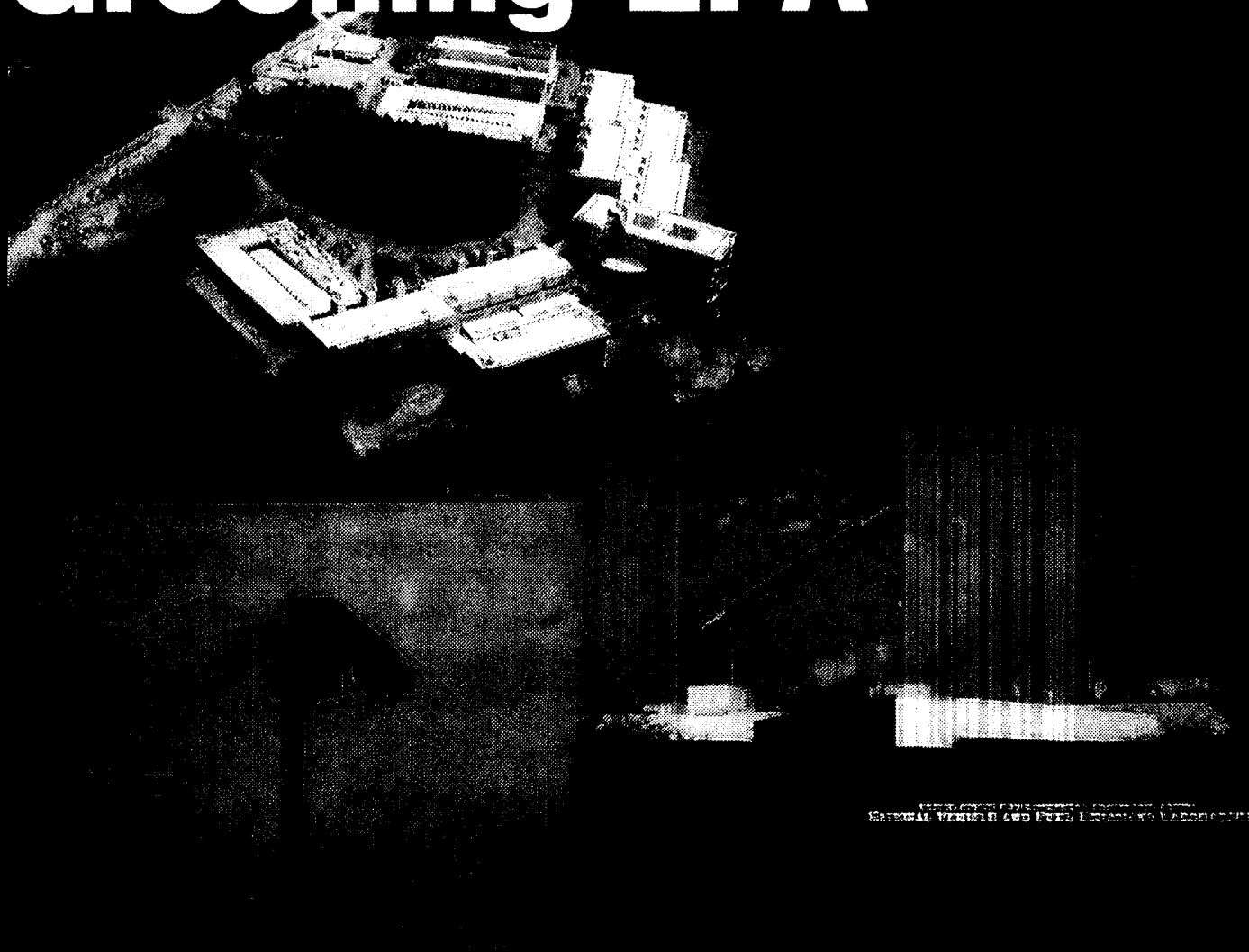


# Greening EPA



ARCHITECTURE, ENGINEERING, AND REAL ESTATE BRANCH  
NATIONAL VISITOR AND PUBLIC LIAISON LABORATORY

The Architecture,  
Engineering, and  
Real Estate Branch's  
Greening Activities

The first of these is the fact that the  
 government has been unable to  
 maintain a stable currency. This  
 has led to a loss of confidence  
 in the government and a  
 consequent loss of support  
 from the people. The second  
 is the fact that the government  
 has been unable to maintain  
 a stable economy. This has  
 led to a loss of confidence  
 in the government and a  
 consequent loss of support  
 from the people. The third  
 is the fact that the government  
 has been unable to maintain  
 a stable society. This has  
 led to a loss of confidence  
 in the government and a  
 consequent loss of support  
 from the people.

# Greening EPA

The Architecture, Engineering, and  
Real Estate Branch's Greening Activities

**March 2001**  
**DRAFT**

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# Acronym List

|        |   |
|--------|---|
| AEREB  | Architecture, Engineering, and Real Estate Branch                           |
| BEES   | Building for Environmental and Economic Sustainability                      |
| BTU    | British Thermal Units   |
| CFC    | chlorofluorocarbon  |
| CPG    | Comprehensive Procurement Guidelines  |
| DDC    | Direct Digital Controls   |
| DOE    | U.S. Department of Energy   |
| EOs    | Executive Orders  |
| EPA    | U.S. Environmental Protection Agency  |
| EPACT  | Energy Policy Act of 1992   |
| ESPCs  | Energy Savings Performance Contracts  |
| FMSD   | Facilities Management Services Division                                     |
| GSA    | U.S. General Services Administration  |
| HVAC   | Heating, Ventilation, and Air Conditioning                                  |
| IUCRC  | Industry/University Cooperative Research Consortium                         |
| Labs21 | Laboratories for the 21st Century   |
| LEED   | U.S. Green Building Council's Leadership in Energy and Environmental Design |
| NVFEL  | National Vehicle and Fuel Emissions Laboratory, Ann Arbor, Michigan         |
| OA     | Office of Administration  |
| PV     | photovoltaic  |
| RTP    | Research Triangle Park, North Carolina                                      |
| SFB    | Sustainable Facilities Branch   |
| SFOs   | Solicitations for Offers  |
| VOC    | Volatile Organic Compounds  |

# Executive Summary

Over the past decade, the U.S. Environmental Protection Agency's (EPA's) Architecture, Engineering, and Real Estate Branch (AEREB) has initiated an impressive number of measures to make the Agency's facilities more environmentally and financially sustainable. Recognizing the importance for the Agency to "walk the walk," AEREB took early proactive measures, utilizing a full range of opportunities, to increase EPA's energy and water efficiency and improve environmental performance well before other EPA branches or federal agencies. AEREB's management remains highly committed to its environmental programs, which ensures that innovative ideas are considered seriously and that EPA remains on the cutting edge of environmental performance.

Initially, AEREB's efforts focused on energy efficiency upgrades, such as ensuring that facilities were GREEN LIGHTS<sup>1</sup>-compliant. AEREB soon recognized, however, that despite the significant improvements in lighting energy efficiency, energy usage from lighting is only 10 percent of most EPA buildings' energy consumption. As a result, AEREB dedicated itself to expanding its efforts to improve energy efficiency beyond lighting upgrades.

It began investigating ways to further improve the environmental performance of its buildings by increasing water efficiency and incorporating the use of environmentally preferable building materials. AEREB has even tested technologies that would be considered "experimental" by some. Many of these technologies, such as bioretention (using soil and plants to remove contaminants), have proven very successful, while others, such as desiccant cooling in laboratory buildings, were abandoned after poor results. It is AEREB's willingness to take risks, however, that has allowed EPA to stand out among its peers in the energy efficiency and pollution prevention arena.

AEREB's main focus has been on improving the environmental performance of EPA's laboratories because they are the only facilities owned by the Agency. AEREB is also working with the General Services Administration (GSA), which owns most of EPA's office facilities, to incorporate sustainable features and practices in EPA-occupied office buildings.

This report discusses AEREB's sustainability and pollution prevention efforts to date, including energy and water conservation, waste prevention and recycling, green buildings, and affirmative (environmentally preferable) procurement practices. It also addresses facility-specific projects broken out by laboratory and regional office.

AEREB's efforts have resulted in EPA facilities becoming models of success for other agencies and organizations. Recognizing the importance of ensuring that EPA continues on the path to sustainability, in 2000, AEREB gave certain responsibilities to the newly formed Sustainable Facilities Branch (SFB). SFB will focus on sustainable practices policy and project implementation full-time, which reflects the importance EPA places on this issue. In addition to highlighting AEREB's past successes, this report will serve as a reference for measuring EPA's future sustainability and pollution prevention efforts.

EPA's National Vehicle and Fuel Emissions Laboratory in Ann Arbor, Michigan, was retrofitted with a comprehensive, integrated energy system that is expected to reduce energy consumption by at least 66 percent and water consumption by 80 percent.

Environmental criteria included in its solicitation for remodeled office space saved EPA's Region 3 almost \$1 million in reduced labor, management, and material costs.

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<sup>1</sup> GREEN LIGHTS is an early EPA program encouraging government agencies and major corporations to install energy-efficient lighting systems. Using such energy-saving technology decreases electricity consumption and reduces the need for additional power plants, which can be significant sources of pollution.





# Introduction

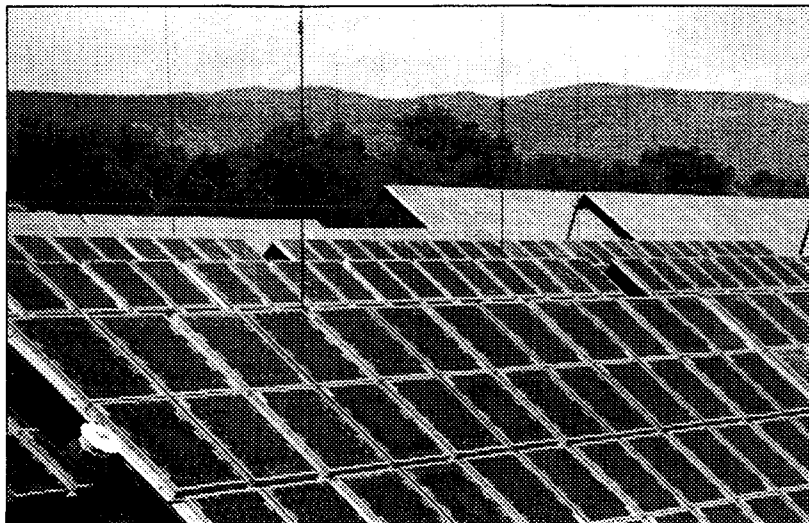
**A**EREB resides within the Facilities Management Services Division (FMSD) of EPA's Office of Administration (OA). OA provides management services, infrastructure, and operations that enable EPA to apply its mission of protecting human health and the environment within its own facilities. Within this framework, AEREB is responsible for acquiring and improving all EPA facilities, including both headquarters buildings and labs and offices across the country. EPA facilities include offices and laboratories in government-owned, EPA-owned, EPA-leased, or GSA-leased space. There are 146 EPA facilities located throughout 78 cities in 38 states across the country, including 20 EPA-owned laboratory facilities.

Several regulations and Executive Orders (EOs) support AEREB's efforts to improve the sustainability of Agency facilities. The Energy Policy Act of 1992 (EPACT) requires federal agencies to reduce energy consumption and to report energy use in buildings and vehicles. Using 1985 as a baseline year, EPACT requires federal agencies to reduce energy use in nonindustrial facilities 10 percent by 1995, 20 percent by 2000, and 30 percent by 2005. EPACT, however, specifically excluded energy-intensive facilities such as laboratories. In 1993, EPA voluntarily decided to report its laboratories' energy and water consumption levels and to meet or exceed the stricter energy reduction goals set for less energy-intensive, nonindustrial facilities.

In early 1997, the Office of Federal Procurement Policy amended the Federal Acquisition Regulations, consistent with legislative authorities provided in EPACT, permitting federal agencies to utilize commercially available financing techniques called Energy Savings Performance Contracts (ESPCs) to finance energy efficiency projects in federal facilities. An ESPC is a form of third-party financing that funds energy-savings upgrades with future utility bill savings, allowing EPA to incorporate energy-efficient technologies without committing capital funds.

EO 13123, *Greening the Government Through Efficiency in Energy Management*, which was signed in 1999, strengthens the EPACT requirements by mandating that agencies reduce energy consumption in nonindustrial facilities 30 percent by 2005 and 35 percent by 2010. EO 13123 also mandates that industrial facilities, including laboratories, meet established energy efficiency goals—20 percent by 2005 and 25 percent by 2010—using a 1990 baseline. In 2000, EPA switched its energy consumption reporting to the industrial facilities category, despite the fact that using the 1990 baseline makes it tougher for EPA to achieve these goals since significant reductions occurred between 1985 and 1990.

In addition to EO 13123, several other EOs promote pollution prevention as the preferred environmental management technique throughout the federal government. They include EO 12856, *Federal Compliance With Right-to-Know Laws and Pollution Prevention Requirements*; EO 12845, *Purchasing Energy-Efficient Computer Equipment*; and EO 13101, *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*. EPA's sustainability initiative incorporates all of these mandates into a single comprehensive strategy.



# Overview of AEREB's Pollution Prevention and Sustainability Accomplishments

## Energy and Water Conservation

AEREB has initiated several efforts to reduce the energy and water that its facilities consume. EPA produced an annual consumption report for 1995 showing that the energy efficiency improvements that AEREB had implemented helped EPA meet EPACT reduction requirements of 10 percent when compared with the 1985 baseline. AEREB also concluded at this time that it could achieve further reductions through an aggressive energy efficiency improvement program focused on laboratories' heating, venting, and air-conditioning (HVAC) systems, which account for about 70 percent of a laboratory's total energy consumption. AEREB, for example, is adopting the use of manifolded exhausts for lab fume hoods, which will allow laboratories to capture waste heat that can be used to lower energy consumption.

AEREB has used ESPCs to fund many of its HVAC upgrades because they require significant investments that couldn't be financed with EPA's buildings and facilities funds alone. By using ESPCs, AEREB has produced performance-based contracts with guaranteed energy-efficiency achievements of greater than 60 percent, which will help EPA meet the 20 percent reduction goal in 2000.

Several years ago, AEREB worked with the White House Climate Change Task Force to ensure that EO 13123 would exclude renewable—or "green"—power used by any federal facility from its total energy consumption. This was determined because little or no pollution is associated with renewable power. Given this flexibility, AEREB began to issue solicitations for purchasing green power at several facilities. (See Section III on AEREB's Facility-Specific Accomplishments for more detail on facilities receiving green power.) AEREB will ensure that EPA meets the 20 percent reduction goal by 2005 by purchasing green power for additional facilities.

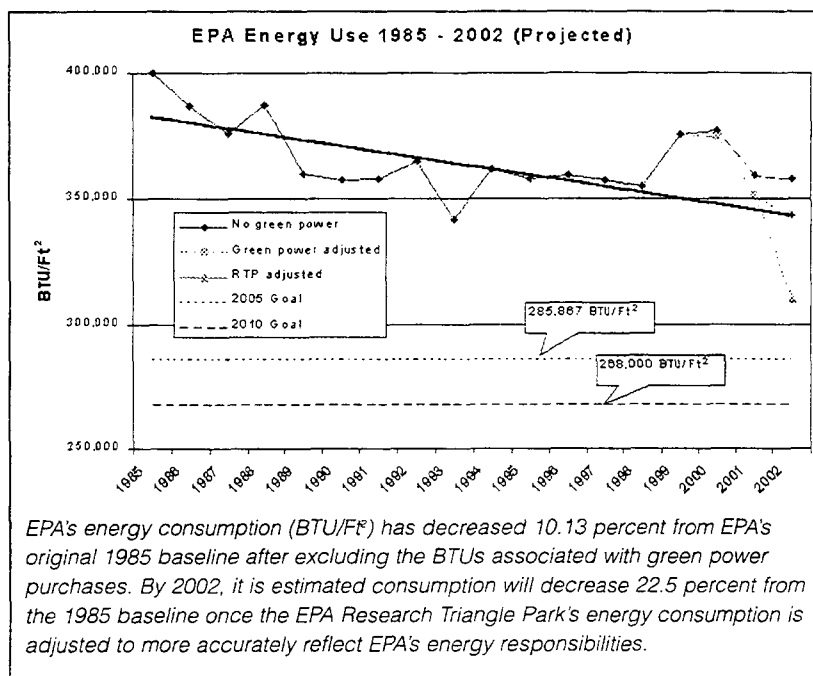
The Agency's facilities have a high rate of energy consumption compared with more traditional government facilities. This is partly because EPA laboratories are energy-intensive, utilizing one-pass air requirements for safety

reasons. EPA's laboratories also have strict temperature and humidity level requirements and use energy-intensive equipment. Despite these challenges, AEREB's energy-efficiency improvements are significantly reducing the Agency's energy consumption.

## Waste Prevention and Recycling

In 1994, EPA launched its Paperless Office Campaign to reduce office paper use by 15 percent within 2 years. The campaign led to a 25 percent reduction in photocopying, saving 56 million sheets of paper. As part of this ongoing campaign and in response to various EO requirements, EPA continues to reduce paper use in its facilities nationwide.

At the end of 1997, EPA Headquarters formally reviewed its recycling program, including the types and amounts of waste generated, the capture rate for recyclables, and the potential waste



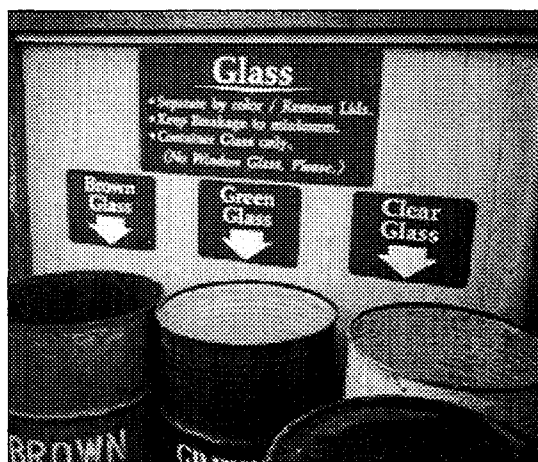
reduction options. This review showed that EPA Headquarters had achieved an overall capture rate of 86 percent for all recyclables (e.g., glass, aluminum cans, office paper, newspaper, plastic, cardboard). The amount of waste generated per employee also decreased significantly when compared with the previous formal study conducted of the Headquarters in 1992. These results show that EPA's source reduction and recycling efforts have successfully affected employee disposal patterns at EPA Headquarters.

### **Recycling at Work**

Fourteen regional facilities and laboratories collected almost 2 million pounds of paper products, almost 200,000 pounds of cardboard, more than 3,500 pounds of aluminum, more than 4,000 pounds of glass, and nearly 1,300 pounds of plastic for recycling in 1998, according to an informal EPA survey.

### **Green Buildings Program**

Green buildings incorporate sustainability in design, renovation, and maintenance programs. AEREB has implemented green building strategies in both newly constructed buildings and renovation projects. To promote a healthy and productive working environment, AEREB's Green Buildings Program has incorporated energy and resource efficiency principles, applied waste reduction and pollution prevention practices, and improved indoor air quality. Numerous solicitations for offers (SFOs) for construction and renovation projects have included green building practices such as the segregation and collection of recyclable materials during construction and demolition activities and the reuse of existing building materials (e.g., doors, cabinetry, moldings). In addition, SFOs have specified use of environmentally preferable building products and materials, promoted low VOC-content adhesives, and required the use of wood from sustainably harvested forests. (Details on facilities in which AEREB has incorporated green building design principles can be found in Sections III and IV.)



### **Affirmative Procurement**

In August 1995, EPA initiated its Environmental Procurement Strategy in response to EO 12873, which was subsequently replaced by EO 13101, *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*. In addition to supporting an environmental/recycling hotline, requiring contractors to comply with certain directives, and maximizing use of nonozone-depleting products and services, EPA's Affirmative Procurement Program began focusing on new standards for recycled paper, ENERGY STAR<sup>2</sup>-compliant computers and other electronic equipment, and sustainable construction. EO 13101 also requires EPA's Comprehensive Procurement Guidelines (CPG) program to designate recycled-content products for purchase by government agencies and to recommend recycled-content levels for these items. The EO requires all federal agencies to increase purchases of recycled-content items and other environmentally preferable products and services.

All EPA offices and laboratories strive to meet the goals of EO 13101. EPA facilities responding to an EPA survey indicated that all current and future office paper purchases meet or exceed the EO's 30 percent postconsumer recovered-content requirement; all CPG purchases adhere to the recommended postconsumer recovered-content levels; and all office equipment purchases were ENERGY STAR-compliant by 1998.

### **An EPA Commitment**

All current and future office paper purchases meet or exceed the 30 percent postconsumer recovered-content requirement of EO 13101.

<sup>2</sup> ENERGY STAR is a voluntary partnership between DOE, EPA, and product manufacturers, local utilities, and retailers. ENERGY STAR-labeled products use less energy than other products, save money on utility bills, and help protect the environment.

# AEREB's Facility-Specific Accomplishments

## Energy and Water Conservation

By designing new EPA labs that are energy- and water-efficient and by improving existing labs' energy and water conservation efforts, AEREB is helping the Agency build a sustainable future.

EPA has chosen a number of different energy-efficient technologies and pollution prevention strategies to implement at its facilities, including the following:

- ◆ High-efficiency HVAC systems.
- ◆ Direct digital controls (DDC) to automate building operation.
- ◆ Natural gas-fired, high-efficiency hot water boilers and chlorofluorocarbon (CFC) -free electric chillers.
- ◆ Windows and skylights that reduce the amount of solar heat entering facilities.
- ◆ Natural lighting and energy-efficient electrical lighting.
- ◆ Solar heaters that conserve electricity and fossil fuel.

### **The Changing Face of HVAC**

AEREB has focused on various modifications to HVAC systems to improve their efficiency, including installing ground-source (geothermal) heat pumps and variable air-volume fume hoods, upgrading fan motors, and incorporating automated energy management and building control systems and modular fume hood controls.

Between 1997 and 1999, EPA's total water consumption rose 4.5 percent, but EPA added three new facilities during this time. Excluding the new facilities, the Agency's water consumption dropped 6.3 percent, thanks to AEREB's water-efficiency upgrades and an emphasis on water conservation.

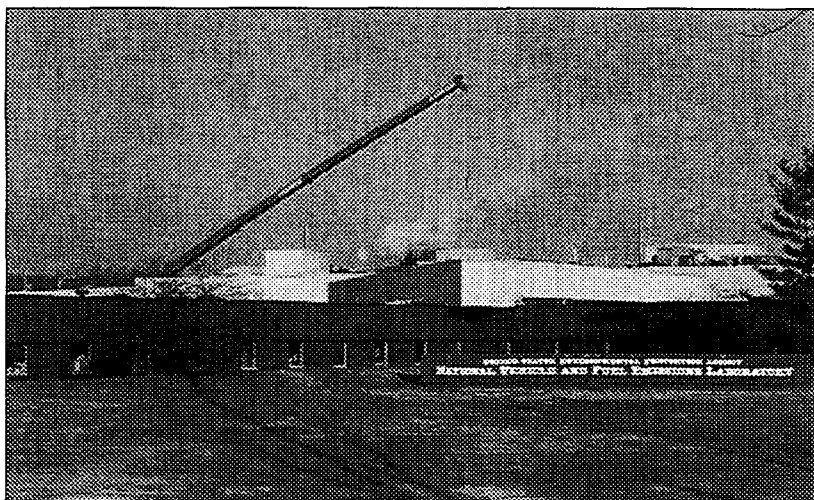
Between 1990 and 2000, AEREB completed CFC removal from many of the chillers in its laboratories and also increased the energy efficiency of the chillers. Since 1995, AEREB has pursued a program to improve HVAC performance in EPA laboratories, and recently, AEREB has installed night setback and variable air-volume systems for EPA laboratories, in accordance with EPA's Safety, Health, and Environmental Management Division. Until recently, EPA's laboratory energy consumption was meeting the 10 percent reduction goal. This reduction was the

result of a combination of efforts, including EPA's GREEN LIGHTS Program, CFC energy-efficient chiller replacements, and improved facility management, especially at the Ann Arbor, Michigan, facility. In 1999 and 2000, EPA's energy consumption increased, also due to the addition of the new facilities. EPA is expecting to meet EO 13123's 20 percent energy reduction requirement by 2005 through the completion of two major ESPC projects, continuation of energy efficiency

upgrades in new and existing laboratories, and the increase of green power purchases at several facilities.

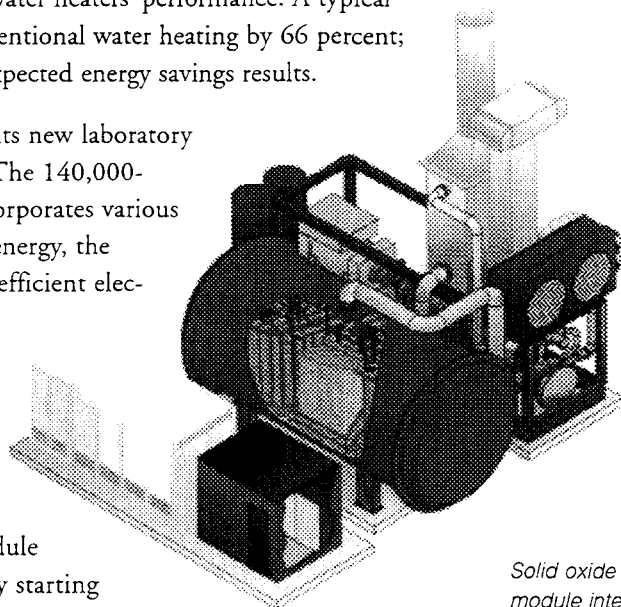
The following highlights summarize activities that individual laboratory facilities have initiated to improve their energy and water conservation performances:

- ◆ **Ann Arbor, Michigan:** An ESPC was awarded at the National Vehicle and Fuel Emissions Laboratory (NVFEL) in 1998. By replacing old, unreliable equipment with a comprehensive, integrated energy system that guarantees an energy



consumption reduction of at least 66 percent, NVFEL is the first laboratory eligible for the ENERGY STAR label. The facility's HVAC system utilizes a DDC system that minimizes the energy needed to maintain optimum airflow throughout the building. Natural gas-fired, high-efficiency hot water boilers and CFC-free electric chillers provide heating and cooling, and a 200-kilowatt fuel cell has been installed. Variable frequency motors minimize the energy required by major fans and pumps. Other features include windows and skylights that reduce the solar heat load entering the facility while also reducing the number of lights needed. That number is further reduced because of an "uplighting" design that offers indirect room lighting from a bright ceiling. The facility also incorporates occupancy sensors that automatically turn lights off in unoccupied rooms. The new equipment at NVFEL is operational as of March 2001 and is expected to be realizing benefits in the near future. This upgrade was completed without adversely affecting research functions at the facility.

- ◆ **Cincinnati, Ohio:** This facility made several energy-efficient upgrades, including a new HVAC system, improved windows and insulation, a new energy-efficient boiler and boiler controls, energy-efficient elevator motors, and a closed-loop glycol cooling tower. The facility also has a revolving door to optimize temperature and building pressure and features enthalpy recovery from boiler exhaust.
- ◆ **Duluth, Minnesota:** The facility reduced its energy consumption by 18 percent from 1997 to 1999, partly by installing an energy and environmental management system that minimizes energy waste through improved equipment controls. The facility also installed energy-efficient windows in 1997.
- ◆ **Edison, New Jersey:** Three solar water heaters, installed at the end of 1998, are the primary hot-water sources for the facility. The solar heaters allow the facility to conserve electricity and fossil fuel by relying on the electrical system only for auxiliary water heating when needed. The solar heating systems feature preheat tanks that hold 66 to 120 gallons of water. The systems also include roof-mounted, single-glazed, liquid-evacuated tube collectors. The largest system also has a meter that helps measure the water heaters' performance. A typical solar heating system decreases the need for conventional water heating by 66 percent; Edison's solar water heaters have exceeded the expected energy savings results.
- ◆ **Fort Meade, Maryland:** EPA began occupying its new laboratory facility at the Fort Meade Army Base in 1999. The 140,000-square-foot facility, which includes 70 labs, incorporates various environmental building elements. To conserve energy, the center maximizes natural light and uses energy-efficient electrical lighting. Lab spaces use variable air-volume technology to minimize heating and cooling costs while maintaining safety standards. To conserve water, the facility utilizes low-water flush units and keeps a separate water supply for cooling water. Plans are under way to operate a solid oxide fuel cell module integrated with a small gas turbine at the facility starting in mid-2001. The hybrid power system will have the highest electrical efficiency (60 percent) and lowest emissions of any power plant fueled by natural gas. The electricity produced will meet the laboratory's needs, with excess power contributing to the local power grid.



*Solid oxide fuel cell module integrated with a small gas turbine*

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- ◆ **Golden, Colorado:** In November 1999, the Denver Regional Laboratory began buying green power. Wind power provided 20 percent of the lab's electricity requirements. Since December 2000, however, 100 percent of the facility's power is wind-generated. The Region 8 laboratory facility also includes a DDC system that monitors HVAC operating conditions and a solar preheating system. The DDC system immediately notifies the facility of problems so the HVAC system can be restored to optimum operating performance as soon as possible, saving energy, time, and money.



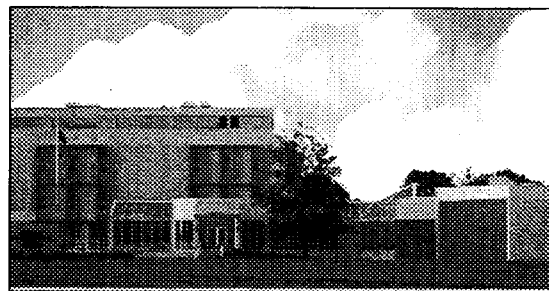
- ◆ **Gulf Breeze, Florida:** The Gulf Ecology Division of the National Health and Environmental Effects Research Laboratory generates power for two formerly unlit piers with a photovoltaic (PV) system. PV systems convert light energy into electricity. Nodal direct digital controls were also installed in the facility to minimize energy waste and to monitor indoor environmental quality, building security, and fire protection. In addition, timers were installed on approximately 20 electric water heaters to further reduce energy consumption. EPA hopes to award an ESPC for a facility energy upgrade in 2001.
- ◆ **Houston, Texas:** A cooling tower condensate return system conserves water and decreases operating costs at this facility. Without the system, a local water utility would have to supply the facility with larger volumes of water. Recent energy efficiency improvements include air-system modifications, an upgraded DDC system, and a night setback system that controls exhaust fans, laboratory fume hoods, and air supply.

- ◆ **Richmond, California:** This Region 9 laboratory served as the pilot for purchasing green power for EPA labs. Under EPA's first renewable electricity contract, the Sacramento Municipal Utility District supplies 100 percent of the laboratory's electricity from a landfill gas plant. The laboratory consumes approximately 1.8 million kilowatt hours of electricity annually, or enough to power 181 typical households. By purchasing renewable energy, the facility reduces greenhouse gas emissions associated with fossil fuel-based power by more than 2.3 million pounds per year. This is equivalent to reducing 2 million automobile miles in California.

### **Additional Efforts**

AEREB is also responsible for initiating many other water- and energy-efficient efforts that will lead to positive gains at EPA facilities in the future. Some of the major efforts include:

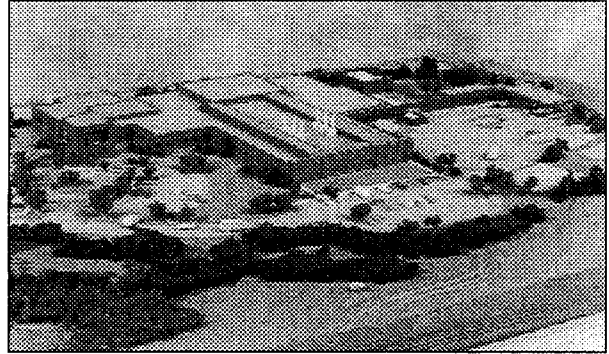
- ◆ **Ada, Oklahoma:** Plans include completely renovating the laboratory's HVAC system under an ESPC. This includes replacing the system with an environmentally preferable ground-source heat-pump system for heating and cooling, installing variable air-volume fume hoods to manage air supply and exhaust emissions, upgrading fan





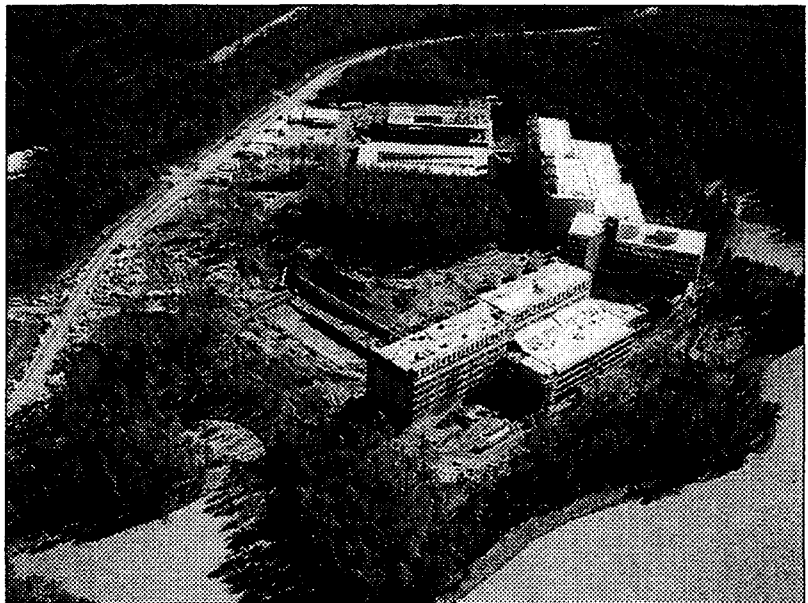
motors, and incorporating an energy management and building control system to allow modular control at each fume hood. The upgrades are expected to decrease the facility's energy use by a minimum of 60 percent and water use by 80 percent.

- ◆ **Chelmsford, Massachusetts:** EPA broke ground on its New England Regional Laboratory in 1999. The building's interior and exterior were designed to minimize energy consumption. Design elements include high-efficiency motors and variable flow pumping systems; water-chilled coolers; daylight dimmers, adjustable occupancy sensors, skylights, and energy-efficient light ballasts; variable air-volume HVAC systems; and active and passive solar design features. To conserve water, the facility will incorporate electronic sensors for restroom plumbing fixtures. Water from roof drainage will be used to replenish wetlands or to irrigate grassy areas. AEREB also coordinated with GSA to issue a contract for purchasing 100 percent wind-generated green power for the facility. When completed, the facility will be eligible for a silver rating from the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program, a significant achievement because the LEED criteria were designed for more traditional and less resource-intensive facilities such as office buildings.



- ◆ **Research Triangle Park, North Carolina:** The EPA campus at Research Triangle Park will consolidate a workforce that was previously spread out among several rented buildings. The National Computer Center and its host facility will represent one of the East Coast's largest PV installations and one of the largest single PV installations in a federal facility upon completion. The 100-kilowatt, integrated roof power system will convert sunlight into energy and feed it directly to the building. The energy will supplement the main power utility. The PV system's roof tile assembly uses PV cells backed with insulating polystyrene foam. This process turns solar energy into usable power and also improves the facility's thermal insulation. EPA partnered with the Virginia Alliance for Solar Electricity, Solarex, PowerLight, and DOE to gain financial assistance for this \$800,000 project. The project supports President Clinton's Million Solar Roofs Initiative, through which businesses, government agencies, and institutions will install solar energy systems on 1 million rooftops nationwide by 2010. It also supports President Clinton's commitment that the federal government will install 20,000 solar rooftop systems by 2010.

The EPA campus will use 40 percent less energy than standard laboratory and office construction. In addition to conserving nonrenewable fossil fuels and decreasing air emissions, the energy-efficient design will save more than \$1 million per year. The facility will use bioretention to treat storm water runoff. The campus will also feature low-flush toilets and flow-restricting faucet and shower nozzles to conserve water. A water-efficient cooling tower will also be incorporated.



- ◆ **Las Vegas, Nevada:** Energy savings feasibility studies have been initiated at this 60,000 square foot complex. Improvements will include replacing constant volume HVAC and fume hoods with variable air volume systems and upgrading the current lighting system with an even more energy-efficient system. Construction is expected to be completed in 2002.



# IV. EPA's Green Lease Riders

In addition to handling new construction and maintenance of EPA-owned facilities, AEREB has jurisdiction over GSA- and EPA-leased facilities. AEREB has worked to ensure that leased buildings are included in EPA's greening efforts. Using Green Lease Riders, which allow EPA to include environmental requirements in its standard lease agreements, AEREB has incorporated environmentally preferable features into several EPA-leased facilities.

## ***EPA Region 3's Green Lease Rider***

EPA Region 3's goal in finding new office space was to demonstrate to businesses and organizations that it is possible to incorporate environmentally preferable purchasing considerations when developing commercial and institutional space. In cooperation with GSA and AEREB, Region 3 successfully included environmental criteria in its solicitation for remodeled office space in an existing building in Philadelphia. In the process, Region 3 saved more than \$900,000 in reduced labor, management, and material costs. The Green Lease Rider included criteria requiring all prospective lessors to reuse as many materials as practical when remodeling the office space; to recycle as much construction and demolition debris as economically feasible; and to use materials with low environmental impacts. In addition, Region 3 restricted the solicitation to lessors in Philadelphia's central business district to promote use of public transportation by employees.

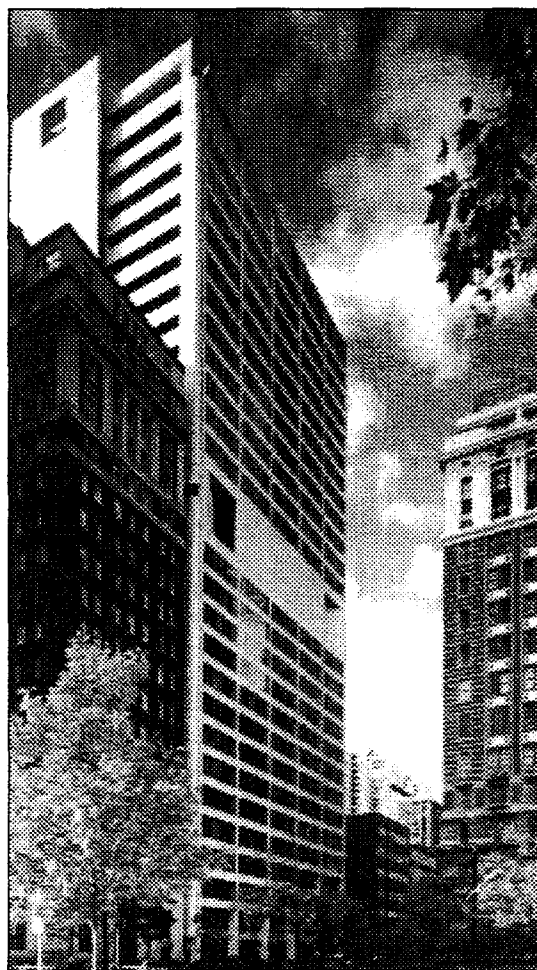
The Region 3 building includes the following environmentally preferable features:

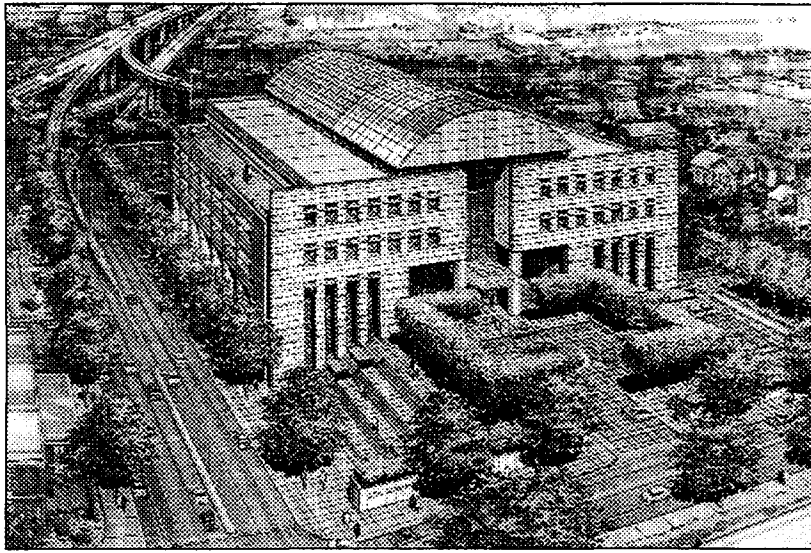
- ◆ Components of the HVAC system were retrofit and reused when feasible.
- ◆ All existing ceiling grid and more than 170,000 square feet (70 percent) of existing ceiling tiles were refurbished and reused.
- ◆ 260 oversized solid-core wood doors were refinished and reused.
- ◆ 3,000 lighting fixtures (80 percent) were retrofit with energy-efficient electronic ballasts and reused.
- ◆ All bathroom tiles, fixtures, and stalls were reconditioned and reused.

Several environmental considerations also were incorporated into the Region 3 building's interior design. Modular furniture replaced traditional furniture, enhancing flexibility and reducing the need to furnish individual offices. To enhance indoor air quality, low-VOC paints and adhesives were used, and no vinyl materials, which produce dioxin as a byproduct during their manufacture, were used. In addition, no endangered tropical woods were used in the remodeling process. Electronic light sensors were installed to automatically turn off lights in unoccupied areas. Region 3 located the building close to a rail hub and provided showers and interior bicycle spaces to encourage employees to use public transportation or alternative commuting methods.

Region 3 awarded the lease in November 1997, and 1,200 employees began occupying the newly designed and retrofit building in summer 1998.

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### ***Kansas City Regional Office***

Based on concepts used in the Region 3 Green Lease Rider, as well as specifications developed for the EPA campus in RTP, North Carolina, and additional research, AEREB developed a new version of a Green Lease Rider for the Kansas City Regional Office procurement process. The Green Lease Rider was issued as an amendment to GSA's original SFO for the Region 7 Regional Office in 1996.

The procurement involved the long-term lease of a new building specifically designed for EPA. The Green Lease Rider set environmental goals to encourage consideration of passive solar design features, day lighting, energy efficiency, and resource conservation.

In addition, it included specifications for energy-efficient lighting, water conservation features, use of recycled materials, and use of products and practices to protect indoor air quality.

In June 1999, the new 217,000-square-foot Kansas City Regional Office opened. The building has won a GSA Build Green Award and an EPA Gold Medal. Documenting the design construction process and environmental features incorporated into the building was an important element of the project. EPA, GSA, and the building developer produced a project booklet for others to use as a resource. Moreover, AEREB used the project documentation to set the bar even higher for the Kansas City Science and Technology Center Project (see below).

### ***Kansas City Science and Technology Center***

In early 1999, AEREB issued procurement documents for a new 39,000-square-foot laboratory in Kansas City, Kansas. Set up as a design competition, the procurement process emphasized sustainable building attributes. In evaluating proposals, AEREB encouraged and rewarded innovative resource conservation strategies. Based on its experience with the previous Kansas City Regional Office project, AEREB updated and improved the Green Lease Rider portion of the laboratory procurement. Specifications for recycled-content building materials, for example, were broadened and made more stringent. The Green Lease Rider also required the winning developer and its design and construction teams to work with EPA to thoroughly document the sustainable features of the building.

In collaboration with DOE's Federal Energy Management Program and GSA, Region 7 developed a Green Lease Information Package that was sent to all competitors for the contract. The package described nine specific green building elements and information that the contractor would be required to report to EPA throughout the construction process. The nine elements are:

- ◆ **Environmental Purchasing.** Includes use of the Building for Environmental and Economic Sustainability (BEES) software to weigh the economic and environmental performance of selected products.
- ◆ **Buying Recycled.** Includes meeting CPG requirements.
- ◆ **Solar Energy Applications.** Includes participation in President Clinton's Million Solar Roofs Initiative.

- ◆ **Green Buildings.** Includes participating in the U.S. Green Building Council's LEED building rating system. The contractor will be required to apply the LEED rating system to the lab and achieve Bronze Medal status.
- ◆ **Water Conservation.** Includes using water-efficient plumbing fixtures and strategies to reduce water in the HVAC equipment.
- ◆ **Energy Conservation.** Includes passive solar design approaches, daylighting, Low E glass, and renewable energy sources.
- ◆ **Natural Landscaping.** Includes developing a landscaping plan that incorporates native, low-maintenance species and that promotes water, energy, and habitat conservation.
- ◆ **Construction and Demolition Debris Reuse and Recycling.** Includes documenting material recovery strategies, quantities recycled, and cost and landfill space savings during the construction period.
- ◆ **Indoor Air Quality.** Includes meeting EPA's detailed indoor air quality requirements.

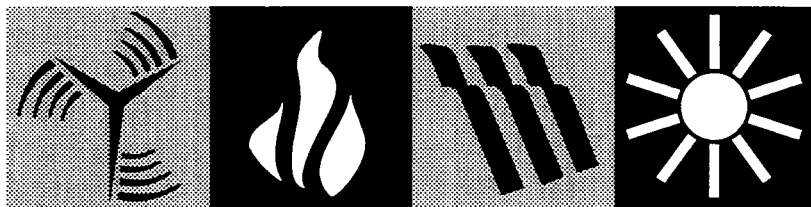
In August 2000, AEREB awarded the contract for the Kansas City Science and Technology Center. The winning design includes extensive day lighting, substantial use of recycled materials, efficient mechanical systems such as a heat recovery system, a rainwater capture system that will be used for toilet flushing, and native landscape species. Construction on the building is expected to begin in spring 2001.

# V. Education and Outreach

AEREB recognizes that the overall success of EPA's pollution prevention and sustainability efforts depends on educating and informing the Agency's facilities about the benefits and successes of various programs and the opportunities available to them. Following are a few examples of AEREB's outreach efforts:

## **Laboratories for the 21st Century (Labs21)**

Labs21 is a joint EPA/DOE initiative focused on upgrading the environmental performance of the nation's laboratories. The program's goals are to improve energy and water efficiency, encourage



## **LABS FOR THE 21ST CENTURY**

use of renewable energy resources, and promote environmental stewardship in U.S. laboratories. AEREB has incorporated the Labs21 approach in EPA laboratories and expects significant cost savings and environmental benefits as a result. By adopting the Labs21 approach, participating laboratories can achieve lower utility and operating costs,

reduce health and safety risks, improve facility management, reduce pollution and greenhouse gas emissions, earn national recognition, and receive other benefits.

Labs21 held its annual conference, which was attended by more than 250 individuals, in San Francisco September 6 through 8, 2000. In 2000, AEREB developed a prototype Partnership Agreement for Labs21 partners and is working with 14 potential Labs21 partners, including representatives from academia, federal agencies, and the private sector. Also in 2000, AEREB signed a Memorandum of Agreement with EPA's Project XL to streamline permit and compliance reviews for Labs21 participants. AEREB also set up a pilot program with DOE and EPA to provide technical support for Labs21 partners to study the challenges and achievements of these partners.

## **ENERGY STAR Buildings Program**



In 1997, EPA signed a letter of commitment to partner with DOE in support of the ENERGY STAR Buildings Program, demonstrating its desire to be an energy efficiency leader. The letter of commitment addresses two objectives. First, it reaffirms EPA's responsibility to install, by 2005, all cost-effective energy efficiency measures with a payback within 10 years or less. Second, it recognizes EPA's responsibility to serve as an example of excellence and leadership for ENERGY STAR Program implementation.

## **Incentive Programs**

EPA is an active participant in the DOE-sponsored "You Have the Power" campaign, which was started to increase awareness of energy efficiency throughout the federal government. EPA has recognized 19 EPA employees as energy champions. Selection criteria is based on an individual's effort and success in conserving energy through building design and operation and real estate transactions, and promoting energy efficiency awareness. Several promotional materials were developed for the campaign, including energy champion posters highlighting the selected EPA employees' energy efficiency achievements.

## Conservation Information Clearinghouse

AEREB established a clearinghouse and hotline to serve as a focal point for collecting and disseminating energy and water conservation information. The clearinghouse also maintains a library of information on topics such as energy management, energy-efficient technologies, chlorofluorocarbon management, and pollution prevention.

## Greening EPA Newsletter

In 1998, EPA redesigned and renamed its quarterly newsletter *Greening EPA*. The newsletter is a key communication mechanism about pollution prevention and sustainability activities for EPA Headquarters, facilities, and the public. It focuses on energy and water conservation and updates readers on EPA facility success stories, regulatory and policy information, upcoming events, training opportunities, and technology advances and applications.

## Awareness Packages

EPA distributes energy and water conservation awareness packages to all facility and energy managers annually. The package typically contains guidance and resource information to help managers implement energy and water awareness programs at their facilities. The awareness packages also present newly available concepts and technologies.

## Facility-Specific Procurement

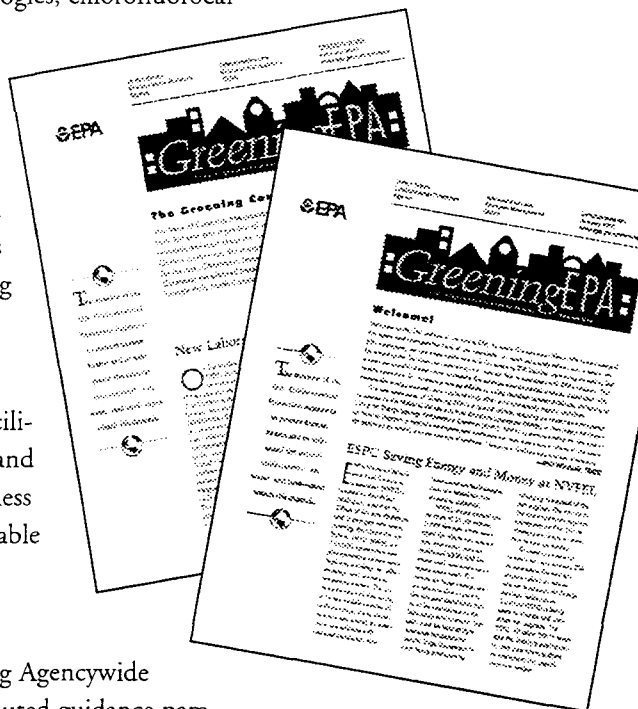
Individual procurement programs at EPA facilities are important to reaching Agencywide environmental purchasing goals. To this end, AEREB developed and distributed guidance pamphlets to encourage affirmative procurement. The pamphlets cover topics such as furniture management, cleaning products, and alternatively fueled vehicles.

## Sustainable Buildings

Through a collaborative effort with Public Technology Inc., the U.S. Green Buildings Council, and DOE, EPA issued the *Sustainable Building Technical Manual* in 1994 to help designers, builders, and owners and operators of public and private facilities implement green building strategies. The manual offers step-by-step guidelines for creating energy- and resource-efficient buildings in the predesign, design, construction, operations, and management stages.

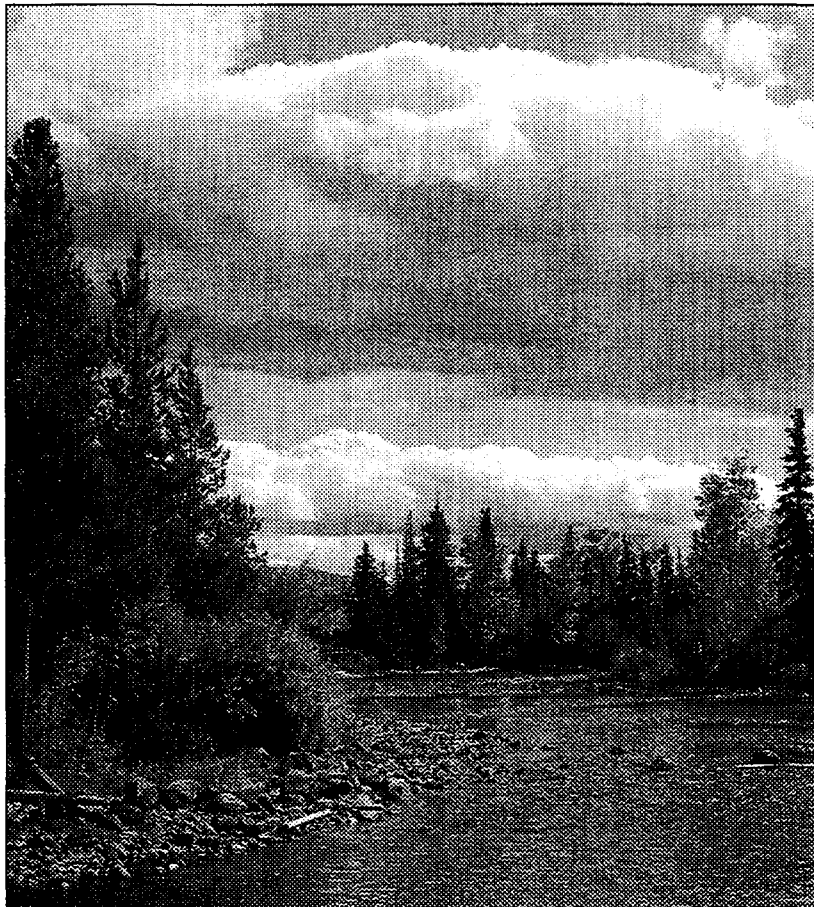
## Carnegie-Mellon University Partnership

EPA is a member of the Industry/University Cooperative Research Consortium (IUCRC) at the Carnegie-Mellon University Center for Building Performance and Diagnostics. With the National Science Foundation as an additional sponsor, IUCRC includes government representatives that help determine research priorities and encourage information transfer among groups. IUCRC research deals directly with environmental, economic, and industrial issues involved with the building industry. EPA's goal is to understand and demonstrate the environmental benefits of these advancements, including their applications and instrumentation, in its own buildings and facilities.



# VI. Conclusion

In April 2000, AEREB received approval to form the Sustainable Facilities Branch (SFB), which will augment AEREB's greening efforts. AEREB has learned from past experience to identify greening opportunities early and to incorporate green practices into all stages of the project, from planning and design through construction. SFB will take on a policy and implementation role, focusing on Labs21, best practices guidelines, demonstration projects for new technologies and renewable sources, green energy purchases, and coordinating ESPCs at existing facilities.



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