



U.S. Environmental Protection Agency

Energy Management and Conservation Program

Fiscal Year 2014 Annual Report

Cover: EPA's Gulf Ecology Division Laboratory in Gulf Breeze, Florida. In FY 2014, EPA began the process of updating its real estate guidance documents to include climate resiliency considerations. EPA performed climate resiliency assessments at its Gulf Breeze, Florida, Laboratory (focused on sea level rise and more severe weather) and at its Robert S. Kerr Environmental Research Center in Ada, Oklahoma (focused on drought impacts).

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FISCAL YEAR (FY) 2014 HIGHLIGHTS

In FY 2014, the U.S. Environmental Protection Agency (EPA) once again demonstrated leadership among federal agencies in the charge to reduce its carbon and environmental footprint. EPA continued to meet or exceed the goals required under Executive Order (EO) 13514, EO 13423, EO 13653, and the Energy Independence and Security Act of 2007 (EISA) for federal greenhouse gas (GHG) emission reductions, energy efficiency, water conservation, high performance sustainable buildings, and solid waste diversion.

In FY 2014, EPA focused on: reducing its Scope 1, 2, and 3 GHG emissions; initiating or completing major energy efficiency capital improvement projects; implementing water conservation and stormwater management strategies; furthering its progress toward meeting the *Guiding Principles for Federal Leadership in High-Performance and Sustainable Buildings (Guiding Principles)*; and improving its non-hazardous solid waste diversion rate. EPA received a status score of “green” in every category for FY 2013 on its January 2014 U.S. Office of Management and Budget (OMB) Sustainability/Energy scorecard, demonstrating the ongoing success of the Agency’s comprehensive approach to sustainability.

In June 2014, in accordance with the requirements of EO 13514, EPA submitted a revised Strategic Sustainability Performance Plan (SSPP) to OMB and the Council on Environmental Quality (CEQ). EPA’s SSPP outlines the Agency’s plans to reduce GHG emissions, energy intensity, water use, solid waste, and other resource use, and to incorporate sustainable design and operations across its facilities.

Scope 1, 2, and 3 GHG Emissions Decreased From FY 2008 Baseline

In FY 2014, EPA reported Scope 1 and 2 GHG emissions of 57,575 metric tons of carbon dioxide equivalent (MTCO₂e). These emissions are 59.5 percent below the Agency’s FY 2008 baseline, which surpasses EPA’s EO 13514 Scope 1 and 2 GHG emissions reduction goal of 25 percent by FY 2020 from the FY 2008 baseline. EPA achieved these reductions by implementing energy efficiency projects at its facilities, improving fleet management practices, and continuing its green power purchase program. EPA anticipates further achievements in this area in FY 2015 as a result of additional capital improvement projects that are already underway or nearly complete. EPA has also begun planning additional projects in anticipation of new federal energy reduction requirements from FY 2016 to FY 2025.

The Agency’s estimated Scope 3 GHG emissions were 38,599 MTCO₂e, a decrease of 45.8 percent compared to the FY 2008 baseline, which surpassed EPA’s EO 13514 goal of 8 percent by FY 2020. A drop in Scope 3 GHG emissions associated with reduced employee business travel accounted for a significant portion of this decrease.

Energy Intensity Decreased 29.0 Percent From FY 2003 Baseline

EPA's FY 2014 reported energy intensity was 282,632 British thermal units (Btu) per gross square foot (GSF)¹, a reduction in energy intensity of 29.0 percent compared to its FY 2003 baseline, which exceeded the 27 percent energy intensity reduction required under EISA and EO 13423. EPA initiated or completed work on several major energy efficiency projects in FY 2014, which are outlined later in this report, and will continue to closely manage its energy use and make further progress in reducing its energy intensity in FY 2015.

EPA continued to be a leader among federal agencies by purchasing green power and renewable energy certificates (RECs) equal to 100 percent of its FY 2014 electricity use. In September 2014, EPA signed a blanket purchase agreement to secure more than 236 million kilowatt hours (kWh) of RECs. Through this contract and other existing green power contracts, EPA will again purchase green power and RECs covering 100 percent of EPA's estimated FY 2015 electricity use.

In FY 2014, EPA completed all EISA-required energy assessments at facilities including: the Andrew W. Breidenbach Environmental Research Center (AWBERC) in Cincinnati, Ohio; the Main Building at EPA's campus in Research Triangle Park (RTP), North Carolina; and the National Vehicle and Fuel Emissions Laboratory (NVFEL) in Ann Arbor, Michigan. Collectively, the facilities for which EPA reported assessment findings in June 2014 represent more than 35 percent of the total energy use of EPA's covered facilities (based on FY 2008 data, per EISA Section 432 guidance). With the completion of these assessments, EPA exceeded the EISA requirement for June 2014.

In FY 2014, EPA had advanced metering projects under design or under construction at three laboratory facilities. Advanced metering hardware is now installed, under design, or under construction to capture approximately 72 percent of Agencywide reportable energy consumption.

Water Intensity Dropped 40.4 Percent From FY 2007 Baseline

In FY 2014, EPA reduced its water use by 40.4 percent compared to its FY 2007 baseline, greatly exceeding the EO 13514 goal for the year of 14 percent. EPA's water intensity in reporting laboratories was 21.2 gallons per GSF in FY 2014 (82.6 million total gallons), much lower than its FY 2007 water intensity baseline of 35.6 gallons per GSF (136.5 million total gallons).

Several EPA facilities completed water conservation projects, including: optimizing cooling tower cycles of concentration; increasing control of tempering water for boilers and steam sterilizers; and installing new water-efficient restroom fixtures. EPA also conducted water assessments for seven EISA-covered facilities in FY 2014.

EPA also continued to exceed the requirements for reducing industrial, landscaping, and agricultural (ILA) water use set forth in EO 13514. EPA estimates that it used 4.6 million gallons

¹ To encourage combined heat and power (CHP) energy projects that reduce source energy use but might increase site energy use, DOE/FEMP allows agencies with operational CHP projects to apply a credit to their reportable annual energy intensity. EPA's energy savings figures account for this credit. As a result, EPA's actual FY 2014 energy intensity reduction is 0.77 percent higher than this figure.

of nonpotable water for ILA applications in FY 2014, which is 96.6 percent lower than its FY 2010 baseline of 135.2 million gallons.

14.8 Percent of EPA-Owned Buildings Met the *Guiding Principles for High Performance and Sustainable Buildings (Guiding Principles)*

Using EPA's Federal Real Property Profile (FRPP) inventory, eight buildings—or 14.8 percent (by number of buildings)—of buildings greater than 5,000 square feet in EPA's projected FY 2015 FRPP met the *Guiding Principles* at the end of FY 2014.² This progress exceeds the target on the January 2015 OMB Energy/Sustainability Scorecard of 13 percent and demonstrates EPA's commitment to building high performance new buildings and upgrading its older existing buildings to federal green building principles. EPA's progress in FY 2014 will contribute significantly to the Agency's efforts to meet the FY 2015 *Guiding Principles* requirement of 15 percent. In FY 2014, EPA internally certified that two additional facilities met the *Guiding Principles*: the Agency's Building A Administration Wing at its RTP, North Carolina, campus and the AWBERC Main Building and Annex I in Cincinnati, Ohio.

Green Certifications Promote High Performance Sustainable Buildings

In addition to internally certifying buildings under the Agency's own set of sustainable building management procedures and policies, EPA uses other systems to benchmark the environmental performance of its real property portfolio. In FY 2014, EPA occupied 11 buildings certified Gold or Silver under the U.S. Green Building Council's (USGBC's) LEED® for Building Design and Construction (LEED BD+C) rating system, as well as 15 buildings certified under the LEED for Building Operations and Maintenance (LEED O+M) rating system. Four Headquarters office buildings and all 10 EPA regional offices have earned the ENERGY STAR® label, nine of which received it within the last three years. Two Headquarters offices, two regional offices, and five smaller offices renewed their labels in FY 2014. Of the 11 million square feet of laboratory, office, and support space that EPA occupies, 40 percent has some form of green building certification.

Facility Projects Improve Stormwater Management

EPA's stormwater management efforts continued in FY 2014 in accordance with the requirements set forth in EO 13514, EISA Section 438, and the *Guiding Principles*. In FY 2014, EPA constructed additional stormwater management facilities at the RTP campus. EPA carefully examines all new projects for stormwater opportunities and requirements.

Solid Waste Recycling Rate Reaches 64.6 Percent

EO 13514 requires federal agencies to meet a non-hazardous solid waste recycling rate of 50 percent by FY 2015, and the Agency previously set its own internal recycling goal of 60 percent. EPA exceeded both requirements in FY 2014 by achieving a recycling rate of 64.6 percent. Several EPA facilities significantly contributed to EPA's non-hazardous solid waste recycling achievements

² FRPP buildings are those that EPA owns or leases directly from property owners.

through their ongoing source reduction, recycling, reuse, donation, composting, and other waste reduction efforts.

U.S. EPA Energy Management and Conservation Program FY 2014 ANNUAL REPORT

In June 2014, EPA submitted to OMB and CEQ an update to its SSPP, a comprehensive, multi-year planning document that identifies targets for reducing Agencywide GHG emissions by FY 2020 and outlines the steps the Agency will take to achieve those reductions. Through this report, EPA outlines its strategy for meeting the federal requirements of EO 13514 by reiterating its plans to reduce energy, water, waste, and other resource use, and to incorporate sustainable design and operations across its facilities. The report details key Agency priorities and strategies for achieving its sustainability goals, including: GHG emission reductions; energy efficiency; renewable energy; fleet management; high performance sustainable buildings; climate adaptation; regional and local planning; water conservation; recycling and pollution prevention; electronics stewardship; and sustainable acquisition. EPA's updated SSPP is available at www.epa.gov/greeningepa.

MANAGEMENT AND ADMINISTRATION SUMMARY

The Agency's Senior Sustainability Officer (SSO) for the duties and responsibilities set forth by EO 13514 is the Acting Assistant Administrator for the Office of Administration and Resources Management, Nanci Gelb, who reports directly to the Administrator.

GHG EMISSIONS INVENTORY AND REDUCTION EFFORTS

EPA has maintained an Agencywide GHG emissions inventory since FY 2008. In addition to quantifying direct and indirect emissions associated with energy consumption at the Agency's 35 reporting facilities, EPA's inventory accounts for: mobile emissions from fleet vehicles and equipment; fugitive emissions associated with building fire suppression and mobile air conditioning equipment; process emissions from laboratory research; and other activities' emissions associated with leased office and support space. EPA's inventory also reflects the significant impact of the Agency's green power and REC purchases.

In accordance with the requirements of EO 13514, EPA committed to reducing its combined Scope 1 and 2 GHG emissions 25 percent by FY 2020 from its current FY 2008 baseline of 142,010 MTCO_{2e}, as well as reducing the required categories of Scope 3 GHG emissions by 8 percent by FY 2020 compared to its FY 2008 baseline of 71,068 MTCO_{2e}. More details on the Agency's GHG emission reduction strategies are available in the Agency's SSPP.

Reported Scope 1 and 2 GHG Emission Reductions

EPA's Scope 1 and 2 GHG Emissions Have Decreased 59.5 Percent From Its FY 2008 Baseline

EPA reported Scope 1 and 2 GHG emissions of 57,575 MTCO₂e in FY 2014, which is 2.5 percent lower than the Agency's FY 2013 emissions and 59.5 percent lower than the Agency's FY 2008 baseline of 142,010 MTCO₂e (see Figures 1 and 2 below). Even when the Agency does not account for green power and REC purchases, EPA's FY 2014 combined Scope 1 and 2 GHG emissions still decreased by 23,440 MTCO₂e, or 16.5 percent, relative to the Agency's FY 2008 baseline. EPA expects to continue to reduce Scope 1 and 2 GHG emissions in FY 2014 based on future green power and REC purchases and energy efficiency projects at its facilities.

Figure 1. EPA's Reported Scope 1 and 2 GHG Emissions: FY 2008 and FY 2014

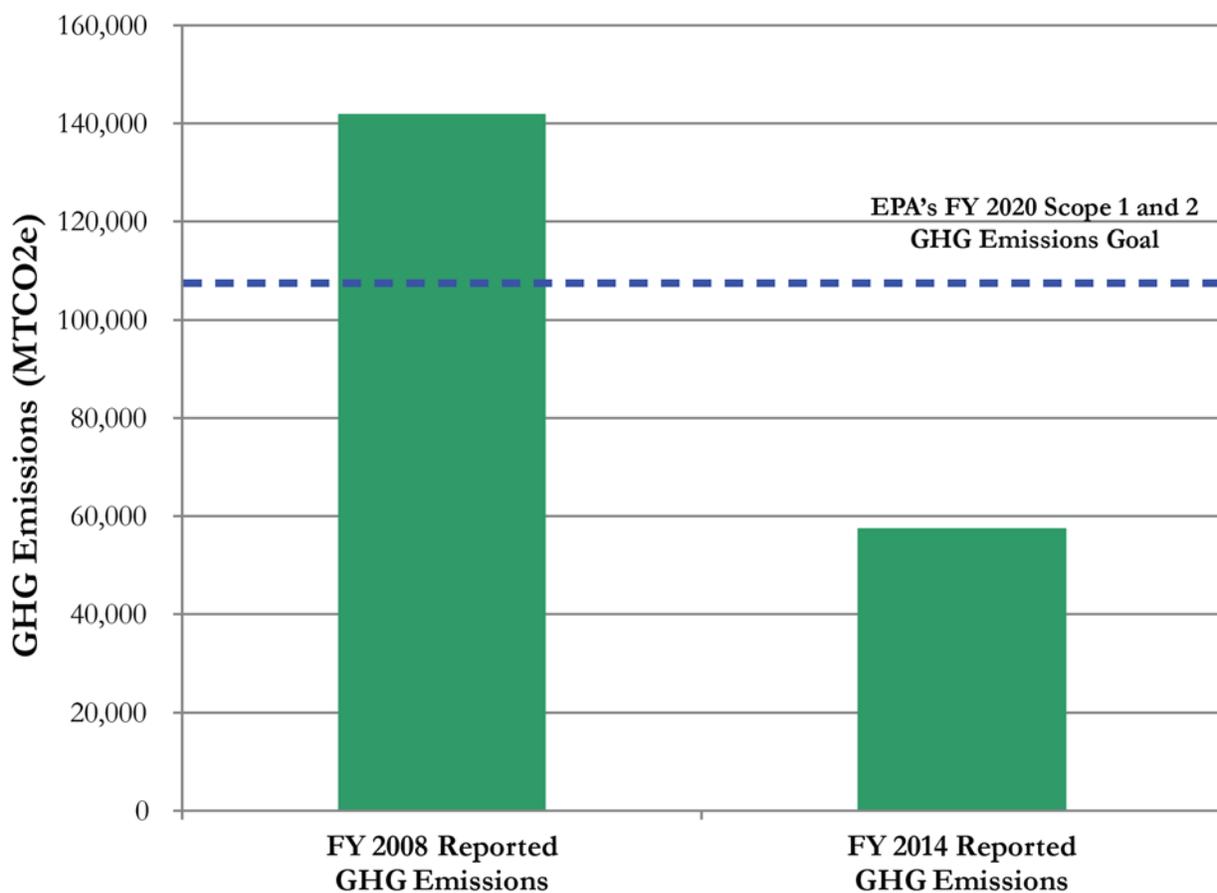
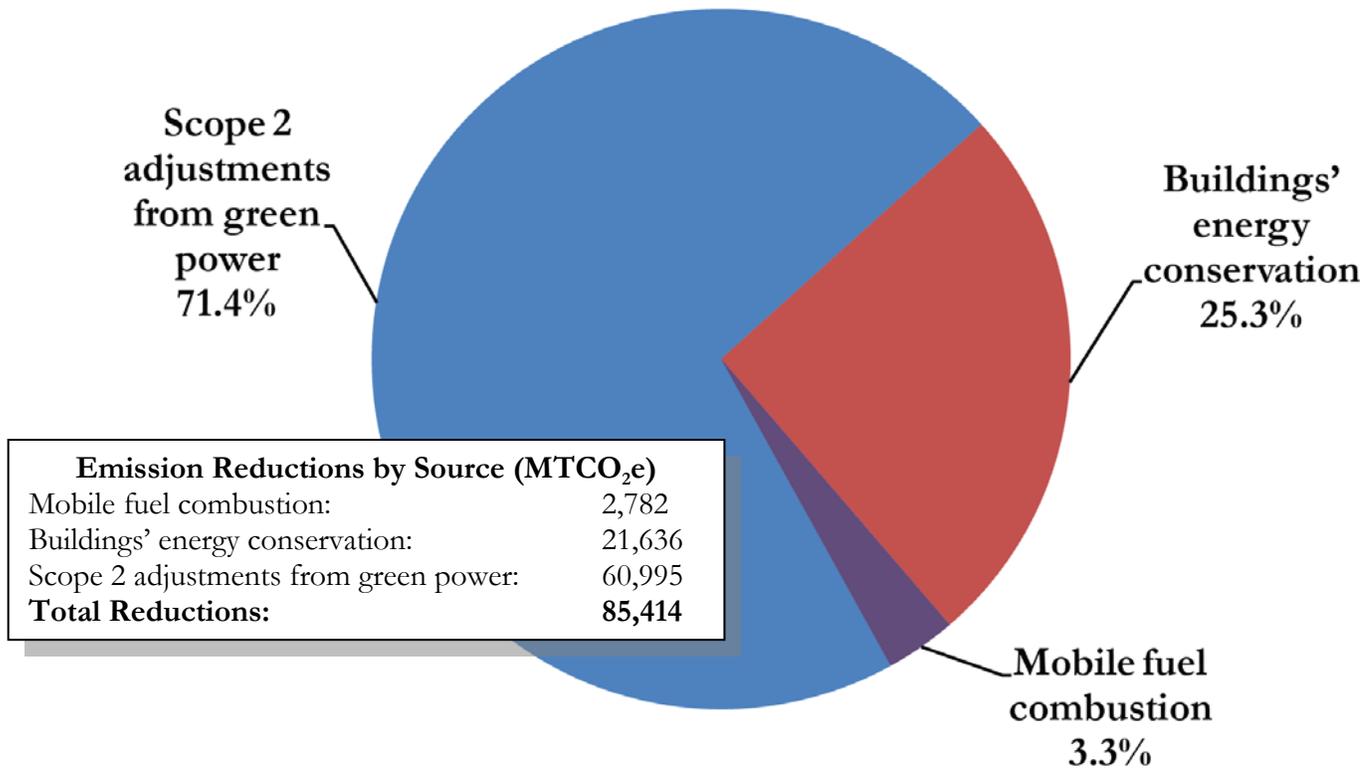


Figure 2. EPA's Scope 1 and 2 GHG Emission Reductions by Source, FY 2014 Compared to FY 2008



Reported Scope 3 GHG Emission Reductions

EPA's Scope 3 GHG Emissions Are 45.8 Percent Lower Than FY 2008 Baseline

Scope 3 GHG emissions include indirect emissions from sources that are not owned or directly controlled by EPA but are related to the Agency's activities, such as: employee business travel and commuting; contracted solid waste disposal; and contracted wastewater treatment. EPA's goal is to reduce the required subset of its Scope 3 GHG emissions by 8 percent by FY 2020 compared to its FY 2008 baseline of 71,068 MTCO₂e. In FY 2014, EPA's estimated Scope 3 GHG emissions were 38,599 MTCO₂e, a decrease of 9.2 percent from FY 2013, and a decrease of 45.8 percent from the FY 2008 baseline (see Figures 3 and 4 below).

Figure 3. EPA's Reported Scope 3 GHG Emissions, FY 2008 and FY 2014

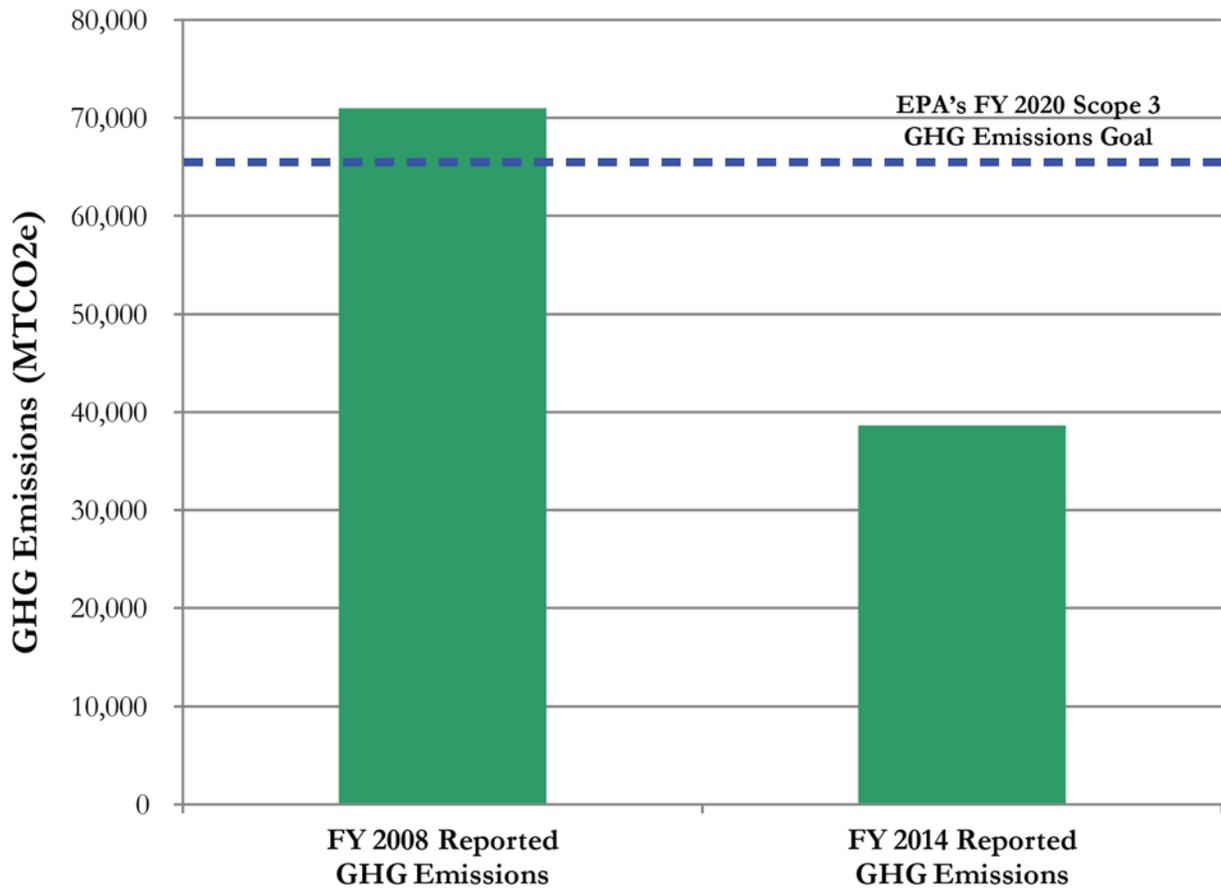
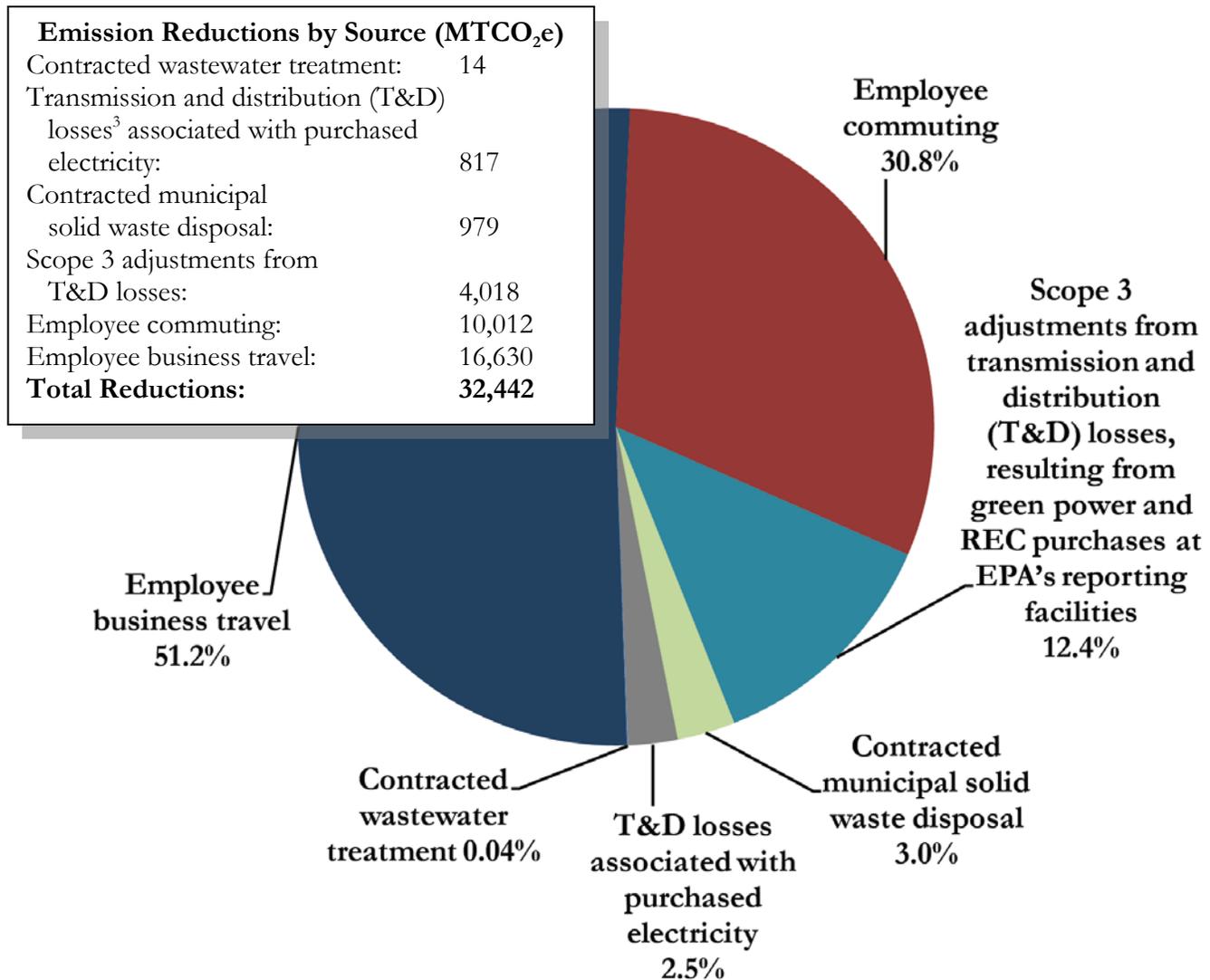


Figure 4. EPA’s Scope 3 GHG Emission Reductions by Source, FY 2014 Compared to FY 2008



Commuting Emissions

EPA conducted its third Agencywide employee commuter survey in October 2014 using the General Services Administration’s (GSA’s) Scope 3 Commuter Survey, a component of GSA’s Carbon Footprint Tool, and used the results to calculate employee commuting-related GHG emissions for FY 2014. Nearly 7,000 EPA employees completed the Agencywide commuter survey, a response rate of 45.8 percent. The Agency’s total commuting-related GHG emissions decreased by 26.7 percent in FY 2014 compared to the FY 2008 baseline, primarily because there were fewer full-time employees in FY 2014 (i.e., fewer commute trips). Average commuting distances per capita decreased between FY 2012 and FY 2014 for each travel mode except intercity rail and authorized use of federal vehicles. EPA plans to continue to use GSA’s Scope 3 Commuter Survey

³ Transmission and distribution (T&D) losses are in electricity during transmission between sources of supply and points of distribution.

in the future and will focus on increasing the survey participation rate to obtain more accurate data on employee commuting patterns.

Optional Sources of Scope 3 GHG Emissions

EPA also voluntarily reports several categories of Scope 3 GHG emissions not currently required by EO 13514. In FY 2014, Scope 3 GHG emissions from energy use at EPA's non-reporting facilities (i.e., regional offices, Headquarters facilities, warehouses) were 65,369 MTCO₂e, a decrease of 20.8 percent compared to the FY 2008 baseline of 82,539 MTCO₂e. The revised EO 13514 Section 9 *GHG Accounting and Reporting Guidance* (published June 4, 2012) suggests that this source of optional Scope 3 GHG emissions may become mandatory in future years. Having calculated and voluntarily reported these emissions since FY 2010, EPA is prepared to continue reporting these emissions, should they become required in the future.

In FY 2014, EPA successfully consolidated personnel in its Headquarters satellite building at 1310 L Street NW, in Washington, DC, into existing space at the Federal Triangle complex. In addition to saving the Agency nearly \$7 million in annual rent and reducing Headquarters' real estate portfolio by nearly 136,000 square feet, EPA expects this move to reduce its FY 2015 optional Scope 3 emissions from leased space by approximately 1,800 MTCO₂e.

ENERGY EFFICIENCY PERFORMANCE

EPA's FY 2014 Energy Intensity Has Decreased 29.0 Percent From FY 2003 Baseline

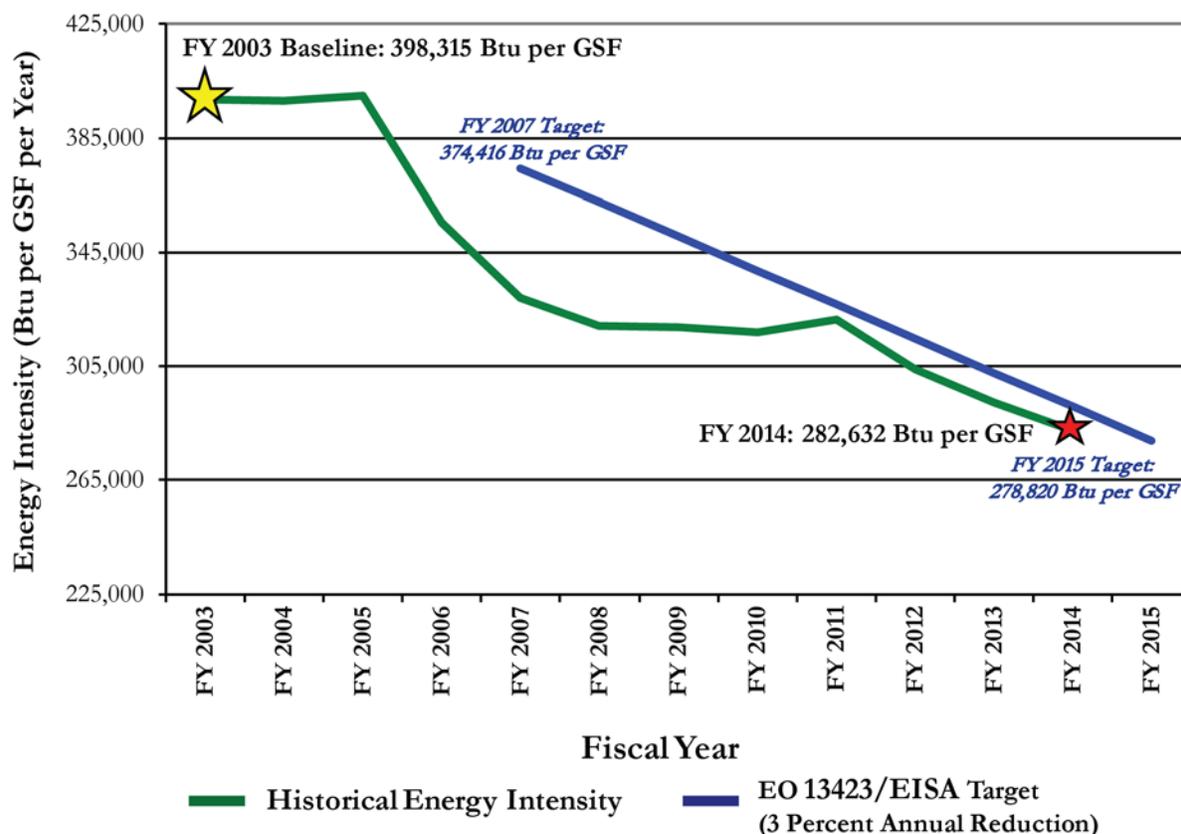
EISA and EO 13423 require federal agencies to reduce their energy intensity by 3 percent per year, or 30 percent by FY 2015, compared to an FY 2003 baseline. In FY 2014, EPA exceeded the required 27 percent cumulative energy intensity reduction. EPA's FY 2014 reported energy intensity was 282,632 Btu per GSF, which is 29.0 percent below the FY 2003 baseline (see Figure 5 below). In absolute terms, EPA's FY 2014 energy consumption was 1,099 billion Btu (BBtu) compared to its FY 2003 baseline of 1,481 BBtu.

The Agency's FY 2014 energy intensity includes a site/source energy intensity reduction credit created by the U.S. Department of Energy's Federal Energy Management Program (FEMP) to encourage energy-efficient co-generation projects.⁴ Without this credit, EPA's actual FY 2014 energy intensity was 285,708 Btu per GSF, or 28.3 percent below the FY 2003 baseline. By either measure, EPA exceeded the FY 2014 energy use reduction requirements. EPA will continue to closely manage its energy use in FY 2015 and expects to exceed the cumulative 30 percent energy intensity reduction requirement by FY 2015, based on projects completed during FY 2014 and nearing completion in early FY 2015.

EPA has already initiated planning of energy projects for FY 2016 to FY 2025 to show its continued commitment to GHG emission reductions and energy conservation.

⁴ Co-generation projects increase reported site energy use but decrease source energy use.

Figure 5. EPA Annual Energy Intensity Relative to its EO 13423/EISA Target



Agencywide Energy Intensity and Percent Change From FY 2003 Baseline	
FY 2003 Baseline: 398,315 Btu/GSF	
FY 2004: 398,282 Btu/GSF: -0.01%	FY 2010: 317,139 Btu/GSF: -20.38%
FY 2005: 400,059 Btu/GSF: +0.44%	FY 2011: 321,437 Btu/GSF: -19.30%
FY 2006: 355,335 Btu/GSF: -10.79%	FY 2012: 304,169 Btu/GSF: -23.64%
FY 2007: 329,257 Btu/GSF: -17.34%	FY 2013: 292,241 Btu/GSF: -26.63%
FY 2008: 319,144 Btu/GSF: -19.88%	FY 2014: 282,632 Btu/GSF: -29.04%
FY 2009: 318,587 Btu/GSF: -20.02%	

RTP Laboratory Consolidation Efforts

In August 2014, EPA completed the relocation of employees from its leased National Health and Environmental Effects Research Laboratory and Reproductive Toxicology Facility (NHEERL/RTF) in RTP, North Carolina, into the Agency’s existing Main Building on the RTP campus. This consolidation project, having already improved space utilization in the Main Building, will significantly reduce EPA’s Scope 1 and 2 GHG emissions and overall energy consumption, reduce the Agency’s rent by \$1.7 million annually, and avoid approximately \$550,000 in annual energy costs. Through this consolidation effort, EPA reduced its laboratory square footage by

approximately 38,000 square feet and renovated 116 existing laboratory modules within the RTP Main Building to accommodate incoming research staff. In FY 2014, EPA completed an airflow reduction study for the NHEERL/RTF facility and implemented the recommended airflow reduction measures in December 2014. To properly close out the facility's radiation licenses and permit, EPA will continue leasing the facility through April 2015.

Safely Reducing Laboratory Ventilation Rates

In FY 2014, EPA continued to implement new approaches to reduce its energy intensity and meet its Scope 1 and 2 GHG emissions reduction targets. These strategies include:

- Adoption of lower fume hood airflow rates while maintaining safe working environments based on the new American National Standards Institute (ANSI)/American Industrial Hygiene Association (AIHA)/American Society of Safety Engineers (ASSE) Z9.5 standards. Once fume hood airflow reductions are completed within a facility, EPA typically rebalances the outside air supply and exhaust systems for the entire building.
- Use of occupancy sensors to set air change-per-hour rates in laboratory modules based on occupancy. After installing occupancy sensors in laboratory modules at the AWBERC facility, EPA is considering installing similar sensors in its New England Regional Laboratory (NERL) in Chelmsford, Massachusetts, and at its Region 10 Laboratory in Manchester, Washington.
- Use of fume hoods that can be easily “hibernated” when not needed. A typical 5-foot, constant volume fume hood requires 1,000 to 1,200 cubic feet per minute (CFM) of conditioned air when closed; a typical 5-foot, high performance, variable air volume (VAV) fume hood requires 170 to 200 CFM of conditioned air when closed; and a typical 5-foot fume hood in hibernation mode requires 60 CFM of conditioned air.

In FY 2014, EPA implemented airflow reduction measures at NERL in Chelmsford, Massachusetts, and at its Science and Technology Center (STC) in Kansas City, Kansas. Implementation of airflow reduction projects are planned for additional facilities in FY 2015, including: the Office of Research and Development (ORD) Laboratory in Athens, Georgia; the Environmental Science Center (ESC) in Fort Meade, Maryland; and the Region 10 Laboratory in Manchester, Washington.

Energy Intensity Exclusions

In FY 2014, EPA excluded one source of energy consumption—its aquatic research vessel, *Lake Explorer II*—from federal energy performance requirements, following the criteria included in FEMP's *Guidelines for Establishing Criteria for Excluding Buildings*. More information on this vessel is included in Appendix A.

Life Cycle Cost Analysis

EPA has well-established processes to evaluate the economic life cycle costs and return on investment (ROI) for new facilities, major renovations, mechanical system upgrades and replacements, and other facility projects. Through EPA's Five-Year Capital Investment Plan, Energy Conservation Plan, Water Conservation Strategy, and Buildings and Facilities (B&F) Capital Budgeting Process (i.e., the B&F Project Ranking Process), the Agency ranks energy projects based

on financial criteria, including: initial investment; energy and operational cost savings; absolute Btu and/or gallons of potable water saved per dollar; and potential for reducing facility maintenance.

For major new EPA facilities, GSA-owned buildings being renovated for EPA, or build-to-suit buildings leased by GSA from private landlords for EPA, the Agency as a standard operating practice performs extensive energy modeling to ensure compliance with the requirement that new buildings and major renovations perform 30 percent better than the ASHRAE 90.1 standard. During this process, EPA weighs the cost of incremental mechanical system and building envelope investments against the energy cost savings that will result from these investments. The Agency pursues energy efficiency performance beyond the 30 percent better than the ASHRAE standard when it can be achieved in a life cycle cost-effective manner.

EISA Section 432 Implementation—Energy Assessments

EPA Completed Energy Assessments at More Than 35 Percent of Covered Facilities as Required by EISA, Ahead of Schedule

From July 2013 through June 2014, EPA conducted energy assessments and recommissioning for facilities that represented more than 35 percent of the total energy use of EPA’s covered facilities (based on FY 2008 data, per EISA Section 432 guidance), surpassing the FY 2014 requirement of 25 percent. Recognizing that multiple projects from the first round of EISA assessments are in the planning pipeline, and to reduce costs and avoid duplication, EPA asked facility managers at some locations to update past assessments rather than coordinate new onsite assessments via engineering firms. Facilities addressed under this approach in FY 2014 included: the ESC in Fort Meade, Maryland; the STC in Kansas City, Kansas; the Gulf Ecology Division (GED) Laboratory in Gulf Breeze, Florida; and the ORD Laboratory in Athens, Georgia.

The Agency collected information on potential energy conservation measures for all facilities evaluated from July 2013 through June 2014 and compiled the associated implementation costs, estimated annual energy savings, and estimated annual cost savings in a comprehensive report submitted to FEMP in June 2014. See Table 1 below for a list of the reported measures.

<i>Facility</i>	<i>Description of Potential Projects</i>	<i>Estimated Annual Energy Savings</i>
Main Building in RTP, North Carolina	Replace transducers in existing Building A Laboratory supply boxes for more accurate system response	0.7 billion Btu
NVFEL in Ann Arbor, Michigan	Optimize sequencing of chillers	14.2 billion Btu
	Optimize systems and conduct retro-commissioning	2.8 billion Btu
	Reduce electrical load during unoccupied hours	2.2 billion Btu
	Optimize system operation for machine shop rooms	0.5 billion Btu
	Reduce lighting hours	0.2 billion Btu
ORD Laboratory in Athens, Georgia	Reduce laboratory airflow	1.9 billion Btu
	Replace air handling unit (AHU)	0.4 billion Btu

	Reduce lighting	Additional study required to determine energy savings
	Implement chiller optimization program to maximize chiller and cooling tower flexibility	N/A
NERL in Chelmsford, Massachusetts	Apply occupancy sensors to laboratory heating, ventilation, and air conditioning (HVAC) system to switch to unoccupied mode when facility is vacant during normal operating hours	1.6 billion Btu
	Replace metal halide outdoor lights with LED lamps	0.2 billion Btu
	Reduce operating hours of AHU-3	0.09 billion Btu
	Integrate supplementary cooling units with laboratory air system	0.05 billion Btu
ESC in Fort Meade, Maryland	Install heat recovery (using exhaust air to pre-condition outside air)	3.4 billion Btu
	Replace existing building interior lighting with T5 fluorescent lamps and solid state electronic ballasts	1.0 billion Btu
	Replace chillers with high efficiency units and optimize cooling tower operation	0.2 billion Btu
	Replace exterior parking lot fixtures with LEDs	0.2 billion Btu
	Install solar hot water heating system	0.03 billion Btu
GED in Gulf Breeze, Florida	Implement VAV system (Building 47)	1.3 billion Btu
	Replace conventional fume hoods with VAV models (Building 20)	0.4 billion Btu
	Replace interior lighting (Buildings 20, 45, 47/49)	0.3 billion Btu
	Upgrade Building Automation System	0.1 billion Btu
	Install solar water heating	0.03 billion Btu
	Replace exterior high-intensity discharge (HID) fixtures with LEDs	0.01 billion Btu
	Upgrade VAV fume hood (Building 47)	0.0014 billion Btu
Region 7 Laboratory in Kansas City, Kansas	Program laboratory nighttime setback	0.9 billion Btu
	Install occupancy sensors in laboratories to reduce fan power and heating/cooling loads	0.8 billion Btu
	Reset hot water, chilled water, and condenser water temperature setpoints	0.2 billion Btu
	Reprogram heat recovery loop variable frequency drive	0.2 billion Btu
	Reset zone supply air temperature setpoints	0.2 billion Btu
	Install daylighting controls	0.02 billion Btu
	Install LED parking lot fixtures	N/A
Atlantic Ecology Division (AED) Laboratory in Narragansett, Rhode Island	Replace traditional fume hoods with more efficient, lower flow fume hoods	2.5 billion Btu
	Safely reduce fume hood ventilation rates	
	Install VAV supply boxes and manifold common exhaust	
	Replace existing pneumatic controls in administrative wing with direct digital control system	
	Upgrade existing controls system to more recent model	
	Provide nighttime setback to existing controls system	

EPA is simultaneously focusing on implementing key projects identified during previous assessments and working with the facilities on measurement and verification efforts. EPA will continue to re-evaluate its covered facilities per EISA requirements to identify more energy- and water-saving opportunities, relying on the expertise of the federal energy managers at these facilities. EPA plans to conduct an additional energy assessment at one non-covered facility in FY 2015.

Completed Energy Retrofits and Capital Improvement Projects

In FY 2014, several EPA facilities achieved significant energy intensity reductions compared to FY 2013 as a result of recently completed projects, which contributed to the Agency’s overall progress. These facilities include, in descending order of total annual energy consumption:

- Main Laboratory in RTP, North Carolina (7.1 percent reduction)
- National Computer Center (NCC) in RTP, North Carolina (10.4 percent reduction)
- ORD Laboratory in Athens, Georgia (15.4 percent reduction)

In addition, EPA has several projects underway that will contribute to the Agency’s future energy savings. In FY 2014, EPA continued work on a multi-phase infrastructure replacement project (IRP) at its AWBERC facility in Cincinnati, Ohio. Following the completion of Phase V construction in summer 2014, EPA plans to complete commissioning of all five phases of the AWBERC IRP in FY 2015. EPA also initiated the design for replacing two aging steam boilers with new, efficient boilers to meet AWBERC’s heating needs. At its Main building in RTP, North Carolina, EPA continued significant energy-saving projects, including a laboratory controls optimization project (LCOP) and laboratory airflow reductions.

In FY 2014, EPA made progress on the energy efficiency efforts listed in Table 2 below, which represent more than 91 billion Btu of total annual energy savings.

<i>Facility</i>	<i>Description of Improvements</i>	<i>Estimated Annual Energy Savings</i>
AWBERC in Cincinnati, Ohio	Initiated the design for replacing two aging, oversized, steam boilers with appropriately sized boilers to improve system operating efficiency. EPA expects to complete the contracting for the first phase of construction in FY 2015.	19.4 billion Btu
	Completed IRP Phase V construction—the last major phase of the IRP. Phase V involved the renovation of vivarium rooms, upgrades to cage washers, and modifications to exhaust distribution systems for animal rooms and associated offices.	10 billion Btu
	Installed VAV supply boxes and manifold common exhaust.	
	Converted/replaced traditional fume hoods with more efficient models.	
	Replaced AHU (seventh floor).	2.6 billion Btu
	Made progress on commissioning all five phases of the IRP, including supply static pressure modification.	

Main Building in RTP, North Carolina	Completed High Bay Building airflow reductions and VAV interlock.	4.3 billion Btu
	Completed an assessment of the laboratory AHU, exhaust fan, and reheat optimization.	0.3 billion Btu
ESC in Fort Meade, Maryland	Initiated an airflow reduction study to safely reduce the number of air changes per hour.	4.5 billion Btu
	Substantially completed a lighting controls upgrade in select areas of the facility.	0.9 billion Btu
NHEERL/RTF Consolidation in RTP, North Carolina	Completed the consolidation of laboratory staff and equipment from the NHEERL/RTF facility into the Main Building. EPA fully vacated the NHEERL/RTF facility at the end of August 2014. Approximately 116 laboratory modules were remodeled at the Main Building as part of the consolidation.	Starting in FY 2015, EPA anticipates a reduction in laboratory space of approximately 38,000 GSF, as well as substantial rent and utility cost savings. Agency energy intensity should drop noticeably, and Scope 1 and 2 GHG emissions should drop significantly. ⁵
Chapel Hill Laboratory in Chapel Hill, North Carolina	Initiated the conceptual design process for HVAC upgrades, including replacing AHUs, manifolded laboratory exhaust fans, and installing low-flow fume hoods.	23.9 billion Btu
	Hired a resource efficiency manager (REM) dedicated to managing energy use at the facility.	4.8 billion Btu
NAREL in Montgomery, Alabama	Awarded the first phase of design for the IRP and began construction. The renovation project includes new laboratory and office areas, as well as two new AHUs capable of providing HVAC for the entire main laboratory facility. It also includes a new exhaust fan sized to serve the main laboratory fume hoods. The IRP will ultimately reduce the number of fume hoods by 25 percent.	2.7 billion Btu
NVFEL in Ann Arbor, Michigan	Added additional mission-critical space in FY 2014, including the expansion of a heavy-duty vehicle test cell and a new dynamometer pit in July 2014. A new light/medium-duty four-wheel-drive test site was funded during FY 2014.	EPA does not anticipate energy savings from this additional space.
AED Laboratory in Narragansett, Rhode Island	Completed Phase I construction of the facility's multi-year mechanical system IRP in July 2014; the construction award for Phase II is planned for FY 2015.	4.5 billion Btu
Western Ecology Division (WED) in Corvallis, Oregon	Continued design of Phase 1A of the facility's multi-year IRP.	1.5 billion Btu
Region 2 Laboratory in Edison, New Jersey	Initiated a study regarding the potential renovation of Bay A, Building 209.	N/A
Region 10	Initiated an airflow reduction study to safely reduce the	N/A

⁵ Energy intensity is normalized by GSF, while GHG emissions are an absolute metric.

Laboratory in Manchester, Washington	number of air changes per hour.	
NERL in Chelmsford, Massachusetts	Substantially completed building air changes to safely reduce the number of air changes per hour. Airflow adjustments included the occupied maximum flow setpoints and occupied/unoccupied minimum flow setpoints.	1.6 billion Btu
ORD Laboratory in Athens, Georgia	Initiated the design and planning process for LCOP to upgrade controls and optimize chiller operations, as well as complete VAV laboratory flow reductions and recommissioning/rebalancing of 30 VAV fume hoods.	1.3 billion Btu
	Completed a lighting retrofit.	0.3 billion Btu
Pacific Coastal Ecology Branch in Newport, Oregon	Initiated a project to replace mechanical equipment focusing on the facility's supply and exhaust systems. Expected reduction of seven fume hoods and a 40 percent increase in operation and energy efficiency of the remaining fume hoods at the end of the project.	8.7 billion Btu

Energy Savings Performance Contracts (ESPCs)

As with many federal agencies, EPA has limited capital funds to maintain existing laboratory infrastructure, replace aging infrastructure, and reconfigure existing research laboratory space to meet mission-critical needs. When appropriate, EPA considers ESPCs as a potential funding source for energy-saving projects, as they enable the Agency to reduce the burden of up-front capital costs. Although many of the Agency's energy-saving or renewable energy projects are often not viable candidates for ESPCs due to the advanced age and complexity of mechanical systems, the laboratories' remote locations, and the small project sizes, EPA continues to evaluate its pipeline of future energy projects for performance contracting opportunities.

EPA is in the process of awarding a 20- to 25-year ESPC at its Region 2 Laboratory in Edison, New Jersey, involving a photovoltaic (PV) installation. With a capacity of up to 2 megawatts (MW), the proposed system would provide the Edison laboratory with more than 40 percent of its electricity through renewable sources. Having already completed a procurement package with the Defense Logistics Agency and received proposals from multiple ESCOs, EPA expects to award the ESPC in FY 2015, once detailed negotiations with the preferred vendor are complete.

EPA is also exploring the feasibility of a utility energy service contract (UESC) at its Region 10 Laboratory in Manchester, Washington. This project would replace the facility's existing propane feeds with natural gas lines, netting significant cost savings for the Agency and reducing particulate and GHG emissions from onsite fuel combustion.

Green Power Purchases

EPA Continues to Purchase Green Power Equal to 100 Percent of Electricity Use

In FY 2006, EPA became the first federal agency to purchase green power equal to 100 percent of its electricity use. In FY 2014, EPA continued to be a leader among federal agencies by covering 100 percent of its estimated FY 2014 electricity use with purchased green power and RECs for the ninth consecutive year.

In September 2013, EPA procured a blanket purchase agreement for a total of more than 260 million kWh of RECs that supported renewable energy generation from wind, landfill gas, and biomass resources in six states, including Indiana, Minnesota, Nebraska, Oklahoma, South Dakota, and Texas. Combined with three additional green power contracts, EPA purchased more than 261 million kWh in delivered green power and RECs for FY 2014, enough to cover 100 percent of the Agency's estimated annual electricity use at its 160 laboratories and offices across the country.

In an effort to maximize the positive impacts of its green power purchases, EPA continued using a solicitation strategy to procure a portion of its total RECs in FY 2014 from regions of the United States where renewable energy generation would displace electricity generated from the highest GHG-emitting conventional power plants, thus enabling EPA to have a greater impact on GHG emission reductions. EPA used the Emissions & Generation Resource Integrated Database (eGRID), its comprehensive source of data on the environmental characteristics of nearly all electric power generated in the United States, to quantify the impact of green power purchases from different regions on the Agency's Scope 1 and Scope 2 GHG emissions. EPA anticipates this targeted REC purchasing strategy will enable the Agency to continue reducing Scope 2 GHG emissions from purchased electricity in the future.

EPA signed a blanket purchase agreement for more than 236 million kWh of RECs in September 2014, which represents 100 percent of EPA's estimated FY 2015 conventional electricity consumption in its offices, laboratories, and support buildings.

Onsite Renewables and Distributed Generation

EPA installs onsite renewable energy systems at its facilities where practical and cost-effective. These systems help the Agency build energy resiliency, diversify its energy supply, and reduce energy losses from transmission and distribution. In FY 2014, onsite renewable resources such as wind, solar, and geothermal power supplied EPA with 5.3 billion Btu, equivalent to 0.43 percent of the Agency's energy use. Among the Agency's numerous onsite renewable energy installations are:

- A ground source heat pump (GSHP) at the Robert S. Kerr Environmental Research Center in Ada, Oklahoma.
- A 100-kilowatt (kW) solar roof at the NCC in RTP, North Carolina.
- A 109-kW hosted PV array on the roof of the First Environments Early Learning Center (FEELC) in RTP, North Carolina.

- A 55-kW, thin-film solar PV system on the roof of the Main Building E, and a 52.5-kW solar PV system on the roof of the Main Building B in RTP, North Carolina.
- A 5-kW solar PV array and four 1-kW wind turbines on the roof of the AED Laboratory in Narragansett, Rhode Island.
- Eight 4.5-kW PV parking lot lighting fixtures at NAREL in Montgomery, Alabama.
- Solar hot water heating systems at the Region 2 Laboratory in Edison, New Jersey, and the ORD Laboratory in Athens, Georgia.

Planned onsite renewable projects include a 2-MW solar PV installation for the Region 2 Laboratory in Edison, New Jersey, as part of an ESPC. This project could generate more than 5 BBtu of solar energy.

Advanced Metering

Advanced Metering Hardware Installed or Under Construction to Capture 72 Percent of Agencywide Reportable Energy Consumption

The Energy Policy Act of 2005 (EPAct 2005) and EISA require federal agencies to install advanced metering equipment for electricity (by FY 2012), and steam and natural gas (by FY 2016) to the maximum extent practicable, considering return on investment and other criteria. Approximately 72 percent of EPA laboratories' energy use was measured by advanced metering hardware by the end of FY 2014.

EPA continues to add advanced metering capacity to its building inventory by coupling metering hardware installations with major infrastructure replacement projects. In FY 2014, EPA continued the design or construction of advanced metering projects in conjunction with infrastructure replacements at three laboratories:

- NAREL in Montgomery, Alabama
- AED Laboratory in Narragansett, Rhode Island
- WED Laboratory in Corvallis, Oregon

In FY 2015, EPA will continue to work toward capturing electricity consumption with advanced metering at all facilities where it is cost-effective to do so.

In September 2014, EPA renewed its contract for a metering software service through the National Technical Information Service (NTIS), an agency within the U.S. Department of Commerce.

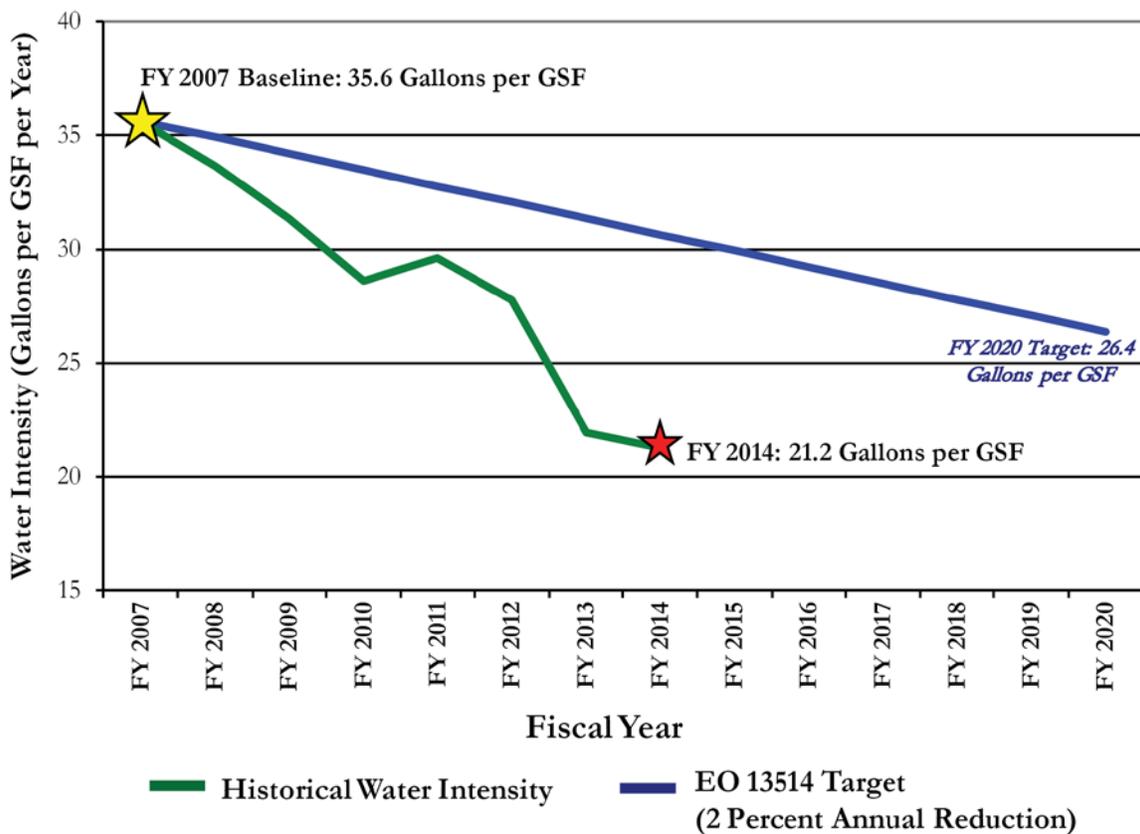
WATER CONSERVATION

EPA's FY 2014 Water Intensity Is 40.4 Percent Lower Than Its FY 2007 Baseline

EO 13514 requires federal agencies to reduce their potable water intensity by 2 percent per year through FY 2020, based on an FY 2007 baseline. EPA continues to far exceed the annual EO 13514 requirements and has already surpassed the FY 2020 federal requirement for water conservation.

Through water-saving measures and capital improvement projects, EPA achieved a water intensity of 21.2 gallons per GSF in FY 2014, which is a decrease of 40.4 percent compared with the FY 2007 baseline (see Figure 6 below). This reduction is 26.4 percent greater than the cumulative reduction required by FY 2013. In absolute terms, EPA used 82.6 million gallons in FY 2014 compared to 136.5 million gallons in FY 2007.

Figure 6. EPA Annual Water Intensity Relative to its EO 13514 Target



Agencywide Water Intensity and Percent Change From FY 2007 Baseline	
FY 2007 Baseline: 35.63 gal/GSF	
FY 2008: 33.66 gal/GSF: -5.52%	FY 2012: 27.74 gal/GSF: -22.15%
FY 2009: 31.35 gal/GSF: -12.00%	FY 2013: 21.95 gal/GSF: -38.39%
FY 2010: 28.61 gal/GSF: -19.70%	FY 2014: 21.25 gal/GSF: -40.36%
FY 2011: 29.59 gal/GSF: -16.95%	

For example, AWBERC in Cincinnati, Ohio, cut its water use by significantly by replacing sensors to control tempering water on a steam sterilizer and boiler flash tank. The Robert S. Kerr Environmental Research Center in Ada, Oklahoma, was able to reduce its water use by optimizing the flow rate of single-pass cooling of air compressors and by replacing the reverse osmosis system with a more efficient system.

EPA’s FY 2014 water conservation efforts were guided by the Agency’s Water Conservation Strategy, which outlines water reduction projects and goals for facilities and is discussed in more detail in the Agency’s SSPP, as well as in reports from the facility water assessments EPA undertook.

EISA Section 423 Implementation—Water Assessments

From June 2013 through June 2014, EPA completed water assessments at seven covered facilities:

- AED Laboratory in Narragansett, Rhode Island
- ESC in Fort Meade, Maryland
- GED Laboratory in Gulf Breeze, Florida
- NERL in Chelmsford, Massachusetts
- NVFEL in Ann Arbor, Michigan
- ORD Laboratory in Athens, Georgia
- STC in Kansas City, Kansas

In FY 2015 and beyond, EPA will analyze projects identified for these facilities for feasibility and cost effectiveness and work with its facility managers to implement them.

Water Conservation Retrofits and Capital Improvements

EPA continued or completed numerous water conservation projects in FY 2014, as listed in Table 3 below, which helped to significantly reduce the Agency’s annual potable water use. EPA estimates that projects completed in FY 2014 will save approximately 2.3 million gallons of potable water per year.

Table 3. Water Conservation Projects Underway or Completed in FY 2014

<i>Facility</i>	<i>Description of Improvements</i>	<i>Estimated Annual Water Savings</i>
AWBERC in Cincinnati, Ohio	Replaced sensors to control tempering water on a steam sterilizer and boiler flash tank so that tempering water is only flowing when necessary.	1,300,000 gallons
NVFEL in Ann Arbor, Michigan	Routing reverse osmosis concentrate to cooling tower, installing a softener on cooling tower make-up water to increase cycles, and seeking a sewer deduction for evaporated cooling tower water.	800,000 gallons (completed November 2014)
Robert S. Kerr Environmental Research Center in Ada, Oklahoma	Optimized the flow rate of single-pass cooling of air compressors, installed cooling tower blowdown metering, and replaced the reverse osmosis system with a more efficient system.	More than 105,000 gallons
ESC in Fort Meade, Maryland	Adjusted the thermostatic water valve on steam condensate flash tank tempering to optimize the temperature of discharge water.	42,000 gallons
Science and Ecosystem Support Division (SESD) Laboratory in Athens, Georgia	Installed 1.5 gallon per minute (gpm) faucet aerators in restrooms.	35,000 gallons
GED Laboratory in Gulf Breeze, Florida	Replaced the water-cooled ice maker in Buildings 47/49 with an air-cooled model.	19,000 gallons
STC in Kansas City, Kansas	Installed 0.5 gpm faucet aerators in restrooms.	14,000 gallons
AED Laboratory in Narragansett, Rhode Island	Eliminated a steam boiler.	12,000 gallons

Nonpotable ILA Water

EO 13514 set requirements for reducing ILA water use by 2 percent per year through FY 2020, compared with an FY 2010 baseline. In accordance with the *Federal Agency Implementation of Water Efficiency and Management Provisions of EO 13514*, EPA calculated its FY 2010 baseline for Agency nonpotable water use to be 135.2 million gallons.

As of FY 2014, five EPA facilities use nonpotable ILA water from sources such as lakes, creeks, and wells for irrigation and agricultural research purposes. These facilities include:

- MED Laboratory in Duluth, Minnesota
- NERL in Chelmsford, Massachusetts
- ORD Laboratory in Athens, Georgia
- SESD Laboratory in Athens, Georgia
- Willamette Research Station in Corvallis, Oregon

EPA estimates that these facilities used a combined 4.6 million gallons of nonpotable water for ILA use in FY 2014. This amount is 96.6 percent lower than the FY 2010 baseline of 135.2 million gallons, and it exceeds the reduction requirements set forth in EO 13514. EPA will continue

assessing each facility's nonpotable water use through its EISA water assessments and will continue reducing the Agency's nonpotable water use where possible.

SUSTAINABLE BUILDING DESIGN AND HIGH PERFORMANCE BUILDINGS

EPA occupies approximately 11 million square feet of space in more than 300 individual buildings nationwide. EPA promotes energy and resource efficiency, waste reduction, pollution prevention, indoor air quality, and other environmental factors both during new construction and in existing buildings owned by the Agency or leased by GSA.

Transforming EPA's existing buildings to facilities that meet federal high performance sustainable building standards is complex work. EPA uses a multi-pronged approach, including: energy and water conservation projects; lighting system controls upgrades; scheduled recommissioning; ventilation and thermal comfort testing and improvements; and stormwater management system upgrades. The Agency has also developed Building Management Plan templates—a comprehensive set of sustainable building management procedures and policies that represent best practices, minimum requirements, conformance assurance processes, and performance standards that help ensure high performance sustainable building operations.

For new major lease acquisitions, EPA works with GSA to acquire high performance sustainable buildings that exceed the environmental performance of the facilities being replaced. EPA has developed a variety of strategies to help GSA meet these objectives. More details on these strategies are available below and in the Agency's SSPP.

Upgrading Existing Agency-Owned Buildings to Meet the *Guiding Principles*

14.8 Percent of EPA's FY 2014 FRPP Inventory Meets the *Guiding Principles*, Exceeding EO 13514 Requirements

EPA's laboratory and office spaces are divided among FRPP and non-FRPP buildings. An agency's FRPP inventory consists of agency-owned or directly leased buildings; EPA's FRPP inventory consists of about 4.3 million square feet in approximately 170 buildings. GSA provides EPA with the remaining 6.9 million square feet of laboratory, office, and support space, either in GSA-owned facilities or in facilities leased by GSA from private owners. EO 13514 requires that 15 percent of an agency's FRPP inventory (by number of buildings) meet the *Guiding Principles* by FY 2015.⁶

At the end of FY 2014, eight buildings—or 14.8 percent—in EPA's FRPP inventory met the *Guiding Principles*. This progress exceeds the January 2015 OMB Energy/Sustainability Scorecard goal of 13 percent and is just shy of the FY 2015 requirement. The eight buildings are:

- AWBERC Main Building and Annex I in Cincinnati, Ohio

⁶ This requirement only applies to buildings that are 5,000 square feet or larger. EPA has 54 buildings at 19 locations in its projected FY 2015 FRPP inventory that are subject to this requirement.

- AWBERC Annex II in Cincinnati, Ohio
- Building A Administration Wing in RTP, North Carolina
- ESC in Fort Meade, Maryland
- FEELC in RTP, North Carolina
- GED Laboratory Building 67 in Gulf Breeze, Florida
- Large Lakes Research Station (LLRS) in Grosse Ile, Michigan
- NCC in RTP, North Carolina

Implementing the *Guiding Principles*

To improve the environmental performance of EPA facilities so that they meet the *Guiding Principles*, EPA must coordinate numerous facility upgrades, including:

- Energy and water conservation projects
- Lighting controls upgrades
- Irrigation system curtailments or removals
- Stormwater management improvements
- Commissioning
- Verification that appropriate ventilation and thermal comfort standards are met
- Development of building management policies and plans

In September 2014, the AWBERC Main Building and Annex I, along with the RTP Building A Administration Wing, became EPA's third and fourth buildings to achieve *Guiding Principles* certification through EPA's internal certification process. This followed EPA's 2013 certification of the ESC in Fort Meade, Maryland, which was EPA's second facility to meet the *Guiding Principles* under EPA's internal self-certification system, and the 2012 certification of the LLRS in Grosse Ile, Michigan, which was EPA's first existing building to meet the *Guiding Principles* requirements (December 2008 version).

In FY 2015, EPA will continue to work closely with facility staff at three other facilities—the Agency's Full Containment Facility and Child Development Center in Cincinnati, Ohio, and the Robert S. Kerr Environmental Research Center in Ada, Oklahoma—where *Guiding Principles* implementation efforts are underway.

With multiple facilities now having used and customized the Building Management Plan templates, EPA believes the templates are an understandable, educational, and value-added tool that will improve the environmental performance of the Agency's facilities. The templates represent an appropriate and efficient path toward helping EPA's existing buildings meet the *Guiding Principles*.

Green Building Certifications

In addition to using its own system for certifying existing buildings as meeting the *Guiding Principles*, EPA uses other green building and energy performance rating systems as part of its toolkit for acquiring high performance green buildings and ensuring their continued performance. EPA has extensive experience with the LEED BD+C and LEED for Interior Design and Construction (LEED ID+C) rating systems. Many of the buildings provided to EPA by GSA have achieved a LEED O+M rating along with a requirement for periodic recertification.

Major new building construction projects initiated by EPA since 1997, whether EPA-owned, GSA-owned, or GSA-leased, that have been certified under the LEED BD+C rating system include:

- AWBERC Annex II in Cincinnati, Ohio
- FEELC in RTP, North Carolina
- GED Laboratory Building 67 in Gulf Breeze, Florida
- NCC in RTP, North Carolina
- NERL in Chelmsford, Massachusetts
- Potomac Yard One in Arlington, Virginia
- Potomac Yard Two in Arlington, Virginia
- Region 1 Office in Boston, Massachusetts
- Region 7 Office in Lenexa, Kansas
- Region 8 Office in Denver, Colorado
- STC in Kansas City, Kansas

In FY 2014, the Region 7 Office in Lenexa, Kansas, received Gold certification under the LEED BD+C rating system (version 2009), supplementing the Silver certification the facility had received under an earlier version of LEED BD+C prior to EPA occupancy.

In FY 2014, both the Potomac Yard One Building in Arlington, Virginia, and the Region 10 Office in Seattle, Washington, received Platinum certification under the LEED O+M rating system. Building E of the La Plaza facility in Las Vegas, Nevada, was certified Gold under the LEED O+M rating system, and Buildings A, B, and D received Silver certification. In addition, the William J. Clinton Federal Buildings East and West were certified under the LEED O+M rating system in FY 2014.

In FY 2015, EPA's Building A Administration Wing in RTP, North Carolina, is targeting Silver certification under the LEED BD+C rating system, and the Region 7 Office in Lenexa, Kansas, is targeting Platinum certification under the LEED O+M rating system.

Of the 11 million square feet of laboratory, office, and support space that EPA occupies, 40 percent has some form of green building certification.

ENERGY STAR Building Label

Since 2003, EPA has required all large, newly leased buildings to have earned the ENERGY STAR building label prior to lease award or within 18 months of the completion date for new construction.

EPA now also requires all new leases for major office buildings to qualify for the ENERGY STAR label every three years, where market conditions make it feasible. EPA's goal, on an ongoing basis, is for all its large offices, including regional offices and Headquarters buildings, to have earned the ENERGY STAR building label within the last three years.

Three EPA Headquarters facilities have earned the ENERGY STAR label in the last three years:

- William J. Clinton Federal Buildings East, West, and Connecting Wing in Washington, DC (2012)
- Potomac Yard One EPA Headquarters Building in Arlington, Virginia (2014)
- Potomac Yard Two EPA Headquarters Building in Arlington, Virginia (2014)

In addition, as of FY 2014 all EPA regional offices have earned the ENERGY STAR label:

- Region 1 Office in Boston, Massachusetts (2012)
- Region 2 Office in New York, New York (2012)
- Region 3 Office in Philadelphia, Pennsylvania (2013)
- Region 4 Office in Atlanta, Georgia (2013)
- Region 5 Office in Chicago, Illinois (2012)
- Region 6 Office in Dallas, Texas (2013)
- Region 7 Office in Lenexa, Kansas (2014)
- Region 8 Office in Denver, Colorado (2008)
- Region 9 Office in San Francisco, California (2014)
- Region 10 Office in Seattle, Washington (2013)

Of these facilities, all but one earned the ENERGY STAR label within the last three years.

Use of ENERGY STAR and Other Energy-Efficient Products

EPA currently tracks and reports the purchase of ENERGY STAR qualified, FEMP-designated, and Electronic Product Environmental Assessment Tool (EPEAT)-registered personal computers, notebook computers, and monitors. As a result of the recent expansion of the EPEAT Program to include imaging equipment and televisions, EPA is broadening its tracking and reporting system to account for the Agency's progress toward the 95 percent EPEAT acquisition goal inclusive of imaging equipment and televisions.

GreenCheck

GreenCheck is a process EPA uses to formally identify environmental performance goals for each new EPA facility, significant renovation/construction project, and lease of EPA-occupied space. These goals include meeting the requirements of EPAct 2005, EO 13423, EISA, the *Guiding Principles*, and EO 13514, as well as the Agency's own policies as reflected in its *Best Practice (Environmental) Lease Provisions* and updated *Architecture and Engineering Guidelines*. EPA updates the GreenCheck checklist periodically to incorporate new requirements and address lessons learned from reviews.

All projects requiring funding in excess of \$150,000 or affecting at least 5,000 GSF (or increasing impervious area by more than 5,000 GSF) qualify for a full GreenCheck review. In FY 2014, EPA staff screened 11 major construction projects and lease actions through the GreenCheck process. To gauge the effectiveness of its GreenCheck program, EPA also chose a random sample of GreenCheck forms to review. This evaluation produced several possible ways to improve the GreenCheck process.

Climate Change Resiliency

In response to Executive Order 13653, *Preparing the United States for the Impacts of Climate Change*, in FY 2014 EPA identified facility planning and design best practices for climate resiliency by contacting other federal agencies engaged with facility-level climate resiliency planning and by reviewing relevant industry literature, including state and municipal building regulations, codes, and ordinances. Based on the results of the literature review and other research, EPA developed facility-level climate resiliency assessment checklists for two laboratories—the Robert S. Kerr Environmental Research Center in Ada, Oklahoma, and the GED Laboratory in Gulf Breeze, Florida—and conducted climate resiliency assessments at these facilities in the first quarter of FY 2015. In FY 2015, EPA plans to update its Agencywide *Architecture and Engineering Guidelines* to incorporate climate resiliency considerations.

Zero-Net-Energy Buildings

EO 13514 requires that, beginning in 2020, all new federal buildings entering the planning process be designed to achieve zero-net-energy status by 2030. Zero-net-energy means the building produces as much energy as it uses over the course of a year and produces no net GHG emissions. Ideally, to achieve zero-net-energy status, a building must first greatly reduce its energy use through attentive design and construction (for new buildings) and deep retrofits (for existing buildings). EPA would then meet remaining energy needs through onsite renewable energy sources or, if that approach is impractical, by acquiring renewable energy on a long-term or permanent basis from offsite sources. EPA plans to follow this approach for all new building designs starting in 2020.

EPA has achieved zero-net-energy status for one facility using this approach. The Robert S. Kerr Environmental Research Center in Ada, Oklahoma, essentially eliminated onsite fossil fuel combustion for heating and cooling by installing a GSHP system via an ESPC in 2004 and by using VAV laboratory ventilation. The facility purchases RECs equivalent to its annual conventional electricity use.

Two other EPA facilities also meet criteria for zero-net-energy buildings, including: the Region 7 Office in Lenexa, Kansas, and the GED Laboratory in Gulf Breeze, Florida. These facilities operate using electricity only. In other words, with the exception of emergency generator fuel use, no fossil fuels are combusted onsite for facility heating and cooling. In FY 2014, EPA purchased enough RECs to cover the facilities' estimated annual electricity consumption.

While the thought of a zero-net-energy laboratory seemed impracticable a decade ago, it is no longer so. An ESPC for a large PV installation proposed for EPA's Region 2 Laboratory in Edison, New Jersey, is estimated to provide 40 percent of the facility's electricity demand under a long-term contract. If a single facility were to combine an ESPC that dramatically reduced energy use (the

type implemented for the Ada, Oklahoma, laboratory's GSHP system) and an ESPC for PV (like the one under procurement at Edison, New Jersey), an EPA laboratory could economically meet almost all of its energy needs on a long-term basis with current renewable energy technology.

In all three of its existing zero-net-energy facilities, EPA is using short-term REC purchases to qualify them as having zero-net-energy status, which is acceptable based on current definitions. As a policy goal, EPA would like to move from short-term REC purchases to long-term power purchase agreements and onsite renewable generation to more closely match building life with the length and type of its renewable energy commitments.

RECYCLING AND SOLID WASTE DIVERSION

EPA's Recycling Rate Reached 64.6 Percent in FY 2014

Based on data submitted by EPA facilities, including Headquarters, regional offices, and regional and program laboratories, the Agency achieved a 64.6 percent solid waste recycling rate in FY 2014, recycling 1,938 tons of materials and diverting 372 tons of organic waste from landfills. EO 13514 requires federal agencies to meet a non-hazardous solid waste recycling rate of 50 percent by FY 2015. Through its recycling, reuse, donation, composting, and other waste reduction efforts, EPA has already exceeded this goal.

Several EPA facilities significantly contributed to EPA's increased non-hazardous solid waste recycling rate, including:

- AED Laboratory in Narragansett, Rhode Island: 92.4 percent
- Robert S. Kerr Environmental Research Center in Ada, Oklahoma: 89.4 percent
- EPA's campus in Cincinnati, Ohio: 85.9 percent
- National Exposure Research Laboratory (NERL) in Las Vegas, Nevada: 83.5 percent
- MED in Duluth, Minnesota: 81.9 percent
- Region 2 Office in New York, New York: 80.1 percent

In addition, in FY 2014 EPA vacated its 1310 L Street NW Headquarters facility and relocated more than 1,200 employees to and within the William J. Clinton Federal Buildings in the Washington, DC, Federal Triangle complex. To facilitate recycling and reuse of office materials during this transition period, EPA added temporary recycling stations throughout its Headquarters buildings for materials including paper, cardboard boxes, binders, toner cartridges, and "technotrash" items. To educate employees and facilities staff about this effort, EPA developed signage, updated instruction manuals for facilities staff, and collected reusable items for donation and reuse.

STORMWATER MANAGEMENT

Stormwater runoff in urban areas is one of the leading sources of water pollution in the United States. EPA has worked closely with other federal agencies to develop technical guidance on stormwater management, and the Agency is committed to implementing designs at its facilities that satisfy EISA requirements through green infrastructure/low impact development (LID) projects.

EPA has adopted its Office of Water *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects* for all new construction and major renovation projects greater than 5,000 square feet to ensure EISA Section 438 compliance.

The Building A Administration Wing at EPA's Main Building in RTP, North Carolina, includes several bioretention areas totaling 1,900 cubic feet to treat stormwater runoff and meet EISA Section 438 requirements.

EPA's stormwater management efforts will continue in FY 2015 in accordance with the requirements set forth in EO 13514, EISA Section 438, and the *Guiding Principles*, which require EISA compliance and implementation of outdoor potable water use reduction strategies for landscape irrigation.

ON TRACK FOR THE FUTURE

EPA is continually working to: reduce its GHG emissions, energy intensity, water intensity, solid waste, and other resource use; incorporate sustainable design and operations across its facilities; and be a model of sustainability for other federal agencies. In FY 2015, the Agency will continue to build on these efforts by focusing on GHG emissions reduction efforts; pursuing new energy efficiency projects and completing ongoing ones; and focusing on projects in areas such as green power, green buildings, advanced metering, water conservation, and waste diversion. EPA will continue to be a leader among federal agencies in the challenge to promote sustainability and reduce the environmental impact of its facilities and operations. For additional data on the Agency's FY 2014 environmental performance, see EPA's *Annual GHG and Sustainability Data Report*.



Appendix A: List of Excluded Facilities

**For Submittal With EPA's
Energy Management and Conservation Program
FY 2014 Annual Report**

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APPENDIX A – LIST OF EXCLUDED FACILITIES

Table A-1. List of Excluded Facilities		
<i>Facility</i>	<i>Explanation</i>	<i>FY 2014 Energy Consumption</i>
Research Vessel, Mid-Continent Ecology Division (MED) Laboratory, Duluth, Minnesota	A research vessel based out of the MED Laboratory in Duluth, Minnesota, consumes energy when it is docked; this is known as “cold iron energy.” FEMP’s <i>Guidelines for Establishing Criteria for Excluding Buildings</i> , dated January 27, 2006, states that “Federal ships that consume ‘Cold Iron Energy’ (energy used to supply power and heat to ships docked in port),” are “assumed to already be excluded from the energy performance requirements of Section 543” of EPLA 2005. Therefore, EPA is reporting the energy consumed by this vessel in FY 2014 in the Energy Goal Excluded category of the <i>GHG and Sustainability Data Report</i> accompanying this narrative. The energy consumed by this vessel was, however, included in the Agency’s Scope 1 and 2 GHG emissions calculations per the EO 13514 <i>Federal Greenhouse Gas Accounting and Reporting Guidance</i> .	36,609 kWh



Appendix B: Revision to FY 2003 Energy Intensity Baseline

**For Submittal With EPA's
Energy Management and Conservation Program
FY 2014 Annual Report**

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FY 2003 ENERGY DATA BASELINE WORKSHEET - EXISTING ON RECORD

Agency: EPA
 Date: 12/12/2014

Prepared by: Bucky Green
 Phone: 202-564-6371

EXECUTIVE ORDER 13123 REPORTING CATEGORIES				
1-1. Standard Buildings/Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
		Total Costs:	\$0.0	0.0
Standard Buildings/Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!
1-2. Industrial, Laboratory, Research, and Other Energy-Intensive Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	134,800.5	\$7,844.1	459.9
Fuel Oil	Thou. Gal.	526.0	\$513.9	73.0
Natural Gas	Thou. Cubic Ft.	369,014.4	\$2,604.7	380.5
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	13.1	\$526.1	13.1
Other	BBtu	534.5	\$5,257.8	534.5
		Total Costs:	\$16,764.8	1,461.8350
Energy-Intensive Facilities (Thou. Gross Square Feet)		3,718.4	Btu/GSF:	393,130
1-3. Exempt Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
		Total Costs:	\$0.0	0.0
Exempt Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!

ENERGY POLICY ACT 2005 REPORTING CATEGORIES				
EPACT Goal-Subject Buildings/Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	134,800.5	\$7,844.1	459.9
Fuel Oil	Thou. Gal.	526.0	\$513.9	73.0
Natural Gas	Thou. Cubic Ft.	369,014.4	\$2,604.7	380.5
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	13.1	\$526.1	13.1
Other	BBtu	534.5	\$5,257.8	534.5
		Total Costs:	\$16,764.8	1,461.8
EPACT Goal Buildings/Facilities (Thou. Gross Square Feet)		3,718.4	Btu/GSF:	393,130
EPACT Excluded Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
		Total Costs:	\$0.0	0.0
EPACT Excluded Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!

ALL FACILITIES COMBINED				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	134,800.5	\$7,844.1	459.9
Fuel Oil	Thou. Gal.	526.0	\$513.9	73.0
Natural Gas	Thou. Cubic Ft.	369,014.4	\$2,604.7	380.5
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	13.1	\$526.1	13.1
Other	BBtu	534.5	\$5,257.8	534.5
		Total Costs:	\$16,764.8	1,461.8
All Facilities (Thou. Gross Square Feet)		3,718.4	Btu/GSF:	393,130

FY 2003 ENERGY DATA BASELINE WORKSHEET - REVISED BASELINE

Agency: EPA
 Date: 12/12/2014

Prepared by: Bucky Green
 Phone: 202-564-6371

EXECUTIVE ORDER 13123 REPORTING CATEGORIES				
1-1. Standard Buildings/Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
Total Costs:			\$0.0	0.0
Standard Buildings/Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!
1-2. Industrial, Laboratory, Research, and Other Energy-Intensive Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	134,800.5	\$7,844.1	459.9
Fuel Oil	Thou. Gal.	526.0	\$513.9	73.0
Natural Gas	Thou. Cubic Ft.	369,014.4	\$2,604.7	380.5
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	32.7	\$526.1	32.7
Other	BBtu	534.5	\$5,257.8	534.5
Total Costs:			\$16,764.8	1,481.4510
Energy-Intensive Facilities (Thou. Gross Square Feet)		3,719.3	Btu/GSF:	398,315
1-3. Exempt Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
Total Costs:			\$0.0	0.0
Exempt Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!

ENERGY POLICY ACT 2005 REPORTING CATEGORIES				
EPACT Goal-Subject Buildings/Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	134,800.5	\$7,844.1	459.9
Fuel Oil	Thou. Gal.	526.0	\$513.9	73.0
Natural Gas	Thou. Cubic Ft.	369,014.4	\$2,604.7	380.5
LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	32.7	\$526.1	32.7
Other	BBtu	534.5	\$5,257.8	534.5
Total Costs:			\$16,764.8	1,481.5
EPACT Goal Buildings/Facilities (Thou. Gross Square Feet)		3,719.3	Btu/GSF:	398,315
EPACT Excluded Facilities				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	0.0	\$0.0	0.0
Fuel Oil	Thou. Gal.	0.0	\$0.0	0.0
Natural Gas	Thou. Cubic Ft.	0.0	\$0.0	0.0
LPG/Propane	Thou. Gal.	0.0	\$0.0	0.0
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	0.0	\$0.0	0.0
Other	BBtu	0.0	\$0.0	0.0
Total Costs:			\$0.0	0.0
EPACT Excluded Facilities (Thou. Gross Square Feet)		0.0	Btu/GSF:	#DIV/0!

ALL FACILITIES COMBINED				
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Site-Delivered Btu (Billion)
Electricity	MWH	134,800.5	\$7,844.1	459.9
Fuel Oil	Thou. Gal.	526.0	\$513.9	73.0
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LPG/Propane	Thou. Gal.	9.8	\$18.3	0.9
Coal	S. Ton	0.0	\$0.0	0.0
Purch. Steam	BBtu	32.7	\$526.1	32.7
Other	BBtu	534.5	\$5,257.8	534.5
Total Costs:			\$16,764.8	1,481.5
All Facilities (Thou. Gross Square Feet)		3,719.3	Btu/GSF:	398,315