

U.S. Environmental Protection Agency

Energy Management and Conservation Program

Fiscal Year 2004
Annual Report



U.S. Environmental Protection Agency
Office of Administration and Resources Management
1200 Pennsylvania Avenue, NW (3101A)
Washington, DC 20460
December 22, 2004

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EXECUTIVE SUMMARY

The U.S. Environmental Protection Agency (EPA) is charged with protecting human health and the natural environment, and the Agency strives to set an example in its own facilities. In fiscal year (FY) 2004, EPA continued to improve the energy and water efficiency and environmental performance of its facilities through commissioning, mechanical system upgrades, green power purchases, water conservation efforts, storm water management projects, and sustainable new building design. The following is a snapshot of EPA's priority projects and the results achieved in FY 2004.

Results

In FY 2004, EPA's reportable energy use (with green power netted out) was 296,877 British thermal units (Btus) per gross square foot (GSF) per year,¹ down 17 percent from its FY 1990 baseline of 357,864 Btus per GSF per year. With the completion in October 2004 of a large green power purchase in Research Triangle Park (RTP), North Carolina, EPA is on track to exceed the FY 2005 Executive Order (E.O.) 13123 requirements to decrease reported energy use by 20 percent from the FY 1990 baseline. In FY 2003, EPA decreased reported energy use by 14.6 percent (green power netted out). In FY 2002, EPA decreased reported energy use by 22.4 percent (green power netted out)².

EPA intends to meet E.O. 13123 FY 2010 goals with a balanced approach of actual energy use reductions and green power purchases.

¹All FY 2004 EPA energy data have been collected and verified except the Human Studies Laboratory in Chapel Hill, North Carolina; because of data quality concerns resulting from a new chilled water billing system, EPA has used FY 2003 chilled water use as a proxy for FY 2004 chilled water use until these concerns can be resolved.

²In FY 2004, EPA's actual energy use (green power not netted out) was 355,773 Btus per GSF per year, essentially even with its FY 1990 reporting baseline of 357,864 Btus per GSF per year. In FY 2003 EPA's actual energy use (green power not netted out) was 326,455 Btus per GSF per year, representing an 8.8 percent reduction from EPA's FY 1990 baseline. In FY 2002, EPA's actual energy use (green power not netted out) was 303,078 Btus per GSF per year, or a 15.3 percent reduction from EPA's FY 1990 baseline.

Targeting Large Energy Users

In FY 2004, EPA's Facilities Management and Services Division (FMSD) continued to focus on the four large and energy-intensive facilities located in RTP, North Carolina. While many individual EPA laboratories have decreased energy use through various projects over the past several years, improved performance by the RTP laboratory complex, which uses approximately 50 percent of EPA's reportable energy, is critical to the Agency meeting the letter and spirit of the FY 2005 and FY 2010 goals outlined in E.O. 13123.

EPA is still working to fully realize energy efficiencies in the consolidated RTP facility. In FY 2004, EPA Headquarters and RTP staff continued to work jointly on a major commissioning effort at this laboratory and completed the development of new commissioning protocols. These protocols will optimize the operation of laboratory fume hood ventilation systems by safely lowering air flow during occupied and unoccupied times. Actual re-commissioning began on November 1, 2004, and should reduce energy at this facility 10 to 15 percent annually at completion. During FY 2004, FMSD also initiated re-commissioning projects in the 10-year-old RTP Human Studies Laboratory and completed a preliminary study of options to re-commission the National Health and Environmental Effects Research Laboratory in RTP. These efforts should result in performance improvements in these energy-intensive facilities by 15 to 20 percent upon successful implementation over the next two to three years. EPA Headquarters and RTP staff also continued work to install an energy metering system at the new Main Laboratory and National Computer Center in RTP to meet E.O. 13123 reporting requirements and allow the Agency to better manage the operations of these facilities. Current estimates put completion of the metering system at September 2005.

EPA also began implementing an energy master plan in FY 2004 at the Andrew W. Breidenbach Research Center (AWBERC) in Cincinnati, Ohio. The objective of the energy master plan is to improve energy efficiency at the AWBERC facility over the long term. AWBERC is the Agency's second largest research facility and consumer of energy. It is 30 years old and its HVAC infrastructure is approaching the end of its useful life. The energy master plan, completed in FY 2003, developed mechanical system replacement options that will increase laboratory space by 39 percent and cut energy use by 46 percent. At the end of FY 2004, a construction contract was awarded to replace the existing cooling towers and upgrade the chilled water distribution system—the first step in a seven-year, multi-million dollar project to

replace major AWBERC mechanical systems and improve its energy efficiency.

Mechanical upgrades designed to reduce energy use by approximately 15 percent were also completed in June 2004 at EPA's Atlantic Ecology Division Laboratory in Narragansett, Rhode Island, and a major mechanical system upgrade was put under contract in June 2004 at the Region 9 Laboratory in Richmond, California. This project should cut energy use 18 percent when completed in March 2005. These smaller laboratory projects demonstrate the Agency's commitment to targeting energy efficiency when any mechanical system overhaul opportunities arise.

Green Power Offsets Energy Use

While making physical and operational improvements to underperforming facilities will have the greatest positive long-term impact on the environment, EPA recognizes that it can reduce the current impact of its energy use through green power procurement. Since 1999, EPA has been a leader in purchasing and supporting the development of energy from new renewable sources. EPA continued to grow its Green Power Purchase Program in FY 2004, adding 11 facilities to the list of those already offsetting their electricity use by procuring "delivered" renewable energy or renewable energy certificates (also known as "green tags"). It also extended or replaced green power contracts at four facilities. At the end of FY 2004, EPA was receiving more than 40 percent of its electricity from green sources—the highest percentage of any federal agency—and has reduced the carbon dioxide emissions associated with its electricity use by 112,000 tons annually. Based on contracts recently completed, EPA will receive more than 75 percent of its electricity via green power in FY 2005.

In July 2004, EPA and its federal purchasing partners (the U.S. Department of Energy's (DOE's) National Renewable Energy Laboratory, the U.S. General Services Administration (GSA), the U.S. Department of Defense's Defense Energy Support Center (DESC), DOE's Federal Energy Management Program (FEMP), and DOE's Western Area Power Administration (Western) received a Presidential Award for Leadership in Federal Energy Management for its Green Power Purchase Program.

Sustainable Design Determines Future Facilities

EPA works to ensure that any new building it acquires is designed to maximize energy and water efficiency and improve environmental performance. New leased office buildings underway in Arlington,

Virginia, and Denver, Colorado, are required to achieve ENERGY STAR® Building labels and Silver or higher level certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED™) program, and incorporate various energy- and water-efficient features as well. In FY 2004, construction continued on the Early Learning Childcare Center in RTP, North Carolina, which was designed to LEED Silver standards. During FY 2004, EPA also adopted LEED Silver certification as a performance goal for its second laboratory annex in Cincinnati, Ohio, and applied for LEED Silver certification for the National Computer Center in RTP, North Carolina. EPA is also working with GSA on renovations to a historic federal courthouse in Boston, Massachusetts, to include sustainable features and achieve the ENERGY STAR Buildings label and LEED certification when EPA moves its Region 1 Office there in 2007/2008.

Through each of these FY 2004 priority projects, EPA is striving to be a model for other federal agencies on energy and water efficiency and sustainable facilities.

SECTION I: MANAGEMENT AND ADMINISTRATION

EPA recognizes that efficient energy and water management must involve senior EPA management as well as facility managers. This section describes EPA's energy management infrastructure and the management tools it uses to implement E.O. 13123, *Greening the Government Through Efficient Energy Management*, which mandates federal agency energy use reductions for laboratory and other industrial facilities of 20 percent by 2005 and 25 percent by 2010, measured from a 1990 baseline.

ENERGY MANAGEMENT

E.O. 13123 requires each federal agency to assemble a technical support team to encourage the use of appropriated funds to meet the energy efficiency goals and requirements of the order. EPA's Office of Administrative Services (OAS) is dedicated to meeting these requirements. Within that office, the Sustainable Facilities Practices Branch (SFPB) serves as an advocate, coordination point, and technical advisor on sustainable practices, policies, and project implementation to all of EPA's facility-related organizations and personnel. The branch is an example of the importance EPA places on energy efficiency, water conservation, and other sustainability issues. Key staff in the SFPB's energy team include the branch chief, a Laboratories for the 21st Century coordinator, two mechanical engineers, an architect, a water conservation/green power coordinator, and a pollution prevention and recycling coordinator.

Senior Agency Official and Energy Team

EPA has designated the Assistant Administrator (AA) of the Office of Administration and Resources Management (OARM) as the Agency Energy and Environmental Executive. Currently, the acting AA for OARM is David J. O'Connor.

Mr. O'Connor is supported by a national energy team located in OAS and the Facilities Management and Services Division (FMSD). SFPB's energy team works closely with architects and engineers from EPA's Architecture, Engineering, and Asset Management Branch (AEAMB) and ventilation safety experts from EPA's Safety, Health, and Environmental Management Division (SHEMD). EPA also receives support from the U.S. Department of Energy's (DOE's) National

Renewable Energy Laboratory and the Federal Energy Management Program (FEMP) on a project-specific basis. Site energy managers for each of the Agency's 29 reporting facilities are listed in Appendix D.

EPA's national energy team employs five principal approaches to meet the E.O. 13123 energy reduction goals of 20 percent by FY 2005 and 25 percent by 2010 (from a 1990 baseline):

- *Good design and oversight for new facilities:* For new facilities, such as the Kansas City Science and Technology Center that opened in FY 2003, the Agency gets involved early in the planning process and reviews projects regularly to ensure appropriate acquisition strategies, energy-efficient design, quality construction, extensive commissioning, and optimal operations.
- *Commissioning, re-commissioning, and retro-commissioning:* Where necessary, EPA re-commissions existing facilities that are not reaching their peak energy performance. Although the Agency's new Main facility in Research Triangle Park (RTP), North Carolina, was designed with many energy-efficient features, the laboratory has not been performing to EPA's expectations for energy use, so the Agency this year has continued its major re-commissioning effort launched in FY 2003.
- *Mechanical systems improvements:* For existing facilities, such as its laboratory in Narragansett, Rhode Island, EPA uses energy audits to identify energy saving opportunities, and then upgrades mechanical systems to reduce energy use.
- *Largest facilities first:* With limited funding and staff resources, EPA concentrates on its largest energy using facilities first. EPA has approximately 10 laboratories that account for 80 percent of its reportable energy use. The remaining 19 smaller labs account for only 20 percent of EPA's reportable energy use. Resources are best focused on larger facilities, with greater energy conservation potential.
- *Green power procurement:* EPA has also found green power to be a quick and effective way to reduce the Agency's environmental footprint at Agency laboratories and offices. Also, renewable energy demonstration projects serve to educate the public and develop markets for new technologies, such as a solar hot water heating system completed in October 2003 at EPA's San Francisco Regional Office.

To improve EPA's ability to manage energy use, EPA constantly improves the quality and usefulness of its energy reporting system. For example, in FY 2004, the Agency completed the verification of the gross square footage of its laboratories, adjusting the gross square footage of several laboratories to produce more accurate energy performance data. SFPB continued to collect copies of utility bills from facility managers to verify the data quality of energy and water consumption figures.

EPA made substantial progress in improving another part of its energy reporting system. Currently, EPA relies on estimates of energy use at two of its largest facilities (the new Main laboratory and National Computer Center in RTP) that together account for approximately 40 percent of the Agency's energy use. The energy metering systems for these new buildings were not functional at the time construction was completed. In FY 2004, the Agency completed a statement of work to design, install, and operate a Web-based utility metering system. Installation should be completed by the end of FY 2005, improving EPA's ability to measure and manage energy at these facilities.

Energy Reporting

EPA energy and facility managers report their energy and water consumption figures to Headquarters on a quarterly basis, and extensive quality control is conducted by comparing reporting forms to monthly utility bills and tracking quarterly data against the same time period in previous years. EPA also continues to send quarterly email updates on energy consumption to facility managers and senior program managers; data include energy consumption on a year-to-date basis, increases or decreases from previous periods and the FY 1990 baseline, and laboratory-by-laboratory performance comparisons. EPA managers can compare their energy performance against their peers and their historic energy use.

MANAGEMENT TOOLS

EPA realizes that the commitment of its employees to improve energy efficiency is vital to achieving the Agency's goals to reduce energy and water consumption. EPA's energy management team uses awards and incentives, as well as continuing education and training programs, to support individual and team efforts in energy efficiency.

Awards (Employee Incentive Programs)

On July 15, 2004, EPA received a DOE Presidential Award for Leadership in Federal Energy Management for its Green Power Purchasing Program. This award recognized EPA for acquiring, by March 2004, 40 percent of its electricity from green power. Because of new contracts completed during the second half of FY 2004 and the first quarter of FY 2005, the Agency currently offsets more than 75 percent of its electricity use with green power. EPA employees in Headquarters and nationwide worked

in cooperation with DOE's National Renewable Energy Laboratory, the U.S. General Services Administration (GSA), the U.S. Department of Defense's Defense Energy Support Center, DOE's Federal Energy Management Program, and DOE's Western Area Power Administration to acquire green power for 15 of its facilities. EPA and its several partners were recognized for their teamwork and results. EPA receives the highest percentage of green power of any major federal agency.

Also in FY 2004, SFPB expanded its internal peer awards program, collectively known as the "Btu Buster Awards," first established last fiscal year. The program recognizes and encourages energy and water conservation among EPA facility managers and building design and construction personnel. The following winners were recognized at EPA's Buildings and Facilities Conference in San Francisco, California, in February 2004:

- Frank Price of the Robert S. Kerr laboratory in Ada, Oklahoma, received the Btu Buster of the Year award for his determination and persistence to complete an energy savings performance contract (ESPC), resulting in a 50 percent energy reduction at the laboratory.
- Russ Ahlgren of the Atlantic Ecology Division Laboratory in Narragansett, Rhode Island, received the Leading Edge Award for making EPA's first major biodiesel purchase.
- Rick Koch of the Andrew W. Breidenbach Research Center in Cincinnati, Ohio, received the Energy Partner Award for the second year in a row for his support and vision leading to the acceptance of the Cincinnati Infrastructure Replacement Master Plan.
- A second Energy Partner Award went to Howard Wilson of the Safety, Health, and Environmental Management Division for his support on several facility projects that will help reduce EPA's energy use and greenhouse gas emissions for years to come.
- Rolly Santos of the Architecture, Engineering, and Asset Management Branch also received an Energy Partner Award for continuing to assess the energy use impacts of his projects, as demonstrated in the Region 10 Manchester Laboratory expansion.
- The newly created H₂Overachiever Award went to John Begley of the Region 7 Office in Kansas City, Kansas, for his work on that facility's water softener and cooling project, which will save approximately 900,000 gallons of potable water per year.
- A second H₂Overachiever Award went to Rick Dreisch for water conservation projects at the Fort Meade, Maryland, Environmental Science Center (ESC). The projects are expected to save more than 1.9 million gallons of potable water per year.
- Andy Franke received the Energy Reporter of the Year Award for timely and accurate energy reporting for the complex laboratory facilities in Cincinnati, Ohio.

Two EPA employees and one cross-agency team including EPA were also recognized this year by the DOE Federal Energy and Water Management Awards for individual achievement:

- Rick Dreisch of the Fort Meade, Maryland, ESC received a Federal Award for water conservation for his efforts to consistently conserve water use at ESC. Under Dreisch's careful tracking and management, ESC's water consumption dropped more than 26 percent during FY 2003, or 1.74 million gallons compared to FY 2002.
- Kurt Johnson, director of EPA's Green Power Partnership, received a Federal Award for exceptional service for his work in helping identify the restructuring of electricity markets, encouraging agencies to purchase renewable energy, and leading the development of EPA's Green Power Partnership, a voluntary program that includes more than 350 public and private sector partners with a combined total commitment to more than 1.2 billion kilowatt hours of green power annually.
- Members of EPA's Atlanta Regional Office, in cooperation with GSA, the owners of the Sam Nunn Atlanta Federal Center, and DOE, initiated an effort to re-commission the building and reduce energy use. EPA's Atlanta Regional Office is located in the Atlanta Federal Center. The goal of the collaboration is to have the facility achieve an ENERGY STAR® label. ENERGY STAR labeled buildings perform in the top 25 percent of office buildings nationwide based on energy use. Analysis of the building's mechanical system operations, new tenant buildout procedures, a pilot motion sensor/metering project, and other initiatives have already led to a savings of nearly 22 billion Btus annually. The building expects to achieve an ENERGY STAR label in March 2005.

Performance Evaluations

Employees who have energy management responsibilities are evaluated annually against criteria based on the Agency's energy management principles.

Training and Education

EPA uses several education and training programs to ensure that employees are aware of the latest technologies and opportunities to increase energy efficiency and overall sustainability:

- *Laboratories for the 21st Century*: The Laboratories for the 21st Century (Labs21) program is a joint partnership between EPA and DOE dedicated to improving the environmental performance and energy efficiency of U.S. laboratories. Through its Web site, workshops, email network, and annual conference, the program provides information on energy-efficient technology alternatives

for laboratory applications and creates a forum for laboratory designers, owners, and operators to obtain up-to-date information and support for implementing energy-efficient and sustainable projects.

In FY 2004, Labs21 held 11 one-day workshops on energy-efficient laboratory design and operations, training more than 400 professionals, each of whom is eligible for continuing education credits. The Labs21 team designed the course to provide a comprehensive understanding of the opportunities to optimize energy performance of new and existing laboratories. Course topics included energy-efficient laboratory design, air supply and distribution systems, commissioning, lighting, and resources and tools. An advanced half-day course was also given this year focusing on the Labs21 Environmental Performance Criteria, a rating system based on the LEED™ Green Building Rating System, but specifically designed for laboratory facilities. Additional information about these courses is posted on the Labs21 Web site at <www.epa.gov/labs21century/training/index.htm>.

The FY 2004 Labs21 Conference took place in Denver, Colorado, from October 21-23, 2003. More than 500 public and private sector laboratory energy managers, policymakers, and other technical experts from the United States, Canada, Great Britain, and New Zealand attended the conference, including 21 EPA employees. The conference presented an important training opportunity for EPA and other federal agencies' facility staffs. A mix of plenary and panel sessions highlighted strategies and technologies for improving energy and water efficiency and environmental performance in laboratories. The FY 2004 conference also featured the first ever Labs21 poster session, which showcased nearly 30 innovative laboratory designs; and the Labs21 Technology Fair, where exhibitors displayed state-of-the-art products for high performance labs. Optional tours included DOE's National Energy Renewable Laboratory, including the nationally recognized Solar Energy Research Facility; and the University of Colorado-Boulder's renowned Integrated Teaching and Learning Laboratory, which provides a dynamic experiential learning environment for undergraduate students. The conference agenda, presentations, and speaker biographies are available at <www.labs21century.gov/conf/past/2003/agenda.htm>. EPA also spent a great deal of time in FY 2004 planning the FY 2005 Labs21 annual conference, which was held in St. Louis, Missouri, October 5-7, 2004.

- *Buildings and Facilities Conference:* In February 2004, EPA conducted its annual three-day Buildings and Facilities Conference. This year's conference was held in San Francisco, California. The 85 conference attendees included 27 facility managers from EPA-operated laboratories and GSA-assigned regional offices and headquarters. SFPB presented an update on energy conservation activities and goals.
- *Online Ordering System for "Green" Office Supplies:* EPA's Environmentally Preferable Purchasing (EPP) Program worked with the Office of Acquisition Management and the Comprehensive Procurement Guidelines program to create an online ordering system for "green" office products in FY 2003. In FY 2004, the new ordering system was awarded as a Blanket Purchase Agreement to Corporate Express. The system enables EPA purchase card holders to buy products that meet or exceed EPA recycled content and other EPP standards, in order to make green purchasing and tracking easier for Agency personnel and increase such purchases throughout the Agency. The system is accessible through EPA's Intranet or by directly accessing <www.epasupplies.com>. A training tutorial is also available on EPA's Intranet.

- *Online Newsletter: Energizing EPA* is an internal EPA newsletter that highlights the Agency's efforts to improve overall sustainability, including energy and water efficiency, at its facilities. The newsletter is produced on a quarterly basis and distributed electronically to all EPA employees to educate them about such issues as energy efficiency, green power, green buildings, alternative energy, recycling programs, water conservation, and low-impact development.
- *Office of Administrative Services Web Site*: EPA's Office of Administrative Services continues to update and enhance its public Web site on sustainability at the Agency (found at <www.epa.gov/greeningepa>). The Web site is a central source of information about energy efficiency approaches and projects, renewable energy projects, and green buildings developed by and for EPA. The site also provides information on facility gross square footage, energy and water consumption data, facility manager contact information, and "green" building highlights for each major facility EPA occupies. In FY 2004, EPA expanded its sections on water and energy conservation, green power, and green buildings, and began developing enhancements to the entire site's navigation.
- To help inform and educate its employees about its Green Power Purchasing Program, EPA produced "window clings" with the phrase "This Building Runs on Green Power" and "This EPA Facility Supports Green Power." These transparent signs, designed to be affixed to windows and glass doors, were distributed throughout FY 2004 to all EPA facilities involved in green power procurement (see Appendix).

Showcase Facilities

This year, the Kansas City Science and Technology Center was designated as a Federal Energy Saver Showcase Facility, an honor that has become increasingly difficult to achieve. On October 28, 2004, EPA received a plaque to display in the building to inform employees and visitors of the efficient use of energy and water at the facility. This facility also garnered an honorable mention in the Sustainable Design/Green Buildings category of the federal *Closing the Circle Awards* given by the Office of the Federal Environmental Executive. EPA's other showcase facilities include: the Ralph H. Metcalfe Federal Building, a GSA owned building housing EPA's Region 5 offices, and the EPA regional laboratory in Chelmsford, Massachusetts.

SECTION II: ENERGY EFFICIENCY PERFORMANCE

E.O. 13123 requires that by FY 2005 each federal agency reduce its reported energy use in its laboratory and industrial facilities by 20 percent from an FY 1990 baseline. Both actual energy use reductions and green power purchases can be used to meet the goal. EPA will meet the FY 2005 goals through a mixture of these two tools.

ENERGY REDUCTION PERFORMANCE

The following table details EPA's energy consumption in FY 2004 for its 29 reporting laboratories:³

**EPA FY 2004 Energy Consumption
For 29 Reporting Laboratories**

Source	Consumed	Percent change from FY 2003	Percent change from FY 1990
Electricity	136,045,483 kilowatt hours	+8.12	+28.12
Green power	62,520,848 kilowatt hours*	+166.76	N/A
Fuel oil	683,369 gallons	+30.06	+1,536.85
Natural gas	3,950,000 CCF	+15.67	+7.51
Propane	6,932 gallons	-29.05	+517.28
Purchased steam	21.93 BBtus	+67.38	N/A
Chilled and Heated Water	322.4 BBtus	-16.69	N/A
Total Btus/GSF	355,773 Btu/GSF	+8.98	-0.58
Total Btu/GSF (green power netted out)	296,877 Btu/GSF	-2.87	-17.04

*Green power accounted for 45.96 percent of the electricity EPA reporting labs purchased in FY 2004. Together with green power purchases at EPA offices, EPA purchased 116.5 million kilowatt hours of green power.

³All FY 2004 EPA energy data have been collected and verified except the Human Studies Laboratory in Chapel Hill, North Carolina; because of data quality concerns resulting from a new chilled water billing system, EPA has used FY 2003 chilled water use as a proxy for FY 2004 chilled water use until these concerns can be resolved.

Energy Use Reductions Combined With Green Power Purchases

EPA continues to make good progress towards the E.O. 13123 goal of reducing reportable energy use by 20 percent from an FY 1990 baseline. EPA finished FY 2004 17.0 percent below its FY 1990 baseline. In FY 2003, EPA's energy use was down 14.8 percent, and in FY 2002 energy use was down 22.4 percent.

In October 2004, EPA contracted for its largest green power purchase ever, 100 million kilowatt hours (kWh) per year, for its RTP facilities. This purchase ensures EPA will exceed its FY 2005 reduction goals. While EPA currently relies heavily on green power purchases to achieve its reportable energy reductions, EPA will continue to improve its energy efficiency through infrastructure improvements and conservation measures.

EPA expects to have a better balance of energy use reduction and green power procurement by FY 2010, when the Agency is required to reduce energy by 25 percent from the 1990 baseline.

Energy Use Reductions Alone

Without deducting green power, EPA's FY 2004 energy use on a Btu per gross square foot basis was virtually even with the baseline year of FY 1990. In FY 2003, EPA energy use on a Btu per gross square foot basis was 8.8 percent lower than FY 1990, and in FY 2002, it was 15.3 percent lower (see Figure II-1). The Agency attributes this temporary slowing of its progress in actual energy use reductions to the opening of a major new laboratory and a new National Computer Center in RTP, North Carolina in FY 2003. As indicated by Figure II-2 below, these two new facilities account for 40 percent EPA's energy consumption. Figure II-3 lists EPA reporting laboratories by energy intensity. These two RTP facilities are among the five most energy-intensive EPA facilities. As previously detailed, the Agency has made RTP facilities its top energy conservation priority, but the fruits of these labors may not be realized for at least a year.

Figure II-1

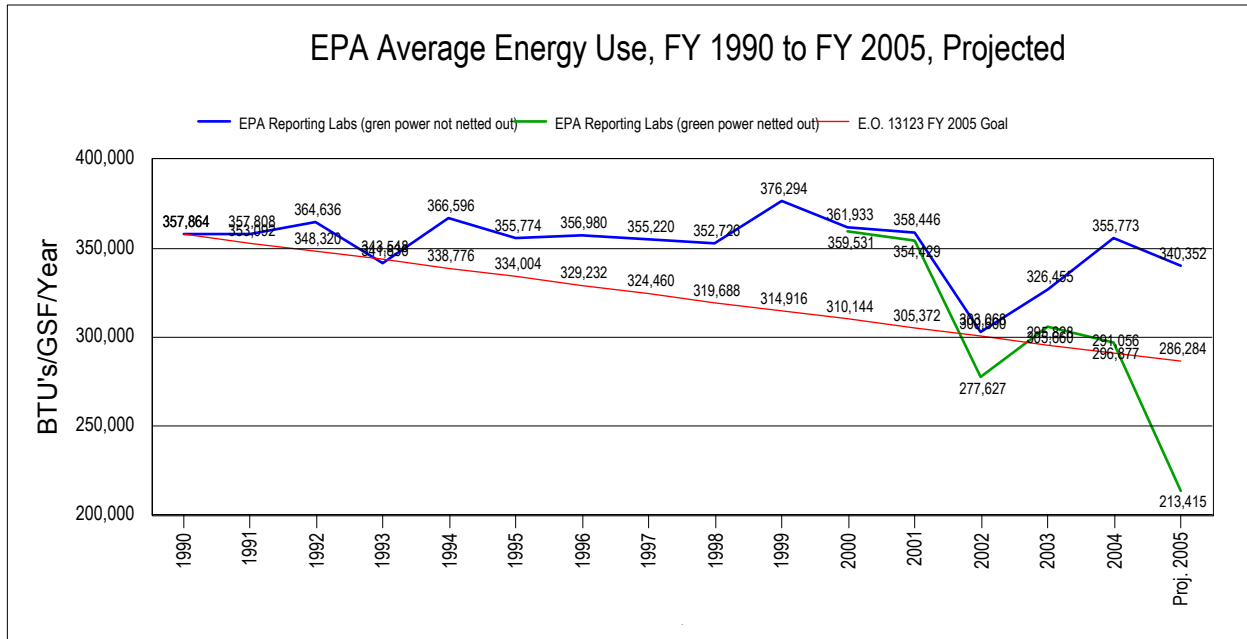


Figure II-2

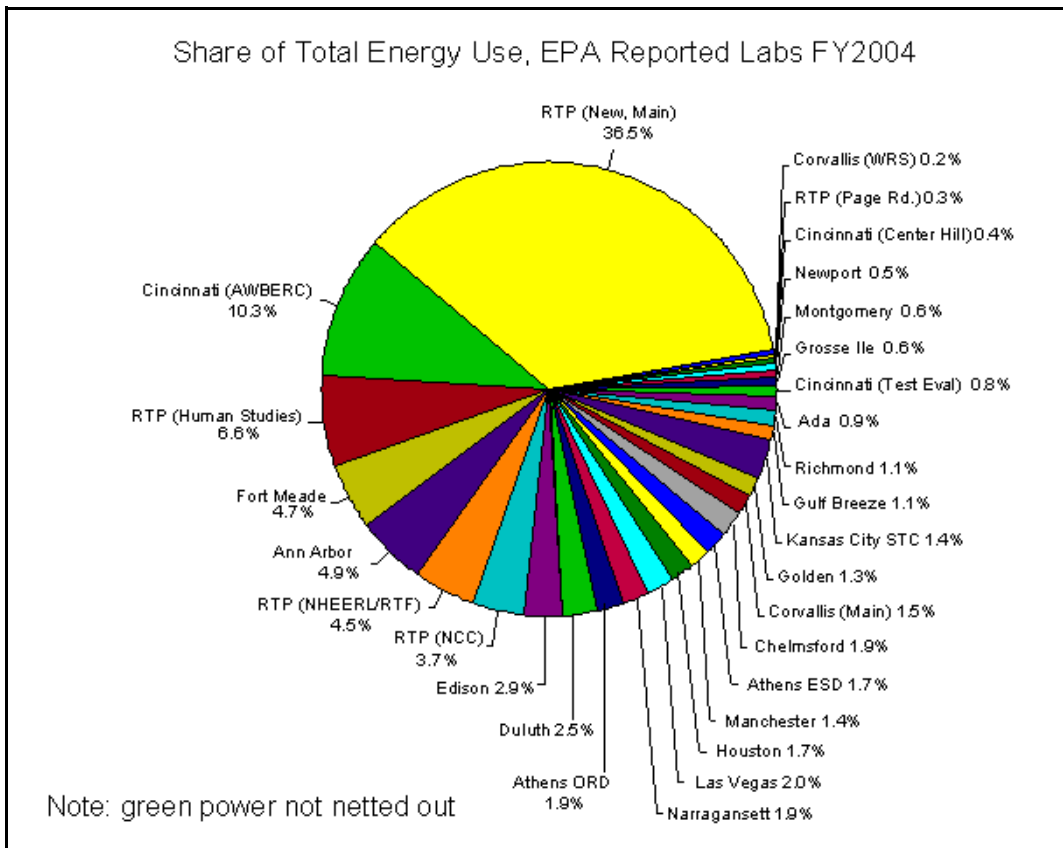
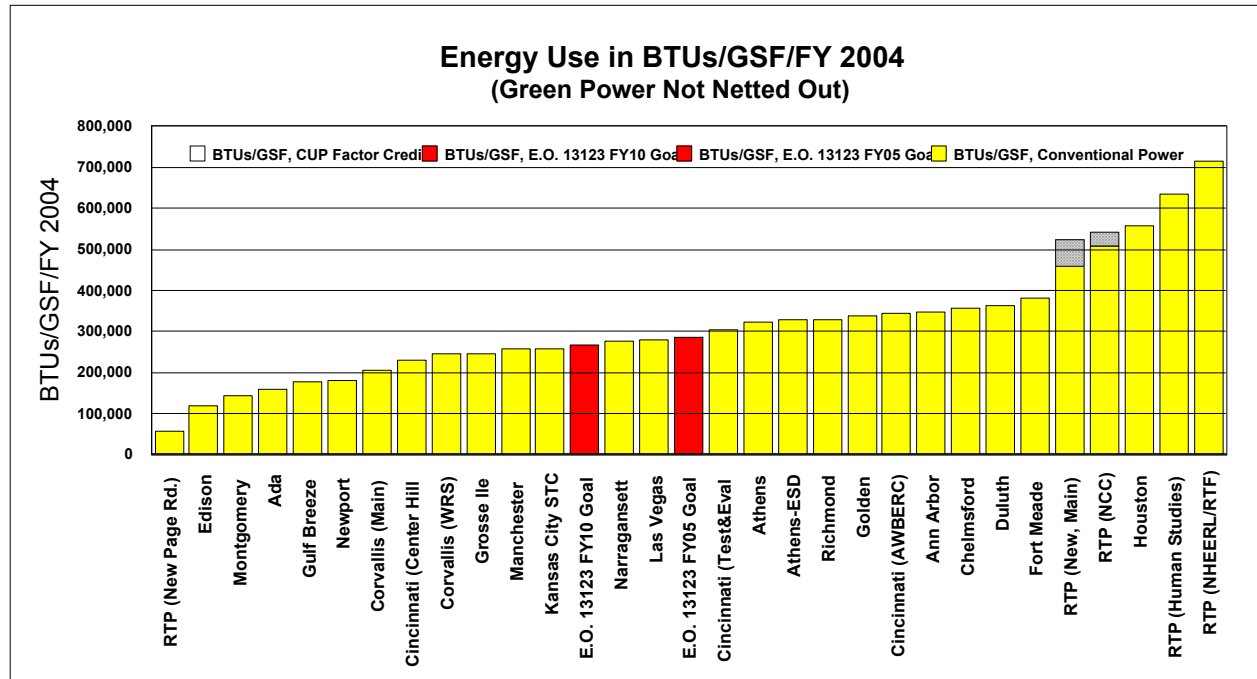


Figure II-3

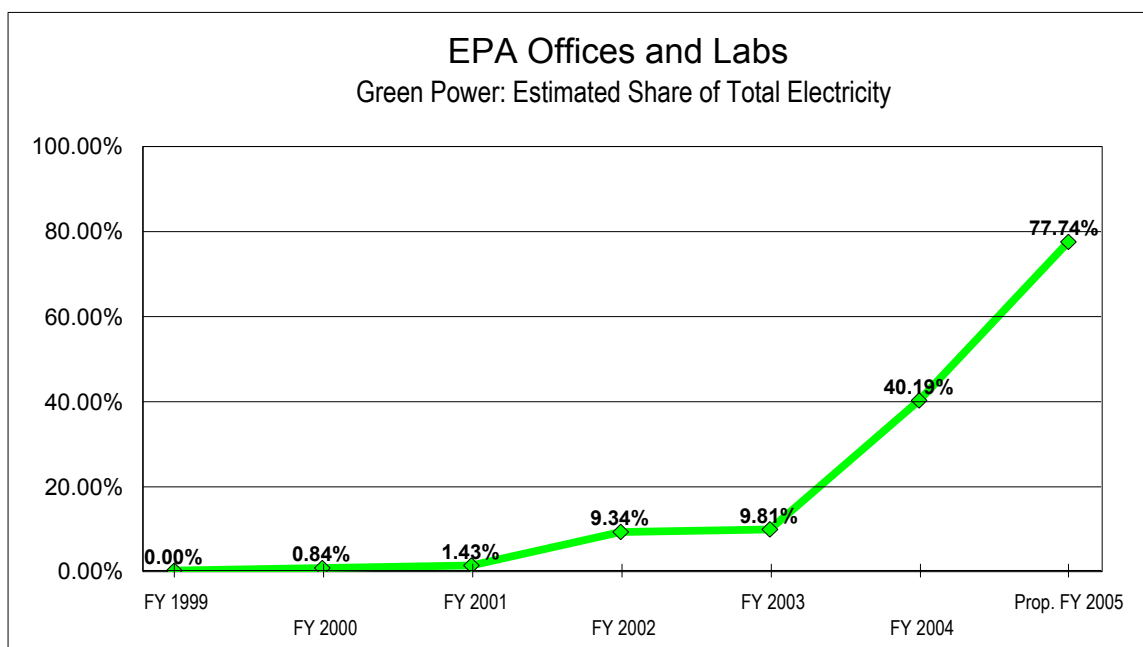


Tactical Vehicle and Equipment Fuel Use

To reduce emissions and fuel consumption and increase fuel efficiency, EPA has incorporated alternative fuel vehicles (AFVs) into its nationwide fleet of 1,172 automotive vehicles. In FY 2004, EPA leased an additional 97 AFVs that use electricity (hybrid), compressed natural gas, or ethanol/gasoline mixtures, bringing the Agency’s total AFV fleet to 382 vehicles. In fact, for the fifth straight year, EPA exceeded the Energy Policy Act and E.O. 13149 requirements that 75 percent of nonexempt, new vehicles be AFVs. In FY 2004, 83 percent of the vehicles acquired by EPA were AFVs.

RENEWABLE ENERGY

In FY 2004, EPA continued its support of renewable energy development with the procurement of green power and/or renewable energy certificates (RECs), or “green tags,” at 11 new facilities. Over the past five years, the Agency has seen its green power commitments grow from one facility in 1999 to 20 facilities in 2004. As a sign of the maturing of EPA’s green power program, the Agency also has had to replace or exercise extension options on contracts serving six major facilities. When combined with previous commitments, the Agency purchased more than 116 million⁴ kWh of green power at the 20 facilities in FY 2004, a figure equivalent to more than 40 percent⁵ of total electric use at offices and laboratories. Nearly all of those 20 facilities procure green power to meet 100 percent of their electricity needs. With additional purchases completed in the first quarter of FY 2005, EPA is offsetting more than 75 percent of its national electricity use with green power.



⁴ Total purchased as of 09/30/04 = 116,485,667 kWh.

⁵ Percentage is based on total FY 2003 electricity use (labs and offices) of 283,363,816 kWh.

As a result of these efforts, the Agency was presented with the 2004 Presidential Award for Leadership in Federal Energy Management in July, 2004. EPA Headquarters and nationwide staff worked in cooperation with DOE's National Renewable Energy Laboratory (NREL), GSA, the U.S. Department of Defense's Defense Energy Support Center (DESC), DOE's Federal Energy Management Program (FEMP), and DOE's Western Area Power Administration (Western) to achieve this honor, which is presented on an annual basis to recognize federal employees for their efforts in promoting and improving federal energy management.

Because EPA has been a leader in green power procurement, it has also seen a number of new procurement-related issues arise from its Requests for Proposals. Since green power markets and RECs are relatively new, (for example Federal Acquisition Law and regulations do not even reference renewable energy certificates), procurement "issues of first impression" arise from some of EPA's green power procurements. "Issues of first impression" are issues that have never been raised, discussed, or adjudicated before. In FY 2004, these issues caused requests for "frank and open discussion" from potential offerors, threats to protest, and one formal protest. Issues involved include geographic preference, emissions limitations, ability to specify specific types of green power, and the definition of "new" resources. These protests are not a sign that EPA, through its procurement partners listed above, is setting unreasonable procurement requirements; rather, they reflect increasing awareness by green power providers that green power markets are becoming too big to ignore. EPA has worked with and through its acquiring agencies to carefully analyze procurement issues, respond to offeror concerns where appropriate, and defend its green power acquisition principles where appropriate and possible. EPA is continuing to work with its purchasing partners to address these issues and further strengthen the green power marketplace for federal purchasers.

EPA also consumed 28,205 gallons of soy ester biodiesel at its Narragansett, Rhode Island, and Manchester, Washington, laboratories.

New Locations/Contracts

Contracts covering the 11 new EPA facilities receiving green power in FY 2004 include EPA's largest procurement for an office complex to date (the Washington, DC, Federal Triangle complex, worth 44 million kWh/year) and the Agency's largest procurement for a laboratory to date (RTP facilities, 100

million kWh/year). In total, Agency green power annual purchases increased by approximately 90 million kWh/year over FY 2003 levels.

New contracts and locations purchasing green power or RECs in FY 2004 include:

- *Federal Triangle, Washington, DC:* In September 2004, EPA replaced its existing, short-term green power contract with a new, three-year, 44 million kWh per year contract. The purchase, equivalent to 100 percent of electricity use at EPA Headquarters' Federal Triangle complex, supports the generation of renewable energy at wind and landfill gas facilities in the Mid-Atlantic states. GSA performed the contracting. In October 2003, EPA began receiving green power for the Federal Triangle Complex at a rate of 39 million kWh per year through a short-term purchase coordinated through GSA.
- *1310 L Street, Washington DC:* In June 2004, EPA worked with DESC to complete the purchase of 4.56 million kWh per year of green power for its Headquarters facility located at 1310 L Street NW in Washington, DC. The three-year commitment will help support the generation of renewable energy from a wind farm in Meyersdale, Pennsylvania.
- *RTP, North Carolina (four facilities):* EPA worked with DESC to procure 100 percent green power for all its RTP, North Carolina, facilities (New Main, National Computer Center, NHEERL, Human Studies, and all ancillary facilities). The RTP purchase went into effect November 1, 2004, and will run through FY 2007. It is the Agency's largest green power purchase to date at 100 million kWh annually. Renewable energy will come from a wood and paper pulp waste plant in Wentworth, Georgia. This procurement replaces a one-year contract executed in October 2003, under which EPA received 29.8 million kWh of renewable energy (enough to meet nearly 40 percent of the electricity needs at RTP's new Main and National Computer Center facilities). The original procurement of RECs supported green power development at a wind farm in Algona, Iowa, and a landfill gas facility in Jacksonville, Florida.
- *Athens, Georgia:* In March 2004, EPA contracted to purchase green power equivalent to 100 percent of the electricity needs at its Region 4 Science and Ecosystem Support Division Laboratory. The three-year contract, procured through DESC, will support annual production of 4.15 million kWh of green power from landfill gas facilities in North Carolina and Kentucky.
- *Atlanta, Georgia:* In March 2004, EPA's Region 4 Office became the Agency's second regional office to purchase 100 percent green power when it finalized a commitment to purchase 7 million kWh of green power annually. The three-year contract, procured through DESC, will support renewable energy generation at landfill gas facilities in North Carolina and Kentucky.
- *Duluth, Minnesota:* In June 2004, the Agency finalized commitments to purchase green power for its Mid-Continent Ecology Division Laboratory. The three-year contract will support the annual generation of 2.35 million kWh of green power from a wind farm in Dodge Center, Minnesota. This figure represents approximately 90 percent of the facility's annual electricity use.
- *Grosse Ile, Michigan:* In June 2004, EPA contracted to purchase 700,000 kWh of renewable energy certificates annually for its Large Lakes and Rivers Research Station. The three-year

contract represents 100 percent of the facility's electricity needs and will support renewable energy generation at a landfill gas facility in Lenox, Michigan.

- *Las Vegas, Nevada:* In June 2004, EPA completed a 4.65 million kWh annual green power purchase for its laboratory facilities on the University of Nevada Las Vegas campus. The three-year contract will support the generation of wind power from a facility in San Geronio Pass, California. The purchase represents 100 percent of electricity needs at EPA's National Exposure Research Laboratory and its Radiation and Indoor Environments National Laboratory.

Contract Extensions

EPA's extended the following contract in FY 2004:

- *Cincinnati, Ohio, Replacement Contract (three facilities):* In May 2001, EPA's Cincinnati campus began receiving green power equivalent to 100 percent of its electricity needs. Since then, Cincinnati facilities have received 15.56 million kWh worth of green tags on an annual basis, supporting the generation of wind power in Pennsylvania and landfill gas power in Illinois. Although the contract expired in September 2004, EPA worked with GSA and Community Energy to extend the contract under the same terms through FY 2007.

New Contracts for FY 2005 Begun in FY 2004

In addition to the green power purchases completed in FY 2004, during the year EPA worked with its partners to procure green power in other new locations, and contracts were signed in the first quarter of FY 2005:

- *Western Area Power Administration:* EPA staff worked with Western to procure green power at four new locations. These facilities include the Region 9 Office in San Francisco, California (2.3 million kWh per year), Region 8 Office in Denver, Colorado (4.7 million kWh per year), Region 7 Office in Kansas City, Kansas (4.5 million kWh per year), and the Region 7 Kansas City Science and Technology Center (2.9 million kWh per year). A contract for the San Francisco Office RECs was signed on November 9, 2004, and contracts for the remaining facilities were signed on December 13, 2004.
- *Golden, Colorado, Replacement Contract:* Starting in 2000, EPA's Region 8 Laboratory purchased 100 percent green power through Xcel WindSource's green pricing program. This contract expired in October 2003. The Agency worked with Western throughout FY 2004 to procure a replacement contract to provide 100 percent green power for the facility (2.1 million kWh per year). A contract was signed on December 13, 2004.

In addition to these procurement efforts, EPA continued to receive green power at six other

facilities in FY 2004:

- *Richmond, California:* In 1999, EPA's Region 9 Laboratory became the first Agency facility to purchase green power. In FY 2004, the laboratory continued to receive 100 percent green power through an agreement renewed in FY 2002 with the Sacramento Municipal Utility District (SMUD), which annually supplies 1.8 million kWh of renewable energy generated at a nearby landfill gas facility.
- *Manchester, Washington:* Since summer 2001, EPA has purchased RECs equivalent to 100 percent of the electricity needs at its Region 10 Laboratory. During FY 2004, the facility continued its 10-year grant with the Bonneville Environmental Foundation, and received approximately 3.3 million kWh of green tags that support the generation of wind power in eastern Oregon.
- *Chelmsford, Massachusetts:* EPA's New England Regional Laboratory received 100 percent green power from Green Mountain Utility through August 2004. The facility's support allowed the generation of 2.6 million kWh of wind power from facilities in Vermont and New York. While the green power contract expired in August 2004, efforts are being made to award a new contract in FY 2005.
- *New York City:* In June 2003, EPA's Region 2 Office became the first regional office to purchase 100 percent green power. The Agency continued this purchase in FY 2004, as it helped support the annual generation of 6.18 million kWh of wind power at the Fenner Wind Power Project in upstate New York.
- *Houston, Texas:* In June 2003, EPA's Environmental Services Branch Laboratory in Houston finalized a commitment to purchase 100 percent green power generated at a wind farm near Clovis, New Mexico. The facility continued this commitment in FY 2004 with 3.35 million kWh of green tags that support the New Mexico Wind Energy Center.
- *Edison, New Jersey:* In September 2003, EPA contracted to support the annual generation of 4.48 million kWh of "delivered" green power, or 93 percent of the facility's electricity use. During FY 2004, the Region 2 Laboratory supported green power development at landfill gas facilities in the Mid-Atlantic states through a contract with PEPCO Energy Services.

Self-Generated Renewable Energy

In FY 2004, EPA continued to increase its self-generating sources of renewable energy with the addition of a ground source heat pump system at its Ada, Oklahoma, laboratory and a solar hot water heater at its Region 9 Office in San Francisco, California. The geothermal heat pump (GHP) was installed as part of the Robert S. Kerr Environmental Research Station's ESPC upgrade, for which construction was completed in June 2004. The GHP has eliminated the facility's use of natural gas and is expected to reduce energy needs by more than 50 percent. The Region 9 Office's solar hot water heater

was completed in October 2003. The new system reduces the need for conventional hot water heating in the facility's gym and child care center by approximately two-thirds and eliminates the need for natural gas to heat hot water.

In addition to these upgrades, EPA continued to operate numerous other self-generation technologies in FY 2004:

- *Solar Arrays:* During FY 2004, EPA contracted for the installation of a 9.5 kW photovoltaic (PV) array at its main laboratory facility in Corvallis, Oregon. The Agency expects to complete installation of the roof-mounted system in December 2004. The Agency also continued to operate a 100-kW photovoltaic array installed in April 2002 on the roof of its National Computer Center in RTP, North Carolina, and a 10 kW solar array installed on the roof of its Region 5 Office facility in Chicago's Metcalfe Building in 2000. EPA's Region 10 Laboratory also continued operation of 28 solar panels with a combined 2 kW capacity. In FY 2004, these arrays generated 109,488 kWh of renewable energy.
- *Photovoltaic (PV) Lighting:* EPA's campus in RTP, North Carolina, includes solar street lights that have served the entrance road and parking lot facilities since FY 2002. The Agency believes this is the largest solar road lighting project in the United States. EPA has also utilized a PV system to light two piers at its Gulf Ecology Division Laboratory in Gulf Breeze, Florida. The pier's solar lights, installed in 1998, have saved an average of 900 kWh of electricity annually. On September 16, 2004, however, EPA suffered the impacts of Hurricane Ivan along the Gulf Coast, and the lights were virtually washed away from the storm surge.
- *Solar Water-Heating Systems:* This year, the Agency installed a solar water-heating system at its Region 9 Child Care and Fitness Center in San Francisco, California. EPA's Region 2 Laboratory in Edison, New Jersey, utilizes three solar water-heating systems that have been the primary source of hot water in their respective facilities since 1998. Each system helps augment its facility's energy use by reducing the need for electricity and natural gas.
- *Solar Power Awnings:* EPA's New England Regional Laboratory in Chelmsford, Massachusetts, has operated a PV awning system since September 2001. The 2 kW capacity awnings feed the regional electric grid and reduce cooling needs by providing shade for the facility's office windows.
- *Solar Wall:* EPA's Region 8 Laboratory's transpired solar collector has augmented the facility's heating and cooling system since March 2002, generating approximately 1.38 MMBtus of solar power annually at the Golden, Colorado, facility.
- *Lake Cooling Water:* EPA's Mid-Continent Ecology Division Laboratory in Duluth, Minnesota, uses water from nearby Lake Superior as non-contact cooling water for building air conditioning and other mechanical equipment. It is estimated that the facility used 73.6 million gallons of water in FY 2004 for these purposes, greatly reducing energy and water costs.

Million Solar Roofs

EPA solar projects include roof-top solar arrays, solar sunshade panels, solar street/pier lights, and solar hot water heaters. Several of these projects have been recognized on DOE's Web site as examples of the Million Solar Roofs initiative:

Facility	Location	Project/Amount	Used Since
Region 9 Office, Child Care and Fitness Center	San Francisco, CA	One solar water-heating system	October 2003
National Computer Center	RTP, NC	100 kW solar roof	September 2002
New England Regional Lab	Chelmsford, MA	2 kW solar sunshade panels	September 2001
Region 5 Office/GSA's Metcalfe Federal Building	Chicago, IL	10 kW solar roof array	FY 2000
Region 10 Laboratory	Manchester, WA	28 solar panels in three PV arrays	June 1999
Region 2 Laboratory	Edison, NJ	Three solar water-heating systems	Approx. 1997

Petroleum

In FY 2004, EPA used a total of 1,173,961 gallons of fuel oil at seven of its reporting laboratories (Narragansett, Rhode Island; Edison, New Jersey; Fort Meade, Maryland; RTP, North Carolina; Cincinnati, Ohio; Golden, Colorado; and Manchester, Washington). Of those seven facilities, two began using a blend of soy ester biodiesel fuel as a clean-burning alternative to traditional diesel fuel. The Atlantic Ecology Division Laboratory in Narragansett, Rhode Island, and Region 10 Laboratory in Manchester, Washington, used a combined 28,205 gallons of 100 percent biodiesel, mixed with traditional diesel fuel in a one-to-four ratio. In addition, the Agency used a total of 6,932 gallons of propane at two facilities during FY 2004 (Edison, New Jersey, and Manchester, Washington).

WATER CONSERVATION

EPA has set an internal goal to reduce water use by 10 percent from a 2000 baseline by 2010. In FY 2004, EPA used 167,471,586 gallons of water in its 29 reporting laboratories, a 10.6 percent reduction from the 187 million gallons used in 2000, and the Agency is currently projected to surpass its FY 2010 reduction goal. Water-efficient upgrades completed in FY 2004—including a scrubber conversion project in Ann Arbor, Michigan, and waterless urinals in RTP, North Carolina (five urinals); Narragansett, Rhode Island (two urinals); Chelmsford, Massachusetts (two urinals); and Corvallis, Oregon (eight urinals), will help the Agency save an additional 1.4 million gallons per year. The Agency also realized a water savings of approximately 735,000 gallons thanks to a rooftop rainwater recapture system in place at its Kansas City Science and Technology Center. EPA also completed and signed water management plans for its laboratories in Duluth, Minnesota; Cincinnati, Ohio; Las Vegas, Nevada; and Corvallis and Newport, Oregon, during FY 2004. The following facilities reduced water consumption significantly in FY 2004:

- *Narragansett, Rhode Island:* Mechanical upgrades completed in July 2004 including improvements to the chilled and condenser water systems had already contributed to a 13 percent decrease in water consumption from FY 2003 to FY 2004, or nearly 400,000 gallons saved.
- *Duluth, Minnesota:* Water-efficient installations such as low-flow plumbing fixtures and native landscaping helped EPA's Duluth laboratory reduce its water use by nearly 10 percent over the past year (100,000 gallons) and nearly 60 percent since the FY 2000 baseline (1.3 million gallons). A culture water reclamation system is also under design that will save between 7 and 15 million gallons of water annually.
- *Cincinnati, Ohio:* AWBERC saw water consumption continue to decrease, by 7.3 million gallons compared to the FY 2000 baseline, thanks to water-efficient faucets and showerheads, native landscaping, and mechanical systems that reduce the use of single-pass cooling. The facility installed a magnetic cooling tower water treatment system to increase water efficiency in FY 2004.
- *Las Vegas, Nevada:* Measures such as installation of low-flow plumbing fixtures and minimization of single-pass cooling helped reduce the National Exposure Research Laboratory's water consumption by 42 percent over the past year, or a savings of 2.6 million gallons.
- *Ann Arbor, Michigan:* An ESPC at EPA's National Vehicle Fuel Emissions Laboratory has helped reduced water use more than 50 percent since FY 2000. In FY 2004, the laboratory replaced a water-based scrubber system a filter packet system that is expected to cut water use up to 1.2 million gallons per year.

SECTION III: IMPLEMENTATION STRATEGIES

In FY 2004, the Agency focused on its largest and most energy-intensive facilities—particularly those in RTP, North Carolina. Addressing energy efficiency in RTP is critical to meeting the FY 2005 and FY 2010 goals outlined in E.O. 13123, because these facilities represent 50 percent of EPA’s energy consumption and are four of EPA’s five highest energy users on a Btu per gross square foot per year basis. The Agency will continue to implement its five-part energy conservation strategy in FY 2005:

- Promoting sustainable design in its new buildings and leases so that new buildings entering the inventory are better than the ones they replace.
- Re- and retro-commissioning to achieve big energy savings in the near term.
- Designing and constructing physical mechanical system changes to achieve energy savings in the long run.
- Concentrating efforts where the most opportunities are, at the Agency’s largest facilities. Regardless of size, however, EPA will also implement energy conservation projects on smaller laboratories where funding, local management, and local staff support exist.
- Purchasing green power, which will always serve as an important component of EPA’s balanced effort to reduce its environmental footprint.

EPA will also continue to conduct energy audits, support life-cycle cost analysis, benefit from ESPCs, use energy-efficient products, and incorporate water conservation measures across all of its facilities.

LIFE-CYCLE COST ANALYSIS

When developing, constructing, and operating its facilities, EPA makes every effort to conserve energy and water, incorporate sustainable design, and identify innovative technologies, products, and services that are environmentally sound and cost-effective throughout their life cycles. All energy projects, for example, go through life-cycle cost analysis. That has been evidenced in the two ESPCs EPA implemented at its Ann Arbor, Michigan, and Ada, Oklahoma, laboratories, which have allowed the Agency to realize significant energy efficiency upgrades and life-cycle savings that would have gone unrealized under the traditional funding process, which emphasizes up-front costs. All new energy projects must go through a life-cycle cost analysis before upgrades are undertaken; occasionally, this may

keep an energy-efficient project from moving forward. In FY 2004, for example, EPA had to cancel a mechanical system upgrade being considered at its Houston Environmental Services Branch laboratory because the landlord's extremely high (and unreasonable) price estimate for the project could not justify the payback.

EPA is working to institutionalize its energy master planning process, investigating energy performance projects over a 15- or 20-year time frame, since laboratories are long-term investments. The Agency has taken that idea one step further and in FY 2004 initiated work on a standard statement of work for sustainable master planning to examine all types of sustainable features on a life-cycle basis for EPA's future facility projects. When procuring new buildings, EPA generally uses energy modeling during the design process, to help identify additional opportunities for improvement. Such modeling, conducted during the 35 percent drawings for EPA's recently completed Science and Technology Center in Kansas City, Kansas, revealed additional economical energy conservation measures that were incorporated into the project.

FACILITY ENERGY AUDITS

To help identify opportunities for energy efficiency improvements to mechanical systems, EPA's office and laboratory facilities are regularly audited as part of a tiered process. The first tier, or Stage 1 audit, is a basic energy use assessment conducted as a stand-alone activity, in conjunction with water use assessments, or in coordination with the Agency's Safety, Health, and Environmental Management Division's compliance audits. Nearly every EPA facility has received a Stage 1 audit or higher in the past three years. In June 2004, EPA conducted a Stage 1 energy audit (as well as a water use assessment) at the Western Ecology Division Laboratory in Corvallis, Oregon.

Stage 2 assessments encompass more thorough energy consumption analysis, focus on specific areas of concern, identify various energy conservation measures, and calculate simple payback schedules, allowing facility managers to make decisions and prioritize energy improvements. In FY 2004, EPA conducted Stage 2 assessments at the Ecosystem Support Division Laboratory in Athens, Georgia, and the Mid-Continent Ecology Division Laboratory in Duluth, Minnesota. EPA also began developing a protocol in FY 2004 for more far-reaching "sustainable opportunities assessments," combining the energy and water assessments currently underway with renewable energy use, recycling, environmentally

preferable product procurement, integrated pest management, and stormwater management opportunities.

FINANCING MECHANISMS

As mentioned earlier, EPA has taken advantage of the ESPC financing mechanism to realize significant energy and cost savings at its Ann Arbor, Michigan, laboratory, as well as the project just completed in June 2004 in Ada, Oklahoma. EPA is also using ESPC-like mechanisms to finance future improvements. Under an agreement with the firm from which EPA leases its Richmond, California, laboratory, the lessor is financing a natural gas co-generator to produce electricity and hot water, two small staging boilers to replace a larger version, and an HVAC controls upgrade. The contract for these projects was awarded in May 2004, and they should be completed by spring 2005. Lease payments will be made by EPA using the 15 percent savings it expects to achieve on utilities.

ENERGY STAR[®] AND OTHER ENERGY-EFFICIENT PRODUCTS

EPA actively promotes the purchase of energy-efficient products that carry the ENERGY STAR label, including photocopier equipment and computers. The Agency reviews and updates its purchasing specifications regularly and incorporates ENERGY STAR and other sustainable product requirements into new lease provisions when the occasion arises.

EPA encourages its employees and other federal purchasers to participate in the Agency's energy management activities through its EPP Program. EPP helps train government purchase card users on buying energy-efficient and sustainable products. In FY 2004, EPA entered into a Blanket Purchasing Agreement (BPA) with office supply company Corporate Express to provide environmentally preferable non-electronic office products. After the initial award in fall 2003, a pilot online ordering system was initiated in March 2004 at Headquarters facilities in Washington, DC. In spring 2004, the on-line system was expanded to all EPA facilities, and a face-to-face training program was developed. The ordering system will become mandatory for all EPA employees starting in FY 2005.

In FY 2004, EPA maintained a comprehensive database of environmentally preferable products for government credit card users and contract language for procuring green products. The Agency also published newsletters, including the *EPP Update* and *Energizing EPA*, that promote the use of energy-

efficient products and provide resources to EPA purchasers through articles on specific products and purchasing procedures. In fall 2003, EPA designed an exhibit to promote the purchase of recycled-content and environmentally preferable products by Agency employees. The exhibit included an ENERGY STAR-labeled computer monitor, energy-efficient compact fluorescent light bulbs, and a motion-sensing power strip called the “Wattstopper.” The exhibit was displayed throughout FY 2004 at EPA Headquarters in Washington, DC; the Region 8 Office in Denver, Colorado; the Robert S. Kerr Environmental Research Center in Ada, Oklahoma; the Environmental Science Center in Fort Meade, Maryland; and at the Agency Acquisition Training Conference in Las Vegas, Nevada.

ENERGY STAR BUILDINGS

ENERGY STAR recognizes buildings that perform in the top 25 percent of their respective sectors with a special label. Because the ENERGY STAR program does not encompass energy-intensive facilities such as laboratories in its labeling program, EPA cannot designate its 29 reporting laboratory facilities as ENERGY STAR Buildings. However, the Agency continues to work with GSA to achieve the ENERGY STAR Building label in office facilities it occupies:

- *New York, New York:* EPA’s Region 2 Office is located within the Foley Square Federal Office Building, which was labeled an ENERGY STAR building in 1999. Some of the energy-efficient features within the building include a building energy management system, T-8 lighting fixtures, steam turbine centrifugal chillers, high efficiency motors, and a variable air volume (VAV) air handling system.
- *Chicago, Illinois:* EPA’s Region 5 Office is located within the 28-story Metcalfe Federal Building, which achieved the ENERGY STAR label in 1999. The building features an energy management system, a comprehensive green lighting system, and a rooftop solar array with a capacity of 10 kW. In addition, the domestic water pumps and cooling tower fans feature high efficiency motors and variable frequency drives.
- *Denver, Colorado (existing office):* EPA’s Region 8 Office has achieved the ENERGY STAR Buildings label in multiple years, including, most recently, 2004. In the past it implemented the Green Lights program, a precursor to ENERGY STAR.
- *Denver, Colorado (future office):* EPA is working with GSA to develop a new facility to house its Region 8 Office. EPA requires that this new building achieve an ENERGY STAR Building label within 14 months of 95 percent occupancy, which is expected in Summer 2006.
- *Arlington, Virginia:* EPA Headquarters facilities in Arlington, Virginia, will soon move to one consolidated 422,000 square foot complex at the south end of Crystal City. EPA is requiring that

the new building meet ENERGY STAR performance criteria within 14 months of occupancy, which is expected in Spring 2006. Energy-efficient mechanical system controls and a highly reflective roof are being considered for the facility.

- *Seattle, Washington:* In FY 2004, EPA's Region 10 Office in the Park Place building was benchmarked during FY 2004 and received an ENERGY STAR label in October 2004.
- *Atlanta, Georgia:* During FY 2004, EPA continued to work toward achieving the ENERGY STAR label at the Sam Nunn Federal Center in Atlanta, where its Region 4 Office is located, through the pilot project with GSA and other tenants mentioned in the awards section of this report. The Agency anticipates qualifying for the label in spring 2005.
- *Improved Data Collection:* In addition to focusing on ENERGY STAR labeling at its office buildings, EPA initiated an effort in FY 2004 to collect and analyze energy data from each of its major regional and Headquarters office buildings. Although GSA has the responsibility to report energy use for these buildings under E.O. 13123, EPA wants to use this data to further identify opportunities to improve its energy performance in the offices it occupies.

SUSTAINABLE BUILDING DESIGN

EPA incorporates sustainable building design principles into the siting, design, and construction of all new facilities, as well as the renovation and maintenance of existing facilities. In FY 2004, EPA updated its Architecture and Engineering Guidelines to reflect these principles in all aspects of design, construction, and operation of its facilities. The Agency utilizes a holistic approach outlined in a Green Buildings Vision and Policy Statement to minimize environmental impacts while maintaining a healthy, comfortable workplace.

The Agency works closely with GSA in the selection of architects, mechanical engineers, and building developers, and incorporates sustainable design language into the solicitations for these vendors. The Agency requires a minimum LEED™ Silver rating for its major new office building leases and requires that each major new office facility obtain the ENERGY STAR label within a fixed post-occupancy time period. EPA also requires 30 percent better than the ASHRAE 90.1-(1999) standard for energy performance for all new major facilities. Future projects with sustainable design features include:

- *EPA Headquarters, Northern Virginia Offices:* In May 2004, GSA signed 10-year leases for 422,000 square feet of newly constructed space in Arlington, Virginia. The new space will house EPA employees currently working at three separate facilities in the Crystal City section of Arlington. As with all of its major new buildings, EPA is requiring that this space obtain a minimum LEED™ Silver rating and meet ENERGY STAR building energy performance

standards to receive a label. Water conservation will be a priority as builders plan to incorporate low-flow plumbing fixtures. Stormwater management techniques will be used to reduce the environmental impact of runoff. In addition, the building contractor has agreed to recycle at least 75 percent of construction period waste and incorporate EPA Headquarters' recycling program into the building design. Excavation is underway, and EPA occupancy is expected by the end of summer 2006.

- *Denver, Colorado, Region 8 Office:* In FY 2004, EPA and GSA worked together to acquire space for EPA's new 250,000-square-foot Region 8 Office facility. This 10-year lease involved new construction; EPA and GSA structured the acquisition as a design competition and evaluated five development teams' proposals on environmental performance, security, quality of materials, and functionality. In August 2004, GSA awarded the development contract, and the contractor promised to achieve a LEED™ Gold rating; the building will receive the ENERGY STAR label within 14 months of 95 percent occupancy. In addition, the developer will maximize water conservation through low-flow plumbing fixtures and water-conserving mechanical systems. The contractor must also ensure resource conservation through the use of environmentally preferable construction materials and construction period recycling. The project should be completed and ready for occupancy in summer 2006.
- *Boston, Massachusetts, Region 1 Office:* GSA is renovating and rehabilitating the John W. McCormack Post Office and Courthouse federal building. EPA's Region 1 Office will be the largest and lead tenant in the building, occupying approximately 225,000 square feet. EPA started meeting with GSA in April 2001 to ensure that sustainable design and energy efficiency experience were considered when selecting the architect and engineering firms for the project. EPA continues to work with GSA and the design team to influence and improve the energy efficiency and sustainability of the project, as well as seek outside funding for energy upgrades. EPA has also funded a "green roof" for this building, which will help control stormwater runoff and mitigate the urban heat island effect.
- *New Childcare Facility, RTP, North Carolina:* Construction of EPA's new childcare facility in RTP, North Carolina, began in April 2004. Like the rest of the RTP campus, the new childcare facility will incorporate green building features such as effective daylighting and energy-efficient design. By incorporating these and other sustainable design principles, the facility will strive to achieve a LEED™ Silver rating. Completion is expected in April 2005.
- *Lab Annex 2, Cincinnati, Ohio:* As part of a new annex to one of EPA's largest laboratories, the Agency hopes to incorporate a green roof, under-floor ventilation, and a variety of other sustainable features as it strives for LEED™ Silver at a minimum and possibly Gold. Construction on this 42,400 square foot annex is expected to start in 2005.

Sustainable Design at Existing Facilities

Some of the newer EPA facilities that have incorporated sustainable design include:

- *Kansas City, Kansas, Science & Technology Center (KCSTC)*: In May 2003, EPA opened a 72,000-square-foot laboratory in Kansas City, Kansas, designed to conserve energy, water, and natural resources. Energy-efficient features include VAV fume hoods and systems, heat recovery, plate and frame heat exchanger system, and combining a variable frequency drive chiller system with two conventional chillers. Water conservation features include a rooftop rainwater recovery system that reduces water use up to 735,000 gallons per year, low-flow plumbing fixtures, and Xeriscaping. In addition, environmentally preferable building materials and a construction period recycling plan were used to help conserve resources. In August 2003, these features helped the facility earn a LEED™ Gold 2.0 rating from the U.S. Green Building Council. Energy performance at this laboratory has been quite good, with the first year's Btus per GSF running approximately 25 percent less than other new EPA VAV laboratories.
- *New Main Facility, RTP, North Carolina*: In constructing its largest facility, which was fully occupied in January 2003, EPA emphasized solid waste reduction, increased energy and water efficiency, healthy indoor environmental quality, environmentally preferable building materials, and natural landscapes. The 1.2 million square foot facility was designed to minimize site disruption and fit within the natural contours of the land. During construction, more than 3,500 plants were transplanted and the entrance road was moved to help preserve and maintain natural vegetation. The facility installed a digitally controlled building automation system with variable speed motors, fans, and pumps designed to conserve energy used by the heating and cooling systems. In addition, native landscaping, stormwater management techniques, and low-flow plumbing fixtures were incorporated to help conserve water. Unfortunately, energy performance at this laboratory has not met original projections, and EPA is re-commissioning the facility and stabilizing its operations.
- *National Computer Center, RTP, North Carolina (NCC)*: Built on the main campus in RTP, North Carolina, and opened in January 2002, NCC houses EPA's central data processing and exchange operations. The facility includes extensive daylighting and a rooftop photovoltaic system that helps power the facility. In Spring 2004, the facility applied for a LEED™ Silver 2.0 rating but has yet to learn the results of that application.
- *Chelmsford, Massachusetts, Laboratory*: EPA's New England Regional Laboratory, which opened in October 2001, incorporates low-flow plumbing, electronic sensors, a rooftop rain recovery system, a nighttime system setback, and photovoltaic awnings. In April 2003, the facility received a LEED™ Gold 2.0 rating. Relative to other VAV laboratories in EPA's inventory, this facility has been performing exceptionally well from an energy use standpoint.
- *Kansas City, Kansas, Region 7 Office*: EPA's Region 7 Office, which opened in 1999, included a green rider in its lease to incorporate sustainable design elements, including environmentally preferable construction materials, lighting motion sensors, low-flow plumbing fixtures, native landscaping, and drip irrigation systems.
- *EPA Headquarters, Washington, DC*: EPA Headquarters has initiated a low-impact development

(LID) project designed to manage urban stormwater runoff around the facilities that make up its Federal Triangle campus. EPA expects the LID project, which will be phased in over the next five years, to reduce the peak volume and pollutant load of stormwater runoff entering Washington, DC-area waterways from the impervious plazas, parking areas, sidewalks, and landscaping surrounding the Ariel Rios, EPA East and West, and Ronald Reagan and International Trade Center buildings. Phase I includes redeveloping the Ariel Rios South Courtyard area to include bioretention cells, high-efficiency irrigation via an underground cistern, and porous pavement walkways. The first phase will also include bioretention cells and a soil/grass stabilization/parking area installed along Constitution Avenue. The remaining phases, for which designs will be developed beginning in FY 2005, include plans to introduce native landscaping in the EPA West Courtyard, install cisterns to catch roof rain water, beautify Benjamin Franklin Circle along 12th Street, and install green roofs on the Ronald Reagan and Ariel Rios buildings. The Agency worked on the procurement during FY 2004 and planned to award the contract by the end of calendar year 2004.

ENERGY EFFICIENCY IN LEASE PROVISIONS

GSA leases most of the office buildings EPA uses; when EPA needs new space, the Agency works with GSA to either lease an existing building or lease a newly designed, newly constructed facility. While the Agency may not be able to directly control existing building design and performance, in most instances it can work with GSA to ensure the existing facilities it leases adhere to minimum environmental performance standards. EPA uses “green riders” to get the best possible existing or newly constructed building, recognizing that there may be limitations. Green riders were included in leases for the Region 3, Region 7, and Region 10 office buildings, including requirements for reusing materials, purchasing environmentally preferable products, recycling construction and demolition debris, promoting public transportation, and improving the facilities’ energy performance through energy-efficient HVAC systems.

In FY 2004, the Agency worked closely with GSA to incorporate green lease provisions for new facilities being constructed in Denver, Colorado, and Arlington, Virginia. As mentioned previously, these provisions ensure that the new buildings will promote energy efficiency, water conservation, resource reuse, and a healthy work environment. Using appropriate lease language, the Agency is able to ensure that all new facilities achieve a minimum LEEDTM Silver rating, the ENERGY STAR building label, and 30 percent better than the ASHRAE 90.1-(1999) standard (for both offices and laboratories).

Even though the Agency is not required to report energy use in its offices, EPA is currently working with GSA to incorporate mandatory quarterly energy reporting in all of its major office buildings, so that it can better understand its office energy use profile, identify poor energy performers in

its inventory, and target locations where collaboration among EPA, GSA, and the landlord will economically reduce energy use.

INDUSTRIAL FACILITY EFFICIENCY IMPROVEMENTS

EPA is continuing to focus on the facilities that use the most energy and water, as the Agency strives to meet the goals outlined in E.O. 13123 and maximize efficiency and environmental performance. The following are the major projects that were either considered, worked on, or completed in FY 2004:

- *Ada, Oklahoma:* Construction of the Robert S. Kerr Environmental Research Center's ESPC was completed in June 2004, and commissioning of the systems started immediately thereafter. As part of its ESPC, the facility has incorporated a ground-source heat pump, VAV fume hoods and air supply, new fan motors, and an integrated digital direct control system for HVAC, energy, fire, and security management. Commissioning was completed in November 2004. When everything is in place, EPA expects to achieve energy savings of more than 50 percent and water savings of more than 80 percent. In FY 2004, the laboratory had already reduced energy use approximately 39.5 percent and water use by 62 percent compared to the baseline average of FY 1998 to FY 2000.
- *Ann Arbor, Michigan:* EPA's National Vehicle Fuel Emissions Laboratory (NVFEL) initiated a water-saving scrubber upgrade this year—replacing a water-based system with dry filter packets—that was completed at the end of FY 2004. In FY 2004, EPA also commissioned the National Renewable Energy Laboratory to perform energy modeling on the facility to develop a simpler measurement and verification methodology, to allow non-ESPC related facility mechanical system and work space expansions, to assist in integrating a “clean power” project at the facility, and potentially add a combined heat and power plant. NVFEL completed its ESPC upgrade in April 2001 and realized energy savings of 36.7 percent in FY 2004 (compared to the FY 1993-95 baseline) from a new cooling tower, air handling units, 200-kW fuel cell, and direct digital control system. The facility has reduced water use by more than 50 percent from 2000 as a result of the ESPC, and continues to implement a water management put in place in FY 2003.
- *Athens, Georgia:* In December 2003, EPA conducted a Stage 2 energy assessment at the Ecosystem Support Division laboratory, focusing on the air handling units' sequence of operation, chilled water system temperature, and other potential energy-saving measures. In FY 2005, the Agency plans to initiate a project to reprogram controls on all mechanical systems, including night and weekend setbacks, reset temperatures, and pressurization, in the hopes of reducing energy use by approximately 15 percent. Following a re-commissioning of all the retrofits, EPA anticipates completing the project by September 2005.
- *Chelmsford, Massachusetts:* EPA's first LEED™ Gold-certified laboratory, which opened in 2001, features VAV HVAC and fume hoods, solar awnings, and extensive daylighting to reduce energy needs. In FY 2004, EPA studied adding a heat recovery loop as well as a water softener to the New England Regional Laboratory, but neither project was determined to be economically feasible. The Agency also conducted a solar feasibility study and is awaiting a proposal from the

vendor. To better control cooling tower water use and provide a more accurate accounting of the flow balance around the cooling tower, a blowdown meter was installed in winter 2003, and EPA has been collecting and analyzing these data in FY 2004.

- *Cincinnati, Ohio:* AWBERC is the Agency's second largest laboratory, and, at more than 30 years old, one of its oldest. AWBERC completed an energy master planning process in April 2003, which determined safe and energy-efficient approaches to replace the facility's mechanical systems over the next seven years. At the end of FY 2004, a construction contract was awarded for cooling towers and a chilled water distribution system. The infrastructure replacement phasing plan for the air handling unit, duct work, and exhaust system was 95 percent complete by the end of the fiscal year, with completion anticipated by the end of December 2004. EPA also launched a study of steam use in AWBERC to look at the possibility of transitioning from a steam boiler to a more efficient hot water system. A water management plan was completed and signed for the AWBERC facility in summer 2004. Work continued in FY 2004 on design of a new laboratory annex, Lab Annex 2, to the AWBERC facility, which will include under-floor ventilation as part of its resource-efficient design. EPA's other laboratories in Cincinnati—the Testing & Evaluation and Center Hill facilities—reduce electricity use through the use of building automation systems and nighttime setback modes on the HVAC system.
- *Corvallis, Oregon:* An energy assessment was conducted on the main building of the Western Ecology Division Laboratory in June 2004 to identify opportunities to reduce energy use before and after pending renovations on the facility. The system configuration and operations represent the result of many years of adjustments within the limitations of the original design and occupant requirements. The auditor observed that energy awareness was high and the operations had been refined to capacity, and that any further system enhancements should be addressed as part of the large-scale renovation. By the end of summer 2004, EPA had also completed water management plans for the main laboratory, the nearby Willamette Research Station, and the Pacific Coastal Ecology Branch laboratory in Newport, Oregon.
- *Denver, Colorado (NEIC):* In FY 2004, EPA's National Enforcement Investigations Center started preparations for a laboratory module re-commissioning project, which is expected to reduce energy use 30 percent to 50 percent from existing air flows. The project is expected to be completed in FY 2005.
- *Duluth, Minnesota:* The Mid-Continent Ecology Division laboratory uses water from Lake Superior for cooling water, significantly reducing energy requirements. In fall 2003, the facility completed a Stage 2 energy assessment as well as a water assessment. A regional architecture/engineering firm was contracted in June 2004 to design a manifold VAV exhaust system for nine laboratory modules, manifolding eight laboratory fume hoods into one exhaust fan (versus eight existing exhaust fans) and updating the air handling unit that feeds these modules. Design is underway and construction is scheduled for FY 2006. In January 2004, the facility's water management plan was completed and signed. A fish culture water system recycling project is currently under design that could save between 8 and 15 million gallons of water per year.
- *Fort Meade, Maryland:* EPA's first laboratory to achieve ISO 14001 certification (in FY 2003), ESC in FY 2004 completed installation and commissioning of a new super-conductivity system to control cooling tower and boiler water recycle concentrations. The facility is now collecting

data to carefully control and maximize water efficiency in the cooling tower. In FY 2004, this VAV laboratory also continued to reap the energy saving benefits of a retro-commissioning effort completed in FY 2002 and a new pony boiler installed to improve summer efficiency in FY 2003. A dry chemical treatment system has been implemented in the condenser water system; this will not only reduce material handling at the laboratory, but decrease water use associated with the cooling towers. In the first half of FY 2004, the facility looked at options for incorporating a heat recovery loop, using the energy stream from the manifolded building/fume hood exhaust and transforming that energy into the main air handling unit fresh air intakes. That project is currently on hold.

- *Golden, Colorado:* The Region 8 Laboratory employs extensive daylighting, energy-efficient lighting, a solar wall, nighttime setbacks for the ventilation system, and direct digital controls to monitor the HVAC system as part of its energy-efficient operations. A water management plan for the laboratory was also completed and signed in October 2003.
- *Gulf Breeze, Florida:* On September 16, 2004, EPA's Gulf Ecology Division Laboratory was hit by the intense wind and rain resulting from Hurricane Ivan. Many of the laboratory facilities suffered roofing damage, and the storm surge resulted in flooding of up to 10 inches in some buildings. The laboratory's location on the north side of Sabine Island protected it from the brunt of the wave action from the Gulf of Mexico, but parts of the facility's piers were washed away by the storm. As a result, the photovoltaic pier lighting system is no longer operational, but power and water were restored to the facility in mid-October.
- *Houston, Texas:* The Environmental Services Branch laboratory incorporates a night setback system to control exhaust fans, fume hoods, and supply air. EPA completed designs for a mechanical system upgrade in FY 2004 for this outdated laboratory, but paybacks could not justify the proposed cost from the landlord, which was outrageously high.
- *Kansas City, Kansas:* EPA's newest VAV laboratory, the Kansas City Science and Technology Center, uses 25 percent less energy than the average amount used by EPA's other new VAV laboratories, thanks to a heat recovery/runaround loop, plate and frame heat exchanger, and variable frequency drive chiller coupled with two conventional chillers. The LEED™ Gold-level laboratory, EPA's second, offsets potable water usage for sewer conveyance by 100 percent with a rooftop rainwater recapture system.
- *Manchester, Washington:* EPA opened a new 11,000 square foot wing featuring VAV fume hoods in May 2003 for the Region 10 laboratory. The existing wings in the facility will be undergoing multi-year upgrades and renovations, which will include high-performance fume hoods that will use 30 to 40 percent less energy than conventional fume hoods. The renovation design process and construction award was completed by the end of FY 2004 for Phase IIA of the project, which includes 11 fume hoods; during FY 2005, construction will be completed and EPA will commission the project]
- *Narragansett, Rhode Island:* Mechanical upgrades completed in July 2004 at the Atlantic Ecology Division laboratory should reduce the facility's energy use by approximately 15 percent and have already increased the water efficiency of its chilled water system. In FY 2004, construction on the chiller primary loop upgrade was completed, and the project was commissioned. EPA also undertook a domestic hot water options study in winter 2004, and

installation of a new system is pending. In October 2003, a water management plan was completed and signed for the facility, which has achieved significant water savings over the past two years. A sustainable site master plan completed in FY 2004 revealed additional opportunities to conserve water and other resources through landscaping. Re-commissioning of the entire facility is being planned to coincide with a laboratory modernization project over the next few years.

- *Richmond, California:* A contract was awarded in June 2004 and construction started in the fall on numerous mechanical upgrades at the Region 9 Laboratory, including: installation of a natural gas co-generation unit for electricity and hot water; replacement of a single oversized boiler with two smaller ones; and an HVAC controls upgrade. The project, which is expected to reduce Richmond's energy use by approximately 15 percent, is anticipated to be completed by March 2005.

- *Research Triangle Park, North Carolina:* EPA's largest energy consumers—the new Main building, NCC, and their sister facilities, the National Health and Environmental Effects Research Laboratory in Durham and the Human Studies Facility in Chapel Hill—have been the main area of focus for EPA in FY 2004. The following are just a few of the efficiency measures underway or completed:
 - *New Main:* This new facility was fully occupied in January 2003. When the facility was accepted, the energy metering system for the building was not functional. One of EPA's current priorities is to properly metering the facility; in the meantime, the facility estimates its energy use. In FY 2004, EPA completed a laboratory controls capability investigation and a laboratory controls optimization pilot to determine how best to safely reduce laboratory ventilation rates within the capabilities of the physical mechanical and monitoring systems. From this work, new laboratory commissioning protocols were developed during summer 2004. Campus-wide implementation of laboratory module re-commissioning began in November 2004 and is expected to be completed in summer 2005, with a campus-wide energy savings of 10 percent anticipated.

A re-commissioning project was also started for the office portion of the New Main building in summer 2004 to ensure proper operation of the VAV boxes and economizers and appropriate integration with the building automation system. Phase I testing was completed in August 2004, and building-wide implementation is anticipated to start in mid- to late FY 2005.

Humidification problems also appeared in FY 2004, initially presenting in one of the four main laboratory wings (the "A" Wing or the animal wing). The system there was not able to maintain humidity adequately. In addition, it was discovered that the quality of water used in the humidification process was negatively affecting the mechanical systems. EPA conducted a humidity investigation, which included analysis of a reverse osmosis humidity makeup water system. As a result, a humidity system upgrade for A wing, which included heat recovery, has been designed. EPA will initiate procurement for this mechanical system change in December 2004. Together, these projects should solve humidification problems in the A wing and save 25 to 30 percent of the energy used in the A wing, for a savings to taxpayers of approximately \$200,000 per year.

- *National Health and Environmental Effects Research Laboratory:* Mechanical engineers developed an implementation plan for energy savings opportunities identified in a fall 2003 energy audit. They completed the implementation plan in spring 2004. Recommendations from the energy audit will be turned into projects for this facility in FY 2006.
- *Human Studies Laboratory:* In 2004, mechanical engineers reviewed an energy audit completed in FY 2003 and made implementation recommendations for this facility. In July 2004, EPA designated several short-term energy projects, including optimizing the air handling units, main chilled water loop, glycol heating, and domestic hot water loop. Some work on the chilled water system was completed in September 2004, and the remaining projects were scheduled to start at the beginning of FY 2005.
- *Other facilities:* NCC is awaiting news of its LEED™ Silver application filed in February 2004, based on its energy efficiency and other green features. A new childcare center is also being built with energy efficiency in mind and to LEED™ Silver standards.

HIGHLY EFFICIENT SYSTEMS

EPA has worked to install highly efficient combined cooling, heating, and power systems at a number of its laboratories. As part of an energy infrastructure upgrade underway at its Richmond, California, laboratory in fall 2004, the Agency will install a natural gas combined heat and power unit. The co-generator will help conserve energy while serving both electricity and hot water needs. The Agency utilizes a geothermal heat pump system installed at its Ada, Oklahoma, laboratory as part of the ESPC upgrade there. The system, which has been in operation since June 2002, generates approximately 13,120 MMBtus of energy each year, which helps augment the facility's use of electricity and natural gas.

DISTRIBUTED GENERATION

EPA utilizes distributed generation to diversify its energy portfolio and improve the reliability of its electric supply. Off-grid electricity sources are an important fixture at NVFEL in Ann Arbor, Michigan. As part of an energy infrastructure upgrade in 2001, a 200 kW capacity natural gas fuel cell was installed to provide both base load power and emergency backup power for the facility. The fuel cell supplies heating water for the reheat water loop serving the air handling units, saving significant amounts of energy that would otherwise be wasted in cooling towers and radiators.

ELECTRICAL LOAD REDUCTION MEASURES

EPA is doing its part to work with local utilities to reduce its buildings' electricity loads during peak times and throughout the day:

- *Atlanta, Georgia:* In May 2004, EPA's Region 4 Office in the Sam Nunn Atlanta Federal Center issued a policy eliminating space heaters. The office also has a power management initiative that consistently powers down computer monitors when not in use. Over the first six months of 2004, EPA conducted a study in which it sub-metered the office space on the 15th floor to measure plugload. The study placed occupancy-controlled, multi-plug outlets in each workspace or office to minimize wasted energy. Baseline data were compared with energy use data after the occupancy sensors and new surge outlets were installed. The study concluded that if plugload power management were to be installed throughout this EPA office, a reduction of 122,667 kWh per year would be realized (or 123 kWh per person per year). A team of GSA, EPA, and DOE personnel were recognized at the 2004 FEMP Energy Awards in October 2004 for their work to improve the performance of this building.
- *Edison, New Jersey:* The laboratory has three solar water-heating systems that are the primary source of hot water in their respective facility areas. Because the building relies on the electrical systems only for auxiliary water heating when necessary, the solar heaters allow the facility to conserve electricity and fossil fuel. So far, Edison's solar technology has registered energy savings results significantly higher than expected.
- *Gulf Breeze, Florida:* EPA utilizes timers on approximately 20 electric water heaters to save energy during off-peak hours.
- *Kansas City, Kansas:* Motion sensors controlling general lighting and timers controlling exterior lighting have been installed throughout EPA's Region 7 Office building.
- *Research Triangle Park, North Carolina:* A lighting control/automatic shutoff system was phased in to the new Main Facility from June to October 2003 to reduce the amount of electricity needed for lighting the building.
- *Richmond, California:* EPA expects to reduce energy use at this laboratory by approximately 15 percent from the new CHP unit, boiler replacement, and HVAC controls upgrades contract awarded in May 2004, which is expected to be completed by spring 2005.

WATER CONSERVATION

As part of its "whole building" approach to facilities management, EPA promotes, encourages, and tracks water conservation efforts at its facilities. Since 1994, the Agency has required the use of water-conserving equipment in all newly leased and built facilities. Equipment upgrades through ESPCs

and other capital projects have led to significant water use reductions. In addition, EPA has a program to conduct detailed water use assessments at each of its laboratory facilities and develop associated water management plans. This effort, coupled with the development of environmental management systems, is formally establishing water conservation goals and best management practices (BMPs) at each laboratory. EPA established a goal to reduce overall laboratory water use by 10 percent by 2010 (from a 2000 baseline). The Agency is well on the way to meeting this goal.

By the end of FY 2004, EPA had completed and signed detailed water management plans and established BMPs in accordance with E.O. 13123 for 11 of its 29 facilities, with more underway. The following are the highlights of EPA's water efficiency efforts in FY 2004:

- *Cincinnati, Ohio:* EPA completed a water management plan for AWBERC in July 2004. The facility adopted nine of the 10 BMPs, including installing water-efficient shower heads and faucets and implementing processes and mechanical systems that significantly reduce the use of single-pass cooling. The facility is also using a magnetic cooling tower water treatment, which reduces chemical buildup and increases water efficiency. Total water savings are estimated to be nine million gallons per year.
- *Las Vegas, Nevada:* EPA's National Exposure Research Laboratory is located on the University of Nevada, Las Vegas campus. EPA completed a water management plan for the laboratory in July 2004, noting six BMPs being implemented, including installation of low flow faucet/shower and sanitary fixtures and elimination of single-pass cooling in all applications where it is cost effective to do so. The facility is also beginning an EMS implementation project, which will help ensure consistent water use monitoring and establish additional water conservation goals. Estimated water savings are 400,000 gallons per year.
- *Duluth, Minnesota:* In January 2004, EPA completed a water management assessment of the Mid-Continent Ecology Division Laboratory. Although the laboratory already has multiple water-conserving efforts in place, including native landscaping and water-efficient lavatory fixtures, EPA is investigating use of a culture water reclamation system that has the potential to recycle 8 to 15 million gallons of water per year.
- *Narragansett, Rhode Island:* A water management plan was completed and signed for this facility in October 2003. Mechanical upgrades completed in July 2004 at the laboratory have already increased the water efficiency of its chilled water system. EPA improved the entire chilled and condenser water system to allow for variable flow; reintegrated an existing small, air-cooled chiller into the primary chilled water loop to allow the large, water-cooled chiller to be shut down when it is more efficient to run the small, air-cooled chiller; and upgraded the building controls for the chilled water system. These improvements have resulted in estimated water savings of 400,000 gallons per year.
- *Corvallis, Oregon:* In August 2004, EPA completed water management plans for its Corvallis, Oregon, Main Laboratory and Willamette Research Station (WRS). The main laboratory has

adopted and will maintain five BMPs. For example, to reduce irrigation water use, the main laboratory is working with a landscape architect to convert turf areas to beds planted with shrubs and plants native to the Northwest. To date, approximately 0.5 acres of turf have been converted through this ongoing project. Inside the facility, autoclave tempering water control valves were also replaced to limit tempering water flow to periods of autoclave operation only. Estimated water savings from these changes are 1.6 million gallons per year.

At the WRS, no irrigation is used on the surrounding landscape; rather, the surrounding pasture grass is allowed to go dormant in winter and recover with natural precipitation in the spring. Also at this facility, the faucets and showerheads were upgraded with water-conserving flow restrictors in August 2004. Estimated water savings from the faucet and showerhead conversion are 10,000 gallons per year.

- *Newport, Oregon:* EPA completed a water management plan for its Western Ecology Division lab in Newport, Oregon, in August 2004, agreeing to adopt and maintain half of the 10 possible BMPs. In July 2004, the laboratory's urinals were converted to a no-flush design, with estimated savings of 45,000 gallons per year.
- *Fort Meade, Maryland:* ESC, which completed and signed a water management plan in December 2002, continued to upgrade mechanical systems to improve its water efficiency. Installation and commissioning of a new super-conductivity control system for the cooling tower and boiler feeder not only saved water and money but also included capabilities that allow EPA to find large water or chemical losses quickly and electronically log water usage. These changes are estimated to save 600,000 gallons per year.
- *Ann Arbor, Michigan:* EPA performed an in-depth water conservation assessment and prepared a water conservation plan for NVFEL in April 2003. Overall water use has decreased by approximately 80 percent over the past decade, thanks to an ESPC and other efforts. In FY 2004, the laboratory replaced a water-based scrubber system with one that uses filter packets, and this should reduce water use up to 20 percent, resulting in estimated savings of 1.2 million gallons per year.
- *Chelmsford, Massachusetts:* EPA's New England Regional Laboratory has had a water management plan signed and in place since December 2002. In winter 2003, the laboratory installed a cooling tower blowdown meter to better measure and control water use in the tower. In summer 2004, EPA conducted a water softener feasibility study for pretreatment of the laboratory's cooling tower water, but concluded the project would not yield additional water savings.
- *Research Triangle Park, North Carolina:* EPA undertook initial water management assessments at some of its facilities in RTP in FY 2004. Water management plans are being prepared based on those assessments and should be completed in FY 2005. In addition to a comprehensive water conservation education and outreach program, RTP has waterless urinals in its new Main facility. Estimated water savings from the urinal conversion is 80,000 gallons per year.

Appendix A

Data Tables

FY 2004 ENERGY MANAGEMENT DATA REPORT

Agency: U.S. Environmental Protection Agency

Prepared by: Bucky Green

Date: 12/9/2004

Phone: 202-564-6371

PART 1: ENERGY CONSUMPTION AND COST DATA

1-1. Standard Buildings/Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Unit Cost (\$)	Site-Delivered Btu (Billion)	Est. Source Btu (Billion)	Est. Carbon Emissions (Metric Tons)
Electricity	MWH	0.0	\$0.0	N/A /kWh	0.0	0.0	0
Fuel Oil	Thou. Gal.	0.0	\$0.0	N/A /gallon	0.0	0.0	0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	N/A /Thou Cu Ft	0.0	0.0	0
LPG/Propane	Thou. Gal.	0.0	\$0.0	N/A /gallon	0.0	0.0	0
Coal	S. Ton	0.0	\$0.0	N/A /S. Ton	0.0	0.0	0
Purch. Steam	BBtu	0.0	\$0.0	N/A /MMBtu	0.0	0.0	0
Other	BBtu	0.0	\$0.0	N/A /MMBtu	0.0	0.0	0
Total Costs:			\$0.0				
Standard Buildings/Facilities (Thou. Gross Square Feet)		0.0		Btu/GSF:	N/A	N/A	

1-2. Industrial, Laboratory, Research, and Other Energy-Intensive Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Unit Cost (\$)	Site-Delivered Btu (Billion)	Est. Source Btu (Billion)	Est. Carbon Emissions (Metric Tons)
Electricity	MWH	136,045.5	\$8,614.0	\$0.06 /kWh	464.2	1,612.1	22,852
Fuel Oil	Thou. Gal.	683.4	\$1,219.0	\$1.78 /gallon	94.8	94.8	1,891
Natural Gas	Thou. Cubic Ft.	395,029.8	\$3,084.3	\$7.81 /Thou Cu Ft	407.3	407.3	5,893
LPG/Propane	Thou. Gal.	6.9	\$15.0	\$2.16 /gallon	0.7	0.7	11
Coal	S. Ton	0.0	\$0.0	N/A /S. Ton	0.0	0.0	0
Purch. Steam	BBtu	21.9	\$421.5	\$19.22 /MMBtu	21.9	30.5	781
Other	BBtu	322.4	\$3,570.8	\$11.07 /MMBtu	322.4	322.4	
Total Costs:			\$16,924.6		1,311.3	2,467.8	31,429
Energy-Intensive Facilities (Thou. Gross Square Feet)		3,685.7		Btu/GSF:	355,773	669,558	

1-3. Exempt Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Unit Cost (\$)	Site-Delivered Btu (Billion)	Est. Source Btu (Billion)	Est. Carbon Emissions (Metric Tons)
Electricity	MWH	0.0	\$0.0	N/A /kWh	0.0	0.0	0
Fuel Oil	Thou. Gal.	0.0	\$0.0	N/A /gallon	0.0	0.0	0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	N/A /Thou Cu Ft	0.0	0.0	0
LPG/Propane	Thou. Gal.	0.0	\$0.0	N/A /gallon	0.0	0.0	0
Coal	S. Ton	0.0	\$0.0	N/A /S. Ton	0.0	0.0	0
Purch. Steam	B/Btu	0.0	\$0.0	N/A /MMBtu	0.0	0.0	0
Other	B/Btu	0.0	\$0.0	N/A /MMBtu	0.0	0.0	0
Total Costs:			\$0.0	Total:	0.0	0.0	0
Exempt Facilities (Thou. Gross Square Feet)		0.0		Btu/GSF:	N/A	N/A	N/A

1-4. Non-Fleet Vehicles and Other Equipment

	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Unit Cost (\$)	Btu (Billion)	Est. Carbon Emissions (Metric Tons)
Auto Gasoline	Thou. Gal.	31.0	\$45.0	\$1.45 /gallon	3.9	75
Diesel-Distillate	Thou. Gal.	89.0	\$84.0	\$0.94 /gallon	12.3	246
LPG/Propane	Thou. Gal.	13.0	\$18.0	\$1.38 /gallon	1.2	21
Aviation Gasoline	Thou. Gal.	0.0	\$0.0	/gallon	0.0	0
Jet Fuel	Thou. Gal.	0.0	\$0.0	/gallon	0.0	0
Navy Special	Thou. Gal.	0.0	\$0.0	/gallon	0.0	0
Other	Thou. Gal.	0.0	\$0.0	/MMBtu	0.0	0
Total Costs			\$147.0		17.5	342

1-5. WATER CONSUMPTION, COST AND EFFICIENCY MEASURES

	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)
Water	Million Gal.	167.5	\$1,051.8
Best Management Practice Implementation Tracking Data			
Number of facilities* in agency inventory			29
Number of facilities with completed water management plans			11
Number of facilities with at least four (4) BMPs fully implemented			11
*number in the agency inventory, can be buildings, bases, or campuses			

1-6. RENEWABLE GREEN ENERGY PURCHASES

(Only include renewable energy purchases developed or contracted after 1990)

	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)
Electricity from Renewables	MWH	67,065.0	\$4,164.8
Natural Gas from Landfill/Biomass	MMBtu	0.0	\$0.0
Renewable Thermal Energy	MMBtu	0.0	\$0.0
Other Renewable Energy Biodiesel*	Gallons	28,205.0	\$39.6

Note: <-- this figures includes a mix of "tags" and delivered product.

The incremental cost of green power at EPA was approx. \$860,213 in FY 2004

*For other renewable energy that does not fit in the type, units used, annual consumption and cost, and include any additional information in your narrative submission. For example, biodiesel used in non-transportation applications. (Renewable fuels used for transportation will be collected through GSA's Fleet Management reporting process.)

1-7. SELF-GENERATED RENEWABLE ENERGY INSTALLED AFTER 1990

	Consumption Units	Total Annual Energy	Energy Used by Agency*
Electricity from Renewables	MWH	111.1	110.1
Natural Gas from Landfill/Biomass	MMBtu	0.0	0.0
Renewable Thermal Energy**	MMBtu	13,121.4	13,121.4
Other Renewable Energy***		0.0	0.0

*Energy used by agency equals total annual generation unless a project sells a portion of the energy it produces to another agency or the private sector. It can equal zero in the case of non-Federal energy projects developed on Federal land.

**Examples are geothermal, solar thermal, and geothermal heat pumps, and the thermal portion of combined heat and power projects. Thermal energy from geothermal heat pumps should be based on energy savings compared to conventional alternatives.

***For other renewable energy that does not fit any category, fill in the type, units used, annual consumption and cost, and include any additional information in your narrative submission. For example energy displaced by daylighting technology or passive solar design.

PART 2: ENERGY EFFICIENCY IMPROVEMENTS

2-1. DIRECT AGENCY OBLIGATIONS

	FY 2004		Projected FY 2005	
	(MMBTU)	(Thou. \$)	(MMBTU)	(Thou. \$)
Direct obligations for facility energy efficiency improvements, including facility surveys/audits		\$ 3,457.50		\$3,885.0
Estimated annual savings anticipated from obligations	0.0	\$345.0	0.0	\$388.0

2-2. ENERGY SAVINGS PERFORMANCE CONTRACTS (ESPC)

	Annual savings (MMBTU)	(number/Thou. \$)
Number of ESPC Task/Delivery Orders awarded in fiscal year & annual energy (MMBTU) savings.	0.0	0
Investment value of ESPC Task/Delivery Orders awarded in fiscal year.		\$0.0
Amount privately financed under ESPC Task/Delivery Orders awarded in fiscal year.		\$0.0
Cumulative guaranteed cost savings of ESPCs awarded in fiscal year relative to the baseline spending.		\$0.0
Total contract award value of ESPCs awarded in fiscal year (sum of contractor payments for debt repayment, M&V, and other negotiated performance period services).		\$0.0
Total payments made to all ESP contractors in fiscal year.		\$0.0

2-3. UTILITY ENERGY SERVICES CONTRACTS (UESC)

	Annual savings (MMBTU)	(number/Thou. \$)
Number of UESC Task/Delivery Orders awarded in fiscal year & annual energy (MMBTU) savings.	0.0	0
Investment value of UESC Task/Delivery Orders awarded in fiscal year.		\$0.0
Amount privately financed under UESC Task/Delivery Orders awarded in fiscal year.		\$0.0
Cumulative cost savings of UESCs awarded in fiscal year relative to the baseline spending.		\$0.0
Total contract award value of UESCs awarded in fiscal year (sum of payments for debt repayment and other negotiated performance period services).		\$0.0
Total payments made to all UESC contractors in fiscal year.		\$0.0

2-4. UTILITY INCENTIVES (REBATES)

	Annual savings (MMBTU)	(Thou. \$)
Incentives received and estimated energy savings	0.0	\$0.0
Funds spent in order to receive incentives		\$0.0

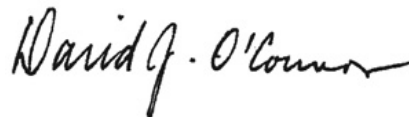
2-5. TRAINING

	(number)	(Thou. \$)
Number of personnel trained/Expenditure	50	\$30.0

Appendix B

Energy Scorecard for FY 2004

FY 2004 Federal Agency Energy Scorecard 12/8/04

Department/Agency Name	Contact Name and Phone																										
U.S. Environmental Protection Agency	Bucky Green, 202-564-6371																										
Name of Senior Energy Official	Signature of Senior Energy Official																										
David J. O'Connor, Acting Assistant Administrator for Administration and Resources Management	 12/22/04																										
Did your agency . . .	Yes	No	Anticipated Submittal Date																								
1. Submit its FY 2004 energy report to OMB and DOE by January 1, 2005 (Sec. 303)?	X		January 1, 2005																								
2. Submit a FY 2005 Implementation Plan by January 1, 2005 (Sec. 302)?	X		January 1, 2005																								
Did your agency . . .	Yes	No	Comments																								
3. Implement or continue to use renewable energy projects at Federal installations or facilitate the siting of renewable generation on Federal land in FY 2004 (Sec. 204)? (Report all self-generated renewable energy from projects installed after 1990; refer to Table 1-7 on the Energy Management Data Report) <small>* Ada's geothermal figure is based on FY 2003 data, as we do not have complete FY 2004 data yet.</small>	X		If yes, how many projects and how much energy generated? (Specify unit: MWh or MMBtu) <table style="margin-left: 20px; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;"># Projects</th> <th style="text-align: center;">Energy</th> <th style="text-align: center;">Unit</th> </tr> </thead> <tbody> <tr> <td>Solar</td> <td style="text-align: center;">5</td> <td style="text-align: center;">111.0</td> <td style="text-align: center;">MWh</td> </tr> <tr> <td>Wind</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Thermal¹</td> <td style="text-align: center;">3</td> <td style="text-align: center;">13,121*</td> <td style="text-align: center;">MMBtu</td> </tr> <tr> <td>Biomass</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Other RE</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> </tbody> </table>		# Projects	Energy	Unit	Solar	5	111.0	MWh	Wind	_____	_____	_____	Thermal ¹	3	13,121*	MMBtu	Biomass	_____	_____	_____	Other RE	_____	_____	_____
	# Projects	Energy	Unit																								
Solar	5	111.0	MWh																								
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Thermal ¹	3	13,121*	MMBtu																								
Biomass	_____	_____	_____																								
Other RE	_____	_____	_____																								
4. Purchase energy generated from new renewable energy sources in FY 2004 (Sec. 204)? ² <small>* These figures do not include the green power EPA purchases for its offices, which GSA reports.</small>	X		If yes, how much: <u>67,065.0*</u> MWh and <u>374.8*</u> MMBtu																								
5. Invest direct FY 2004 appropriations in projects contributing to the goals of the Order (Sec. 301)?	X		If yes, how much: <u>\$ 3,457,500</u>																								
6. Specifically request funding necessary to achieve the goals of the Order in its FY 2006 budget request to OMB (Sec. 301)? (Refer to OMB Circular A-11, Section 25.5, Table 2)	X		If yes, how much: <u>\$ 3,102,000</u>																								
7. Perform energy audits of 10% of its facility space during the fiscal year (Sec. 402)? <small>* Based on RTP New Main recommissioning (1,042,611 GSF) and Corvallis (Main), Athens-ESD, and Duluth audits (251,421 GSF). Total EPA = 3,685,665 GSF. 1,294,032 GSF / 3,685,665 GSF = 35.1% of total.</small>		X	What percentage of facility space was audited during the FY? <u>35.1%*</u> How much facility space has been audited since 1992? ³ <u>72 %</u>																								
8. Issue to private-sector energy service companies (ESCOs) any energy savings performance contract (ESPC) delivery orders (Sec. 403(a))? (Refer to Table 2-2 on the Energy Mgmt Data Report) ⁴		X	How many? _____ Annual savings (MMBtu): _____ Total investment value ⁵ : \$ _____ Guaranteed cost savings: \$ _____ Award value: \$ _____																								

1 Examples are geothermal, solar thermal, and geothermal heat pumps. Thermal energy from geothermal heat pumps should be determined as follows: Thermal energy = Total geothermal heat transferred – electrical energy used.

2 "New" renewable energy means sources developed after 1990.

3 Should be greater than 100% if all facility space has been audited at least once since 1992. Additions to EPA's inventory since 1992 are why EPA's figures are less than 100%.

4 Although ESPC authority expired October 1, 2003, some agencies may have signed delivery orders under existing contracts.

5 Investment value includes design, materials, labor, overhead, and profit but excludes contractor's financing costs and government's administration costs. Using investment value allows comparison with other traditional execution methods such as appropriated and working capital funded projects.

Did your agency . . .	Yes	No	Comments
9. Issue any utility energy services contract (UESC) delivery orders (Sec. 403(a))? (Refer to Table 2-3 on the Energy Management Data Report)		X	How many? _____ Annual savings (MMBtu): _____ Total investment value ³ : \$ _____ Cumulative cost savings: \$ _____ Award value: \$ _____
10. Incorporate energy efficiency requirements into relevant acquisitions (Sec. 403(b)(3))?	X		
11. Adopt and apply the sustainable design principles (e.g., Whole Building Design Guide, Leadership in Energy and Environmental Design (LEED)) to the siting, design, and construction of new facilities or major (budget line item) renovations begun in FY 2004 (Sec. 403(d))? The 5 facilities include Northern Virginia, Denver, Boston, Cincinnati-Lab Annex 2, and RTP Childcare.	X		Number of new building (or major renovation) design/construction projects in FY 2004 ⁶ : <u>5</u> Number of these projects that can or will be certified under LEED ⁶ : <u>5</u>
12. Provide training to appropriate personnel ⁷ on energy management (Sec. 406(d))?	X		Number of appropriate personnel trained: <u>~ 50</u> Total number of appropriate personnel: <u>175</u>
13. Implement any additional management tools (Sec. 406)?	X		Check all that apply: Awards: <u>X</u> Performance Evaluations: <u>X</u> Showcase Facilities: <u>X</u> Number of Showcase Facilities designated in fiscal year: <u>1</u>
14. Establish Water Management Plans (WMPs) and implement at least 4 Best Management Practices (BMPs) in at least 10% of agency facilities (Sec. 207, 503(f))?	X		Number of facilities with WMPs and 4 BMPs: <u>11 (7 new, 4 old)</u> Number of facilities in agency inventory: <u>29</u>

NOTE: Provide additional information below if a “No” reply is used for any of the questions above.

⁶ Count projects only once, regardless of phase. For example, if in FY 2004, your agency had 10 new building or major renovation projects, of which 2 can be LEED certified, then report 10 and 2, respectively, in the spaces provided. If the project was designed and reported on in response to this question in a previous year, do not report it as a new project in FY 2004, even if construction commenced or continued in FY 2004.

⁷ Appropriate personnel include the agency energy management team as well as Federal employees and on-site contractors who are energy or facility managers, operations and maintenance workers, design personnel, procurement and budget staff, and legal counsel.

Please enter data from annual energy report pertinent to performance toward the goals of Executive Order 13123	Base Year	Previous Year (2003)	Current Year (2004)	% Change (Current vs. Base)
15. Site Energy Efficiency Improvement Goals (Sec. 202). 1985 Base Year	N/A	N/A	N/A	N/A
16. Industrial/Energy Intensive Facilities Goals (Sec. 203). 1990 Base Year	357,864 Btu/GSF	326,455 Btu/GSF	355,773 Btu/GSF	-0.58%
16a. Green Power Netted Out	357,864 Btu/GSF	305,660 Btu/GSF	296,877 Btu/GSF	-17.04%
17. Source Energy Use (Sec. 206). 1985 Base Year	N/A	N/A	N/A	N/A
18. Water Conservation Goal (Sec. 207). 2000 Base Year	187.3 MGal	171.7 MGal	167.5 MGal	-10.56 %
19. Renewable Energy (Sec. 204) Energy used from self-generation and RE purchases	N/A	93.3 BBtu	246.0 BBtu*	N/A

Abbreviation Key: Btu/Ft² = British thermal units per gross square foot
 Btu/unit = British thermal units per unit of productivity (or gross square foot when such a unit is inappropriate or unavailable)
 MGal = Million gallons
 MMBtu = Million British Thermal Units
 BBtu = Billion British Thermal Units
 RE = Renewable energy
 GSF = Gross Square Footage
 N/A = Not applicable

* The Agency also purchased 49.4 million kilowatt hours of green power in FY 2004 for the buildings it occupies in the Federal Triangle complex and 1310 L Street NW in Washington, DC and its New York and Atlanta Regional Offices. GSA, which manages and pays the utilities for these buildings, will report on these green power acquisitions in its energy report.

Notes

Question 4: EPA purchased renewable energy includes 67,065 MWh of green power and 374.8 MMBtu of biodiesel fuel (28,205 gallons of biodiesel at 132,900 Btu/gallon).

Question 7: EPA performed traditional energy audits at facilities that represent 6.8% of its square footage. However, the Agency continued an intensive commissioning process at its largest research facility, located in Research Triangle Park, North Carolina, a facility that represents approximately 29% of EPA's laboratory space. Commissioning work included testing the consistency and reliability of fume hood exhaust flows, the accuracy of flow monitors, and the BAS system. EPA also began recalculating the theoretical air flows of 400 laboratory modules and has reset exhaust volumes in approximately 50 laboratories by December 7, 2004. While this work technically does not meet the definition of an energy audit, the work involved in commissioning this facility does represent a thoughtful evaluation of operations at the building and a tremendous effort to improve energy performance there.

Question 8: EPA did not enter into any new ESPCs in FY 2004. However, the Agency continues to work with its ESPC contractor, Johnson Controls Inc., at its Ada, Oklahoma laboratory. In FY 2004, JCI worked to correct several engineering issues at the laboratory, and the fume hoods were finally certified in November 2004.

Question 9: EPA does not use UESCs.

Appendix C

Not Required

Appendix D

Industrial and Laboratory Facilities Inventory

APPENDIX D—INDUSTRIAL AND LABORATORY FACILITIES INVENTORY¹

Robert S. Kerr Environmental Research Lab
Ada, Oklahoma
Site Energy Manager: Frank Price

National Vehicle and Fuel Emissions Laboratory
Ann Arbor, Michigan
Site Energy Manager: Steven Dorer

National Exposure Research Laboratory
Athens, Georgia
Site Energy Manager: Harvey Holm

Science and Ecosystem Support Division
Athens, Georgia
Site Energy Manager: Betty Kinney

New England Regional Laboratory
Chelmsford, Massachusetts
Site Energy Manager: Bob Beane

Andrew W. Breidenbach Environmental Research Center
Cincinnati, Ohio
Site Energy Manager: Rich Koch

Test and Evaluation Facility
Cincinnati, Ohio
Site Energy Manager: Rich Koch

Center Hill Test and Evaluation Facility
Cincinnati, Ohio
Site Energy Manager: Rich Koch

National Health and Environmental Effects Research Laboratory - Western Ecology Division
Corvallis, Oregon
Site Energy Manager: Jay Gile

¹ EPA is required to report to DOE and OMB the energy use at facilities for which the Agency pays utility bills. Although EPA occupies other facilities, the utilities are paid by GSA.

Willamette Research Station
Corvallis, Oregon
Site Energy Manager: Jay Gile

National Health and Environmental Effects Research Laboratory - Mid-Continent Ecology Division
Duluth, Minnesota
Site Energy Manager: Rod Booth

Region 2 Laboratory
Edison, New Jersey
Site Energy Manager: Joseph Pernice

Environmental Science Center
Fort Meade, Maryland
Site Energy Manager: Rick Dreisch

Region 8 Laboratory
Golden, Colorado
Site Energy Manager: Sue Datson

Large Lakes Research Station
Grosse Ile, Michigan
Site Energy Manager: Rod Booth

National Health and Environmental Effects Research Laboratory - Gulf Ecology Division
Gulf Breeze, Florida
Site Energy Manager: Clay Peacher

Region 6 Environmental Laboratory
Houston, Texas
Site Energy Manager: Daniel Young

Kansas City Science & Technology Center
Kansas City, Kansas
Site Energy Manager: John Begley

University of Nevada, Las Vegas - On Campus EPA Facilities
Las Vegas, Nevada
Site Energy Manager: Fred Childers

Region 10 Laboratory
Manchester, Washington
Site Energy Manager: Mark Ader

National Air and Radiation Environmental Laboratory
Montgomery, Alabama
Site Energy Manager: Herb Reed

National Health and Environmental Effects Research Laboratory - Atlantic Ecology Division
Narragansett, Rhode Island
Site Energy Manager: Russ Ahlgren

National Health and Environmental Effects Research Laboratory - Western Ecology Division Newport,
Oregon
Site Energy Manager: Jay Gile

New Consolidated Facility
Research Triangle Park, North Carolina
Site Energy Manager: James White/Glen Lowery

New Computer Center
Research Triangle Park, North Carolina
Site Energy Manager: James White/Glen Lowery

National Health and Environmental Effects Research Laboratory
Research Triangle Park, North Carolina
Site Energy Manager: James White/Glen Lowery

Human Studies Facility
Research Triangle Park (Chapel Hill), North Carolina
Site Energy Manager: James White/Glen Lowery

New Page Road
Research Triangle Park, North Carolina
Site Energy Manager: James White/Glen Lowery

Central Regional Laboratory
Richmond, California
Site Energy Manager: Jennifer Mann

U.S. Environmental Protection Agency
FY 2005 Energy and Water Implementation Plan

December 22, 2004

For information call: Sustainable Facilities Practices Branch, 202 564-6371

SECTION I

MANAGEMENT AND ADMINISTRATION

The U.S. Environmental Protection Agency (EPA) recognizes that efficient energy and water management must involve all facility management employees as well as senior management. This section describes EPA's energy management infrastructure and the management tools it will continue using to implement Executive Order (E.O.) 13123, *Greening the Government Through Efficient Energy Management*.

ENERGY MANAGEMENT INFRASTRUCTURE

E.O. 13123 requires each federal agency to assemble a technical support team to encourage meeting the energy-efficiency goals and requirements of the order. EPA's Sustainable Facilities Practices Branch (SFPB), which EPA's Office of Administration and Resources Management (OARM) created at the end of 2000, is dedicated to meeting these requirements. SFPB will continue to serve as an advocate, coordination point, and technical advisor on sustainable practices, policies, and project implementation to all of EPA's facility-related organizations and personnel, with a focus on EPA's largest energy and water-consuming facilities. Key staff in the SFPB's energy team include the branch chief, education/outreach and Laboratories for the 21st Century coordinator, two mechanical engineers, an architect, a water conservation/green power coordinator, and a pollution prevention and recycling coordinator.

Senior Agency Official and Energy Team

EPA's Assistant Administrator for Administration and Resources Management (currently David J. O'Connor, acting) will continue to serve as the Agency Energy and Environmental Executive, supported by SFPB's national energy team described above. The energy team will continue to be supplemented by architects and engineers from EPA's Architecture, Engineering, and Asset Management Branch and by the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory on a project-specific basis. Site energy managers for each of the Agency's 29 facilities are listed in Appendix D of the annual report.

OARM will continue to focus on sustainable design and procurement for new facilities, commissioning, mechanical system improvements, large energy users, and green power procurement to meet the E.O. 13123 energy reduction goals.

MANAGEMENT TOOLS

EPA will encourage its employees' commitment to improving energy efficiency. EPA's energy management team will continue to use awards, incentives, and performance evaluations, as well as continuing education and training programs, to support individual and team efforts in energy efficiency.

Awards (Employee Incentive Programs)

EPA will continue encouraging and recognizing its employees for their achievements in conserving energy and in overall promotion of energy-efficiency awareness. In March 2005, EPA will present its third annual "Btu Buster" and "H₂O Overachiever" awards to facility managers that have reduced the largest volume or percentage of their facilities' energy use and significantly cut water consumption, as well as recognize employees who have led cutting-edge projects or partnered with EPA's facility organizations to reduce energy during FY 2004. EPA also will continue to participate in the *White House Closing the Circle Awards* for energy and resource conservation and green buildings. In addition, EPA will maintain its Agency-wide awards program to address sustainable design and energy conservation, recognizing such work as green power procurement and energy-efficient project implementation.

Performance Evaluations

Employees who have energy management responsibilities will continue to be evaluated annually against criteria based on the Agency's energy management principles.

Training and Education

Using several education and training programs, EPA will continue to ensure that employees are aware of the latest technologies and opportunities to increase energy efficiency.

- # *Laboratories for the 21st Century*: SFPB's Laboratories for the 21st Century (Labs21) program, a joint partnership between EPA and DOE dedicated to improving the environmental performance of U.S. laboratories, will continue to support a Web site, workshops, e-mail network, and annual conference in FY 2005. Approximately 29 EPA employees attended the October 2004 conference in St. Louis, Missouri. The 2005 conference will be held in Portland, Oregon, October 5-7. Details on registration, the annual call for papers, and other details are available on the Labs21 Web site at <www.labs21century.gov>. Labs21 will also continue to hold its one-day workshops on energy-efficient laboratory design and operations throughout FY 2005.
- # *Buildings and Facilities Conference*: EPA encourages all Agency facility managers to attend an annual three-day Buildings and Facilities conference. The FY 2005 conference is planned for March 2005 in Philadelphia, Pennsylvania, and will include presentations on commissioning, green power purchases, and energy-efficient design and retrofits.
- # *Green Online Ordering System*: In FY 2005, EPA's on-line, "green" credit card ordering system under a blanket purchase agreement (BPA) becomes mandatory for all EPA offices, so that employees can make purchasing decisions consistent with EPA's Environmentally Preferable Purchasing Program's (EPP) guidelines. The BPA, which was launched in FY 2004 at EPA Headquarters, consists only of non-electronic office products that meet or exceed EPA recycled content and other EPP standards. EPA also conducts training to make green purchasing easier for Agency personnel and increase such purchases throughout the Agency. Credit card purchasing guidelines on EPA's EPP Web site also provide easy access for credit card holders to ensure their purchases comply with environmental laws and EPA policies. The guidelines identify specific environmental attributes to look for when selecting products, including the ENERGY STAR[®] label or other energy-efficiency designations.
- # *Energizing EPA Newsletter*: EPA will continue to distribute this quarterly newsletter to all EPA senior, program, and facility managers and other employees to keep them up to date on energy and water conservation at new and existing laboratories, green power purchases and projects, and energy- and water-efficiency activities in EPA facilities.
- # *Office of Administrative Services Web Site*: In FY 2005, EPA will complete the reorganization of its Office of Administrative Services Web site to provide more user-friendly access and features. The Web site provides the latest information on energy and water performance at EPA facilities, new energy efficiency projects, green power procurement, green fleet acquisitions, and other efforts that make EPA more efficient.
- # *Energy 2005*: EPA is actively participating on the planning committee for Energy 2005, a large federal energy management conference targeted at federal energy managers. Approximately 1,200 people attend this annual conference, which covers topics such as commissioning, energy savings performance contracts, green power, and sustainable building design. EPA will be actively marketing the conference internally to EPA managers, facility managers, and green building policy staff.

Showcase Facilities

EPA's most recent facility to open, the Kansas City Science and Technology Center, was named a Federal Energy Saver Showcase Facility in FY 2004. While the Agency does not have any new major facilities being occupied prior to application deadline in FY 2005, EPA anticipates that new regional offices in Denver and Boston will be nominated in FY 2006.

SECTION II

IMPLEMENTATION STRATEGIES

EPA is committed to continuing to use a variety of strategies to reduce energy consumption and improve energy and water efficiency in its facilities, including: sustainable new building design, commissioning, re-commissioning, and retro-commissioning; heating, ventilation, and air conditioning (HVAC) system upgrades; focusing on large energy users; green power and renewable energy certificate purchases; and water conservation efforts. As a key component of this effort, and to focus limited resources, EPA will make its top priority addressing energy issues at its facilities in Research Triangle Park (RTP), North Carolina, which use 50 percent of EPA's reportable energy and present tremendous opportunities for energy savings.

OVERALL STRATEGY

The Agency will continue to implement its five-part energy conservation strategy in FY 2005:

- # Promoting sustainable design in its new buildings and leases, so that new buildings entering the inventory are more energy-efficient and sustainable than the ones they replace.
- # Re- and retro-commissioning to realize big energy savings in the near term.
- # Designing and constructing physical mechanical system changes to achieve energy savings in the long run.
- # Concentrating efforts where the most opportunities are, at the Agency's largest energy consuming facilities. Regardless of size, however, EPA will also implement energy conservation projects at smaller laboratories where funding, local management, and local staff support exist.
- # Purchasing green power, which will always serve as an important component of EPA's balanced effort to reduce its environmental footprint.

EPA will also continue to conduct energy audits, support life-cycle cost analysis, benefit from energy savings performance contracts (ESPCs), use energy-efficient products, and incorporate water conservation measures across all of its facilities.

Addressing energy efficiency in RTP is critical to meeting the FY 2005 and FY 2010 goals outlined in E.O. 13123, because, as stated above, these facilities represent 50 percent of EPA's energy consumption. In addition, these facilities represent four of EPA's five highest energy users on a Btu per gross square foot per year basis.

LIFE-CYCLE COST ANALYSIS

When designing, constructing, and maintaining its facilities, EPA will seek to maximize energy and water efficiency and incorporate innovative technologies that are cost-effective and environmentally sound throughout their life cycles.

In FY 2005, EPA will continue to recognize the long-term energy and water savings from its ESPCs in Ann Arbor, Michigan, and Ada, Oklahoma, and begin to recognize the savings from mechanical upgrades procured through an ESPC-like contract in Richmond, California. EPA only reports on laboratories that are owned by the Agency or leased under very long-term leases. EPA will continue implementing its policy of using longer time frames to determine life-cycle cost savings, examining savings over a 15- or 20-year time frame, as EPA has longer time frames to recoup the taxpayers' investments in energy efficiency improvements. The Agency will also complete a standard/base Sustainable Master Plan Statement of Work initiated in FY 2004, for use in hiring architectural and engineering firms involved in this type of work.

FACILITY ENERGY AUDITS

In accordance with the Energy Policy Act and E.O. 13123, and to help identify opportunities for energy system improvements, EPA's facilities will continue to be audited regularly for energy and water efficiency. By FY 2005, EPA had completed energy assessments at nearly all of its laboratories and major regional offices. This year, the Agency will complete a protocol for a broader sustainable opportunities assessment, covering water conservation, storm water management, recycling, green power, and other green procurement activities, and use this new procedure to explore the full range of sustainable improvements at key facilities.

FINANCING MECHANISMS

EPA will continue to use innovative financing strategies where possible and appropriate. Though ESPC authority was renewed for 18 months, EPA does not plan at the present time to implement new ESPCs, but rather monitor the two ESPCs it has completed. EPA is using ESPC-like mechanisms to finance mechanical system improvements, though. Under an agreement with the firm from which EPA leases its Richmond, California, Region 9 Laboratory, the lessor is financing a natural gas co-generator to produce electricity and hot water, two smaller staging boilers to replace a larger version, and an HVAC controls upgrade, all of which should be completed by spring 2005. Lease payments will be made by EPA using the 15 percent savings it expects to achieve on utilities.

ENERGY STAR® AND OTHER ENERGY-EFFICIENT PRODUCTS

EPA will continue promoting the purchase of energy-efficient products that carry the ENERGY STAR label, including photocopier equipment and computers, during FY 2005. EPA employees are encouraged to become involved and responsible participants in the Agency's energy management activities through the EPP program, training for government purchase card users on buying energy-efficient and sustainable products, and guides and databases that include the environmental attributes of available products. EPA will ensure that all of its offices and labs have access to the new Blanket Purchase Agreement/online green products ordering system started in FY 2004, which consists completely of green office products and energy-efficient office equipment.

EPA newsletters including *EPP Update* and *Energizing EPA* will continue to promote the use of energy-efficient products and provide resources to EPA purchasers. In FY 2005, *Energizing EPA* will begin a feature column in each issue devoted to energy-saving tips employees can use, including instructions for how to "power down" ENERGY STAR computer monitors and other products.

ENERGY STAR BUILDINGS

EPA will continue to approach facility upgrades from a systemic perspective and incorporate holistic design principles in its construction projects. Currently, the ENERGY STAR Buildings program does not encompass energy-intensive facilities such as laboratories; therefore, EPA cannot designate its 29 laboratory facilities as ENERGY STAR buildings. However, the Agency's regional offices in Denver, Chicago, Seattle, and New York City are ENERGY STAR-labeled buildings. The Agency has made it a requirement that all new major leased facilities (i.e. Northern Virginia, Boston, and Denver) achieve the ENERGY STAR label. EPA's Region 10 Office in the Park Place Building in Seattle achieved its ENERGY STAR label in FY 2005 (October 2004). A re-commissioning effort at EPA's Atlanta Regional Office is expected to result in a label in early 2005.

SUSTAINABLE BUILDING DESIGN

As part of its *Green Buildings Vision and Policy Statement*, EPA incorporates sustainable design principles into the siting, design, and construction of new facilities, as well as the renovation and maintenance of existing facilities. The Agency requires that all major newly constructed or renovated buildings: achieve at least a minimum Silver rating from the Leadership in Energy and Environmental Design (LEED™) program of the U.S. Green Building Council; benchmark energy use and achieve the ENERGY STAR label within a fixed post-occupancy time period; and achieve 30 percent better than the ASHRAE 90.1-(1999) energy performance standard.

In FY 2005, EPA will continue work on numerous sustainable design building projects, most notably:

- # *Denver, Colorado.* Design completion and initial construction of the Agency's new Region 8 Office building, a 250,000 rentable square foot facility, will take place in FY 2005. Construction of this build-to-suit lease should be completed in 2006.

- # *Arlington, Virginia.* Site clearing for EPA's newest headquarters satellite building in Northern Virginia began in FY 2004. In FY 2005, design for this 422,000 rentable square foot facility will be completed and construction initiated. Occupancy is anticipated in summer 2006.

- # *Boston, Massachusetts.* EPA will continue working with GSA to rehabilitate and renovate the McCormick Post Office and Courthouse. EPA will occupy 225,000 square feet in the building, which will house EPA's New England Regional Office and is expected to be ready for occupancy in October 2008.
- # *Cincinnati, Ohio.* Initial construction of the second Research Support Annex for EPA's Andrew W. Breidenbach Environmental Research Center (AWBERC) will take place during FY 2005, with completion anticipated in mid- to late 2006. By providing 42,400 square feet of additional office space, Annex 2 will free up space in AWBERC that can be converted to accommodate new laboratories.
- # *Research Triangle Park, North Carolina.* Construction of a new childcare facility in RTP that began in April 2004 will continue into FY 2005. The 25,400 square foot facility will replace the current center and will allow EPA to extend services to 54 additional children of federal employees.
- # *Research Triangle Park, North Carolina.* EPA expects its National Computer Center in RTP to receive LEED™ certification by mid-FY 2005.

ENERGY EFFICIENCY IN LEASE PROVISIONS

GSA leases most of the office buildings EPA occupies. When EPA needs new office space, the Agency works with GSA to lease either an existing building or a newly designed, newly constructed facility. While the Agency may not be able to directly control an existing building's environmental performance, in most instances, it can work with GSA to ensure a leased facility meets minimum environmental performance standards. The Agency requires that all major newly constructed office buildings achieve the ENERGY STAR® label for buildings and 30 percent better energy performance than ASHRAE 90.1-(1999) requirements. In FY 2005, EPA will continue working closely with GSA to incorporate lease provisions on energy performance for the Agency's new offices in Denver, Boston, and Northern Virginia.

INDUSTRIAL FACILITY EFFICIENCY IMPROVEMENTS

Reflecting EPA's focus on its largest and most energy-intensive facilities, in FY 2005 the Agency intends to expend its greatest facility improvement efforts on several buildings in Research Triangle Park, North Carolina, including the new Main building and the Human Studies Laboratory in Chapel Hill. The following are just a few of the improvements that will be underway in FY 2005:

- # *New Main:* This new facility was fully occupied in January 2003. When the facility was accepted, the energy metering system for the building was not functional. One of EPA's current priorities is to properly meter the facility; in the meantime, the facility estimates its energy use. Current estimates put completion of the metering system at September 2005. New laboratory commissioning protocols were developed during summer 2004. Building-wide implementation of laboratory module re-commissioning began in November 2004 and is expected to be completed in summer 2005, with a campus-wide energy savings of 10 percent anticipated.

Humidification problems also appeared in FY 2004, initially presenting in one of the four main laboratory wings (the "A" Wing or the animal wing). The system there was not able to maintain humidity adequately. In addition, it was discovered that the water used in the humidification process was coating the mechanical systems. EPA conducted a humidity investigation, which included analysis of a reverse osmosis humidity makeup water system, and designed a humidity system upgrade for A wing, including heat recovery. EPA will initiate procurement for this mechanical system change in December 2004. Together, these projects should solve humidification problems in the A wing and save 25 to 30 percent of the energy used in the A wing, for a savings to taxpayers of approximately \$200,000 per year.

- # *Human Studies Laboratory:* In 2004, mechanical engineers reviewed an energy audit completed in FY 2003 and made implementation recommendations for this facility. In July 2004, EPA designated several short-term energy projects, including optimizing the air handling units, main chilled water loop, glycol heating, and domestic hot water loop. Some work on the chilled water system was completed in September 2004, and the remaining projects were scheduled to start at the beginning of FY 2005.

The following efficiency improvement opportunities are also underway or being considered for other EPA facilities in FY 2005:

- # *Ada, Oklahoma:* Commissioning on mechanical upgrades associated with the ESPC awarded for the Robert S. Kerr Environmental Research Center in 2002 is anticipated to be completed in early FY 2005, with laboratory module commissioning scheduled to be completed in December 2004. When everything is in place, EPA expects to achieve energy savings of more than 50 percent and water savings of more than 80 percent.

- # *Athens, Georgia:* EPA's Ecosystem Support Division laboratory undertook a Stage 2 energy assessment in FY 2004; during FY 2005, the Agency plans to initiate a project to reprogram controls on all mechanical systems, including night and weekend setbacks, reset temperatures, and pressurization, in the hopes of reducing energy use approximately 15 percent. Following a re-commissioning of all the retrofits, EPA anticipates completing the project by September 2005.

- # *Cincinnati, Ohio:* AWBERC is the Agency's second largest laboratory, and, at more than 30 years old, one of its oldest. AWBERC completed an energy master planning process in April 2003, which determined safe and energy-efficient mechanical system approaches to replace the facility's mechanical systems over the next seven years. A construction contract was awarded on cooling towers and a chilled water distribution system in FY 2004. The infrastructure replacement phasing plan for the air handling unit, duct work, and exhaust system was 95 percent complete by the end of the fiscal year, with completion anticipated by the end of December 2004. EPA will also complete a study of steam use in AWBERC to look at the possibility of transitioning from a steam boiler to a more efficient hot water system. Construction is also anticipated to start on the 42,400 Annex 2 to the AWBERC laboratory, which will incorporate under-floor ventilation and a variety of other sustainable design features.

- # *Denver, Colorado (NEIC):* In FY 2005, EPA's National Enforcement Investigations Center expects to complete a laboratory module re-commissioning project, which is expected to reduce energy use 20 percent to 30 percent from existing air flows.

- # *Duluth, Minnesota:* At the Mid-Continent Division Laboratory, design is underway and construction is scheduled for FY 2005 for a manifold variable air volume (VAV) exhaust system for nine laboratory modules, manifolding eight laboratory fume hoods into one exhaust fan (versus eight existing exhaust fans) and updating the air handling unit that feeds these modules.

- # *Manchester, Washington:* During FY 2005, as part of multiyear upgrades and renovations, construction will be completed and EPA will commission high-performance fume hoods that will use 30 to 40 percent less energy than the old versions.

- # *Richmond, California:* Construction started in fall 2004 on numerous mechanical upgrades at the Region 9 Laboratory, including: installation of a natural gas co-generation unit for electricity and hot water; replacement of a single oversized boiler with two smaller ones; and an HVAC controls upgrade. The project, which is expected to reduce Richmond's energy use by approximately 15 percent, is anticipated to be completed in spring 2005.

HIGHLY EFFICIENT SYSTEMS

In FY 2005, EPA anticipates completing installation of a natural gas combined heat and power (CHP) unit as part of an energy infrastructure upgrade at its Richmond, California, Region 9 Laboratory initiated in fall 2004. The co-generator will help conserve energy while serving both electricity and hot water needs. EPA will also continue to operate a geothermal heat pump at the Robert S. Kerr

Environmental Research Center in Ada, Oklahoma, which generates approximately 13,120 MMBtus each year and helps augment the facility's use of electricity and natural gas.

DISTRIBUTED GENERATION

EPA will continue to use and study distributed generation technologies to diversify its electric resources and provide more reliable, off-grid resources for uninterrupted power needs at its labs:

- # *Ann Arbor, Michigan:* A 200 kW natural gas fuel cell, installed in FY 2001, provides heating water for the reheat water loop serving the air handling units. By integrating the heating and cooling plant, EPA recovers significant amounts of energy that would have otherwise been wasted in cooling towers or radiators.
- # *Chelmsford, Massachusetts:* Solar awnings with a capacity of 2,000 watts will continue to supply electricity daily to the regional electric grid and will provide shade for the facility's office windows, thus reducing the amount of cooling needed.
- # *Edison, New Jersey:* The laboratory has three solar water-heating systems, allowing the building to rely on the electrical systems only for auxiliary water heating.
- # *Golden, Colorado:* EPA utilizes a transpired solar collector panel for the south wall of the facility's hazardous materials building. The solar panel saves energy by preheating ventilated air when heating is required.
- # *Manchester, Washington:* The facility will continue to utilize a net metering system that includes 28 solar panels.
- # *Research Triangle Park, North Carolina:* A 100-kW roof-top solar array contributes to electricity use reduction at RTP's National Computer Center. In addition, solar street lights operate throughout the facility.
- # *San Francisco, California:* The Region 9 Child Care and Fitness Center will continue to use a solar water heater to offset the natural gas consumed by the previous gas-fired water heating system.

ELECTRICAL LOAD REDUCTION MEASURES

EPA will continue to do its part to reduce its buildings' electricity loads during peak times and throughout the day:

- # *Gulf Breeze, Florida:* EPA utilizes timers on approximately 20 electric water heaters to save energy during off-peak hours.
- # *Kansas City, Kansas:* Motion sensors controlling general lighting and timers controlling exterior lighting are installed throughout EPA's Region 7 Office building.
- # *Research Triangle Park, North Carolina:* The laboratory wing re-commissioning that began in November 2004 should produce 10 to 15 percent reductions in electric use when completed in FY 2005.

RENEWABLE ENERGY

EPA will continue to procure renewable energy for new locations and replace existing green power contracts in FY 2005, adding to the 20 facilities already receiving 116 million kilowatt hours (kWh) of electricity from renewable sources. If all procurements go as planned, EPA will be purchasing 225 kWh of green power for a total of 26 facilities in FY 2005, or 77 percent of its electricity needs:

- # *Research Triangle Park, North Carolina:* During the latter part of FY 2004 and the beginning of FY 2005, EPA worked with the Defense Energy Support Center to procure green power for all of its facilities in RTP, replacing smaller contracts initiated in FY 2003. On November 1, 2004, EPA entered into its largest green power contract to date, committing to purchase 100 million kWh of renewable power in the form of renewable energy certificates (RECs) each year. The three-year purchase, procured through Unicoi Energy Services by the Defense Energy Support Center, will help support the annual generation of 100 million kWh of biomass energy derived from paper pulp waste in Port Wentworth, Georgia. This purchase will offset the use of non-renewable fuels to supply electricity use at RTP's Main Campus, National Computer Center, Human Studies Facility, National Health and Environmental Effects Research Laboratory, and all other RTP facilities.
- # *San Francisco, California:* In November 2004, EPA began purchasing 2.23 million kWh of green power per year in the form of RECs for its Region 9 Office. The three-year contract with 3-Phases Energy will help support the generation of geothermal energy from The Geysers in Middletown, California. The Geysers, which is located approximately 100 miles north of San Francisco in the Mayacamas Mountains, consists of 19 geothermal plants with a generation capacity of 850 Megawatts.
- # *Golden, Colorado.* In FY 2005, EPA replaced its previous green power contract for 2.1 million kWh per year for its Region 8 laboratory with a three-year contract with Aquila, Inc. The purchase, which represents 100 percent of the lab's annual electricity use, will come in the form of RECs that will help support the generation of wind power at Colorado Green Wind Project

facilities in Lamar, Colorado. The wind farm, which consists of 108 turbines spanning 11,840 acres in Prowers County, Colorado, has a generation capacity of 162 Megawatts.

- # *Denver, Colorado.* In early FY 2005, EPA began purchasing 4.7 million kWh of green power annually, in the form of RECs, for its Region 8 Office. Purchases under a three-year contract with Aquila, Inc., procured by the Western Area Power Administration, will offset 100 percent of the annual electricity used by the office, and will help support the generation of wind power at Colorado Green Wind Project facilities in Prowers County, Colorado.

- # *Kansas City, Kansas.* EPA is now purchasing green power in the form of RECs for its Region 7 Office and Science and Technology Center facilities in Kansas City. Two three-year contracts with Aquila, Inc. (procured by the Western Area Power Administration) will help offset 100 percent of the facilities' annual electricity use of 8.3 million kWh per year, and will support the generation of wind electricity from the Gray Country Wind Farm near Montezuma, Kansas. The wind farm consists of 170 turbines capable of generating 110 Megawatts of electricity.

WATER CONSERVATION

EPA will continue to implement its water conservation initiative in FY 2005, including: collecting and analyzing water use data in each of its facilities; developing and implementing water management plans; conducting in-depth water assessments at select laboratories; and investigating water conservation projects. For example, EPA's Mid-Continent Ecology Division Laboratory in Duluth, Minnesota, is investigating use of a culture water reclamation system that has the potential to recycle 15 million gallons of water. In FY 2005, the Agency expects to complete water conservation assessments and management plans for its National Health and Environmental Effects Research Laboratory (NHEERL), and Human Studies Facility in Research Triangle Park, North Carolina. EPA also anticipates initiating a water conservation assessment at the new Main Building in RTP as well. In addition to completing these plans, implementation of other water-saving efforts should yield results in FY 2005:

- # *Las Vegas, Nevada:* In addition to implementing its water management plan completed in FY 2004, the National Exposure Research Laboratory will begin an environmental management system implementation effort to help ensure consistent water use monitoring and establish water conservation goals. Estimated water savings are 400,000 gallons per year.

- # *Duluth, Minnesota:* The Mid-Continent Ecology Division Laboratory is completing the design of a culture water reclamation system that has the potential to recycle 7 to 15 million gallons of water per year.

- # *Corvallis, Oregon:* EPA's main laboratory in Corvallis is working with a landscape architect to convert turf areas of beds planted with shrubs and plants native to the Northwest in order to reduce irrigation water use by approximately 350,000 gallons per year. Inside the facility, the replacement of autoclave tempering water control valves near the end of FY 2004 is expected to save the facility approximately 1.6 million gallons of water in FY 2005 by limiting tempering water flow to periods of autoclave operation only.

- # *Fort Meade, Maryland:* A super-conductivity control system installed in FY 2004 for the Environmental Science Center's cooling tower and boiler feeder should help EPA identify large chemical or water losses quickly, and is anticipated to help the facility save about 600,000 gallons of water in FY 2005.

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EPA Supports

Green Power



EPA funds green power generation equivalent to this facility's electricity use. For more information, visit www.epa.gov/greeningepa/greenpower.htm