is performed, data must be submitted. Responsibility for assessing risk ultimately falls to EPA, however. If EPA finds reason for concern, it has regulatory options, including the ability to require testing.

Given its responsibility, EPA has developed numerous tools over the years to assess new chemical hazards and exposures. Recognizing the potential value these tools could have for industry during research and development, EPA began working with chemical manufacturers and environmental groups on an alternative approach to new chemical review. Numerous computer-based methods that screen for hazardous exposure concerns were combined into a Pollution Prevention (P2) Framework. This tool gives users information about products and pollution prevention opportunities early, when process and chemical changes are easier and less costly. By taking chemical compounds and characteristics into account, the P2 Framework enables manufacturers and EPA to address risk-related questions quickly when actual testing data are lacking.

In 2000, EPA launched a pilot program to test the P2 Framework more broadly and offered companies a valuable incentive to participate—faster reviews of pre-manufacture notices. Qualifying companies received a response to their notice in half the normal time, a real advantage for an industry that aims to get products to market quickly. Participating companies cited other benefits, including a chance to minimize hazardous wastes, product liability, and costs for research and development. In fact, a study by one participant, Eastman Kodak, showed research and development costs could be reduced by up to 50 percent.

Based on pilot results, EPA released the P2 Framework for industry-wide use in 2003 as part of the Sustainable Futures Initiative. This initiative combines the P2 Framework with training, technical assistance, and special support for small businesses to promote the design, development, and application of safer products and processes throughout the chemical industry. In addition to chemical manufacturers, EPA is now promoting this tool to other manufacturing industries that use chemicals, such as textiles and consumer products, which also could benefit from earlier analysis of product risks.

EPA's Design for the Environment program provides another venue for working with industry to improve understanding of the relative risks of chemicals and encourage use of safer alternatives. Industry partners value collaboration with EPA because it helps them identify opportunities to reduce chemical risks and increase market share for environmentally preferable products. According to one partner, Bactain Environmental Products, Design for the Environment was key to getting their new product stocked at over 250 Wal-Mart and West Marine stores. Partners cite other important environmental and economic benefits. One company's

Views on the Pollution Prevention Framework

"This sort of upfront knowledge of a potential problem and the ability to address it before a premanufacture notice . . . saves time and resources for both the company and the agency." —PPG Industries

"This fits in well with our internal policy of life cycle analysis and product stewardship." —Akzo Nobel

"These are the kinds of tools industry toxicologists need to persuade business leaders to pursue new directions in chemistry." —Ciba Specialty Chemicals

"EPA...may underestimate the true value of these tools." —The Procter & Gamble Company

"Sustainable Futures makes versatile screening models available to all who have an interest in moving from a reactive to a precautionary approach to designing products with social, environmental, and economic benefits." —GreenBlue (a nonprofit environmental organization)

new technology eliminated use of 340,000 gallons of toxic chemicals while saving 100 million gallons of water and the energy required to heat it. And a partnership with the automobile refinishing sector has reduced emissions of toxic chemicals, including one that is known to be the leading cause of occupational asthma, by as much as 30 percent. On average, these improvements have saved each shop between $4,000 and $13,000 per year.

EPA's Green Chemistry program is also helping to reduce risks from chemical products. Companies design and commercialize chemical products or processes that are safer for human health and the environment and that are also economically viable. Each year, EPA sponsors the Presidential Green Chemistry Challenge Awards, which recognize the most outstanding product or process innovations. To date, the award-winning technologies have eliminated the use or generation of more than 326 million pounds of highly toxic chemicals and solvents, including chlorofluorocarbons and volatile organic compounds. These technologies also have conserved more than 390 million gallons of water from a broad range of industrial processes. These and other benefits are helping the chemical industry maintain its global competitiveness and ensure progress toward a more sustainable society.

Developing Safer Pesticides

EPA is also working in partnership with the private sector to reduce risks from pesticides. Pesticides play an important role in ensuring a safe, abundant, and affordable food supply, but they can also pose risks to humans, other living creatures, and the natural environment.

EPA's Pesticide Environmental Stewardship Program provides support and recognition to organizations for reducing the health and environmental risks associated with pesticide use. Many partners are testing reduced-risk approaches and alternatives to conventional pesticides, such as biological pesticides and reduced-risk chemicals. Walnut growers in California, for example, are interested in alternative approaches for handling the coddling moth. This industry is especially interested in reduced risk pesticides because of the moth's resistance to commonly

used insecticides and the availability of new application technologies for pheromone-based products. These products contain naturally occurring chemicals and now, with sprayable formulations, they are easier and less costly to apply. In demonstration projects, the Walnut Control Board tested these products and found them to be successful in disrupting mating patterns. The industry is now refining application techniques and planning a statewide mating disruption program with interested growers. The long-term goal is to reduce the use of conventional insecticides by 75 percent as walnut growers switch to the safer, more cost-effective products.

California's almond industry is also working on reduced-risk pest management strategies. The Almond Board has set up demonstrations at field sites as well as educational events to teach growers how to reduce or eliminate use of diazinon and other higher-risk products. Several field days are held each year to allow growers to learn about successful management techniques. These events give growers the opportunity to see firsthand—under local conditions—how low-risk practices can be used in almond production. As a result of continued outreach and education over the past five to six years, less than 40 percent of growers now rely on conventional organophosphate products for insect control.

Addressing Regional Priorities

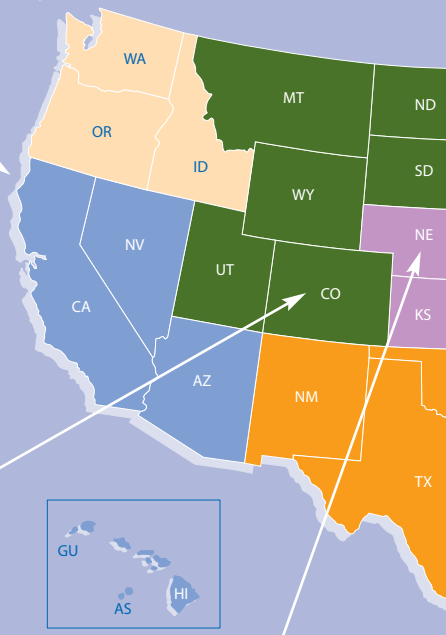
By working closely with states and territories, EPA's 10 regions are devising innovative approaches for addressing a range of environmental issues. As the following examples show, these innovations often create models or practices that can be useful in other parts of the country.

Innovation in the Regions

Region 10: Collaborating to Improve Air Quality—In the Pacific Northwest, shared leadership is setting the stage for a dramatic transformation in the way air quality is protected. Through the Northwest Collaborative Air Priorities Project, EPA and other organizations are working together to address a set of regional air priorities over the next five to 10 years. This collaborative approach is broadening support for air quality initiatives, opening communication channels among participants, and enabling smarter use of scarce resources.

Region 9: Controlling Mercury—A voluntary partnership with the Nevada gold mining industry gives companies technological and process options for voluntarily reducing mercury air emissions, a toxic pollutant that can have serious neurological effects. Since 2002, this program has reduced mercury emissions by 40 percent, or more than 8,000 pounds annually. These reductions are the equivalent to the emissions of 33 power plants.

Region 8: Addressing Air Toxics at the Community Level—In northeast Denver, EPA is part of a community-based partnership that is addressing hazardous air pollutants in a heavily industrialized area. Working together, the team is identifying the pollution sources, facilitating public participation, and implementing projects that will improve air quality and reduce risks to human health.

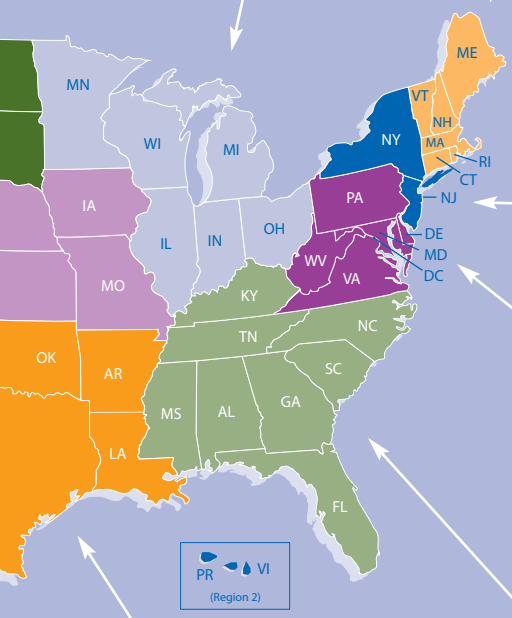


Region 7: Using Renewable Energy in Cleanups—In Nebraska, EPA, the United States Army Corps of Engineers, and the University of Missouri-Rolla are using a wind turbine generator to power a groundwater remediation system at a former military ammunition plant. Designed as a demonstration project, this approach is conserving fossil fuels and protecting air quality while restoring groundwater resources.

Region 5: Reducing Agricultural Impacts—To address agricultural water quality concerns, Region 5 established agricultural liaisons to work with U.S. Department of Agriculture and state agencies on a suite of watershed issues, such as pathogens from animal feedlots and protection of drinking water sources. Through training and collaboration, these liaisons have gained insights and information on agricultural practices that will be used to improve water quality management strategies in partnership with other federal, state, and local agencies.

Region 1: Breathing Better in Boston—In New England, EPA Region 1 is working with the city of Boston to increase participation in a number of voluntary clean air transportation initiatives, such as the *Voluntary Diesel Retrofit program*, *Best Workplaces for Commuters*, *SmartWay Transport Partnership*, and *Clean School Bus USA*. The goal is to make Boston a national model for community-based voluntary transportation programs that reduce air pollution and traffic congestion.

Region 2: Promoting Green Buildings—From construction to operation to demolition, buildings can pose significant impacts to the environment and the people working in or around them. EPA and the New York City Department of Environmental Protection launched a *Green Building Design Competition* to establish the city as a leader in America's green building movement. The focus is on showcasing green building principles, developing new ideas, and identifying green building impediments.



Region 3: Addressing Contaminated Sediments—In the Mid-Atlantic region, a watershed approach is being used to clean up and prevent contamination of sediments in the Anacostia River. Working across the watershed, EPA and the Anacostia Watershed Toxic Alliance have undertaken a variety of actions in and around the river to improve environmental quality and to link those improvements to an economic development vision. This robust, stakeholder-driven model offers useful lessons for addressing challenges in other urban watersheds.

Region 6: Evaluating Passive Air Samplers— EPA is partnering with the states of Texas and New Mexico to test passive samplers for sulfur dioxide, nitrogen dioxide, and toxic air emissions. Passive air monitors are smaller, more portable, and less expensive than conventional equipment and do not require electrical power. If these devices gain EPA approval, air monitoring costs could be reduced by up to 50 percent without reducing accuracy, quality control, or precision.

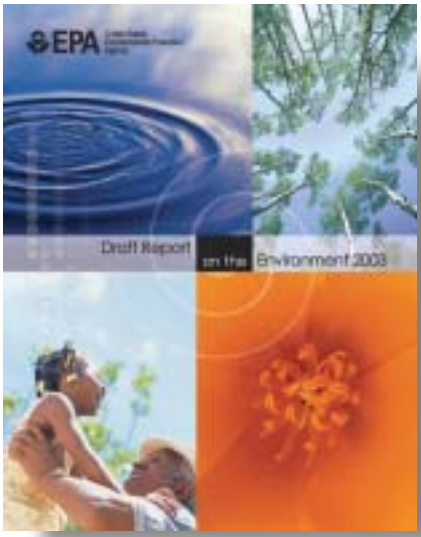
Region 4: Focusing on Sustainability—EPA is working with stakeholders in the fast-growing area spanning Charlotte, North Carolina, and Rock Hill, South Carolina, to achieve a healthy environment, vibrant economy, and high quality of life. The *Sustainable Environment for Quality of Life (SEQL) initiative* is evaluating growth taking many factors into account, such as air and water quality, energy use, transportation, and economic development. In addition to helping the region achieve its desired future, SEQL will create a model of integrated environmental management that can be used by other areas facing similar growth challenges.

Developing Innovative Tools and Approaches

The environmental challenges EPA addresses on a regular basis are as diverse as the environment itself. Some are very localized, while others are national in scope. Some clearly need regulated action, while others are more suited to voluntary initiatives. To find the best solution for each problem, EPA is developing new tools and approaches that create more options for environmental problem-solving. The following highlights show some of the new offerings and how they are being used to enhance environmental and public health protection.

Environmental Indicators and Results

Environmental quality and public health can be affected by many factors, making it difficult to attribute measurable results specifically to environmental programs. This dilemma can be complicated further by the timeframes involved—results from actions taken today might not be detectable in nature or public health for years.



Having quality data to track progress and guide decisionmaking is a critical need for EPA, and an EPA report released in 2003 will go a long way in meeting it. The *Draft Report on the Environment* provides EPA's first-ever national picture of environmental conditions, describing what is known and not known about environmental conditions and how those conditions are changing. This

Highlights from the *2003 Draft Report on the Environment*

Air

Based on measurements of six common air pollutants at more than 5,000 monitoring sites across the country, air pollution has declined 25 percent over the past 30 years—even with large increases in population, gross domestic product, and vehicle miles traveled.

Drinking Water

In 2002, 94 percent of Americans served by community water systems received their drinking water from systems that meet EPA's health-based standards—an increase of 15 percent in the last decade.

Land

Releases of toxic chemicals have declined by 48 percent since 1988, and waste management has improved significantly. Municipal solid waste recycling and composting increased 1,100 percent in the last decade.

Human Health

Americans are living longer than ever before, while infant mortality has dropped to the lowest level ever recorded.

comprehensive assessment, which is undergoing public review, is part of a larger initiative to develop environmental indicators that can be used to identify priority concerns and target resources to address them. Just as economic indicators tell us about the state of the economy, environmental indicators reveal important information about the state of the natural environment. Indicators used in creating the report, such as wetland acreage and air pollution levels, were based on a thorough review of available data from EPA's own databases; other federal, state, and tribal agencies; and some nongovernmental organizations. The results represent EPA's most comprehensive attempt to characterize the condition of the nation's environment. They also reveal important data needs that must be addressed to improve understanding of environmental conditions in the future.

Environmental Technology

Environmental technologies have played a key role in enabling environmental progress in the United States. From monitoring and assessing ecological conditions, to preventing and controlling pollution, to cleaning up contaminated lands and groundwater, environmental technologies enable a range of environmental protection activity. With annual investments in environmental technology and related services in the United States now exceeding $150 billion a year, there is strong interest in new products that can be applied at home and abroad.

EPA offers several programs to support environmental technology development, commercialization, and use. These programs offer help with financing, testing, and verification, as well as incentives and information. To provide information and make assistance available, in 2003, EPA launched the Environmental Technology Opportunities Portal (ETOP). Through this Web-based resource, users can search central databases, learn about new funding opportunities, and get updates on the latest environmental technology news. Links are provided not only for EPA technology programs, but also for programs run by other governmental and non-governmental organizations.

EPA's Science to Achieve Results (STAR) grant program is one of the programs found on ETOP. This program awards funds to scientists and engineers from academia, states, and nonprofit organizations to address environmental research priorities of special significance to EPA's mission, such as hazardous waste cleanup and control of particulate matter in the air. Designed to support only the highest quality research, STAR has supported numerous distinguished scientists and researchers, including some past winners of the Nobel Prize.

EPA is engaging other bright minds to find innovative solutions to today's environmental problems. In 2003, EPA and partners from industry, nongovernmental organizations, and other agencies launched a national student design competition to respond to the scientific and technical challenges of moving towards a sustainable society. Through the

Taking Technology to a Whole New Level

Nanotechnology is the ability to work at the molecular level, atom by atom, to create fundamentally new organizational structures. Today scientists are finding ways to apply this exciting new capability to environmental research. With STAR funding, scientists at Lehigh University are synthesizing nano-sized particles for use in groundwater cleanup; researchers at the University of California—San Diego are developing a nano-based sensor for real-time, remote detection of heavy metals; and at the University of Delaware, researchers are studying how nano-sized particles can be used to treat automobile exhaust.

P3 Competition and Award Program, named for the three pillars of sustainability—people, prosperity, and the planet—teams of college students compete for grants to research and develop sustainable solutions to environmental challenges. In spring 2005, the grant recipients will be invited to compete for a national award that conveys additional funding to further the development and use of sustainable designs. Along with advancing select designs, this program will help integrate an understanding of sustainability into higher education and training.

Small businesses are responsible for most new technology development, and the Small Business Innovation Research Program provides scientific and technological firms with funding for research and development and commercialization. EPA is one of 10 federal agencies that solicits and funds project proposals. In 2003, EPA awarded approximately $8 million to small businesses to develop technologies for water and air pollution control, pollution prevention, and new analytical monitoring instruments. EPA's latest solicitation for 2004 focuses on hazardous waste minimization. These projects will become part of a legacy of pollution prevention technology developed by small businesses with EPA support.

A new Environmental Technology Council will help EPA coordinate all of its technology-related activities. Established earlier this year, the Council will facilitate innovative technological solutions to environmental problems, particularly problems with multi-media implications. The Council will also focus on improving results from EPA's core regulatory, enforcement, and voluntary programs.

Environmental Management Systems

As more organizations look for ways to integrate environmental issues into their everyday operations, EPA is promoting the use and development of Environmental Management Systems (EMSs). Comprised of a set of standard processes and practices for addressing environmental impacts, EMSs can help environmental professionals manage regulatory responsibilities and unregulated environmental impacts such as resource conservation and energy efficiency.

Based on a growing body of research investigating the impact of EMSs on environmental and economic performance, in 2002, EPA issued a policy statement to encourage EMS use more broadly. Since then, EPA has promoted EMSs in a variety of ways, starting with its own facilities. EPA is now implementing EMSs at 36 facilities, spanning all ten EPA regional offices and the headquarters facility in Washington, D.C.

To accelerate EMS use by others, EPA has worked with a variety of organizations including universities, public sector entities, small business assistance groups, and, as the next section describes, industry trade associations. Joint ventures include the preparation of case studies to showcase EMS results; support for the PEER center, a Web-based clearinghouse to support EMS activities in local, county, and state government; and investments in research to assess EMS performance. With EPA funding, researchers from the University of North

An EMS Fosters Environmental Improvement in EPA Region 8

In Denver, EPA engaged employees in developing an EMS, getting their help in identifying the environmental impacts of everyday operations and brainstorming ways to reduce them. For example, after identifying the driving of fleet vehicles as one impact, the region ordered a Honda hybrid vehicle to reduce air emissions and save energy. Likewise, the region changed sampling processes to reduce use of methylene chloride and installed software to automatically power down computer monitors when not in use. By promoting more efficient use of paper, the region has cut photocopying by 20 percent, saving paper and energy.

Carolina (UNC) and the Environmental Law Institute created the National Database on Environmental Management Systems to collect and analyze EMS data. According to the project director, Dr. Pete Andrews of UNC, the study demonstrates that "EMSs are worth encouraging. On balance, performance and compliance appear to improve, and facilities believe they benefit."

To help guard against recurring violations of environmental requirements, EPA also added EMSs to civil settlements in certain enforcement cases. In late 2003, EPA completed a strategy to explore how and whether EMSs might be used in other regulatory programs, such as permitting, to achieve better environmental results at less cost. Together, these and other actions have the potential to make EMSs as common in the future as accounting, fire prevention plans, and other standard management tools are today.

Sector Strategies

Many of EPA's programs are designed with a national scale in mind; however, customized strategies that hone in on special circumstances surrounding a problem can be highly effective, too. In recent years, EPA has found that working with specific industry sectors to improve environmental performance can reveal significant opportunities.

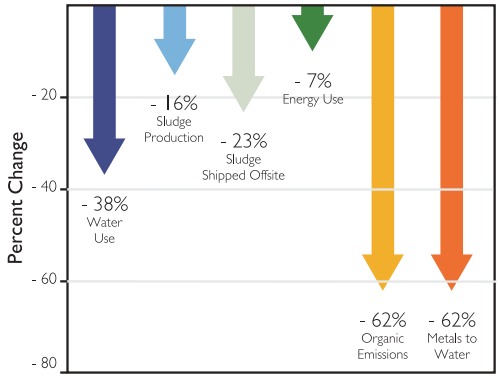
Through the Sector Strategies Program, EPA works with trade associations, state and local governments, and other constituent groups to reduce the environmental impacts of selected manufacturing and service sectors. Priorities include addressing regulatory barriers that can stand in the way of better performance, promoting widespread use of EMSs developed with sector-specific operations in mind, and developing measures to track environmental performance on a sector-wide basis.

EPA expanded this program in 2003 to 12 sectors. Collectively, they comprise 700,000 establishments that employ more than 11 million workers and contribute 23 percent of the value of manufacturing shipments in the United States. Each year, these sectors spend more than $8 billion on pollution control—approximately 30 percent of the national total—yet they still present significant opportunities to reduce their impacts on air, water, and land.

The value of this sector-based approach can be seen in results from the metal finishing industry. In the late 1990s, metal finishers began working with EPA, states, and other stakeholders on a comprehensive set

of environmental performance goals. As the chart to the right shows, in 2003, participating facilities reported that organic air emissions and toxic discharge fell by more than 60 percent. Water use fell by more than one-third, while the amount of sludge shipped offsite was cut by nearly a quarter. While these improvements were being made, EPA worked with stakeholders to address regulatory concerns. For example, after learning how requirements under the Resource Conservation and Recovery Act might be limiting beneficial reuse of metals from metal finishing waste streams, the Agency is now considering changes that would allow easier recovery of metals from low-toxicity sludge.

Results from the Metal Finishing Strategic Goals Program 2003



Percentage reductions by participating facilities from 1992 baseline; reductions normalized by $ of sales using most current available data.

Working with the industries' trade associations has been an effective method for promoting EMSs to a large number of businesses, and each industry is encouraging EMS development in its own way. For example, in 2003, EPA developed tailored EMS instructional guides and booklets explaining the business benefits of an EMS for several sectors. Now, a number of industries are using EPA tools and support to set up national EMS development programs. For example, the Association of General

EPA's Sector Partnerships

- Agribusiness
- Cement manufacturing
- Colleges & universities
- Construction
- Forest products
- Iron & steel manufacturing
- Metal casting
- Metal finishing
- Paint & coating
- Ports
- Ship building & ship repair
- Specialty-batch chemicals

Contractors is completing an EMS guide and preparing training for its 35,000 members of the construction industry. Meanwhile, EPA and the American Association of Port Authorities launched a project to help 11 major ports adopt EMSs, with a focus on related port security issues.

Several trade associations are adding EMSs to their environmental stewardship initiatives. EPA and the Synthetic Organic Chemical Manufacturers Association recently completed an EMS template that will be part of the association's Responsible Care® Management Systems program. Likewise, the American Meat Institute is using an EMS template as part of a new performance improvement program for its members.

Integrated Compliance and Enforcement Strategies

Compliance assistance, which gives the regulated community information and support to understand and follow regulatory requirements, is an important tool for protecting public health and the environment. It can be delivered in many forms, including environmental management guides and checklists, Web-based resource centers, and onsite visits. Another tool is enforcement, which imposes penalties on businesses and other organizations that fail to meet regulatory requirements. Enforcement also may entail a range of activities, from administrative orders to criminal sanctions. Both tools are valuable and can be effective independently, but EPA is finding their value can be magnified greatly when used together.

The benefits of an integrated strategy can be seen in EPA's approach to protecting children from lead-based paint. Lead poisoning is a major health concern for children—one that can cause seizures, comas, and even death. Under federal law, businesses and individuals that sell or rent property are required to let potential residents know about lead-based paint hazards and provide information explaining the risks in detail. After publicizing these requirements through inspections, seminars, mailings, and public service announcements, EPA launched several activities with the

Assisting Small Businesses

According to the final report of the Small Business Paperwork Relief Task Force, there are more than 22 million small businesses in America, and many of them are subject to environmental regulations. Yet smaller companies often do not have the time or resources needed to fully understand regulatory requirements. Recognizing this challenge, EPA has developed resources specifically for small businesses. These resources include a national hotline that routinely responds to more than 1,000 calls per month and environmental management guides, checklists, and workbooks that help small business owners assess and improve their environmental performance. In all, EPA has more than 100 small business initiatives underway, and a **Small Business Strategy** completed in 2003 is unifying them in a way that has never been achieved before. By improving understanding and coordination of these activities, EPA aims to provide small businesses with the assistance they need most as efficiently and effectively as possible.

Department of Housing and Urban Development (HUD) to encourage real estate companies to disclose and address any failures to provide relevant information about lead risks.

The first activity provided real estate companies with a valuable incentive—substantially reduced or eliminated penalties for voluntarily disclosing mistakes and agreeing to address the problem. This incentive was offered in 11 cities with significant lead risks. Having provided information about what was required and an incentive to encourage compliance, EPA then followed up with enforcement actions against firms that had not fulfilled their responsibilities. A second activity involved examining the compliance records of the nation's largest landlords and using the results to target potential enforcement action. In one case, a national real estate firm was required to test for lead and address lead-related problems in 130,000 apartment buildings in 47 states. Finally, EPA and HUD, along with the Department of Justice, began conducting joint inspections in lead "hot spots" identified by local governments. One of those cases, which involved obstruction of justice, ultimately led to a criminal prosecution—a first for a case involving lead disclosure.

In addition to integrating compliance and enforcement at the federal level, EPA is supporting integrated strategies by states. With support from EPA, the state of California, for example, launched a study of chrome-plating businesses in the South Coast Air Basin and found that less than a quarter of firms were complying with environmental requirements. Through targeted compliance assistance, inspections, and enforcement, California boosted compliance rates to 80 percent within three years. Similar results were achieved in Colorado, where inspections showed most asphalt facilities were out of compliance. After providing compliance assistance and providing facilities with performance reports, more than 90 percent came into compliance.

Incentives

In an effort to build a better working relationship with regulated entities and encourage environmental improvements that exceed the minimal requirements of law, EPA is building more incentives into its programs and policies. One valued incentive is regulatory flexibility, which gives environmental managers more choice in deciding how to achieve a regulatory goal in a way that best suits their operations.

In recent years, EPA has begun offering more flexibility to proven environmental leaders. For example, in 2003, EPA added regulatory incentives to its most comprehensive program for recognizing environmental leadership—the National Environmental Performance Track. This program, which has more than 340 members, provides rewards and recognition to select facilities that meet certain environmental performance criteria. Members will soon receive regulatory advantages, such as the option of storing hazardous materials onsite twice as long as allowed for other facilities. By reducing hauling offsite, this action will cut air emissions, energy use, transport costs, and paperwork.

> "Incentive-based programs present genuine opportunities that should be aggressively pursued by all levels of government, the private sector, and the NGO community,"
>
> —John Flatley, Performance Track Participants Association

Another benefit cuts in half the reporting required under certain Clean Air Act provisions. "Incentive-based programs present genuine opportunities that should be aggressively pursued by all levels of government, the private sector, and the NGO community," said John Flatley, executive director of the Performance Track Participants Association.

> "Since management quality is the primary driver of stock returns, environmental performance turns out to be an excellent indicator of stock market potential."
>
> —Frank Dixon, Innovest

Public recognition, such as media attention, awards, and use of distinctive logos, also provides a valuable incentive for improving environmental performance. Organizations can use public recognition to build market share, improve community relations, and—as Performance Track members have seen—increase investor confidence. In 2003, Innovest, an investment advisory firm, began using Performance Track membership as a factor in developing the ratings used to guide investment decisions. "Since management quality is the primary driver of stock returns, environmental performance turns out to be an excellent indicator of stock market potential," said Frank Dixon, managing director of Innovest. The company's action shows the value of public recognition and sets the stage for increased consideration of environmental performance by others in the investment advisor industry. Indeed, earlier this year, two additional investment firms—Calvert Group, Ltd and KMD Research and Analytics, Inc.—announced they would also begin using Performance Track membership in their ratings.

Strengthening Our Innovative Partnership with States and Tribes

EPA's interest in environmental innovations is mirrored at the state level. As the primary implementor of environmental programs, states are in excellent position to gauge how well environmental programs are working and recognize opportunities for improving them. As such, EPA is supporting state-led innovations in a number of ways.

Providing Financial Support

Because funding shortfalls can hinder new ideas from getting off the ground, EPA launched a new competitive grant program in 2002 to support state innovation. This program focuses on innovations surrounding a core regulatory responsibility—environmental permitting. Seven states received a total of $750,000 to explore new permitting approaches—from online systems that simplify the permit application process to alternatives that replace conventional permits with more comprehensive environmental management agreements. Based on the strong state response, EPA announced a second grant competition in 2003 that also focuses on improving permitting.

> "EPA's most important partnerships are those with states and tribes . . . (they) are closer to the front lines of environmental protection and must be an integral part of a strategy to obtain better results through innovation."
>
> —EPA Innovation Action Council

Setting Priorities Jointly

No matter how large or small the task, states and EPA can accomplish more by working together. Today, EPA works with many states to agree upon common priorities using principles set forth in the National Environmental Performance Partnership System (NEPPS). This system was established in 1995 with the intent of promoting joint planning and priority-setting between states and EPA. While it has been helpful, states continue to raise concerns about the extent of their influence.

State Innovation Grants

Exploring New Approaches to Environmental Permitting

Arizona is developing an automated system for stormwater permitting that allows users to go online to make applications, check on permit status, and learn about compliance requirements.

Colorado is pilot testing performance-based, multimedia permits for facilities that use environmental management systems as a basis for meeting regulatory requirements while committing to continual environmental improvements.

Delaware is using self-certification procedures, compliance assistance, and performance measurement to replace traditional permits for the autobody maintenance and repair sector.

Illinois is developing a system that allows permit-holders to make certain permit modifications without prior regulatory approval if they have demonstrated strong environmental stewardship by adopting a formal environmental management system.

Massachusetts is creating a watershed-based permitting system that integrates point and non-point source controls to create a total maximum daily load for nutrients.

Oregon is creating a streamlined process for managing sediments that will enable faster and more economical decisions about beneficial reuse and disposal options.

Texas is integrating a requirement for environmental management systems into air and water permitting programs to help drive continuous environmental improvement.

Agreeing on the need to better align priority-setting and improve the NEPPS process, EPA and states endorsed enhancements in 2003 that increase state input in EPA's planning and budgeting processes. These enhancements focus on achieving environmental results, engaging states and tribes early on, making priority-setting as open and inclusive as possible, and minimizing transaction costs.

> "The challenge to EPA and the states is finding clear, distinctive ways to evaluate performance . . ."
>
> —National Academy of Public Administration
>
> *Environment.gov: Transforming Environmental Protection for the 21st Century*

One of the biggest changes for states and EPA is the development of regional plans. Under federal law, EPA is required to prepare a national strategic plan every three years. Many states prepare their own plans, covering various time frames. For the first time, EPA is placing new emphasis on strategic planning at the regional level.

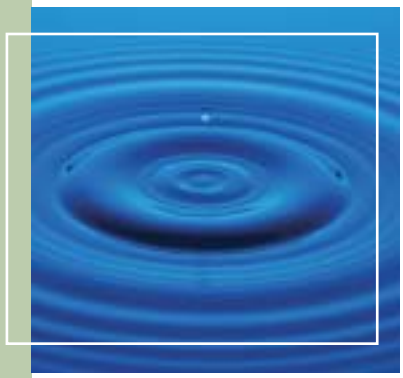
Under the new model, EPA regions—working in consultation with states and tribes—develop plans that address regional conditions and protection needs. In addition to focusing work at the regional level, these plans explain how progress will be made in achieving national environmental goals and lay the groundwork for preparation of national program guidance. Finally, by creating more opportunity for dialogue, this model facilitates the preparation of performance partnership agreements, which set out what states and EPA will do to accomplish environmental goals, and annual grant work plans, which describe how states will manage funds received from EPA. Performance partnership grants allow states to combine funds and gain the greatest management flexibility.

Collaborating to Solve Problems

While the improved process described in the previous section will create more opportunities for states and EPA to engage on priority issues, the Joint EPA/State Agreement to Pursue Regulatory Innovation provides a vehicle specifically for exploring innovations. Under this agreement, states and EPA work together to identify innovative approaches for improving environmental protection and remove regulatory barriers that can hinder environmental progress.

Since the establishment of this agreement in 1998, states have launched more than 50 projects designed to improve environmental programs and policies. For example, EPA Region 5 and Michigan are testing a simplified process for handling certain automobile wastes. Under the Resource Conservation and Recovery Act (RCRA), wastewater sludge from some automobile manufacturing processes is classified as hazardous waste due the presence of certain toxic constituents. In recent years, automakers have eliminated or reduced the toxicity in sludge through process changes. Yet their sludge has remained on the hazardous waste list because under regulations, the process of "delisting" a waste must occur facility-by-facility and usually takes about two years to complete. Michigan proposed a simplified process applicable to multiple facilities. In addition to saving resources, this approach reduces the amount of waste being disposed in hazardous waste landfills and creates an incentive for automakers to minimize the hazardous constituents in their wastewater sludge. EPA is now adapting this approach to expedite delisting decisions for other automobile manufacturing plants in the region. Moreover, results are being evaluated to determine the need for a change in the RCRA regulations. Ultimately, this project may have even wider effects, as a simplified approach is considered for other industries that manage hazardous waste.

In an effort to further address issues of common interest, states and EPA began developing a joint innovation work plan in 2003. This plan targets three problems. Community toxics was chosen because toxic exposure can occur from many different and diffuse sources. Recognizing that conventional regulatory controls may not be feasible or sufficient, states and EPA agreed to explore community-based strategies that can address risks at the local level. The second priority is expediting the development of TMDLs. By exploring innovative approaches, such as developing multiple TMDLs required for a water body simultaneously, and by considering ways to use flexibility provided under existing regulations, states and EPA hope to put more of these important water quality improvement strategies in place. The final area for collaboration is hazardous waste permitting under RCRA. Hazardous waste transport and disposal is highly regulated, and the states and EPA recognize the need to explore options for making those regulations more efficient and effective.



Replicating Innovative Successes

As new ideas evolve, states and EPA are working together to expand the use of innovative approaches that have already proven successful. One of the best examples is the Environmental Results Program (ERP). Created by the state of Massachusetts, this program focuses on improving environmental performance among small businesses, particularly those that have not received significant regulatory attention in the past. ERP takes an unconventional approach to helping small businesses meet their environmental responsibilities. Rather than issuing environmental permits to each business, the state provides small businesses in certain sectors with the information and assistance they need to check and self-certify compliance with requirements. Using a set of performance measures, the state then tracks environmental progress across the sector as a whole. This approach is enabling environmental improvement and a level of outcome reporting that was previously unavailable. For example, before this program, Massachusetts found only 33 percent of dry cleaners were performing routine leak checks for perchloroethylene emissions; three years after this program was initiated, the percentage had doubled. Similarly, before the program, 60 percent of Massachusetts' photo-processing firms were complying with a limit on silver discharges; one year into the program, the rate had jumped to 98 percent.

This alternative approach to small business compliance has other advantages. Because it is less burdensome than conventional regulatory approaches, more small businesses are apt to participate. Indeed, after three years, Massachusetts had increased the number of dry cleaning operations tracked in its databases by 85 percent. And, with its self-certification procedures, this program enables the state to target inspection resources to higher-priority problems. Based on the results, and with EPA assistance and encouragement, nine states are now establishing similar programs to address small business sectors.

Sharing Lessons Learned

The Environmental Results Program described in the previous section is the kind of innovation that can benefit many states and inspire environmental professionals to rethink how they might achieve environmental goals. To gain more exposure to new ideas, the states and EPA joined with the Council for Excellence in Government in 2003 to host a national symposium on environmental innovation. Over two days, participants had an opportunity to share a variety of insights and experiences. First held in 2000, this forum is the only one of its kind for states and EPA to discuss innovations shaping the next generation of environmental progress.

Fostering Innovation in EPA's Culture and Organizational Systems

The same commitment to improving results that is driving innovation within EPA's programs, policies, and partnerships with others is also influencing the Agency's internal operations. Under the leadership of EPA's Innovation Action Council, the Agency has focused on creating a culture of innovation—one that enables and rewards environmental problem-solving by staff. As the preceding section describes, EPA has realigned planning and budgeting systems with states. In addition to achieving better coordination with states, this approach creates more opportunities to incorporate innovation priorities into strategic resource and management decisions. This section highlights some of the additional changes EPA has made to foster innovation internally.

Capitalizing on Managerial Talent

While depth of knowledge and continuity can be valuable assets for managers, there are also advantages to having leadership with fresh perspectives and ideas. In an effort to bring the full value of EPA's

> "Innovation must become an attitude, an outlook, and an integral part of EPA's daily work."
>
> —EPA Innovation Action Council

managerial talents to bear in addressing environmental challenges, EPA rotated nearly a quarter of its senior mangers to new positions in 2002. Managers from voluntary programs were moved into regulatory positions and vice versa. In some cases, managers were switched to entirely new

A National Center for Environmental Innovation

A year after the release of *Innovating for Better Environmental Results: A Strategy to Guide the Next Generation of Environmental Progress*, EPA showed its commitment to innovation again by creating a National Center for Environmental Innovation (NCEI). Designed to fill a special role at EPA, this organization focuses on finding ways of achieving better environmental results. It does so by supporting the full cycle of innovation—starting with testing of new ideas, continuing with evaluations to measure results, and ultimately helping others apply approaches that prove successful. NCEI also runs a set of multimedia programs that help to improve environmental performance in businesses, communities, states, and other government agencies. These include **National Environmental Performance Track** and **Sector Strategies**, as well as programs that focus on smart growth and support for small businesses.

NCEI
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media, so that approaches commonly used to address one type of problem, such as waste, could be factored into strategies for addressing other issues, such as air pollution or water quality. As envisioned, these exchanges are resulting in more cross-fertilization of ideas, perspectives, and experiences, and providing the leadership needed to drive innovative approaches in environmental programs.

Tearing Down Organizational Barriers

In addition to spurring exchange of ideas, the management rotations enacted in 2002 are also helping to overcome organizational barriers within EPA. These barriers are a remnant of EPA's organizational development—one that evolved in response to the passage of environmental laws. As laws were passed for specific purposes, EPA set up national programs to oversee implementation. This approach has been effective in addressing many issues, but it is not as effective for addressing problems that involve more than one media, such as air or water, and need a more holistic approach.

One of those issues is growth and development. Across the country communities and individuals are realizing that growth patterns have significant impacts on the environment, the economy, and overall quality of life. These impacts include loss of open space and farmlands; more polluted runoff flowing from paved surfaces into lakes and streams; and more driving, air pollution, and traffic. Through the national Smart Growth Network, EPA is working with other federal agencies, state and local governments, developers, environmental groups, and communities to identify common ground on a range of growth and development issues.

EPA's work is designed to improve understanding of growth issues through research and policy development, information and outreach, and technical tools and assistance. Often this work is conducted in partnership with other organizations. For example, EPA and the International City/County Management Association developed *Getting to Smart Growth: 100 Policies for Implementation*. More than 100,000 copies were distributed around the country after issuance, while 30,000 copies of a second volume, containing additional policies, were distributed in just the first three months following publication. Meanwhile, EPA's National Award for Smart Growth Achievement provides a high-profile method of recognizing smart growth policies and practices by cities, states, other public entities, communities, and developers.

Reducing the environmental impacts of buildings represents an important opportunity for achieving smart growth. Nationwide, buildings use 66 percent of all energy, contribute 25 percent of greenhouse gas emissions, and generate 40 percent of all solid waste entering landfills. Rather than addressing these and other impacts individually, EPA is drawing environmental expertise from multiple programs to address buildings holistically. In the Mid-Atlantic region, EPA Region 3 is helping the Philadelphia school district incorporate "green building" into a $1.5 billion capital campaign, while work with commercial developers has already resulted in the greening of a major Philadelphia office tower. In addition to supporting others, EPA is also promoting green building at its own facilities. EPA's recently completed campus in Research Triangle Park,

North Carolina (see photo, opposite page), incorporates hundreds of green features and is a model for other organizations. Hundreds of visitors, including many international guests, have toured the facility in the past two years to learn from EPA's example.

Sharing Information to Spur Innovation

Enhancing information flow throughout an organization fosters greater creativity and innovation by facilitating the exchange of ideas. To this end, EPA's national waste program set up an innovation workgroup with representatives from all parts of the organization, who meet routinely to discuss new ideas and issues needing attention. Similarly, EPA Regions 2 and 10 established "innovation networks" to bring together staff from multiple programs to share information about new approaches.

Recognizing the importance of innovation in achieving air quality goals, EPA's 10 regional air directors also created an information sharing network. Led by EPA's regional office in Dallas, the EPA Center of Excellence for Air Innovations/Futures is used to facilitate communication about innovative approaches and to set up innovation teams to address specific priorities.

> "EPA's regional offices are in many ways at the crux of institutional changes the agency needs. Some of the regions have already organized along multimedia lines and have become powerful forces for innovation and organizational change."
>
> —National Academy of Public Administration
>
> *Environment.gov: Transforming Environmental Protection for the 21st Century*

While the networks described above are helpful for sharing information across organizations, vertical information flow—up and down the organizational chain—is important, too. With this in mind, the national enforcement and compliance assurance program established a Creativity and Innovations Change Board to provide a direct conduit for staff to reach management with new ideas. One idea involves using more incentives to encourage environmentally responsible redevelopment and reuse of contaminated properties. As a result, EPA is now developing new incentives, such as supplemental environmental projects for green building,

to complement conventional enforcement tools. In addition, EPA is working with other government agencies to identify and bring even more incentives to bear on redevelopments. The Creativity and Innovation Change Board has been instrumental in enabling this work by providing a venue for internal communication and collaboration.

Evaluating Innovations to Assess Value

Evaluations play a critical role in the innovation process, generating results that enable decisionmakers to determine whether an approach has value and merits further use and investment. Through an internal Improving Results Competition, EPA invests in evaluations to help improve environmental programs. Some of those resources are directed specifically at innovation projects. For example, an evaluation of a market-based approach to controlling air pollution in California identified key features that, if designed differently, might have addressed the unexpected increase in the price of emission credits. The results were used by the EPA Clean Air Act Advisory Committee and in other venues where innovative approaches to air quality improvement are considered.

Another evaluation of state watershed management programs reaffirmed the national water program's decision to reorient around watersheds. Some of the benefits found from a watershed approach included improvements in the quality and quantity of water quality monitoring data, better planning and assessment capabilities, and more efficient and equitable permitting programs. In addition to informing program management decisions, these and other evaluations are building EPA's capacity to analyze program results and creating awareness about the important role that evaluation plays in the development and use of new approaches.

Setting Aside Funds to Explore New Ideas

Because of the lead times required for planning, and the tendency to favor well-established programs, innovative projects can often have difficulty competing for resources in the standard budgeting process. With this in mind, several EPA offices have created competitive funding programs to allow innovative projects to be introduced and acted upon quickly. After

setting up a new office to spur innovation, the national waste program, for example, also established a fund to test new approaches to waste minimization, energy recovery, recycling, and land revitalization. One project led by EPA Region 9 in San Francisco is testing the placement of environmentally preferable products on television shows to raise consumer awareness. Through the efforts of another project in North Carolina, 1,750 tons of waste will be diverted from landfills by reusing wood pallets as wood flooring. Additionally, at least 12 new jobs will be created. Along with demonstrating the environmental and economic benefits that can be achieved with new approaches, these projects are creating models that can be replicated to improve results on a larger scale.

Creating Awards for Innovation

One of the same incentives EPA uses to encourage environmental improvement by external partners—awards—is being used to spur environmental innovation internally. For example, EPA's Office of Enforcement and Compliance Assurance instituted the Assistant Administrator's Award for Excellence in Innovation. A second award—the Best Practices for Innovative Practices in the Enforcement and Compliance Assurance Program—recognizes innovations that can provide models for others. In the national waste program, a new Assistant Administrator Priorities Award recognizes an individual or team that has helped to advance program priorities in an innovative manner.

Several EPA regions have established innovation awards as well. In the Northwest, EPA Region 10 selects an "Innovation of the Year." In 2003, that award was presented for a state-of-the-art modeling tool for assessing the impacts of current or planned forestry burns. Whether planned or accidental, the air quality impacts of these burns can be significant. The Blue-Sky/RAINS system gives EPA and other users a way to visualize and analyze these impacts over the entire affected area. Work is now underway to extend this valuable tool to other parts of the country and to consider how it might be adapted to address other environmental issues. In the Northeast, EPA Region 2 also recognizes employee innovation. A recent award was given for an electronic emergency contact information system that will allow the region to provide a faster, more effective response when faced with an emergency situation.

Conclusion

In 2002, EPA released a strategy to guide the next generation of innovation in environmental programs. Two years later that effort has proven influential in many ways. This report shows how EPA is changing its mode of operation to foster innovation and provides examples of innovative approaches being used throughout the country. Many of those innovations offer models that can be applied in other places and on a much larger scale. Therein lies the real power of innovation—taking ideas that show promise, testing their value, and then applying proven concepts to increase the newfound benefits many times over.

The EPA Innovation Action Council based its innovation strategy on a vision for an improved system of environmental protection for the 21st century, one that:

- Focuses on performance and results
- Emphasizes environmental stewardship
- Takes a comprehensive and integrated approach to problem-solving
- Uses market-based incentives
- Emphasizes partnership and stakeholder collaboration

Evidence of these attributes can be found throughout this report—partnerships and collaborative problem-solving, in particular, are mentioned routinely.

So has this vision of an improved environmental protection system been achieved? Not yet, but change is underway. Indeed, through the power of innovation, it does appear increasingly within reach.

For More Information

EPA gleaned information from numerous sources to produce this report, and much of it can be found on the Agency's Web site. The following list identifies the major topics discussed in each section, and provides Web site addresses for obtaining more information.

Introduction

"Innovating for Better Environmental Results: A Strategy to Guide the Next Generation of Innovation at EPA"
http://www.epa.gov/innovation/plan/final4_10.pdf

Improving Water Quality

Water Quality Conditions in the United States
http://www.epa.gov/305b/2000report/factsheet.pdf

2003 Watershed Initiative
http://www.epa.gov/owow/watershed/initiative/selected.pdf

"Water Quality Trading Policy"
http://www.epa.gov/owow/watershed/trading/finalpolicy2003.html

Trading—Regional and State Examples
http://www.epa.gov/owow/watershed/tradelinks.html

Watershed-based Permitting
http://cfpub.epa.gov/npdes/wqbasedpermitting/wspermitting.cfm

Meeting Water Infrastructure Needs

The Clean Water and Drinking Water Infrastructure Gap Analysis
http://www.epa.gov/owm/gapfact.pdf

EPA Forum "Closing the Gap: Innovative Responses for Sustainable Water Infrastructure"
http://www.epa.gov/water/infrastructure/GapForum.htm

Applicability of the Safe Drinking Water Act to Submetered Properties
http://www.epa.gov/fedrgstr/EPA-WATER/2003/December/Day-23/w31588.htm

Reducing Greenhouse Gas Emissions

ENERGY STAR® and Change a Light, Change the World Campaign
www.energystar.gov

Climate Leaders
http://www.epa.gov/climateleaders/

Smart Way Transport
http://www.epa.gov/smartway/

Best Workplaces for Commuters Program
http://www.bwc.gov

"ENERGY STAR® and Other Voluntary Programs 2002 Annual Report"
http://www.epa.gov/appdstar/pdf/cppdann02.pdf

Reducing Smog

Ground-level Ozone
http://www.epa.gov/airnow/health/

Particle Pollution
http://www.epa.gov/air/urbanair/pm/index.html

Clean Diesel Program
http://www.epa.gov/otaq/diesel.htm

Voluntary Diesel Retrofit Program
http://www.epa.gov/otaq/retrofit/

Adopt-a-School Bus Initiative
http://www.epa.gov/region6/6xa/adopt_a_school_bus.htm

Clean School Bus USA
http://www.epa.gov/cleanschoolbus/

Proposed NO_x and SO_2 Trading Program
http://www.epa.gov/clearskies/

Early Action Compacts
http://www.epa.gov/air/eac/

Reducing Waste

Resource Conservation Challenge
http://www.epa.gov/epaoswer/osw/conserve/

Electronics Recycling
www.plugintoecycling.org

Design Challenge for E-Commerce Shipping Packaging and Logistics
http://www.epa.gov/epaoswer/non-hw/reduce/epr/products/pfed.html

Brownfields Program
http://www.epa.gov/brownfields/

Land Revitalization Agenda
http://www.epa.gov/swerrims/landrevitalization/agenda.htm

One Cleanup Program
http://www.epa.gov/swerrims/onecleanupprogram/docs/OCPFactSheet.pdf

Reducing Chemical Risks

Pollution Prevention (P2) Framework
http://www.epa.gov/oppt/p2framework/

Sustainable Futures Initiative
http://www.epa.gov/opptintr/newchems/sustainablefutures.htm

Design for the Environment
www.epa/gov/opptintr/dfe

Green Chemistry
www.epa.gov/greenchemistry

Pesticide Environmental Stewardship Program
http://www.epa.gov/oppbppd1/PESP/

Addressing Regional Priorities

Green Building Design Competition
http://www.nyc.gov/html/moec/pdf/competition.pdf

Regional Vulnerability Assessment Program
http://www.epa.gov/reva/

Developing Innovative Tools and Approaches

EPA Draft Report on the Environment
http://www.epa.gov/indicators/roe

Environmental Technology

Environmental Technology Opportunities Portal
http://www.epa.gov/etop

Science to Achieve Results Program
http://es.epa.gov/ncer/grants/

People, Prosperity, and the Planet Award Competition
http://es.epa.gov/ncer/p3/

Environmental Management Systems

EPA Position Statement on Environmental Management Systems
http://www.epa.gov/ems/policy/own.htm

National Database on Environmental Management Systems: Project Final Report
http://ndems.cas.unc.edu/final_report.htm

Sector Strategies

Sector Strategies Program
http://www.epa.gov/sectors/

Metal Finishing
http://www.epa.gov/sectors/metalfinishing/

Integrated Enforcement Strategies

Lead Disclosure Settlement
http://yosemite.epa.gov/opa/admpress.nsf/b1ab9f485b098972852562e7004dc686/3f92045482734fc085256b43006d136a?opendocument

Small Business Information
http://www.epa.gov/smallbusiness/

Unifying EPA's Small Business Activities: A Strategy to Meet the Needs of Small Business
http://www.smallbiz-enviroweb.org/html/pdf/Strategy_Final_062303.pdf

Incentives

Performance Track
http://www.epa.gov/performancetrack/

Innovest Announcement
http://yosemite.epa.gov/opa/admpress.nsf/0/7b9462a8420e654085256d820074d586?OpenDocument

Strengthening Our Innovation Partnership with States and Tribes

State Innovation Grants
http://www.epa.gov/innovation/stategrants/

National Environmental Performance Protection System
http://www.epa.gov/ocir/nepps/

"Joint EPA/State Agreement to Pursue Regulatory Innovation"
http://www.epa.gov/fedrgstr/EPA-GENERAL/1998/May/Day-05/g11799.htm

Environmental Results Program
http://www.epa.gov/permits/02summary.pdf

State–EPA Environmental Innovation Symposium
www.excelgov.org/epa

Fostering Innovation in EPA's Culture and Organizational Systems

National Center for Environmental Innovation
www.epa.gov/innovation

Evaluation Support
http://www.epa.gov/evaluate/index.htm

Smart Growth
www.epa.gov/smartgrowth

Green Buildings
www.epa.gov/oppt/greenbuilding/

Blue Skies/RAINS System
http://blueskyrains.org

National Academy of Public Administration
http://www.napawash.org/pc_economy_environment/recent_publications.html

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