



The Library of Congress
Office of the Inspector General



Library-wide

*Survey of the Library's
Energy Conservation Efforts*

Audit Survey Report No. 2009-PA-103
July 2009



UNITED STATES GOVERNMENT

LIBRARY OF CONGRESS

Memorandum

Office of the Inspector General

TO: James H. Billington
Librarian of Congress

July 31, 2009

FROM: Karl W. Schornagel
Inspector General

A handwritten signature in black ink, appearing to read "Karl W. Schornagel".

SUBJECT: *Survey of the Library's Energy Conservation Efforts*
Audit Survey No. 2009-PA-103

This transmits our final audit survey report on the Library's energy conservation efforts. The Executive Summary begins on page *i*, and complete survey results and a recommendation appear on pages 4 to 10.

Both the Library's Office of Facility Services and the Architect of the Capitol agreed with our results. Facility Services' complete response is included as an appendix to the report. Based on the written comments to the draft report, we consider the recommendation resolved. Please provide, within 30 calendar days, an action plan addressing implementation of the recommendation, including implementation dates, in accordance with LCR 211-6, Section 11.A.

We appreciate the cooperation and courtesies extended by Facility Services and the AOC during this audit.

cc: Chief Operating Officer
Superintendent, Library Buildings & Grounds, Architect of the Capitol
Inspector General, Architect of the Capitol

▶▶ TABLE OF CONTENTS

▶▶ Executive Summary	<i>i</i>
▶▶ Introduction.....	1
▶▶ Objectives, Scope, and Methodology.....	3
▶▶ Summary of OIG Survey Results	4
I. The AOC’s Energy Conservation Initiatives	4
a. The Energy Policy and Energy Independence and Security Acts.....	4
b. Energy Savings Performance Contracts.....	5
c. Best Practices and Ongoing Initiatives.....	6
d. The Library’s Energy Consumption	7
II. The Library’s Energy Conservation Initiatives.....	8
a. Outreach Efforts	8
b. Recycling Programs	9
c. Energy Efficient Products	9
Recommendation	9

▶▶ EXECUTIVE SUMMARY

The operation of the Library of Congress' buildings requires large amounts of energy and water, and generates equally large amounts of waste. During 2008 alone, the estimated cost for electricity, water, and steam for these buildings was \$18 million.

This report provides the results of an audit survey we performed to assess energy conservation at the Library and evaluate the Library's and the Architect of the Capitol's (AOC) efforts to reduce energy consumption, emissions of pollutants, and greenhouse gasses. We limited our survey to the Library's three Capitol Hill complex buildings.

The AOC is responsible for the maintenance, renovation, and new construction of all buildings within the Capitol Hill complex, including Library buildings. Its staff provide mechanical, electrical, plumbing, elevator, structural, and maintenance work for the Library's buildings and grounds, and make any necessary building improvements. On the Library's behalf, Facility Services is responsible for planning, designing, and implementing space usage, custodial care for the buildings, and monitoring and reporting to the AOC any facility structural or mechanical problems.

Based on the results of our survey, we determined that the Library and AOC are taking appropriate steps to reduce the Library's energy consumption. Accordingly, we are concluding this project with an audit survey report. Following are summaries of significant issues we identified during this review and a recommendation to improve the Library's energy conservation efforts:

The AOC's Energy Conservation Initiatives—The AOC has adopted the spirit of the Energy Policy Act of 2005 (EPACT 2005) and the Energy Independence & Security Act of 2007 (EISA). The EISA spells out annual energy reduction goals for federal government buildings, starting from a 2003 baseline with a final goal of 30 percent reduction by 2015. As of 2008, the AOC has achieved the interim year goals.

To continue to meet the EISA goals, the AOC has scheduled energy audits for each of the Library's three Capitol Hill buildings to identify cost-effective projects that would decrease energy use and related greenhouse gas emissions. The AOC has obtained Congressional approval to use Energy Savings Performance Contract (ESPC) arrangements to facilitate achievement of the identified projects. Under an ESPC, the AOC enters into a long-term contract (up to 25 years) with a private energy services company. The company conducts a comprehensive energy audit and then finances and implements energy saving projects approved by the AOC. The AOC/Library repays the company with the resulting energy savings. Overall, the AOC expects the total energy used by the Library to decrease by 20 percent after the identified energy projects are completed. AOC officials intend to award contracts for the projects during FY 2010.

The Library's Energy Conservation Initiatives—The Library has initiated a variety of programs to conserve energy and recycle waste. Integrated Support Services (ISS) sponsors various forums and meetings to promote conservation by Library staff. Additionally, ISS had established an active recycling program for paper and ink cartridges and was participating in the "Computers for Learning Program" which involves donating used computer equipment to eligible schools. Facility Services management plans to request budget approval to establish a new position within its Facility Operations section to serve as "Energy Coordinator" to help facilitate and promote energy conservation and recycling activities within the Library.

We commend Facility Services for its plan to establish the coordinator position. However, regardless of the outcome of the related planned budget request, we believe that the Library should be undertaking more energy awareness activities to ensure staff fully participate in efforts to conserve energy and follow the Library's conservation policy. We recommend that ISS management undertake more initiatives to increase awareness among Library staff of the importance of energy conservation and recycling programs.

ISS and AOC generally agreed with our report and recommendation.

▶▶ INTRODUCTION

The operation of the Library of Congress' buildings requires large amounts of energy and water, and generates equally large amounts of waste. The effectiveness with which the Library and the Architect of the Capitol (AOC) manage these facilities has significant implications for both operational costs and the health of the environment. This report provides the results of an audit survey we performed on the work being done by the Library and the AOC to conserve resources used for the Library's buildings and control related waste.

Substantial Library funding is required to pay for the energy and water consumed at the buildings the Library occupies. During 2008 alone, the estimated cost for electricity, water, and steam for these buildings was \$18 million.¹

The Library has a longstanding energy conservation policy. Issued in October 1977, Library of Congress Regulation (LCR) 1810-3, *Building Services, Maintenance, and Repairs - Conservation of Services*, §8, states "[m]embers of the staff are expected to assist in the economical management of buildings by practicing good housekeeping methods and economizing on electric current, heat, air-conditioning, supplies, and other facilities and equipment. Electric lights and electrical equipment should be turned off when not needed. Supplies furnished for the servicing of buildings should be conserved. Trash and other waste materials should be disposed of in the receptacles provided."

The AOC is responsible for the maintenance, renovation, and new construction of all buildings within the Capitol Hill complex, including Library buildings. Its staff includes electricians, plumbers, carpenters, painters, masons, and other skilled crafts people who provide mechanical, electrical, plumbing, elevator, structural, and maintenance work for the Library's buildings and grounds, and make any necessary building improvements.

¹ Consumption of electricity and regular water (non-chilled) was based on an actual meter reading for each of the three Library buildings on Capitol Hill. Because the Library does not have meters for steam and chilled water, we estimated these based on square footage of building space.

Steam and chilled water for the Library's three main buildings on Capitol Hill are provided by the Capitol Power Plant, which is managed by the AOC. Steam is used to heat the buildings, provide hot water, and humidify the air. Chilled water is used to cool the buildings and equipment and dehumidify the air. Natural gas and electricity for legislative branch facilities on Capitol Hill, including the Library's buildings, are purchased from Washington Gas and Pepco Energy Services, respectively.

On the Library's behalf, Facility Services is responsible for planning, designing, and implementing space usage, custodial care for the buildings, and monitoring and reporting to the AOC any facility structural or mechanical problems. The General Services Administration is responsible for building operations at the Library's leased facilities on Taylor Street in North-West, Washington, D.C and Landover, Maryland. The Library pays for the energy consumed at these facilities.

►► OBJECTIVES, SCOPE, AND METHODOLOGY

Our survey objective was to assess energy conservation at the Library and evaluate the Library's and AOC's efforts to reduce energy consumption, emissions of pollutants, and greenhouse gasses. We limited our survey to the Library's three Capitol Hill complex buildings. Consequently, we excluded the Library's off-site Book Storage Modules at Fort Meade, Maryland and the National Audio-Visual Conservation Center in Culpeper, Virginia (AOC is responsible for the building structure, electrical, mechanical, and plumbing systems at both facilities). Likewise, we excluded the Library's leased facilities at Landover, Maryland and Taylor Street in North-West, Washington, D.C. (both are General Services Administration leased facilities).

To respond to the survey objectives, we researched applicable laws and regulations, reviewed relevant documents, and interviewed officials of the AOC and the Library's Integrated Support Services (ISS) and Information Technology Services organizations.

We conducted this audit survey from the beginning of April 2009 through May 2009 in accordance with generally accepted government auditing standards and LCR 211-6, *Functions, Authority, and Responsibility of the Inspector General*. Government auditing standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions, based on our audit objectives. We believe that the evidence we obtained provides a reasonable basis for our findings and conclusions, based on our audit objectives.

▶▶ SUMMARY OF OIG SURVEY RESULTS

I. The AOC’s Energy Conservation Initiatives

a. The Energy Policy and Energy Independence and Security Acts

The AOC is responsible for maintaining and making upgrades to the infrastructure of the buildings. The AOC has adopted the spirit of the Energy Policy Act of 2005 (EPACT 2005) and the Energy Independence & Security Act of 2007 (EISA).

Among other things, these require:

- Reductions in annual energy use (up to 30 percent by fiscal year [FY] 2015 as compared to FY 2003);
- An energy audit of all congressional facilities every four years;
- Developing and implementing a cost-effective energy and water conservation plan for all congressional facilities; and
- Annual reports to Congress which document actual past performance and specify plans and expectations.

The EISA spells out annual energy reduction goals for federal government buildings, starting from a 2003 baseline.

The AOC has interpreted the EISA to require it to achieve annual reductions in energy use considering the Capitol Hill complex as a whole, and not to individual buildings or organizations. According to the AOC, this interpretation gives it the flexibility to obtain the greatest impact on energy reduction and more flexibility to take on larger projects.

Cumulative EISA Energy Consumption Reduction Goals and Actual Capitol Complex Reductions		
Fiscal Year	Goal (%)	Actual (%)
2006	2	6.5
2007	4	6.7
2008	9	10.7
...	...	
2015	30	

The Library’s Book Storage Modules at Fort Meade, Maryland and the National Audio-Visual Conservation Center in Culpeper, Virginia are not subject to the requirements of EPACT 2005 and EISA due to the unique temperature and humidity requirements at these facilities. Therefore, energy consumption data for these facilities is not included in the

AOC's energy reduction statistics. However, the AOC separately provides energy consumption and cost data for these facilities as "Goal-Excluded" facilities in required reports. Moreover, despite the lack of stated energy reduction goals for these buildings, the AOC has implemented, to the extent practicable, strategies to improve energy efficiency at these facilities.

b. Energy Savings Performance Contracts

The AOC has obtained congressional approval to use "Energy Savings Performance Contract" (ESPC) arrangements to facilitate achievement of EISA goals for legislative branch facilities on Capitol Hill including the Library's buildings. ESPCs provide an alternative to direct appropriations for funding energy-efficiency improvements in federal facilities.

Under an ESPC, the AOC enters into a long-term contract (up to 25 years) with a private energy services company. The company conducts a comprehensive energy audit and then finances and implements energy saving projects approved by the AOC. The energy services company guarantees that the improvements will generate energy cost savings sufficient to pay for the project over the term of the contract. The AOC/Library repays the company with the resulting energy savings. Terms of the ESPC require that savings to the agency must exceed payments to the energy services company. After the contract ends, all additional cost savings accrue to the agency.

The AOC expects to use energy service companies under an existing Department of Energy "umbrella" contract to perform several energy saving projects at the Library. ESPC projects identified by the AOC include:

- replacing existing chilled water pump motors with premium efficiency motors that meet National Electrical Manufacturers Association (NEMA) standards,
- installing variable frequency drives on pump motors,
- replacing air handler fan motors with premium efficiency motors that meet NEMA standards,
- installing carbon monoxide-based control systems for garage ventilation fans,

- replacing existing magnetic ballasts in fluorescent fixtures with low power electronic ballasts,
- installing occupancy sensors in designated areas to control fluorescent fixtures and garage lighting, and
- installing variable frequency drives on heating pump motors.

The AOC estimates that these projects will cost \$36.9 million, yield a first-year savings of \$4.7 million, and achieve a payback period of about 8 years. Overall, the AOC expects the total energy used by the Library to decrease by 20 percent after these projects are completed. AOC officials intend to award contracts for the projects during FY 2010.

c. Best Practices and Ongoing Initiatives

The AOC follows best practices such as (1) conducting periodic energy assessments, (2) identifying energy needs, deficiencies, and conservation measures, (3) performing life-cycle cost analyses to evaluate investment proposals and potential energy-efficient product acquisitions, and (4) developing funding strategies for energy conservation that incorporate short- and long-term priorities.

Additionally, the AOC has taken many actions over the past five years to maintain the Library's aging facilities and bring them up to current energy efficiency standards. Significant actions included:

- installing a burner retrofit at the Culpeper facility that is expected to reduce fuel oil consumption by 15%;
- completing an independent study on heating, ventilating, and air conditioning energy saving measures for the Library's three main buildings;
- adjusting the Adams building book stack light timers from two hours to 15 minutes;
- renovating the restrooms in the Adams building, including new water saver faucets and low flow flush valves;
- upgrading the lighting controller for the main buildings;
- upgrading 98,000 light fixtures with solid state ballasts and 30 watt lamps;
- replacing incandescent with compact fluorescent light bulbs;

- upgrading switch gear in the Adams and Jefferson buildings; and
- awarding a contract to modernize elevators in the Madison and Jefferson buildings.

The AOC has also worked to educate and encourage Capitol Hill offices to conserve energy. For example, in October 2008 the AOC launched the *Power to Save* energy awareness program, intended, among other things, to encourage offices to replace old, inefficient office equipment with newer, more efficient models.

d. The Library's Energy Consumption

We reviewed the Library's own energy consumption over the past five years to determine whether reductions occurred in electricity consumption for those facilities compared to the FY 2003 level. We found that the Library's electricity use has been relatively constant over the past five years and that it has not met EISA goals. For example, Library facilities used 66,962,560 kilowatt-hours of electricity in FY 2008. That amount exceeded the EISA goal of 58,744,442 kilowatt-hours for that year (i.e., 9 percent reduction from the FY 2003 level).

We were unable to assess the steam and chilled water consumption of the Library's Capitol Hill facilities because those facilities do not have meters that measure their use. AOC estimates consumption for those buildings based on square footage.

The AOC has been taking steps to reduce the Library's overall energy consumption. For example, the AOC is monitoring the electricity used in each building on hourly and daily bases and taking action whenever spikes occur. Moreover, the AOC has proposed energy audits for the Library buildings on four-year cycles as required by EISA.² However, energy audits are expensive to perform. For example, the projected cost of the FY 2009 Madison Building audit is nearly \$526,000. Therefore, the actual frequency of the audits will depend on the availability of funds.

² EISA Section 432 requires completion of comprehensive energy and water evaluations on each building once every four years. The purpose is to determine the cost and payback period of energy and water conservation measures.

II. The Library's Energy Conservation Initiatives

The Library has a longstanding energy conservation policy. It also has initiated a variety of programs to conserve energy and recycle waste. Although it is on the right path, the Library should take further action to ensure it conserves energy resources to the maximum extent possible. The following paragraphs identify significant Library conservation initiatives and include a recommendation to increase awareness among Library staff of the importance of energy conservation and recycling programs.

a. Outreach Efforts

Integrated Support Services (ISS) sponsors various forums and meetings to promote conservation by Library staff. For example, ISS hosts quarterly forums where it provides senior staff and managers with information on the Library's recycling efforts and energy conservation activities. In March 2008, ISS presented the Library's "Greening Initiatives" at a Union President's meeting. In January 2009, Facility Services and Information Technology Services met to discuss possible ways to achieve and promote staff awareness for greater energy conservation. More recently, at the Library's fourth annual Earth Day Event in April 2009, Facility Services and the AOC were featured speakers on energy conservation and sustainability, and presented meaningful and practical ways staff can conserve energy in the workplace.

Notwithstanding these positive efforts, energy conservation needs to be continuously and strongly promoted by the Library. Facility Services management recognizes this and informed us that it plans to request budget approval to establish a new position within its Facility Operations section to serve as "Energy Coordinator" to help facilitate and promote energy conservation and recycling activities within the Library.

We commend Facility Services for its plan to establish the coordinator position. However, regardless of the outcome of the related planned budget request, we believe that the Library should be undertaking more energy monitoring and awareness activities to ensure staff fully participate in efforts to conserve energy and follow the Library's conservation

policy. We have observed lights unnecessarily left on after normal business hours, mostly because many light switches control large sections of buildings, as opposed to specific office areas. Similarly, the television monitor outside the Madison building cafeteria appears to be on into the evening hours. Facility Services needs to do a better job of identifying energy waste such as these two examples and bring it to the attention of staff and the AOC.

b. Recycling Programs

The Library was promoting conservation through its involvement in several recycling programs. For example, ISS had established an active recycling program for paper and ink cartridges and was participating in the "Computers for Learning Program" which involves donating used computer equipment to eligible schools. The Library donated 1,498 computers to schools through that program in FY 2008. However, in a previous audit we found that the long turnaround time from getting the excess computers out of the Library to schools reduces the benefits of recycling, in some cases.

c. Energy Efficient Products

The Library was procuring computers manufactured by the Dell company. Those computers exceed the Environmental Protection Agency's Energy Star standard. Products which meet that standard are designed to be energy-efficient and reduce greenhouse gas emissions.

Recommendation

We recommend that ISS management undertake more initiatives to increase awareness among Library staff of the importance of energy conservation and recycling programs. Among other things, initiatives that should be undertaken include:

- providing employee training to increase staff members' awareness of the importance of energy conservation and recycling;
- making staff aware of the EISA energy reduction goals via articles in the Library's weekly staff newspaper, *The Gazette*;

- designating an energy liaison for each office;
- distributing periodic e-mail messages to encourage employees to turn off lights and computers, and implement other efficiency practices;
- posting notices near light switches and computer equipment to turn the lights and equipment off when not in use;
- disseminating energy awareness materials to educate employees about smart energy management practices in the work place and at home; and
- establishing systems to alert employees of unexpected days of high-energy demand.

Major Contributors to This Report:

Nicholas Christopher, Assistant Inspector General for Audits
Patrick Cunningham, Senior Auditor

▶▶ APPENDIX – MANAGEMENT RESPONSE

From: Nick Christopher
 To: pcun
 Date: 7/15/2009 6:36:56 AM
 Subject: Fwd: draft IG Audit - Energy Conservation at the Library

>>> Mary B Levering 7/14/2009 5:44 PM >>>
 7/14/09

Nick, Neal Graham has provided the comments below in response to your message of 7/9/09, asking for comments on the draft IG survey report. Rob Williams, chief of ISS/ office systems services also reviewed the draft report but he had no comments on the draft.
 thanks for sharing the draft with us for review and comment.
 mary levering

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>>> "Neal Graham" <ngra@loc.gov> 7/14/2009 1:29:26 PM >>>
 FACS has reviewed the OIG draft report on LOC energy conservation efforts and generally agree with the OIG recommendation.

Editorially, I suggest a few points need to be clarified:

- (1) In the Executive Summary, clarify that cost savings resulting from implementation of ESPC arrangements are shared by the AOC and the private energy services company (as stated on page 5, savings to the agency must exceed payments to the energy services company.)
- (2) Energy costs for government owned buildings occupied by the LOC are paid by the AOC using its own appropriated funds. LOC appropriated funds are used to pay energy costs at facilities leased from GSA.
- (3) Agree with the single recommendation that ISS management undertake more initiatives to increase awareness among Library staff of the importance of energy conservation and recycling programs. FACS plan to submit a FY11 MDEP requesting one (1) FTE to oversee Energy Conservation Efforts, which will include communications and recycling efforts. The AOC LBG will receive one (1) FTE focused in energy conservation in FY10 (in House and Senate marks)

Note that the report provided no formal "findings" with which to agree or disagree.

Neal Graham