



A Legacy of Sustainability

FISCAL YEAR 2013 ANNUAL SUSTAINABILITY, ENERGY
AND WATER CONSERVATION REPORT

Serving Congress
Preserving Resources
Inspiring Change



Cover: The U.S. Capitol framed by cherry trees on Capitol Square.

Back Cover: U.S. Capitol and the Washington Monument at twilight.

Congressional Mandates and Oversight

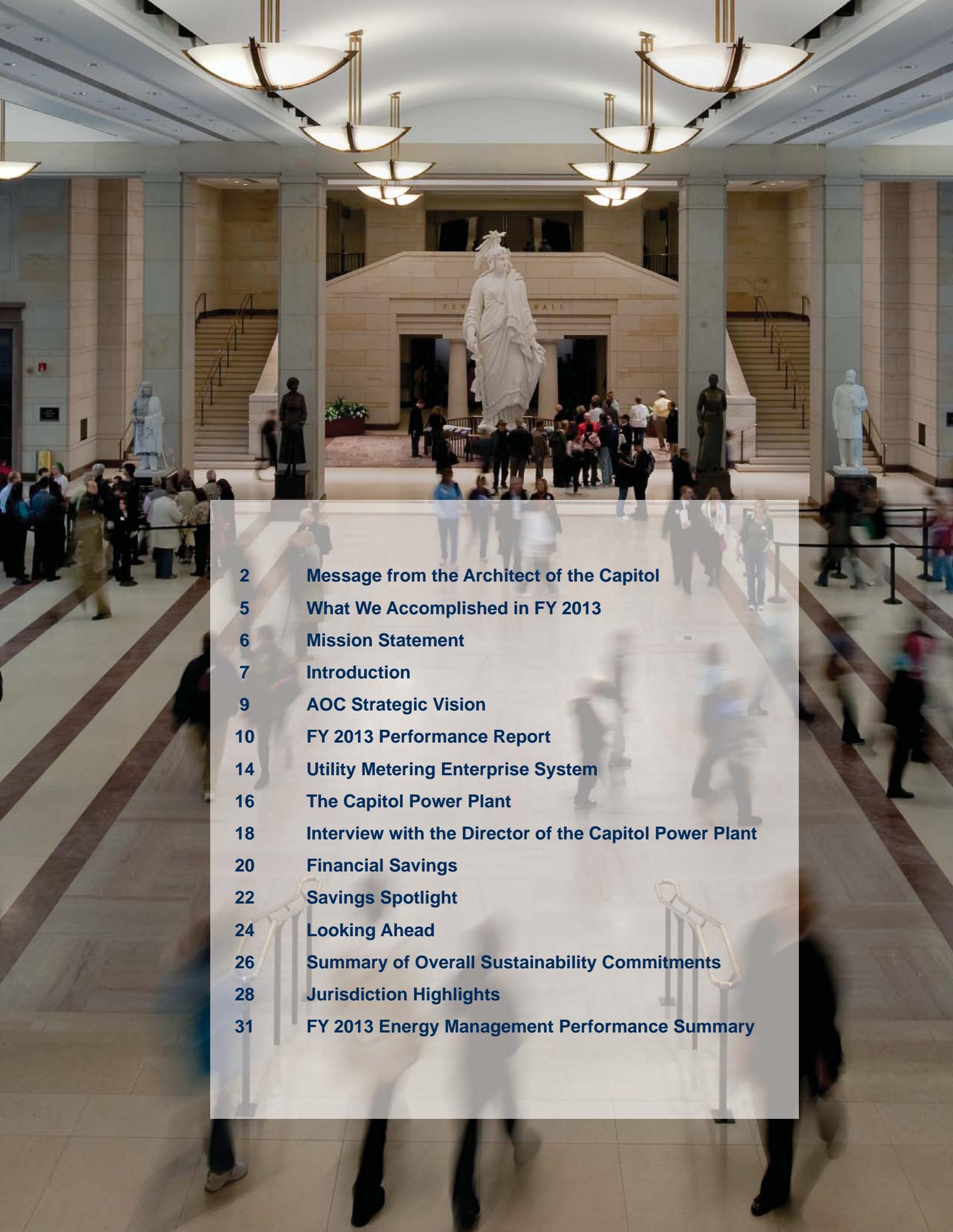
The Architect of the Capitol (AOC) is part of the legislative branch of government and serves Congress and the U.S. Supreme Court. It is responsible for the maintenance, operation, development and preservation of the U.S. Capitol Building and Grounds. As stewards of the Capitol campus and its off-site facilities, the AOC is required to meet annual reductions in energy consumption under the Energy Policy Act of 2005 (EPAct2005) and the Energy Independence and Security Act of 2007 (EISA2007).

In accordance with EISA2007, the AOC is driven to apply aggressive standards to reduce energy use by three percent annually from Fiscal Year (FY) 2003 levels, yielding a 30 percent total reduction by FY 2015.

This report was created to inform Congress and the public of the AOC's progress on meeting its efficiency goals as well as its further commitments to sustainability and water efficiency. It includes details on the AOC's approach, achievements, and areas identified for future progress.

All photographs provided by AOC's Photography Branch.

AOC staff in order of appearance: Joseph Shields, Geneis Jesse, William Lewis, Chris Potter, Marcea Austin, Michelle Morrow, Jonathan Wilson, Michael Pepin, Robert Dales, Joe Quade, Ed Payne, Tom Bergeron, Kelley Robinson, and Gary Williams.



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Message from the Architect of the Capitol

I am pleased to present the Architect of the Capitol's (AOC's) Fiscal Year (FY) 2013 Annual Sustainability, Energy and Water Conservation Report. Since 2006, we have reported on our successful efforts to reduce energy and water consumption. This past year was no different in that we made great progress in reducing energy consumption across the Capitol campus.

This report details our achievements, as well as our future plans and initiatives. We have two success stories in FY 2013 that merit special attention:

- The AOC achieved a 25.2 percent energy reduction, exceeding our goal of 24 percent. This achievement was made possible by the unwavering commitment and teamwork of AOC employees. We accomplished our goal while still maintaining the historic integrity and operational functionality of our buildings. We did this through coordinated information sharing and employee innovation.
- Throughout the past eight years of our 10-year energy reduction program, the AOC worked diligently to meet our energy goals. Enhanced technology components of our recent infrastructure and building upgrades provided new tools to improve our energy use decision-making and efficiency. This year's success is directly attributable to our employees' adoption of these new technologies. We are using energy data and advanced control systems to solve complex issues and drive efficiency improvements.

The AOC's collective efforts were formally recognized in September 2013 by the Association of Energy Engineers with its Regional Energy Award for "Accomplishments on Developing, Organizing, Managing and Implementing an Outstanding Corporate Energy Management Program." This honor is a direct result of both our commitment to save energy and the investment Congress has made in our facilities.

The AOC faces a significant challenge meeting the energy reduction goal in the final two years of the 10-year program. This report, along with the AOC Strategic Vision and our Sustainability Plan, conveys our conservation and sustainability goals and details the critical efforts we are undertaking to achieve the next goal of 27 percent energy reduction in FY 2014. We all understand that our individual actions can add up to a tremendous collective effort to save energy. As stewards of the Capitol campus, we will continue to do our part to improve energy efficiency at the U.S. Capitol.



Stephen T. Ayers, FAIA, LEED AP
Architect of the Capitol



What We Care For



BUILDINGS

17.4 MILLION

SQUARE FEET



INFRASTRUCTURE

560

ACRES



PEOPLE

30,000

BUILDING OCCUPANTS

What We Accomplished IN FY 2013

25.2%

Energy reduction from the FY 2003 baseline, exceeding the FY 2013 goal

320,000

HVAC control points used to monitor performance and reduce energy use

42.5%

Materials recycled (operational and construction waste)

27%

Increased Capitol Power Plant chilled water efficiency from FY 2003 to FY 2013

94%

Construction waste recycled by the AOC Construction Division

16%

Reduction in potable water use from the FY 2008 baseline

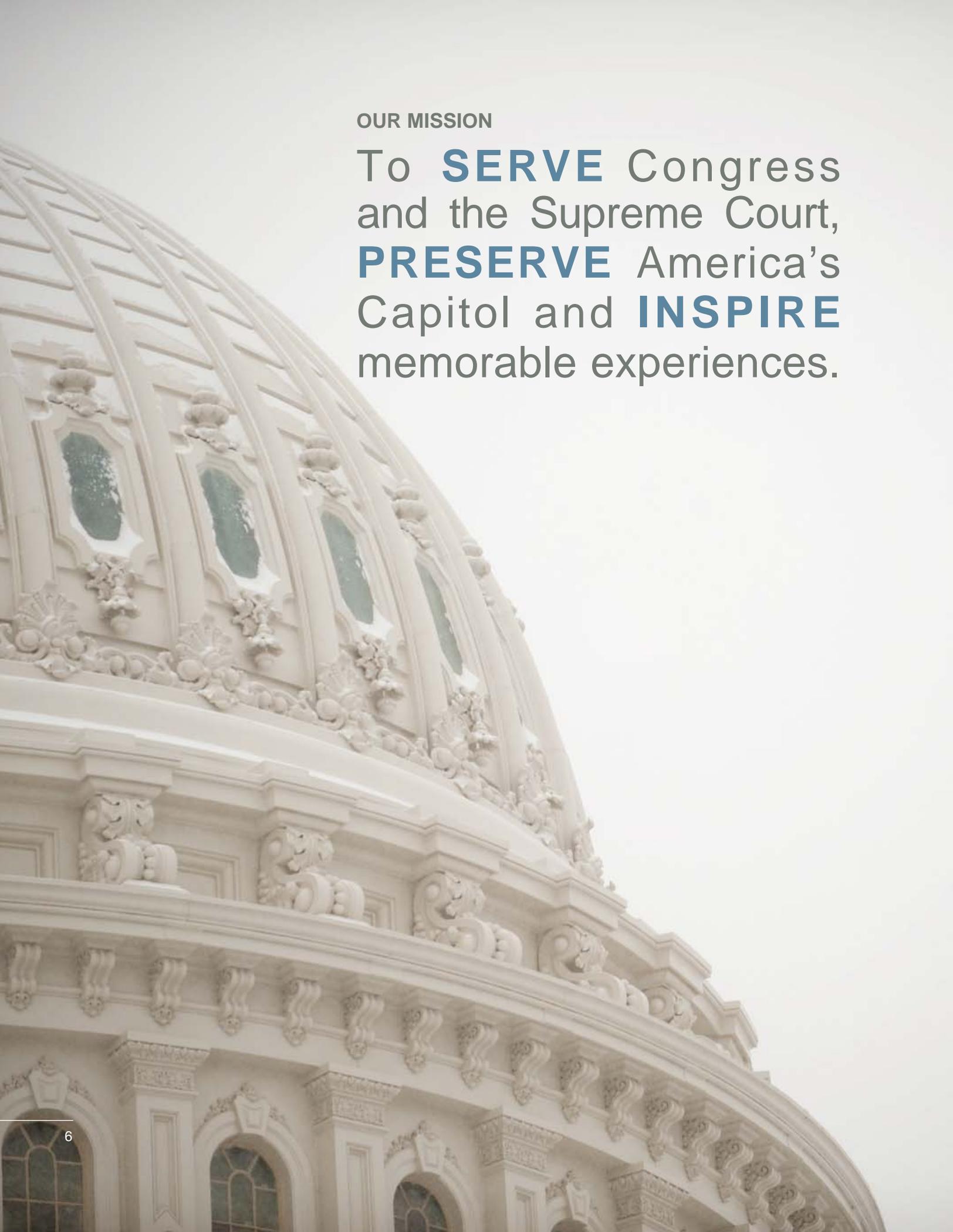
22%

Use of renewable electricity, placing the agency in the top half of federal agencies using renewable energy

70

Sustainability reviews of potential capital improvement projects

In FY 2013, the AOC achieved significant energy savings through innovative operational changes as a result of meaningful employee engagement.



OUR MISSION

To **SERVE** Congress
and the Supreme Court,
PRESERVE America's
Capitol and **INSPIRE**
memorable experiences.



Introduction

INVEST · MEASURE · SAVE

The Sustainability and Energy Division of the Architect of the Capitol, formally established in 2011, produces an annual Sustainability, Energy and Water Conservation report to inform Congress and the public of the AOC's progress on meeting its resource efficiency goals. This division is responsible for advancing the AOC's sustainability and energy performance initiatives while addressing some of the agency's challenges, including preserving the historic integrity of the buildings on Capitol Hill, while making them as energy efficient as possible.

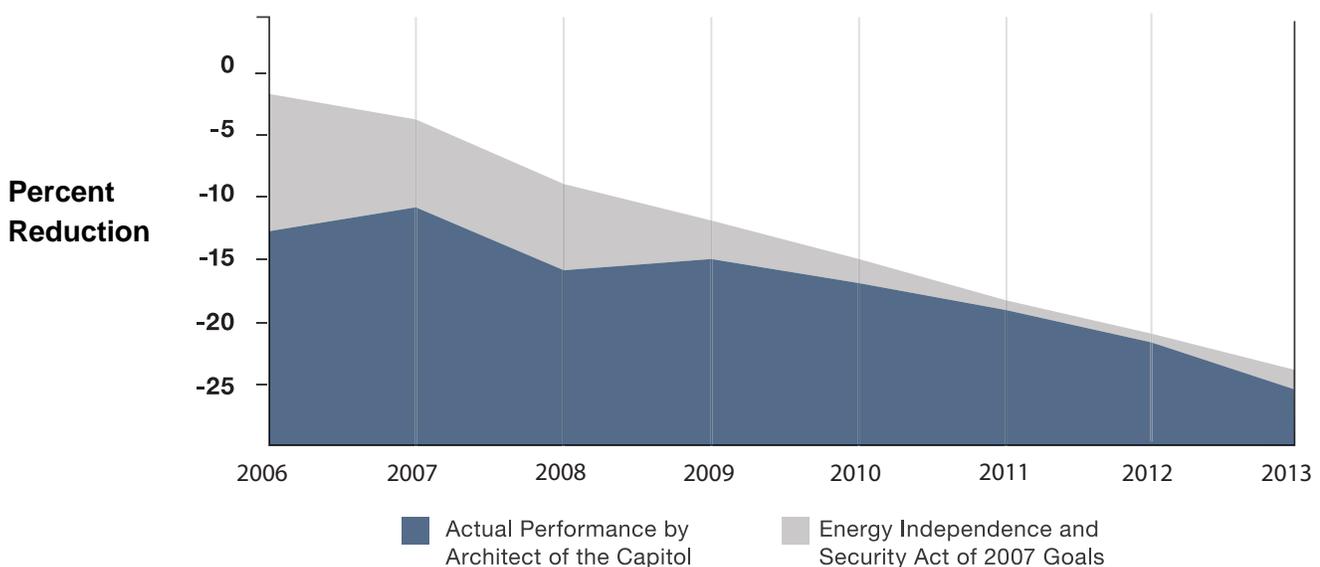
In 2012, the AOC committed staff and resources to a new Strategic Vision. The vision is organized around four goals and provides a framework for performance reporting for FY 2012-2016. The strategic objectives under goals One Team, One Mission and Innovative and Empowered Workforce focus on promoting a culture of integrity, teamwork and accountability. The Awe-Inspiring Facilities and Extraordinary Services goals address principal-program areas related to facilities operational support, project delivery, preservation of heritage assets and historic structures, visitor services, safety and security. The objectives included under Awe-Inspiring Facilities promote a culture of resource conservation throughout the agency.

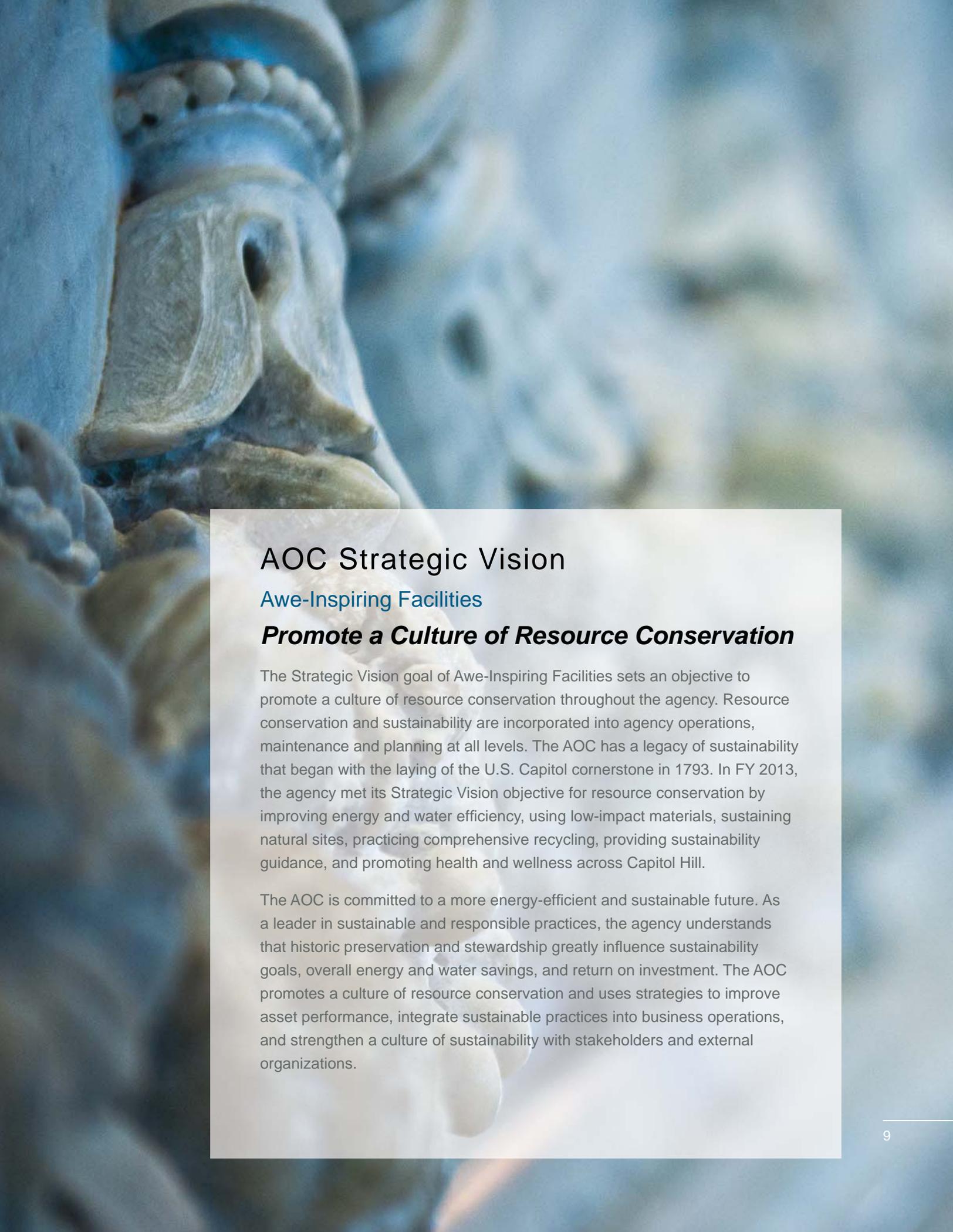
The AOC has worked to reduce its annual energy consumption to meet the requirements of the Energy Policy Act of 2005 (EPAct2005) and the Energy Independence and Security Act of 2007 (EISA2007). In accordance with EISA2007, the AOC is aggressively working to reduce energy use by three percent annually from FY 2003 levels, yielding a 30 percent total reduction by FY 2015. The AOC exceeded its 24 percent energy reduction goal through FY 2013 with a 25.2 percent reduction.

Under Executive Order 13514, “Federal Leadership in Environmental, Energy and Economic Performance” (2009), executive branch agencies must comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* (Guiding Principles). The Guiding Principles is a federal high-performance, sustainable building standard that defines focus areas and associated targets to improve environmental performance. Although a legislative branch agency, the AOC committed to mirroring the Guiding Principles for existing buildings by focusing on reducing energy and water use, improving indoor air quality, and reducing the environmental impact of materials through procurement practices and waste diversion.

The AOC has invested in modern infrastructure, building systems and innovative technology to give a more accurate picture of our energy use. New initiatives focus on measuring environmental impacts, improving efficiencies and operational performance, and evaluating life cycle cost of these systems. In addition, the AOC’s jurisdictions continuously prioritized energy conservation measures allowing the agency to meet its energy reduction goal for FY 2013 and achieve significant cost savings. The AOC remains focused on implementing innovative efficiencies and improving stewardship of taxpayer dollars while meeting our mission to serve Congress and the U.S. Supreme Court, to preserve the facilities under our care and to inspire memorable experiences.

Annual Energy Reduction





AOC Strategic Vision

Awe-Inspiring Facilities

Promote a Culture of Resource Conservation

The Strategic Vision goal of Awe-Inspiring Facilities sets an objective to promote a culture of resource conservation throughout the agency. Resource conservation and sustainability are incorporated into agency operations, maintenance and planning at all levels. The AOC has a legacy of sustainability that began with the laying of the U.S. Capitol cornerstone in 1793. In FY 2013, the agency met its Strategic Vision objective for resource conservation by improving energy and water efficiency, using low-impact materials, sustaining natural sites, practicing comprehensive recycling, providing sustainability guidance, and promoting health and wellness across Capitol Hill.

The AOC is committed to a more energy-efficient and sustainable future. As a leader in sustainable and responsible practices, the agency understands that historic preservation and stewardship greatly influence sustainability goals, overall energy and water savings, and return on investment. The AOC promotes a culture of resource conservation and uses strategies to improve asset performance, integrate sustainable practices into business operations, and strengthen a culture of sustainability with stakeholders and external organizations.



FY 2013 Performance Report

INVEST ▪ MEASURE ▪ SAVE

Energy Savings

In FY 2013, the AOC exceeded the EISA2007 energy reduction goal of 24 percent by achieving a 25.2 percent reduction. This marks the eighth consecutive year of meeting energy reduction goals. Early in the conservation program, the agency focused on energy saving efforts through infrastructure projects that lowered energy usage by 5 to 6 percent. Later the focus shifted to completing building projects using Energy Savings Performance Contracts (ESPCs) in the U.S. Capitol, Senate and House Office Buildings that resulted in reductions in energy and water consumption.

In FY 2013, the AOC completed the ESPC projects in the Capitol and Senate Office Buildings. The projects provided many facility infrastructure upgrades including installing energy-efficient lamps and ballasts, adding state-of-the-art lighting controls in select areas for daylight harvesting and dimming, and upgrading heating, ventilation and air conditioning controls. The ESPCs collectively resulted in 15 percent of the agency's current energy savings.

Performance Improvements

As a result of efforts to provide infrastructure and building system improvements, the AOC now has an extensive amount of measurable data to enable our building operators to identify new conservation opportunities. We established a robust training program to help our employees use these new tools to maximize energy savings from within our building systems. We also focus on the people who occupy the facilities by providing energy conservation guidance to building occupants through outreach efforts.

We continue to make necessary investments to improve the building automation systems by installing direct digital controls on the air handling units and terminal equipment. Reducing water usage and installing more efficient lighting systems are other curtailment strategies that reduce energy use across the Capitol campus.

The well-being of all those who work and visit Capitol Hill is a top priority of the agency and we continually work to ensure a healthy and safe environment is maintained. Key measures for a healthy building include ventilation, moisture control, thermal comfort and adequate lighting controls to accommodate occupant needs.

In FY 2013, the AOC conducted detailed audits in several facilities to confirm that the buildings were meeting the air quality requirements of the Guiding Principles, in accordance with American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) standards 55-2004 and 62.1-2007. The AOC benchmarks indoor conditions and monitors occupant feedback for all facilities through its Corporate Performance Dashboard.

One measurement of the AOC's commitment to energy management is validation by outside experts. In FY 2013, the AOC received the Association of Energy Engineers (AEE) - Region II Corporate Energy Management Award.

This collective agency-wide award recognizes the AOC's energy-saving efforts in a highly competitive region that includes the Southeast and Mid-Atlantic states.

The AOC faces a significant challenge meeting the energy reduction goal in the final two years of the 10-year program. Projects that yield short financial paybacks are already in place. The AOC is investing in new project approaches and further operational energy savings to complement the energy savings performance projects that are ongoing or completed.

The **25 percent** energy intensity reduction equates to powering the entire **Capitol campus** 1 out of every 4 days.



Waste Reduction

Since 2009, the AOC has recycled Construction and Demolition (C and D) waste in several facilities as part of an effort to increase recycling rates within the Capitol campus. The agency's Construction Division contracts with a vendor to collect concrete, drywall, scrap wood and scrap metal waste for recycling. Construction Division employees place waste in roll-off containers located at several campus locations.

The vendor removes the waste off-site and separates recyclables from non-recyclable wastes. Reports show that as of April 2013, approximately 80 percent of the waste collected since the inception of the program was recycled. On average, the program recycled 94 percent of C and D waste in 2013. The AOC is currently working to expand the scope of the Construction Division's C and D recycling program by developing a contract to include waste generated by other AOC buildings.

In FY 2013,
Construction Division
recycled 94 percent
of Construction and
Demolition waste.





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UTILITY METERING ENTERPRISE SYSTEM

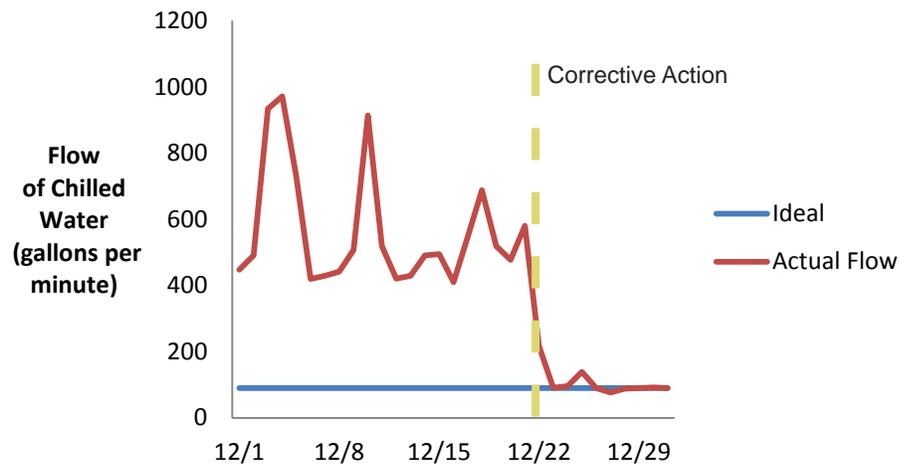
Having accurate and real-time data about our energy consumption is a critical element of a successful energy reduction program. Improved information allows better decision making and highlights consumption issues as they occur. The AOC initiated a long-term investment program for 230 advanced utility meters throughout the campus. These meters measure the amount of steam, chilled water, electric, condensate, domestic water, fire service water, natural gas and fuel oil consumed and provide valuable data to accurately track energy usage.

Metered utility data is collected in a central Utility Metering Enterprise System (UMES) database and allows the agency to make improvements based on quantifiable data. This new tool gives energy managers and operational personnel the building-level, near real-time energy information to easily analyze trends, identify performance anomalies and savings opportunities and track results. This includes being able to distinguish between issues requiring significant investment versus minor repairs.

UMES, launched for use AOC-wide in 2013, was a collaborative effort across the agency. UMES uses a web-based graphic interface that displays hundreds of millions of data points from the meters into simple and easy-to-read charts and graphs. This allows staff to easily and quickly sort, filter and analyze large amounts of near real-time data and generate and export jurisdictional and executive level reports for various requirements. This functionality helped improve building energy performance throughout the jurisdictions.

An important component to this success was integrating training with the launch of the system. The training ensures that employees are educated on the functionality and features of the system and are able to immediately see benefits. The charts and graphs generated through UMES are used by energy managers and operators to improve energy performance by optimizing building temperature settings, reducing simultaneous heating and cooling, and validating ESPC savings. The system also allows operations staff to detect and address issues and energy anomalies in virtual real-time.

Peak Flow of Chilled Water at the Cannon House Office Building



CHILLED WATER EFFICIENCY

The above UMES graph of peak chilled water flow in the Cannon House Office Building indicates that in early FY 2013, there was a higher than optimal amount of peak chilled water flow. The staff found the problem and corrected it, which is indicated by the dramatic reduction in flow on December 22, 2012. This reduction in flow and improved temperature differential at the building helps the Capitol Power Plant save energy used to cool and distribute the chilled water.



THE CAPITOL POWER PLANT

The Capitol Power Plant, which has provided uninterrupted service since 1910, continues to implement operational changes and pursue modernization efforts to ensure the most cost-effective and energy-efficient operations.

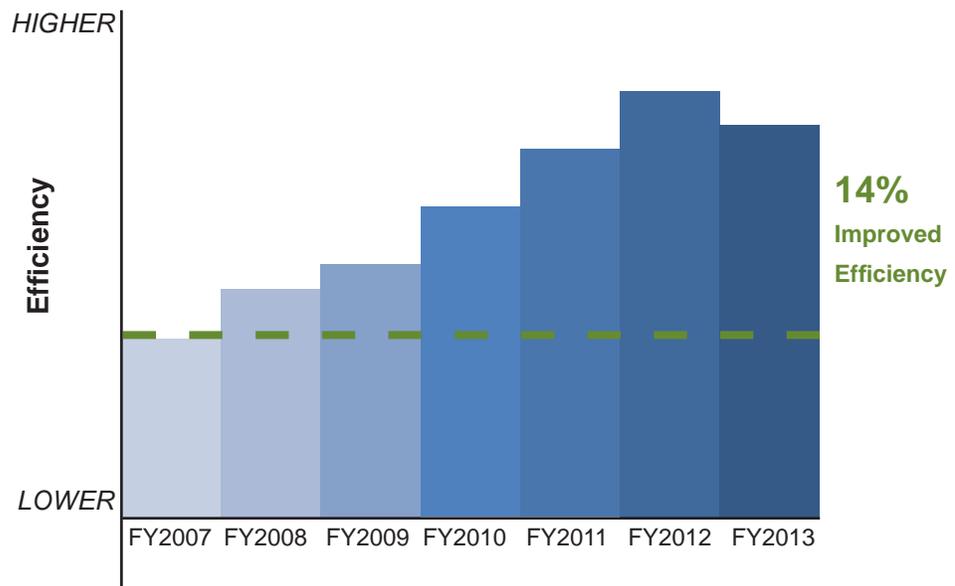
Plant operators take an active role in understanding and using new equipment in the most efficient manner possible. This starts with access to real-time efficiency monitoring. Operations staff, along with shop personnel, work together to improve energy conservation by installing more efficient equipment, or finding and eliminating sources of wasted energy. Training and an instilled sense of pride in continued energy-efficient improvements are an integral part of the teams' process.

The Capitol Power Plant is focusing on improving the efficiency of the steam plant. Recent efforts involved the proper tuning and maintenance of the boilers, as well as implementing energy efficiency projects related to the variable speed pumps and heat recovery systems. These projects save significant energy to help the AOC meet its energy reduction goals.

The Capitol Power Plant is also making improvements in the process to generate and distribute chilled water. The chillers at the Capitol Power Plant make chilled water for distribution in the buildings using electric motors to compress refrigerant, which is a very energy-intensive process. When the outside air temperature is below 45 degrees Fahrenheit, there is a process to make chilled water using cold outside air instead of compressing refrigerant in the chillers. This process is called “free cooling,” and it results in significant energy savings. Switching to free cooling and turning off one of the large chillers for one day is the equivalent of saving all of the electrical power drawn by the U.S. Capitol and the Capitol Visitor Center in one day. Capitol Power Plant operators constantly monitor the campus chilled water load and the outside air temperature to determine when free cooling is possible. Sometimes the switch to free cooling occurs in the middle of the night, even if only for a few hours. This is critical to the AOC’s ongoing and future energy conservation efforts.

By leveraging investments made in previous years and a commitment to teamwork and energy reduction, the Capitol Power Plant contributed significant energy reductions in FY 2013. The employees demonstrated a willingness to learn and adapt as new technologies and innovations were implemented. The team continues to seek out new means to improve operations and save energy while maintaining the mission of the Capitol Power Plant to provide uninterrupted utility services to the Capitol campus.

Efficiency of Chilled Water Production at the Capitol Power Plant





An Interview with CHRIS POTTER

Director of the Capitol Power Plant

Q: What is the mission of the Capitol Power Plant?

A: The core mission of the Capitol Power Plant (CPP) is to provide steam and chilled water utility services to the facilities on and around Capitol Hill including the U.S. Capitol, the Capitol Visitor Center, the House and Senate Office Buildings, the Supreme Court, the Library of Congress, the U.S. Botanic Garden, Union Station, Postal Square, the Folger Library and the Government Printing Office. Our Capitol Power Plant staff work around the clock, 365 days a year, to ensure everything is operated in a safe, reliable, efficient and environmentally responsible manner.

Q: How has the CPP been able to reduce energy usage during the past eight years?

A: The CPP accounts for more than 60 percent of the AOC's total energy use so the success of the overall AOC program relies on the success at the CPP. In 2013, we continued our trend of reduced total energy consumption, resulting in an overall reduction of 25.2 percent. In large part we've been able to accomplish these goals because of Congressional support to fund critical infrastructure and system improvement projects. For example, we achieved significant improvements in chiller efficiencies and the ability to use free cooling through our recent Refrigeration Plant Revitalization projects. We have also used savings realized through CPP efficiencies to invest in Energy Savings Performance Contracts or ESPCs in the U.S. Capitol and in the Senate and House Office Buildings.

Our success is also due to the technical abilities and collaboration of AOC employees at the CPP and from all jurisdictions. All of our new equipment and building upgrades rely on skilled and motivated staff to operate it in the most efficient manner. AOC staff at all levels and across all jurisdictions are working together with a common objective to save energy and meet the energy reduction goals. The increased collaboration and communication among executives, energy managers, building engineers and plant operators is impressive. We are definitely working as One Team with One Mission when it comes to energy reduction.

Q: What does the future hold for the CPP?

A: The CPP is continuing to implement the Refrigeration Plant Revitalization Program and is working on a cogeneration project. These two efforts are critical to our continued success and to achieving our goal of becoming a world-class utility service facility. I also expect that AOC collaboration and communication will continue to increase in other areas beyond energy. This is an exciting time to be at the AOC and the CPP.

DID YOU KNOW?

The CPP pays all the utility bills for the entire Capitol campus. The dedicated staff at the CPP processes almost 1,500 invoices for utility payments each year to ensure the facilities operate continuously.



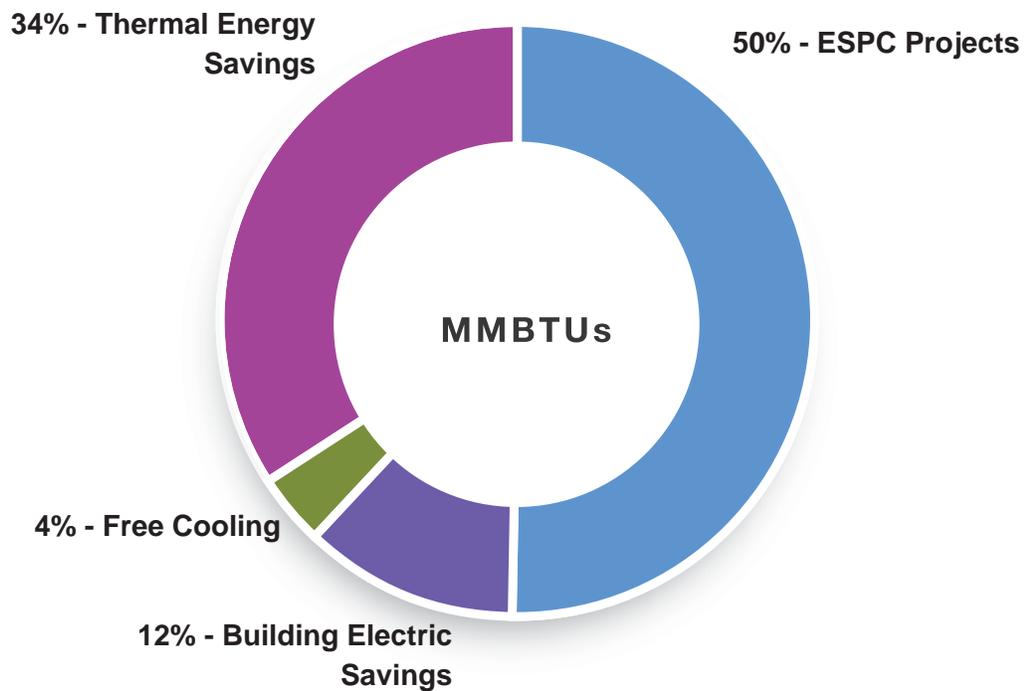
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Financial Savings

The AOC achieved its energy savings by focusing on buildings, infrastructure and people. The savings resulting from these energy conservation efforts are substantial. The annual cost avoidance of the 25.2 percent energy reduction is more than \$14 million. These savings were made primarily through the implementation of employees' initiatives.

Although the AOC exceeded the energy reduction goals through FY 2013, future energy savings opportunities have longer payback periods. Achieving further operational energy savings to complement the completed energy reduction projects will require significant investments and commitment going forward.

Major Sources of Cost Savings



MMBTU's = Million British Thermal Units

Buildings

The three completed Energy Savings Performance Contracts invested \$93 million into the various building energy systems. The resulting energy savings are financing the improvements. The savings also cover debt service on the original investment as well as oversight to ensure the savings continue throughout the life of the contracts. The project paybacks range from 10 to 17 years; however, the improvements and savings potential have much longer life spans, typically greater than 20 years. After the debt on these projects is retired, the improvements will continue to provide significant savings for many years. The estimated cost avoidance from these projects is \$9 million annually.

Infrastructure

Large investments in the Capitol Power Plant's infrastructure were made to improve system performance and add additional capacity necessary as the campus footprint expanded. These projects also provided significant energy savings with an estimated cost avoidance of \$4 million annually.

People

Investments in infrastructure and building systems have provided the AOC with new tools such as the Utility Metering Enterprise System (UMES) and expanded building automation networks. Using these tools, the AOC continues to find new efficiencies and resulting energy savings. The estimated savings by employee-driven operational improvements by the Library Buildings and Grounds is approximately \$1 million annually.



Savings Spotlight

LIBRARY OF CONGRESS

The Library of Congress (Library), as the research arm of Congress and the largest library in the world, has a collection of more than 158 million items that includes more than 36.8 million cataloged books and other print materials in 470 languages; more than 68.9 million manuscripts; the largest rare book collection in North America; and the world's largest collection of legal materials, films, maps, sheet music and sound recordings. The Library's mission to maintain this important collection requires energy-intensive systems and buildings. The Library's facilities are approximately 24 percent of the AOC's building portfolio, but more than 29 percent of its overall energy usage. These facilities are cared for by the AOC's Library Buildings and Grounds (LBG) jurisdiction staff. Reducing the Library's energy use is critical in meeting the AOC-wide energy reduction goals.

The LBG's energy manager teamed up with the jurisdiction's 2nd and 3rd Division Maintenance, Electrical and Air Conditioning Shop employees to develop a plan to reduce energy while still allowing the Library to meet its mission. The plan, based on a successful energy reduction pilot program initiated in 2012, included a variety of operational changes to existing energy systems. The team utilized energy savings estimates based on energy audits, utility meter data and recommendations from the AOC Sustainability, Energy and Water Conservation Division.

The program saved
7.8 million kilowatt
hours of electricity,
valued at **\$780,000** in
one year.

The energy reduction plan included cutting back on non-essential lighting, escalators, elevators and other similar changes while still maintaining minimum operations for safety. The team replaced minor heating and air conditioning mechanical equipment that improved functionality with nightly shutdowns of unnecessary systems to meet the goals of the plan. The team presented the energy reduction plan to Library leadership to share information and to identify any potential impacts on Library operations. This outreach and engagement phase was vital to the overall success of the plan. Maintaining a dialogue with the Library throughout the implementation of the energy reduction plan also ensured that issues were addressed quickly and effectively.

As the team implemented the changes, it relied heavily on new data technology tools, including utility meter data and integrated training. Thanks to new meters and Utility Metering Enterprise System charts and graphs, the results of the initiative were immediately apparent. The program saved 7.8 million kilowatt hours of electricity, and nearly \$780,000. With each successful improvement, the team was able to use the results to move forward with additional energy-saving changes.

The program established an improved education and feedback system between the shops and the Library on energy efficiency and improvements. The feedback system helped the team adjust the plan based on client input and shared results. Education and data focused on the criticality of energy and improving efficiency in the systems. The team also helped the Library better understand the relationship between the plan's improvements and energy efficiency at the Capitol Power Plant. The team became champions of the program and actively worked as ambassadors for energy reduction within the Library buildings. The overall success of the plan and process empowered the employees to continuously identify challenges and work toward effective solutions, leading the way in operational savings.





Looking Ahead

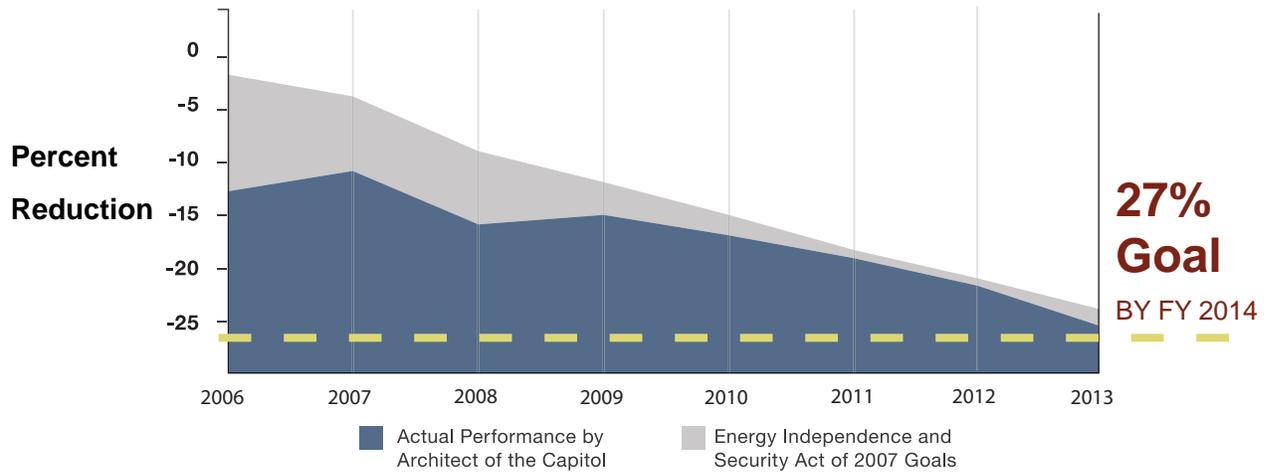
THE ROAD TO 27

While FY 2013 was a successful energy reduction year, meeting the goals for future years is a challenge. The operational changes spearheaded by AOC employees are not enough to achieve the future energy reduction goals. The road to the 27 percent reduction by FY 2014 requires continued project investment and employee innovation. To engage AOC employees and ensure that individual efforts positively contribute toward achieving the 30 percent energy reduction goal by FY 2015, several initiatives are underway.

Energy Plan

The AOC's Energy Plan provides jurisdictional energy managers with action plans to improve the energy performance of the AOC's facilities. The action plans include prioritized lists of energy conservation opportunities that were previously identified by audits, surveys and retro-commissioning efforts. The campus, jurisdictional and building level profiles contain actual FY 2013 energy usage, updated energy models, performance targets and model assumptions for the major buildings. Follow-up on the targets occurs during regular jurisdictional meetings to discuss building performance issues, strategies and progress.

Annual Energy Reduction



Sustainable Guidance

The Sustainability, Energy and Water Conservation Division collaborates with other AOC divisions and jurisdictional staff to address the operations and maintenance of AOC facilities. The team is developing a series of customized plans designed to help employees incorporate sustainable elements into daily operations and comply with the Guiding Principles.

The AOC's Design Guidelines set high standards for construction and renovation efforts. To keep up with state-of-the-art technologies and practices, the design standards are regularly reviewed and updated. The Design Guidelines include sustainable design and resource conservation strategies, and the consideration of environmentally preferable products to improve overall environmental performance and to meet the requirements of the Guiding Principles.

Additional guidance includes a Sustainable Purchasing Policy, Integrated Pest Management Plan and Green Cleaning Plan to ensure that the AOC's buying power is leveraged to the greatest extent possible to encourage the availability of environmentally preferable products in the general marketplace, without compromising the AOC's commitment to fiscal responsibility.

Sustainability Plan

As the leader in the design, construction, maintenance and preservation of the nation's cultural assets, the AOC uses sustainability as an essential performance measure. The AOC Sustainability Plan for FY 2014 - FY 2016 outlines initiatives to meet the AOC's commitments through specific sustainability goals, benchmarks and strategies for success.

This plan highlights the agency's collective vision, goals and the implementation plan required for each. The AOC believes that early and frequent interaction between all stakeholders produces desired results while also preventing redundancy and waste.

SUMMARY OF OVERALL SUSTAINABILITY PLAN COMMITMENTS

The AOC developed commitments for each of the five pillars of sustainability (energy, water, materials, indoor environmental quality and site) and cross referenced them to the AOC's overarching elements: Buildings, Infrastructure and People.



BUILDINGS



INFRASTRUCTURE



PEOPLE

PORTFOLIO GOALS*



————— **Achieve compliance with the *Guiding Principles for Sustainable Existing Buildings*** in 15 percent of Congressional buildings (greater than 5,000 square feet) by end of FY 2015.



————— **Track and assess new construction and major renovation projects** to the United States Green Building Council's Leadership in Energy and Environmental Design (LEED®) rating system by end of FY 2014.



————— **Track and assess 100 percent of goal-subject buildings** by the end of FY 2016. Buildings will be metered for electricity, steam and chilled water; and benchmarked against current and ideal building performance models.

ENERGY



————— **Reduce overall energy use intensity** by 30 percent by end of FY 2015.



————— **Reduce Greenhouse Gas (GHG) Emissions (Scope 1 and 2)** by 25 percent compared to the FY 2008 baseline by end of 2016.

SUSTAINABILITY COMMITMENTS

WATER

-   — Track and assess **100 percent of water use** by the end of FY 2016.
-    — Meet the *Guiding Principles for Sustainable Existing Buildings* for indoor and outdoor water requirements for **15 percent of Congressional buildings** by end of FY 2015.

MATERIALS

-  — Reduce, reuse or recycle at least **40 percent of building occupant waste** by end of FY 2016.
-  — Reduce, reuse or recycle at least **80 percent of construction and demolition waste** by end of FY 2016.
-  — Divert **90 percent of non-recyclable, building occupant waste** for waste-to-energy by end of FY 2016.
-  — Develop an **Environmentally Preferable Product Policy** by end of FY 2015.

INDOOR ENVIRONMENTAL QUALITY

-  — Provide a comfortable and productive environment that achieves **ventilation and thermal comfort levels** as defined in American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) 55-2004 and 62.1-2007 in **15 percent of buildings** by end of FY 2014.
-  — Develop a **Moisture Control Policy** and associated implementation strategy by end of FY 2015.

SITE

-  — Any new construction project of greater than 5,000 square feet that impacts its surrounding site area to **meet and/or exceed applicable legal stormwater regulations** by end of FY 2016.
-  — Design new landscaping projects to meet the **Sustainable Sites Initiative™ (SITES) standard** by the end of FY 2016.
-  — Track existing landscapes within the *Guidance for Federal Agencies on Sustainable Practices for Designed Landscapes*, where feasible, by end of FY 2016.
-   — Evaluate and document **climate change risks and the potential impacts on the agency's mission, programs and operations** by end of FY 2016.

Jurisdiction Highlights

KEY EFFORTS IN FY 2013



U.S. CAPITOL BUILDING AND CAPITOL VISITOR CENTER

In FY 2013, the U.S. Capitol Building jurisdiction completed the Energy Savings Performance Contract and the energy savings performance period began. These projects are expected to significantly improve the energy efficiency of the U.S. Capitol Building and contribute to the agency's overall energy reduction requirement.

At the Capitol Visitor Center, retro-commissioning of the HVAC equipment and integration of the building control system was completed. This effort provided a review of the building's HVAC and lighting control systems, as well as a list of potential energy reduction issues. Many of the issues were immediately corrected and other larger scale actions are planned for implementation in FY 2014.



OFFICE OF SECURITY PROGRAMS

The Office of Security Programs maintains the Capitol Police Buildings, Grounds, and Security. The jurisdiction implemented several energy saving measures including the installation of a solar light tower and the upgrade of campus parking lot lighting to LED fixtures. These efforts mark the beginning of a campus-wide sustainable lighting program managed by the jurisdiction. In addition, the jurisdiction incorporated a building automation system for the U.S. Capitol Police Headquarters' heating and cooling systems that will result in a lower energy intensity. These upgrades are expected to generate approximately \$300,000 in annual cost avoidance.



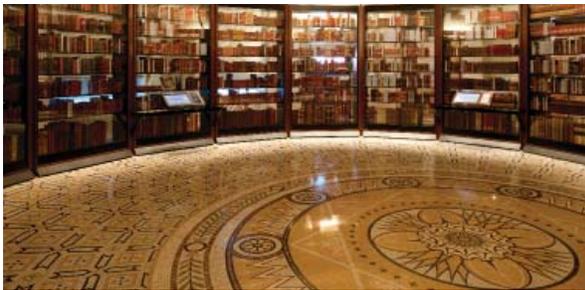
HOUSE OFFICE BUILDINGS

The House Office Buildings jurisdiction completed a number of projects that are reducing energy costs, such as replacing steam traps, installing room occupancy sensors, replacing old air handlers, adding electric vehicle charging stations and hosted a successful energy saving awareness showcase. The jurisdiction also created a Sustainability Program to coordinate recycling, environmental compliance and hazardous material tracking.



SENATE OFFICE BUILDINGS

The Senate Office Buildings jurisdiction successfully completed the Energy Savings Performance Contract projects, implemented climate control curtailment strategies that reduced energy usage, installed electric vehicle charging stations and hosted a successful energy saving awareness showcase.



LIBRARY BUILDINGS AND GROUNDS

The Library Buildings and Grounds jurisdiction completed numerous energy reduction projects. Upgrades included modifying system controls that manage lighting usage based on ambient light or time of day, replacing high-wattage light bulbs, re-commissioning air handling units and HVAC systems and improving energy efficiency in the data center. These improvements, along with operational changes, resulted in annual cost avoidance of approximately \$780,000.



SUPREME COURT BUILDINGS AND GROUNDS

The Supreme Court Buildings and Grounds jurisdiction continues to identify ways to reduce its energy consumption. In FY 2013, the jurisdiction completed a comprehensive modernization project and optimized systems. Additional improvements are planned for completion in FY 2014. Once complete, the jurisdiction can establish a baseline usage of energy and further develop reduction strategies.



CAPITOL POWER PLANT

The Capitol Power Plant jurisdiction is working to complete the Refrigeration Plant Revitalization project, which has delivery phases scheduled over several years. This fiscal year, Phase I was completed in a manner that coordinated necessary power outages to allow for continued reliable operations of the Capitol Power Plant. Phase I improvements provided new variable speed chillers and resulted in significant improvements to chilled water production efficiency.



U.S. BOTANIC GARDEN

The U.S. Botanic Garden jurisdiction continued its commitment to sustainability and energy conservation in FY 2013 by implementing a variety of improvements to the lighting and HVAC systems throughout its facilities. They also made great strides in reducing water use. A new system was installed throughout the Conservatory that allows for the control and programming of lighting. Different light levels are programmed to occur at specific times and in specific locations. In addition, a project to replace an aging and failing evaporative cooling system and the HVAC at the Production Facility was started. This updated equipment ensures that the Botanic Garden can meet its mission while becoming more energy efficient.



U.S. CAPITOL GROUNDS

The U.S. Capitol Grounds jurisdiction continued to implement best practices in its landscape and infrastructure management efforts. Capitol Grounds crews installed low-cost, low-maintenance Bermuda grass atop the House Underground Garage, executed the reduction of fountain operating hours to save energy and maintained a fleet of fuel-efficient vehicles.

FY 2013 Energy Management Performance Summary

The following performance charts were created to provide a summary of the AOC's progress on meeting the requirements under the Energy Policy Act of 2005 (EPA2005) and the Energy Independence and Security Act of 2007 (EISA2007).

GOAL PERFORMANCE				
Energy Management Requirement	FY 2003 Btu/GSF	FY 2013 Btu/GSF	Percent Change FY 2003 - 2013	FY 2013 Goal Target
Reduction in Energy Intensity in Facilities Subject to the EPA2005 Goals	172,678	129,176	-25.2%	-24.0%
Renewable Energy Requirement	Renewable Electricity Use (MWH)	Total Electricity Use (MWH)	Percentage	FY 2013 Goal Target
Eligible Renewable Electricity Use as a Percentage of Total Electricity Use	71,256.8	323,362.2	22.0%	7.5%
Water Intensity Reduction Goal	FY 2007 Gallon/GSF	FY 2013 Gallon/GSF	Percent Change FY 2003 - 2013	FY 2013 Goal Target (AOC Internal Metric)
Reduction in Potable Water Consumption Intensity	28.2	23.8	-15.8%	Met
Metering of Electricity Use	Cumulative # of Buildings Metered	Cumulative % of Electricity Metered	Cumulative % of Appropriate Buildings Metered	FY 2013 Goal Target
Standard Electricity Meters in FY 2013	26	14.0%	53.1%	Met
Advanced Electricity Meters in FY 2013	23	86.0%	46.9%	Met
Total Electricity Meters in FY 2013	49	100.0%	100.0%	100.0% (Met)
Federal Building Energy Efficiency Standards			Percent of New Building Designs	FY 2007 Forward Goal Target
Percent of New Building Designs Started Since Beginning of FY 2007 That are 30 Percent More Energy Efficient Than Relevant Code, Where Life-Cycle Cost Effective:			100%	100%

INVESTMENTS IN ENERGY AND WATER MANAGEMENT		
Sources of Investment	Investment Value (Thou. \$)	Anticipated Annual Savings (Million Btu)
Direct Obligations for Facility Energy Efficiency Improvements	\$482.0	12,500.0
Investment Value of ESPC Task/Delivery Orders Awarded in Fiscal Year	\$0.0	0.0
Investment Value of Utility Energy Service Contract Task/Delivery Orders Awarded in Fiscal Year	\$0.0	0.0
Total	\$482.0	12,500.0
		Percentage
Total Investment as a Percentage of Total Facility Energy Costs		0.9%
Financed (ESPC/Utility Energy Service Contract) Investment as a Percentage of Total Facility Energy Costs		0.0%

FY 2013 ENERGY MANAGEMENT DATA REPORT

Part 1: Energy/Water Consumption Data

1-1. EPAct GOAL SUBJECT BUILDINGS							
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Unit Cost (\$)	Unit of Measure	Site-Delivered Btu (Billion)	Est. Source Btu (Billion)
Electricity	MWH	211,259.4	\$ 20,613.1	\$ 0.10	/kWh	720.8	2,277.8
Fuel Oil	Thou. Gal.	8.9	\$ 38.3	\$ 4.30	/Gallon	1.2	1.2
Natural Gas	Thou. Cubic Ft.	1,223,165.3	\$ 15,845.6	\$ 12.95	/Thou Cu Ft.	1,223.2	1,279.4
Coal	S. Ton	885.8	\$ 231.1	\$ 260.94	/S. Ton	24.8	24.8
Purch. Steam	BBtu	14.8	\$ 574.7	\$ 38.86	/MMBtu	14.8	34.0
Purch. Chilled Water	BBtu	11.3	\$ 1,406.2	\$ 124.66	/MMBtu	11.3	14.4
Excluded Steam (-)	BBtu	(169.0)	\$ (5,681.7)	\$ 33.61	/MMBtu	(169.0)	(228.2)
Excl. Chilled Water (-)	BBtu	(42.2)	\$ (702.5)	\$ 16.67	/MMBtu	(42.2)	(54.0)
Excluded Security (-)	MWH	(78.5)	\$ (7.7)	\$ 0.10	/kWh	(23.0)	(72.7)
Purch. Renew Electric.	MWH	71,256.8	\$ 7,252.7	\$ 0.10	/kWh	243.1	0.0
Purch. Renew. Other	BBtu	0.0	\$ -	\$ -	/MMBtu	0.0	0.0
		Total Costs:	\$ 38,783.7		Total:	2,005.0	3,276.9
FY 2013 Goal Subject Buildings Gross Square Feet (Thousands)		15,521.7			Btu/GSF:	129,176	211,116
Goal Subject Buildings FY 2003 Baseline (Btu/GSF)		172,678					

1-2. EPAct GOAL EXCLUDED BUILDINGS							
Energy Type	Consumption Units	Annual Consumption	Annual Cost (Thou. \$)	Unit Cost (\$)	Unit of Measure	Site-Delivered Btu (Billion)	Est. Source Btu (Billion)
Electricity	MWH	40,924.6	\$ 3,993.1	\$ 0.10	/kWh	139.6	441.2
Fuel Oil	Thou. Gal.	418.0	\$ 1,287.8	\$ 3.08	/gallon	58.5	58.5
Natural Gas	Thou. Cubic Ft.	29,409.1	\$ 381.0	\$ 12.95	/Thou Cu Ft.	29.4	30.8
Coal	S. Ton	0.0	\$ -	\$ -	/S. Ton	0.0	0.0
Purch. Steam	BBtu	0.0	\$ -	\$ -	/MMBtu	0.0	0.0
Purch. Chilled Water	BBtu	0.0	\$ -	\$ -	/MMBtu	0.0	0.0
Excluded Steam (-)	BBtu	169.0	\$ 5,681.7	\$ 33.61	/MMBtu	169.0	228.2
Excl. Chilled Water (-)	BBtu	42.2	\$ 702.5	\$ 16.67	/MMBtu	42.2	54.0
Excluded Security (-)	MWH	78.5	\$ 7.7	\$ 0.10	/kWh	23.0	72.7
Purch. Renew Electric.	MWH	0.0	\$ -	\$ -	/kWh	0.0	0.0
Purch. Renew. Other	BBtu	0.0	\$ -	\$ -	/MMBtu	0.0	0.0
		Total Costs:	\$ 12,053.8		Total:	461.8	885.4
FY 2013 Goal Subject Buildings Gross Square Feet (Thousands)		1,052.3			Btu/GSF:	438,794	841,341
Goal Excluded Subject Buildings FY 2003 Baseline (Btu/GSF)		121,847					

FY 2013 ENERGY MANAGEMENT DATA REPORT

1-3. ALL RENEWABLE ENERGY USE (INCLUDING NON-ELECTRIC) AS A PERCENTAGE OF FACILITY ELECTRICITY USE		
All Renewable Energy Use (Billion Btu)	Total Facility Electricity Use (Billion Btu)	RE as a Percentage of Energy Use
71,256.8	323,519.2	22.0%

1-4.1 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 Water Usage	393.9	\$6,036.5	16,574.0	23.8
				Percent
Approx. Percentage of Reported Water Consumption that is Estimated:				70%
Is the FY 2007 Agency Water Intensity Baseline Preliminary or Final?				Final

Part 2: Energy Efficiency Improvements

2-1. DIRECT AGENCY OBLIGATIONS				
	FY 2013		Projected FY 2014	
	(Million Btu)	(Thou. \$)	(Million Btu)	(Thou. \$)
Direct Obligations for Facility Energy Efficiency Improvements, Including Facility Surveys/Audits		\$482.0		\$1,200.0
Estimated Annual Savings Anticipated from Obligations	12,500.0	\$250.0	24,520.0	\$ 490.4

2-2. ENERGY SAVINGS PERFORMANCE CONTRACTS (ESPC)		
	Annual Savings (Million Btu)	Task Orders/Savings (Number/Thou. \$)
Direct Obligations for Facility Energy Efficiency Improvements, Including Facility Surveys/Audits	0.0	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		\$7,600.3



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