



# ENERGY MANAGEMENT AND CONSERVATION PROGRAM

## FISCAL YEAR 2009 ANNUAL REPORT







UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

DEC 30 2009

OFFICE OF  
ADMINISTRATION  
AND RESOURCES  
MANAGEMENT

Mr. Richard Kidd, Director  
Federal Energy Management Program  
U.S. Department of Energy  
1000 Independence Avenue SW  
Washington, DC 20585

Dear Mr. Kidd:

Enclosed, as required, is the Environmental Protection Agency's (EPA) FY 2009 Energy and Conservation Program Report. EPA looks forward to continuing its progress and efforts to improve the environmental performance of its facilities and operations.

If you have any questions regarding this report, please feel free to contact Bridget Shea, Director, Facilities Management and Services Division at 202-564-2030.

Sincerely,

A handwritten signature in cursive script, appearing to read "Craig E. Hooks".

Craig E. Hooks  
EPA Senior Sustainability Officer  
Assistant Administrator for  
Administration and Resources Management

Enclosure



# **U.S. ENVIRONMENTAL PROTECTION AGENCY**

## **ENERGY MANAGEMENT AND CONSERVATION PROGRAM**

### **FY 2009 ANNUAL REPORT**

**THIS PAGE INTENTIONALLY BLANK**

## **FY 2009 HIGHLIGHTS**

The U.S. Environmental Protection Agency (EPA) has consistently demonstrated leadership among federal agencies in the challenge to reduce its environmental footprint and promote environmental stewardship. In October 2009, EPA was honored to receive a Presidential Award for Leadership in Federal Energy Management, one of only five federal agencies chosen, recognizing the Agency's long-term and consistent success and leadership in energy and water conservation, green power, green buildings, environmental stewardship, and the improved environmental performance of its fleet.

In fiscal year (FY) 2009, EPA focused on meeting new federal requirements contained in the Energy Independence and Security Act of 2007 (EISA) and new green building goals associated with existing Executive Orders (E.O.s).

### **Energy Conservation**

In FY 2009, EPA continued to exceed federal energy conservation requirements, though energy use did not change significantly this fiscal year. The Agency's overall energy intensity reported in FY 2009 was 18.1 percent lower than its FY 2003 baseline intensity. EPA was required to reduce its energy intensity by 12 percent. When green power purchases and source energy savings credits are taken into account, the Agency actually reduced its energy intensity 24.4 percent from the FY 2003 baseline.

At the end of FY 2009, EPA awarded a construction contract for Phase III of the Infrastructure Replacement Project at EPA's second largest laboratory, the Andrew W. Breidenbach Environmental Research Center (AWBERC) in Cincinnati, Ohio. EPA also contracted for the design contract of a heat recovery system for its largest laboratory, New Main in Research Triangle Park (RTP), North Carolina, which should reduce energy use at that facility by 7 to 9 percent when construction is completed in FY 2011. EPA achieved a 4.9 percent reduction in energy intensity at RTP New Main in FY 2009, which had a significant positive impact on EPA's overall energy performance.

### **EISA Energy and Water Assessments**

In FY 2009, EPA conducted the first round of EISA-mandated energy and water audits and re-commissioning evaluations at six facilities: New Main, National Computer Center (NCC), and the Human Studies Laboratory, all in RTP, North Carolina; AWBERC and Annex 2 in Cincinnati, Ohio; and the Mid-Continent Ecology Division Laboratory in Duluth, Minnesota.

### **Advanced Metering**

By the end of FY 2009, EPA was capturing more than 45 percent of its Agencywide energy consumption through advanced metering hardware. EPA began commissioning a new version of its national advanced metering software system in August 2009.

### **Green Power Purchases**

In FY 2009, EPA continued purchasing enough green power to offset 100 percent of its Agencywide electricity use via delivered green power and renewable energy certificates (RECs). Two new contracts signed in 2009 ensure that EPA will purchase enough green power to offset 100 percent of its electricity use through March 2010.

## National Onsite Renewable Energy Study

In September 2009, EPA completed a feasibility study on the potential for onsite renewable energy projects at all owned laboratories. The study reviewed solar, wind, and geothermal potential at each laboratory to identify the projects with the highest potential. The study concluded that EPA could meet 9.8 percent of its energy needs through renewables at a cost of \$115 million.

## Greenhouse Gas (GHG) Emissions Inventory and Reductions

EPA improved the scope and detail of its Scope 1 and Scope 2 GHG emissions inventory in FY 2009. This work gives the Agency a tremendous lead in implementing the GHG-related requirements of E.O. 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, issued October 5, 2009.

EPA estimated its FY 2003 Scope 1 and 2 GHG emissions to be 155,472 MTCO<sub>2</sub>e. As a direct result of Agencywide energy efficiency improvements, these emissions in FY 2009 totaled 139,943 MTCO<sub>2</sub>e—a reduction of 15,528 MTCO<sub>2</sub>e, or approximately 10 percent. Under the Climate Leaders' reporting methodology, EPA's purchases of green power and RECs enable it to adjust its total Scope 1 and 2 GHG emissions to 139,201 MTCO<sub>2</sub>e in FY 2003 and to 53,903 MTCO<sub>2</sub>e in FY 2009. These data indicate that EPA has reduced its net Scope 1 and 2 GHG emissions by 85,298 MTCO<sub>2</sub>e, or approximately 61 percent, since FY 2003.

## Green Buildings

In FY 2009, EPA obtained the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED<sup>®</sup>) certification for New Construction (NC) for two new facilities, and LEED certification for Existing Buildings (EB) for two buildings. EPA received the ENERGY STAR<sup>®</sup> label for several facilities in FY 2009 as well. EPA extensively strengthened its GreenCheck process in FY 2009 and completed GreenChecks for all major construction, renovation, and leasing projects. The Agency also made significant updates to its Architecture and Engineering (A/E) Guidelines and its Best Practice Environmental Lease Provisions.

The Agency submitted an improved *Sustainable Building Implementation Plan* to the Office of Management and Budget (OMB) in August 2009 and a more detailed *Strategy for Meeting the Guiding Principles in 15 Percent of Existing Buildings by Fiscal Year 2015* in December 2009. Based on guidance from OMB and the Office of the Federal Environmental Executive (OFEE), EPA also performed sustainable building assessments at six facilities in FY 2009.

## Water Reductions

In FY 2009, EPA reduced its water intensity by 10.8 percent relative to FY 2007. This exceeds the 4 percent reduction required over that time period by E.O. 13423 by a wide margin.

## Recycling

Under the umbrella of the "Strive for 45" initiative, EPA reinvigorated and improved its recycling programs and waste diversion practices across Agency facilities in FY 2009. Based on available data for FY 2008, the Agency met and exceeded its 45 percent goal with an estimated waste diversion rate of 47 percent Agencywide. The "Strive for 45" initiative included a six-month waste reduction competition among EPA facilities. Participating facilities achieved a cumulative waste diversion rate of 66 percent.



## **Executive Order 13514**

E.O. 13514 extends requirements of previous executive orders and introduces new requirements regarding GHG emissions inventories and reductions. Based on the firm foundation EPA has in energy conservation, water conservation, green buildings, GHG emissions accounting, green power, and other work, EPA is well prepared to face the significant challenges of this new Executive Order.

**THIS PAGE INTENTIONALLY BLANK**

# CONTENTS

Management.....	9
Awards and Incentives.....	9
Performance Evaluations, Training, and Education.....	9
Energy Efficiency Performance.....	11
Renewable Energy and Green Power.....	12
Onsite Renewable Energy Study.....	12
Water Conservation.....	13
Advanced Metering .....	13
Federal Building Energy Efficiency Standards.....	14
High Performance Sustainable Buildings (HPSB).....	14
Implementation Highlights.....	16
Life-Cycle Cost Analysis .....	16
Energy .....	16
Energy Retrofits and Capital Improvements .....	19
ESPCs Provide New Ideas.....	20
Water.....	21
ENERGY STAR.....	23
Sustainable Building Design and High Performance Buildings .....	24
Energy Efficiency/Sustainable Design in Lease Provisions .....	26
Distributed Generation.....	27
Greenhouse Gas Emissions Inventory.....	28
Stormwater Management.....	30
Recycling and Pollution Prevention .....	31
Education for Others .....	32
FY 2009 Energy Management Data Report .....	Appendix A
Source Energy Reductions Credit Calculations.....	Appendix B
FY 2003 Energy Baseline Revision .....	Appendix C
FY 2007 Water Baseline Revision and Summary of Revision to EPA’s Methodology for Reporting Water Consumption .....	Appendix D
Summary of EPA Scope 1 and 2 GHG Emissions .....	Appendix E
Facility Inventory .....	Appendix F
Sustainability Champion Winners.....	Appendix G
Projects Which Filed Fully Completed GreenCheck Forms in FY 2009 .....	Appendix H
National Onsite Renewable Energy Study .....	Appendix I

**THIS PAGE INTENTIONALLY BLANK**

## **MANAGEMENT**

The U.S. Environmental Protection Agency (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 (OARM), Craig Hooks, serves as the Agency's environmental executive and delineates responsibility for implementing sustainable principles throughout EPA's operations. The Office of Administration's (OA), 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 OA's Architecture, Engineering, and Asset Management Branch (AEAMB) and the Safety, Health, and Environmental Management Division (SHEMD) in acquiring and maintaining high-performance, sustainable buildings. Training, education, awards, and incentives encourage an ongoing commitment to efficiency throughout the Agency, while guidelines for project management and commissioning ensure ongoing adherence.

### **Awards and Incentives**

Each year, EPA recognizes and applauds its employees' commitment to energy reduction and sustainability goals through incentive programs, including awards. The Agency's internal "Sustainability Champion" awards recognize facilities and staff annually to honor their efforts in energy efficiency, water conservation, sustainable buildings, green landscaping, pollution prevention, and other environmental achievements. During the national Energy and Facilities Workshop in May 2009, EPA distributed awards in 10 different categories to recognize facility managers, building design/maintenance personnel, and other EPA staff who have demonstrated exceptional efforts and achievement in facility sustainability. (See Appendix G for a complete list of award recipients.)

In addition to internal awards, EPA actively participates in the White House Closing the Circle (CTC) Awards, the Department of Energy's (DOE's) Federal Energy and Water Management Awards and Presidential Awards for Leadership in Federal Energy Management, and other opportunities for professional recognition. In October 2009, EPA was presented a Presidential Award for Leadership in Federal Energy Management by the White House Council on Environmental Quality (CEQ) for overall agency performance toward Executive Order (E.O.) 13423 goals for energy, environmental stewardship, and transportation management. EPA was among five agencies selected for superior performance on the Office of Management and Budget (OMB) Environmental Management Scorecards. EPA also received a Federal Energy and Water Management Award for its leadership in water conservation at its New Main laboratory in Research Triangle Park (RTP), North Carolina. Also in FY 2009, EPA's Region 8 office in Denver, Colorado, received CTC Awards for its Environmental Management System (EMS) and for its electronics stewardship activities. The Agency also received an honorable mention for the EMS at its Region 7 office in Kansas City, Kansas.

### **Performance Evaluations, Training, and Education**

Senior managers and other key staff are held responsible for meeting sustainability goals through annual performance reviews and other venues.

EPA uses a variety of venues, including workshops, conferences, an e-newsletter, and a Web site, to train its personnel, as well as personnel from other federal agencies.

## **Energy and Facilities Workshop**

In May 2009, EPA held a two-day training workshop in Cincinnati, Ohio. A total of 75 EPA employees attended, including national facility managers from each of the Agency's regions. The presentations, which were made available for review on EPA's intranet after the workshop, covered many topics of interest, including Energy Independence and Security Act of 2007 (EISA) requirements, advanced metering, stormwater management, efforts to green EPA's fleet, the Agency's greenhouse gas (GHG) inventory, and water conservation. The workshop helped facility energy managers meet EISA training requirements and learn from each other about important sustainability issues. Attendees also toured EPA's newest facility to receive the Leadership in Energy and Environmental Design (LEED) for New Construction (NC) Gold certification, Research Annex 2 at the Andrew W. Breidenbach Environmental Research Center (AWBERC) in Cincinnati, Ohio, and attended a construction site tour of Phase II of AWBERC's Infrastructure Replacement Project (IRP). This multi-phased project to replace the 35-year-old mechanical system at AWBERC is EPA's largest energy project currently under construction. AWBERC is EPA's second largest laboratory.

## **Laboratories for the 21<sup>st</sup> Century**

Laboratories for the 21<sup>st</sup> Century (Labs21) is the premiere program and conference for energy-efficient and sustainable laboratory design in the United States. The Labs21 Annual Conference includes in-depth technical discussions on issues faced by laboratory owners, users, designers, and builders, including mechanical systems configurations, controls, commissioning, operations and maintenance (O&M), and other sustainability issues. At the Labs21 Conference, senior professionals in the field can share lessons learned and focus on current issues and new opportunities in laboratory sustainability. In September 2009, 24 EPA facilities staff members attended and/or presented at the conference. Labs21 educational efforts are jointly sponsored by EPA, DOE, and the International Institute for Sustainable Laboratories (I<sup>2</sup>SL), the nonfederal conference co-sponsor.

## **GovEnergy/Federal Environmental Summit (FES) East**

GovEnergy, an annual energy training conference for federal energy managers, took place in Providence, Rhode Island, in August 2009. The Federal Environmental Summit (FES), now known as GreenGov, is an annual training conference for a wide range of federal sustainability issues, including energy and water conservation, green buildings, GHG accounting, green procurement, and green fleets. FES East took place in Bethesda, Maryland, in June 2009. EPA facilities staff were well represented at both conferences as attendees and/or presenters.

For more on EPA's participation in and assistance to federal environmental training efforts through Labs21, the GovEnergy Conference, and FES East/GreenGov, see page 33.

## ***Building Buzz***

In March 2009, EPA began distributing a monthly e-newsletter to its facilities personnel, *Building Buzz*. *Building Buzz* features news and updates about facility energy and water conservation projects; renewable energy projects and green power purchases; green building achievements (e.g., LEED<sup>®</sup> and ENERGY STAR<sup>®</sup>); awards won by EPA facilities and personnel; and other matters that are important to the Agency's sustainable facilities community. In addition, *Building Buzz* invites readers to submit questions or requests for future articles, promoting communication between Headquarters and field staff. *Building Buzz* reaches approximately 230 EPA employees, including facility managers, facility EMS coordinators, Headquarters staff, and contractors.

## Greening EPA Web Site

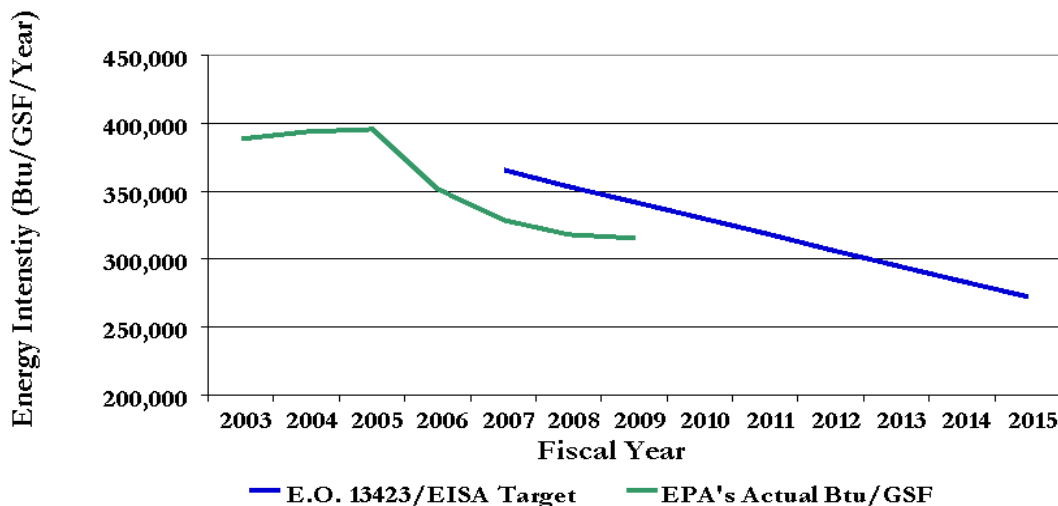
EPA's "Greening EPA" Web site ([www.epa.gov/greeningepa](http://www.epa.gov/greeningepa)) provides publicly accessible information on energy conservation, water conservation, green building processes and projects, green power and onsite renewable power, stormwater management, GHG emissions inventories, and other environmental stewardship activities. Frequently updated, Greening EPA serves as a practical resource for EPA staff, other federal agencies, and the public at large to learn how to reduce the environmental impact of facilities.

## ENERGY EFFICIENCY PERFORMANCE

### EPA Reduces Energy Use 18.1 Percent

In FY 2009, EPA greatly exceeded federal energy conservation requirements, though Agency energy use did not change significantly during the fiscal year. The Agency's overall energy intensity reported in FY 2009 was 318,050 British thermal units per gross square foot (Btu/GSF), 18.1 percent lower than its FY 2003 baseline intensity of 388,400 Btu/GSF<sup>1</sup>. To meet the requirements of EISA and E.O. 13423, EPA needed to reduce its energy intensity by 12 percent. When green power purchases and source energy savings credits are taken into account, the Agency actually reduced its reported energy 24.4 percent from the FY 2003 baseline (see Figure 1). Although the pace of energy reductions slowed significantly in FY 2009, EPA is still ahead of schedule for meeting its energy use reduction goals.

**Figure 1. EPA Energy Intensity Relative to E.O. 13423/EISA Goals**



EPA ended FY 2009 with the award of a construction contract for Phase III of the IRP at its AWBERC facility. This multi-year project should reduce energy use at this facility by more than 30 percent compared with a pre-project baseline. In addition, EPA contracted for the design of a heat recovery system at its RTP New Main facility. This project is expected to reduce RTP New Main's

<sup>1</sup> Verifications of conditioned gross square footage (GSF) at four facilities resulted in revised Agencywide GSF totals for EPA's reporting facilities, affecting the FY 2003 energy intensity baseline.

energy use by 7 to 9 percent when construction is completed in FY 2011. Another significant FY 2009 achievement was the 4.9 percent reduction in energy intensity at RTP's New Main campus, which contributed significantly to EPA's overall FY 2009 energy performance. The RTP campus is responsible for about one-third of the Agency's overall reportable energy use.

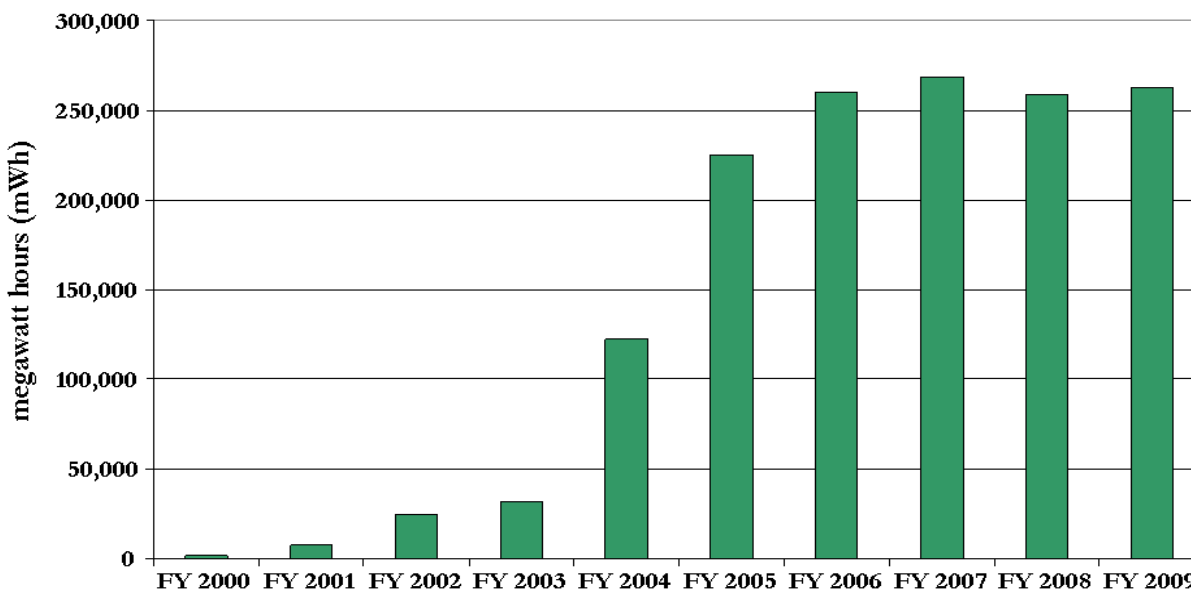
## Renewable Energy and Green Power

For more than a decade, EPA has been a leader among federal agencies in supporting the renewable energy market through its green power purchasing program. In FY 2009, EPA continued offsetting 100 percent of its Agencywide electricity use with delivered green power and renewable energy certificates (RECs). EPA also conducted a feasibility study on the potential for onsite renewable energy projects at facilities it owns.

### New Green Power Contracts Signed

In March 2009, EPA signed a blanket contract to purchase 69 million kilowatt hours (kWh) of green power RECs. Combined with eight existing contracts providing more than 193 million kWh of RECs and delivered green power to facilities in FY 2009, this purchase allowed the Agency to continue offsetting 100 percent of Agencywide electricity consumption through the end of FY 2009. To take advantage of unusually low REC prices, EPA finalized an additional contract for 130 million kWh of RECs in June 2009, which ensures that EPA will offset 100 percent of Agencywide electricity use through March 2010. For a history of EPA's green power purchases see Figure 2.

**Figure 2. EPA's Electricity Consumption Offset by Green Power**



### Onsite Renewable Energy Study

In January 2009, EPA commissioned a feasibility study of potential onsite renewable projects across its laboratory network. The study, completed in September 2009, evaluated solar, wind, and ground source heat pump projects and concluded that, based on FY 2008 data, EPA could generate 9.8 percent of its energy needs through onsite renewables at an estimated cost of \$115 million. It also confirmed that ground source heat pump systems are the most economical renewable technology to



reduce energy use and reduce fossil fuel use at EPA facilities. See page 27 for more information on the study.

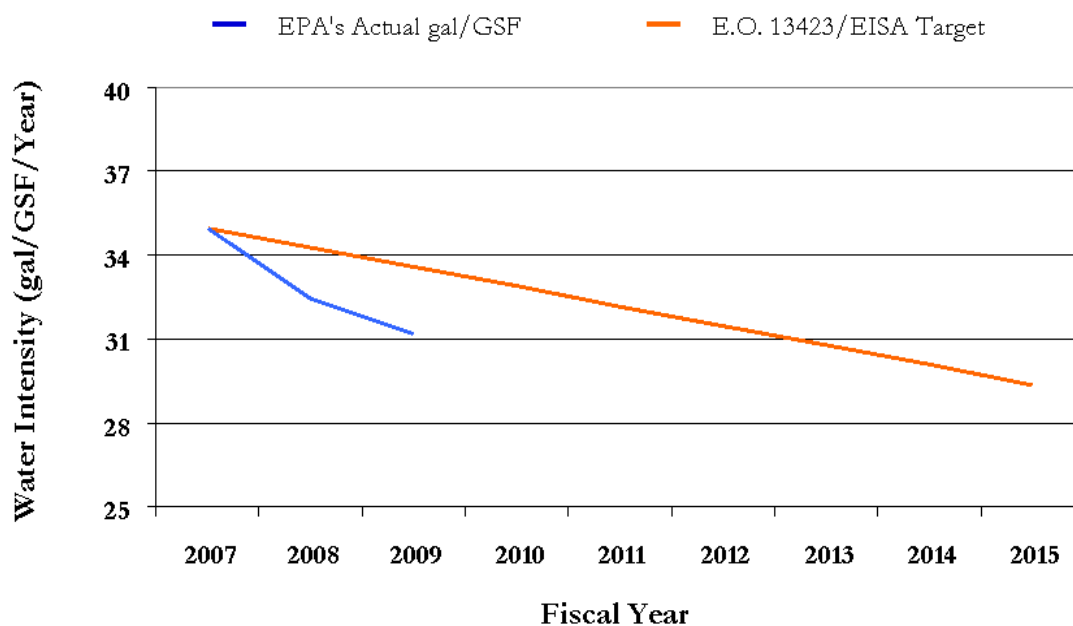
## Water Conservation

### Results

EPA has focused on water conservation for many years, long before E.O.13423 required 2 percent annual reductions in water use. The Agency reduced its water use by 11 percent between FY 2000 and FY 2007. For E.O. 13423 reporting purposes, EPA's FY 2007 baseline was a low 35.0 gallons per square foot. Despite this challenge, EPA reduced its FY 2009 water intensity by 10.8 percent relative to FY 2007 (see Figure 3), surpassing the 4 percent reduction required under that period of time by a wide margin. Water conservation efforts in FY 2009, directed by the Agency's Water Conservation Strategy, focused on four areas:

- Landscape irrigation elimination, system size reduction, repairs and improvements.
- Air handler condensate recovery and cooling tower water supply systems.
- Elimination of single-pass cooling.
- Faucet replacements or retrofits.

**Figure 3. EPA Water Intensity Relative to E.O. 13423/EISA Goals**



### Advanced Metering

Consistent with EPA's pursuit of federal leadership, EPA's advanced metering strategy calls for the implementation of advanced metering for *all* energy utilities and domestic water where it is cost-effective to do so. This strategy enables EPA to be well-positioned to exceed the advanced metering requirements included in the Energy Policy Act of 2005 (EPAct 2005) and EISA, which require advanced metering for electricity, steam, and natural gas. The Agency accomplished a number of significant milestones in FY 2009, including:

- *Hardware Installation and Integration at the Agency's Two Largest Campuses:* In December 2005, EPA completed the installation of a Web-based advanced metering system for its primary research campus in RTP, North Carolina. This initial advanced metering system allowed EPA to capture approximately 33 percent of its Agencywide energy consumption with advanced metering hardware. Also in October 2008, EPA completed the installation of advanced electric and natural gas meters at AWBERC in Cincinnati, Ohio—the Agency's second largest energy-consuming facility, which represents more than 12 percent of the Agency's reportable energy use. By the end of FY 2009, EPA captured more than 45 percent of its Agencywide energy consumption with advanced metering hardware.
- *Hardware Design at Additional Facilities:* In FY 2009, EPA initiated the design phase for new advanced metering hardware at six laboratory facilities and two support buildings: the Environmental Science Center in Fort Meade, Maryland; the New England Regional Laboratory in Chelmsford, Massachusetts; AWBERC, the Testing and Evaluation Center, and Center Hill Facility in Cincinnati, Ohio; the Human Studies Facility in Chapel Hill, North Carolina; and the First Environments Early Learning Center and Page Road Warehouse in RTP, North Carolina. EPA plans to award and complete the construction of advanced metering hardware at these eight facilities in FY 2010. With five additional laboratory advanced metering installations planned for design and construction by the end of FY 2010, EPA anticipates capturing nearly 76 percent of its Agencywide energy consumption with advanced metering hardware.
- *Site-Specific Advanced Metering Implementation Plans:* EPA's advanced metering team completed six site visits in FY 2009. These visits, which evaluate the technical feasibility and cost-effectiveness of advanced utility metering at each reporting facility and serve as the basis for the design and installation of new advanced metering hardware, will allow completion of the last of 34 site-specific metering plans.
- *National Advanced Metering Software System:* EPA ended FY 2008 by issuing a beta version of a national advanced metering software system, which is designed to compile the Agency's advanced metering data and provide a Web-based, user-friendly interface for streamlined data analysis and reporting. EPA spent FY 2009 refining the capabilities of the software system and released an updated version of the software at the end of July 2009. Comprehensive, third-party commissioning of the July 30, 2009, version of the software system began in August 2009.

## **Federal Building Energy Efficiency Standards**

No new designs for buildings owned by EPA have been started since the beginning of FY 2007. For new building designs and mechanical system projects that are initiated, EPA's GreenCheck process ensures they are reviewed for compliance with all federal requirements, including EPCA 2005's requirement that they be designed to achieve energy consumption levels at least 30 percent below the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) standard as long as it is life-cycle cost-effective. For more information on GreenCheck, see page 25, and for more information on EPA's life-cycle cost analysis of a multi-phase laboratory design project, see page 16.

## **High Performance Sustainable Buildings (HPSB)**

### **5.3 Percent of EPA Buildings Meet HPSB Standards**

Because of its historic commitment to green buildings, in FY 2009 EPA occupied nine LEED-NC Gold or Silver certified buildings and two LEED for Existing Buildings (EB) Gold certified

buildings. In December 2009, EPA will complete moving its Region 1 office into the General Services Administration's (GSA's) historic, and recently renovated, McCormack Post Office and Courthouse building in Boston, Massachusetts, which is expected to achieve LEED-NC Silver certification.

EPA requires that all new construction and major renovation projects strive to achieve LEED-NC Gold or LEED-EB: Operations and Maintenance Gold certification whenever possible, with a minimum certification of LEED-NC or LEED-EB Silver required.

The Agency's FY 2009 progress toward achieving green building certifications for newly constructed, newly leased, or newly occupied EPA facilities is detailed in Table 1.

<b>Table 1. Green Building Certification Activity in FY 2009</b>		
<i><b>Facility</b></i>	<i><b>Location</b></i>	<i><b>Certification</b></i>
Computational and Geospatial Sciences Building. Occupancy January 2008.	Gulf Breeze, Florida EPA-Owned	LEED-NC 2.2 Silver received April 2009.
Boston Regional Office. Move-in completed Dec 14, 2009.	Boston, Massachusetts GSA-Owned	LEED-NC 2.2 Silver expected in FY 2010.
AWBERC Annex 2. Occupancy July 2007.	Cincinnati, Ohio EPA-Owned	LEED-NC 2.1/2.2 Gold received December 2008.
Seattle Regional Office (Existing)	Seattle, Washington GSA-Leased	LEED-EB 2.0 Platinum expected in FY 2010.
Seattle Regional Office (New)	Seattle, Washington (Procurement Underway)	Procurement documents require a minimum LEED-NC or LEED-EB Silver. EPA strives for Gold-level certification.
San Francisco Regional Office (Existing)	San Francisco, California GSA-Leased	LEED-EB 2.0 Gold received in FY 2009.
San Francisco Regional Office (New)	San Francisco, California (Procurement Underway)	Procurement documents require a minimum LEED-NC or LEED-EB Silver. EPA strives for Gold-level certification.
Kansas City Regional Office (New)	Kansas City, Kansas (Procurement Underway)	Procurement documents require a minimum LEED-NC or LEED-EB Silver. EPA strives for Gold-level certification.

Using the Federal Real Property Profile (FRPP) inventory of EPA-owned and direct lease buildings, 5.3 percent of EPA-owned buildings greater than 5,000 square feet (as specified in E.O. 13514) meet the Guiding Principles for High Performance Sustainable Buildings. Using the broader measure of

EPA-owned and EPA-occupied buildings (which includes GSA-owned/EPA-occupied and GSA-leased/EPA-occupied buildings) 12.8 percent of EPA's full inventory meets the Guiding Principles for High Performance Sustainable Buildings.

## **IMPLEMENTATION HIGHLIGHTS**

Having made a number of improvements to its most energy-intensive facilities over the past few years, in FY 2009 EPA focused on identifying more energy and water improvement projects to include in its projects pipeline. Moving forward, the Agency will continue to expand its energy and water efficiency project portfolio with projects identified in master plans, from EISA assessments, and through continuous commissioning.

### **Life-Cycle Cost Analysis**

To ensure the life-cycle cost-effectiveness of EPA's efforts to achieve laboratory energy performance that is 30 percent better than the ASHRAE 90.1.2007 standard, the Agency conducts lifecycle cost analysis through energy modeling.

At the end of FY 2009, EPA initiated an energy modeling study as part of its initial design efforts for a new laboratory in Houston, Texas. A contractor is simulating a hypothetical laboratory concept with engineering criteria designed to meet the ASHRAE standard, then simulating a system designed to perform 30 percent or higher than the standard. The study will compare the construction cost differences and life-cycle costs of both concepts. The energy modeling will be completed in the first phase of design to ensure that the facility is energy efficient and effective.

In addition, EPA is currently reviewing energy modeling results for its next long-term IRP, planned for the Western Ecology Division laboratory in Corvallis, Oregon. Again, EPA is using energy modeling to confirm compliance with federal building energy efficiency standards (30 percent better than ASHRAE 90.1) and to evaluate the life-cycle costs of various mechanical system design approaches.

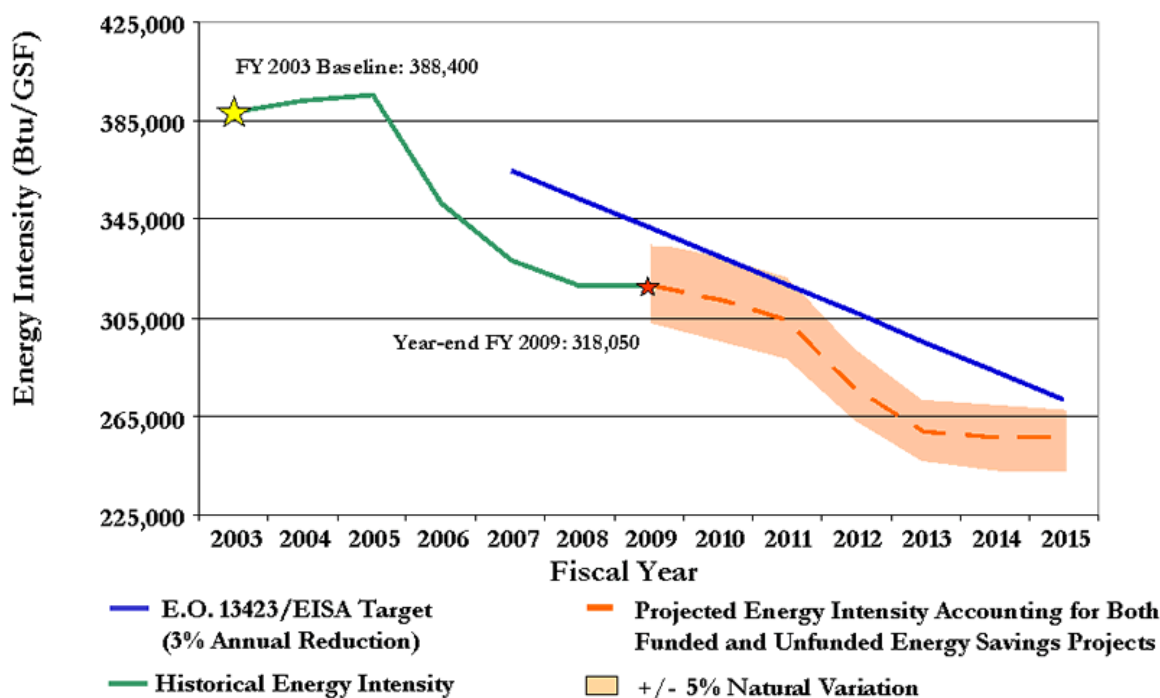
## **Energy**

### **Energy Strategic Plan/Energy Forecasting**

Since FY 2002, EPA has developed energy forecasts to determine if its proposed energy projects, their timing, and their energy savings meet the energy use reductions required by legislation and various executive orders. The Agency's energy forecast also includes estimated energy project cost and is used to ensure that adequate project funding is available. In updating the energy forecast in FY 2009, the Agency focused on adding projects identified in the EISA-mandated energy audits and re-commissioning efforts, as well as updating project cost and implementation timelines. Continuing a practice begun in FY 2007, EPA set facility-specific, tailored annual energy-reduction targets for each reporting facility based on the Agency's Energy Strategic Plan and used these targets to evaluate performance for the remainder of FY 2009.

EPA anticipates significant reductions in its energy intensity in the coming years, due to projects already planned (see Figure 4).

Figure 4. EPA Average Energy Intensity, FY 2003 to FY 2015, Projected<sup>2</sup>



## EISA Section 432 Implementation

In December 2008, per the requirements of EISA Section 432, EPA designated its “covered facilities” and named energy managers for each. EPA surveyed facility managers about professional energy management training completed and identified additional training opportunities to ensure effective facility energy management throughout EPA. The Agency also established an internal policy that it would treat all facilities as if they were covered facilities, though EISA only requires facilities representing 75 percent of energy use be designated as covered.

EISA Section 432 also requires that each federal agency conduct energy audits at and re-commission 25 percent of its covered facilities annually and return to those facilities for energy audits and re-commissioning quadrennally. In FY 2009, during its first round of EISA-mandated energy audits and re-commissioning, EPA focused on six facilities: New Main and the National Computer Center (NCC) in RTP, North Carolina; the Human Studies Facility in Chapel Hill, North Carolina; AWBERC and Annex 2 in Cincinnati, Ohio; and the Mid-Continent Ecology Division (MED) laboratory in Duluth, Minnesota. The combined energy use at these facilities represented approximately 29 percent of the total energy use of EPA’s covered facilities based on FY 2008 data.

The Agency collected information on potential energy conservation measures from these assessments and compiled the associated implementation cost, estimated annual energy savings, and estimated annual cost savings in a comprehensive report submitted to the Federal Energy Management Program (FEMP) on June 30, 2009. These findings were also used to update and expand EPA’s Energy Strategic Plan and energy forecast:

- *MED Laboratory—Duluth, Minnesota:* In June 2009, EPA identified several opportunities for energy savings, such as reducing the supply air temperature and decreasing the air flow rate in

<sup>2</sup> The projection in this chart assumes full funding of EPA energy conservation projects.

one of the facility's largest air handling units (AHUs). Re-commissioning focused on optimizing the performance of the laboratory ventilation systems and minimizing air flow during unoccupied periods.

- *New Main—RTP, North Carolina:* EPA conducted a detailed energy study of a heat recovery system for three of the four major laboratory wings to meet EISA energy audit requirements. EPA also evaluated the performance of its re-commissioning of laboratory ventilation systems completed in 2007. As part of this effort, the Agency conducted a system operating mode test (SOMT) on major portions of the facility in April 2009. EPA analyzed actual occupied and unoccupied flow in several buildings and identified measurement errors and O&M issues, particularly with variable air volume (VAV) air distribution and ventilation systems. EPA used the results of the SOMT to more accurately assess the changes in the facility's O&M procedures required to maintain optimum system performance. EPA also examined air flow set-point optimization on the sixth floor of the C Tower, an office building, and modified heating, ventilation, and air conditioning (HVAC) equipment to more efficiently condition the space. EPA will apply the findings of this pilot re-commissioning project to the remaining floors with similar layout at this building.
- *NCC—RTP, North Carolina:* A data center energy efficiency study DOE performed in FY 2008 identified energy conservation measures that could avoid more than \$100,000 in energy cost with an average payback period of 0.8 years (e.g., consolidating activities to reduce air conditioning needs in unoccupied space). EPA initiated a commissioning report for NCC in FY 2009 as well.
- *Human Studies Laboratory—Chapel Hill, North Carolina:* An energy study explored options for the long-term replacement of this facility's old and inefficient constant-volume HVAC system, as well as short-term opportunities to conserve energy. Potential projects include manifolded fume hoods, upgrading from constant volume conventional fume hoods to VAV high-performance fume hoods, upgrading the facility's building automation system (BAS), and installing variable fan drivers (VFDs) in the facility's AHUs. EPA initiated a commissioning report for Human Studies in FY 2009 as well.
- *AWBERC—Cincinnati, Ohio:* The Cincinnati Energy Master Plan and associated energy modeling served as the basis for design of Phase I of AWBERC's multi-year IRP. Construction, initial commissioning, and the commissioning report of Phase I was completed in February 2009.
- *AWBERC Annex 2—Cincinnati, Ohio:* Completing construction and commissioning of AWBERC's Annex 2 and achieving LEED-NC Gold certification produced the documents necessary to meet EISA requirements for an energy audit and commissioning.

EPA began its second round of EISA energy audits and re-commissioning in Fall 2009. For FY 2010, the Agency plans to perform energy audits on and re-commissioning of facilities in Ann Arbor, Michigan; Athens, Georgia (Office of Research and Development); Chelmsford, Massachusetts; Fort Meade, Maryland; Gulf Breeze, Florida; Kansas City, Kansas; Montgomery, Alabama; Narragansett, Rhode Island; and additional portions of AWBERC and RTP's New Main complex. These assessments collectively represent nearly 27 percent of the energy use of EPA's covered facilities, based on FY 2008 data.

EPA sees the quadrennial re-commissioning requirements contained in EISA as an opportunity to help it dramatically improve its facility operations and as an important step in moving toward continuous commissioning.

## Energy Retrofits and Capital Improvements

### Ongoing Energy Projects

Although EPA focused in FY 2009 on meeting EISA reporting requirements, the Agency's existing energy efficiency efforts have yielded great results, as summarized in Table 2 and as described in further detail below.

<b>Table 2. Energy Conservation Projects Underway or Completed</b>			
<i>Facility</i>	<i>Location</i>	<i>Improvements</i>	<i>Savings</i>
<i>AWBERC</i>	<i>Cincinnati, OH</i>	Continued with IRP.	Once the IRP is complete, EPA projects energy reduction of more than 30 percent compared to the pre-renovation baseline, and avoided energy costs of \$800,000 per year in (total) utilities.
<i>Large Lakes Research Station</i>	<i>Grosse Ile, MI</i>	Upgraded heating system central plant.	FY 2009 energy intensity was down 13 percent compared to FY 2008, and 26.6 percent compared to FY 2003 baseline.
<i>New Main</i>	<i>RTP, NC</i>	Rejected energy saving performance contract (ESPC) option as uneconomic. Initiated conventional design and construction for heat recovery.	Once the heat recovery project is complete, EPA projects energy consumption savings of 9 percent compared to FY 2008.
<i>Reproductive Toxicology Facility (RTF)</i>	<i>RTP, NC</i>	Developed plans to vacate and transfer employees to RTP New Main.	After transfer to RTP New Main, EPA projects reducing energy 100 percent for a net savings of approximately 42,179 million Btu per year.
<i>Human Studies</i>	<i>Chapel Hill, NC</i>	Developed short- and long-term energy conservation measures. Began addressing many short-term projects.	After implementing all identified projects, energy intensity is expected to drop by 25.5 percent compared to a pre-implementation baseline.

- *AWBERC—Cincinnati, Ohio.* EPA continued work on the multi-year IRP at the Agency's second largest research laboratory, including: upgrading mechanical equipment such as fans, pumps, and motors to replace older, inefficient models; installing high-performance VAV fume hoods with automatic sash closers; manifolding laboratory exhaust systems; improving the air distribution system (including ductwork and AHUs); rezoning office and laboratory space to eliminate unnecessary one-pass air; and implementing a heat recovery system. EPA completed construction of Phase I in December 2008. Phase II is under construction, with completion expected in December 2009. EPA awarded contracts for the construction of Phase III and the design of Phase IV in August 2009. Once the entire renovation project is complete, EPA estimates that it will reduce AWBERC's energy consumption by more than 30 percent compared to the pre-renovation baseline and result in avoided energy costs of \$800,000 per year or more as energy costs continue to rise.

- *Large Lakes Research Station—Grosse Ile, Michigan:* In FY 2008, EPA initiated a heating system central plant upgrade. Completed in February 2009, the project included replacing two 34-year-old steam boilers and installing a new hot water boiler, circulating hot water pumps, condensate pump, expansion tank, and updated piping and controls in the boiler room. New controls were connected to the BAS. As a result, EPA reduced FY 2009 energy consumption at this facility by 13 percent compared to FY 2008, or 26.6 percent compared to the FY 2003 baseline.
- *New Main—RTP, North Carolina:* In late Spring 2009, EPA concluded that an ESPC for heat recovery in the RTP New Main facility was a poor value for the taxpayers and is now pursuing heat recovery at this facility under a conventional approach. In FY 2010, EPA will begin construction on glycol heat recovery systems for AHUs and exhaust fans. Once the project is complete, EPA anticipates an energy savings of 7 to 9 percent compared to FY 2008. EPA also revisited the laboratory re-commissioning effort that it completed in FY 2008 in order to determine the changes in the need for laboratory ventilation and to analyze opportunities for further reductions in air flow. Additional projects EPA initiated in FY 2009 include office re-commissioning and installing a connector pipe at the central utility plant (CUP) serving RTP New Main to increase the efficiency of the plant and reduce operating costs.
- *Reproductive Toxicology Facility (RTF)—RTP, North Carolina:* EPA is studying the consolidation of all personnel and research currently located at the RTF into RTP New Main. This consolidation will net absolute energy savings of approximately 42,179 million Btu per year, and an Agencywide GHG Scope 1 and Scope 2 emissions reduction of approximately 3 percent. Energy intensity at RTP New Main will rise slightly.
- *Human Studies Laboratory—Chapel Hill, North Carolina:* In FY 2009, EPA completed an energy study of short- and long-term energy conservation measures for its Human Studies laboratory in Chapel Hill, North Carolina, which the Agency leases from the University of North Carolina. The facility's HVAC system is a constant volume system, and its associated controls are outdated. In FY 2009, EPA began addressing many of the short-term projects, including assessing the performance of the facility's AHUs, making mechanical adjustments to the building's steam traps, and upgrading lighting controls. Implementation of long-term, major mechanical upgrades—including installing a full VAV air distribution system, replacing older fume hoods with high-performance models, manifolding the facility's exhaust system, and balancing air systems—will require a phased approach. Full implementation of all identified projects could result in a facility-wide energy use reduction of 35 percent.

## ESPCs Provide New Ideas

The Agency's first ESPC, completed in 2001 in Ann Arbor, Michigan, resulted in an initial 42 percent energy-use reduction, although the project has been revisited several times in an effort to maintain performance. EPA's second ESPC, completed in 2004, at the Robert S. Kerr Environmental Research Center in Ada, Oklahoma, led to the Agency's first carbon-neutral laboratory.

In FY 2008 and FY 2009, EPA spent considerable resources exploring an ESPC for a heat recovery project at its New Main facility in RTP, North Carolina. An energy savings company (ESCO) produced a conceptual design and a detailed energy study in Spring 2009. In June 2009, EPA chose not to pursue this ESPC because of high implementation costs. The Agency is now pursuing the project as a conventional design-bid-build project.



EPA pursued several other ESPCs in FY 2008 and FY 2009, but no interested vendors could be identified. Based on the Agency's recent efforts, ESPCs currently do not appear to be the best tool for improving performance at EPA's laboratories either because of the laboratories' small sizes, the complexity of their laboratory mechanical systems, and/or the need to finance complete replacements of their old and outdated mechanical systems. However, EPA will continue to evaluate potential ESPCs when appropriate and cost-effective, in addition to pursuing other means to increase energy efficiency.

## **Water**

### **Water Conservation Strategy**

Given EPA's successful water use reduction work between FY 2000 and FY 2007, the Agency had some concern regarding its ability to meet the water use reduction requirements of E.O. 13423. In early 2008, EPA collected all its water management plans (WMPs), listed the available water conservation strategies and projects, identified for each facility which water conservation opportunities remained, and calculated estimated water savings at each facility for each approach. This first comprehensive Water Conservation Strategy showed that EPA could, in fact, meet E.O. 13423's requirements, and it detailed priority projects and the strategies needed to achieve the new water use reductions. The strategy also identified short-term water conservation projects that could be accomplished while longer-term conservation strategies were being implemented. The strategy is designed to ensure that EPA meets or exceeds its 2-percent Agencywide water reduction target each year. To help implement the Water Conservation Strategy, EPA sets annual facility-specific water reduction targets to keep all of its facilities accountable for jointly meeting the Agency's annual goal.

Since it started in 2002, EPA has completed WMPs at all of its reporting facilities. The Agency uses the mandatory EISA water audits as an opportunity to update and improve each facility's WMP.

### **EISA Water Assessments Identify Improvements**

Per EISA requirements, in FY 2009 EPA completed water assessments to identify potential water projects at six facilities: AWBERC and the Child Development Center (CDC), both in Cincinnati, Ohio; the MED laboratory in Duluth, Minnesota; New Main and NCC in RTP; and the Human Studies Facility in Chapel Hill, North Carolina. EPA updated WMPs for these facilities to document their current major water-using processes and describe projects and water savings estimates identified during the assessments. The Agency reported the potential water-saving projects described in Table 3 from these assessments to FEMP on June 30, 2009, as required. The water assessments and updated WMPs are used by EPA to regularly update its Water Conservation Strategy. EPA and its facility managers are currently implementing or analyzing the water-saving projects described in Table 3 for feasibility and cost-effectiveness.

In FY 2009, EPA also signed WMPs for the Center Hill Facility and the Testing and Evaluation Center in Cincinnati, Ohio; the Science and Technology Center in Kansas City, Kansas; and the Environmental Science Center (ESC) in Fort Meade, Maryland. EPA assesses each of its facilities using FEMP's best management practice (BMP) areas for water efficiency. FEMP expanded from 10 to 14 BMPs in FY 2009, and EPA focuses on achieving BMP status in all 14 areas at each of its facilities. EPA has also developed its own laboratory-specific BMPs, which it uses in its water assessments.

**Table 3. Potential Water-Saving Projects From EISA Water Assessments**

<i>Facility</i>	<i>Potential Projects</i>	<i>Projected Savings (Approximate)</i>
<i>AWBERC Cincinnati</i>	Replace toilets and urinals with high-efficiency models.	2.2 million gallons per year.
	Retrofit steam sterilizers.	1.2 million gallons per year.
	Replace liquid-ring vacuum pump with dry system.	200,000 gallons per year.
	Replace tempering water sensor on the flash tank to only allow water flow when flash tank is discharging.	750,000 gallons per year.
	Capture air handler condensate and route it to the cooling tower as part of IRP.	1.4 million gallons per year.
	Eliminate single-pass cooling for an ice maker and a cold water booster pump.	600,000 gallons per year.
<i>MED Duluth</i>	Replace toilets and urinals with high-efficiency models.	320,000 gallons per year.
	Replace or retrofit faucets.	25,000 gallons per year.
	Replace ice maker that uses single-pass cooling.	280,000 gallons per year.
<i>New Main RTP</i>	Repair tempering water sensor on flash tank to only allow tempering water flow when the flash tank is discharging.	500,000 gallons per year.
	Replace urinals with high-efficiency models.	560,000 gallons per year.
	Take High Bay cooling tower offline.	1.9 million gallons per year.
	Construct an air handler condensate recovery system. More details are included on page 23.	8 million gallons per year.
<i>NCC, RTP</i>	Replace or retrofit faucets.	57,000 gallons per year.
<i>Human Studies Chapel Hill</i>	Replace or retrofit showerheads.	52,000 gallons per year.
	Replace toilets with dual-flush models and urinals with high-efficiency models.	240,000 gallons per year.
	Retrofit steam sterilizers.	240,000 gallons per year.

### **Water Conservation Retrofits and Capital Improvements**

In addition to setting the facility-specific water reduction targets described previously, EPA continued or completed several nationally important efforts in FY 2009:

- *Landscape Irrigation Reductions:* The Western Ecology Division laboratory in Corvallis, Oregon, and the Science and Ecosystem Support Division Laboratory (SESD) in Athens, Georgia, have

committed to planting native, drought-tolerant plants, practicing xeriscaping, and discontinuing use of irrigation systems. The Corvallis laboratory improvements alone are estimated to save 980,000 gallons of water per year.

- *Vacuum Pump Seal Projects:* AWBERC is in the process of replacing its liquid-ring vacuum pump. This project is expected to be completed in FY 2010 and is projected to save 200,000 gallons of water per year.
- *Condensate Recovery Systems:* EPA's New Main laboratory in RTP, North Carolina, generates up to 8 million gallons annually in condensate from air handling unit cooling coils. EPA is evaluating how RTP New Main can collect this condensate and route it to the cooling towers at the CUP that serves RTP New Main. (EPA does not own the CUP that provides New Main with chilled water). The study will evaluate the most economical approach to deliver the condensate to the CUP cooling towers either directly over land or by feeding it to a lake between the RTP New Main facility and the CUP cooling tower, then pumping the same amount of water from the lake. The ESC in Fort Meade, Maryland, also completed a project in June 2009 to capture air handler condensate and route it to a cooling tower. The initial engineering evaluation indicates that it may be possible to capture up to 660,000 gallons per year. This water will significantly offset the consumption of potable water for cooling tower make-up and avoid costs of approximately \$7,500 per year, offering a payback of less than one year.
- *Faucet Replacements or Retrofits:* Because high-efficiency faucets with a maximum rate of 0.5 gallons per minute (gpm) are well-suited for use in hand washing in office and laboratory restrooms and supported by the American Society of Mechanical Engineers (ASME) Standard A112.18.1-2005, EPA launched a program to replace or retrofit lavatory faucets in all of its facilities. Ten EPA facilities replaced or retrofitted their lavatory faucets in FY 2009, resulting in water savings of more than 170,000 gallons per year.
- *Toilets and Urinals Replacements:* AWBERC began replacing older toilets and urinals in its main building in FY 2009 with high-efficiency models and expects to complete restroom renovations in FY 2010, with a projected savings of 420,000 gallons of water per year. The remainder of the restrooms in the 10-story building will be renovated as funding is available, and are expected to save an additional 1.8 million gallons per year.
- *Eliminating Single-Pass Cooling:* At AWBERC, EPA identified an opportunity to eliminate single-pass cooling in the cold water booster pump used to maintain pressure on the domestic cold water supply system. This project has not been funded yet but is anticipated to save approximately 600,000 gallons of water annually. At NHEERL, EPA identified a project to eliminate the use of single-pass cooling in a laboratory electron microscope, which could save 530,000 gallons per year. Other projects to eliminate single-pass cooling have been identified at the Testing and Evaluation Center and the Center Hill Facility in Cincinnati, Ohio; the Large Lakes Research Station in Grosse Ile, Michigan; and at MED in Duluth, Minnesota.

## **ENERGY STAR**

In addition to requiring all new major office leases to obtain the ENERGY STAR<sup>®</sup> label for buildings after their first year of operation, EPA recently included a requirement in all new leases for major office buildings to achieve the ENERGY STAR label every three years. As a result of these requirements, EPA is close to achieving its goal of having all its regional office buildings be ENERGY STAR labeled. Currently, nine of 10 regional offices and EPA's Potomac Yard One Headquarters satellite building have achieved the ENERGY STAR building label (the ENERGY

STAR building labeling program does not cover laboratory facilities). Recent developments in ENERGY STAR labeling include:

- *EPA Headquarters—Arlington, Virginia*: A variety of energy-saving design features allowed Potomac Yard One, a privately owned building leased through GSA, to achieve the ENERGY STAR label in 2007 and again in October 2008. A highly reflective ENERGY STAR-qualified roof reduces the amount of solar heat absorbed by the building, decreasing the building's cooling load while minimizing the heat island effect of the building.
- *Region 7 Office—Kansas City, Kansas*: EPA's Region 7 office received the ENERGY STAR label in FY 2009, in part due to energy efficiency improvements from the installation of a small chiller that serves 24-hour-per-day loads and allows two large, main chillers to shut down as appropriate. Motion sensors control general lighting in the building while timers control the exterior lighting.

## **Sustainable Building Design and High Performance Buildings**

### **Sustainable Building Implementation Plan Updated**

In FY 2009, EPA continued to refine its Sustainable Building Implementation Plan (SBIP). The SBIP ensures that EPA takes the most efficient and effective path toward meeting E.O. 13423 and other federal sustainable building requirements. It outlines EPA's tools, processes, and procedures for implementing these requirements in its building projects, including the GreenCheck process (described below), green architecture and engineering firm requirements, mandatory commissioning, up-to-date Architecture and Engineering (A/E) Guidelines, continuously revised Best Practice Environmental Lease Provisions, and sustainable master planning.

On December 1, 2008, the Interagency Sustainability Working Group (ISWG) released an update of the *Guiding Principles for Sustainable New Construction and Major Renovations* and of the *Guiding Principles for Sustainable Existing Buildings*. EPA updated its SBIP in FY 2009 to reflect these new guiding principles and changes in previously released regulations, executive orders, and guidance. EPA submitted its required annual update to the Office of the Federal Environmental Executive (OFEE) in August 2009.

### **Strategy for 15 Percent of Existing Buildings Meeting the Guiding Principles by FY 2015**

EPA has implemented four main strategies to ensure that 15 percent of its existing buildings meet the high performance sustainable green building requirements by FY 2015:

1. Achieve third-party certification under a multi-attribute green building standard developed by an American National Standards Institute (ANSI)-accredited organization. EPA used this strategy to meet the Guiding Principles at four major buildings. To use this approach, a building had to be registered before October 1, 2008, and eventually certified. The U.S. Green Building Council (USGBC) LEED rating system is considered a multi-attribute standard, and the USGBC is an ANSI-accredited organization.
2. Ensure that all new facilities construction projects comply with the *Guiding Principles for Sustainable New Construction and Major Renovation*.
3. Target facilities that will fund mechanical system upgrades to also receive funding for water conservation projects. EPA will then focus at these targeted facilities on meeting the remaining guiding principles through operational changes such as O&M improvements and indoor environmental quality program implementation.

4. Continue to assess the Agency's existing "non-targeted" facilities for the potential to meet the *Guiding Principles for Sustainable Existing Buildings*.

Currently, 5.3 percent of EPA's FRPP inventory meets the guiding principles through Strategy 1. In addition, seven FRPP facilities are undergoing major renovations or are existing buildings that will be assessed for the feasibility of upgrades to meet the guiding principles through Strategy 3.

Non-targeted buildings will continue to be subject to EPA's national energy conservation, renewable energy, advanced metering, water conservation, and stormwater management programs, as well as operating policy and contracting policy initiatives.

EPA revised its Strategy for 15 Percent of Existing Buildings Meeting the Guiding Principles by FY 2015 and delivered it to OFEE in December 2009.

## **Building Sustainability Assessments**

In FY 2009, OMB and the OFEE introduced new requirements for sustainable building assessments via the Environmental Stewardship Scorecard. To perform these assessments as efficiently as possible, EPA coordinated its EISA assessments with corresponding sustainability assessments and evaluated facilities against the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*. EPA performed assessments at the following six facilities from April to June 2009:

- ESC—Fort Meade, Maryland
- AWBERC—Cincinnati, Ohio
- New England Regional Laboratory—Chelmsford, Massachusetts
- MED—Duluth, Minnesota
- New Main—RTP, North Carolina
- Human Studies Laboratory—Chapel Hill, North Carolina

The assessments focused on how each facility employs integrated O&M principles; optimizes energy performance; protects and conserves water; enhances indoor environmental quality; and reduces the environmental impact of materials.

EPA's assessment team determined the level of implementation of each of 26 guiding principle sub-topics using one of four scores: 1) fully implemented, 2) significant process made, 3) introductory steps taken, and 4) not currently addressed. The team determined that the six facilities have been proactive in their approaches to sustainability and are already meeting many of the guiding principles. The team identified opportunities for improvement, including developing comprehensive building O&M plans; developing moisture control strategies; creating procurement policies to track low-emitting material, recycled, and biobased content for all purchases; and developing phase-out plans for ozone-depleting compounds. These sustainability assessments inform EPA's Strategy for 15 Percent of Existing Buildings Meeting the Guiding Principles by FY 2015.

## **Implementing and Refining GreenCheck**

EPA initiated GreenCheck in FY 2006 as a system to clearly and formally identify environmental performance goals for each new major EPA facility and each major construction project. Beginning in FY 2009, EPA transformed the GreenCheck process into a much more rigorous, highly structured, and detailed program to ensure that all real property projects meet the numerous environmental requirements of EPA Act 2005, E.O. 13423, EISA, and the Guiding Principles, as well

as the Agency's own policy choices as reflected in its Best Practice Environmental Lease Provisions and updated A/E Guidelines. More specifically, GreenCheck:

- Establishes discrete environmental performance goals for each project that should be considered during design, construction, renovation, and operation of each new major lease or construction project.
- Reviews all real property-related construction, repair, and improvement projects, as well as lease acquisitions (via GSA) that cost more than \$85,000, affect 10,000 GSF, or increase the impervious area by more than 5,000 GSF.
- Confirms that these projects meet federal environmental design requirements and EPA guidelines.

GreenCheck consolidates these various requirements and guidelines into a user-friendly and time-saving checklist that ensures EPA facility projects meet all applicable federal requirements and EPA policy.

Of the 57 projects that went through the GreenCheck process in FY 2009, 15 were below the thresholds for funding or square footage, and thus completed only the GreenCheck cover sheet. The other 42 projects have fully completed GreenCheck forms on file. Seven of these GreenChecks involved lease expirations. The remaining 35 are listed in Table 1 in Appendix H. Evaluated projects in FY 2009 included major laboratory renovations, infrastructure design and construction, central utility plant improvements, boiler replacements, large space alternation projects, and roof replacements, among others.

## **A/E Guidelines**

EPA uses a Facilities Manual composed of four distinct yet complementary resources for planning and managing its facilities. The four volumes are meant to be used simultaneously to determine design intent, requirements, and the ongoing evaluation of all EPA facilities. The Agency invested significant resources in FY 2009 to revise Volume 2 of the manual, the A/E Guidelines, to capture lessons learned from EPA's Best Practice Environmental Lease Provisions and to include requirements from EISA and the updated Guiding Principles.

## **Best Practice Environmental Lease Provisions**

EPA continues its program to continually update its Best Practice Environmental Lease Provisions based on lessons learned from recently completed lease projects with GSA, new understanding in various conservation policy areas, new technologies, better environmental performance metrics, and improved environmental performance measures.

## **Energy Efficiency/Sustainable Design in Lease Provisions**

### **Best Practice Environmental Lease Provisions**

EPA compiles environmental provisions in a standard GSA Solicitation for Offer (SFO) format, which it uses for new lease solicitations. This document includes provisions to pursue compliance with EPAct 2005, E.O. 13423, EISA, and the Guiding Principles, and to obtain LEED certification for new and existing buildings. The provisions are continually updated as lessons learned from recent building projects suggest improvements to the provisions. Significant revisions took place in FY 2009 based on work done for EPA's Seattle and San Francisco regional office SFOs. The Best

Practice Environmental Lease Provisions also set forth EPA's basic building evaluation criteria used to evaluate buildings on sustainability, design quality, and functionality.

Currently three regional office building leases are ending; these leases house the Region 7 office in Kansas City, Kansas; the Region 9 office in San Francisco, California; and the Region 10 office in Seattle, Washington. A competitive acquisition process is underway but has not been completed. The Best Practice Environmental Lease Provisions were used extensively in this work.

## **Distributed Generation**

### **National Onsite Renewable Energy Study**

In FY 2009, EPA assessed the Agency's laboratory facilities to evaluate their suitability for renewable energy projects above and beyond projects already underway at individual facilities. The study included reviews of geographic and regional data available on solar, wind, and geothermal potential to identify which facilities had the highest potential for each type of renewable energy, as well as building systems analysis and site documentation for each facility. The study concluded that EPA could meet 9.8 percent of its energy needs through renewables, at an estimated cost of \$115 million.

The report also indicates that ground source heat pumps (GSHPs) appear to be the most promising renewable energy technology for EPA facilities. EPA is pursuing GSHP projects at the Western Ecology Division Laboratory in Corvallis, Oregon; the Atlantic Ecology Division Laboratory in Narragansett, Rhode Island; and the Region 6 Laboratory in Houston, Texas. For more information on the projects identified by the study, see Appendix I.

### **Purchased Power Agreement in Edison, New Jersey**

In FY 2009, EPA issued a Request for Proposals through the Defense Energy Support Center (DESC) for a purchased power agreement (PPA) contract to install a photovoltaic (PV) array at its Region 2 Laboratory in Edison, New Jersey. EPA is planning to install the array on a 105,000 square-foot site, where it is projected to provide approximately 725 kilowatts (kW) of electricity, or 1,587,750 kWh annually, to offset approximately 33 percent of the annual electrical needs of the Edison laboratory. Through the PPA, a solar services provider will build and maintain the PV array, and EPA will commit to purchasing the renewable electricity that it generates. New Jersey's considerable tax incentives for PV installations and the availability of open space (approximately 500,000 square feet) make the Region 2 facility an ideal site for this project. EPA would like to award the PPA contract by Spring 2010, with the expectation that the solar PV system would go online in 2011. Upon completion, the Edison PV installation would far surpass in size and production any existing EPA onsite renewable energy project.

### **Installed Onsite Renewable Energy Projects**

EPA's existing renewable energy projects as of FY 2009 are described in Table 4.

<b>Table 4. FY 2009 Onsite Renewable Energy Generation</b>				
<i>Facility</i>	<i>Location</i>	<i>Type of Renewable Project</i>	<i>Energy Generated in FY 2009</i>	<i>Start Date</i>
New England Regional Laboratory	Chelmsford, MA	Solar awning	689 kWh	2001
NCC	RTP, NC	Solar array	99,364 kWh	2002
Robert S. Kerr Environmental Research Center	Ada, OK	Ground source heat pump	29,598 million Btu	2004
Region 8 Laboratory	Golden, CO	Solar wall	1.38 million Btu	2002
Region 10 Laboratory	Manchester, WA	Solar array	2,180 kWh	1999
Western Ecology Division Laboratory	Corvallis, OR	Solar array	4,598 kWh	2004

## GREENHOUSE GAS EMISSIONS INVENTORY

In January 2008, to better understand and manage its carbon footprint, EPA voluntarily began developing a GHG emissions inventory, following the GHG Inventory Guidance developed by EPA's Climate Leaders Program. The Agency's initial GHG emissions inventory quantified direct and indirect stationary emissions associated with energy consumption at the Agency's 34 reporting facilities for three of the six major GHGs—carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O)—and in FY 2009, EPA expanded its inventory to include hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). The inventory accounted for the efforts that EPA has made to “adjust” its emissions (per Climate Leaders methodology) through green power and REC purchases. The elements composing the inventory are further described in Table 5.

<b>Table 5. Elements of EPA's Voluntary GHG Emissions Inventory</b>	
<i>Direct Stationary and Mobile, or Scope 1, Emissions</i>	Onsite combustion of natural gas, fuel oil, propane, and kerosene for heating and onsite power generation; fuel combustion in fleet and tactical vehicles; fugitive emissions from stationary and mobile air-conditioning equipment and building fire suppression equipment; and process emissions, including onsite waste incineration, laboratory fume hood testing, and mission-oriented research.
<i>Indirect Stationary, or Scope 2, Emissions</i>	Indirect emissions associated with purchased electricity, steam, chilled water, and high-temperature hot water.
<i>Inventory Adjustment From Renewable Energy Purchases</i>	EPA has a long history of leading the federal government in supporting the renewable energy market. This commitment to developing clean energy generation has resulted in avoiding GHG emissions from combusting fossil fuel at conventional power plants. EPA uses the Climate Leaders-approved methodology to quantify the environmental benefits of its renewable energy purchases.

As a result of its calculations, EPA has estimated its FY 2003 Scope 1 and 2 GHG emissions to be 155,472 MTCO<sub>2</sub>e. As a direct result of Agencywide energy efficiency improvements since FY 2003, these emissions in FY 2009 totaled 139,943 MTCO<sub>2</sub>e—a reduction of 15,528 MTCO<sub>2</sub>e, or approximately 10 percent, from the Agency's FY 2003 baseline (see Figure 5). Furthermore, under the Climate Leaders' reporting methodology, the Agency's purchases of green power and RECs



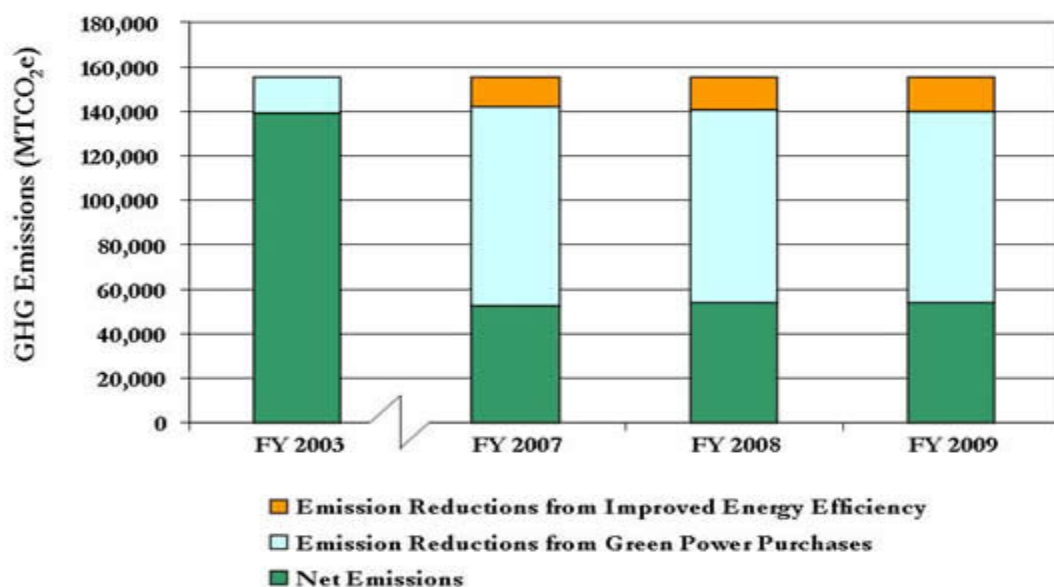
enable EPA to adjust its total Scope 1 and 2 GHG emissions to 139,201 MTCO<sub>2</sub>e in FY 2003 and to 53,903 MTCO<sub>2</sub>e in FY 2009. These data indicate that EPA has reduced its net Scope 1 and 2 GHG emissions by 85,298 MTCO<sub>2</sub>e, or approximately 61 percent, in the six years since FY 2003.

In FY 2009, EPA began to quantify its Scope 3 emissions associated with energy consumption at the Agency’s non-reporting facilities (approximately 140 offices and other leased facilities around the country). Base information comes from three sources:

- GSA’s Energy Center of Expertise, which provided EPA with FY 2003, FY 2007, and FY 2008 energy consumption data for GSA-owned facilities.
- EPA’s multi-year effort to include mandatory energy and water use reporting requirements by private landlords in GSA leases of space for EPA.
- Directly from cooperative building management representatives in buildings with older GSA leases without mandatory reporting.

The new data set allowed EPA to expand the scope of its inventory beyond the Agency’s owned facilities and quantify the environmental impacts of EPA’s day-to-day operations more comprehensively. Scope 3 emissions from EPA regional offices, Headquarters buildings, and miscellaneous leased support spaces are just one—but a significant—part of EPA’s Scope 3 GHG inventory efforts.

**Figure 5. EPA’s GHG Emissions in FY 2003, 2007-2009**



Note: EPA elected to use FY 2003 as the base year for its GHG emissions inventory initiated in 2008 to align with the base year against which annual energy reduction requirements are outlined in E.O. 13423 and EISA. EPA has not developed annual GHG emission inventories for FY 2004-06.

## EPA Joins Climate Leaders

In May 2009, EPA joined the Agency’s Climate Leaders Program as an official partner. In addition to engaging in one of EPA’s own partnership programs, EPA demonstrated its commitment to improving its environmental performance by agreeing to set an



emissions reduction target within two years. Consistent with the requirements of Climate Leaders partnership, EPA developed a comprehensive Inventory Management Plan (IMP), which provides a transparent and comprehensive record of the data sources and methodology for quantifying the Agency's emissions for FY 2003 and FY 2007 through FY 2009<sup>3</sup>.

## Testing the Public Sector Protocol

With the growing momentum and interest in GHG accounting in the public sector, EPA recognized the need for an established public-sector GHG accounting protocol. In FY 2009, the Agency participated in a stakeholder review of the new Public Sector Protocol (PSP) for GHG emissions accounting, developed by the Logistics Management Institute (LMI) in partnership with the World Resources Institute (WRI) and DOE. The Agency is performing a "road test" of this new protocol to evaluate its suitability for federal agencies.

## More GHG Inventory Work From E.O. 13514

Having expanded the scope of its GHG emissions inventory in FY 2009, EPA gleaned a broader perspective of the environmental impacts of various fuels used to condition buildings that the Agency occupies (both owned and leased) and to operate its fleet and tactical vehicles. EPA's proactive initiative to develop its GHG emissions inventory represents an important early step forward for the federal government. The Agency is now poised to share valuable information as other agencies seek to develop GHG inventories, set goals, and reduce their emissions to meet the requirements of E.O. 13514.

## STORMWATER MANAGEMENT

EISA Section 438 requires federal agencies to maintain or restore a site's predevelopment hydrology when projects impact more than 5,000 square feet of a site. In FY 2009, EPA continued to work on its intra-agency Green Infrastructure Program, involving the Agency's Office of Wetlands, Oceans, and Watersheds, Non-Point Source Branch, and Office of Wastewater Management, Municipal Branch. EPA also developed draft design specifications in its facility manual for stormwater management at the Agency's facilities and continued implementing sustainable stormwater management and low impact development (LID) projects such as:

- *Inventorying Stormwater Management Techniques:* In FY 2009, EPA compiled an inventory of stormwater management systems and practices at its facilities, which will allow EPA to continue identifying retrofit opportunities across the Agency to help satisfy the requirement of E.O. 13423 that 15 percent of existing building inventory meet the Guiding Principles established by the Federal Leadership in High Performance and Sustainable Buildings MOU by 2015.
- *Region 2 Laboratory—Edison, New Jersey:* In FY 2009, EPA began to upgrade a major parking lot, enabling a long-term study to evaluate the quality of the lot's runoff from various types of surfaces, including porous asphalt, porous concrete, and porous paver blocks. EPA's Office of Research and Development compiled extensive documentation during construction to support planned long-term research activity. The project was completed in early FY 2010.

---

<sup>3</sup> EPA uses Climate Leaders protocol for GHG emissions estimates, which produces higher GHG emissions than DOE's methodology. Refer to the Appendix E for more detailed GHG emissions information.

- *AWBERC—Cincinnati, Ohio*: As a training tool for EPA architects and engineers, and to assist EPA’s Office of Water (OW) in ground testing its stormwater management protocols, EPA asked a civil design firm to re-envision the AWBERC site using as many LID strategies as possible. The resulting “Not For Construction” design document serves as a teaching tool and reference for designers and informed OW’s work on stormwater management guidance. LID practices in the design include: non-structural sand filter, vegetated filter box, vegetated swale, bioretention basin, green roofs, porous concrete pavement, permeable open joint pavers, porous asphalt pavement, cisterns, and sustainable planting area. The hypothetical design document is available on the Greening EPA Web site for research and training purposes.
- *Stormwater Training*: EPA trained its facility managers and other personnel about how to use LID and sustainable stormwater management techniques, giving a presentation on stormwater management, wet-weather green infrastructure, and LID at the May 2009 Energy and Facilities Conference in Cincinnati, Ohio. EPA is also developing a catalog of fact sheets that describe the stormwater management practices and provide an example design detail for each.
- *Atlantic Ecology Division Laboratory—Narragansett, Rhode Island*: A 30-year-old, 3,000 square foot roof was replaced with a green roof expected to reduce heating and cooling energy costs and provide stormwater mitigation. Vegetated material in a planting media was installed over a membrane. The project, completed in September 2009, includes sustainable materials and an irrigation system for maintenance during drought periods.
- *National Exposure Research Laboratory, Office of Research and Development—Athens, Georgia*: EPA created a stormwater management pond to capture stormwater runoff and overland flow. The Agency also installed a retaining wall adjacent to the stormwater pond as an extension of a landscaped barrier wall.

## RECYCLING AND POLLUTION PREVENTION

### Strive for 45 Initiative

In FY 2009, ahead of an E.O. 13423 requirement that all federal agencies set a waste diversion goal by the year 2010, EPA launched *Strive for 45*, a campaign to divert 45 percent of all waste generated Agencywide from the municipal solid waste stream through recycling, reuse, donation, composting, and other waste reduction efforts. *Strive for 45* provided facility managers at laboratories and offices throughout the Agency with technical assistance resources and outreach materials to help improve recycling and other waste diversion programs. To help invigorate recycling efforts Agencywide, EPA started the Recycling Rally, a competition between facilities to reduce waste and increase recycling. Based on data submitted for FY 2008, EPA facilities achieved a 47 percent waste diversion rate, representing an increase of 7 percent over EPA’s FY 2007 rate.

### Recycling and Pollution Prevention Assessments

In FY 2009, EPA conducted recycling and pollution prevention assessments at four of its facilities: the Region 8 Laboratory in Golden, Colorado; the Region 8 Office in Denver, Colorado; the National Air and Radiation Environmental Laboratory in Montgomery, Alabama; and the Gulf Ecology Division (GED) Laboratory in Gulf Breeze, Florida. The assessments reviewed each facility’s existing waste reduction program, identified and provided opportunities for improvement,

shared best practices with other facilities, and collected recycling metrics to factor into the Agencywide recycling rate.

## EDUCATION FOR OTHERS

### Laboratories for the 21<sup>st</sup> Century (Labs21<sup>®</sup>)

Labs21 is the premiere program and conference for energy-efficient and sustainable design of laboratories in the United States. Labs21 education efforts are jointly sponsored by EPA, DOE, and the International Institute for Sustainable Laboratories (I<sup>2</sup>SL), the nonfederal conference co-sponsor.

The Labs21 Annual Conference includes in-depth technical discussions on issues faced by laboratory owners, users, designers, and builders, including mechanical systems configurations, controls, commissioning, O&M, and other sustainability issues. This year’s conference was from September 22 to 24, 2009, in Indianapolis, Indiana. The event was a success, attracting more than 607 laboratory architects, engineers, federal employees, builders, facility managers, owners, and other laboratory professionals, including 24 EPA employees. The conference included three tracks of technical sessions and two tracks of focused symposia that covered topics such as sub-metering and benchmarking, O&M, and climate-neutral research facilities. EPA presented on the Agency’s water conservation and commissioning efforts at AWBERC during the conference.

I<sup>2</sup>SL also helped EPA coordinate Labs21 Design Courses in FY 2009. Labs21 courses trained 322 people in 15 different workshops across the country in FY 2009.

Five new partners joined Labs21 in FY 2009, bringing the total number of partners to 65 federal and private sector organizations, including 13 federal agencies that receive information and technical assistance for nearly 50 federal facilities. FY 2009 energy, emissions, and dollar savings from partner projects are detailed in Table 6.

<b>Table 6. Energy, Emissions, and Cost Savings from 17 Labs21 Partner Projects in FY 2008</b>	
<i>Energy Reduction</i>	353,049 billion Btu—equal to the average annual electricity use of more than 9,200 U.S. homes.
<i>Carbon Dioxide Emissions Reduction</i>	96 million pounds—the equivalent of removing nearly 8,000 passenger vehicles from the road and saving nearly 5 million gallons of gasoline.
<i>Avoided Cost Savings</i>	\$7.9 million

In addition to the annual conference and workshops described earlier, the Labs21 Web site ([www.labs21century.gov](http://www.labs21century.gov)) provides additional information on the program, including regularly updated conference details, opportunities to join the program as a Partner or Supporter, access to the online Tool Kit, and a Laboratory Equipment Efficiency “wiki.” During FY 2009, Labs21 added a best practices guide on chilled beams to the Tool Kit. The Web site received nearly 2.8 million visits in FY 2009.

Laboratories as a category of buildings still lack 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 via the Labs21 Energy Benchmarking Tool. The benchmarking data in this tool cover overall building performance metrics (thousand 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 similar facilities, in FY 2009 The Agency entered FY 2008 energy consumption data for its reporting laboratories into the Labs21 benchmarking tool. This tool allows facility managers to compare the more up-to-date energy performance of their facilities to similar facilities and thereby help identify potential energy cost savings opportunities for the Agency.

### **GovEnergy Conference and Federal Environmental Summit (FES)/GreenGov GHG Emissions Track**

EPA contributed financial and staff resources for the annual GovEnergy Conference in Providence, Rhode Island, presenting topics such as federal requirements for specialty buildings, environmentally preferable purchasing, benchmarking for data centers, water efficiency, and building sustainability measurement. EPA helped plan and coordinate a "green jobs" seminar in conjunction with GovEnergy 2009 by researching relevant Rhode Island businesses and agencies that could help transition local unemployed workers back into these important careers. EPA also managed a booth at the conference, sharing information with attendees on various program initiatives, including its Labs21 program.

In June 2009, SFPB and DOE's Princeton Plasma Physics Laboratory (PPPL) led a three-day track on GHG emissions at FES. The track included an overview of the current domestic climate legislation, the status of regional GHG emissions tracking efforts, a workshop on GHG emissions inventory development, several federal agencies' GHG inventory development lessons learned, and other related topics. EPA has again joined with PPPL to manage the GHG track at GreenGov 2010. Numerous EPA employees attended both GovEnergy and GreenGov.

**THIS PAGE INTENTIONALLY BLANK**



# **Appendix A: FY 2009 Data Report**

**For Submittal With EPA's  
Energy Management and Conservation Program  
FY 2009 Annual Report**





**U.S. Environmental Protection**

**Agency FY 2009 Energy Management Performance Summary**

**Goal Performance**

<b>Energy Management Requirement</b>	FY 2003 Btu/GSF	FY 2009 Btu/GSF	Percent Change 2003 - 2009	FY 2009 Goal Target
Reduction in energy intensity in facilities subject to the NECPA/E.O. 13423 goals	388,400	293,541	<b>-24.4%</b>	-12.0%

<b>Renewable Energy Requirement</b>	Renewable Electricity Use (MWH)	Total Electricity Use (MWH)	Percentage	FY 2009 Goal Target
Eligible renewable electricity use as a percentage of total electricity use	147,605.7	127,161.9	<b>116.1%</b>	3.0%

<b>Water Intensity Reduction Goal</b>	FY 2007 Gallon/GSF	FY 2009 Gallon/GSF	Percent Change 2007 - 2009	FY 2009 Goal Target
Reduction in potable water consumption intensity	35.0	31.2	<b>-10.8%</b>	-4.0%

<b>Metering of Electricity Use</b>	Cumulative # of Buildings Metered	Cumulative % of Electricity Metered	Cumulative % of Appropriate Buildings Metered	FY 2012 Goal Target
Standard Electricity Meters in FY 2009	32	64.7%	91.4%	100%
Advanced Electricity Meters in FY 2009	3	35.3%	8.6%	Maximum Extent Practicable
Total Electricity Meters in FY 2009	35	100.0%	100.0%	

<b>Federal Building Energy Efficiency Standards</b>	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:	<b>N/A</b>	100%

**Investments in Energy and Water Management**

<b>Sources of Investment</b>	Investment Value (Thou. \$)	Anticipated Annual Savings (Million Btu)
Direct obligations for facility energy efficiency improvements	\$3,875.0	5,696.5
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	\$3,875.0	5,696.5

	Percentage
Total investment as a percentage of total facility energy costs	18.7%
Financed (ESPC/UESC) investment as a percentage of total facility energy costs	0.0%

## FY 2009 ENERGY MANAGEMENT DATA REPORT

Agency: U.S. Environmental Protection Agency  
 Date: 12/15/2009

Prepared by: Karen Murray  
 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 <sub>2</sub> e)	
Electricity	MWH	126,777.9	\$10,299.0	\$0.08 /kWh	432.57	1,502.3	(13,015)	
Fuel Oil	Thou. Gal.	157.9	\$283.8	\$1.80 /gallon	21.9	21.9	1,606	
Natural Gas	Thou. Cubic Ft.	382,691.7	\$3,911.8	\$10.22 /Thou Cu Ft	394.6	394.6	20,971	
LPG/Propane	Thou. Gal.	7.0	\$16.1	\$2.31 /gallon	0.7	0.7	41	
Coal	S. Ton	0.0	\$0.0	#DIV/0! /S. Ton	0.0	0.0	0	
Purch. Steam	BBtu	37.1	\$1,443.2	\$38.90 /MMBtu	37.1	51.6	4,948	
Other	BBtu	335.1	\$4,720.0	\$14.08 /MMBtu	335.1	335.1	44,692	
Purch. Renew. Electric.	MWH	384.0	\$29.1	\$0.08 /kWh	1.3			
Purch. Renew. Other	BBtu	0.0	\$0.0	#DIV/0! /MMBtu	0.0			
		<b>Total Costs:</b>	<b>\$20,702.9</b>		<b>Total:</b>	<b>1,223.2</b>	<b>2,306.2</b>	<b>59,242</b>
FY 2009 Goal Subject Buildings Gross Square Feet (Thousands)		<b>3,846.1</b>			<b>Btu/GSF:</b>	<b>318,049</b>	<b>599,613</b>	
Goal Subject Buildings					<b>Btu/GSF w RE Purchase Credit:</b>	<b>296,449</b>		
FY 2003 Baseline (Btu/GSF)		<b>388,400</b>			<b>Btu/GSF w RE &amp; Source Btu Credit:</b>	<b>293,541</b>		

\* The estimated GHG emissions are calculated using DOE's default equations and emission factors provided as part of the data report template. Starting 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. Please see Appendix E for additional information about and calculation of EPA's FY 2009 Scope 1 and Scope 2 emissions.

#### 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 <sub>2</sub> e)	
Electricity	MWH	0.0	\$0.0	#DIV/0! /kWh	0.0	0.0	0	
Fuel Oil	Thou. Gal.	0.0	\$0.0	#DIV/0! /gallon	0.0	0.0	0	
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	#DIV/0! /Thou Cu Ft	0.0	0.0	0	
LPG/Propane	Thou. Gal.	0.0	\$0.0	#DIV/0! /gallon	0.0	0.0	0	
Coal	S. Ton	0.0	\$0.0	#DIV/0! /S. Ton	0.0	0.0	0	
Purch. Steam	BBtu	0.0	\$0.0	#DIV/0! /MMBtu	0.0	0.0	0	
Other	BBtu	0.0	\$0.0	#DIV/0! /MMBtu	0.0	0.0	0	
Purch. Renew. Electric.	MWH	0.0	\$0.0	#DIV/0! /kWh	0.0			
Purch. Renew. Other	BBtu	0.0	\$0.0	#DIV/0! /MMBtu	0.0			
		<b>Total Costs:</b>	<b>\$0.0</b>		<b>Total:</b>	<b>0.0</b>	<b>0</b>	
FY 2009 Excluded Facilities Gross Square Feet (Thousands)		<b>0.0</b>			<b>Btu/GSF:</b>	<b>#DIV/0!</b>	<b>#DIV/0!</b>	
Goal Excluded Facilities					<b>Btu/GSF w RE Purchase Credit:</b>	<b>#DIV/0!</b>		
FY 2003 Baseline (Btu/GSF)		<b>0</b>			<b>Btu/GSF w RE &amp; Source Btu Credit:</b>	<b>#DIV/0!</b>		

**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 <sub>2</sub> )
Auto Gasoline	Thou. Gal.	8.0	\$29.0	\$3.63 /gallon	1.0	71
Diesel-Distillate	Thou. Gal.	182.0	\$360.0	\$1.98 /gallon	25.2	1,847
LPG/Propane	Thou. Gal.	1.0	\$2.0	\$2.00 /gallon	0.1	6
Aviation Gasoline	Thou. Gal.	0.0	\$0.0	#DIV/0! /gallon	0.0	0
Jet Fuel	Thou. Gal.	0.0	\$0.0	#DIV/0! /gallon	0.0	0
Navy Special	Thou. Gal.	0.0	\$0.0	#DIV/0! /gallon	0.0	0
Other	BBtu	0.0	\$0.0	#DIV/0! /MMBtu	0.0	
Total Costs:			\$391.0		26.3	1,923

**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 2009, 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 <i>New Solar</i> projects (MWH)	5	119.3	119.3
Electricity from <i>New Wind</i> projects (MWH)	0	0.0	0.0
Electricity from <i>New Biomass</i> projects (MWH)	0	0.0	0.0
Electricity from <i>New Landfill Gas</i> projects (MWH)	0	0.0	0.0
Electricity from <i>New Geothermal</i> projects (MWH)	0	0.0	0.0
Electricity from <i>New Hydro/Ocean</i> projects (MWH)	0	0.0	0.0
Electricity from <i>Old Solar</i> projects (MWH)	0	0.0	0.0
Electricity from <i>Old Wind</i> projects (MWH)	0	0.0	0.0
Electricity from <i>Old Biomass</i> projects (MWH)	0	0.0	0.0
Electricity from <i>Old Landfill Gas</i> projects (MWH)	0	0.0	0.0
Electricity from <i>Old Geothermal</i> projects (MWH)	0	0.0	0.0
Electricity from <i>Old Hydro/Ocean</i> projects (MWH)	0	0.0	0.0
Natural Gas from <i>New Landfill/Biomass</i> projects (Million Btu)	0	0.0	0.0
Renewable Thermal Energy from <i>New</i> projects (Million Btu)	2	29,599.5	29,599.5
Other <i>New</i> Renewable Energy ( <i>Specify Type</i> ) (Million Btu)	0	0.0	0.0
Natural Gas from <i>Old Landfill/Biomass</i> projects (Million Btu)	0	0.0	0.0
Renewable Thermal Energy from <i>Old</i> projects (Million Btu)	0	0.0	0.0
Other <i>Old</i> Renewable Energy ( <i>Specify Type</i> ) (Million Btu)	0	0.0	0.0
Total New Renewable Electricity (MWH)	5	119.3	119.3
Total Old Renewable Electricity (MWH)	0	0.0	0.0
Total New Non-Electric Renewable Energy (Million Btu)	2	29,599.5	
Total Old Non-Electric Renewable Energy (Million Btu)	0	0.0	
Total Renewable Energy Generation (Million Btu)	7	30,006.6	

**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.)

	Amount Produced or Used	Amount Qualified for Goal
Renewable energy reported here comes from projects: 1) placed in service <b>after 1/1/1999 (New)</b> ; 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
Renewable energy reported here must come from projects: 1) placed in service <b>before 1/1/1999 (Old)</b> ; 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

**1-6. RENEWABLE ENERGY/RENEWABLE ENERGY CERTIFICATE PURCHASES IN FY 2009**

(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 end-use categories (Goal or Excluded) or purchase terms (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 Purchased from Projects on Federal or Indian Lands	FY 2009 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 Fac. (Billion Btu)	State or Region of Generation or Source
Electricity from <i>New</i> Renewable Source					RE: 100% EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.					
Duluth	24.0		\$0.7	0.0	RE: 100% EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.	Short	Goal	0.1	0.0	Southwestern MN
Corvallis (Main)	380.0		\$28.4	0.0	RE: 100% EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.	Short	Goal	1.2	0.0	OR
Electricity from <i>Old</i> Renewable Source					RE: Up to 1.5% of total electricity use EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.					
RECs from <i>New</i> Renewable Source					RE: 100% EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.					
Cincinnati	17,000.0		\$94.4	0.0	RE: 100% EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.	Short	Goal	58.0	0.0	TX
Manchester	3,333.0		\$50.0	0.0	RE: 100% EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.	Long	Goal	11.4	0.0	WY
FY 2009 Blanket Green Power Purchases	126,650.0		\$444.8	0.0	RE: 100% EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.	Short	Goal	432.1	0.0	TX, FL, NY, GA, WA, CA, LA, KY, SD, OK, KS, ND, GA, MI, OH, IN, ND
RECs from <i>Old</i> Renewable Source					RE: Up to 1.5% of total electricity use EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.					
RECs from <i>Old</i> Renewable Source					RE: Up to 1.5% of total electricity use EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.					
Non-Electric Energy from <i>New</i> Renewable Source					RE: no contribution to goal (see comment) EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.					
Non-Electric Energy from <i>New</i> Renewable Source					RE: no contribution to goal (see comment) EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.					
Non-Electric Energy from <i>Old</i> Renewable Source					RE: no contribution to goal EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.					
Non-Electric Energy from <i>Old</i> Renewable Source					RE: no contribution to goal EE-Credit: Up to 4.8% reduction for short-term and 7.2% reduction for long-term.					
<b>Total Purchases of <i>New</i> Renewable Electricity</b>	<b>384.0</b>		<b>\$29.1</b>	<b>0.0</b>	Eligible Short-Term Purchase					
<b>Total Purchases of <i>New</i> RECs</b>	<b>146,983.0</b>		<b>\$589.1</b>	<b>0.0</b>	Goal Building EE Credit (BBtu):	71.7				
Bonus for Purchases from New Projects on Federal or Indian Land	0.0				Eligible Long-Term Purchase					
<b>Total Purchases of <i>Old</i> Renewable Electricity</b>	<b>0.0</b>		<b>\$0.0</b>	<b>0.0</b>	Goal Building EE Credit (BBtu):	11.4				
<b>Total Purchases of <i>Old</i> RECs</b>	<b>0.0</b>		<b>\$0.0</b>	<b>0.0</b>	Total Goal Building EE Credit (BBtu):	83.1				
<b>Total Purchases of <i>New</i> Non-Electric Renewable Energy</b>	<b>0.0</b>	<b>0.0</b>	<b>\$0.0</b>		Eligible Short-Term Purchase					
<b>Total Purchases of <i>Old</i> Non-Electric Renewable Energy</b>	<b>0.0</b>	<b>0.0</b>	<b>\$0.0</b>		Excluded Fac. EE Credit (BBtu):	0.0				
<b>Total Purchases for Goal Buildings</b>	<b>147,367.0</b>	<b>0.0</b>	<b>\$618.2</b>		Eligible Long-Term Purchase					
<b>Total Purchases for Excluded Facilities</b>	<b>0.0</b>	<b>0.0</b>	<b>\$0.0</b>		Excluded Fac. EE Credit (BBtu):	0.0				
<b>Total All Purchases</b>	<b>147,367.0</b>	<b>0.0</b>	<b>\$618.2</b>		<b>Total Excluded Fac. EE Credit (BBtu):</b>	<b>0.0</b>				

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

(Calculated from input above per FEMP Renewable Energy Guidance)

Components of Eligible RE Use	Renewable Electricity Use (MWH)	Total Facility Electricity Use (MWH)	RE as a Percentage of Electricity Use
<b>Eligible Renewable Electricity Total</b>	<b>147,605.7</b>	<b>127,161.9</b>	<b>116.1%</b>
New Renewable Electricity (without Bonus)	147,486.3		
Bonus, Federal or Indian Land	119.3		
Eligible Old 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
532.8	433.9	122.8%

**1-9. WATER USE INTENSITY AND COST**

Potable Water	Annual Consumption (Million Gallons)	Annual Cost (Thou. \$)	Facility Gross Square Feet (Thou.)	Gallons per Gross Square Foot
Buildings & Facilities Subject to Water Goal	120.0	\$1,000.5	3,846.1	31.2
				Percent
Approx. percentage of reported water consumption that is estimated:				0%
Is the FY 2007 agency water intensity baseline preliminary or final?				Final

\* See Appendix D for additional information about revisions to EPA's FY 2007 Water Use Baseline.

**PART 2: ENERGY EFFICIENCY IMPROVEMENTS**

**2-1. DIRECT AGENCY OBLIGATIONS**

	FY 2009		Projected FY 2010	
	(Million Btu)	(Thou. \$)	(Million Btu)	(Thou. \$)
Direct obligations for facility energy efficiency improvements, including facility surveys/audits		\$3,875.0		\$10,229.8
Estimated annual savings anticipated from obligations	5,696.5	\$48.3	23,972.2	\$351.7

**2-2. ENERGY SAVINGS PERFORMANCE CONTRACTS (ESPC)**

	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

Note: EPA pursued several ESPCs in FY 2008 and FY 2009. However, based on the Agency's recent efforts, ESPCs do not appear to be the best tool for improving performance at EPA's laboratories due to the laboratories' small sizes, the complexity of laboratory mechanical systems, and/or the need to finance complete replacements of old mechanical systems. EPA will continue to evaluate potential ESPCs when appropriate.

**2-3. UTILITY ENERGY SERVICES CONTRACTS (UESC)**

	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
2009	32	64.7%	3	35.3%	35	100.0%
2010 planned	18	32.1%	17	67.9%	35	100.0%

\* EPA officially reports annual energy and water data for 34 NECPA/E.O. 13423 Goal Subject facilities. Of these 34 facilities, three separately-metered facilities on the Edison, NJ campus are collectively grouped together as one Goal Subject facility. In FY 2008, the number of Goal Subject facilities equated to the number of appropriate buildings for metering. During its FY 2009 advanced metering implementation progress, however, EPA decided to consider each of the three Edison, NJ individually. Doing so has increased the number of appropriate buildings for metering from 34 to 35.

**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
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 FY 2009/Expenditure	122	\$109.3

## 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
<b>Please see note below</b>							
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				

**Note: EPA has not initiated any new building designs since the beginning of FY 2007.**



**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](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	5,918.3	8,996.1	6,405.9
Project No. 2	2,481.4	6,712.2	4,779.5
Project No. 3	0.0	0.0	0.0
Totals	8,399.6	15,708.3	11,185.4

**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 2009 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)' is defined as the annual energy used from FY 2001 to FY 2005.

<b>Base Case (without Project)</b>		
Annual Source Energy Used	25,859	MMBtu
Annual Site energy Used	7,446	MMBtu
<b>With Project</b>		
Annual Source Energy Used	16,863	MMBtu
Annual Site energy Used After Project	13,364	MMBtu
Annual Source Energy Saved After Project	8,996	MMBtu
Annual Site Energy Increase After Project	5,918	MMBtu
502(e) Adjustment to Annual Site Energy, per DOE guidance	6,406	MMBtu
Annual electricity displaced as a result of the project:	759,168	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 Case (without Project)' is defined as the annual energy used from FY 2003 to FY 2005.

<b>Base Case (without Project)</b>		
Annual Source Energy Used	21,707	MMBtu
Annual Site energy Used	14,769	MMBtu
<b>With Project</b>		
Annual Source Energy Used	14,995	MMBtu
Annual Site energy Used After Project	17,251	MMBtu
Annual Source Energy Saved After Project	6,712	MMBtu
Annual Site Energy Increase After Project	2,481	MMBtu
502(e) Adjustment to Annual Site Energy, per DOE guidance	4,780	MMBtu
Annual electricity displaced as a result of the project:	566,427	kWh





# **Appendix C: EPA's Revised FY 2003 Energy Baseline**

**For Submittal With EPA's  
Energy Management and Conservation Program  
FY 2009 Annual Report**





## Appendix C - FY 2003 ENERGY DATA BASELINE WORKSHEET - EXISTING ON RECORD

Agency: EPA  
Date: 12/31/2008

Prepared by: Karen Murray  
Phone: 202-564-2539

EXECUTIVE ORDER 13123 REPORTING CATEGORIES				
<b>1-1. Standard Buildings/Facilities</b>				
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
		<b>Total Costs:</b>	\$0.0	0.0
Standard Buildings/Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!
<b>1-2. Industrial, Laboratory, Research, and Other Energy-Intensive Facilities</b>				
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
		<b>Total Costs:</b>	\$16,764.8	1,442.5
Energy-Intensive Facilities (Thou. Gross Square Feet)		3,647.0	Btu/GSF:	395,520
<b>1-3. Exempt Facilities</b>				
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
		<b>Total Costs:</b>	\$0.0	0.0
Exempt Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!

ENERGY POLICY ACT 2005 REPORTING CATEGORIES				
<b>EPACT Goal-Subject Buildings/Facilities</b>				
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
		<b>Total Costs:</b>	\$16,764.8	1,442.5
EPACT Goal Buildings/Facilities (Thou. Gross Square Feet)		3,647.0	Btu/GSF:	395,520
<b>EPACT Excluded Facilities</b>				
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
		<b>Total Costs:</b>	\$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.	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
		<b>Total Costs:</b>	\$16,764.8	1,442.5
All Facilities (Thou. Gross Square Feet)		3,647.0	Btu/GSF:	395,520

## Appendix C - FY 2003 ENERGY DATA BASELINE WORKSHEET - REVISED BASELINE

Agency: EPA  
Date: 12/15/2009

Prepared by: Karen Murray  
Phone: 202-564-2539

EXECUTIVE ORDER 13123 REPORTING CATEGORIES				
<b>1-1. Standard Buildings/Facilities</b>				
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
		<b>Total Costs:</b>	\$0.0	0.0
Standard Buildings/Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!
<b>1-2. Industrial, Laboratory, Research, and Other Energy-Intensive Facilities</b>				
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
		<b>Total Costs:</b>	\$16,764.8	1,442.5
Energy-Intensive Facilities (Thou. Gross Square Feet)		3,713.9	Btu/GSF:	388,400
<b>1-3. Exempt Facilities</b>				
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
		<b>Total Costs:</b>	\$0.0	0.0
Exempt Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!

ENERGY POLICY ACT 2005 REPORTING CATEGORIES				
<b>EPACT Goal-Subject Buildings/Facilities</b>				
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
		<b>Total Costs:</b>	\$16,764.8	1,442.5
EPACT Goal Buildings/Facilities (Thou. Gross Square Feet)		3,713.9	Btu/GSF:	388,400
<b>EPACT Excluded Facilities</b>				
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
		<b>Total Costs:</b>	\$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.	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
		<b>Total Costs:</b>	\$16,764.8	1,442.5
All Facilities (Thou. Gross Square Feet)		3,713.9	Btu/GSF:	388,400



# **Appendix D: EPA's Revised FY 2007 Water Baseline**

**For Submittal With EPA's  
Energy Management and Conservation Program  
FY 2009 Annual Report**



## Summary of Revision to EPA's Methodology for Reporting Water Consumption

The U.S. Environmental Protection Agency's (EPA's) Research Triangle Park (RTP), North Carolina, campus is located adjacent to the National Institute of Environmental Health Sciences (NIEHS). EPA's RTP buildings receive high temperature hot water and chilled water produced by a central utility plant (CUP), which is owned by NIEHS and operated by a contractor under the supervision of NIEHS.

As with other EPA facilities served by central district heating plants or chilled water plants, EPA does not report on energy received at those plants, but rather on the energy it receives at its facilities in the form of steam, high temperature hot water, and chilled water. In FY 2009, EPA realized that it was reporting energy received from the CUP at its buildings, but was estimating and reporting water use from the cooling tower makeup water at the CUP. Thus, there was an apparent discrepancy on how EPA reports its energy at its RTP campus (energy received at each building) and water (water received at each building, plus a share of CUP cooling tower water).

EPA proposes to align its water reporting framework for its RTP facilities with its energy reporting framework by only reporting water received at its buildings. EPA adjusted its FY 2007 water intensity baseline for the following reasons:

**Lack of Operational Control.** EPA originally elected to report a pro-rated portion of estimated CUP water consumption in its FY 2007 water intensity baseline and annual water reporting in error. EPA does not exercise day-to-day control of NIEHS's CUP operations.

**Incongruence with Energy Reporting.** EPA has been reporting only energy received at its buildings in RTP, while it reports water at its buildings in RTP *and* a share of water received at the CUP and associated cooling towers.

**Accurate CUP Water Data Not Available.** After two years of discussions with NIEHS, it is still unclear to EPA that NIEHS water use at the CUP is all metered accurately.

Due to these issues, EPA no longer reports water consumption associated with the NIEHS CUP in its Annual Energy and Water Conservation Report to DOE. Rather, EPA plans to use data from meters that directly measure the water consumed in its buildings as the basis of its water use reporting.

## Appendix D

### FY 2007 WATER DATA BASELINE WORKSHEET - EXISTING ON RECORD

Agency: EPA  
Date: 12/31/2008

Prepared by: Karen Murray  
Phone: 202-564-2539

Potable Water	Annual Consumption (Million Gallons)	Annual Cost (Thou. \$)	Facility Gross Square Feet (Thou.)	Gallons per Gross Square Foot
Buildings & Facilities Subject to Water Goal	166.6	\$1,258.2	3,723.3	44.7
				Percent
Approx. percentage of reported water consumption that is estimated:				0%
Is the FY 2007 agency water intensity baseline preliminary or final?				Final

\* 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 166,613,412 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.

### FY 2007 WATER DATA BASELINE WORKSHEET - REVISED BASELINE

Agency: EPA  
Date: 12/15/2009

Prepared by: Karen Murray  
Phone: 202-564-2539

Potable Water	Annual Consumption (Million Gallons)	Annual Cost (Thou. \$)	Facility Gross Square Feet (Thou.)	Gallons per Gross Square Foot
Buildings & Facilities Subject to Water Goal	133.6	\$949.2	3,820.3	35.0
				Percent
Approx. percentage of reported water consumption that is estimated:				0%
Is the FY 2007 agency water intensity baseline preliminary or final?				Final

\* After the finalization of EPA's FY 2008 Energy Management and Conservation Program Annual Report, EPA formally decided to remove water consumption and costs associated with the central utility plant (CUP) serving EPA's Research Triangle Park campus from its FY 2007 water baseline and annual water reporting. This change adjusts the previously reported year-end FY 2007 water consumption total from 166,613,412 gallons to a new 133,619,199 gallons. Furthermore, EPA made additional adjustments to more accurately account for actual FY 2007 GSF figures at two of EPA's reporting facilities. These combined adjustments lowered the FY 2007 water intensity baseline from 44.7 gallons per GSF to 35.0 gallons per GSF.



# **Appendix E: Summary of EPA FY 2009 Greenhouse Gas Emissions Scope 1 and 2 Emissions**

**For Submittal With EPA's  
Energy Management and Conservation Program  
FY 2009 Annual Report**





**Appendix E**  
**Summary of EPA's FY 2009 Scope 1 and Scope 2 GHG Emissions**

**Background**

This appendix presents EPA's best estimate of the various components of the Agency's FY 2009 Scope 1 and Scope 2 GHG emissions. (Note: Highlighted cells below indicate FY 2008 proxy data values pending finalization of FY 2009 GHG emissions data).

<b>Scope 1 and 2 Emissions</b>				
<b>Emissions Category</b>	<b>FY 2009 GHG emissions (MTCO<sub>2</sub>e)</b>			
	<b>Gross Estimate</b>	<b>Reasonably Good Estimate</b>	<b>Formal Calculations</b>	<b>Percent of Total Scope 1 &amp; 2 Emissions</b>
<b>SCOPE 1 EMISSIONS</b>				
Stationary fuel (natural gas, fuel oil, propane, kerosene) combustion at reporting facilities	0	0	22,604	16.2%
Direct emissions from all Agencywide fuel consumption in EPA's fleet (e.g., passenger cars, minivans, trucks) and tactical vehicles (e.g., trailers, generators, boats)	0	5,566	0	4.0%
Fugitive emissions in reporting facilities from refrigerant leakage in air-conditioning equipment	0	6,609	0	4.7%
Fugitive emissions in reporting facilities from fire suppression equipment		57		0.0%
Fugitive emissions from EPA's fleet and tactical vehicles (e.g., refrigerant leakage from air-conditioning equipment)	0	507	0	0.4%
Process emissions from laboratory fume hood testing	0	302	0	0.2%
Process emissions from NVFEL vehicle and engine testing	0	175	0	0.1%
Process emissions from furnace testing at RTP-High Bay	2,818	0	0	2.0%
Process emissions from RTP-Incinerator/Waste Handling facility's stack	0	53	0	0.0%
<b>Sub-total</b>	<b>2,818</b>	<b>13,269</b>	<b>22,604</b>	
<b>Total Scope 1 Emissions</b>	<b>38,692</b>			<b>27.6%</b>
<b>SCOPE 2 EMISSIONS</b>				
<b>FY 2009 GHG emissions (MTCO<sub>2</sub>e)</b>				
<b>Emissions Category</b>	<b>Gross Estimate</b>	<b>Reasonably Good Estimate</b>	<b>Formal Calculations</b>	<b>Percent of Total Scope 1 &amp; 2 Emissions</b>
Purchased electricity, steam, hot water, and chilled water in reporting facilities	0	0	101,251	72.4%
<b>Sub-total</b>	<b>0</b>	<b>0</b>	<b>101,251</b>	
<b>Total Scope 2 Emissions</b>	<b>101,251</b>			<b>72.4%</b>
<b>Total Scope 1 &amp; 2 Emissions</b>		<b>139,943</b>		
<b>SCOPE 1 &amp; 2 INVENTORY "ADJUSTMENTS"</b>				
Adjustments to Scope 2 emissions resulting from green power and REC purchases at EPA's reporting facilities	0	0	-86,040	
EPA's purchased offsets	0	0	0	
<b>Sub-total</b>	<b>0</b>	<b>0</b>	<b>-86,040</b>	
<b>Total Adjustments to Scope 1 &amp; 2 Emissions</b>	<b>-86,040</b>			
<b>Total Reportable Scope 1 &amp; 2 Emissions (w/ Adj.)</b>	<b>53,903</b>			

Cells highlighted in yellow indicate a FY 2008 proxy value





# **Appendix F: EPA Facility Inventory**

**For Submittal With EPA's  
Energy Management and Conservation Program  
FY 2009 Annual Report**



**Appendix F**  
**FY 2009 EPA Act Goal Subject Building Inventory<sup>1</sup>**

<b>Facility Name</b>	<b>Location</b>	<b>Site Energy Manager</b>
Robert S. Kerr Environmental Research Laboratory	Ada, Oklahoma	Frank Price
National Vehicle and Fuel Emissions Laboratory	Ann Arbor, Michigan	Steven Dorer
National Exposure Research Laboratory	Athens, Georgia	Rick Pittman
Science and Ecosystem Support Division Laboratory	Athens, Georgia	Betty Kinney
New England Regional Laboratory	Chelmsford, Massachusetts	Bob Beane
Andrew W. Breidenbach Environmental Research Center	Cincinnati, Ohio	Rich Koch
Test and Evaluation Facility	Cincinnati, Ohio	Rich Koch
Center Hill Test and Evaluation Facility	Cincinnati, Ohio	Rich Koch
National Health and Environmental Effects Research Laboratory - Western Ecology Division	Corvallis, Oregon	Primo Knight
Willamette Research Station	Corvallis, Oregon	Primo Knight
National Health and Environmental Effects Research Laboratory - Mid-Continent Ecology Division	Duluth, Minnesota	Rod Booth
Region 2 Laboratory	Edison, New Jersey	Joseph Pernice
Environmental Science Center	Fort Meade, Maryland	Rick Dreisch
Region 8 Laboratory	Golden, Colorado	Craig Greenwell
Large Lakes Research Station	Grosse Ile, Michigan	Rod Booth
National Health and Environmental Effects Research Laboratory - Gulf Ecology Division	Gulf Breeze, Florida	Clay Peacher
Region 6 Environmental Laboratory	Houston, Texas	L.C. Miner
Kansas City Science and Technology Center	Kansas City, Kansas	John Begley
University of Nevada, Las Vegas – On-Campus EPA Facilities	Las Vegas, Nevada	Robert Andrews
Region 10 Laboratory	Manchester, Washington	Linda Donahue
National Air and Radiation Environmental Laboratory	Montgomery, Alabama	Mike Clark/ Jonathan Aplin
National Health and Environmental Effects Research Laboratory - Atlantic Ecology Division	Narragansett, Rhode Island	Russ Ahlgren
National Health and Environmental Effects Research Laboratory - Western Ecology Division	Newport, Oregon	Primo Knight
New Consolidated Facility	Research Triangle Park, North Carolina	Sam Pagan
New Computer Center	Research Triangle Park, North Carolina	Sam Pagan
National Health and Environmental Effects Research Laboratory	Research Triangle Park, North Carolina	Sam Pagan
Human Studies Facility	Research Triangle Park (Chapel Hill), North Carolina	Sam Pagan
New Page Road	Research Triangle Park, North Carolina	Sam Pagan
Central Regional Laboratory	Richmond, California	Jennifer Mann

<sup>1</sup>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.





# **Appendix G: FY 2009 Annual Report**

**For Submittal With EPA's  
Energy Management and Conservation Program  
FY 2009 Annual Report**





## Sustainability Champion Winners

### *Btu Buster Award*

- Betty Kinney of the Science and Ecosystem Support Division (SESD) laboratory in Athens, Georgia, helped achieve energy savings of 7.8 percent in FY 2008 compared to FY 2007, mostly by instituting nighttime setbacks that reduced energy use during unoccupied times in non-laboratory spaces.
- The National Vehicle and Fuel Emissions Laboratory (NVFEL) staff, led by Amy Caldwell, Robert Caldwell, Robert Cresmen, Steven Dorer, Dan McBryde, Maria Peralta, Kevin Roller, and David VanAmburg in Ann Arbor, Michigan, achieved energy savings of 5.5 percent in FY 2008 compared to FY 2007. By monitoring and controlling test cell energy use, the staff helped to ensure that during the 99 percent of the time that air handlers were not in use, they were turned off, thus significantly reducing energy use and allowing the facility to meet its annual energy reduction goals.

### *H<sub>2</sub>Overachiever Award*

- Frank Price of the Robert S. Kerr Environmental Research Center in Ada, Oklahoma, helped the laboratory achieve water savings of 27.7 percent in FY 2008 compared to FY 2007 by reducing the amount of water used in the laboratory's irrigation practices and installing water-efficient aerators on the facility faucets.
- Steven Dorer and Amy Caldwell of the National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor, Michigan, retrofitted and upgraded the water infrastructure to achieve water savings of 22.7 percent in FY 2008 compared to FY 2007. Their efforts included installing high-efficiency toilets and urinals, upgrading equipment with a closed-loop temperature conditioner, and preheating all humidification water for rooftop air handlers with a heat exchanger using the building hot water loop, allowing the water to be better absorbed into the air stream, which requires much less water.
- The Water Team for EPA's Main campus in RTP, North Carolina, including team members Dan Amon, Greg Eades, Bill Gaines, Marshall Gray, Bucky Green, Dexter Johnson, Alex Montilla, Billy Morris, Sam Pagan, Carol Purvis, Bill Ridge, Pete Schubert, and Robert Wippich, achieved water savings of 15 percent in FY 2008 compared to FY 2007 due to several water conservation activities, including eliminating single-pass cooling from two laboratories on the RTP Main campus and retrofitting lavatory faucets and steam sterilizers with more efficient models or kits.

### *Energy Partner of the Year Award*

- Rick Dreisch of the Environmental Science Center (ESC) in Fort Meade, Maryland, successfully implemented a three-phased ventilation upgrade project that helped contribute to a decrease in energy intensity of more than 3 percent in FY 2008 compared to FY 2007.

### *Leading Edge Award*

- David Shoffner and Jason Mangum of EPA's National Health and Environmental Effects Research Laboratory in RTP, North Carolina, installed a solar powered air compressor that provides free air for tire inflation to RTP employees. The laboratory gave out miniature tire inflator gauges at the annual Environmental Management System

(EMS) training to ensure proper tire inflation and save gasoline through improved vehicle efficiency.

#### *Pollution Prevention Partner of the Year*

- Ruth Schenk and Dorothy Richards of NVFEL in Ann Arbor, Michigan, made efforts to increase recycling, which in FY 2008 resulted in approximately half of the facility's waste being diverted from the waste stream. This rate includes the electronics recycling through the Recycling Electronics and Asset Disposition (READ) contract.
- The Electronics Stewardship Team in the EPA Region 8 office in Denver, Colorado—Chris Ayala, Kim Bartels, Carl Truszynski, Kendra Wilborn, and Greg Zurla—developed an award-winning electronics management program that emphasizes a cradle-to-grave approach to electronics stewardship.
- Cate Berard of the Office of Pollution Prevention and Toxics at EPA Headquarters in Washington, DC, played an integral role in advancing electronics stewardship within EPA and across the broader federal community.

#### *Appreciation Award*

- Scott Tharp and Bill Wise of AWBERC in Cincinnati, Ohio, provided reliable and exceptional service in supporting the EPA Facilities Management and Services Division's (FMSSD's) construction contracting efforts.

#### *Reporter of the Year*

- Vicki Blackmon of the Gulf Ecology Division laboratory in Gulf Breeze, Florida, consistently submitted timely, accurate invoice packages and reporting forms for the Gulf Breeze facilities.
- Andy Franke of EPA's Cincinnati, Ohio, campus consistently submitted timely, accurate invoice packages for the entire Cincinnati campus.

#### *Green Thumb*

- The Rain Garden Team at ESC in Fort Meade, Maryland, designed and installed a rain garden to prevent excess runoff from the building roof and to prevent soil from eroding around the front entrance of the building. Team members included Robin Costas, John Curry, Joe Dorsey, Jennifer Gundersen, Rebecca Pines, Lynda Podhorniak, Mary Price, Al Robertson, Dave Russell, Chuck Stafford, Narda Terry, Skip Weisberg, Stevie Wilding, and Peggy Zawodny.

#### *Lifetime Achievement*

- Bob Beane of the New England Regional Laboratory in Chelmsford, Massachusetts, has contributed to sustainable design and facility conservation at EPA for nearly four decades. Under his management, in 2001 the New England Regional Laboratory became the first U.S. Green Buildings Council (USGBC) Leadership in Energy and Environmental Design (LEED)<sup>®</sup> certified laboratory to be built by the Agency.
- Harvey Holm of the National Exposure Research Laboratory in Athens, Georgia, spent years in dedicated service to EPA, including designing a low-cost air handling unit condensate recovery system using existing infrastructure and installing water-efficient

sanitary fixtures that helped the laboratory reduce water consumption by more than 26 percent in FY 2008 compared to FY 2007.

*Sustainable Partner of the Year*

- The Cincinnati Infrastructure Replacement Project (IRP) Team—Bucky Green, Stephanie James, Abbas Keshavarz, Rick Koch, Bill Ridge, Scott Tharp, Evelyn Toro, and Bill Wise—made significant efforts to complete Phase I of the IRP, a multi-year, multi-phase project that will replace all of the air handlers, vertical and horizontal supply ductwork, control systems, exhaust systems, and associated equipment at AWBERC. The IRP is expected to help the facility cut its energy use by more than 30 percent, once all four phases of the project are completed.
- Joe Gillian of EPA Headquarters in Washington, DC, assisted with the design and award of a contract to install a green roof at the Atlantic Ecology Division laboratory in Narragansett, Rhode Island. The roof will mitigate stormwater runoff and drain excess water to rain barrels or cisterns, allowing the facility to reuse it.





# **Appendix H: FY 2009 Annual Report**

**For Submittal With EPA's  
Energy Management and Conservation Program  
FY 2009 Annual Report**



**Table 1. Projects Which Filed Fully Completed GreenCheck Forms in FY 2009**

<p><i>The National Exposure Research Laboratory and Radiation and Indoor Environments National Laboratory Las Vegas, Nevada</i></p>	<p>LaPlaza Security Fence/Construction</p>	<p><i>Human Studies Facility Chapel Hill, North Carolina</i></p>	<p>Replace Roof at Human Studies Facility/Construction</p>
<p><i>Western Ecology Division Laboratory Corvallis, Oregon</i></p>	<p>Phase 1A Construction Mechanical &amp; Electrical Systems for WED-COR  Update WED Main Building Mechanical &amp; Electrical System Design Phase 1A</p>	<p><i>New England Regional Laboratory Chelmsford, Massachusetts</i></p>	<p>Laboratory Recommissioning and BMS Energy Use Reduction Modifications/Design &amp; Commissioning</p>
<p><i>AWBERC Cincinnati, Ohio</i></p>	<p>Infrastructure Replacement Construction (Phase 3)  Infrastructure Follow-on &amp; Commissioning - Phase 3  Renovation of LRPCD Laboratories during Infrastructure Replacement Project (IRP)/Design  Lab Decon - Phase 3/Decommissioning  Infrastructure Design - Phase 4/Design  WSWRD Lab Consolidation and Upgrading/Design  WSWRD Laboratory</p>	<p><i>Page Road Durham, North Carolina</i></p>	<p>Grand Slam Audit Finding Corrections-Page Road H&amp;S Repairs/Construction</p>
<p><i>Atlantic Ecology Division Laboratory Narragansett, Rhode Island</i></p>	<p>Renovation of LRPCD Laboratories during Infrastructure Replacement Project (IRP)/Design  Lab Decon - Phase 3/Decommissioning</p>	<p><i>Atlantic Ecology Division Laboratory Narragansett, Rhode Island</i></p>	<p>New Sprinkler System  Phase 1, Lab Modernization, Renovate/Construction &amp; Phase Services &amp; Commissioning</p>
<p><i>National Vehicle &amp; Fuel Emissions Laboratory Ann Arbor, Michigan</i></p>	<p>Infrastructure Design - Phase 4/Design  WSWRD Lab Consolidation and Upgrading/Design  WSWRD Laboratory</p>	<p><i>National Vehicle &amp; Fuel Emissions Laboratory Ann Arbor, Michigan</i></p>	<p>Equipment Protection System (EPS)/Design &amp; Construction  Fuel Handling, Blending, Conditioning and Dispensing  Upgrade/Replacement/Design &amp; Construction</p>

<p>Modernization - AWBERC IRP Phase II &amp; III/Design</p> <p>ADA Upgrades (AWBERC Restrooms) - Phase B/Construction</p> <p>Infrastructure Construction - Phase 1</p> <p>Infrastructure Design - Phase 3/Design</p> <p>Office of Water Lab Renovation - Labs 176, 178, 180, 182 184</p> <p>Advanced Metering (Electric)/Construction</p>		<p><i>Region 2 Laboratory Edison, New Jersey</i></p> <p>Green Parking Lot Construction</p> <p>Phase II of Edison Regional Response Center - ERRD Staff Offices/Construction</p>
		<p><i>MED Duluth, Minnesota</i></p> <p>Roof Replacement - Main Building</p>
		<p><i>National Air &amp; Radiation Environmental Laboratory Montgomery, Alabama</i></p> <p>Facility Control System Upgrade</p>
		<p><i>New Main RTP, North Carolina</i></p> <p>Controls Master Plan (EPA-RTP Main Campus)/Phase 3/Construction</p> <p>Recoat Building A Green Floor/Construction</p> <p>Utility Submetering for EPA-RTP Campus/Construction</p>
<p><i>Federal Triangle Headquarters Washington, DC</i></p> <p>HQ Space Alterations/Construction</p>		<p><i>ESC Fort Meade, Maryland</i></p> <p>Independent AC for Computer Center</p>
<p><i>Center Hill Cincinnati, Ohio</i></p> <p>Center Hill Lab 125 – HVAC Upgrade/Construction</p>		<p><i>Large Lakes Research Station Grosse Ile, Michigan</i></p> <p>Replace Roofing of Main Lab Building /Construction</p> <p>Replace Steam Boilers</p>





# **Appendix I: FY 2009 Annual Report**

**For Submittal With EPA's  
Energy Management and Conservation Program  
FY 2009 Annual Report**



## National Onsite Renewable Energy Study

Following the study to evaluate EPA's laboratory facilities for new renewable energy projects, EPA developed a spreadsheet complete with recommendations for opportunities to apply the following technologies at some of its facilities:

- *Solar*: EPA looked at the costs, benefits, and feasibility of solar hot water, rooftop photovoltaic (PV) panels, solar pre-heat walls and ground-level onsite lighting. Secondary benefits, such as the potential for PV panels to extend the life of the roof, were also considered. Sites were prioritized based on expected average daily and annual solar radiation for the facility, available roof area, and potential shading impacts.
- *Wind*: EPA evaluated whether it made sense to place wind turbines on site to generate base-load and stand-by power for its facilities, taking into account local conditions for wind power, including weather, regulations, utility restrictions, state and local rebates available to lower investment costs, and other factors that affect feasibility. The evaluation primarily focused on facilities located in Class 4 or higher wind areas; however, EPA noted any location that could have potential for future review in its renewable energy analysis spreadsheet.
- *Ground Source Heat Pumps (GSHP)*: EPA considered geothermal options as a source of base-load and stand-by heating, ventilation, and air conditioning (HVAC) capacity. Local considerations for GSHP included soil conditions, regulatory or utility restrictions, state and local rebates available to lower investment costs, and other factors that affect feasibility.

Other renewable technologies were included as appropriate. EPA put a priority on using GSHPs for buildings with older HVAC systems approaching the end of their useful life and requiring replacement. Buildings with existing water source heat pump systems were also given priority. After this initial screening assessment to evaluate the technical feasibility of each technology at each facility, EPA analyzed facilities with the highest potential more fully, considering the following questions: What is the estimated cost, as an order of magnitude? What is the payback period in which cost would be recouped in energy savings? How many Btu are estimated to result from the project?

EPA documented potential energy savings, the initial cost of installation, and ongoing costs of maintenance, interconnectivity, and utility stand-by charges. The Agency plans to review the results of this analysis with facility managers and senior management to develop an onsite renewable energy strategy across the Agency. At the end of FY 2009, draft reports had been completed for all 11 facilities that were identified for facility-specific analysis, as shown in Table 1.

Table 1. High Renewable Energy Potential EPA Facilities				
Facility	Location	Geothermal Heat Pump	Photovoltaics	Wind
Atlantic Ecology Division Laboratory	Narragansett, RI	X	X	X
NERL	Athens, GA	X	X	

Table 1. High Renewable Energy Potential EPA Facilities				
NAREL	Montgomery, AL	X	X	
New Main	RTP, NC		X	
Human Studies	RTP, NC		X	
NCC	RTP, NC		X	
FEELC	RTP, NC		X	
NVFEL	Ann Arbor, MI	X		
Robert S. Kerr Environmental Research Center	Ada, OK	X		
Pacific Coastal Ecology Branch Laboratory	Newport, OR		X	X
Western Ecology Division Laboratory	Corvallis, OR	X	X	