

U.S. Environmental Protection Agency
Energy Management and
Conservation Program

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Fiscal Year 2008 Annual Report



U.S. ENVIRONMENTAL PROTECTION AGENCY

ENERGY MANAGEMENT AND CONSERVATION PROGRAM

FY 2008 ANNUAL REPORT

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EXECUTIVE SUMMARY

In fiscal year (FY) 2008, the U.S. Environmental Protection Agency (EPA) continued to reduce energy and water consumption, promote green buildings, and implement a number of new projects and initiatives designed to improve the Agency's environmental performance over the coming years.

Energy Efficiency Exceeding Requirements

In FY 2008, EPA reduced energy intensity (measured in British thermal units [Btu] per gross square foot [GSF] per year) by 3.2 percent from FY 2007, and by 17.5 percent compared to the FY 2003 baseline established by law. This reduction is far higher than the 9 percent decrease the Agency is required to achieve from the FY 2003 baseline by FY 2008. As a result, the Agency is not only on track, but it is well ahead of requirements set forth in the Energy Policy Act of 2005 (EPAct 2005), Executive Order (E.O.) 13423, and, most recently, the Energy Independence and Security Act (EISA) of 2007 for energy use reductions relative to an FY 2003 baseline.¹

Accounting for EPA's extensive green power purchases and source energy savings credit, EPA reduced its "reportable" energy intensity by 24.4 percent in FY 2008 compared to the Agency's revised FY 2003 baseline (this total savings figure comprises 17.5 percent as a result of actual energy use reductions; 6.2 percent additional reductions from green power purchases; and 0.7 percent reductions from the source energy reduction credit). Although green power purchases are currently allowed to be partially counted according to the Executive Order, EPA far exceeded E.O. 13423 requirements without counting these purchases.

EPA continued to make significant progress in reducing energy use at the New Main building in Research Triangle Park (RTP), North Carolina. This facility has been the Agency's largest energy consumer since it came online in FY 2003. RTP New Main was able to reduce its energy use by 50.4 billion Btu, or 12 percent, between FY 2007 and FY 2008. These results stem from a multi-year effort to retro-commission the building, improve operations and maintenance, install an advanced metering system, and complete a number of mechanical system improvement projects. RTP New Main has reduced energy use 37.1 percent compared to the FY 2003 baseline. Because RTP New Main accounts for 30.4 percent of the Agency's total energy consumption, this is a major contribution to the Agency's energy efficiency success.

EPA also initiated or continued a number of other projects that yielded significant energy savings in FY 2008, including:

- Phase I upgrades to the Andrew W. Breidenbach Environmental Research Center (AWBERC) in Cincinnati, Ohio, including the replacement of old constant volume air handling units (AHUs) with variable air volume (VAV) AHUs, the replacement of constant volume fume hoods with VAV high-performance fume hoods, and the installation of new ductwork and controls. This infrastructure replacement project is expected to help the facility cut its energy use by more than 30 percent, once all four phases of the project are complete.

¹ Please note that EPA has adjusted its FY 2003 energy intensity baseline compared to the figures reported in previous years. This baseline adjustment is the result of the second and final phase of an adjustment to energy consumption data at EPA's consolidated RTP campus to account for the transition from a manual reporting system to a new advanced metering system (see Appendix C for more background and details about this baseline adjustment and Appendix D for EPA's revised FY 2003 energy baseline data).

- Completion of a three-phased ventilation upgrade project at EPA's Environmental Science Center in Fort Meade, Maryland, which is expected to reduce the facility's airflow demand by more than 19 percent and helped contribute to a decrease in energy intensity of more than 3 percent over the past year.
- Building control modifications at EPA's Science and Ecosystems Support Division Laboratory in Athens, Georgia, which include a transition from constant volume to variable frequency drive AHUs and nighttime setbacks to reduce energy use during unoccupied times, resulted in energy savings of 7.8 percent compared to an FY 2007 baseline.

EPA has also been pursuing two energy savings performance contracts (ESPCs), one covering a heat recovery system at RTP New Main, and another involving the construction of a large biomass system at the RTP Central Utility Plant.

Advanced metering is not only a requirement for federal agencies, but it is also helping EPA improve collection and reporting of energy and water data, which in turn helps identify areas for potential savings and allows EPA to maximize its current energy efficiency efforts. In FY 2008, EPA made significant progress in developing its national advanced metering system. The Agency installed advanced metering hardware at the AWBERC facility, which reports to the national system. EPA also tackled firewall issues and connected the "stand alone" advanced metering system serving the RTP New Main and National Computer Center (NCC) facilities to the national software system. These three facilities account for nearly 47 percent of EPA's total energy; EPA is optimistic that it will be able to affect significant energy and water savings by monitoring these facilities closely in FY 2009.

EPA has learned a great many lessons from the installation of advanced metering systems at RTP and AWBERC and intends to carry them forward to future projects planned at other facilities. In FY 2009, EPA plans to focus on its efforts to install advanced metering at its RTP Human Studies facility in Chapel Hill, North Carolina. In addition, EPA plans to develop a national contract for advanced metering hardware installation, commissioning, operation, and maintenance at its remaining facilities.

Focusing on EISA

Much of the work done by EPA during FY 2008 focused on preparing to meet the new requirements in EISA. EPA sees these requirements as an opportunity to further reduce energy use, improve facility management, seek out and implement new energy-saving projects, and focus on smaller facilities that have not received as much attention on efficiency in recent years because the priority was EPA's largest energy-consuming laboratories.

EISA requires federal agencies to complete energy assessments, water assessments, and re-commissioning at 25 percent of their "covered facilities" (those that constitute at least 75 percent of energy use) each year; enter energy and water use data into a national Web-based tracking system; and designate a facility energy manager who will be responsible for overseeing these objectives at each reporting location. In FY 2008, EPA began developing a list of covered facilities, developing preliminary schedules of assessments and commissioning, and explored contracting mechanisms for this work.

Water Conservation

EPA met and surpassed the new federal requirements for water savings. E.O. 13423 requires annual 2 percent water intensity reductions from an FY 2007 baseline. In FY 2008, the Agency reduced its water use by 9.9 million gallons, equivalent to a 6.4 percent reduction in water intensity compared to the FY 2007 baseline. EPA also completed water assessments and drafted water management plans at six different facilities in FY 2008. As part of its Agencywide Strategic Water Conservation Plan developed in FY 2008, EPA initiated a number of water-saving projects that are expected to account for approximately 6.4 million gallons annually of future water savings:

- In FY 2008, EPA initiated a program to replace or retrofit many of its lavatory faucets with high-efficiency models that flow at a maximum rate of 0.5 gallons per minute. This project was 70 percent complete at the close of FY 2008, with upgrades at 19 EPA facilities accounting for a combined water savings of approximately 1 million gallons per year. Nine other facilities are in the process of retrofitting their faucets, and three others have plans to do so in FY 2009.
- In FY 2008, EPA eliminated much of the single-pass cooling at its RTP New Main campus, which will save the facility approximately 500,000 gallons of water per year. Five additional facilities have identified projects to eliminate single-pass cooling; these projects are currently under evaluation and are expected to be initiated in FY 2009.
- EPA had WaterSense irrigation partners perform irrigation system audits at five of its facilities, in an effort to cut the amount of water used by the facilities' irrigation systems. EPA anticipates 700,000 gallons per year of water savings once the audit findings are implemented.

EPA is well positioned to meet the E.O. 13423 cumulative water use reduction target of 16 percent by FY 2015.

Greenhouse Gases (GHGs) and Green Power

In FY 2008, EPA further demonstrated its commitment to reducing its environmental footprint by developing a voluntary GHG inventory and quarterly reporting system. Based on its FY 2008 energy use data, EPA has cut Agencywide GHG emissions by 69.5 percent compared to the FY 2003 baseline established by the Agency. EPA achieved these reductions through a combination of energy efficiency projects and green power purchases. In the future, this GHG inventory will be expanded to track and report the Agency's emissions for all office facilities and all of its vehicles and will provide EPA with a new tool to help quantify its carbon footprint and evaluate potential GHG emissions reduction strategies, including energy efficiency projects. Note: EPA uses its Office of Air and Radiation's Climate Leaders protocols for GHG emissions estimates; this method produces higher GHG emissions than the U.S. Department of Energy's (DOE's) methodology.

EPA continues to reinforce a commitment to renewable energy and reducing emissions by offsetting 100 percent of its annual electricity use in FY 2008 through direct green power purchases and renewable energy certificate (REC) procurement. EPA signed two separate blanket contracts for a combined total of 380 million kilowatt hours (kWh) of RECs, allowing EPA to offset the emissions associated with Agencywide electricity consumption for FY 2008, as well as the first half of FY 2009.

EPA also explored opportunities for onsite renewable technology at several facilities. Projects are now underway or being developed for a 10 kilowatt (kW) photovoltaic (PV) system at the National Exposure Research Laboratory in Athens, Georgia, and a geothermal heating and cooling system at the Western Ecology Division Laboratory in Corvallis, Oregon. In addition, EPA is considering options to install a 966 kW PV array at the Region 2 Laboratory in Edison, New Jersey. EPA is working on a “power purchase agreement” for this project, whereby the utility company builds and maintains the PV array, and EPA would commit to purchasing the renewable electricity that it generates.

Green Buildings

In FY 2008, EPA’s new state-of-the-art Region 8 office in Denver, Colorado, achieved both Leadership in Energy and Environmental Design (LEED®) for New Construction (NC) Gold certification and the ENERGY STAR® label, as well as a Chicago Athenaeum American Architecture Award. EPA also completed or worked on a number of successful green building procurements in FY 2008. EPA moved into the Research Support Annex (Annex 2) of the Cincinnati AWBERC facility in January 2008 and expects to receive LEED-NC Gold certification in FY 2009. LEED-NC Gold certification is expected for EPA’s Region 1 office, a renovation underway in Boston, Massachusetts, and LEED-NC Silver or Gold certification is anticipated for EPA’s new Computational and Geospatial Sciences Building in Gulf Breeze, Florida. In addition, EPA worked with the General Services Administration (GSA) to include many green building requirements in the lease provisions for the Region 9 office in San Francisco, California, and for the Region 10 office in Seattle, Washington, both of which are expected to be awarded in FY 2009.

In FY 2008, the Agency took steps to enhance the internal process for ensuring building performance and sustainability. For example, EPA began revising the *Architecture and Engineering (A&E) Guidelines* to ensure that the Agency’s future buildings meet recently updated requirements and guidelines for efficiency, sustainability, and environmental performance. EPA’s “GreenCheck” process also underwent significant modifications in FY 2008 in an effort to standardize and improve the environmental performance goals that should be considered during design, construction, renovation, and operation of each new major lease or construction project. EPA has compiled a Best Practice Environmental Lease Provisions document for new lease solicitations that includes provisions to: meet federal environmental and conservation requirements; meet EPA environmental performance standards; obtain LEED-NC if new construction or major renovations are involved; and obtain LEED Existing Building (LEED-EB) certification to cover building operations and maintenance during the life of the lease.

In FY 2008, EPA developed a strategy for meeting the E.O. 13423 requirement that 15 percent of its existing buildings meet the Guiding Principles set forth in the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding signed in January 2006. The strategy targets buildings where EPA expects to invest significantly in expensive energy conservation and water conservation efforts by FY 2015. EPA will also implement non-capital intensive operating practices at these laboratories to ensure all Guiding Principles are met.

Stormwater Management

Reinforced by Section 438 of EISA, which requires stormwater management at federal facilities, EPA completed stormwater management retrofit projects at several facilities this year. EPA’s Office

of Water also initiated a Green Infrastructure Program. During FY 2008, EPA completed a garage cistern project at the Washington, D.C., Headquarters complex; installed a green roof and xeriscaping at the Atlantic Ecology Division (AED) Laboratory in Narragansett, Rhode Island; designed an upgrade of one major parking lot at the Region 2 Laboratory in Edison, New Jersey, to include porous surfaces and testing equipment to evaluate the quality of the lot's runoff; and added a stormwater retention pond to the grounds of the Office of Research and Development Laboratory in Athens, Georgia.

Looking at Labs in the Future

Laboratories for the 21st Century (Labs21[®]), EPA's voluntary partnership program, is experiencing major growth. During FY 2008, Labs21 hosted two successful annual conferences, including one in San Jose, California, in September that reached record attendance of more than 750 laboratory professionals. EPA signed a Memorandum of Understanding with the Public Works and Government Services Canada to promote the goals and objectives of the Labs21 Program. In FY 2008, Labs21 added 12 new federal and private sector partners, bringing the total number of partners to 62.

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FACING NEW CHALLENGES IN ENERGY AND WATER EFFICIENCY

In fiscal year (FY) 2008, the U.S. Environmental Protection Agency (EPA) faced a growing number of federal requirements to improve energy and water efficiency. When the Energy Independence and Security Act (EISA) was signed in December 2007, EPA was prepared to respond to the ever-increasing challenges to conserve these important natural resources. As a result, in FY 2008 the Agency achieved success in a variety of sustainability efforts, despite the major challenges presented by this new legislation and previous mandates, including Executive Order (E.O.) 13423 and the Energy Policy Act of 2005 (EPAAct 2005).

EISA

EISA's overarching goals are to increase U.S. energy security, expand production of renewable fuels, and improve vehicle fuel economy. With these goals come some unique challenges. EISA reinforces the E.O. 13423 requirement that federal agencies reduce energy intensity 30 percent by FY 2015, compared with an FY 2003 baseline. In addition, beginning in FY 2010, federal agencies will be required to lease space that has earned the ENERGY STAR[®] label in the most recent year. EPA is continuing to refine its energy conservation strategy, which was updated in FY 2006 with the addition of ConservE targets. ConservE presents facility-specific targets for energy intensity reduction to enable EPA to meet or exceed EISA and other legislative targets.

EISA also includes a requirement for agencies to identify all "covered facilities" that constitute at least 75 percent of the agency's energy use, and then complete energy assessments at 25 percent of covered facilities each year. EPA is developing a list of covered facilities, but the Agency intends to consider all reporting facilities for energy evaluation and reduction. EPA has already conducted a number of energy assessments at several key facilities over the past years, so the Agency will schedule reassessments to refine the scope of potential energy conservation measures identified at these facilities.

EISA also includes a zero net energy initiative for the commercial buildings occupied by federal agencies. EPA is striving for more energy-, water-, and carbon-neutral buildings and has made green practices the standard for all building operations and maintenance (O&M) activities. This is becoming especially challenging, because the majority of EPA's building inventory is laboratories, where energy needs and intensity continue to grow in the post-9/11 world as the Agency responds to the expanding need for increased biohazard and chemical warfare research.

MANAGEMENT

EPA continues to face increasing federal responsibilities to reduce energy and water intensity with a variety of management techniques. The Assistant Administrator (AA) for EPA's Office of Administration and Resources Management serves as the Agency's environmental executive and delineates responsibility for implementing sustainable principles throughout EPA's operations. The Sustainable Facilities Practices Branch (SFPB) includes mechanical engineers, green building experts, and other staff devoted to developing and implementing strategies for meeting the various federal requirements on energy and water reduction, green buildings, and resource conservation. SFPB works with and supports the Architecture, Engineering, and Asset Management Branch and the Safety, Health, and Environmental Management Division in acquiring and maintaining high performance sustainable buildings. A senior energy advisor consults with the AA, and senior

managers and other key staff are held responsible for meeting sustainability goals through annual performance reviews and other venues. Training, education, awards, and incentives encourage ongoing commitment to efficiency throughout the Agency. Guidelines for project management and commissioning ensure ongoing adherence.

Training and Education

To educate EPA employees on the requirements of EPCA 2005 and E.O. 13423, EPA continued providing internal energy and green buildings training sessions in FY 2008. These training sessions also meet an E.O. 13423 mandate that agencies establish an internal environmental training program that will provide initial awareness and review of the Executive Order goals and related instructions, including the environmental impacts of employees' actions. Presentations were made on green buildings, water conservation, and advanced metering. Approximately 50 EPA employees attended the various training opportunities, which were offered at Headquarters. These sessions will continue in FY 2009 with presentations on life-cycle costing, renewable energy, energy savings performance contracts, emissions, green leases, operations and maintenance, and EISA 2007 issues.

Building and Facilities Workshop

Following up on Headquarters staff training initiated in FY 2007, in April 2008 EPA held a two-day training workshop at the Region 8 Headquarters in Denver, Colorado. The 95 EPA employees in attendance represented the Agency's 10 regions and numerous laboratories. The focus was different for each day of the workshop. On day two, all attendees took part in sessions on advanced metering, federal energy requirements, operations and maintenance, green buildings, water conservation, stormwater management, and greening EPA's fleet.

Sustainable Laboratory Forum

Prior to the start of the Denver workshop mentioned above, laboratory managers were invited to a one-day Sustainable Laboratory Forum hosted by the Agency's Office of Research and Development (ORD) in Denver, Colorado. For several months over 2007 and 2008, ORD worked with a varied group of stakeholders in EPA's laboratory community to compile and document an extensive list of short-term strategies to improve the sustainability and cost efficiency of EPA's day-to-day laboratory activities. ORD utilized this one-day forum to bring together more than 100 EPA facility managers, laboratory directors and researchers, and senior management in an effort to develop and instill an EPA-wide "community of practice" centered around the implementation of these activities. The group held several sessions in which three topic areas were offered: energy conservation, water conservation, and chemical management. During each session, attendees were asked to discuss practices currently being implemented in their respective laboratories in the different subject areas. To close out the forum, the entire group reviewed the ideas discussed during each session, and the moderator asked each attendee to commit to bringing back at least one idea to his or her respective laboratory for implementation in the near term.

Laboratories for the 21st Century

Laboratories for the 21st Century (Labs21) is a voluntary partnership program dedicated to improving the environmental performance of U.S. laboratories. Co-sponsored by EPA and the U.S. Department of Energy (DOE), the program is committed to helping build sustainable, high-

performing, and low-energy laboratories. With 13 new partners joining the program in FY 2008, there are now 63 federal and private sector organizations committed to supporting sustainable laboratory design and operations. Among the current Labs21 partners are 11 federal agencies that receive information and technical assistance for more than 40 federal facilities. The success of the Labs21 Partnership Program was demonstrated on November 2, 2008, when the program received a Presidential Award for Leadership in Federal Energy Management for its support, leadership, and efforts in promoting and improving federal energy management.

During FY 2008, Labs21 held two of its most successful conferences to date. In 2008, EPA and DOE welcomed the International Institute for Sustainable Laboratories (I²SL) back as the nonfederal Labs21 Conference co-sponsor, and I²SL coordinated the Labs21 2008 Annual Conference from September 16 to 18, 2008, in San Jose, California. The event was the most successful Labs21 conference ever—attracting more than 750 laboratory designers, owners, and operators—and included a new track of technical sessions concentrating on sustainability in data centers. For the 2007 conference, 560 architects, engineers, federal employees, facility managers, and other laboratory professionals—including 31 EPA employees—convened in North Charleston, South Carolina, from October 2 to 4, 2007. I²SL also helped to coordinate 13 Labs21 Design Courses in FY 2008. Labs21 introductory and advanced courses trained 365 people in 13 different workshops across the country in FY 2008.

As of October 2008, 5,959 industry professionals were involved in Labs21 through the Labs21 Network, which provides monthly updates on the various program components, including an annual conference, partnership and supporter programs, and a tool kit of technical resources.

During FY 2008, Labs21 completed one new case study and three best practices guides as part of its tool kit of resources in support of sustainable design, construction, and operation of high-performance laboratories. The program also released two new technical bulletins as the start of a new line of resources included in the tool kit. In just a few pages, the bulletins provide readers with a concise and valuable overview of a particular laboratory design issue, outlining the problem and the Labs21 recommended approach to solving it. Labs21 created a laboratory equipment efficiency “wiki” this year to share information about laboratory equipment efficiency among users, and encourage manufacturers to provide more data on the energy use characteristics of their products. The wiki can be found at: <www.labs21century.gov/toolkit/equip_wiki.htm>.

The success of the Labs21 program is tracked through various measures, such as attendance at the annual conference and training courses, as well as the use of the Environmental Performance Criteria—a rating system developed specifically for laboratories—and use of the benchmarking tool—a Web-based database tool that allows users to compare the energy performance of their laboratory facilities with similar facilities.

The most valuable measure of the program’s success, however, is the energy (Btu per square foot), emissions, and dollar savings achieved from Labs21 partner projects. According to partner savings data reported for FY 2007, EPA calculates that the 18 currently reporting Labs21 partner projects have:

- Reduced their annual energy use by 437 billion Btu—equal to the average annual electricity use of more than 12,000 U.S. homes.

- Reduced their annual carbon dioxide emissions by an estimated 119 million pounds annually—the equivalent of removing nearly 36,000 cars from the road.
- Saved \$9.4 million on their energy bills in 2007.

The Labs21 Web site (www.labs21century.gov) provides additional information on the program, including regularly updated conference details, opportunities to join the program as a partner or supporter, and access to the online tool kit.

Benchmarking Energy With Labs21

EPA understands the value of benchmarking facilities' energy consumption to better understand where to focus its resources for improved energy efficiency. It should be noted that laboratories encompass a category of buildings that still lacks good energy benchmarking data that can be used to help identify opportunities for better facility design and operation.

EPA's Labs21 program has been working to build benchmarking data for both public and private sector laboratories. The benchmarking data cover overall building performance metrics (Btu per GSF per year), as well as building system metrics such as plug loads (watts per square foot). To help increase the available data set and better understand how EPA laboratories' energy performance compares with that of their peers, in FY 2008 EPA entered energy consumption data for its reporting laboratories into the Labs21 benchmarking tool. Toward the end of FY 2008 and into FY 2009, the Agency also applied the Labs21 benchmarking tool to rate the energy consumption of EPA laboratories pursuing LEED EB: O&M against their peers—a requirement of LEED EB: O&M. EPA plans to continue to expand the Labs21 benchmarking database tool, with the help of other federal agencies with laboratories.

Awards and Incentives

Each year, EPA recognizes and applauds employees' commitment to energy reduction and sustainability goals through incentive programs, including awards. EPA's internal "Sustainability Champion" awards are given to facilities and staff annually to honor their efforts in water efficiency, pollution prevention, and energy conservation. In March 2008, awards in six different categories were distributed to recognize facility managers, building design/maintenance personnel, and other EPA staff who have demonstrated exceptional effort and achievement in energy and water efficiency and other sustainability areas:

Btu Buster Award

- Joseph Pernice of the Region 2 Laboratory in Edison, New Jersey, helped achieve an 11.4 percent energy savings at the Region 2 Laboratory in FY 2007 compared with FY 2006.

H₂Overachiever Award

- Clay Peacher of the Gulf Ecology Division Laboratory in Gulf Breeze, Florida, reduced water consumption by 51.3 percent in FY 2007 compared with FY 2006, through adjustments made to cooling tower set points and the adoption of best water management practices.

- Betty Kinney of the Science and Ecosystem Support Division Laboratory in Athens, Georgia, provided diligent oversight, which helped the laboratory achieve water savings of 37.8 percent in FY 2007 compared with FY 2006.
- Russ Ahlgren and Mark Tagliabue of the National Health and Environmental Effects Research Laboratory in Narragansett, Rhode Island, received an Honorable Mention for their successful oversight of the installation of a compressed air delivery system, which contributed to the facility's 1.3 million gallon water use reduction in FY 2007.

Energy Partner of the Year Award

- The Research Triangle Park (RTP) Energy Team, consisting of Bucky Green, Dan Amon, Greg Eades, Bill Gaines, Billy Morris, Sam Pagán, James White, and Robert Wippich, reduced energy consumption at the RTP campus by 9.5 percent in FY 2007 compared with FY 2006. This accomplishment had a major impact on EPA's overall energy use in FY 2007 because the RTP facilities represent 47.7 percent of EPA's reported annual energy consumption.

Leading Edge Award

- The Cincinnati Annex 2 Team, which includes Rhonda Hampton, Gary Henson, Stephanie James, Abbas Keshavarz, Richard Koch, Bill Ridge, and Bill Wise, made a significant contribution to the creation of the Andrew W. Breidenbach Environmental Research Center (AWBERC) Research Support Annex, known as Annex 2, which is expected to receive LEED Gold. Annex 2 features state-of-the-art, energy-efficient building features, water-efficient plumbing fixtures, a low-impact development sustainable landscaping area, and a green roof.
- Clay Peacher, Mario Sanchez, and Cathy Berlow of the Gulf Breeze Facility Team managed the construction of the Gulf Breeze, Florida, facility, which incorporated several sustainable design features that will help the facility achieve LEED Gold or Silver certification, including: an extensive rainwater capture reuse system; high-efficiency, high-performance plumbing fixtures; occupancy sensors; and the use of local, recycled materials.

Pollution Prevention Partner of the Year

- Stephanie Bailey from the Region 10 Laboratory in Manchester, Washington, led employees to recycle more than 23,200 pounds of materials in 2007 through her role as EMS Coordinator.

Appreciation Award

- Cathy Berlow, from EPA Headquarters' Architectural, Engineering, and Asset Management Branch, received the award for her enduring commitment to greening EPA facilities.
- The Cincinnati AWBERC Infrastructure Replacement Team, which includes Stephanie James, Abbas Keshavarz, Richard Koch, Bill Ridge, Evelyn Toro, and Howard Wilson, received the award for its efforts toward the Infrastructure Replacement Project, a multi-year, multi-phase,

multi-million dollar project that will replace all of the air handlers, vertical and horizontal supply ductwork, control systems, exhaust systems, and associated equipment at AWBERC.

In addition to internal awards, EPA actively participates in the White House Closing the Circle Awards, DOE's Federal Energy and Water Management Awards, the Presidential Awards for Leadership in Federal Energy Management, and other opportunities for professional recognition. In FY 2008, EPA received an honorable mention for its team recycling effort at EPA Region 10's Manchester Environmental Laboratory. EPA's Region 8 office in Denver, Colorado, was honored with the distinguished American Architecture Award for 2008, the highest and most prestigious award in the United States that recognizes cutting-edge design.

Individual EPA employees were also recognized for their efforts; Sam Pagan of the Research Triangle Park, North Carolina, campus and Rick Dreisch of the Fort Meade, Maryland, Environmental Science Center received 2008 Federal Energy and Water Management Awards for exceptional management of their respective facilities.

Architecture and Engineering Guidelines

EPA's *Architecture and Engineering (A&E) Guidelines* provide guidance for facilities management, engineering, planning, and architecture professionals in the design and construction of new EPA facilities and the evaluation of existing facilities. In FY 2008, EPA began revising the *A&E Guidelines* to ensure that the Agency's future buildings meet new legal and regulatory requirements in EISA and EPAct 2005 and recently developed EPA best practices for efficiency, sustainability, and environmental performance. The primary purpose of the *A&E Guidelines* is to provide a consistent, Agencywide level of quality and excellence in the planning, design, and construction of all EPA facilities projects. These revisions, due for completion by early 2009, will also ensure that the *A&E Guidelines* parallel recent updates to EPA's Best Practice Environmental Lease Provisions.

GreenCheck

In FY 2008, EPA updated its "GreenCheck" process and checklist, which was started in FY 2007 and ensures that all real property related actions are reviewed to see if they meet the requirements of EPAct 2005, E.O. 13423, EISA, the Guiding Principles for implementing the Federal Leadership in High Performance and Sustainable Buildings MOU, and EPA's best practices. GreenCheck is a framework that establishes environmental performance goals that should be considered during design, construction, renovation, and operation of each new major lease or construction project (projects affecting more than 20,000 square feet or capital projects greater than \$85,000). EPA made significant modifications to the checklist in FY 2008 to standardize and improve the process. Every EPA construction project and large lease in FY 2008 was evaluated to see if it qualified under the GreenCheck criteria. Twenty-seven of the 45 projects evaluated qualified, and those 27 projects received a full GreenCheck review. EPA will continue to refine GreenCheck based on feedback from those reviews.

Best Practices Environmental Lease Provisions

EPA has compiled a Best Practice Environmental Lease Provisions document to be used for new lease solicitations. This document includes provisions to: pursue compliance with the Federal

Leadership in High Performance and Sustainable Buildings MOU, E.O. 13423, EPLA 2005, and EISA; obtain LEED NC certification if new construction or major renovations are involved; and obtain LEED EB certification to cover building O&M during the life of the lease. The provisions incorporate a standardized lessons-learned process (harvesting knowledge gained from recently completed building projects) to improve future projects. EPA also has developed specific language that highlights the Agency's sustainable design priorities, to be used in GSA's construction source selection plans. Model lease submittals and contract language will be developed to provide templates for construction source selection, commissioning, indoor air quality management, green housekeeping, integrated pest management, landscape maintenance, and recycling.

Improving the Commissioning Process

In July 2004, EPA updated the Agency's *A&E Guidelines*, which serve as Volume 2 of EPA's official *Facilities Manual*. As an integral appendix to this document, the Agency's official *Commissioning Guidelines* provide comprehensive information about EPA's processes for commissioning, preventative O&M, retro-commissioning, and continuous commissioning.

With aggressive annual energy reductions required by EPLA 2005 and EISA 2007, EPA relies heavily on commissioning and believes that continuous commissioning is a key strategy for realizing and retaining significant energy savings, especially at energy-intensive laboratories. The Agency supports commissioning as an integral part of EPA's design-and-build process and works to ensure the *Commissioning Guidelines* are applied in a consistent manner.

As part of this effort, in FY 2008 EPA revised the *A&E Guidelines*, including updating the *Commissioning Guidelines* to address new considerations, such as the overlap with LEED EB: O&M. To reflect the importance of this area, the Agency moved the updated *Commissioning Guidelines* from an appendix to the main narrative. EPA also drafted and finalized new *Commissioning Implementation Guidelines* to help the Agency better identify and clarify roles, responsibilities, and protocols for implementing commissioning under different facility occupancy arrangements (e.g., EPA-owned facilities, full-service GSA lease agreements, and unbundled GSA lease agreements).

In FY 2009, EPA plans to build on the updated *Commissioning Guidelines* as it complies with EISA Section 432, which requires each facility energy manager to identify and assess recommissioning measures as part of required comprehensive energy and water assessments. In addition, EPA will pursue commissioning of several existing buildings as part of the LEED EB: O&M certification process and energy conservation strategy.

STRATEGIC PLANNING

Between EPLA 2005, E.O. 13423, EISA, and other federal sustainability initiatives, EPA is faced with ever-increasing mandates to improve energy efficiency, water conservation, renewable energy support, emissions reductions, and other requirements. Both in response to these new requirements, and as a way to continue to demonstrate leadership among federal agencies, EPA has developed several strategies over the past year or more, culminating in an overriding strategy for sustainability completed in FY 2008.

E²PLAN Strategy for Sustainability

In FY 2008 EPA developed a plan to meet the challenges of achieving *energy* and *environmental performance, leadership, accountability* and where possible *neutrality*—the E²PLAN Strategy for Sustainability. By clearly defining goals and objectives and making employees more accountable for reaching efficiency targets at facilities and Agencywide, this strategy for sustainability will help EPA to not only meet aggressive federal energy and environmental requirements outlined in recent laws and executive orders, but to also lead the way toward the next level of federal stewardship and sustainability.

EPA's E²PLAN is based on six key areas: energy efficiency, water efficiency, sustainable buildings, renewable energy, transportation, and environmental management systems. In addition to outlining a strategy for reaching the federal energy and environmental requirements and goals, EPA has developed key strategies to exceed these requirements and lead other agencies.

Strategic Area	Performance Requirement	EPA Goal
Energy Efficiency	Steadily increasing annual targets to 30 percent reduction in energy intensity by FY 2015, from FY 2003 baseline	Exceed annual reduction targets wherever possible
Water Efficiency	Steadily increasing annual targets to 16 percent reduction in water intensity by FY 2015, from FY 2007 baseline	Meet annual targets from a low baseline and lead by example
Sustainable Buildings	Implementing E.O. 13423/MOU in new construction, renovation, and 15 percent of existing inventory by FY 2015	Exceed E.O. 13423 goals and meet the MOU guiding principles
Renewable Energy	Steadily increasing annual targets to 7.5 percent of electricity use in FY 2013 derived from renewable sources	Exceed annual targets and lead with onsite renewable investments
Transportation	75 percent alternative fuel vehicles, 95 percent alternative fuel use in AFVs, and increasing alternative fuel use 10 percent	Exceed AFV percentage and meet alternative fuel use requirements
EMS	Implementing/using EMS as the primary approach to managing environmental aspects	Meet EMS requirements and lead with continuous improvement

Longer term and more aggressive goals are also in place. This strategic plan for sustainability is ambitious, but EPA is already planning ways to realize longer term goals for the future. By 2030:

- EPA will strive to achieve carbon neutrality—through a combination of energy efficiency, onsite renewables, and green power purchases—in as many existing buildings as possible. (The Agency currently has three carbon-neutral facilities, including laboratories in Ada, Oklahoma, and Gulf Breeze, Florida, and the Kansas City, Kansas, regional office.)
- EPA will design all new buildings/major renovations to be zero net energy, achieve and maintain the ENERGY STAR label, and use 30 percent less water than similar buildings.
- EPA's fleet of vehicles will be powered by the most beneficial alternative fuels.
- EPA will reduce overall greenhouse gas emissions by 30 percent from a 2010 baseline.

Many of the strategies outlined in the E²PLAN were based on the individual strategies refined in FY 2008 and described below.

Advanced Metering

In response to Section 103 of EPLA 2005, which requires the installation of advanced electric meters at federal facilities (where cost-effective) by October 1, 2012, EPA decided to lead the federal government by going above and beyond these requirements and implementing advanced metering for *all* commodities. With this decision, EPA was well-positioned for the additional advanced metering requirements included in EISA, which mandate the implementation of advanced metering for steam and natural gas in federal facilities (where cost-effective) by October 1, 2016.

To improve the Agency's overall energy management framework and meet requirements included in both EPLA 2005 and EISA, EPA accomplished a number of significant milestones in FY 2008, including:

- *Site Visits and Implementation Plans:* Picking up where it left off in FY 2007, EPA conducted the remaining three advanced metering site visits in FY 2008 at its Region 6 Laboratory in Houston, Texas; Robert S. Kerr Environmental Research Center in Ada, Oklahoma; and Region 9 Laboratory in Richmond, California. During these final visits, EPA and its contractors met with facility staff, information technology (IT) coordinators, building engineers, O&M contractors, and utility providers to evaluate several conditions, including:
 - Mechanical equipment and metering hardware
 - Building automation systems
 - IT network infrastructure
 - Commodity consumption patterns
 - Programs and services offered by the facilities' utility providers

By the end of FY 2008, EPA completed draft reports outlining the recommended advanced metering implementation strategy for all of the Agency's reporting facilities.

- *National Software System:* To effectively compile the Agency's advanced metering data and provide a platform for easy-to-use data analysis and reporting, in early FY 2008 EPA initiated the design and development of a custom national advanced metering software system. Developed by EPA's Resources Management Staff (RMS), the Web-based system will ultimately fully automate the Agency's energy and water reporting process and provide facility staff and senior management crucial information about real-time and historical building performance at the touch of a button. In March 2008, EPA issued a contract for third-party commissioning of the national advanced metering software system to ensure optimum performance and compliance with EPA's advanced metering software performance specifications. To help facilitate the timely and effective development and deployment of EPA's advanced metering software system, in May 2008 EPA created an advanced metering implementation team, which convenes twice each month to review the status of software development and site-specific hardware deployment.
- *Advanced Metering Session at Buildings and Facilities/Energy Workshop:* On April 23, 2008, RMS hosted three sessions, which provided attendees of the 2008 Building and Facilities Workshop a sneak peek at the beta version of EPA's national advanced metering software system. During

each session, RMS software developers provided a brief tutorial of the software system's features, including trend analysis, shadow invoicing, and performance benchmarking.

- *Revised Agencywide Advanced Metering Plan:* In June 2008, EPA developed a revised version of the Agency's Advanced Metering Plan, which was originally required in the EPA Act 2005 advanced metering guidance developed by DOE. This revised version accounted for a number of updates, including EISA's extended advanced metering requirements for natural gas and steam, EPA's decision to develop an in-house custom software system, and updates to other milestones resulting from modified implementation schedules and shifted priorities.
- *Pilot implementation at AWBERC and RTP:* In FY 2008, EPA issued a design-build contract for the installation of advanced electric and natural gas meters at the AWBERC facility in Cincinnati, Ohio—the Agency's second largest energy-consuming facility. To further test the performance of the Agency's advanced metering software system using EPA metered data, the Agency also leveraged the existing advanced metering network in place at EPA's largest research campus in RTP, North Carolina. This network was originally designed to be self contained and only transmit data to the local RTP software system. In FY 2008, EPA began reconfiguring RTP's metering software to enable a simultaneous, dual transmission of metered data to both the local software system and the pilot national software system. In FY 2009, EPA plans to collect live data from both AWBERC and RTP metering networks for analysis and apply the lessons learned to further develop the Agency's new national software system. EPA also plans to expand implementation at AWBERC to collect advanced metering data for fuel oil, which the facility uses as backup fuel for its boilers. Totalling the RTP facilities and the Cincinnati facility, EPA has advanced metering covering 40 percent of the energy use of its reporting facilities.

Energy Conservation Progress Continues

In response to the annual energy reduction requirements mandated by EPA Act 2005, EPA added to the process for identifying, implementing, tracking and evaluating energy conservation projects across the inventory of reporting facilities. EPA introduced "ConservE," a component that assigns each reporting facility a tailored annual energy reduction target to ensure that the Agency continues to meet mandated Agencywide energy reduction goals.

ConservE use continued in FY 2008. In January 2008, the Sustainable Facilities Practices Branch (SFPB) issued draft FY 2008 ConservE targets to all EPA reporting facilities. In March 2008, EPA held an Agencywide conference call with facility managers to explain FY 2008 ConservE targets and to address any questions or concerns. After addressing all concerns, EPA issued a final version of the FY 2008 ConservE targets, which were used throughout the remainder of FY 2008 to evaluate facility-specific energy performance.

Water Conservation Strategy

In FY 2008, EPA laid the groundwork for continued success in water conservation by completing a detailed and thoughtful Agencywide strategic plan for water conservation. In developing the plan, EPA evaluated the status of more than 15 major water conservation opportunities at each of EPA's laboratories, calculating estimated water savings potential, and prioritizing water projects. EPA also set individual water reduction targets for each reporting facility through its "ConservW" process.

Most EPA laboratories have water management plans in place. EPA will continue to work to implement the procedures and recommendations in those plans.

Sustainable Buildings Commitment Renewed

EPA's Sustainable Buildings Implementation Plan, initiated in FY 2007 and updated in FY 2008, provides the approach for acquiring facilities in accordance with a tiered process, which identifies the most critical projects and buildings and focuses on projects that will have the greatest impact on the Agency's environmental footprint. The process is designed to be comprehensive of all capital projects and will lead to meeting the sustainable goals required by legislation and executive orders.

On April 18, 2008, EPA Administrator Steven Johnson formally announced a Green Building Strategy and created a Green Building program within the Office of Policy, Economics, and Innovation's Office of Cross-Media Programs. The Green Building program will coordinate EPA's numerous programs that touch on green building issues. The goal is to leverage green buildings (federal and non-federal) as a mechanism for environmental protection. EPA's leadership through its own high performance sustainable buildings is a key component of EPA's green building strategy.

In addition to achieving green buildings for new construction through the facility acquisition process, EPA has implemented a number of activities to ensure that all existing buildings and projects incorporate sustainable principles. In response to the Federal Leadership in High Performance and Sustainable Buildings MOU Guiding Principles, EPA in June 2008 completed a *Strategy for Meeting the Guiding Principles in 15% of Existing Buildings by FY 2015*. Outlined in more detail in the Green Building section of this report, the strategy focuses on a subset of buildings to upgrade to meet the Guiding Principles. Buildings were selected where staff-intensive and capital-intensive energy conservation projects and water conservation projects are already identified as a priority in the Agency's capital budget process.

Renewable Energy Strategy

As the first major federal agency to offset 100 percent of its annual electricity consumption with green power (since September 2006), and one of EPA's Green Power Partnership's (GPP's) "National of Top 25" green power purchasers, EPA has a long history of federal leadership in the renewable energy arena. To further demonstrate the Agency's commitment to the continued advancement of the renewable energy market, in FY 2008 EPA outlined its Agencywide renewable energy strategy as part of EPA's *E²PLAN Strategy for Sustainability*. Key components of EPA's renewable energy strategy include:

- Continuing to offset 100 percent of annual electricity use with green power and/or renewable energy certificates.
- Increasing EPA's focus on onsite renewable energy generation, including demonstration projects for promising new technologies.
- Evaluating new renewable projects that will be compatible with the Agency's facility infrastructure replacement and improvement plan.

- Reducing the Agency's demand on the nation's power grid and ensuring a more reliable and clean energy supply.

GHG Emissions Inventory

In FY 2008, EPA began developing an internal GHG emissions inventory and quarterly reporting system, representing an initiative to track and report the Agency's carbon footprint. In FY 2008, EPA's scope 1 and scope 2 GHG emissions resulting from energy consumption in reporting facilities were 122,732 metric tons of carbon dioxide equivalent (MTCO₂e)—a reduction of 16,275 MTCO₂e from EPA's FY 2003 baseline. When the Agency's extensive green power purchases are accounted for, EPA reduced its overall GHG emissions footprint by more than 86,254 MTCO₂e, or by 69.5 percent in FY 2008 compared to FY 2003.

While there are no specific requirements currently in place for federal GHG emission reductions, EPA is taking a proactive approach to quantify and reduce its emissions in conjunction with the Agency's Climate Leaders program. The GHG inventory provides EPA with a new tool to help quantify its environmental footprint and evaluate potential GHG emissions reduction strategies. EPA is one of the first federal agencies to establish a GHG inventory.

Initially, EPA drafted an inventory management plan to institutionalize the process for collecting, calculating, and maintaining GHG data. EPA chose FY 2003 as the Agency's GHG baseline to align with the base year for the energy reductions set forth by EPAAct 2005, E.O. 13423, and EISA. EPA then began developing inventories for FY 2007 and FY 2008 to assess the Agency's progress in reducing GHG emissions since the FY 2003 baseline.

EPA is taking a phased approach to developing the annual GHG emissions inventory. During the first phase of the inventory development process, EPA quantified direct (scope 1) and indirect (scope 2) GHG emissions resulting from purchased and consumed energy in EPA's 34 energy reporting facilities. Since SFPB already collects and reports annual energy data for these facilities to DOE, EPA was able to readily calculate this subset of GHG emissions using existing energy consumption data. The Agency based its accounting methodologies on Climate Leaders guidance for calculating direct GHG emissions from the combustion of natural gas, fuel oil, propane, and kerosene; and indirect GHG emissions associated with purchased electricity, steam, and chilled water.

In accordance with this guidance, EPA determined the quantities of carbon dioxide, nitrous oxide, and methane emissions from each source of energy consumption, and also normalized these emissions by converting nitrous oxide and methane to units of carbon dioxide equivalent (CO₂e), which is a function of the global warming potential of each gas. Having completed the inventory framework for EPA's reporting facilities, the Agency has begun to work on the GHG inventory to account for emissions from EPA's regional offices, Headquarters, and all other EPA-occupied, non reporting facilities.

Climate Leaders allows partners to adjust their indirect GHG emissions resulting from electricity consumption using green power and REC purchases, as renewable energy generation reduces the fossil fuel emissions that would otherwise result from the generation of conventional electricity. In an effort to accurately and appropriately calculate adjustments to EPA's annual GHG emission inventories, the Agency reviewed the FY 2003 REC contracts and attestation forms to confirm the

actual locations and time periods of associated green power generation. EPA applied specific regional emission factors from EPA's Emissions & Generation Resource Integrated Database (eGRID) to calculate adjustments to eligible indirect emissions for those historical contracts for which EPA could verify the location and time period of green power generation. When specific attestation information could not be obtained, the Agency used national average emission factors to calculate adjustments to indirect emissions per the recommendation of Climate Leaders. In FY 2009 EPA will continue efforts to verify details of green power generation for more current contracts.

As a secondary step in the GHG emissions inventory development, EPA will calculate mobile source (transportation-related) GHG emissions. In accordance with the Agency's Climate Leaders guidance on mobile source emissions, EPA began to use fuel consumption and fleet composition (i.e., model, year, and fuel economy) data for the Agency's vehicles from the Facilities Operations and Transportation Branch (FOTB). In FY 2009, EPA will continue to refine the mobile emissions component of the GHG inventory. Once the Agency's comprehensive GHG emissions inventory is complete, EPA will be able to assess and prioritize strategies for emission reductions.

FACILITY ENERGY IMPROVEMENTS

Although EPA has been working to develop numerous strategies in FY 2008 to address new, more rigorous energy reduction requirements, the Agency's existing energy efficiency efforts have yielded great results, as evidenced by the major improvements described below:

- *AWBERC Infrastructure Replacement Project—Cincinnati, Ohio:* AWBERC began Phase 1 of a four-phase Infrastructure Renovation Project (IRP) in FY 2008. EPA's second largest research and development facility, this 429,646 gross-square-foot building is responsible for a significant portion of EPA's national energy use. The pre-infrastructure renovation energy consumption was more than 134 billion Btu in FY 2006. EPA aims to reduce this environmental impact with several facets of the renovation, including replacing old constant volume air handling units with variable air volume (VAV) models. Phase 1 of the project was 75 percent complete as of July 2008. That work is currently being commissioned, and that portion of the facility is scheduled for complete occupancy in late January 2009. Energy savings of 8.5 percent compared with an FY 2007 baseline are expected from Phase 1 alone, with cost savings of approximately \$200,000. The Cincinnati AWBERC expects to reduce energy use by nearly 30 percent from the cumulative IRP once the entire project is completed. Total cost savings are anticipated to be approximately \$800,000 per year.

As part of the multi-year IRP, Cincinnati plans to upgrade mechanical equipment such as fans, pumps, and motors to replace older, inefficient models; install VAV fume hoods; rezone office and laboratory space to eliminate one pass air in offices; implement a heat recovery system to help reuse exhaust air; and install high-performance fume hoods to operate at lower flows. The design for Phase 2 of the IRP has already been completed, the design of Phase 3 has been awarded, and completion of designs for the third phase is anticipated in June 2009.

- *Environmental Science Center—Fort Meade, Maryland:* EPA's Environmental Science Center (ESC) in Fort Meade, Maryland, accounts for 4.5 percent of the Agency's reportable energy use. As the first step of a three-phase ventilation upgrade project, in FY 2006 EPA conducted an extensive audit of the facility's baseline airflow and research demands for ventilation. From these baseline

measurements, EPA developed a comprehensive report documenting all existing laboratory exhaust devices, making special note of devices not currently in use or being used incorrectly by laboratory staff. Additionally, this Phase 1 report identified potential airflow reductions and other opportunities to improve the efficiency of the building's ventilation system.

EPA completed Phase 2 of this project in FY 2007, developing a revised laboratory ventilation management plan (LVMP) that established new set points to meet reduced airflow demand. Phase 2 also included a pilot that successfully implemented the LVMP in 20 percent of the facility's laboratory modules. In FY 2008, the results of this pilot were incorporated into Phase 3, which culminated in the full-scale implementation of the LVMP and the recommissioning of the HVAC system and controls. As EPA approaches the conclusion of the project's final phase, the Agency estimates that the facility's airflow demand will be safely reduced by approximately 19 percent. This work reduced ESC's annual energy use in FY 2008 by 3.1 percent compared to FY 2007.

- *Science and Ecosystems Support Division—Athens, Georgia:* EPA's Science and Ecosystems Support Division (SESD) Laboratory implemented modifications to building controls and transitioned from constant volume to variable frequency drive air handling units (AHUs) as part of an overall facility upgrade. In May 2008, EPA completed a nighttime setback on three of the facility's AHUs that condition office, hallway, and conference room spaces. Previously, the AHUs were operating nonstop. EPA adjusted the operational settings so that these units shut down during the evening and overnight hours, and also adjusted their humidity control set points. In FY 2008, the SESD laboratory reduced its energy use 7.8 percent from FY 2007.
- *Region 10 Laboratory—Manchester, Washington:* As part of multi-stage renovations at the Region 10 Laboratory, EPA completed installation of high-performance fume hoods in a portion of the laboratory in February 2008. The Region 10 Laboratory is the first EPA facility to fully implement high-performance fume hoods, which can reduce energy consumption by 40 percent compared with traditional fume hoods. With the next stage of Manchester's modernization plan, EPA will upgrade the remaining conventional fume hoods in FY 2009 and expects to reduce energy intensity at the facility by a total of 5 percent once the upgrades are complete. The Agency is also planning to make high-performance fume hoods standard in new laboratory construction and future upgrades at other facilities.
- *Research Triangle Park (RTP) Campus, North Carolina:* Through extensive, long-term recommissioning efforts, improved O&M, and numerous facility improvements made possible with data provided by an advanced metering system, EPA realized continued energy savings at the RTP campus in FY 2008. At the New Main facility, EPA completed several multi-year laboratory air flow optimization projects, which reduced both occupied and unoccupied flow rates. In turn, the reduced flow rates allowed EPA to lower static pressure throughout the facility and reduce energy consumption by 12 percent compared to FY 2007, or 37.1 percent compared to the FY 2003 baseline.

RTP staff continued to take a coordinated approach to facility operations by working closely with employees to power down non-critical equipment during weekend and overnight hours. Also, researchers are conducting energy-intensive laboratory work during off-peak hours when possible, in an effort to diffuse peak demand.

EPA also completed an energy reduction strategic plan for the Human Studies Laboratory in RTP in October 2008. Although further refinements will be required, it is already clear that significant energy savings opportunities exist at Human Studies for both the short and long terms. EPA also completed a commissioning report as well as a feasibility study of modifying computer room temperatures at RTP's NCC in FY 2008. The study concluded that NCC could raise the temperature of its computer operating center by 10° F, requiring less cooling load without adversely affecting the operating equipment. Temperature changes were implemented in fall 2008.

- *Region 2 Laboratory, Edison, New Jersey:* When two 20-year-old boilers at the Region 2 Laboratory began failing, EPA needed to replace them to maintain the integrity of the laboratory space as well as supporting office space. As a result, in February 2007 EPA initiated the design phase for the replacement of the two boilers, seeking to replace the existing boilers with high-efficiency/low emissions boilers with dual-fuel capabilities (i.e., the ability to use either natural gas or fuel oil). The boilers began operating in FY 2008; EPA plans to commission them under a full heating load in first quarter FY 2009. This upgrade is expected to reduce laboratory energy use by 1 percent in FY 2009.
- *Atlantic Ecology Division, Narragansett, Rhode Island:* EPA is on track to complete an engineering master plan for the Atlantic Ecology Division (AED) Laboratory, including plans for the first two phases of a four-year comprehensive infrastructure upgrade, in October 2008. Contracts for Phase 1 and 2 construction will be awarded in FY 2009, and Phase 1 construction is anticipated to begin the same year, with Phase 2 construction following one year later. Once the full infrastructure upgrade is complete, AED expects to use 30 percent less energy than a FY 2007 baseline.

As part of the engineering master plan, AED is working with National Grid, its gas utility provider, on a cooperative agreement to replace two inefficient, 30-year-old boilers with several smaller, more efficient modular boilers. With the old boilers, the laboratory was forced to run each full-time, even if the boiler output exceeded the heating needs of the facility. The new boilers will provide AED with the flexibility to heat the laboratory by running only as many boilers as needed at a given time, greatly improving efficiency. EPA expects this project to reduce natural gas consumption by 30 percent, which will allow the laboratory to accrue significant cost savings as the price of natural gas continues to rise.

- *Science and Technology Center—Kansas City, Kansas:* EPA designed the Region 7 Science and Technology Center Laboratory, a LEED-NC Gold-certified facility, with energy efficiency in mind. Due to inefficient O&M practices, however, energy use at the Region 7 Laboratory has increased 16.5 percent since FY 2006. Working with the contracting officer of the lease, real estate staff, the property developer, and the laboratory facility manager, EPA has been addressing the energy use increase by correcting setbacks and ensuring that the facility is operated within the parameters of the lease (which includes provisions for energy efficiency). In order to more closely monitor building systems operations, EPA has arranged for a building engineer to log the natural gas and electricity meters daily and report data to GSA and EPA on a biweekly basis. As energy consumption begins to level off and decrease, the Agency is actively pursuing additional strategies to further reduce energy use at the laboratory.

- *Large Lakes and Rivers Research Station—Grosse Ile, Michigan:* Installation of a new boiler for EPA's Large Lakes and Rivers Research Station was initiated in FY 2008. The building has been heated by two 34-year-old steam boilers. This boiler replacement project was designed to replace the existing heating system central plant with a new energy-efficient heating system central plant. Upon completion, the steam boilers, hot water converter, hot water pumps, condensate pump, expansion tank, and all associated piping and controls located in the boiler room will have been replaced. EPA plans to install a hot water condensing boiler and associated pump, piping, and controls for summer operations. In addition, all new and existing hot water, steam, and condensate return piping will be insulated. As a result of these upgrades, EPA expects to reduce energy use at this facility by 7.5 percent in FY 2009.

Other Facility Improvements

- *Mid-Continent Ecology Division Laboratory—Duluth, Minnesota:* EPA's Mid-Continent Ecology Division Laboratory completed construction of a wet lab wastewater treatment system on September 30, 2007. This system is responsible for treating 90 percent of the sewage discharge from the facility, averaging nearly 19 million gallons per year. In FY 2008, EPA obtained an effluent discharge permit that allowed the wet lab to channel sewage discharge to a self-contained recycling system or to Lake Superior, following filtration, in order to reduce the cost to EPA and to help prevent the local treatment plant from exceeding its capacity during heavy rains.

Beginning in FY 2008, the system was down for six months for repair work. The ozone "micro-mixer" component, which is only produced by one company in Australia, had to be rebuilt and strengthened. After reinstalling the mixer on June 24, 2008, EPA restarted and tested the system; preliminary water quality testing yielded promising results. Further testing is needed to produce clean results before wastewater is diverted from the sanitary sewer system. Once operating properly, the system will reduce the sanitary sewer load by about 50,000 gallons per day.

- *National Air and Radiation Environmental Laboratory—Montgomery, Alabama:* In June 2008, construction of a new main chiller plant was completed at EPA's National Air and Radiation Environmental Laboratory (NAREL) in Montgomery, Alabama. The project included constructing the chiller plant; replacing an old cooling tower; installing a new chiller; moving an existing chiller, pumps, and control systems from the mechanical basement into the chiller plant; and re-plumbing the chilled water supply and return piping through the facility. During construction, a 350-ton temporary chiller was installed and maintained the NAREL heating, ventilation, and air conditioning (HVAC) system.

The chiller plant, which was designed to provide chilled water to the seven air handling units in the main NAREL laboratory and to the new Emergency Response Asset Warehouse currently under construction on the NAREL campus, began operating in November 2007.

LOAD REDUCTION STRATEGIES

In FY 2008, EPA offices and laboratories around the country explored and implemented energy load reduction strategies in an effort to reduce their facilities' impacts on the environment. The

following are examples of near-term strategies that EPA staff have employed to achieve significant energy savings.

Lighting a Little Less

In FY 2008, EPA's Atlantic Ecology Division (AED) Laboratory in Narragansett, Rhode Island, reduced energy use by reducing the lighting used on empty parking lot space. Instead of lighting an entire lot for a small number of workers who work late in the evenings, the facility's EMS Team decided to designate an area of the lot for late-night workers, and turn off the lights at night in the rest of the parking area. EPA staff conducted a security audit on the facility to ensure that reduced parking lot lighting did not compromise employee safety. Reduction of the office's energy load through more efficient lighting practices, not only in hallways and the parking lot, but also in outdoor lighting, saved an estimated 19,000 kWh, 30,000 pounds of CO₂ emissions, and \$3,000 in FY 2008.

Both AED and EPA's Region 8 laboratory in Golden, Colorado, have removed the bulbs from every other fixture common in hallways, a simple and cost-free strategy that improves lighting efficiency and reduces energy costs. Both facilities achieved energy savings, as hallway lighting is a significant source of energy use in the facilities. The facilities also saved on hours of time spent on O&M, as fewer bulbs needed replacing; reduced disposal costs for bulbs that have burned out; and reduced the amount of waste generated from these bulbs.

Seeking a near-term energy load reduction, staff at EPA's Western Ecology Division (WED) Laboratory in Corvallis, Oregon, focused on lighting retrofits, replacing parking lot T8 fluorescent bulbs with the slightly smaller T5 fixtures. These bulbs are 12 percent to 18 percent more efficient than T8s and offer more lumens per watt, so they are less expensive to operate. Standard T5s and T8s have about the same lamp life, yet T5s use 40 percent less glass, 40 percent less phosphorous, and less mercury. While the lighting is still sufficient to illuminate the parking area, EPA reduced its energy use at WED through this simple equipment upgrade.

An Agencywide Effort

In April 2008, as part of an effort to employ as many near-term sustainability practices as possible, EPA decided to explore acceptable thermal ranges for daily operations in the Agency's laboratories. A determination of these acceptable ranges will ensure that unnecessary energy is not used on heating and cooling. The Agency is in the process of incorporating guidance on the acceptable thermal comfort ranges for daily operations into the ongoing update of EPA's *A&E Guidelines*.

EXPLORING ESPCS

Energy savings performance contracts (ESPCs) are one of the many tools that EPA has historically used to increase the Agency's energy efficiency and reduce its environmental impact. The Agency's first ESPC, completed in 2001 at the National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor, Michigan, resulted in an initial energy use reduction of more than 42 percent over the pre-ESPC baseline. EPA's second ESPC, located at the Robert S. Kerr Environmental Research Center in Ada, Oklahoma, led to the designation of the Agency's first carbon-neutral laboratory. In order to continuing using ESPCs to accomplish the Agency's energy reduction goals, EPA is

finalizing plans for two ESPC opportunities that could lead to significant energy savings at its RTP, North Carolina, campus. The Agency has also conducted a preliminary ESPC study at the laboratory in Duluth, Minnesota, and considered an ESPC in Gulf Breeze, Florida.

New Main Laboratory—RTP, North Carolina

As part of an overall effort to reduce energy consumption at the Agency's largest laboratory, EPA is finalizing the details of a heat recovery ESPC for Buildings B, D, and E at the New Main laboratory. Through this potential ESPC, glycol heat recovery systems will be added to 22 existing air handling units (AHUs) and 19 existing exhaust fans. Once installed, these systems will preheat outside air in the winter and pre-cool it in the summer, significantly reducing the energy presently used to condition outside air.

Completion of this project is expected to save the New Main facility approximately 31 billion Btu per year. These projected savings represent 2.5 percent of EPA's Agencywide FY 2008 energy consumption, and 8.4 percent of New Main's annual energy use. Additionally, this project is expected to save 7.7 million gallons of water annually, more than 4.5 percent of the Agency's annual water consumption. EPA believes the detailed energy study will start in the first quarter of FY 2009 and anticipates finalizing a contract in late FY 2009.

Central Utility Plant—RTP, North Carolina

EPA is finalizing a comprehensive ESPC to upgrade the infrastructure at the central utility plant (CUP) that supplies energy to New Main and the NCC, as well as the National Institutes of Health (NIH) facilities on the RTP campus. Because EPA and NIH share the CUP's chilled and hot water output, this ESPC will be a joint, interagency effort to reduce energy use.

The first component of this ESPC is to convert the currently independent chilled water plants for EPA and NIH into a single, combined operation plant. The synchronization of these two plants' operations will significantly reduce the Agencies' cooling requirements, as well as increase cooling system flexibility and redundancy. The second phase will replace one of the CUP's large, inefficient chillers with a smaller, high-efficiency winter chiller that is correctly sized to meet the facilities' off-season cooling loads. The project will also substitute one of the CUP's gas-fired boilers with a biomass boiler. Using locally grown wood as its fuel source, this boiler will satisfy 100 percent of the facilities' summer hot water heating load and greatly reduce the wintertime fossil fuel consumption required by the facilities' existing gas-fired boilers. Through this ESPC, EPA and NIH's combined energy savings are expected to total more than 180 billion Btu per year. EPA expects to finalize the contract in 2009.

RENEWABLE ENERGY

EPA has long been committed to enhancing the market for renewable energy, both through green power purchase and onsite renewable technologies installed at its facilities. In fact, EPA was the first federal agency to purchase green power for 100 percent of a facility's electricity, with a landfill gas purchase for the Richmond, California, Region 9 Laboratory. In FY 2008, the Agency solidified that commitment by completing a strategic plan designed to reiterate EPA's commitment to green power

and step up Agency efforts to demonstrate the feasibility and environmental benefits of onsite renewable energy generation.

100 Percent Commitment

In September 2006, EPA became the first major federal agency to offset 100 percent of its Agencywide annual electricity consumption with green power and REC purchases. This accomplishment was due in large part to a major blanket contract for 110 kilowatt hours (kWh) of RECs from 3 Phases Energy Services to support wind farms across the West and Great Plains.

In FY 2008, EPA reinforced its commitment to renewable energy by continuing to offset 100 percent of annual electricity use at facilities nationwide, including the Agency's 34 reporting facilities, 10 regional offices, Headquarters complex in the Washington, D.C. metropolitan region, and small and remote locations. In addition to more than 46 million kWh of green power and RECs purchased through facility-specific contracts, in FY 2008 EPA also signed two separate blanket contracts for a combined total of 380 million kWh of RECs, allowing EPA to offset Agencywide electricity consumption for FY 2008, as well as the first half of FY 2009. Beginning October 1, 2007, EPA entered into a 6-month contract to procure 135 million kWh of RECs from Sterling Planet over the first half of FY 2008. In June 2008, EPA followed up this purchase with an additional contract representing 245 million kWh of RECs to offset the remainder of electricity consumed during FY 2008 through March 31, 2009.

Onsite Opportunities

Although the Agency has several onsite renewable energy projects that fall under the Million Solar Roofs initiative, EPA is looking more aggressively at onsite renewable technology in accordance with EPCA 2005, E.O. 13423, and EISA. For example, the Agency is currently considering installing a photovoltaic (PV) array on the campus of its Region 2 Laboratory in Edison, New Jersey. New Jersey has strong tax incentive programs for solar technology, and EPA is also working out a "power purchase agreement" with a utility, whereby the utility company builds and maintains the PV array, and EPA commits to purchasing the renewable electricity that it generates. Although dependent on contractual agreements and provisions in legislation currently under debate, the 966 kW PV array that EPA is considering would be capable of producing up to 1,034 megawatt-hours of electricity per year (more than 20 percent of the laboratory's total annual electricity consumption).

EPA is also adding a PV power system to its Athens, Georgia, National Exposure Research Laboratory. The 20-panel, 10 kW array will offset the power requirements for a new entrance gate to the campus, which includes a guard booth, vehicle barrier gates, and entryway lighting. When demand for power is low at the entryway, the PV system will provide power to the main laboratory facility. EPA expects to complete project installation by February 2009. A 10 to 20 kW PV system is also under consideration at the National Exposure Research Laboratory and Radiation and Indoor Environments National Laboratory in Las Vegas, Nevada.

In Corvallis, Oregon, EPA is in the initial stages of planning for a geothermal heating and cooling system at the Western Ecology Division Laboratory. The Agency planned to complete a feasibility study by the end of 2008. The proposed ground-source heat pump would complement existing infrastructure at the laboratory and would significantly reduce the facility's heating and cooling costs.

GREEN BUILDINGS

EPA requires that all new construction and major renovation projects must achieve at least LEED Silver and the ENERGY STAR label, and LEED Gold whenever possible. EPA also initiated a Sustainable Buildings Implementation Plan, which provides EPA's approach for acquiring facilities in accordance with a tiered process—identifying the most critical projects and buildings and focusing on those that will have the greatest impact on its environmental footprint. Following is a summary of the green buildings efforts underway at EPA in FY 2008:

- *Annex 2, Cincinnati, Ohio:* In FY 2008, EPA completed construction of a 42,400 GSF Research Support Annex (Annex 2) for the Andrew W. Breidenbach Environmental Research Center (AWBERC) in Cincinnati, Ohio. The north wing of Annex 2 was completed and occupied in September 2007, and the west wing was completed and occupied in January 2008. Half of Annex 2 is being used as permanent office space for various agencies, and the other half is serving as temporary “swing space” during a major Infrastructure Replacement Project at AWBERC.

Annex 2 is slated to achieve LEED-NC 2.1/2.2 Gold certification in December 2008. Sustainable features include energy-efficient temperature controls, variable air volume (VAV) and water-side economizers, under-floor ventilation, daylighting, a green roof, sustainable landscaping, water-efficient plumbing fixtures, and an advanced metering system. In addition, EPA is offsetting 100 percent of the electricity used in Annex 2 with RECs.

- *Sam Nunn Federal Center, Atlanta, Georgia:* GSA has been pursuing LEED-EB for the Sam Nunn Federal Center in Atlanta, Georgia. EPA Region 4 has assisted GSA and is the largest tenant, occupying 30 percent of the building. Featured and/or pending items include: de-lamping some areas, occupancy sensors for lights, recycled-content carpet, low-VOC paint, green cleaning (via contracts), additional bicycle racks, and recycled glass for landscaping. In addition, the building is located adjacent to a rail transit station, so many employees commute by train. Related activities include a GSA-led Green Building Advisory Committee and green building educational classes organized and taught by Region 4 employees.
- *Gulf Ecology Division Replacement Building—Gulf Breeze, Florida:* The new Computational and Geospatial Sciences Building at EPA's Gulf Ecology Division in Gulf Breeze, Florida, is expected to achieve LEED[®] Silver or Gold certification. The 10,000-square-foot office building is used primarily to conduct biogeochemical population and community modeling, as well as spatial analysis and modeling of manmade effects on coastal ecosystems.

During construction, which was completed in January 2008, a wide variety of sustainable design features were incorporated. Occupancy sensors were installed in every room to turn off lighting systems when not in use, as were ENERGY STAR-qualified appliances, where possible. Designers also incorporated many skylights and windows to increase daylighting opportunities and lower lighting requirements. In addition, a variety of features limit the building's heating and cooling requirements, an especially difficult task in the temperate climate of Florida. The extra-thick walls feature a soy-based insulation to maintain the temperature of the building. In addition, the building's porch provides shading to help with cooling, and its reflective roof keeps the structure from absorbing too much heat from the sun.

- *Region 8 Office—Denver, Colorado:* EPA's state-of-the-art Region 8 office achieved both LEED-NC Gold certification and the ENERGY STAR label in FY 2008. The building shows the Agency's commitment to designing, constructing, and operating highly sustainable buildings. Extensive daylighting—combined with dimming controls and occupancy sensors—allows the office to take advantage of Denver's ample sunlight. Additional energy savings come from high-efficiency, building-wide systems such as under-floor air delivery; an HVAC system that works at the lowest possible cooling loads in warmer weather; and air-side economizers that cool the building using the city's cooler, mile-high air.

The building also features a 19,200-square-foot green roof with an organic soil layer composed of drought-resistant plants that reduce rooftop and building temperatures and filter downtown pollution. A 48-panel, 10-kilowatt PV array was installed, and EPA purchased 4.7 million kWh in RECs to offset the building's electricity use. EPA's Region 8 office is expected to reduce energy use by nearly 68 percent and water by 36 percent over similar buildings of conventional construction.

In August 2008, the Region 8 office received an American Architecture Award honoring new cutting-edge design, urban philosophy, design approach, style, and intellectual substance in American architecture today. In addition, the Region 8 office is undergoing a Sustainable Building Challenge Assessment, which aims to advance the development of an international cooperative process to compare existing environmental performance assessment tools and develop new ones.

- *Region 9 Office—San Francisco, California:* EPA is currently working with GSA to draft the Solicitation for Offer (SFO) for the San Francisco Region 9 office. GSA has posted a notice of intent to lease and is reviewing potential offerors. SFO release and award schedule is still to be determined. The SFO will include requirements for sustainable features pulled from EPA's Best Practices Lease Provisions.
- *Region 10 Office—Seattle, Washington:* EPA and GSA collaborated on preparing the Seattle Region 10 office SFO. The SFO was released on June 9, 2008, and offers are due July 31, 2008. A lease award is anticipated in early January 2009. The SFOs for both Region 9 and Region 10 incorporate requirements for sustainable features pulled from EPA's Best Practices Lease Provisions, including:
 - LEED-NC and LEED-EB certification
 - ENERGY STAR label
 - Daylighting
 - Water saving toilets, urinals, and lavatory faucets
 - Low-VOC paints and architectural coatings
 - Carpet tile and adhesives meet Green Label Plus
 - Green cleaning plan
 - Integrated pest management plan
 - Reporting: water use, energy use, solid waste disposal, recycling

ENERGY STAR

Since 2002, EPA's Facilities Management and Services Division has required all new major office leases to obtain the ENERGY STAR label for buildings, meaning they are required to operate in the top 25 percent of their class of building. ENERGY STAR covers office buildings, but not laboratories. EPA recently included a requirement in all new leases for major office buildings to achieve the ENERGY STAR label every 3 years. The Metcalfe Building, a 28-story building located in downtown Chicago, houses EPA offices as well as the U.S. Departments of Housing and Urban Development and Agriculture and the Social Security Administration. The building, constructed in 1991, was designed to be energy efficient, and simple measures have been added since the opening of the building to ensure its continued success as an energy-efficient building. The building was first awarded the ENERGY STAR label in 1999, with the installation of a comprehensive green lighting system. In 2007, the building received the ENERGY STAR label again with a performance rating of 80 out of 100, an improvement over the rating of 77 received by the facility in 1999. EPA's Region 5 office in Chicago is a prime example of the strategies EPA has recently deployed to obtain the ENERGY STAR label for offices.

A lighting retrofit replaced all incandescent bulbs with compact fluorescent lamps and installed LED exit signs, occupancy sensors, and "Vending Misers"—devices that control the operation of vending machines. In addition, an energy management system controls ventilation and lighting. High-efficiency motors and variable frequency drives were installed on the domestic water pumps and cooling tower fans. The Metcalfe Building also participates in Commonwealth Edison Company's Energy Curtailable Service Cooperative, a program that allows the utility to curtail electric use during times of high demand. Participating in the program provides a credit on the Metcalfe Building's electric bill and helps to eliminate the construction of new generating plants, helping to preserve natural resources and reducing the amount of pollution produced by the utility.

Other EPA-occupied buildings that have received the ENERGY STAR label in the last 3 years include:

- Atlanta Region 4 office (GSA-owned).
- Seattle Region 10 office (private building leased through GSA; current lease expires July 31, 2009).
- EPA Headquarters Potomac Yard in Arlington, Virginia (private building leased through GSA).
- Denver Region 8 office (private building leased through GSA; certification required by December 2009, and a rating of 90 out of 100 was recently achieved).

The following new regional office locations will require ENERGY STAR certification within 14 months of occupancy:

- Philadelphia Region 3 office (lease re-negotiation December 31, 2009).
- Seattle Region 10 office (new lease July 31, 2009).
- San Francisco Region 9 office (new lease September 30, 2009).
- Kansas City Region 7 office (lease renewal May 31, 2009).
- Boston Region 1 office (GSA-owned major renovation, occupancy in FY 2010).

EPA's Region 7 office in Kansas City, Kansas, recently benchmarked its building to qualify for the ENERGY STAR label and, based on preliminary calculations, should be receiving the label in FY 2009. The New York Region 2 office received the ENERGY STAR rating in 1999, and EPA has been working to partner with GSA to re-commission and re-label the building. The bulk of EPA Headquarters office space, including Federal Triangle buildings Ariel Rios North, Ariel Rios South, EPA East, EPA West, Connecting Wing, and the Ronald Reagan Building are owned and controlled by GSA and have not received the ENERGY STAR label.

Non-Reporting Office Buildings

EPA occupies approximately 10.5 million square feet of space, of which approximately 3.9 million square feet is laboratories (approximately 3.7 million are "reporting" facilities). Of the 6.6 million square feet of non-laboratory space, 2.3 million represent Headquarters office space, 2.7 million represent regional office space, and the remainder, approximately 1.6 million rentable square feet, is a collection of small office and support spaces occupied throughout the country. EPA has been able to obtain energy use data for GSA-owned buildings it occupies via the GSA Finance Center in Fort Worth, Texas. Obtaining energy use data from facilities leased by GSA in private buildings for EPA requires more foresight.

EPA is working to determine the environmental footprint of all its facilities, in order to better understand and mitigate any negative impacts. For the past five years, although not required to do so, EPA has worked, as major leases expire, to require energy data, water data, and solid waste and recycling figures. Currently EPA has access to energy data on approximately 75 percent of the large office facilities (regional offices and Headquarters). By early FY 2010, after the new Boston, Seattle, and San Francisco regional offices are occupied, EPA will have access to energy data on approximate 93 percent of the large office facilities.

LEED for New and Existing Buildings

E.O. 13423 established the goal that 15 percent of the existing building inventory of each Agency (as of the end of FY 2015) should incorporate the Guiding Principles set forth in the Federal Leadership in High Performance and Sustainable Buildings MOU. EPA set out to reach this goal by implementing two main strategies:

1. Complying with the Guiding Principles for all new construction and major renovation that is planned through FY 2015 (as required by E.O. 13423).
2. Selecting existing buildings to upgrade to meet the Guiding Principles.

In FY 2008, EPA continued to require that all new major building construction achieve LEED Silver certification at a minimum and strive for Gold wherever possible. EPA has also expanded its efforts toward improving the environmental performance in existing buildings. EPA is planning to achieve LEED-EB certification by employing the best sustainable practices possible through O&M improvements in existing buildings. The goal is for EPA to maximize efficiency while minimizing environmental impacts through these practices.

The Region 9 office in San Francisco and Region 7 office in Kansas City, Kansas, are planning to renew their leases at their current buildings while actively pursuing LEED-EB. In addition, newly leased buildings such as Denver's Region 8 office and upcoming Region 10 Seattle office will be required to obtain LEED-EB in the future. The Headquarters office building at Potomac Yard set the course for these facilities, achieving LEED-EB Gold certification in July 2008. By taking the necessary steps to achieve LEED-EB certification through new lease provisions, EPA recognizes that existing buildings play an important role in improving Agencywide environmental performance.

WATER MANAGEMENT

EPA has made water management a priority for many years. Long before E.O. 13423 required 2 percent annual reductions in water use, EPA had set—and exceeded—its own internal water conservation goals. As a result, the FY 2007 baseline year was a very good one for EPA in terms of water use, but a challenging one in terms of future reductions. And in fact, after EPA submitted its FY 2007 annual energy and water report to DOE, the Agency received updated water consumption data from several utility companies that supply the Agency's laboratories. These updates correspondingly lowered the FY 2007 water intensity baseline from 45.2 gallons per GSF to 44.7 gallons per GSF. Even with this more aggressive water baseline, EPA was able to reduce its FY 2008 water intensity by 6.4 percent relative to FY 2007.

In FY 2008, EPA conducted assessments and prepared draft water management plans for the Kansas City, Kansas, Science and Technology Center, three different facilities in Research Triangle Park, North Carolina, and two facilities—the Center Hill Facility and Testing and Evaluation Center—in Cincinnati, Ohio. These plans are currently under review and are pending signature.

To improve upon its history of efficient water use, in addition to setting the ConservW facility-specific targets described earlier, EPA undertook several efforts in FY 2008:

- *Faucet Retrofits:* The Agency initiated a program to replace or retrofit many of its lavatory faucets to reduce faucet water use. The current federal efficiency standard for lavatory faucets is a maximum flow of 2.2 gallons per minute (gpm). But high-efficiency faucets are available that flow at a maximum rate of 0.5 gpm and are well suited for use in hand washing in office and laboratory restrooms. EPA embarked on an effort to replace or retrofit its 2.2 gpm faucets with versions with a maximum flow of 0.5 gpm. Nine facilities have taken the lead and installed the lower flowing faucets, for a combined water savings of approximately 1 million gallons per year. Eight other facilities are in the process of retrofitting their faucets, and several others have plans to do so in FY 2009.
- *Single-Pass Cooling Elimination:* In addition, EPA facilities made efforts to eliminate single-pass cooling, which is inefficient because water is circulated only once and then discharged. In FY 2008, RTP's New Main campus eliminated single-pass cooling for two projects, which will save them approximately 500,000 gallons of water per year. Five facilities—Cincinnati AWBERC, Cincinnati Center Hill, Cincinnati Testing & Evaluation, Grosse Ile, and RTP's Reproductive Toxicology Laboratory—have identified projects to eliminate single-pass cooling. These projects are currently under evaluation or design with construction contracting to be initiated in FY 2009.
- *Irrigation Audits:* EPA also targeted EPA laboratories with automatic irrigation systems for potential water savings. EPA's WaterSense program labels certification programs for irrigation

designers, auditors, and installation/maintenance professionals; the certified professionals can become WaterSense irrigation partners. EPA anticipates that irrigation audits performed by partners can cut the amount of water used by irrigation systems by up to 20 percent when audit findings are implemented. EPA identified local WaterSense irrigation partners to conduct audits during August and September 2008 at the laboratories in Ada, Oklahoma; Golden, Colorado; Houston, Texas; Corvallis, Oregon; and Athens, Georgia. Irrigation improvements currently are being pursued.

EPA also conducted water conservation projects in FY 2008 at the following facilities:

- *Environmental Science Center (ESC)—Fort Meade, Maryland:* In FY 2008, ESC retrofitted the toilets in the facility with dual-setting flush valves. These flush devices allow the user to select a full flush of 1.6 gallons for solid waste, or a light flush of 1.1 gallons for liquid waste. In addition, the facility has retrofitted its lavatory faucets with 0.5 gpm aerators. To further conserve water, ESC implemented a project to capture excess deionized water generated by its reverse osmosis system and use the water as boiler feed water, saving 100,000 gallons per year.
- *Gulf Ecology Division—Gulf Breeze, Florida:* To lower water consumption at the new, 10,000-square-foot Computational and Geospatial Sciences Building at EPA's Gulf Ecology Division in Gulf Breeze, Florida, high-efficiency, high-performance plumbing fixtures were installed throughout the building. All urinals and dual-flush toilets use 100 percent recycled water gathered from a rainwater cistern located on the roof, allowing the building to greatly lower its potable water needs and consumption.
- *Office of Research and Development (ORD) Laboratory—Athens, Georgia:* In FY 2008, the Athens ORD facility responded very aggressively to the call to use water efficiently. The facility replaced an older steam sterilizer with more efficient equipment, reducing the use of water used to cool sterilizer condensate. In addition, the facility retrofitted all lavatory sinks with 0.5 gpm aerators, and retrofitted two of its restrooms with high efficiency toilets and urinals. The toilets flush with 1.28 gpf, and the urinals flush with 0.125 gpf.
- *Science and Ecosystems Support Division Laboratory—Athens, Georgia:* In May 2008, the Athens SESD facility completed a project to capture condensate from three roof-mounted air handlers. The condensate is routed to the cooling tower, saving approximately 1 million gallons per year in cooling tower make-up water.

STORMWATER MANAGEMENT AT EPA

EISA 2007 requires federal agencies to maintain or restore a site's predevelopment hydrology when projects impact more than 5,000 square feet of a site. The Agency's Office of Wetlands, Oceans, and Watersheds, Non-Point Source Branch and Office of Wastewater Management, Municipal Branch, initiated a Green Infrastructure Program effort in FY 2008 to write specifications for stormwater management. For EPA, however, demonstrating proper stormwater management techniques was a priority long before EISA was passed, for example:

- *EPA Headquarters—Washington, D.C.:* In FY 2008, EPA Headquarters completed a garage cistern project at one of its Washington, D.C. buildings. The system consists of six 1,000-gallon cisterns at the base of the West Building's parking garage on Constitution Avenue in Washington, D.C.

The cisterns collect rooftop stormwater which is later used to irrigate nearby landscaping. Rainwater is collected by gravity from downspouts accessible in the garage ceiling and then conveyed to the cisterns. The cisterns collect the stormwater and provide a reservoir of water for the EPA West irrigation system. An energy-efficient pump installed on the last tank is used to convey cistern water to the irrigation lines. Potable water is used to supplement the supply when cistern water demand is insufficient.

- *Atlantic Ecology Division Laboratory—Narragansett, Rhode Island:* AED installed a green roof to mitigate stormwater runoff. The roof helps filter pollutants such as nitrogen and phosphorous from the rainwater through bioremediation and phytoremediation. As the vegetation grows, it not only provides greater aesthetic appeal, but also greater absorption during rain events. In addition, the green roof could potentially drain excess water to rain barrels or cisterns, allowing the facility to reuse it.

In other sustainable initiatives at AED, in FY 2008, the facility replaced grassy areas near its parking lot with native, sustainable shrubs and trees and a wildflower meadow. Because less mowing is required, the amount of emissions produced by lawn equipment for the facility as a whole is reduced. By replacing grassy areas with native plantings that form a diversity of communities, the wildlife population is expected to increase significantly.

- *Region 2 Office, Edison, New Jersey—*In FY 2008, EPA's Region 2 office in Edison, New Jersey, elected to incorporate an innovative and comprehensive experiment involving porous surfaces into the planning of its parking lot upgrade project. With supplemental funding from ORD, the Region 2 office is working with designers to integrate multiple porous paving surfaces into a nearly 50,000 square-foot area that will function as both a parking lot and a testing site for the new paving materials. Current plans for the parking area include removing and crushing existing concrete, grading the surface of the area, and reusing the crushed concrete as a sub-base material. On top of this foundation, porous asphalt, porous concrete, and permeable pavers will each be used to pave 20 spaces, for a total of 60 spaces. Engineering controls and the slope of the area will allow rain to drain across all three surfaces even, where catchments will guide rain and runoff into tanks used for water quantity and quality recording. Instruments will also be installed to monitor temperatures and saturation levels of the surfaces. Furthermore, excess runoff from the entire parking area, which will also include asphalt driveways and access roads, will drain into the rain garden. The proposed parking area and testing site will not only significantly reduce runoff from the parking area at the Region 2 office, but may also provide EPA with five to 10 years of valuable research on the effectiveness of three porous paving materials. The design of the parking area is currently up for bid, and completion of this project is anticipated in 2010.
- *Office of Research and Development (ORD) Laboratory—Athens, Georgia:* The Athens ORD laboratory improved onsite stormwater management by retrofitting the site with a stormwater retention pond. The pond is designed to capture stormwater runoff and overland flow, reducing the amount of sediment and pollution flowing into local tributaries and facilitating better aquifer recharge. Retaining the runoff of the site, the release of stormwater is also returned to near predevelopment conditions. Retaining this water in the pond saturates the soil and enables an abundance of plant growth. In addition, the use of flower gardens and a variety of vegetation has helped to improve the aesthetics of the facility.

POLLUTION PREVENTION AND RECYCLING

Based on requirements under E.O. 13423, EPA set an Agencywide goal to achieve a waste diversion rate of 45 percent across all of its facilities by 2010. Through this goal, the Agency is striving to exceed the Executive Order's requirement of a 35 percent recycling rate for all federal agencies. EPA strives to continually improve waste reduction across all facilities, collecting new materials for recycling, holding educational events to renew employees' commitment to recycling, and preventing waste whenever possible.

EPA's baseline Agencywide recycling rate, initially calculated for FY 2006, was 39 percent, based on data from facilities that have the ability to collect both trash and recycling data. Each year, EPA solicits data from all major facilities to determine progress toward the Agencywide waste diversion goal. In FY 2007, the Agencywide waste diversion rate was calculated to be 40 percent, a slight increase over the FY 2006 baseline. FY 2008 data are still being compiled, but EPA is already working on an Agencywide challenge to each of its regional offices and all of its laboratories to help the Agency meet its 2010 by increasing data collection and recycling rates at all of its facilities.

To gather data and enhance recycling efforts, for the past several years, EPA has conducted recycling and pollution prevention assessments at Agency office and laboratory facilities across the country. The goal of the assessments is to observe the waste diversion program the facilities have in place, provide recommendations for improvement, share best practices, and discuss the facilities' ability to collect/improve metrics to factor into the Agencywide recycling rate. Examples of waste reduction initiatives underway at the facilities visited during FY 2008 are highlighted below:

- *Manchester Environmental Laboratory—Manchester, Washington:* The Region 10 Manchester Environmental Laboratory (MEL) composts food waste through a vermicomposting competition among employees, who compete to see which group generates the most organic waste for vermicomposting. Participants use the worm tea and castings in their personal gardens, as well as on native plantings located on the facility. MEL also collects trash in small flowerpots instead of regular-sized trash cans.
- *National Vehicle Fuel Emissions Laboratory—Ann Arbor, Michigan:* The National Vehicle Fuel & Emissions Laboratory in Ann Arbor, Michigan, requires construction and demolition materials reuse in remodeling contracts to reduce use of new building supplies. The laboratory also recycles solvents using closed- and open-loop systems, saving more than 50 gallons per year.
- *Region 2 Laboratory—Edison, New Jersey:* The Region 2 laboratory in Edison, New Jersey, uses creative strategies to keep recycling front-of-mind for employees. The lab conducts an EMS training using a display of recyclable items to show employees which materials can be recycled and which cannot. The laboratory also periodically collect coats, professional clothing, and aluminum beverage can tabs to donate to charity or raise money for charity.
- *National Exposure Research Laboratory—Las Vegas, Nevada:* The National Exposure Research Laboratory in Las Vegas, Nevada, takes advantage of its location on the campus of University of Las Vegas-Nevada (UNLV), by partnering with the UNLV Rebel Recycling program to collect materials for reuse and recycling. The UNLV program collects recyclables from the lab and keeps the proceeds from selling the materials, also hosting biannual yard sales, office supply

drives, and clothing donations. The Las Vegas laboratory also keeps employees up-to-date on sustainability initiatives through a monthly online newsletter.

Electronics Recycling Collection

As part of a week-long Earth Day celebration in April 2008, EPA offered employees the opportunity to recycle their old or unused personal electronics. At three EPA Headquarters locations: Potomac Yard, 1310 L Street, and Federal Triangle, employees collected a total of 3,900 pounds of electronics such as laptop computers, televisions, and fax machines over the course of the week. This electronics recycling collection was just one in a series of events and activities that promote ways Headquarters employees could make daily decisions that reduced their impacts on the environment.

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Appendix A: FY 2008 Data Report

**For Submittal With EPA's
Energy Management and Conservation Program
FY 2008 Annual Report**

**U.S. Environmental Protection
Agency FY 2008 Energy Management Performance Summary**

Goal Performance

Energy Management Requirement	FY 2003 Btu/GSF	FY 2008 Btu/GSF	Percent Change 2003 - 2008*	FY 2008 Goal Target
Reduction in energy intensity in facilities subject to the EPACT and E.O. 13423 goals	395,520	299,164	-24.4%	-9.0%

* The 24.4% reduction in energy use in FY 2008 compared to FY 2003 is composed of the following:
 17.5% - reduction in actual energy use
 6.2% - credit for green power
 0.7% - source energy savings credit (This is a credit that DOE guidance allows to encourage high performance projects like the Richmond, California, Cogeneration that increase site energy use but decreases source energy.)

Renewable Energy Requirement	Renewable Electricity Use (MWH)	Total Electricity Use (MWH)	Percentage	FY 2008 Goal Target
Eligible renewable electricity use as a percentage of total electricity use	149,621.3	128,306.5	116.6%	3.0%

Water Intensity Reduction Goal*	FY 2007 Gallon/GSF	FY 2008 Gallon/GSF	Percent Change 2007 - 2008	FY 2008 Goal Target
Reduction in potable water consumption intensity	45	41.9	-6.3%	-2.0%

* After the finalization of EPA's FY 2007 *Energy Management and Conservation Program* Annual Report, EPA received updated water consumption data from several utility companies that supply the Agency's laboratories. These updates reduced the previously reported year-end FY 2007 water consumption total of 168,116,231 gallons to a new 166,512,412 gallons. These updates, in addition to retroactive adjustments to the FY 2007 GSF figures for two of EPA's reporting facilities, lowered the FY 2007 water intensity baseline from 45.2 gallons per GSF to 44.7 gallons per GSF.

Metering of Electricity Use	Cumulative # of Buildings Metered	Cumulative % of Electricity Metered	Cumulative % of Appropriate Buildings Metered	FY 2012 Goal Target
Standard Electricity Meters in FY 2008	32	76.6%	94.1%	100%
Advanced Electricity Meters in FY 2008	2	23.4%	5.9%	Maximum Extent Practicable
Total Electricity Meters in FY 2008	34	100.0%	100.0%	

Federal Building Energy Efficiency Standards	Percent of New Building Designs	FY 2007 forward Goal Target
Percent of new building designs started since beginning of FY 2007 that are 30 percent more energy efficient than relevant code, where life-cycle cost effective:	N/A	100%

Investments in Energy and Water Management

Sources of Investment	Investment Value (Thou. \$)	Anticipated Annual Savings (Million Btu)
Direct obligations for facility energy efficiency improvements	\$4,893.0	49,430.4
Investment value of ESPC Task/Delivery Orders awarded in fiscal year	\$0.0	0.0
Investment value of UESC Task/Delivery Orders awarded in fiscal year	\$0.0	0.0
Total	\$4,893.0	49,430.4

	Percentage
Total investment as a percentage of total facility energy costs	24.1%
Financed (ESPC/UESC) investment as a percentage of total facility energy costs	0.0%

FY 2008 ENERGY MANAGEMENT DATA REPORT

Agency: U.S. Environmental Protection Agency Prepared by: Karen Murray
 Date: 12/31/2008 Phone: 202-564-2539

PART 1: ENERGY/WATER CONSUMPTION AND COST DATA

1-1. NECPA/E.O. 13423 Goal Subject Buildings

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Unit Cost (\$)	Site-Delivered Btu (Billion)	Est. Source Btu (Billion)	Est. GHG Emissions (MTCO ₂ e)*
Electricity	MWh	127,922.5	\$9,832.9	\$0.08 /kWh	436.47	1,515.9	(13,674)
Fuel Oil	Thou. Gal.	105.2	\$243.7	\$3.36 /gallon	14.2	14.2	1,040
Natural Gas	Thou. Cubic Ft.	377,531.9	\$4,331.0	\$11.47 /Thou.Cu Ft	389.2	389.2	20,688
LPG/Propane	Thou. Gal.	8.3	\$19.0	\$2.29 /gallon	0.8	0.5	50
Coal	S. Ton	0.0	\$0.0	N/A /S. Ton	0.0	0.0	0
Purch. Steam	BBtu	38.8	\$1,088.0	\$28.06 /MMBtu	38.8	53.9	5,170
Other	BBtu	335.7	\$4,683.7	\$13.83 /MMBtu	338.7	338.7	N/A
Purch. Renew. Electric	MWh	384.0	\$27.5	\$0.07 /kWh	1.3	N/A	N/A
Purch. Renew. Other	BBtu	0.0	\$0.0	N/A /MMBtu	0.0	0.0	0
Total Costs:			\$20,325.2		1,219.5	2,312.7	13,273
FY 2008 Goal Subject Buildings					326,230	618,680	
Gross Square Feet (Thousands)		3,738.1					
Goal Subject Buildings					301,830		
FY 2003 Baseline (BU/GSF)		395,520			299,164		

* The estimated GHG emissions are calculated using DOE's default equations and emission factors provided as part of the data report template. In FY 2008, EPA began developing an internal greenhouse gas (GHG) emissions inventory and quarterly reporting system, representing an initiative to track and report the Agency's carbon footprint. This approach is discussed in the narrative of the FY 2008 Annual Report to DOE.

1-2. NECPA/E.O. 13423 Goal Excluded Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Unit Cost (\$)	Site-Delivered Btu (Billion)	Est. Source Btu (Billion)	Est. GHG Emissions (MTCO ₂ e)
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
Purch. Renew. Electric	MWh	0.0	\$0.0	N/A /kWh	0.0	0.0	0
Purch. Renew. Other	BBtu	0.0	\$0.0	N/A /MMBtu	0.0	0.0	0
Total Costs:			\$0.0		0.0	0.0	0
FY 2008 Excluded Facilities					N/A	N/A	
Gross Square Feet (Thousands)		0.0					
Goal Excluded Facilities					N/A		
FY 2003 Baseline (BU/GSF)		0			N/A		

1-3. Non-Fleet Vehicles and Other Equipment (Does not include Fleet Vehicle Data Captured by FAST System)

	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Unit Cost (\$)	Btu (Billion)	Est. GHG Emissions (MTCO ₂)
Auto Gasoline	Thou. Gal.	341.0	\$1,238.0	\$3.63 /gallon	42.6	3,021
Diesel-Distillate	Thou. Gal.	7.0	\$30.0	\$4.29 /gallon	1.0	71
LPG/Propane	Thou. Gal.	0.0	\$0.0	N/A /gallon	0.0	0
Aviation Gasoline	Thou. Gal.	0.0	\$0.0	N/A /gallon	0.0	0
Jet Fuel	Thou. Gal.	0.0	\$0.0	N/A /gallon	0.0	0
Navy Special	Thou. Gal.	0.0	\$0.0	N/A /gallon	0.0	0
Other	BBtu	0.0	\$0.0	N/A /MMBtu	0.0	0
	Total Costs:		\$1,268.0		43.6	3,092

Optional 1-3a. Fleet Vehicle Consumption and Costs Captured by the FAST System

(Input reflects format of Section IV, Part C, Annual Fuel Consumption Report, by Fuel Type of FAST SF 82 - Aggregate Combined Report)

Description	Consumption Units	Annual Consumption	Annual Cost (Actual \$)	Btu (Billion)
Biodiesel	GEG	0.0	\$0.0	0.0
Diesel	GEG	0.0	\$0.0	0.0
Electric	GEG	0.0	\$0.0	0.0
E-85	GEG	0.0	\$0.0	0.0
Gasoline	GEG	0.0	\$0.0	0.0
Hydrogen	GEG	0.0	\$0.0	0.0
M-85	GEG	0.0	\$0.0	0.0
LPG	GEG	0.0	\$0.0	0.0
NG	GEG	0.0	\$0.0	0.0
Other	GEG	0.0	\$0.0	0.0
TOTAL	GEG	0.0	\$0.0	0.0

1-4. RENEWABLE ENERGY GENERATED ON FEDERAL OR INDIAN LAND WHERE RECS ARE RETAINED BY THE GOVERNMENT
(New renewable energy is from projects placed in service after January 1, 1999. Include projects that did not retain RECs if they qualify under the grandfather clause.)

Renewable energy project types in service during FY 2008, by age and source	Number of Projects	Annual Energy Produced	Energy Produced on Federal or Indian Land and Used at a Federal Facility
Electricity from New <u>Solar</u> projects (MWH)	3	94.1	94.1
Electricity from New <u>Wind</u> projects (MWH)	0	0.0	0.0
Electricity from New <u>Biomass</u> projects (MWH)	0	0.0	0.0
Electricity from New <u>Landfill Gas</u> projects (MWH)	0	0.0	0.0
Electricity from New <u>Geothermal</u> projects (MWH)	0	0.0	0.0
Electricity from New <u>Hydro/Ocean</u> projects (MWH)	0	0.0	0.0
Electricity from <u>Old Solar</u> projects (MWH)	0	0.0	0.0
Electricity from <u>Old Wind</u> projects (MWH)	0	0.0	0.0
Electricity from <u>Old Biomass</u> projects (MWH)	0	0.0	0.0
Electricity from <u>Old Landfill Gas</u> projects (MWH)	0	0.0	0.0
Electricity from <u>Old Geothermal</u> projects (MWH)	0	0.0	0.0
Electricity from <u>Old Hydro/Ocean</u> projects (MWH)	0	0.0	0.0
Natural Gas from New <u>Landfill/Biomass</u> projects (Million Btu)	0	0.0	0.0
Renewable Thermal Energy from New projects (Million Btu)	2	82,663.7	82,663.7
Other New Renewable Energy (Specify Type) (Million Btu)	0	0.0	0.0
Natural Gas from <u>Old Landfill/Biomass</u> projects (Million Btu)	0	0.0	0.0
Renewable Thermal Energy from <u>Old</u> projects (Million Btu)	0	0.0	0.0
Other <u>Old</u> Renewable Energy (Specify Type) (Million Btu)	0	0.0	0.0
Total New Renewable Electricity (MWH)	3	94.1	94.1
Total Old Renewable Electricity (MWH)	0	0.0	0.0
Total New Non-Electric Renewable Energy (Million Btu)	2	82,663.7	82,663.7
Total Old Non-Electric Renewable Energy (Million Btu)	0	0.0	0.0
Total Renewable Energy Generation (Million Btu)	5	82,984.8	82,984.8

1-5. ON-SITE RENEWABLE ENERGY GENERATION WHERE RECS ARE NOT RETAINED BY THE GOVERNMENT
(This energy is only counted toward the renewable energy goal if the agency has enough new RECs to qualify for the on-site bonus.)

Renewable energy reported here comes from projects: 1) placed in service after 1/1/1999 (New); 2) where RECs have not been retained by the government; 3) where the amount has not been reported elsewhere on this data report; and 4) where the energy or RECs have not been sold to another agency that is counting it toward their renewable energy goal. (MWH)	Amount Produced or Used	Amount Qualified for Goal
Renewable energy reported here must come from projects: 1) placed in service before 1/1/1999 (Old); 2) where RECs have not been retained by the government; 3) where the amount has not been reported elsewhere on this data report; and 4) where the energy or RECs have not been sold to another agency that is counting it toward their renewable energy goal. (MWH)	0.0	0.0
	0.0	0.0

1-6. RENEWABLE ENERGY/RENEWABLE ENERGY CERTIFICATE PURCHASES IN FY 2008

(New renewable energy is from resources developed after January 1, 1999)

Type of Renewable Energy Purchase. (Two rows are provided for each type. Insert additional rows as necessary for purchases of same type for different uses. Insert rows between each color-coded category.) (Short or Long). Insert rows between each color-coded category.)	Total Amount Purchased (MWH)	Total Amount Purchased (Million Btu)	Annual Cost (Thou. \$)	Portion of Total Purchases from Projects on Federal or Indian Lands	FY 2008 Goal Application Renewable Energy Goal (RE) Energy Efficiency Goal (EE) Credit	Purchase Term (Enter: Short or Long)	End Use Category (Enter: Goal or Excluded)	Total Amount Purchased for Goal Buildings (Billion Btu)	Total Amount Purchased for Excluded Facilities (Billion Btu)	State or Region of Generation or Source
Electricity from New Renewable Source					RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.					
Duluth	24.0		\$0.0	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	0.1	0.0	Southwestern Minnesota
Corvallis (Main)	300.0		\$30.0	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	1.2	0.0	Oregon
Electricity from Old Renewable Source					RE: Up to 15% of total electricity use. EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.					
RECs from New Renewable Source					RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.					
Chelmsford	2,625.0		\$5.4	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	9.0	0.0	Hyde County, SD; Lamoure County, ND; Carbon County, WY
Narragansett	1,279.2		\$4.1	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	4.4	0.0	Dodge Center, MN
Edison	5,250.0		\$10.7	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	17.9	0.0	Hyde County, SD; Lamoure County, ND; Carbon County, WY
Cincinnati (Total)	12,709.0		\$69.3	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	43.4	0.0	Taylor County, TX; Nolan County, TX; Borden County, TX; Garza County, TX, Scurry County, TX
Ada-ORD	1,750.0		\$3.3	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	6.0	0.0	Unita County, WY; Solano County/Rio Vista, CA; Brown County, NE
Kansas City (STC)	320.8		\$0.4	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	1.1	0.0	Montezuma, KS
Golden	175.0		\$0.2	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	0.6	0.0	Powers County, CO
Richmond	1,662.5		\$3.0	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	5.7	0.0	Palm Springs, CA; Solano County, CA
Manchester	3,333.0		\$50.0	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Long	Goal	11.4	0.0	Foots Creek IV, WY
FY 2008 Blanket Green Power Purchases	119,944.6		\$391.8	0.0	RE: 100% EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal	409.3	0.0	Ohio; Texas
RECs from Old Renewable Source					RE: Up to 15% of total electricity use. EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.					
RECs from Old Renewable Source					RE: Up to 15% of total electricity use. EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.					
Non-Electric Energy from New Renewable Source					RE: no contribution to goal (see comment) EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal			
Non-Electric Energy from New Renewable Source					RE: no contribution to goal (see comment) EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Long	Excluded			
Non-Electric Energy from Old Renewable Source					RE: no contribution to goal EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Short	Goal			
Non-Electric Energy from Old Renewable Source					RE: no contribution to goal EE Credit: Up to 5.4% reduction for short term and 7.2% reduction for long term.	Long	Excluded			
Total Purchases of New Renewable Electricity	384.0		\$27.5	0.0	Eligible Short-term Purchase					
Total Purchases of New RECs	149,049.1		\$738.2	0.0	Goal Building EE Credit (BBtu):					
Bonus for Purchases from New Projects on Federal or Indian Land	0.0		\$0.0	0.0	Eligible Long-term Purchase					
Total Purchases of Old Renewable Electricity	0.0		\$0.0	0.0	Goal Building EE Credit (BBtu):					
Total Purchases of Old RECs	0.0		\$0.0	0.0	Total Goal Building EE Credit (BBtu):					
Total Purchases of New Non-Electric Renewable Energy	0.0		\$0.0	0.0	Eligible Short-term Purchase					
Total Purchases of Old Non-Electric Renewable Energy	149,433.1		\$765.7	0.0	Eligible Long-term Purchase					
Total Purchases for Goal Buildings	0.0		\$0.0	0.0	Excluded Fac. EE Credit (BBtu):					
Total Purchases for Excluded Facilities	149,433.1		\$765.7	0.0	Total Excluded Fac. EE Credit (BBtu):					

1-7. GOAL-ELIGIBLE RENEWABLE ELECTRICITY USE AS A PERCENTAGE OF FACILITY ELECTRICITY USE

(Calculated from input above per FEMP Renewable Energy Guidance)

	Renewable Electricity Use (MWH)	Total Facility Electricity Use (MWH)	RE as a Percentage of Electricity Use
Components of Eligible RE Use	149,627.3	128,306.5	116.6%
Eligible Renewable Electricity Total	149,627.2		
New Renewable Electricity (without Bonus, Federal or Indian Land)	94.1		
Eligible OR Renewable Electricity	0.0		

1-8. ALL RENEWABLE ENERGY USE (INCLUDING NON-ELECTRIC) AS A PERCENTAGE OF FACILITY ELECTRICITY USE (WITHOUT BONUS)

(Calculated from input above for information only)

	All Renewable Energy Use (Billion Btu)	Total Facility Electricity Use (Billion Btu)	RE as a Percentage of Energy Use
	592.9	437.8	135.4%

1-9. WATER USE INTENSITY AND COST*

Category	Annual Consumption (Million Gallons)	Annual Cost (Thou. \$)	Facility Gross Square Feet (Thou.)	Gallons per Gross Square Foot
Potable Water				
Buildings & Facilities Subject to Water Goal	156.6	\$1,259.2	3,736.1	41.9
Approx. percentage of reported water consumption that is estimated: Is the FY 2007 agency water intensity baseline preliminary or final?				Percent
				Final
				0%

* After the finalization of EPA's FY 2007 Energy Management and Conservation Program Annual Report, EPA received updated water consumption data from several utility companies that supply the Agency's laboratories. These updates reduced the previously reported year-end FY 2007 water consumption total of 168,116,231 gallons to a new 166,512,412 gallons. These updates, in addition to retroactive adjustments to the FY 2007 GSF figures for two of EPA's reporting facilities, lowered the FY 2007 water intensity baseline from 45.2 gallons per GSF to 44.7 gallons per GSF.

PART 2: ENERGY EFFICIENCY IMPROVEMENTS

2-1. DIRECT AGENCY OBLIGATIONS

Description	FY 2008		Projected FY 2009
	(Million Btu)	(Thou. \$)	
Direct obligations for facility energy efficiency improvements, including facility surveys/audits		\$4,893.0	\$5,870.0
Estimated annual savings anticipated from obligations	49,430.4	\$696.9	34,548.9
			\$547.1

2-2. ENERGY SAVINGS PERFORMANCE CONTRACTS (ESPC)

Description	Annual savings (Million Btu)	(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 ESPC contractors in fiscal year.		\$0.0

2-3. UTILITY ENERGY SERVICES CONTRACTS (UESC)

Description	Annual savings (Million Btu)	(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. METERING OF ELECTRICITY USE

FY	Standard Meters		Advanced Meters		Appropriate Buildings	
	Cumulative # of Buildings Metered	Cumulative % of Electricity Metered	Cumulative # of Buildings Metered	Cumulative % of Electricity Metered	# of Appropriate Buildings for Metering	Cumulative % of Buildings Metered
2008	32	76.6%	2	23.4%	34	100.0%
2009 planned	20	45.1%	14	54.9%	34	100.0%

2-5. FEDERAL BUILDING ENERGY EFFICIENCY STANDARDS

	Number of New Building Designs
Total new building designs started since beginning of FY 2007:	0
Total new building designs started since beginning of FY 2007 that are expected to be 30 percent more energy efficient than relevant code, where life-cycle cost effective:	0
Percent of new building designs started since beginning of FY 2007 that are expected to be 30 percent more energy efficient than relevant code, where life-cycle cost effective:	N/A

2-6. TRAINING

	(number)	(Thou. \$)
Number of personnel trained in	215	
FY 2008 Expenditure		\$164.2

U.S. Environmental Protection Agency

List of New Federal Building Designs and Construction

(Note: Only new buildings which began the design phase after the beginning of FY 2007 need to be listed. Buildings for which construction was completed in FY 2007 and after do not need to be listed if they were designed prior to FY 2007.)

New Construction Project Information*			Design		Completed New Construction		
Project ID	Building Name	Location (City, State)	Design Started (FY)	Percentage below ANSI/ASHRAE/IESNA Standard 90.1-2004 in terms of energy use	If not at least 30% below ANSI/ASHRAE/IESNA Standard 90.1-2004, will design achieve maximum level of energy efficiency that is life-cycle cost-effective?	Date Construction Completed (FY)	In terms of energy use, percentage below ANSI/ASHRAE/IESNA Standard 90.1-2004 achieved
			20??	0%	Yes or No	20??	0%
Total new building designs started since beginning of FY 2007:			0				
Total new building designs started since beginning of FY 2007 expected to be 30% more energy efficient than relevant code, where life-cycle cost effective:			0				

* While EPA did not initiate any designs for new construction in FY 2007, below is a sampling of recently completed EPA constructions designed prior to FY 2007 and their respective LEED certification ratings. Also provided is a list of several recently completed or active GSA space acquisitions.

Facility	Location	Occupation Date	Level of Certification	LEED Version
New England Regional Lab	Chelmsford, MA	October 2001	Gold	1.0
National Computer Center	Research Triangle Park (RTP), NC	January 2002	Silver	2.0
Science and Technology Center Region 7 Lab	Kansas City, KS	May 2003	Gold	2.0
EPA Headquarters Potomac Yard Two	Arlington, VA	May 2006	Gold	2.1
EPA Headquarters Potomac Yard One	Arlington, VA	July 2006	Gold	2.1
Region 8 Headquarters	Denver, CO	January 2007	Gold	2.1
Cincinnati Annex II	Cincinnati, OH	November 2007	Gold	2.1/2.2
Child Care Center	RTP, NC	January 2007	Silver	2.2
Region 1 Headquarters	Boston, MA	January 2009	Gold	2.2

Recently Completed or Currently Active Space Acquisitions:

- Boston Regional Office
- Seattle Regional Office
- San Francisco Regional Office
- Denver Regional Office
- Philadelphia Regional Office
- Kansas City Regional Office
- Houston Laboratory

**U.S. Environmental Protection Agency
Designated Covered Facilities for 42 USC 8253(f), Use of Energy and Water Efficiency Measures in Federal Buildings**

Identification Information		Location Information			Building Characteristics		Energy Manager Information			
Agency Facility Number (Optional)	Facility Name	City	State	Zip Code	Gross Square Footage (Thous.)	Annual Energy Use (Site Billion Btu)	Unique Identifier	Last Name (Optional)	First Name (Optional)	E-Mail (Optional)
	RTP-New Main	Research Triangle Park	NC	27711	1,043	370.7	EPA-04-005	Montilla	Alex	montilla.alex@epa.gov
	Cincinnati-AWBERC	Cincinnati	OH	45268	430	148.8	EPA-05-003	Kappa	John	kappa.john@epa.gov
	RTP-Human Studies	Research Triangle Park	NC	27711	137	100.0	EPA-04-005	Montilla	Alex	montilla.alex@epa.gov
	Fort Meade	Fort Meade	MD	20755	163	55.5	EPA-03-001	Dreisch	Rick	dreisch.rick@epa.gov
	Ann Arbor	Ann Arbor	MI	48105	184	53.7	EPA-05-001	Dorer	Steven	dorer.steven@epa.gov
	RTP-NCC	Research Triangle Park	NC	27711	95	51.0	EPA-04-005	Montilla	Alex	montilla.alex@epa.gov
	Duluth	Duluth	MN	55804	89	29.4	EPA-05-002	Booth	Rodney	booth.rod@epa.gov
	Narragansett	Narragansett	RI	02882	90	26.8	EPA-01-002	Ahlgren	Russell	ahlgren.russell@epa.gov
	Athens-ORD	Athens	GA	30605	78	25.3	EPA-04-001	Pittman	Rick	pittman.rick@epa.gov
	Corvallis-Main	Corvallis	OR	97333	97	23.7	EPA-10-002	Knight	Primo	knight.primo@epa.gov
	Kansas City STC	Kansas City	KS	66101	72	20.7	EPA-07-001	Begley	John	begley.john@epa.gov
	Houston	Houston	TX	77099	39	19.5	EPA-06-002	Miner	L. C.	miner.lc@epa.gov
	Gulf Breeze	Gulf Breeze	FL	32561	83	18.8	EPA-04-003	Peacher	Clay	peacher.clay@epa.gov
	Chelmsford	Chelmsford	MA	1863	69	17.8	EPA-01-001	Beane	Bob	beane.bob@epa.gov
	Ada-ORD	Ada	OK	74820	81	12.1	EPA-06-001	Price	Frank	price.frank@epa.gov
	Montgomery	Montgomery	AL	36115	63	8.7	EPA-04-004	Clark	Michael	clark.michael@epa.gov
Total Estimated Energy Use for Covered Facilities (Billion Btu):						982.3				
Percentage of Total Facility Energy Use:						80.6%				

Notes:

"Gross Square Footage" figures are based on 2008 data.

"Annual Energy Use" figures are based on FY 2008 energy consumption data.

AGENCY COMPILATION WORKSHEET FOR CREDIT FOR PROJECTS THAT INCREASE SITE ENERGY USE BUT SAVE SOURCE ENERGY

(See http://www.eere.energy.gov/femp/pdfs/sec502e_%20guidance.pdf)

EPACT Goal Subject Buildings

Name of Project Saving Source Energy in Current Fiscal Year (insert additional rows as necessary)	Annual Site Energy Increase with the Project	Annual Source Energy Saved with the Project	Adjustment to Annual Site Energy
	(Million Btu)	(Million Btu)	(Million Btu)
Project No. 1	7,094.1	8,026.9	5,715.7
Project No. 2	4,485.3	5,969.2	4,250.4
Project No. 3	0.0	0.0	0.0
Totals	11,579.4	13,996.1	9,966.1

EPACT Excluded Facilities

Name of Project Saving Source Energy in Current Fiscal Year (insert additional rows as necessary)	Annual Site Energy Increase with the Project	Annual Source Energy Saved with the Project	Adjustment to Annual Site Energy
	(Million Btu)	(Million Btu)	(Million Btu)
Project No. 1	0.0	0.0	0.0
Project No. 2	0.0	0.0	0.0
Project No. 3	0.0	0.0	0.0
Totals	0.0	0.0	0.0



Appendix B: Project-Specific Calculations for Source Energy Reductions

**For Submittal With EPA's
Energy Management and Conservation Program
FY 2008 Annual Report**

Appendix B: Calculations for Project-Specific Source Energy Reductions

Project 1: Replacement of aging heat pumps with new, energy-efficient, gas-fired boilers

Oregon Pacific Coastal Ecology Branch Laboratory, Newport, OR

Project completed in FY 2006

Base Case (without Project)		
Annual Source Energy Used	25,859	MMBtu
Annual Site energy Used	7,446	MMBtu
With Project		
Annual Source Energy Used	17,832	MMBtu
Annual Site energy Used After Project	14,540	MMBtu
Annual Source Energy Saved After Project	8,027	MMBtu
Annual Site Energy Increase After Project	7,094	MMBtu
502(e) Adjustment to Annual Site Energy, per DOE guidance	5,716	MMBtu
Annual electricity displaced as a result of the project:	677,376	kWh

Project 2: Installation of a natural gas-fired combined heat and power (CHP) unit for electricity and hot water

Region 9 Laboratory, Richmond CA

Project completed in FY 2006

Base Care (without Project)		
Annual Source Energy Used	21,707	MMBtu
Annual Site energy Used	14,769	MMBtu
With Project		
Annual Source Energy Used	15,738	MMBtu
Annual Site energy Used After Project	19,255	MMBtu
Annual Source Energy Saved After Project	5,969	MMBtu
Annual Site Energy Increase After Project	4,485	MMBtu
502(e) Adjustment to Annual Site Energy, per DOE guidance	4,250	MMBtu
Annual electricity displaced as a result of the project:	503,727	kWh



Appendix C

Summary of Adjustments to FY 2003-08 Energy Consumption Data for the U.S. Environmental Protection Agency's (EPA's) RTP, North Carolina, Campus



**For Submittal With EPA's
Energy Management and Conservation Program
FY 2008 Annual Report**

8 Dec 2008

BACKGROUND

To verify compliance with federally mandated energy and water reduction requirements, EPA is required to annually report energy and water consumption and cost data for its portfolio of 34 nationwide “reporting” facilities (for which EPA pays utility costs directly to the utility company) to the Department of Energy (DOE) and the Office of Management and Budget (OMB). Of these facilities, EPA’s RTP, North Carolina, campus accounts for nearly 48 percent of EPA’s reported energy consumption.

EPA maintains a comprehensive energy and water reporting framework to effectively manage the agency’s energy and water consumption and meet its annual reporting requirements. Using this framework, EPA collects and verifies quarterly energy and water consumption and cost data, as well as corresponding utility invoices and fuel logs from all reporting facilities to ensure that all compiled and reported data is of the highest possible quality. To meaningfully evaluate the Agency’s energy and water performance and progress in meeting federally mandated energy and water reduction requirements, it is especially important that EPA have accurate and reliable baseline data (FY 2003 for energy reductions and FY 2007 for water reductions).

In FY 2003, EPA relocated its largest research complex in Research Triangle Park (RTP), North Carolina, to a new consolidated campus, adjacent to the National Institute of Environmental Health Sciences (NIEHS). EPA occupies four buildings on this consolidated campus:

- New Main building
- National Computer Center (NCC)
- First Environments Early Learning Center (Child Care)
- Incinerator/Waste Handling (shared with NIEHS)

New Main, NCC, and the Incinerator/Waste Handling facilities receive a significant portion of their energy from a central utility plant (CUP), which EPA shares with NIEHS. For the first few years that EPA occupied the consolidated RTP campus, the energy delivered from the CUP to EPA and NIEHS was not separately metered. As a result, quarterly reporting of these energy commodities was very difficult, and relied primarily on high-level engineering estimates that changed sporadically.

In December 2005, EPA and NIEHS completed the installation of an advanced, Web-based metering system (ION system). The purpose of the ION system is to accurately measure energy inputs and outputs at the CUP and the energy delivered to the EPA and NIEHS facilities to more effectively manage energy and to allocate energy costs between the two agencies more fairly.

Instead of immediately reporting energy consumption data from the new ION system, however, EPA decided to take a phased approach to incorporating data from the ION system in order to ensure the integrity of the new data stream and to determine the most appropriate method for normalizing historical energy data previously reported using engineering estimates. In FY 2007, EPA discovered that quarterly energy consumption data for numerous commodities delivered from the shared CUP had been historically reported using several different, inconsistent methodologies. In July 2007, EPA completed the first phase of the RTP data adjustment (the Phase I Adjustment) to “synchronize” RTP’s historical energy consumption data to a single, consistent set of methodologies, which still partially relied on engineering estimates. Following this Phase I Adjustment, EPA submitted an accompanying revised FY 2003 baseline to DOE with the Agency’s *Energy Management and Conservation Program Fiscal Year 2007 Annual Report*.

For the Phase II Adjustment, completed in November 2008, EPA performed two years of parallel data tracking (i.e., compiling energy consumption data using both the new ION system and the previously synchronized “engineering estimate” methodology) for five commodities (see Table 1). EPA performed this parallel tracking to determine a correlation—or “delta”—between the two data streams and establish a revised FY 2003 energy baseline for the RTP facilities and for the Agency that is more reflective of actual energy performance. In performing this parallel tracking, EPA calculated an average, commodity-specific delta for each quarter over the trending period. This delta represents the difference between reportable energy consumption resulting from the engineering estimate (“old”) and ION system (“new”) methodologies. EPA then applied each quarterly- and commodity-specific delta to the previously reported FY 2003-06 quarterly energy consumption values that were calculated using the old methodology. EPA’s revised FY 2007-08 energy consumption data represent accurate data measured directly from the ION system (i.e., EPA did not apply a delta to this subset of data).

Table 1. Energy Commodities Analyzed in Phase II Adjustment

Facility*	Commodity	Reference Used in this Appendix
New Main	Electricity used at CUP to generate portion of chilled water received at New Main	New Main chilled water electric
	Natural gas used at CUP to generate portion of hot water received at New Main	New Main hot water gas
	Fuel oil used at CUP to generate portion of hot water received at New Main	New Main hot water fuel oil
NCC	Electricity used at CUP to generate portion of chilled water received at NCC	NCC chilled water electric
Incinerator/ Waste Handling	Natural gas	Inc/WH gas

*Note: RTP’s Childcare facility came online in FY 2006 and has been separately and accurately metered since its opening. As a result, EPA is not reporting any adjustments to historical energy consumption data for this facility.

The end result of the Phase II Adjustment is a complete FY 2003-08 data set that is normalized for the new methodology, enabling EPA to make more meaningful historical comparisons of energy performance once EPA switches over to quarterly reporting based on the new methodology in FY 2009.

Adjustment Methodology

The Phase II Adjustment consists of the following discrete steps:

- 1) Determine the appropriate time period over which each commodity will have data tracked in parallel fashion using the old and new methodologies.**

To normalize data from the old methodology for data based on the new methodology, it is ideal to have a data set as large as possible so that the data captures the seasonal and operational variations that can impact energy consumption and efficiency. Wherever possible, EPA tracked two years of consecutive data from the old and new methodologies in parallel fashion. Table 2 outlines the time period over which EPA performed parallel tracking for each of the five commodities included in the Phase II Adjustment.

Table 2. Temporal Span of Parallel Tracking of Commodities Included in Phase II Adjustment

Facility	Commodity	Temporal Span Over Which Quarterly Delta is Calculated
New Main	Chilled water electric	October 2006 – September 2008 (1 st Qtr FY07 – 4 th Qtr FY 08)
	Hot water gas ¹	July 2007 – September 2008 (4 th Qtr FY07 – 4 th Qtr FY08)
	Hot water fuel oil ²	July 2007 – September 2008 (4 th Qtr FY07 – 4 th Qtr FY08)
NCC	Chilled water electric	October 2006 – September 2008 (1 st Qtr FY07 – 4 th Qtr FY 08)
Incinerator/Waste Handling	Gas	October 2006 – September 2008 (1 st Qtr FY07 – 4 th Qtr FY 08)

- 2) **Create an Excel template to compile and summarize parallel tracking data for each of the five commodities included in the Phase II Adjustment.**
- 3) **For each quarter of parallel tracking data, calculate the delta from the old to new methodology for each commodity.**

For each quarter where parallel tracking data was available, EPA applied the following equation to calculate a quarterly-, commodity-specific delta:

$$\text{Delta} = \frac{[\text{Btu from new methodology} - \text{Btu from old methodology}]}{[\text{Btu from old methodology}]}$$

- 4) **Calculate an average quarterly delta for each commodity using the available parallel data.**

For fiscal quarters occurring twice in a data set, EPA averaged the respective deltas to arrive at an average quarterly-, commodity-specific average delta. For the data sets in which fiscal quarters only appeared once, EPA used the respective delta as the average quarterly-, commodity-specific delta.

- 5) **Apply average quarterly-, commodity-specific deltas to normalize old data.**

For each of the five commodities included in the Phase II Adjustment, EPA applied the average quarterly-specific delta to all data based on the old methodology for the time period prior to the parallel tracking period. For the time period for which parallel tracking data was available, EPA did not apply the delta; instead EPA used the data derived from the new methodology in the final data set. EPA used the following equation to normalize old data to derive a modeled new value:

$$\text{New value} = \text{data from old methodology} + [\text{data from old methodology} \times \text{delta}]$$

¹ In the fall of 2006, SFPB identified a problem with a sensor measuring hot water Btu for the New Main facility in the ION system, which impacts the data for New Main hot water gas and hot water fuel oil. On June 14, 2007, EPA relocated this sensor, which EPA has since improved the reliability of New Main's hot water Btu data reported by the ION system. As a result of this hardware malfunction, parallel tracking of New Main hot water gas and fuel oil could not be performed until 4th quarter FY 2007.

² See footnote 1 above.

RESULTS OF PHASE II ADJUSTMENT

The impacts of the Phase II Adjustment of RTP's FY 2003-08 energy consumption data, which are presented below in Table 3 and Figures 1 and 2, show that EPA's old reporting methodology significantly underestimated energy consumption at the Agency's RTP facilities.

Table 3. Percent Change in Energy Intensity, FY 2008 Compared to FY 2003 Baseline (Old and New Methodology)

Facility	Old Methodology	New Methodology
New Main	-31.76%	-37.08%
NCC	-19.53%	-19.66%
Incinerator/Waste Handling	N/A	N/A
RTP (Total)	-23.25%	-28.58%
Agencywide	-13.65%	-17.52%

Figure 1. RTP (Total) FY 2003-08 Annual Energy Intensity (Old vs. New Methodology)

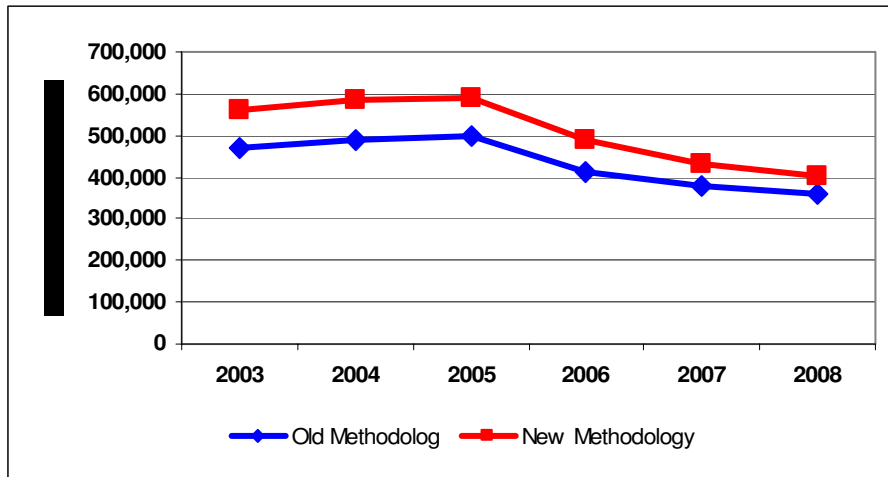
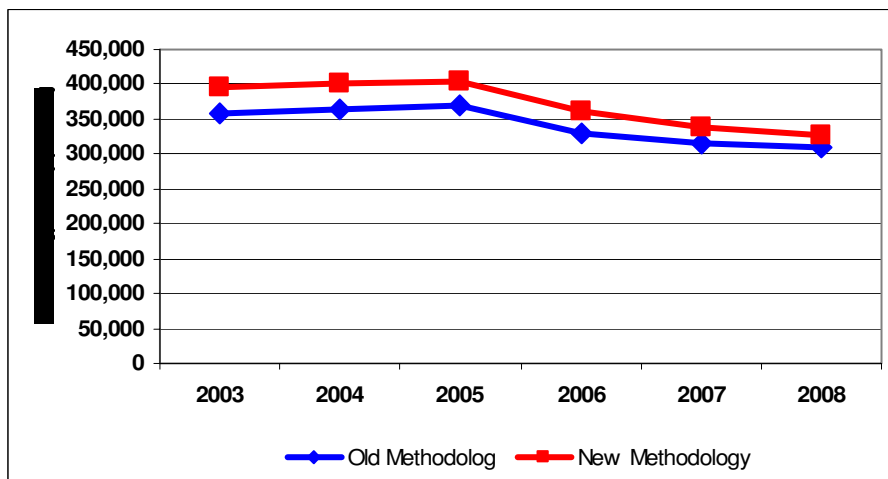


Figure 2. Agencywide FY 2003-08 Annual Energy Intensity (Old vs. New Methodology)



For more detail on EPA's adjusted FY 2003 baseline, see Appendix D.



Appendix D: EPA's Revised FY 2003 Energy Baseline

**For Submittal With EPA's
Energy Management and Conservation Program
FY 2008 Annual Report**

Appendix D - FY 2003 ENERGY DATA BASELINE WORKSHEET - EXISTING ON RECORD

Agency: EPA Prepared by: Luis Luna
 Date: 12/14/2007 Phone: 202-564-4600

EXECUTIVE ORDER 13123 REPORTING CATEGORIES

1-1. Standard Buildings/Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
Total Costs:			\$0.0	
Standard Buildings/Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!

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

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	133,543.2	\$7,844.1	455.6
Fuel Oil	Thou. Gal.	694.9	\$513.9	96.4
Natural Gas	Thou. Cubic Ft.	354,630.9	\$2,604.7	365.6
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	13.1	\$526.1	13.1
Other	BBtu	378.3	\$5,257.8	378.3
Total Costs:			\$16,764.8	1,310.0
Energy-Intensive Facilities (Thou. Gross Square Feet)		3,648.8	Btu/GSF:	359,020

1-3. Exempt Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
Total Costs:			\$0.0	0.0
Exempt Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!

ENERGY POLICY ACT 2005 REPORTING CATEGORIES

EPACT Goal-Subject Buildings/Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	133,543.2	\$7,844.1	455.6
Fuel Oil	Thou. Gal.	694.9	\$513.9	96.4
Natural Gas	Thou. Cubic Ft.	354,630.9	\$2,604.7	365.6
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	13.1	\$526.1	13.1
Other	BBtu	378.3	\$5,257.8	378.3
Total Costs:			\$16,764.8	1,310.0
EPACT Goal Buildings/Facilities (Thou. Gross Square Feet)		3,648.8	Btu/GSF:	359,020

EPACT Excluded Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
Total Costs:			\$0.0	0.0
EPACT Excluded Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!

ALL FACILITIES COMBINED

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	133,543.2	\$7,844.1	455.6
Fuel Oil	Thou. Gal.	694.9	\$513.9	96.4
Natural Gas	Thou. Cubic Ft.	354,630.9	\$2,604.7	365.6
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	13.1	\$526.1	13.1
Other	BBtu	378.3	\$5,257.8	378.3
Total Costs:			\$16,764.8	1,310.0
All Facilities (Thou. Gross Square Feet)		3,648.8	Btu/GSF:	359,020

Appendix D - FY 2003 ENERGY DATA BASELINE WORKSHEET - REVISED BASELINE

Agency: EPA Prepared by: Karen Murray
 Date: 12/31/2008 Phone: 202-564-2539

EXECUTIVE ORDER 13123 REPORTING CATEGORIES

1-1. Standard Buildings/Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
Total Costs:				0.0
Standard Buildings/Facilities (Thou. Gross Square Feet)			Btu/GSF:	#DIV/0!

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

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	133,543.2	\$7,844.1	455.6
Fuel Oil	Thou. Gal.	525.4	\$513.9	72.9
Natural Gas	Thou. Cubic Ft.	354,470.0	\$2,604.7	365.5
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	13.1	\$526.1	13.1
Other	BBtu	534.5	\$5,257.8	534.5
Total Costs:				1,442.5
Energy-Intensive Facilities (Thou. Gross Square Feet)			Btu/GSF:	395,520

1-3. Exempt Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
Total Costs:				0.0
Exempt Facilities (Thou. Gross Square Feet)			Btu/GSF:	#DIV/0!

ENERGY POLICY ACT 2005 REPORTING CATEGORIES

EPACT Goal-Subject Buildings/Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	133,543.2	\$7,844.1	455.6
Fuel Oil	Thou. Gal.	525.4	\$513.9	72.9
Natural Gas	Thou. Cubic Ft.	354,470.0	\$2,604.7	365.5
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	13.1	\$526.1	13.1
Other	BBtu	534.5	\$5,257.8	534.5
Total Costs:				1,442.5
EPACT Goal Buildings/Facilities (Thou. Gross Square Feet)			Btu/GSF:	395,520

EPACT Excluded Facilities

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
Total Costs:				0.0
EPACT Excluded Facilities (Thou. Gross Square Feet)			Btu/GSF:	#DIV/0!

ALL FACILITIES COMBINED

Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	133,543.2	\$7,844.1	455.6
Fuel Oil	Thou. Gal.	525.4	\$513.9	72.9
Natural Gas	Thou. Cubic Ft.	354,470.0	\$2,604.7	365.5
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	13.1	\$526.1	13.1
Other	BBtu	534.5	\$5,257.8	534.5
Total Costs:				1,442.5
All Facilities (Thou. Gross Square Feet)			Btu/GSF:	395,520



Appendix E: EPA Facility Inventory

**For Submittal With EPA's
Energy Management and Conservation Program
FY 2008 Annual Report**

APPENDIX E—EPA Act Goal Subject Building Inventory¹

Robert S. Kerr Environmental Research Laboratory
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: Rick Pittman

Science and Ecosystem Support Division Laboratory
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: Primo Knight

Willamette Research Station
Corvallis, Oregon
Site Energy Manager: Primo Knight

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, utility expenses for those facilities are paid by GSA.

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: Craig Greenwell

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: L.C. Miner

Kansas City Science and 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: Hayden Hardie

Region 10 Laboratory
Manchester, Washington
Site Energy Manager: Linda Donahue

National Air and Radiation Environmental Laboratory
Montgomery, Alabama
Site Energy Manager: Mike Clark

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: Primo Knight

New Consolidated Facility
Research Triangle Park, North Carolina
Site Energy Manager: Sam Pagan

New Computer Center
Research Triangle Park, North Carolina
Site Energy Manager: Sam Pagan

National Health and Environmental Effects Research Laboratory
Research Triangle Park, North Carolina
Site Energy Manager: Sam Pagan

Human Studies Facility
Research Triangle Park (Chapel Hill), North Carolina
Site Energy Manager: Sam Pagan

New Page Road
Research Triangle Park, North Carolina
Site Energy Manager: Sam Pagan

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

