Country Paper on Energy Savings (United States)

Background

The federal government is the largest energy consumer in the United States. In fiscal year 2015, the federal government spent $6.7 billion on energy for federal buildings and facilities. The Department of Defense (DOD) is the largest energy consumer in the federal government, spending about $3.8 billion on facility energy in fiscal year 2015. In recent years, the United States Government Accountability Office (GAO) has reviewed energy efficiency, energy conservation, and the resulting energy savings of federally-owned facilities. This work was performed in response to mandates and congressional requests. Selected reports on these issues include:

- DOD Renewable Energy Projects: Improved Guidance Needed for Analyzing and Documenting Costs and Benefits, GAO-16-487, September 2016.
- Defense Infrastructure: Energy Conservation Investment Program Needs Improved Reporting, Measurement, and Guidance, GAO-16-162, January 2016.
- Energy Savings Performance Contracts: Additional Actions Needed to Improve Federal Oversight, GAO-15-432, June 2015.

Objectives and Methodology

For each of the three reviews, we sought to determine whether the agencies had analyzed or achieved cost savings as a result of energy efficiency or energy conservation projects.

<u>DOD Renewable Energy Projects (GAO-16-487)</u>

- *Key objective:* Examine DOD's approach for analyzing the financial costs and benefits of selected projects.

- *Methodology:* We reviewed the relevant project documentation for 17 selected projects, including business case analyses of cost savings and, for alternatively financed projects, the project contracts with developers and any associated agreements to allow developers temporary use of land for the project to determine how DOD analyzed the financial costs and benefits of selected renewable energy projects. We selected projects that were built with a generating capacity greater than 1 megawatt on military installations in the United States with funding or contracts awarded from 2010 through 2015. Including approved projects that were not necessarily operational enabled us to review more recent projects that are more revealing of DOD's current efforts and emphasis on larger, alternatively financed projects. We selected projects that reflected a range of military departments and services, funding mechanisms, and renewable energy technologies. Because this was a nonprobability sample, our findings are not generalizable to other DOD renewable energy projects. We also interviewed key officials with the Office of the Secretary of Defense; military departments and services; installations with specific knowledge of projects; and Department of Energy, which provides federal agencies information and support when examining energy projects and related matters.

- *Findings:* DOD used various approaches to analyze the financial costs and benefits of the 17 renewable energy projects we reviewed. However, the project documentation DOD developed did not always clearly identify the value of land used for the projects and in turn the compensation the department received for the land. In addition, key

differences in DOD's analyses and documentation for projects incorporating long-term power purchase agreements raise questions about the information available to approving officials about projects' estimated costs and benefits.

- *Recommendations:* We made 8 recommendations to DOD, including:
  - Modify guidance for presenting land values in project documentation to apply to the range of financing mechanisms DOD has used.
  - Clarify how to describe sensitivity analyses in project documentation for projects involving long-term power purchase agreements on DOD land.
  - Clarify how project documentation should present information on all costs of a project, including the value of land and compensation received for it and, in turn, how that value and compensation would affect the estimated costs and benefits of purchasing electricity from the project.

- *Results:* We issued this report in September 2016 and, as such, DOD has not had an opportunity to implement the recommendations. In response to a draft of the report, DOD concurred with all of our recommendations, but did not discuss steps it planned to take to implement the recommendations.

DOD Energy Conservation Investment Program (ECIP) Projects (GAO-16-162)

- *Key objective:* Assess the extent to which DOD has found that completed ECIP projects have resulted in cost savings or lower energy use.

- *Methodology:* We developed and administered a questionnaire for the 35 ECIP projects in our scope. The 35 projects include all of the projects that the military services began after 2011, were completed as of June 2015, and were located in the United States. The questionnaire focused on the projects' scopes and measurement and verification plans, and whether the projects achieved anticipated cost and energy savings. Based on the information obtained from the questionnaires and additional documentation, we assigned projects to one of four categories, as described in table 1 below.

Table 1: Categories of Measurement and Verification Plans

Category	Description of Category
Full measurement and verification (evidence provided)	Installation energy staff reported that the project had achieved the cost savings or lower energy use anticipated in the project proposal and provided documentation to support their statements.
Full measurement and verification	Installation energy staff reported that the project had achieved the savings anticipated in the project proposal, but did not provide documentation of these savings.
Partial measurement and verification	Measurement and verification data are either incomplete or project managers could not fully document that they had achieved cost savings or lower energy use.
No measurement and verification	Installation energy staff could not perform measurement and verification or had no plans to perform it.

Source: GAO-16-162.

- *Findings:* Of the 35 projects in our sample, DOD installation managers have measured and verified data demonstrating actual cost savings or reduced energy use for 8 of these projects. Two projects were not operational at the time of our review. Managers of the remaining projects either did not complete the projects according to their original scope (12 projects), partially documented that they had achieved cost savings or lower energy

use (6 projects) or did not document savings at all (7 projects). DOD officials said they had not completed measurement and verification of savings in part because the military services have not ensured that installation managers include costs for such activities in project proposals.

- *Recommendations:* We made 5 recommendations to DOD:
  - Include projected measurement and verification costs in project proposals as they develop projects.
  - Provide additional guidance on the range of measurement and verification options that are appropriate for different project sizes and types, and how to scope ECIP projects to available funding.

- *Results:* We issued this report in January 2016 and, as such, DOD has not had an opportunity to implement the recommendations. In response to a draft of the report, DOD partially concurred with these two recommendations.

Federal Energy Savings Performance Contract (ESPC) Projects (GAO-15-432)

- *Key objective:* Examine the extent to which ESPC projects have achieved their expected cost and energy savings.

- *Methodology:* We reviewed contractors' annual measurement and verification reports and other project documentation for a nongeneralizable sample of 20 ESPC projects to identify instances where contractors noted changes in the performance or operation of equipment that could have affected the savings they generated. We selected these projects from among the 530 ESPC projects awarded by the seven agencies in our scope in fiscal years 1995 through 2014. We selected projects that reflected a range of contract award dates, contract values, and other characteristics.

- *Findings:* Our review of a nongeneralizable sample of 20 projects found that contractors overstated cost and energy savings for 14 projects by reporting some savings that, due to agency actions, were not achieved. Contractors must calculate and report savings in accordance with plans agreed to in their contracts with agencies. If factors beyond contractors' control reduce the savings achieved, contractors generally are not required to reduce the amount of savings they report or measure the effects of such factors on savings. Agencies were not always aware of the amount of expected savings that were not achieved among their projects, in part, because contractors generally do not provide this information in measurement and verification reports.

- *Recommendations:* We made several recommendations to the seven agencies in our review, including:
  - For future contracts, revise contract vehicles or guidance to require that measurement and verification reports include estimates of cost and energy savings that were not achieved because of agency actions.
  - For current contracts, work with contractors to determine the best way to obtain estimates of cost and energy savings that are not achieved because of agency actions and include these estimates in measurement and verification reports, and where economically feasible.

- *Results:* We issued the report in June 2015 and are currently in the process of following up with agencies on the status of implementing the recommendations. In response to a draft of the report, agencies generally partially concurred with the recommendations.

Challenges, Barriers, and Lessons Learned

The availability of data or documentation was a recurring challenge across all three of these reviews. For example, for the review of DOD renewable energy projects, the project documentation DOD provided us was not always clear about all aspects of the estimation process or the source of assumptions; moreover, DOD could not provide documentation for the business case analysis done for 1 of the 17 projects we examined. Additionally, as stated in the findings of the ECIP review, installations could only provide documentation of the measurement and verification of savings for 8 of the 35 projects we reviewed. To address this challenge, we used the data that were available and generally made recommendations to agencies to improve the collection of such information.