



U.S. Department of Energy  
Office of Inspector General  
Office of Audit Services

# Audit Report

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The Department of Energy's  
Opportunity for Energy Savings  
Through Improved Management of  
Facility Lighting



**Department of Energy**  
Washington, DC 20585

July 1, 2010

MEMORANDUM FOR THE SECRETARY

*Gregory H. Friedman*

FROM: Gregory H. Friedman  
Inspector General

SUBJECT: INFORMATION: Audit Report on "The Department of Energy's Opportunity for Energy Savings Through Improved Management of Facility Lighting"

BACKGROUND

The American Recovery and Reinvestment Act of 2009 (Recovery Act) highlighted the importance of reducing the Nation's dependence on foreign oil and conserving scarce energy resources. The Department of Energy, as the designated lead agency for promoting new technologies, providing leadership for energy conservation and helping Federal agencies reduce energy costs, plays a pivotal role in achieving the Recovery Act's energy related goals. The Department spends nearly \$300 million per year in energy costs for its 9,000 buildings at 24 sites. Electricity costs, totaling \$190 million, account for close to two-thirds of the Department's total energy expenditures, with roughly 40 percent or \$76 million of those costs attributable to the cost of lighting. New lighting technologies and advanced lighting systems offer the Department the opportunity to significantly reduce energy consumption; decrease operating costs at its sites throughout the country; and, demonstrate the benefits of using new lighting technologies that are currently being developed in its laboratories and by other sources.

Because of its energy conservation leadership role, we initiated this audit to determine whether the Department's facilities had implemented lighting conservation measures.

RESULTS OF AUDIT

The seven sites included in our review had not always taken advantage of lighting technology opportunities to reduce energy consumption and save taxpayer dollars. While sites had, to varying degrees, begun to update lighting, significant opportunities for conservation remain. Specifically, we noted that the sites had not always:

- Used the most efficient lighting. In fact, each of the sites used outdated fluorescent lights when more energy and cost efficient alternatives were available. For example, more than 55 percent of lighting purchases made by the Idaho National Laboratory and 40 percent from the Savannah River Site consisted of outdated, less efficient fluorescent lights. Also, Sandia National Laboratory site personnel estimated that 60 to 70 percent of the buildings at their California site used similar, inefficient fluorescent lighting;

- Implemented, to the extent practical, energy efficient lighting technologies, such as spectrally enhanced lighting (SEL) and solid state lighting (SSL), whose research and development had actually been funded by the Department. In addition to significant energy savings, SEL and SSL have proven to be highly cost-effective, with estimated payback periods as short as one to three years when considering maintenance and energy savings; and,
- Maximized the energy savings associated with installing automated lighting control systems. Of the 96 buildings reviewed, 30, or about one-third, did not use occupancy sensors and 77 of the buildings, or 80 percent, did not use scheduling systems to automatically shut off lights.

Local officials acknowledged that they had not fully utilized basic and advanced lighting conservation measures. They cited the lack of resources for phasing in more energy efficient lighting as the primary impediment along with a lack of systematic planning. Although not widespread, other reasons offered by site officials included problems with temporarily shutting down contaminated sites and sensitive areas to replace lighting; security concerns; and, worker displacement. We noted that site officials, especially energy management team personnel, were knowledgeable of energy-saving lighting technology and appeared to be enthusiastic about the potential for reducing energy consumption by improving lighting efficiency.

By not capitalizing on opportunities to improve lighting efficiency, the Department uses and will continue to use more energy than necessary, impacting its ability to achieve its mission to advance the energy security of the United States. Based on the work performed during the audit, and using a conservative estimating technique, we believe that, had the Department employed the latest lighting technologies throughout the complex, it could have saved enough electricity to power over 3,200 homes per year. Further, the Department missed a significant opportunity to promote advanced lighting technologies, including those developed by its own laboratory system. Finally, the leadership role of the Department, specifically in the Federal energy sector, is undermined when it does not avail itself of readily available energy efficiency techniques.

Prior Office of Inspector General reports have identified similar or related issues regarding energy conservation at the Department. In our report on *The Department of Energy's Opportunity for Energy Savings Through the Use of Setbacks in its Facilities* (DOE/IG-0817, July 2009), we found that the Department could significantly reduce energy consumption through the use of setbacks on heating and cooling systems. In two other reports, *Department of Energy Efforts to Manage Information Technology Resources in an Energy-Efficient and Environmentally Responsible Manner* (OAS-RA-09-03, May 2009), and *Management of the Department's Data Centers at Contractor Sites* (DOE/IG-0803, October 2008), we found that the Department had not always taken adequate steps to incorporate energy efficient processes into information technology systems.

We made several recommendations designed to assist the Department in its effort to save energy and reduce costs.

## MANAGEMENT REACTION

Department management generally agreed with our findings and recommendations. Management emphasized the importance of reducing energy consumption and greenhouse gas emissions and provided actions that will be taken to address the issues identified in our report. In separate comments, the National Nuclear Security Administration indicated that it would work with its sites and Headquarters to ensure that actions are taken to address facility lighting.

Management's comments are included in Appendix 4.

### Attachment

cc: Deputy Secretary  
Under Secretary of Energy  
Under Secretary for Science  
Under Secretary of Nuclear Security  
Chief of Staff  
Chief Financial Officer  
Director, Office of Risk Management, CF-80  
Director, Office of Science, SC-1  
Team Leader, Office of Risk Management, CF-80  
Audit Resolution Specialist, Office of Risk Management, CF-80  
Director, Office of Internal Controls, NA-66

**REPORT ON THE DEPARTMENT OF ENERGY'S OPPORTUNITY FOR ENERGY SAVINGS THROUGH IMPROVED MANAGEMENT OF FACILITY LIGHTING**

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## **ENERGY SAVINGS OPPORTUNITIES**

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### **Use of Efficient and Innovative Lighting**

Our review of lighting equipment and systems in 96 buildings at 7 of the Department of Energy's (Department) 24 major sites found significant opportunities for conserving energy and reducing costs. Specifically, the Department had not always used the most efficient lighting available in the market; fully adopted innovative lighting technologies developed in the Department's laboratories; and, ensured the optimal use of advanced lighting control systems.

#### Use of Energy Efficient Lighting

The seven sites we visited used, to varying extents, outdated and inefficient fluorescent lights, commonly known as T12s. These lights were introduced over 40 years ago and were replaced by T8 technology in the 1980s. Since that time, T8 technology has advanced rapidly. Despite demonstrated and well known energy reductions of up to 40 percent associated with the latest fluorescent lighting technology, the Department's facilities continued to make widespread use of T12 technology. (See Appendix 1)

Although the Department lacked consistent and comprehensive information on its use of different types of lighting, we observed examples of the large-scale uses of inefficient, outdated lighting. In 2009, T12 lights accounted for over 55 percent of all lighting purchases at Idaho National Laboratory (Idaho) and over 40 percent at Savannah River Site (Savannah River), with T12 light purchases totaling 21,500 and 18,000 units respectively. Pantex Plant (Pantex) officials told us that they had upgraded a significant number of lighting fixtures, but acknowledged that numerous buildings had not been upgraded at the site due to the partial termination of an Energy Savings Performance Contract. As of December 2009, Pantex did not have a definitive schedule to install improved lighting equipment that had been stored in large containers for almost a year. Additionally, at Argonne National Laboratory (Argonne), the entire administrative building relied on inefficient T12 lighting; and, Sandia National Laboratory (Sandia) personnel estimated that 60 to 70 percent of the buildings at its California site used T12 lights.

While an improvement over T12 equipment, some sites continued to use outdated T8 lights. Savannah River, for example, had not evaluated the cost-effectiveness of upgrading approximately 22,000 T8 lights that had been installed 15 years ago. According to the Department's Federal Energy Management Program, the trend of rapid improvements in lighting technologies can create cost-effective opportunities for upgrading lighting in Federal facilities, even if the lighting has been upgraded in the last 5 to 10 years. High performance T8 lights are initially more expensive than either T12s or

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outdated T8s. However, the payback period can be as short as 2 years, with energy savings of 10 to 20 percent compared to outdated T8 lighting systems.

In addition to savings that could be achieved by updating fluorescent lighting, the Department could also conserve energy by replacing incandescent lights with compact fluorescent lights (CFLs). CFLs use 75 percent less energy, last about 10 times longer than incandescent lights and are generally compatible with existing sockets. Therefore, they often require no additional labor costs or fixture adjustments. Despite the substantial benefits of CFLs, all of the sites we visited continued to purchase incandescent lights. CFL replacement, if available, can dramatically reduce energy consumption. In fact, replacing one standard incandescent light with a CFL can save \$30 in energy costs over its lifetime, which is approximately 6,000 to 12,000 hours. (See Appendix 1)

#### Implementation of Innovative Lighting Technologies

For the most part, sites either did not use, or made limited use of, innovative lighting technologies developed in the Department's research laboratories. For example, the Department had funded research in a technology known as Spectrally Enhanced Lighting (SEL). This technology takes advantage of the human eye's ability to see more clearly when the spectral properties of lighting are shifted to be more like the color of daylight. One SEL study concluded that energy reductions ranging from 20 to 45 percent could be realized with no effect on occupant satisfaction. Further, the costs to upgrade to SEL are estimated to be recouped through energy and maintenance savings in one to three years. Despite known benefits, of the seven sites reviewed, the use of SELs was limited to two leased facilities at Idaho, and one project at Argonne. Argonne officials stated that energy consumption was reduced by 50 percent as a result of converting its old T12 systems to SEL technology.

In addition to energy savings opportunities afforded by SEL, Department officials reported that no other lighting technology offers as much potential to save energy and enhance the quality of building environments as Solid State Lighting (SSL). Some applications of the technology are now commercially viable. For example, cost-effective solid state light-emitting diode (LED) products that offer lighting uniformity and longer operating life are now available for exterior applications. In fact, a Department parking lot lighting demonstration project in California concluded that LED technology saved enough money to cover initial costs in three years. However, the sites we reviewed had used LEDs in only a limited number of

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outdoor applications. Officials at four of the seven sites stated that they had completed small LED projects to include several test demonstrations. Only Sandia completed a larger project, comparatively, with over 120 parking lot and street lights replaced with LEDs.

To their credit, a number of Department sites are planning to expand the use of innovative technologies. The Department, for example, plans to replace 600 fixtures in the outdoor area of the Forrestal building in Washington, D.C., with LEDs, with anticipated savings of close to \$50,000 annually and a payback period of less than four years. In addition, Argonne officials informed us that they have begun to gather information on an indoor lighting project for the Advanced Photon Source Building and are working with a vendor to evaluate the replacement of metal halide and fluorescent lamps with LEDs. According to officials, replacing existing lighting with LEDs has the potential to immediately reduce energy consumption by 60 to 70 percent per light, depending on the application.

#### Use of Lighting Control Systems

The seven sites we visited also had not always maximized the energy savings associated with using automated lighting control systems. An estimated 30 to 50 percent reduction in lighting energy use can be achieved with lighting control systems. While all sites reviewed employed occupancy sensors to turn lights off in empty rooms, the sensors had not been implemented uniformly throughout each site. Of the 96 buildings that we evaluated for use of occupancy sensors, 30 buildings, or about 30 percent, did not contain occupancy sensors. Lawrence Livermore National Laboratory, for example, had installed occupancy sensors in only one-half of the occupied space in one of the buildings included in our review. In two buildings we evaluated for occupancy sensor use at Argonne, officials identified additional opportunities for expanded use of occupancy sensors in the restrooms and additional office space areas that are currently not covered by sensors.

In addition to occupancy sensing systems, the sites had not consistently installed automatic light scheduling systems to reduce energy consumption through lighting. Of the 96 buildings, 77 buildings, or about 80 percent, did not contain automatic scheduling systems. In one case, an installed system was not operational. Specifically, Argonne had installed an automatic scheduling system in a building at the time it was constructed in 1997, but the central control unit needed to make the system operable had not been purchased as of March 2010.

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## **Prioritizing Improvements in Facility Lighting**

Overall, these conditions occurred because the Department lacked a systematic approach to upgrading lighting systems and an adequately funded energy conservation program. Department support for improving lighting was generally very limited. The Department had not planned for energy efficiency improvements in the budgeting process, relying, to some extent, on private financing mechanisms known as Energy Savings Performance Contracts (ESPCs). However, according to the Department, funding lighting projects with ESPCs may not be a viable option solely due to the size and scope of the projects. According to Department guidance, ESPCs are most appropriately used for comprehensive projects rather than single measure projects such as lighting. In fact, recent proposals for ESPCs at Savannah River and Lawrence Berkeley National Laboratory (Berkeley), which included lighting components, were rejected because the projects, as a whole, were not economically feasible. Notably, the National Nuclear Security Administration (NNSA) requested over \$6.6 million for an Energy Modernization and Investment Program for Fiscal Year (FY) 2011 to promote sustainability and reduce energy usage.

Further, the Department had not tracked or ensured the reinvestment of savings accruing from energy conservation projects. DOE Order 430.2B requires savings from energy conservation measures to be reinvested in additional energy conservation efforts. We found, and a senior Department official confirmed, that there was no Department-wide system in place to track or calculate reinvestment of energy savings. With the exception of Argonne, there was no formal system in place at the sites we visited to identify energy savings for reinvestment. Argonne officials report energy savings and reinvestment opportunities to the Argonne Site Office on a semi-annual basis. Formally tracking and reinvesting energy savings allows for additional funding opportunities for projects that are smaller in scale in relation to other energy conservation activities, like facility lighting.

Finally, we found that the sites each had unique lighting replacement issues. Specifically, Argonne officials commented that they faced two issues in upgrading a large administrative building containing T12 lights – the displacement of workers and ceiling heights. Additionally, Pantex and Savannah River officials stated that replacing lighting can be very complicated due to the mission needs of the sites and related security concerns. Though we acknowledge the difficulties associated with replacing lighting in some buildings, overall, we concluded that with proper planning, coordination and funding these efforts would be highly beneficial to the sites and the Department.

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**Energy Savings Opportunities**

By exploiting readily available efficient lighting and lighting systems opportunities, the Department could save over \$2.2 million in electric utility operating costs annually, equating to the amount of electricity used to power over 3,200 homes per year. Equally important, by demonstrating the cost-effective use of state-of-the-art lighting, the Department could better fulfill its role of promoting energy conservation and adoption of the latest technologies in both the private and public sectors.

The energy savings estimate, in our view, was based on extremely conservative calculations. Our estimate does not reflect, for example, the additional savings opportunities that are available to the Department through retrofitting incandescent, high pressure sodium, metal halide, or standard T8 lighting systems. We were unable to fully quantify the use of these systems. However, during site tours and our review of purchasing data, we observed that these outdated technologies are in use and represent an opportunity for the Department to realize additional savings.

**RECOMMENDATIONS** To improve the Department's management of facility lighting, we recommend that the Under Secretary of Energy, the Under Secretary for Science, and the Under Secretary for Nuclear Security require Federal Site Managers to:

1. Evaluate opportunities for replacing outdated lighting systems and demonstrating the practical application of lighting technologies developed in the Department's laboratories;
2. Develop a plan to phase in more efficient lighting technologies currently available in the market; and,
3. Develop a process to track and reinvest energy savings as required in DOE Order 430.2B.

We also recommend that the Under Secretary of Energy and the Under Secretary for Science, in conjunction with the Chief Financial Officer:

4. Evaluate the budget process to ensure that the Department is pursuing funding for energy efficiency programs.

**MANAGEMENT REACTION**

Management generally agreed with the conclusions and recommendations in our report. The Office of the Under Secretary of Energy indicated that it would take action to develop processes to

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track energy savings and recognized that there were additional opportunities available to reduce energy consumption through improved lighting. The Office of Science noted that it would take additional steps to address the findings in our report and evaluate policy options for tracking and reinvesting savings. The Office of the Chief Financial Officer provided comments indicating that it would further evaluate policy options for tracking and reinvesting savings across the Department and that the FY 2012 budget guidance addressed the recommendation to evaluate the budget process for energy efficiency programs.

In separate comments, NNSA indicated that it would work with its sites and Headquarters to resolve impediments to capitalizing on energy efficient lighting, and develop plans to deploy more energy efficient, technologically advanced lighting.

**AUDITOR  
COMMENTS**

Management's comments, included in Appendix 4, are responsive to our finding and recommendations. Overall, we are encouraged by the Department's response to our report and its plans to reduce energy consumption through improved facility lighting at Department sites.

In response to Office of Science comments, we reconsidered the methodology we used to calculate the potential energy savings presented in our report. We concluded that the estimate we used was accurate and reasonable. The estimate of energy savings was based, in part, on data provided by the Energy Information Administration.

## TYPES OF LIGHTING



### T12 Fluorescent Light

- Commonly available in 34W and 40W
- Considered inefficient technology



### T8 Fluorescent Light

- Commonly available in 25W, 28W, and 32W
- 30-35 percent more efficient than T12 (including a ballast change)
- Slightly smaller in diameter than T12



### Incandescent Light

- On average, produces 10 percent light to 90 percent heat
- Most commonly used type of light
- Most inefficient lighting source



### Compact Fluorescent Light

- 75 percent more efficient than incandescent
- Lasts ten times longer than incandescent
- Replaces most common incandescent lights

## Appendix 2

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**OBJECTIVE** The objective of this audit was to determine if the Department of Energy (Department) had effectively used lighting conservation measures.

**SCOPE** The audit was performed between September 2009 and April 2010 at the Department's Headquarters in Washington, D.C.; Lawrence Livermore National Laboratory in Livermore, California; Sandia National Laboratory (Sandia) in Livermore, California; Lawrence Berkeley National Laboratory in Berkeley, California; Idaho National Laboratory in Idaho Falls, Idaho; Pantex Plant (Pantex) in Amarillo, Texas; Argonne National Laboratory in Argonne, Illinois; and, Savannah River Site in Aiken, South Carolina.

**METHODOLOGY** To accomplish the audit objective, we:

- Analyzed 12 months (Fiscal Year 2009) of lighting products purchased for each site;
- Reviewed energy management programs and site executable plans for each site;
- Interviewed key personnel at Department Headquarters and each of the sites;
- Toured selected general purpose and administrative buildings at each site;
- Analyzed cost-effectiveness of different lighting technologies;
- Developed a savings estimate by using an assumption that 10 percent of the Department's facilities used T12 lighting systems, and applying a 30 percent energy savings associated with converting from a T12 to a T8 system to the 40 percent energy consumption attributed to building lighting;
- Reviewed energy saving performance contracts and analyzed lighting projects completed and planned for each site; and,
- Reviewed laws and regulations pertaining to energy conservation practices and lighting standards.

Due to the lack of consistent and comprehensive information on the Department's use of lighting, we were unable to statistically project the number of T12 and outdated T8 lighting systems currently used at Department facilities. However, we based our energy savings estimate that 10 percent of Department facilities contained T12 lighting systems on information gathered from the sites we reviewed to include site tours, procurement data, and interviews with energy management officials. Each site provided varying information regarding the number of T12 lights used at the site. Pantex stated that 10 percent of the site's lighting systems had not been upgraded while Sandia stated 60 to 70 percent of the site used T12 lighting systems. Because of the difference between sites and the inconsistent data presented, we used the most conservative number, 10 percent, provided by the sites. In addition, we based our estimate that 40 percent of site electricity is consumed through lighting on estimates made by the Energy Information Administration. Based on the information gathered during the audit, we believe this estimate accurately represents our findings.

We conducted this performance audit in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our finding and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our finding and conclusions based on the audit objective. The audit included tests of controls and compliance with laws and regulations necessary to satisfy the audit objective. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit.

During the audit, we assessed the Department's compliance with the Government Performance and Results Act of 1993. We concluded that the Department had not established performance measures for management of lighting controls at the sites reviewed. Also, we did not rely on computer generated data to perform the audit.

Management waived the exit conference.

### PRIOR AUDIT REPORTS

- *The Department of Energy's Opportunity for Energy Savings Through the Use of Setbacks in its Facilities* (DOE/IG-0817, July 2009). The audit revealed that the Department of Energy (Department) had not effectively used operational setbacks of the heating, ventilation, and air conditioning systems in Department facilities. It was noted during the audit that several sites examined did not use or failed to properly maintain setback systems, and the Department did not ensure setback capabilities were utilized at 64 percent of the sites reviewed. The audit discovered the Department could improve on reducing energy consumption by properly maintaining or utilizing setbacks, thereby saving taxpayer dollars. An estimated \$11.5 million could have been saved in annual utility costs.
- *Department of Energy Efforts to Manage Information Technology Resources in an Energy-Efficient and Environmentally Responsible Manner* (OAS-RA-09-03, May, 2009). The audit revealed that the Department did not take adequate steps to ensure energy efficiency through management of information technology resources. 8 Specifically, the sites visited had not implemented the recommended time for standby mode, many computers did not have the hibernation feature enabled, and energy saving desktop devices were not purchased. The Department had not taken important steps to reduce energy consumption and properly monitor performance to realize energy savings, and it was estimated the Department spent \$1.6 million more on energy costs for Fiscal Year 2008 by not adequately addressing the opportunity for savings.
- *Management of the Department's Data Centers at Contractor Sites* (DOE/IG-0803, October 2008). The audit found that the Department had not taken advantage of energy savings through consolidation and efficient hardware technologies. In particular, data centers duplicated common services provided such as e-mail, data storage, and libraries. Four of six sites made only limited use of more efficient hardware technologies that conserve energy and reduce operational costs. The audit identified potential annual savings of \$2.3 million through consolidation and use of more efficient hardware technologies in the data centers.



### Department of Energy

Washington, DC 20585

June 18, 2010

MEMORANDUM FOR GEORGE W. COLLARD  
ASSISTANT INSPECTOR GENERAL  
FOR PERFORMANCE AUDITS

FROM: ASAF NAGLER   
STAFF DIRECTOR AND SENIOR ADVISOR  
OFFICE OF THE UNDER SECRETARY OF ENERGY

SUBJECT: Comments on the Draft IG Report, "Department of Energy's  
Opportunity for Energy Savings through Improved  
Management of Facility Lighting"

Thank you for the opportunity to review the draft report, "Department of Energy's Opportunity for Energy Savings through Improved Management of Facility Lighting." We recognize the importance of improving the energy efficiency of its facilities, including lighting modernization, and have invested over \$400 million since 2008 for energy conservation measures through Energy Savings Performance Contracts. Of this amount, the Department of Energy (DOE) has invested over \$11 million to modernize lighting, resulting in an estimated annual savings of \$1.25 million.

Despite these investments, we recognize that additional opportunities exist to reduce energy consumption through more efficient lighting. Accordingly, the Department is working to develop the appropriate strategies for funding such improvements as part of its Strategic Sustainability Performance Plan process. Investments in lighting enhancements will be considered in conjunction with other measures that may reduce energy consumption and greenhouse gas emissions.

The Office of the Under Secretary of Energy generally agrees with the recommendations. As part of the development of the annual Executable Plans for energy efficiency improvements, the DOE Federal Energy Management Program (FEMP) will continue to provide guidance to DOE sites to evaluate opportunities for improvements to facility lighting. Energy sites are evaluating lighting systems in conjunction with other projects to improve energy efficiency. Implementation will be based on life cycle cost analysis and prioritization of energy efficiency opportunities. These sites will continue to track energy savings realized by Energy Savings Performance Contracts, as required. For other investments in energy efficiency measures, we will work with the Office of the Chief Financial Officer (CFO) in evaluation of policy options for tracking and reinvesting savings across the Department.

cc: Richard Kidd, FEMP Program Manager

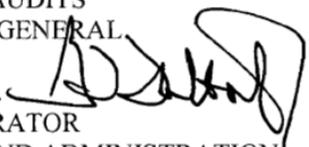


Department of Energy  
National Nuclear Security Administration  
Washington, DC 20585



May 27, 2010

MEMORANDUM FOR: GEORGE W. COLLARD  
ASSISTANT INSPECTOR GENERAL  
FOR PERFORMANCE AUDITS  
OFFICE OF INSPECTOR GENERAL

FROM: GERALD L. TALBOT, JR.  5/27/10  
ASSOCIATE ADMINISTRATOR  
FOR MANAGEMENT AND ADMINISTRATION

SUBJECT: Comments to the IG Draft Report on Facility Lighting, A09FR042;  
IDRMS No. 2009-0259

The National Nuclear Security Administration (NNSA) appreciates the opportunity to review the Inspector General's (IG) draft report, *The Department of Energy's Opportunity for Energy Savings Through Improved Management of Facility Lighting*. Because of the importance of the Department's energy conservation initiatives to the National energy agenda, I understand that the IG initiated this audit to determine whether the Department's facilities had effectively used lighting conservation measures.

NNSA generally agrees with the report. For your consideration, attached are technical comments from Sandia and Pantex Site Offices which we believe will make the report more accurate.

NNSA agrees with the recommendations and acknowledges that there are some circumstances (i.e., funding, mission, and/or security) at NNSA site(s) that may hinder the site's ability to convert to newer/more technologically advanced lighting fixtures in a timely manner. We will work with NNSA sites and appropriate Headquarters organizations to identify and resolve impediments to capitalizing on efficient lighting opportunities; develop a systematic plan for evaluating lighting needs; identify the required resources; and outline an implementation schedule for deploying more energy efficient, technologically advanced lighting across the enterprise.

With regard to recommendation 3, we believe that the Department's Office of the Chief Financial Officer (CFO) and the NNSA's Office of Field Financial Management (OFFM) need to be included in the process of developing a tracking system and recommend changing the wording to include their participation. The rationale is that the DOE CFO and NNSA's OFFM have expertise in financial matters and could assist the Under Secretaries in developing a consistent approach for tracking and reinvesting energy savings in accordance with established requirements. NNSA recommends the following wording:

## Appendix 4 (continued)

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"Develop in conjunction with the DOE Office of the Chief Financial Officer and NNSA's Office of Field Financial Management, a process to track and reinvest energy savings in accordance with DOE Order 430.2B, *Departmental Energy, Renewable Energy and Transportation Management* and Section 546 of the National Energy Conservation Policy Act (42 USC 8256(e))."

If you have any questions concerning this response, please contact JoAnne Parker, Acting Director, Office of Internal Controls, at 202-586-1913.

### Attachment

cc: Associate Administrator for Infrastructure and Environment  
Assistant Deputy Administrator for Nuclear Safety & Operations



**Department of Energy**  
Washington, DC 20585

JUN 15 2010

MEMORANDUM FOR GEORGE W. COLLARD  
ASSISTANT INSPECTOR GENERAL  
FOR PERFORMANCE AUDITS  
OFFICE OF INSPECTOR GENERAL

FROM: MARCUS E. JONES *Marcus Jones*  
ASSOCIATE DIRECTOR OF SCIENCE FOR  
SAFETY, SECURITY AND INFRASTRUCTURE  
OFFICE OF SCIENCE

SUBJECT: Response to Inspector General's Draft Report, "The  
Department of Energy's Opportunity for Energy Savings  
through Improved Management of Facility Lighting."

Thank you for the opportunity to review and comment on the subject draft report. The Office of Science (SC) comments follow.

**Recommendation 1:** Require Federal Site Managers to evaluate opportunities for replacing outdated lighting systems and demonstrating the practical application of lighting technologies developed in the Department's laboratories.

**Management Response:** Concur

**Action Plan:** The SC sites will continue their evaluation of their lighting systems to improve efficiency. Plans for improvements are documented annually in the Executable Plans. Implementation will be based on life cycle cost analysis as well as over all prioritization against mission readiness factors. We will support the Office of Energy Efficiency and Renewable Energy in demonstrating new lighting technologies at SC sites. The site's Executable Plans submitted at the end of the calendar year will identify opportunities, plans, and accomplishments.

**Estimated Completion Date:** March 31, 2011

**Recommendation 2:** Develop a plan to phase in more efficient lighting technologies currently available in the market.

**Management Response:** Concur

## Appendix 4 (continued)

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**Action Plan:** The application of more efficient lighting technologies will be included in the site's Executable Plan and implemented based on economic viability and life cycle cost analysis.

**Estimated Completion Date:** March 31, 2011

**Recommendation 3:** Develop a process to track and reinvest energy savings as required in DOE Order 430.2B.

**Management Response:** Partially concur.

**Action Plan:** The SC sites currently track energy savings realized by Energy Savings Performance Contracts, as required. For other investments in energy efficiency measures, the Office of the Chief Financial Officer (CFO) will review the pilot program at Argonne National Laboratory and will evaluate further policy options for tracking and reinvesting savings across the Department.

**Estimated Completion Date:** January 2011

**Recommendation 4:** Evaluate the budget process to ensure that the Department is pursuing funding for energy efficiency programs.

**Management Response:** Concur

**Action Plan:** The Department's FY 2012 budget guidance, issued in March 2010, addresses this recommendation.

**Estimated Completion Date:** Completed

**Monetary Impact:** The draft memo and report state, "Electricity costs, totaling \$190 million, account for close to two-thirds of the Department's total energy expenditures, with roughly 40 percent or \$76 million of those costs attributable to the cost of lighting." The 40% attributable to lighting is high for SC sites where 10 to 20% is the norm. The methodology for calculating the percentage should be reviewed. If this figure is overstated then the potential savings from improvements are overstated.

**General/Technical:** Page 3, last sentence of second paragraph under "Prioritizing Improvements in Facility Lighting": "Argonne, the exception, provided....*informal* energy management program that requires..." Change "informal" to "internal." The word "informal" is misleading. The process is formal within Argonne, where on a semi-annual basis a report is sent to the Argonne Site Office CFO to account for the savings. A more appropriate describing word is "internal."

If you have any questions on these comments, please contact John Yates at 301-903-8435.



**Department of Energy**  
Washington, DC 20585

JUN 16 2010

MEMORANDUM FOR GEORGE W. COLLARD  
DEPUTY INSPECTOR GENERAL FOR AUDIT SERVICES

FROM *SEI*  
STEVE ISAKOWITZ  
CHIEF FINANCIAL OFFICER

SUBJECT: Comments to Draft Report – *The Department of Energy’s Opportunity for Energy Savings Through Improved Management of Facility Lighting*

Thank you for the opportunity to review your draft report “*The Department of Energy’s Opportunity for Energy Savings Through Improved Management of Facility Lighting.*” The Office of the Chief Financial Officer generally concurs with your recommendation to evaluate the way in which the Department budgets for energy efficiency improvements, and has already made significant changes to the FY 2012 budget process. We are also planning to review the feasibility of separately tracking and reinvesting financial savings resulting from energy efficiency improvements, as anticipated by DOE Order 430.2B. As part of this review we plan to incorporate any lessons learned from the pilot program at Argonne National Laboratory as identified by your report.

Please see our responses to the two recommendations addressing financial management and budgeting issues in the attachment. We have also provided general and contextual comments as part of a separate attachment for your consideration as you finalize the report.

If you require additional information, please contact Mr. Thomas Griffin, Office of Risk Management, at 202-586-1585.

### CFO Comments on IG Draft Report

#### *Department of Energy's Opportunity for Energy Savings Through Improved Management of Facility Lighting*

*To improve the Department's management of facility lighting, we recommend that the Under Secretary of Energy, the Under Secretary for Science, and the Under Secretary for Nuclear Security require Federal Site Managers to:*

**Recommendation 3** Develop a process to track and reinvest energy savings as required in DOE Order 430.2B.

**Management Response:** Partial concur

**Action Plan:**

DOE sites currently track energy savings realized by Energy Savings Performance Contract as required. For other investments in energy efficiency measures, the Office of the CFO will review the pilot program at Argonne National Laboratory and will evaluate further policy options for tracking and reinvesting savings across the Department.

**Estimated Completion Date:** January 2011

*We also recommend that the Under Secretary of Energy and the Under Secretary for Science, in conjunction with the Chief Financial Officer:*

**Recommendation 4** Evaluate the budget process to ensure that the Department is pursuing funding for energy efficiency programs.

**Management Response:** Concur

**Action Plan:**

The Department's FY 2012 budget guidance, issued in March 2010, addresses this recommendation. The guidance requests that DOE program offices submit funding plans for achieving lower DOE greenhouse gas emissions, reducing water runoff, and related sustainability goals as established by Executive Order 13514. Each program office will complete a template for sustainability-related projects. This information will allow the Department to prepare a summary of all energy efficiency efforts.

The additional reporting requirements in the FY 2012 budget process will complement the Department's existing budget processes in which program offices work with sites to determine indirect or direct funding requests for construction, equipment, maintenance and related projects. Per CFO budget guidance, program offices include projects deemed essential, priority, or ready for funding in their Integrated Priorities List (IPL) that is submitted to the CFO for review (through the appropriate Under Secretary). The IPLs are used during the budget deliberation process and are submitted to the Deputy Secretary's Resource Board (DRB) for approval.

**Estimated Completion Date:** Completed

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