



June 2017

# DEFENSE INFRASTRUCTURE

## Additional Data and Guidance Needed for Alternatively Financed Energy Projects

# GAO Highlights

Highlights of [GAO-17-461](#), a report to congressional committees

## Why GAO Did This Study

DOD, the largest energy consumer in the federal government, has been addressing its power needs by diversifying its power resources, reducing demand, and implementing conservation projects. To address its goals for energy projects, DOD also has been using alternative financing from private-sector contracts rather than relying solely on annual federal appropriations to fund projects upfront.

The House and Senate reports accompanying their respective bills for the National Defense Authorization Act for 2017 included provisions that GAO review DOD's alternatively financed energy projects. This report (1) evaluates the military services' use of alternative financing arrangements since 2005 and data collected and provided to DOD on those projects; (2) assesses reported project savings and verification of reported performance, and (3) describes benefits and disadvantages and potential other costs of using alternative financing rather than up-front appropriations. GAO analyzed and reviewed DOD data, relevant guidance, and project documentation; interviewed cognizant officials; and reviewed a nongeneralizable sample of projects.

## What GAO Recommends

GAO recommends that the military services collect and provide DOD complete and accurate data on all alternatively financed energy projects and that DOD update its guidance to clarify requirements for verifying UESC savings. DOD concurred with the first recommendation and nonconcurred with the second. GAO continues to believe its recommendation is valid, as discussed in this report.

View [GAO-17-461](#). For more information, contact Brian J. Lepore at (202) 512-4523 or [leporeb@gao.gov](mailto:leporeb@gao.gov).

June 2017

## DEFENSE INFRASTRUCTURE

### Additional Data and Guidance Needed for Alternatively Financed Energy Projects

## What GAO Found

The military services have used alternative financing arrangements—entering into about 38 private-sector contracts annually from 2005 through 2016—to improve energy efficiency, save money, and meet energy goals. However, the military services have not collected and provided the Department of Defense (DOD) complete and accurate data, such as total contract costs and savings. For example, GAO was unable to identify and the military services could not provide total contract costs for 196 of the 446 alternatively financed energy projects since 2005. Furthermore, some data provided on select projects did not include the level of accuracy needed for planning and budgeting purposes. According to officials, the military services did not always have complete and accurate data because authority for entering into these projects has been decentralized and data have not been consistently maintained. As such, neither the military departments, which include the military services, nor DOD have complete and accurate data on the universe of these projects. Without complete and accurate data on all alternatively financed energy projects, decision makers will not have the information needed for effective project oversight or insight into future budgetary implications of the projects, including impacts on utility budgets.

DOD's alternatively financed energy projects that GAO reviewed reported achieving expected savings. Specifically, GAO's review of 13 operational alternatively financed energy projects found that all 13 projects reported achieving their expected savings. However, the military services have varying approaches for verifying whether projected savings were achieved for all utility energy service contracts (UESC)—an arrangement in which a utility arranges financing to cover the project's costs, which are then repaid by the agency over the contract term. DOD guidance requires the military services to track estimated and verified savings and measurement and verification information for all energy projects, but DOD's guidance is inconsistent with more recent Office of Management and Budget guidance. This inconsistency and DOD's interpretation of Office of Management and Budget guidance have resulted in the military departments developing varying approaches for verifying savings of UESC projects. Without clear guidance from DOD on how the military services should be taking steps to verify savings associated with UESC projects, the military services will continue to interpret guidance differently and are likely to take inconsistent approaches to verifying the savings of UESC projects spanning potentially a 25-year duration.

DOD and military service officials identified benefits and disadvantages, as well as other potential costs, of using alternative arrangements to finance energy projects rather than using up-front appropriations. According to officials, benefits include the ability to fund projects that would not otherwise be funded due to budgetary constraints, to complete projects more quickly, and to have expert personnel available to implement and manage such projects. However, officials also identified disadvantages, including higher costs and the risks associated with long-term financial obligations. In addition, GAO found that some potential costs for these alternatively financed energy projects, such as costs associated with operation and maintenance and repair and replacement of equipment, add to overall project costs and may not be included in the total contract payments.

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## Abbreviations

DOD	Department of Defense
ESPC	Energy Savings Performance Contract
PPA	Power Purchase Agreement
UESC	Utility Energy Service Contract

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June 20, 2017

Congressional Committees

The Department of Defense (DOD) is the largest energy consumer in the federal government, spending \$3.9 billion on facilities energy in fiscal year 2015. DOD has reported that it considers energy to be a critical resource across the full range of military operations and has found that ensuring the availability of energy is a substantial expense that competes with the department's other investments in manpower and equipment.<sup>1</sup> To address its power needs, DOD has diversified its power sources to include renewable and alternative sources of energy and has reduced its demand for installation energy by investing in efficiency and conservation projects on its installations.<sup>2</sup> The department has used alternative financing arrangements in addition to using up-front appropriations to fund a portion of its infrastructure related to renewable energy generation, energy efficiency, power generation, and energy security on military installations. These alternative financing arrangements include energy savings performance contracts (ESPC), utility energy service contracts (UESC), power purchase agreements (PPA), and some forms of enhanced use leases. These arrangements rely on the private capital obtained by energy service companies, utilities, and private developers to fund the up-front investment of such projects. The installation generally repays the cost of the project using appropriated funds based on the savings attributable to the energy project, such as those resulting from lower utility bills, or on the utility rates paid by DOD in accordance with the power purchase agreement. DOD has increasingly relied on alternative financing arrangements to decrease energy intensity on military installations and to fund energy projects as the agency attempts to implement such projects at a time when constrained budgets have

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<sup>1</sup>DOD, Office of the Assistant Secretary of Defense (Energy, Installations, and Environment), *Department of Defense Annual Energy Management Report, Fiscal Year 2015* (June 2016).

<sup>2</sup>DOD distinguishes installation energy from operational energy. According to DOD, installation energy includes energy needed to power fixed installations and enduring locations, as well as non-tactical vehicles, whereas operational energy is the energy required for training, moving, and sustaining military forces and weapons platforms for military operations, to include energy used by tactical power systems and generators at non-enduring locations.

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limited the appropriated funding available to meet increasing energy efficiency goals.<sup>3</sup>

We have previously reported on DOD's use of alternative financing arrangements for its energy projects. In 2012, we reported on DOD's use of up-front appropriations and alternative financing arrangements for renewable energy projects and recommended that DOD issue comprehensive guidance on completing business case analyses of different financing options and improve information-sharing resources, including best practices and lessons learned, on financing such projects.<sup>4</sup> DOD generally concurred with the recommendations and has taken steps to implement them. Specifically, DOD and the military services have issued guidance on developing business case analyses, and DOD has established a renewable energy integrated process team where officials from the Office of the Secretary of Defense meet regularly with officials from the military services to discuss DOD renewable energy plans and processes. Moreover, in 2015, we found that in 14 out of 20 ESPC projects that we reviewed, contractor reports overstated some cost and energy savings of these contracts.<sup>5</sup> We made three recommendations to DOD aimed at improving the oversight of its ESPC projects through clearer reporting of savings, among other things. DOD generally concurred with our recommendations, and officials told us that they sent additional guidance on measurement and verification reports to the energy service companies. In addition, in 2016, we reported that DOD used various approaches to analyze the financial costs and benefits of 17 renewable energy projects.<sup>6</sup> We made eight recommendations, including that DOD should clarify guidance for project documentation, such as including information on land values and how projects will help DOD meet

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<sup>3</sup>Executive Order 13693 defines energy intensity as energy consumption per gross square foot of building space. See Executive Order 13693, *Planning for Federal Sustainability in the Next Decade* (Mar. 19, 2015).

<sup>4</sup>GAO, *Renewable Energy Project Financing: Improved Guidance and Information Sharing Needed for DOD Project-Level Officials*, [GAO-12-401](#) (Washington, D.C.: Apr. 4, 2012).

<sup>5</sup>GAO, *Energy Savings Performance Contracts: Additional Actions Needed to Improve Federal Oversight*, [GAO-15-432](#) (Washington, D.C.: June 17, 2015). Because of the large number of factors that can result in overstated or understated savings, we did not determine the net effect of all factors on projects' achieved savings. For example, some energy conservation measures in the projects we reviewed outperformed expectations, which may have offset the lower-than-expected savings of other energy conservation measures in those projects.

<sup>6</sup>GAO, *DOD Renewable Energy Projects: Improved Guidance Needed for Analyzing and Documenting Costs and Benefits*, [GAO-16-487](#) (Washington, D.C.: Sept. 28, 2016).

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its energy security objective. DOD concurred with our recommendations and to date has implemented one of the recommendations by issuing revised guidance on renewable energy projects involving long-term power purchase agreements.<sup>7</sup>

The House and Senate reports accompanying proposed bills for the National Defense Authorization Act for Fiscal Year 2017 included provisions for us to review DOD energy projects funded with alternative financing arrangements.<sup>8</sup> In this report, we (1) evaluate the extent to which the military services have used alternative financing arrangements to fund energy projects since 2005 and collected and provided DOD complete and accurate data on those projects; (2) assess the extent to which the military services reported achieving expected savings and verified the reported performance of selected projects; and (3) describe the benefits and disadvantages reported by the military services—as well as potential other costs—of using alternative financing arrangements for selected energy projects rather than using up-front appropriations.

To evaluate the extent to which the military services have financed energy projects with alternative financing arrangements since 2005 and collected and provided DOD complete and accurate data on those projects, we reviewed available data and documentation on the alternatively financed projects from fiscal years 2005 through 2016 that were previously reported by DOD in the Annual Energy Management Reports or we collected during previous reviews.<sup>9</sup> We focused on this time frame because, with the passage of the Energy Policy Act of 2005, the military services began contracting for more alternatively financed energy projects.<sup>10</sup> We included 2016 data as they capture the most recent complete fiscal year of data.<sup>11</sup> We used this information to develop pre-populated spreadsheets for each of the military services on their

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<sup>7</sup>The guidance calls for submitted information to include the fair market value of the leased land and to describe how the compensation received for the leased land will be applied to the renewable energy project, such as for a reduction in utility rates.

<sup>8</sup>H.R. Rep. No. 114-537 at 105-106 (2016) and S. Rep. No. 114-255 at 129 (2016).

<sup>9</sup>[GAO-15-432](#) and [GAO-12-401](#). We also used information obtained during our review of the effects of base closures on alternative financing agreements. GAO, *Defense Infrastructure: Improved Guidance Needed for Estimating Alternatively Financed Project Liabilities*, [GAO-13-337](#) (Washington, D.C.: Apr. 18, 2013).

<sup>10</sup>Pub. L. No. 109-58, § 203 (2005) (codified at 42 U.S.C. § 15852).

<sup>11</sup>We excluded any contracts associated with the territories of the United States or other overseas locations.

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alternatively financed contracts and then requested that they verify the information and add new projects, as appropriate, in order to obtain data on the universe of these projects for the specified time period. We assessed the reliability of the data we received by interviewing DOD officials and comparing the multiple data sets we received from the military services with data reported in the Annual Energy Management Report and obtained through prior reviews to ensure that there was consistency in the data provided. We determined that the data were sufficiently reliable for our purposes of meeting our objectives. We reviewed the statute requiring DOD to report data on alternatively financed energy projects and DOD's guidance requiring the military departments to maintain a utility energy reporting system to prepare data, including data on energy consumption and costs, for the Annual Energy Management Report.<sup>12</sup> We compared the military services' tracking of their data, such as total contract costs, estimated cost savings, and the length of the contract, on alternatively financed energy projects to DOD's guidance and statutory requirements for tracking such data. We also compared DOD's data collection efforts with *Standards for Internal Control in the Federal Government*, which identify standards for collecting and providing accurate and complete data.<sup>13</sup> We also interviewed Office of the Secretary of Defense and military department officials to discuss the availability of data related to their alternatively financed energy projects.

To assess the extent to which the military services reported achieving expected savings and verified the reported performance of selected projects, we reviewed DOD, Department of Energy, and Office of Management and Budget guidance on the different levels of measurement and verification or performance assurance that are required

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<sup>12</sup>See 10 U.S.C. § 2925 and Department of Defense Instruction 4170.11, *Installation Energy Management* (Dec. 11, 2009) (Change 1, Mar. 16, 2016). (Hereinafter cited as DOD Instruction 4170.11 (Dec. 11, 2009)).

<sup>13</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).



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for alternatively financed energy projects.<sup>14</sup> Using the data on the alternatively financed energy projects that we obtained from the military services, we then selected a non-generalizable sample of 17 projects—13 of which were in operation at that time—as case studies to discuss and observe during our site visits to the 11 installations where the projects were in operation. We selected these projects to obtain a cross section of projects by military service; type of alternative financing arrangement; year the contract was awarded; and contract vehicle (Army, Department of Energy, General Services Administration area-wide,<sup>15</sup> or stand-alone contract). We then compared measurement and verification efforts for the 13 operational projects in our sample with DOD guidance requiring measurement and verification for all energy projects to determine the extent to which installation officials followed guidance requiring verification of savings.<sup>16</sup> We also collected and analyzed data and documentation on the expected and reported savings for the 13 operational projects in our sample, and we documented reasons for any differences. We assessed the reliability of the project data by reviewing the internal controls DOD officials used to observe and corroborate the data contractors reported in their annual measurement and verification reports; the data collection and monitoring the officials did for performance assurance; and the data the officials used to assess project savings. We determined that the data were sufficiently reliable for our purposes of describing the extent to which the military services reported achieving expected savings and verified the reported performance of selected projects. Additionally, we interviewed officials at the 11

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<sup>14</sup>DOD Instruction 4170.11 (Dec. 11, 2009); U.S. Department of Energy Federal Energy Management Program, *M&V Guidelines: Measurement and Verification for Performance-Based Contracts Version 4.0*, DOE/EE-1287-0286 (November 2015); U.S. Department of Energy Federal Energy Management Program, *Utility Energy Service Contract Guide*, DOE/EE-0952 (Revised October 2016); Office of Management and Budget, Memorandum M-98-13, *Federal Use of Energy Savings Performance Contracting* (Washington D.C.: July 25, 1998); and Office of Management and Budget, *Addendum to Office of Management and Budget Memorandum M-98-13 on Federal Use of Energy Savings Performance Contracts (ESPCs) and Utility Energy Service Contracts (UESCs)* (Washington, D.C.: Oct. 3, 2012).

<sup>15</sup>An area-wide contract is an agreement between the General Services Administration and a utility for a range of utility services for periods up to 10 years. According to its guidebook, the General Services Administration is the only agency authorized to sign an area-wide contract, but once signed, the agreement can be used by any federal agency in that particular utility service territory. General Services Administration, *Utility Areawide Guide: A Practical Guide to Procuring Utility Services through a GSA Areawide Contract* (August 2015).

<sup>16</sup>DOD Instruction 4170.11 (Dec. 11, 2009).

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installations in our sample and their contracting or engineering commands to discuss these projects and their latest measurement and verification report or other assessment, and officials at the Office of the Secretary of Defense and the military departments to discuss guidance on assessing the performance of UESCs during the contract performance period.

To describe the benefits and disadvantages reported by the military services—as well as potential other costs—of using alternative financing arrangements for selected energy projects rather than using up-front appropriations, we reviewed DOD, Department of Energy, and military service guidance on the use of alternative financing arrangements and the cost-effectiveness of those arrangements to determine the requirements for life-cycle cost analyses. For the 17 projects in our nongeneralizable sample, we collected project planning documentation and reviewed available life-cycle cost analyses and contract documentation. Additionally, we interviewed officials at the installations in our sample, their contracting or engineering commands, or their military service headquarters to discuss the projects in our sample, including the benefits and disadvantages of using alternative financing arrangements for those energy projects. We also discussed how the individual contracts identified the costs to operate and maintain the energy conservation measures or power-generating equipment. Finally, we interviewed officials from the Department of Energy's Federal Energy Management Program to discuss federal policies and guidance related to alternative financing arrangements for energy projects and officials from the General Services Administration to discuss the agency's area-wide contracts with utility companies to gain an understanding of issues related to the benefits and costs of such projects. Further details on our scope and methodology can be found in appendix I.

We conducted this performance audit from June 2016 to June 2017 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 findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

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### Roles and Responsibilities for Installation Energy Management and Reporting

The Deputy Assistant Secretary of Defense (Installation Energy), under the Office of the Assistant Secretary of Defense (Energy, Installations and Environment), has the role and responsibility for, among other things, overseeing DOD's installation energy program. The office also is responsible for issuing installation energy policy and guidance to the DOD components and serving as the primary adviser for matters regarding facility energy policy.<sup>17</sup> In addition, the office provides management for energy conservation and resources, including establishing goals for the department's energy conservation program, developing procedures to measure energy conservation, and developing policy guidance for reporting energy use and results of conservation accomplishments against goals for federal energy conservation and management. These goals and requirements are found in, but are not limited to, the Energy Independence and Security Act of 2007, the Energy Policy Act of 2005, and Executive Order 13693, Planning for Federal Sustainability in the Next Decade.<sup>18</sup> Also, the military departments have established goals related to developing renewable energy projects. For example, the Secretary of the Navy has established goals to obtain half of the Navy's energy from alternative sources and to produce at least half the shore-based energy requirements from renewable sources, such as solar, wind, and geothermal. Further, each military department has issued department-level guidance to develop 1 gigawatt of renewable energy, for a total of 3 gigawatts by 2025.

In addition, DOD's instruction on energy management states that the Secretary of a military department is responsible for developing an energy program management structure to meet DOD requirements, with the primary objectives of improving energy efficiency and eliminating energy

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<sup>17</sup>DOD guidance defines components, collectively, as the Office of the Secretary of Defense, the military departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the combatant commands, the Office of the Inspector General of the Department of Defense, the defense agencies, DOD field activities, and all other organizational entities within DOD. See Department of Defense Directive 5100.01, *Functions of the Department of Defense and Its Major Components* (Dec. 21, 2010). For this review, we focused on the military departments, which are components of DOD and which include the military services. The Department of the Navy includes both the Navy and the Marine Corps.

<sup>18</sup>Pub. L. No. 110-140, § 431 (codified at 42 U.S.C. § 8253); Pub. L. No. 109-58, § 203 (2005) (codified at 42 U.S.C. § 15852); and Executive Order 13693 of Mar. 19, 2015.

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waste, while maintaining reliable utility service. Each military service has assigned a command or headquarters to provide guidance and funding, with regional commands or military installations managing site-specific energy programs. According to DOD's instruction, DOD component heads are to provide facilities with trained energy program managers, operators, and maintenance personnel for lighting, heating, power generating, water, ventilating, and air conditioning plants and systems.<sup>19</sup> At the installation level, the departments of public works, general facilities, or civil engineering oversee and manage the day-to-day energy operations.

Each year, DOD is to submit the Annual Energy Management Report to the congressional defense committees, as required by section 2925 of title 10 of the United States Code. This report describes the department's progress toward meeting its energy performance goals and, among other items, provides information on all energy projects financed with alternative financing arrangements. The Annual Energy Management Report is required to contain the following information on DOD's alternatively financed projects: the length of the contract, an estimate of the financial obligation incurred over the contract period, and the estimated payback period. The DOD components maintain a utility energy reporting system to prepare the data for submission of this report, which DOD describes as the primary vehicle by which it tracks and measures its performance and energy efficiency improvement.

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## Types of Alternative Financing Arrangements

DOD has used partnerships with the private sector as a tool for alternative financing arrangements to further energy efficiency efforts and allow installations to improve infrastructure through upgrades to existing systems and the purchasing of new equipment. Each financing arrangement leveraged by private capital has distinct requirements and legal authorities, and sometimes DOD components combine arrangements to finance the same project. Table 1 summarizes the main alternative financing arrangements that are available to DOD for funding its energy projects.

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<sup>19</sup>DOD Instruction 4170.11 (Dec. 11, 2009).

**Table 1: Alternative Financing Arrangements Available to the Department of Defense (DOD)**

Financing arrangement	Brief summary of arrangement
Energy Savings Performance Contract (ESPC)	A multiyear contract between a federal agency and an energy service company. Based on the results of a comprehensive energy audit, the energy service company, in consultation with the federal agency, designs and constructs a project to save energy and arranges the necessary financing for the project. The contractor guarantees that the improvements will generate energy cost savings sufficient to pay for the project over the term of the contract, with all additional cost savings accruing to the agency after the contract ends. A single contract can combine multiple energy conservation measures, such as more efficient equipment and renewable energy, and contract terms can extend up to 25 years. <sup>a</sup>
Utility Energy Service Contract (UESC)	A contract between a federal agency and its serving utility for the purpose of producing measurable energy or water reductions or measurable amounts of demand reduction. The utility arranges financing to cover the capital costs of energy-efficiency and renewable energy projects, and the costs of the project are repaid by the agency over the contract term. The agency's repayments are usually based on estimated cost savings generated by the energy-efficiency measures, but the UESC authority does not require a guarantee of the savings. The length of the agreements typically has not exceeded 10 years, but DOD took steps in May 2016 to clarify that contracting officers can enter into such agreements for up to 25 years. <sup>b</sup>
Power Purchase Agreement (PPA)	An agreement negotiated between DOD and an energy supplier to purchase specified quantities of electricity at specified prices for a specific period of time. PPAs range from 10 years or less up to 30 years. Revenues that developers receive under PPAs can be used to repay the costs of constructing and operating a renewable energy project on a DOD installation. <sup>c</sup>
Enhanced Use Lease	A long-term lease of property to a private developer for uses including the installation of renewable energy systems in exchange for cash or in-kind services. These leases are usually for 25 years or more, up to 50 years. <sup>d</sup> In many cases, enhanced use leases do not include a specific provision to purchase electricity produced from the project. <sup>e</sup>

Source: GAO analysis of alternative financing approaches and statutory authorities. | GAO-17-461

<sup>a</sup>The authority for ESPCs is found in 42 U.S.C. § 8287 et seq. Our prior work provides more information on how federal agencies develop and implement ESPC projects. See *Energy Savings Performance Contracts: Additional Actions Needed to Improve Federal Oversight*, GAO-15-432 (Washington, D.C.: June 17, 2015).

<sup>b</sup>The authorities for UESCs are found in 10 U.S.C. § 2913 and 42 U.S.C. § 8256. DOD issued its final rule to amend the Defense Federal Acquisition Regulation Supplement to clarify that contracting officers may enter into an energy savings contract for a period not to exceed 25 years. See 48 C.F.R. § 241.103. UESCs are not always funded using alternative financing. They may be awarded for periods of one year or less or be paid for using up-front appropriations. For this report, we are including only those UESCs that were funded using alternative financing arrangements.

<sup>c</sup>DOD has several authorities for entering into PPAs. For example, under 10 U.S.C. § 2410q, DOD can enter into contracts for up to 5 years generally, or up to 10 years in certain circumstances. Under 10 U.S.C. § 2922a, DOD may enter into agreements of up to 30 years. According to officials from the Office of the Secretary of Defense, DOD does not refer to its 2922a projects as PPAs but rather as 2922a contracts. In the fiscal year 2015 Annual Energy Management Report, DOD describes the funding arrangement used under the 2922a authority as utility service contracts that enable the department to enter into agreements for the provision and operation of energy production facilities and the purchase of energy from such facilities. Under 10 U.S.C. § 2809, subject to certain conditions, DOD may enter into contracts of up to 32 years, excluding the period for construction.

<sup>d</sup>We have previously reported that these leases are often entered into for periods longer than 25 years, and as much as 50 years. See GAO, *Defense Infrastructure: The Enhanced Use Lease Program Requires Management Attention*, GAO-11-574 (Washington, D.C.: June 30, 2011).

<sup>e</sup>The military services refer to certain leases of real property undertaken pursuant to the authority in 10 U.S.C. § 2667 as "enhanced-use leases."

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In December 2011, the President challenged federal agencies to enter into \$2 billion in performance-based contracts, including ESPCs and UESCs, through the President's Performance Contracting Challenge to meet the administration's goals of cutting energy costs in agency facilities as part of a broader effort to reduce energy costs, cut pollution, and create jobs in the construction and energy sectors.<sup>20</sup> In May 2014, the President expanded the challenge by an additional \$2 billion, bringing the total goal to \$4 billion in performance-based contracts across the federal government by the end of calendar year 2016.<sup>21</sup> According to DOD, as of December 31, 2016, the three military departments and the other defense agencies combined had awarded 194 ESPCs and UESCs that totaled over \$2.28 billion.<sup>22</sup> DOD reported that these results exceeded its target of awarding over \$2.18 billion in such contracts over this period.

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## Related DOD and Military Service Audits

DOD and military service audits have examined the development and management of DOD's alternative financing arrangements. For example, in May 2016, the DOD Inspector General found that the Air Force Civil Engineer Center did not effectively manage the Air Force's existing ESPCs and made recommendations to improve controls and validate energy savings.<sup>23</sup> In January 2017, the DOD Inspector General found that the Naval Facilities Engineering Command did not effectively manage the Navy's 38 ongoing ESPCs that were in the performance phase.<sup>24</sup> The DOD Inspector General stated that management was not effective because the command did not appoint contracting officer's representatives for 31 of the ongoing projects and did not develop a quality assurance surveillance plan for any of them. Additionally, the DOD

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<sup>20</sup>White House Memorandum, *Implementation of Energy Savings Projects and Performance-Based Contracting for Energy Savings* (Dec. 2, 2011).

<sup>21</sup>White House Fact Sheet: *President Obama Announces Commitments and Executive Actions to Advance Solar Deployment and Energy Efficiency* (May 9, 2014). The President's Performance Contracting Challenge ended in 2016, and there have been no additional efforts announced yet.

<sup>22</sup>According to DOD officials, the other defense agencies included the Defense Logistics Agency, the Defense Intelligence Agency, and the National Security Agency.

<sup>23</sup>DOD, Office of Inspector General, *Air Force Civil Engineer Center Management of Energy Savings Performance Contracts Needs Improvement*, DODIG-2016-087 (Alexandria, Va.: May 4, 2016).

<sup>24</sup>DOD, Office of Inspector General, *Naval Facilities Engineering Command Management of Energy Savings Performance Contracts Needs Improvement*, DODIG-2017-044 (Alexandria, Va.: Jan. 26, 2017).

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Inspector General reviewed five other projects in more detail and found questionable contract payments. The DOD Inspector General recommended the appointment of contracting officer's representatives for ESPCs and that the Naval Facilities Engineering Command Expeditionary Warfare Center—which oversees the Navy's ESPCs—document the validity of prior year energy savings for the selected ESPCs.<sup>25</sup> In addition, in September 2014, the Army Audit Agency found that the Army's renewable energy projects were generally operational and contributed to renewable energy goals.<sup>26</sup> However, the audit also identified the need for improvements to ensure projects were performing as intended and that installations were reporting renewable energy output sufficiently to help the Army meet federal mandates and the DOD goals for renewable energy. At the time of the Army Audit Agency review, the Army was not meeting the federal and DOD renewable energy goals.

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<sup>25</sup>The Navy concurred with the DOD Inspector General recommendations. According to Navy officials, as of October 2016, the Navy had appointed contracting officer's representatives for all ESPCs in the performance phase. In addition, Navy officials stated that they are obtaining documentation to validate contractor claimed energy savings for select ESPCs and expect to complete this effort in the spring of 2017.

<sup>26</sup>U.S. Army Audit Agency, *Performance of Renewable Energy Projects*, A-2014-0114-IEE (Fort Belvoir, Va.: Sept. 29, 2014). DOD officials told us that the Office of the Assistant Secretary of the Army for Installations, Energy and Environment had requested this review because of the increased task order volume to ensure that the program delivered promised results and guaranteed savings. Officials stated that the efforts resulted in publication of revised ESPC implementation guidance and greater efforts to strengthen contract management and oversight systems.

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## The Military Services Have Used Alternative Financing for Hundreds of Energy Projects since 2005, but Have Not Collected and Provided Complete and Accurate Data to DOD

Since 2005, the military services have used alternative financing arrangements for hundreds of energy projects to improve energy efficiency, save money, and meet energy goals; however, the military services have not collected and provided DOD complete and accurate data to aid DOD and congressional oversight of alternatively financed energy projects.

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## Military Services Have Used Alternative Financing Arrangements for Hundreds of Energy Projects since 2005

Based on the data provided by the military services, the services have used alternative financing arrangements for 464 energy projects or contracts since 2005, entering into about 38 contracts annually from fiscal year 2005 through fiscal year 2016.<sup>27</sup> The Army entered into the most alternatively financed contracts (305), followed by the Navy (90), the Air Force (50), and the Marine Corps (19). Military service officials attributed the continued use of alternative financing to three separate factors. First, officials cited the President's Performance Contracting Challenge, issued in December 2011, which challenged federal agencies to enter into \$2 billion in performance contracts, such as ESPCs and UESCs. Second, officials stated that they did not have sufficient appropriated funds to accomplish many of these projects, making alternative financing an attractive option for addressing needed repairs, obtaining new equipment designed to improve operations, and reducing energy consumption. Third, service officials stated that alternative financing reduces the risk for equipment maintenance and budgeting. Specifically, many contracts

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<sup>27</sup>The total number of alternatively financed energy projects was derived from military service officials during this review, from our prior audit work, and from past Annual Energy Management Reports. The total includes ESPCs, UESCs, and PPAs from the Army, Air Force, Navy, and Marine Corps. It also includes about a minimum of 30 projects that the services have completed, terminated, or bought out at some cost to the government. A service can buy out a contract if, for example, it wishes to shorten the contract length and reduce the amount of interest it will be paying for the energy conservation measures over time. For the purposes of this review, we refer to each individual ESPC or UESC project as a separate contract, even if multiple projects are under a single contract. Therefore, if a contract was awarded with multiple project delivery orders, we counted them as separate projects and would report them as ESPC or UESC "contracts" above.



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include a cost-savings guarantee, which requires that the contractor maintain the equipment in good working order over the life of the contract. Additionally, many contracts have fixed annual payments regarding projects, so the services have certainty in terms of budgeting for portions of an installation's annual energy costs.

The alternative financing contracts the military services awarded have obligated the government to pay billions of dollars to contractors over the next 25 years, as shown in table 2. According to military service officials, these contractual obligations are must-pay items from their annual budgets. In order to account for these must-pay items in their budgets, they said that the military service headquarters must have visibility into certain data, such as the costs of such projects. We found that from fiscal years 2005 through 2016, the military services have used UESCs more often than the other types of alternative financing arrangements we reviewed. Specifically, the military services have entered into contracts for 245 UESCs compared to 201 ESPCs.

**Table 2: Reported Number of Department of Defense (DOD) Energy Projects Using Alternative Financing Arrangements and the Estimated Costs of the Projects, Fiscal Years 2005 through 2016**

Alternative financing arrangement	Reported number of contracts identified <sup>a</sup>	Reported number of contracts with total contract costs identified	Estimated cost to the government based on total contract costs identified (then-year dollars) <sup>b</sup>
<b>Energy savings performance contracts (ESPC)</b>			
Army	131	89	\$3.2 billion
Navy	27	25	925 million
Air Force	38	30	722 million
Marine Corps	5	5	110 million
<b>Total ESPC</b>	<b>201</b>	<b>149</b>	<b>\$5 billion over the next 25 years<sup>c</sup></b>
<b>Utility energy service contracts (UESC)</b>			
Army	167	25	\$278 million
Navy	59	58	243 million
Air Force	8	7	77 million
Marine Corps	11	11	79 million
<b>Total UESC</b>	<b>245</b>	<b>101</b>	<b>\$677 million over the next 17 years<sup>c</sup></b>

Source: GAO analysis of DOD data, Annual Energy Management Reports, and prior audit work. | GAO-17-461

<sup>a</sup>These figures are based on the project and cost information provided by the military services. They do not include contracts identified by the military departments that had a duration of one year or less and that were paid for up front with appropriated funds. Although officials from the military departments identified some of these one-year contracts as UESCs, those projects did not involve financing and did not include annual payments to the utility over time. To the extent we could identify such one-year contracts from the data provided by the military departments, we removed those contracts from our counts. The Navy provided us project and cost information for all of the Marine Corps' alternatively financed energy projects that they identified as being awarded from fiscal years 2005 through 2016.

<sup>b</sup>These estimated costs are based on the number of projects for which we identified contract cost data and do not cover all of the projects that were identified. We define total contract costs as the overall amount a military service will pay for the project(s) over the life of the contract, which includes payments to the energy service company or utility over time for its costs to implement and finance the project up front, interest on the financing, and other services that the company or utility may provide, such as operating and maintaining the equipment. Additionally, we did not have cost data broken down by year in most cases, so we are unable to provide the present discounted values of these costs.

<sup>c</sup>The military services did not provide cost data for all of these projects, but we gathered cost data from other sources, such as the Annual Energy Management Report and our prior audit work. We used the maximum contract length to indicate the number of years for the estimated cost to the government. Not every ESPC or UESC in the project data is extended over this maximum contract length.

In addition to ESPCs and UESCs, the military services have also entered into financing agreements through PPAs. We found that of the 18 PPAs that either we or the military services identified as being awarded since

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2005, 10 have been awarded since 2014. In these military power purchase agreements, a private entity will purchase, install, operate and maintain renewable energy equipment, and the military service will purchase the electricity generated by the equipment.

Since 2005, the Army, Navy, and Marine Corps have reported contractor project investment costs totaling almost \$1.46 billion for PPAs.<sup>28</sup> Some of these projects, such as solar arrays, can have significant project investment costs to the contractor, and the military services compensate the contractors over time, either in part or in full, through payments for their energy usage. However, we identified challenges in determining the true costs of these PPA projects to the government for several reasons. First, the future cost to the government could exceed \$1.46 billion because some of the PPAs are still in the design and construction phase and cost data are not known. Second, minimum purchase agreements are typically set in the contracts, but in some cases the service could purchase more than the minimum amount of energy required, which would increase the costs. Third, the energy providers have other ways of recouping their project investment costs, which means the military services may not be responsible for repaying all of the costs. In addition to possible rebates and tax incentives, energy developers may be able to take advantage of renewable energy credits, which can lower the up-front costs of projects by reimbursing either the military or the energy provider.<sup>29</sup> Lastly, in some cases, the energy provider can take excess energy produced by the equipment and sell it to other customers as another means of recouping its investment costs and reducing the costs to the military services.

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<sup>28</sup>We initially defined project investment costs as the total price of the contract or task order, to include the cost of the equipment, labor for installation, and other direct project costs, but not the cost of financing. However, because each annual payment varies based on the amount of energy purchased, the services provided their best estimates where they could. The Air Force did not report any project investment costs for its PPA projects.

<sup>29</sup>According to Department of Energy guidance, renewable energy credits represent the technological and environmental attributes of energy generated from renewable resources. Developers can use these credits to meet state requirements or they can sell the credits to others. DOD must retain ownership of these credits to claim the energy produced by these projects toward its energy consumption goal or purchase credits to replace them. A goal of the Energy Policy Act of 2005 is for federal agencies to consume, to the extent it is economically feasible and technically practicable, not less than 7.5 percent of electrical energy from renewable sources each year. See Department of Energy, Office of Energy Efficiency and Renewable Energy, *Renewable Energy Requirement Guidance for EPACT 2005 and Executive Order 13423* (Jan. 28, 2008).

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## Military Services Have Not Collected and Provided Complete and Accurate Project Data to DOD

Since 2005, the military services have not collected and provided complete and accurate project data to DOD on alternatively financed energy projects. Specifically, the military services provided partial data on total contract costs, savings, and contract length related to their respective alternatively financed energy projects during this time frame. However, we were unable to identify and the military services could not provide complete data on the range of their alternatively financed projects, to include data on total contract cost for 196 of 446 ESPC and UESC projects.<sup>30</sup> In particular:

- The Army could not provide total contract costs for about 42 of its 131 ESPCs.<sup>31</sup> Moreover, the Army could not provide total contract costs for about 142 of its 167 UESCs.
- The Navy could not provide total contract costs for 1 of its 59 UESCs and 2 of its 27 ESPCs.
- The Navy also provided a list of Marine Corps projects and relevant data related to total contract costs for those projects. However, we identified discrepancies between the list of projects provided to us and those that DOD reported receiving.
- The Air Force could not provide total contract costs for 8 of its 38 ESPCs and 1 of its 8 UESCs.

Additionally, the military services could not provide data related to either cost savings for 195 contracts or contract length for 232 contracts.

Furthermore, some of the data provided by the Army and Navy on their alternatively financed energy projects did not include the level of accuracy needed for better or improved planning and budgeting purposes. For example, we contacted three installations where the Army had identified UESCs in the Annual Energy Management Report to Congress, but

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<sup>30</sup>These totals do not include the PPA projects, for which total contract prices are not available.

<sup>31</sup>DOD officials told us that 25 of the 42 Army ESPC projects that did not include the total contract costs were modifications that are counted as separate task orders. The department stated that the total costs for these modifications may be wrapped up in the total cost of the original task orders as modified and tracked by the contracting offices. However, we could not determine from the data the Army provided whether or not the costs for these modifications were included in the total contract costs for the original contracts. Further, Army officials did not identify whether or not the Army's ESPC contracts had been modified, as we had requested in our data call.

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officials from two of those installations told us that no UESC existed.<sup>32</sup> The Navy provided data on most of its projects, but Navy headquarters officials acknowledged that they had low confidence in the accuracy of the data on three specific ESPCs because they had not actually reviewed the contract documents, which were awarded by one of the Navy's subordinate commands. Also, cost and other data reported by Navy headquarters for UESC projects at one of its installations did not match the cost data and project details provided by the regional command overseeing the installation's contracts. Additionally, military service headquarters and installations or other service entities provided information that did not always match. For example, an Army official told us about discrepancies in the service's internal tracking documents that officials had to resolve prior to providing their data to us.

According to the DOD instruction, the military services are required to track and store data on energy projects, including data on all estimated and actual costs, interest rates, and mark-ups, among others, as well as any changes to project scope that may affect costs and savings.<sup>33</sup> Moreover, section 2925 of title 10 of the United States Code requires DOD to report to Congress after each fiscal year on its alternatively financed energy projects, to include information on the projects' duration and estimated financial obligations, among other things, which requires that DOD have reliable information about these projects so that DOD and the Congress will be better able to conduct oversight and make informed decisions on programs and funding.<sup>34</sup> Furthermore, *Standards for Internal Control in the Federal Government* state that management should obtain

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<sup>32</sup>We did not include these two UESCs in the 464 total of alternatively financed contracts or projects that the military services have awarded since fiscal year 2005. The two projects were among 14 of the total UESC projects that the military departments initially identified but that we did not include in our total contract count because the military departments either could not confirm the contracts or they were not funded using alternative financing arrangements. Of these two Army UESCs, one was a study that was funded using up-front appropriations but for which no project was developed to implement energy conservation measures because the study did not identify an economical project that met the installation's requirements. The other UESC was funded using up-front appropriations rather than alternative financing arrangements.

<sup>33</sup>DOD Instruction 4170.11 (Dec. 11, 2009).

<sup>34</sup>See 10 U.S.C. § 2925. DOD reports on its energy projects financed through alternative financing arrangements through its Annual Energy Management Report. However, we reported in 2016 that DOD's 2013 Annual Energy Management Report was not fully reliable or complete. See GAO, *Defense Infrastructure: Improvement Needed in Energy Reporting and Security Funding at Installations with Limited Connectivity*, [GAO-16-164](#) (Washington D.C.: Jan. 27, 2016).

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quality information that is, among other things, complete and accurate in order to make informed decisions.<sup>35</sup>

During the course of this review, military service and DOD officials stated that one reason that the military departments and DOD headquarters levels did not always have complete and accurate data is because the military services have decentralized authority for entering into alternatively financed projects and for maintaining associated data. Given this decentralized authority, the data maintained are not always tracked in a manner that captures the full range of data needed at the headquarters level for oversight, nor are they consistently reported to the headquarters level. Therefore, the military departments and DOD do not have complete and accurate information on the universe of active alternatively financed energy projects to aid oversight and to inform Congress. Specifically, complete and accurate data are also necessary for DOD to meet its requirement to report annually to Congress on the department's alternatively financed energy projects through the Annual Energy Management Report, to include data on projects' respective duration, financial obligation, and payback period. Having complete data on total contract costs, cost savings, and contract length are all necessary data points in order for the military departments to also formulate accurate cost estimates for annual budget requests and project expenses. Without these data, the military departments also will not have a full understanding of the cumulative impacts of these alternative financing arrangements on their installations' utility budgets over periods of up to 25 years. Furthermore, if the military departments do not provide complete and accurate data to DOD, decision makers within the department and in Congress may not have all information needed for effective oversight of the projects, which could hinder insight into future budgetary implications of the projects.

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<sup>35</sup>[GAO-14-704G](#). Per paragraph 13.05 of these standards, "quality information" is appropriate, current, complete, accurate, accessible, and provided on a timely basis. Management uses quality information to make informed decisions and evaluate an entity's performance in achieving key objectives and addressing risks.

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## DOD Reported Savings on Selected Energy Projects, but the Military Services Have Not Consistently Verified Project Performance

DOD reported achieving expected savings or efficiencies on the operational alternatively financed energy projects we reviewed; however, the military services have not consistently verified project performance on its ESPC and UESC projects to confirm that the reported savings were achieved.<sup>36</sup> Without more consistent verification of performance for all alternatively financed projects, DOD cannot be certain that all projects are achieving their estimated savings.

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### Selected Projects Generally Reported Achieving Expected Savings

In our review of a nongeneralizable sample of 17 alternatively financed energy projects across the military services, we found DOD reported that 13 were considered operational and that all 13 of these projects—8 ESPCs, all 3 of the UESCs, and 2 PPAs—achieved their expected savings.<sup>37</sup> Installation officials measured savings for these projects differently, depending on which type of alternatively financed arrangement was used.<sup>38</sup>

- For the 8 ESPCs in our sample, we reviewed the most recent measurement and verification reports provided by the contractors and found that each project reported achieving its guaranteed savings.<sup>39</sup> The measurement and verification reports provided by the contractors

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<sup>36</sup>A project is considered operational if its energy conservation measures have been installed. We asked the military services to identify projects that were operational, in design or construction, terminated, or bought out.

<sup>37</sup>Three of the remaining four projects were still under construction at the time of our review and thus the military services had not yet begun reporting on their actual cost savings or efficiencies. The fourth project had recently completed construction but had not been in operation long enough for the contractor to have reported on its annual energy or cost savings.

<sup>38</sup>Some savings are also measured using formulas that do not necessarily account for changes that occur over time on the installation, as we describe later in this report.

<sup>39</sup>For ESPCs, the military services are required to measure savings. The expected cost and energy savings for an ESPC project are established during project development, finalized when the contract is awarded, and measured and verified over the course of a project's performance period. Measurement and verification is required to assure that the project is meeting the guaranteed cost savings levels that must be achieved in order for the contractor to be fully paid, which is done using appropriated funds. We describe energy and cost savings for ESPCs and the measurement and verification process in more detail in [GAO-15-432](#).

reported guaranteed savings of between 100 and 145 percent for the ESPC projects we reviewed, as shown in table 3.<sup>40</sup>

**Table 3: Savings for Selected Department of Defense (DOD) Energy Savings Performance Contracts (ESPC) as Reported in the Most Recent Contractor Measurement and Verification Reports**

Military service and project location	Guaranteed cost savings <sup>a</sup> (then-year \$)	Reported cost savings <sup>b</sup> (then-year \$)	Ratio of reported to guaranteed savings (percentage)
<b>Army</b>			
Fort Irwin, California	\$1,279,494	\$1,318,779	103
Fort Jackson, South Carolina	1,626,509	2,121,460	130
Joint Base Myer-Henderson Hall, Virginia	1,796,083	2,603,697	145
<b>Air Force</b>			
Joint Base Charleston, South Carolina	2,362,475	2,536,885	107
Nellis Air Force Base, Nevada	746,515	924,366	124
<b>Navy</b>			
Naval Base Kitsap-Keyport, Washington	2,285,165	2,322,730	102
<b>Marine Corps</b>			
Marine Corps Air Station Beaufort, South Carolina	328,584	411,768	125
Marine Corps Base Quantico, Virginia	\$586,285	\$586,285	100

Source: GAO summary of contractor measurement and verification reports provided by DOD. | GAO-17-461

<sup>a</sup>For this review, officials provided us with their most recent measurement and verification reports, which had end dates ranging from November 2015 through October 2016.

<sup>b</sup>Because of the large number of factors that can result in overstated or understated savings, we did not determine the net effect of all factors on projects' achieved savings.

- For the three UESCs in our sample, we found that installation officials used various performance assurance methods to maintain energy savings by ensuring that the installed equipment was operating as

<sup>40</sup>Federal ESPC projects must include guaranteed annual cost savings, which are a specified level of cost savings the contractor must provide. The agency keeps any cost savings that result from energy savings above the guaranteed savings levels. If a project does not meet its guaranteed savings levels, the agency may decrease its payment to the contractor.



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designed.<sup>41</sup> For UESCs, identification of project savings can include either annual measurement and verification or performance assurance. The authority for UESCs, unlike that for ESPCs, does not have a requirement for guaranteed savings, but the agency's repayments are usually based on estimated cost savings generated by the energy-efficiency measures. At Fort Irwin, California, officials stated that they used efficiency gauges installed on the equipment to verify that the equipment was operating properly. At Naval Air Weapons Station China Lake, California, officials stated that operation and maintenance personnel performed systems checks to ensure the installed equipment is functioning properly. At Naval Base Kitsap-Bangor, Washington, officials used the energy rebate incentives issued by the utility company as a proxy to ensure that savings were being met. The officials stated that if they received the rebate, then they were achieving the requisite energy and cost savings.<sup>42</sup>

- For the two PPA solar array projects that we reviewed, officials reported that purchasing power through the contract remained cheaper than if they had to purchase power from non-renewable energy sources. For PPAs, savings measurement does not include annual measurement and verification. PPAs are an agreement to purchase power at an agreed-upon price for a specific period of time, and as such, they do not require continuous measurement and verification. However, DOD officials informed us that their contracts require such projects to be metered so that they can validate the receipt of electrical power before payment for the service. Officials also reported that they periodically assessed and reported on whether

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<sup>41</sup>According to officials with the Department of Energy, a UESC instead includes a performance assurance plan aimed at verifying the performance of the installed equipment throughout the term of the contract through appropriate operation and maintenance, inspection, and improvements. The Department of Energy provides federal agencies guidance on the level of recommended performance assurance for UESCs, and officials described an effective performance assurance plan as one that includes measurement and verification, generally for one to five years, and a commissioning plan. A commissioning plan identifies a systematic process of verification and documentation to ensure energy conservation measures operate according to their design intent and can be properly operated and maintained during their useful life. While performance assurance is a method of ensuring the installed equipment functions as designed, it does not include the same guarantees of cost savings that is provided through the measurement and verification of ESPCs.

<sup>42</sup>Officials from the installation and Naval Facilities Engineering Command Northwest explained that maximizing energy efficiency enables utilities to avoid the capital cost of new power generation projects. Utilities pay out rebates and incentives for proven energy conservation measures and establish requirements for customers to measure, verify, and report savings to the serving utility in order to qualify for those rebates and incentives.

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the utility rates remained at levels that were profitable for the project. Projects remained profitable when the prices to generate electricity from the solar panels were below the market rate for electricity obtained through the utility company. For example, through monitoring of utility rates, one official reported that the installation's PPA project obtained a favorable rate for electricity of 2.2 cents per kilowatt hour, well below the prevailing market rate of 7.2 cents per kilowatt hour. This rate is fixed over the course of this 20-year contract, whereas the current market rate fluctuates, and the official estimated that the project saved the installation approximately \$1 million in utility payments in fiscal year 2016. For the other PPA project we reviewed, installation officials reported that the project terms were still profitable and estimated that without the PPA, the cost for electricity would be about 80 percent higher than the cost they were getting through the PPA. However, according to the officials, a state regulation governing electricity usage requires that the installation obtain a specific amount of electricity from the utility company. Installation officials told us that they had to curtail some of the project's own energy production to meet this requirement, which resulted in the project not always operating at the capacity they had planned. For example, contractor documents show that from September 2013 through August 2014, the electricity generated monthly by the project was curtailed by between 0.1 percent to 14.2 percent.

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## Two Factors May Have Affected Reported Savings of Selected ESPC Projects

In our review of eight military service ESPC projects that had reported achieving or exceeding their guaranteed cost savings, we found that the cost savings may have been overstated or understated in at least six of the eight projects. Expected cost and energy savings for ESPC projects are established during project development, finalized when the contract is awarded, and measured and verified over the course of a project's performance period. These savings can include reductions in costs for energy, water, operation and maintenance, and repair and replacement directly related to a project's energy conservation measures. ESPC projects generally include two types of expected savings: (1) proposed cost and energy savings, which contractors estimate will result from the energy conservation measures installed, and (2) guaranteed cost savings, which must be achieved for the contractor to be fully paid. For five of the six projects where we found that cost savings may have been overstated or understated, we identified two key factors that have affected

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reported savings—project modifications and agency operation and maintenance actions.<sup>43</sup>

- *Project modifications*<sup>44</sup>—We found that the installations had modified some of the energy conservation measures in at least 4 of the ESPC projects for which cost savings may have been overstated or understated. Specifically, we found instances where officials had completed demolitions or renovations to facilities where energy conservation measures were installed or had demolished equipment. For example, at one installation, the most recent measurement and verification report indicated that buildings associated with the project savings were demolished or scheduled to be demolished in four of the nine years following the project's completion. Based on the contractor's report, we calculated that the building demolitions, closings, and renovations negated approximately 30 percent of the project's annual cost savings for 2016. According to the report, these changes have compromised the project to such an extent that the contractor recommended the service modify the contract with a partial termination for convenience to buy out portions of the project where

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<sup>43</sup>For the sixth project, the measurement and verification report identified that one installed energy conservation measure was found to be not operational, but the report did not specify if this issue was due to agency or contractor actions. The report identified that savings for this energy conservation measure were not being included in the verified savings; however, it was unclear how long the system had been inoperable, and because the contractor was not reporting any savings for the equipment, it is possible that cost savings may have been understated. We also found one instance where project changes that may have affected the energy and cost savings were neither the fault of the agency nor the contractor. Officials told us that the installation experienced two floods in three years, with each flood damaging or destroying boiler and chiller equipment contained within its ESPC. Because this equipment needed to be replaced before the end of its useful life, the contract was modified to have the contractor replace the equipment destroyed in the 2013 flood, which was funded using emergency funding from the Army. According to Department of Energy officials, because project savings are verified in accordance with the contractually agreed upon measurement and verification plan, some agency actions may result in savings in excess of the guaranteed savings and thus savings higher than were reported. Because of the large number of factors that can result in overstated or understated savings, we did not determine the net effect of all factors on projects' achieved savings. For example, contractors reported that some energy conservation measures in the projects we reviewed outperformed expectations, which may have offset the lower-than-expected savings of other energy conservation measures in those projects.

<sup>44</sup>For this review, we define project modifications as instances when changes to the project, such as demolitions or renovations to buildings where energy conservation measures were installed, required modifications to the contract.

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changes have occurred and savings were affected.<sup>45</sup> At another installation, the measurement and verification report indicated that cost savings came directly from those cost savings that were established in the contract and did not reflect equipment that had been demolished or required repair. In its report, the contractor verified that the equipment was in place and documented issues that negatively affected the energy conservation measures, but it did not adjust the savings to account for those issues. In both of these cases, the contractor continues to report meeting guaranteed cost savings levels and the service is required to continue making its full payment. Project modifications can occur, such as when missions change at an installation, but we found that these changes may prevent the project's cost savings from being fully realized.

- *Agency operation and maintenance actions*<sup>46</sup>—We found that such agency actions were identified as an issue for the ESPCs in our review and may have reduced the savings realized for five of the six ESPC projects for which cost savings may have been overstated or understated. Specifically, we found instances where the measurement and verification reports identified that some replacement items were installed incorrectly or left uninstalled and some light fixtures and sensors were poorly maintained or removed. For example, at one installation, the most recent measurement and verification report showed that base personnel disabling installed energy conservation measures, such as installing incorrect lamps or removing lighting control sensors, coupled with abandoned or faulty equipment, have reduced cost savings for this project. Contractors are not generally required to reduce the amount of savings they report or measure the effect of project changes for which the contractor is not responsible. The contractor stated that the energy and cost savings in its measurement and verification report were derived directly from the calculated energy and cost savings negotiated as a part of the original contract and do not reflect reductions due to abandoned equipment or

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<sup>45</sup>Contracts entered into under the Federal Acquisition Regulation include a legal right to termination for convenience prior to completion when circumstances, such as closing a DOD installation, mean termination is in the government's interests. A termination for convenience, however, comes at a cost to the government because the military service must pay the contractor a negotiated settlement for reimbursable costs, such as incurred costs for work performed, termination costs, plus, in some cases, a reasonable profit or fee on its completed work, minus all payments made to date and the value of the property the contractor retained upon termination.

<sup>46</sup>For this review, we define agency operation and maintenance actions as instances when installation personnel did not always operate or maintain equipment as agreed to or when they removed or modified energy conservation measures.

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other factors outside of the contractor's control.<sup>47</sup> At another installation, the most recent contractor measurement and verification report indicated that some bulbs were burned out and lighting fixtures were dirty. As a result, the contractor lowered the calculated savings for the lighting energy conservation measure for that year, while also noting that the savings still exceed the proposed savings for that measure. Officials at one installation described the challenge of preventing installation personnel from acting in ways that detract from the projects' energy savings, such as by removing low-flow shower head controls, adjusting water temperatures, or removing or adjusting heating and cooling controls.

In June 2015, we described similar factors as potentially reducing energy savings on select ESPC projects in seven federal agencies, including the Air Force, Army, and Navy.<sup>48</sup> In that review, we found that the contractor is generally not required to either reduce the amount of savings they report or to measure the effects of such factors on reported savings when factors beyond their control reduce the savings achieved. Further, we reported that agencies were not always aware of the amount of expected savings that were not being achieved among their projects, in part because contractors generally do not provide this information in their measurement and verification reports. In the 2015 report, the savings estimates that were reported but not achieved ranged from negligible to nearly half of a project's reported annual savings. As a result, we recommended then that the Secretary of Defense specify in DOD guidance or ESPC contracts that measurement and verification reports for future ESPC projects are to include estimates of cost and energy savings that were not achieved because of agency actions, and DOD agreed with our recommendation. Given similar findings with respect to the ESPC projects we examined as part of this review, we continue to believe that our 2015 recommendation is valid.

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<sup>47</sup> Depending on the terms established in the contract, some ESPC projects may have stipulated savings, which are precalculated savings amounts that are not required to be altered when changes occur. In this example, officials had not consistently reviewed the measurement and verification reports at the installation level prior to the contracting entity making the payment to the contractor, which might have resulted in officials identifying these issues earlier. According to DOD officials, stipulation of savings is no longer allowed, and officials noted that no Army contracts after 2008 contain stipulated savings. In this example, we were reviewing an ESPC that was awarded prior to 2008.

<sup>48</sup> [GAO-15-432](#).

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## The Military Departments Have Varying Approaches for Verifying Savings for UESC Projects

The military departments have varying approaches for verifying whether all of their alternatively financed UESCs are achieving expected savings. Army, Navy, and Air Force officials described their processes and guidance for verifying savings for their UESCs, and we found that they did not consistently follow all requirements in both DOD and Office of Management and Budget guidance.<sup>49</sup> Alternatively financed UESCs must meet certain requirements in order to allow the use of private sector funding to develop the project and to have the ability to repay the project, generally using appropriated funds over the contract term instead of having to fund the entire project cost up front. Additionally, according to DOD's 2009 instruction, repayments for UESCs are based on estimated cost savings generated by the energy conservation measures, although energy savings are not necessarily required to be guaranteed by the contractors.<sup>50</sup> This instruction further requires DOD components to verify savings to validate the performance of their energy efficiency projects, thereby providing assurance that such projects are being funded with generated savings or as agreed to in specified contracts. Specifically, the instruction requires the military departments to track all estimated and verified savings and measurement and verification information for its energy projects. Tracking and verifying savings associated with such alternatively financed energy projects is necessary because the projects require a long-term investment from the department—in some cases allowing the military services to budget for these projects for a period of up to 25 years—and it is not until contractors have been fully repaid for the costs of the energy conservation measures and related contract costs that agencies retain any savings the project continues to generate.<sup>51</sup>

In addition, DOD uses guidance issued by the Office of Management and Budget. Specifically, in 2012, the Office of Management and Budget

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<sup>49</sup>Officials from the military departments also told us that they refer to the Department of Energy's guide for implementing UESCs.

<sup>50</sup>DOD Instruction 4170.11. Measurement and verification is the process used to calculate the annual energy and cost savings achieved by energy conservation measures. Measurement and verification is required for projects to ensure that they are meeting the guaranteed cost savings levels that must be achieved in order for the contractor to be fully paid. As noted earlier, identification of project savings for UESCs can include either annual measurement and verification or performance assurance.

<sup>51</sup>The costs of the energy conservation measures include interest and other costs associated with financing the measures, and related contract costs include any operation and maintenance services the contractor provided. We provide more information on project costs later in this report.

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updated guidance,<sup>52</sup> stating that UESCs may be scored on an annual basis if the UESC requires performance assurance or savings guarantees and measurement and verification of savings through commissioning or retro-commissioning.<sup>53</sup> According to officials from the Office of the Secretary of Defense, the department has interpreted the Office of Management and Budget guidance as giving federal agencies the option of requiring either performance assurance, savings guarantees, or measurement and verification for UESCs. Each of the various techniques provides a different level of assurance that the installed equipment is functioning as designed and the project is performing as expected, but the Office of Management and Budget's guidance does not specify the type of measurement technique required. Also, Office of the Secretary of Defense officials stated that the military services are required to adhere to the Office of Management and Budget's guidance in order to determine whether they can enter into an alternatively financed agreement, and then adhere to the requirements for determining whether the project is performing as expected.

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<sup>52</sup>Office of Management and Budget, Memorandum M-98-13, *Federal Use of Energy Savings Performance Contracting* (Washington D.C.: July 25, 1998). In 1998, the Office of Management and Budget issued guidance outlining requirements for federal agencies to follow in developing and entering into alternatively financed contracts for ESPCs, to include requirements for the budgetary scoring of such projects. The Office of Management and Budget does not reflect—or “score”—the full amount of the government's financial commitment under an ESPC up front in the budget when the contract is signed. Rather, under the Office of Management and Budget's scoring treatment, an agency must obligate, at the time a contract is executed, sufficient budgetary resources to cover contract payments for the fiscal year in which the contract is signed. For each subsequent fiscal year during the contract period, the agency must obligate funds to cover the contract payments the agency is required to make for that year. Without this guidance, scoring rules require agencies to obtain sufficient appropriations for the full project up front to ensure that the consequences of budget decisions are considered when the decision to buy is made.

<sup>53</sup>Office of Management and Budget, *Addendum to OMB Memorandum M-98-13 on Federal Use of Energy Savings Performance Contracts (ESPCs) and Utility Energy Service Contracts (UESCs)* (Washington, D.C.: Oct. 3, 2012). This updated guidance emphasizes requirements for performance assurance as a condition of annual scoring for the life of the contract. These conditions include: (1) energy savings performance assurances or guarantees of the savings to be generated by improvements, which must cover the full cost of the federal investment for the improvements; (2) measurement and verification of savings through commissioning and retro-commissioning; and (3) competition or an alternatives analysis as part of the selection process prior to entering into a UESC. According to the Department of Energy, commissioning is a process used to ensure that facilities perform in accordance with the intended design and operational needs. Retro-commissioning is a process used to improve and optimize energy performance in an existing building.

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As noted earlier, energy savings for UESCs are not necessarily required to be guaranteed by contractors, and repayments are usually based on estimated cost savings generated by the energy conservation measures. We found that the guidance issued by both DOD and the Office of Management and Budget require a verification of savings for UESCs, though the requirements differ. The DOD instruction requires the military services to track all estimated and verified savings and measurement and verification information for its energy projects, while the Office of Management and Budget requirement is for measurement and verification through commissioning and retro-commissioning rather than ongoing through the life of the project. We found that DOD's interpretation of this Office of Management and Budget requirement—which DOD officials said gives the military departments the option of having either performance assurance, savings guarantees, or measurement and verification at certain points for UESCs—differs from the department's own guidance.<sup>54</sup> Additionally, DOD's interpretation of this guidance has resulted in the military departments developing varying approaches for verifying savings of their UESC projects. The Navy has taken and the Air Force is taking steps to require that all UESC projects be assessed to determine actual savings, with approaches focused more on measurement and verification as opposed to performance assurance, whereas Army officials told us that they do not plan to require measurement and verification for their UESCs. Specifically,

- **Navy:** The Commander, Navy Installations Command, issued guidance in March 2015 requiring Navy installation officials to assess all Navy UESC projects to verify energy project savings through measurement and verification.<sup>55</sup> According to the guidance, the installations will report on their energy and cost savings each year to enable the Commander, Navy Installations Command, to monitor the effectiveness of UESC projects because the Navy has significantly increased its investment in ESPC and UESC projects and will use this analysis to help manage risk. The Navy's assessment will be conducted with the Navy's energy return-on-investment tool, which is

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<sup>54</sup>DOD issued Change 1 to DOD Instruction 4170.11 in March 2016 to incorporate energy resilience into the instruction and other changes, but according to DOD officials, the Office of Management and Budget guidance was not included in the revisions.

<sup>55</sup>Department of the Navy, Commander, Navy Installations Command, CNICINST 4101.2, *Evaluation of Energy Project Investment Performance* (Mar. 16, 2015).



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a set of project tools used to conduct analysis and track project requirements.<sup>56</sup>

- **Air Force:** The Air Force has engineering guidance that addresses management of UESCs, but headquarters officials told us that this guidance requires only the standard requirement of performance assurance for these projects.<sup>57</sup> According to officials, the Air Force is developing a UESC manual, which it expects to complete in September 2017, to replace the existing guidance. These officials stated that the manual will include a measurement and verification requirement for UESCs that will adhere to the same levels required for ESPCs. However, headquarters and engineering center officials stated that the two alternative financing arrangements may continue to have some differences in requirements.<sup>58</sup>
- **Army:** The Army had not issued guidance for its UESCs at the time of our review, according to an Army headquarters official, and instead was relying on its ESPC policy manual to guide its UESC projects. The official told us that the Army is working to issue UESC guidance that is similar to that for ESPCs, but stated that the guidance will not include a requirement to perform measurement and verification of these projects. The official stated that although the Army cannot be completely certain that savings levels are being achieved using performance assurance, the current approach provides an acceptable

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<sup>56</sup>The Navy UESCs in our sample were awarded prior to the issuance of this guidance in 2015 and did not include measurement and verification, and Navy headquarters officials told us that operation and maintenance checks generally were made in lieu of measurement and verification prior to the 2015 policy. Navy officials told us that 10 UESC projects were awarded with the new measurement and verification language since the 2015 guidance was issued; however, because Navy UESCs typically have a two-year construction period and one year of performance before the measurement and verification report is obtained, they will not receive the first UESC measurement and verification report to review until later in 2017.

<sup>57</sup>Department of the Air Force, Headquarters Air Force Civil Engineer Support Agency, *Engineering Technical Letter (ETL) 12-10: Utility Energy Service Contracts (UESC)* (Tyndall Air Force Base, Fla., Apr. 3, 2012).

<sup>58</sup>The officials initially stated that this manual will include instructions for all UESCs moving forward to adhere to the same levels of measurement and verification required of ESPCs, following guidelines from the Department of Energy, although headquarters and engineering center officials later indicated that these assessments would be less stringent than those for ESPCs.

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level of assurance while avoiding the increased costs associated with performing measurement and verification.<sup>59</sup>

We found that the military services have taken different approaches to verifying the savings associated with UESCs because DOD has not clarified requirements in guidance that reflect the intent of the department and the Office of Management and Budget. Verification of savings to validate project performance of all alternatively financed energy projects across the department is necessary to ensure that the projects are meeting expected energy and costs savings required to fulfill DOD's requirement that these projects be paid for entirely through the projects' generated cost savings. This verification would help the military services ensure they are appropriately budgeting for the projects over the life of the contract, which are expected to increase in number. Specifically, in 2016, DOD issued a rule amending the Defense Federal Acquisition Regulation Supplement that authorizes a contract term limit for UESCs for a period up to 25 years, which is also the limit allowed for ESPCs.<sup>60</sup> Without updated and clear guidance about requirements on how the military departments should verify savings associated with UESCs, the military services will likely continue to interpret DOD guidance differently and are likely to take inconsistent approaches to assuring the performance of UESC projects, which could limit DOD's visibility over projects that commit the departments to long-term payments.

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<sup>59</sup>According to the official, measurement and verification is not required for UESC projects because utility companies do not provide savings guarantees and, as a result, the Army cannot withhold payments if the savings are not met. Therefore, the Army prefers to use performance assurance to maintain equipment efficiencies by focusing on completing regular operation and maintenance of the installed energy conservation measures.

<sup>60</sup>See 48 C.F.R. § 241.103.

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## The Military Services Identified Benefits and Disadvantages, as Well as Potential Other Costs, of Using Alternative Financing for Selected Energy Projects

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### Officials Have Identified Benefits and Disadvantages of Using Alternative Financing Arrangements Instead of Up-front Appropriations for Energy Projects

Alternative financing arrangements provide the military services the opportunity to partner with the private sector to finance energy projects; however, there are benefits and disadvantages to these projects. DOD and military service officials we contacted regarding their renewable energy generation, energy efficiency, power generation, and energy security projects identified benefits to financing energy projects through alternative arrangements, including funding projects that otherwise would not be funded through appropriated funding, shorter time frames, and the availability and expertise of personnel to implement and manage such projects, as described below.

- *Funding Projects*—At the military department level, officials told us that alternative financing arrangements enabled them to fund energy projects they might not otherwise have been able to pay for due to limited appropriated funding for developing and implementing such projects and the need to use their service budgets for mission requirements. We previously reported that implementing projects to meet energy requirements and goals can be costly, and obtaining up-front appropriations for such projects has been particularly challenging for agencies because of constrained federal budgets.<sup>61</sup> The military services' reliance on alternative financing arrangements has enabled them to more easily take on larger projects and combine several different energy conservation measures or installations into one contract rather than undertaking them individually over time. Of the eight installations we contacted whose contracts had a renewable energy component, officials at six of those installations told us that they would not have been able to undertake those projects without the

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<sup>61</sup>[GAO-15-432](#).

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use of alternative financing arrangements or would have had to scale down the scope of the projects. For example, one official told us that the military service's ability to fund its large solar arrays, which cost over \$1 million to develop, would not have been a viable option for the installation with up-front appropriations because mission requirements take priority over energy conservation or renewable energy production. Some officials also said that power purchase agreements are useful from a budget standpoint because the installation does not have to provide financing for the project but rather pays for the energy that is produced through its energy bill.

According to agency officials, alternative financing arrangements may also save operation and maintenance costs because, in many cases, using alternative financing arrangements results in the contractor installing new equipment and sustaining that equipment during the contract performance period.<sup>62</sup> Officials from one service told us that energy efficiency does not decline over the life of the project because the contractor brings the project to industry standards and then maintains the project over the course of the contract. Officials at two military service headquarters told us that it would be challenging to operate and fully maintain the equipment installed for energy projects funded through up-front appropriations because funds for maintaining equipment are also limited. Some officials at the installation level stated that alternatively financed energy projects can assist with budget certainty, as many of the contracts require the utility or energy company to cover operation and maintenance costs for installed equipment and equipment replacement costs over the life of the contract, compared to funding those ongoing costs each year through their appropriated funding. Further, some installation officials noted that the initial assessments for large energy projects were generally rolled into the costs of the contracts and the installation would have had to pay those costs up front if they had to fund those aspects of the projects. Other installation officials commented on the budgeting certainty these alternative financing arrangements provide. For example, according to one Marine Corps official, ESPCs provide a benefit during the utility budgeting and programming process. With an ESPC, a large portion of the utility budget is constant for many years out, which decreases the number of variables, such as weather

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<sup>62</sup>We have previously reported that payments to contractors for ESPCs generally cover the costs associated with equipment and installation, contractor-provided operation and maintenance services, financing charges, and other costs. See [GAO-15-432](#). However, as described later in this report, contractor maintenance is not included for all ESPCs.

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conditions and usage, in the utility budget that must be considered in the budget forecasting process, resulting in more accurate budgeting.

- *Time frames*—We previously reported that officials told us, for renewable energy projects funded through military construction appropriations, it can take a military service three to five years from project submission through the beginning of construction because of the length of the budget and appropriations cycle.<sup>63</sup> Some officials representing installations in our sample also considered the reduced time frames for developing an energy project to be another benefit of using alternative financing arrangements. For example, through these arrangements, officials can bundle several smaller projects together into a single package as opposed to implementing the projects individually over the course of several years. In addition, according to some officials, working with a local utility or energy company to develop large energy-saving projects can take much less time than attempting to achieve the same results through the military construction process. For example, officials at Naval Base Kitsap-Bangor, Washington, said its multiphase UESC, which includes replacing exterior, street, and parking lot lighting on several installations with new energy-efficient technology, has been implemented faster than it could through another approach. Some other installation officials said that using the indefinite-delivery, indefinite-quantity ESPC contract vehicles awarded through the Department of Energy or the U.S. Army Corps of Engineers or working through the service engineering commands for ESPCs and UESCs took much less time and is less cumbersome than going through the services' acquisition process for new equipment.<sup>64</sup>
- *Expertise or Availability of Personnel*—Officials we met with at six installations said they often did not have personnel at the installation level with the needed expertise or in sufficient numbers to assist in the

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<sup>63</sup>[GAO-12-401](#).

<sup>64</sup>Both the Department of Energy and the Army Corps of Engineers have awarded indefinite-delivery, indefinite-quantity ESPC contract vehicles to a set of prequalified energy service companies. Under an indefinite-delivery, indefinite-quantity contract, agencies may award more than one contract to more than one contractor from a single solicitation. An indefinite-delivery, indefinite-quantity contract provides for an indefinite quantity of supplies or services within stated limits, during a fixed period. These contracts can allow agencies to develop and implement an ESPC project in less time because the process of competitively selecting qualified contractors has already been completed and key aspects of contracts have been broadly negotiated.

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development, operation, and maintenance of such projects.<sup>65</sup> For example, officials at one installation said that the energy service company had personnel with the technical expertise to do some things, such as development of life-cycle cost analyses and measurement and verification, better than installation officials. Officials at another installation cited a shortage of personnel at the time the contract was awarded that made it challenging to operate and maintain energy projects. Installation energy managers were able to work around some of these personnel constraints by including requirements for contractors to operate and maintain the installed energy conservation measures, including repairing and replacing equipment as needed during the performance period. We reported in 2016 that working with private developers allows DOD to leverage private companies' expertise in developing and managing projects and limits the number of personnel DOD has to commit to projects.<sup>66</sup>

In addition to some of the benefits they described, officials identified some disadvantages of using alternative financing arrangements for their energy projects, including higher overall costs, a delay in their ability to take advantage of savings initially through funding with up-front appropriations, and risks associated with long-term financial obligations. First, some officials said that the overall costs over the contract term are generally higher than those funded using up-front appropriations. For example, for one of the ESPCs we reviewed, we found that the estimated cost for using alternative financing was about 15 percent higher than if the project had been funded using up-front appropriations. In 2004, we reported that alternative financing arrangements may be more expensive over time than full, up-front appropriations since the federal government's

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<sup>65</sup>Officials from the military services confirmed that they have the expertise at their headquarters and regional command levels to assist installations in developing energy projects. The installation officials we met with were not discounting this support, but were focused on whether they had a sufficient number of trained personnel at the installation level to operate and maintain such equipment once installed.

<sup>66</sup>Conversely, a lack of DOD expertise can be a drawback for contractors. As we noted in our recent report on the costs and benefits of renewable energy projects, one drawback of entering into agreements with private developers is that it can require staff to help the developers understand specific requirements for development on installations. In particular, developing projects inside installations involves a complex combination of financing, regulatory requirements, ensuring that the projects are compatible with the installations' military missions, and other needs that require DOD expertise. See [GAO-16-487](#).

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cost of capital is lower than that of the private sector.<sup>67</sup> Second, some officials noted that they would prefer to use appropriated funds for projects because with alternative financing arrangements, the installation pays the energy service company out of the savings rather than retaining those savings. As a result, when relying on alternative financing for energy projects, installations do not actually realize the savings until after the contract is completed, which could be up to 25 years later for ESPCs and UESCs. Similarly, although spreading costs over 25 years may provide greater certainty for installation utility budgets, these arrangements also tie up those funds over that period, resulting in less flexibility in managing future budgets. Third, officials at one service headquarters stated that the risk associated with a 20- to 25-year contract can pose a disadvantage, such as in cases where a base realignment or closure action occurs.<sup>68</sup>

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### Contracts for Selected Alternatively Financed Energy Projects Varied in Their Treatment of Costs

There are different costs associated with the implementation of the ESPCs and UESCs we selected for our review, and some potential costs may affect the overall cost of a project or may not always be included in total contract payments.<sup>69</sup> However, we found some potential costs that may add to the overall cost of a project or may not always be included in total contract payments. In our review of the life-cycle cost analyses and contract documentation for the selected ESPCs and UESCs in our sample, we found that contracts varied in how they funded other potential costs associated with the projects, such as operation and maintenance and the repair and replacement of installed equipment, as well as some

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<sup>67</sup>GAO, *Capital Financing: Partnerships and Energy Savings Performance Contracts Raise Budgeting and Monitoring Concerns*, [GAO-05-55](#) (Washington, D.C.: Dec. 16, 2004). For the six ESPC case studies GAO reviewed for the 2004 report, we found that the government's costs of acquiring assets increased from 8 to 56 percent by using ESPCs rather than timely, full, and up-front appropriations.

<sup>68</sup>We have previously reported that liabilities will likely exist for renewable energy projects in the event of base closure because these projects commit the government to making future payments over a period of years, although those liabilities may be limited by termination for convenience clauses in agreements. See [GAO-13-337](#).

<sup>69</sup>We defined the implementation price of a contract as the cost of the equipment, the labor for installation, and other direct costs for developing and constructing a project. We further defined the total contract cost as the overall amount a military service will pay for the project over the life of the contract. These total contract costs include payments to the energy service company or utility over time for its costs to implement and finance the project up front, interest on the financing, and other services that the company or utility may provide, such as operating and maintaining the equipment.

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other energy project costs that may or may not be included in the payment to contractors.

- *Operation and maintenance costs*—Officials representing installations in our sample identified different approaches for how they manage the costs for operation and maintenance of their alternatively financed energy projects, and those costs may not always be included in the total contract costs. As noted earlier, one benefit of alternative financing arrangements that military service officials identified is the reduced risk and savings in operation and maintenance costs that can be achieved when a contractor installs and sustains the energy conservation measures. According to officials, the ongoing and periodic maintenance of the equipment by the contractor that is generally provided by ESPCs can free limited installation budgets for other maintenance requirements. Further, with UESCs, operation and maintenance costs associated with the project may decrease, but it is usually the responsibility of the agency, not the utility, to pay for these decreased costs. Further, depending on the contract terms, contractors are not always responsible for operation and maintenance of all of the energy conservation measures for a project. In these cases, an installation would provide manpower, spare parts, and potentially replacement equipment during the life of the contract. Based on our review of select projects, we found different ways in which the installations approached the funding for these costs. For example, officials at one installation decided not to include the costs for operation and maintenance services in the contract. The officials instead opted to have the contractor that was already providing operation and maintenance support for the facility continue to provide these services for all of the equipment. They also reported that the cost of that operation and maintenance contract was reduced due to the efficiencies that came with some of the measures installed through the ESPC, which resulted in manpower savings.<sup>70</sup> At another installation, however, officials opted to have the ESPC contractor take over maintenance not only of equipment installed as part of the contract, but also of existing equipment in the same buildings that had been maintained by the base operating support contractor so that the installation would not have two contractors maintaining different parts of systems within the same building.

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<sup>70</sup>The ESPC contractor checks the support contractor's maintenance logs to ensure maintenance requirements are carried out as required for guaranteed savings.



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- *Repair and replacement funds*—Some contracts also establish and manage repair and replacement accounts using either an installation’s operation and maintenance funding or the savings from the energy conservation measures. These accounts may allow the installation to ensure the continued operation and maintenance of equipment installed as part of the alternatively financed project for which the contractor or utility may not have responsibility, such as items not covered under their warranty or that are manufactured by another company, by setting aside funds to cover the costs to repair or replace equipment that fails during the contract performance period. These accounts are included in the total contract costs. In our review of select ESPC projects, we found different ways in which these accounts were established and operated. For example, at one installation, officials told us they set up two repair and replacement accounts that are part of their monthly payments, which cover repairs to installed equipment not covered under the contract, such as equipment that was not manufactured by the contractor and controls components that were integrated onto the existing system. Funding for these two accounts is included in the installation’s annual payment to the contractor, and unused funds in the larger contractor equipment repair and replacement account roll over into the next year to cover any required maintenance as well as the replacement of equipment at the end of the contract term, if needed. At another installation, the ESPC was established with an account for repair and replacement funds to cover costs other than normal preventive maintenance, and this account is also funded annually as part of the payment to the contractor. According to installation officials, the purpose of this account is to have funding available to pay for a larger piece of equipment in case it needed to be replaced, and unused funding for this account is also expected to roll over and be available in future years. Installation officials told us that because labor is a large part of the repair and replacement of equipment, the account has generally been drawn down in full each year and there generally have not been funds available to roll over into the next year.
  - *Other energy project costs*—There are some costs associated with energy projects that installations may incur regardless of the funding arrangement used—some of which may not be included in the total contract costs—and potential other costs installations may pay to bring down the total contract payments. For example, despite the funding source used, a project may require land valuations or environmental assessments. There are also project development costs, such as design and engineering services, as well as preliminary energy surveys for identifying potential energy conservation

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measures, which the contractor or utility may prepare and fund. Additionally, officials from the military service headquarters told us that some alternatively financed energy projects are managed by other DOD or federal entities, such as the Army Corps of Engineers or the Department of Energy, which may require contract administration fees that are paid either through a one-time up-front payment or at least annually through the life of the contract. For example, at two installations we visited, officials told us they would be paying either the U.S. Army Corps of Engineers or the Naval Facilities Engineering Command for items such as developing a request for proposal; conducting life-cycle cost analyses; and providing supervision, inspection, and overhead services whether they used up-front appropriations or alternative financing arrangements for their energy projects. These costs would not be included in the total costs because they are paid to the contracting officer at the federal agency rather than to the energy service company or utility.<sup>71</sup> For example, officials at one installation told us they paid approximately \$23,000 to the Naval Facilities Engineering Command for project management and oversight of the installation's UESC. Finally, we found instances where installations used some up-front funds to reduce the amount financed for their projects. These up-front payments were still included in the total payments to the contractors, but the installations were able to reduce the amount on which they had to pay interest, thereby reducing the total amount they would have owed had they not made the up-front payments. For example, at one installation, we found that the total amount financed for the project was less than the cost to implement the project because the installation paid almost \$2 million up front in pre-performance payments. According to an installation official, the installation had planned to repair some mechanical systems and had already set aside Facilities Sustainment, Restoration, and Modernization funds for this project. With the ESPC, the installation was able to use those funds to instead pay for more energy-efficient technologies to replace rather than repair those systems, using the funds to reduce the amount to be financed for the ESPC.

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<sup>71</sup>According to DOD officials, the Army reports contracting support fees to the Office of the Secretary of Defense as part of the Annual Energy Management Report data. Officials stated that these fees are reported as a program cost rather than as an individual project cost since project costs are typically reported as costs to repay the contractor.

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## Conclusions

DOD has taken various actions to meet its needs as the largest energy consumer in the federal government, including diversifying power sources, implementing conservation and other efficiency actions to reduce demand, and relying on private-sector contracts through alternative financing arrangements in lieu of using up-front appropriations to fund energy projects. Since 2005, DOD has awarded 464 contracts for alternatively financed energy projects. While DOD guidance requires the military services to track and store data related to energy projects, the military services have not collected complete and accurate data or consistently provided the data to the military department or DOD headquarters level on an annual basis to aid DOD oversight and to inform Congress. If DOD does not require the military services to provide DOD with complete and accurate data on all alternatively financed energy projects, decision makers within the department and Congress may not have all information needed for effective oversight of these projects, which represent long-term budgetary commitments for periods of up to 25 years.

Confirming savings and validating project performance of all alternatively financed energy projects are necessary to ensure that the projects are meeting expected energy and costs savings and that the military services are appropriately budgeting for the projects over the life of the contract. The military services have taken some steps to verify project performance and confirm savings, and the alternatively financed energy projects we reviewed that were operational reported achieving expected savings or efficiencies. However, because guidance on when verification of savings is required is not clear, the military services have taken varying approaches for confirming UESC savings and lack full assurance that expected savings are being realized for the entirety of their UESC projects. DOD's guidance requires the military departments to track estimated and verified savings and measurement and verification information for all energy projects, whereas the Office of Management and Budget guidance states that UESCs may be scored on an annual basis if the UESC requires performance assurance or guarantees and measurement and verification of savings at specific points in time—commissioning and retro-commissioning—rather than ongoing through the life of the project. However, DOD's interpretation of this Office of Management and Budget requirement assumes that the military departments have the option of conducting either performance assurance, savings guarantees, or measurement and verification for UESCs, which differs from the department's own guidance on verification of savings for all energy projects. Without updated and clear guidance on how the military departments should be taking steps to verify savings

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associated with UESC projects to validate project performance, the military services will likely continue to interpret DOD guidance differently and are likely to take inconsistent approaches to assuring the performance of UESC projects, which could limit DOD's visibility over projects that commit the departments to long-term payments.

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## Recommendations for Executive Action

To assist DOD and Congress in their oversight of DOD's alternatively financed energy projects, we recommend that the Secretary of Defense direct the military services to collect complete and accurate data on their alternatively financed energy projects, including data on the services' financial obligations and cost savings, and provide the data to DOD at least annually to aid departmental oversight.

To help ensure that the military departments conduct the level of assessment required to assure the performance of their UESC projects over the life of the contract, we recommend that the Secretary of Defense direct the Office of the Assistant Secretary of Defense (Energy, Installations and Environment) to update its guidance to clarify the requirements for the verification of savings for UESC projects.

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## Agency Comments and Our Evaluation

We provided a draft of this report for review and comment to DOD and the Department of Energy. In written comments, DOD concurred with our first recommendation and nonconcurred with our second recommendation. DOD's comments on this report are summarized below and reprinted in their entirety in appendix II. In an e-mail, the audit liaison from the Department of Energy indicated that the department did not have formal comments. DOD and the Department of Energy also both provided technical comments, which we incorporated as appropriate.

DOD concurred with our first recommendation that the Secretary of Defense direct the military services to collect complete and accurate data on their alternatively financed energy projects, including data on the services' financial obligations and cost savings, and provide the data to DOD at least annually to aid departmental oversight.

DOD nonconcurred with our second recommendation that the Secretary of Defense direct the Office of the Assistant Secretary of Defense (Energy, Installations and Environment) to update its guidance to clarify the requirements for the verification of savings for UESC projects. In its response, DOD stated that UESCs are service contracts for utility services and that the only financial requirement on federal agencies is the

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obligation of the annual costs for these contracts during each year that the contract is in effect. The department stated that there is no statutory requirement for annual measurement and verification of the energy, water, or cost savings, or a contractual guarantee of those savings as there is for ESPCs. However, the department noted that DOD will continue to require its components to accomplish necessary tasks to assure continuing performance of the equipment or systems installed in a UESC to ensure expected energy and/or water consumption and cost reductions.

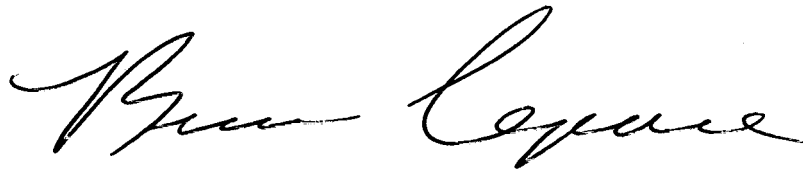
We agree that UESCs do not include guaranteed cost savings. In response to DOD's comments, we made changes to the draft report to emphasize that, while UESCs do not include guaranteed cost savings, repayments for UESCs—which can commit the department to a contract term limit for a period of up to 25 years—are based on estimated cost savings generated by the energy conservation measures. Thus, verification of savings to validate project performance is necessary to ensure that the projects are meeting expected energy and costs savings required to fulfill the requirement that these projects be paid for entirely through the projects' generated cost savings. We further noted in our report that guidance from DOD does not align with that of the Office of Management and Budget, and this misalignment results in the military services taking different approaches to validating achievement of benefits expected from these UESC projects. In addition, we did not recommend that the department annually measure and verify UESC projects. Rather, we recommended that DOD clarify and update its guidance for verifying savings for these projects to help the military services appropriately budget for the projects over the contract's life. Without updated and clear guidance about requirements on how to verify savings associated with UESCs, the military services will likely continue to interpret DOD guidance differently and take inconsistent approaches to assuring the performance of UESC projects. Doing so could limit DOD's visibility over projects that commit the departments to long-term payments.

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We are sending copies of this report to appropriate congressional committees; the Secretary of Defense; the Secretaries of the Air Force, Army, and Navy; the Commandant of the Marine Corps; and the Secretary of Energy. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

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If you or your staff have any questions about this report, please contact me at (202) 512-4523 or [leporeb@gao.gov](mailto:leporeb@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.

A handwritten signature in black ink, reading "Brian Lepore". The signature is written in a cursive style with a large initial "B" and "L".

Brian J. Lepore  
Director, Defense Capabilities and Management

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*List of Committees*

The Honorable John McCain  
Chairman  
The Honorable Jack Reed  
Ranking Member  
Committee on Armed Services  
United States Senate

The Honorable Thad Cochran  
Chairman  
The Honorable Richard Durbin  
Ranking Member  
Subcommittee on Defense  
Committee on Appropriations  
United States Senate

The Honorable Mac Thornberry  
Chairman  
The Honorable Adam Smith  
Ranking Member  
Committee on Armed Services  
House of Representatives

The Honorable Kay Granger  
Chairwoman  
The Honorable Pete Visclosky  
Ranking Member  
Subcommittee on Defense  
Committee on Appropriations  
House of Representatives

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# Appendix I: Scope and Methodology

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To evaluate the extent to which the military services have financed energy projects with alternative financing arrangements since 2005 and collected and provided the Department of Defense (DOD) complete and accurate data on those projects, we reviewed available data and documentation on the alternatively financed energy projects that had previously been either reported by DOD or the Department of Energy in its published documents or collected by us or other audit agencies during previous reviews. Based on these criteria, we scoped our review to focus on the following types of alternatively financed energy projects for which the military services had awarded contracts from fiscal years 2005 through 2016: Energy Savings Performance Contracts (ESPC), Utility Energy Service Contracts (UESC), and Power Purchase Agreements (PPA). We focused on this time frame because with the passage of the Energy Policy Act of 2005, the military services began contracting for more alternatively financed energy projects.<sup>1</sup> Moreover, we reported in 2005 that data prior to this time was incomplete. We included 2016 data as they capture the most recent full fiscal year of data. We reviewed data on projects awarded for installations in the United States and excluded the territories and other overseas installations.

We developed a data collection instrument to confirm the completeness and accuracy of data we already had on existing alternatively financed energy projects, obtain any missing or revised data on those projects, and gather information on projects that had been awarded since our previous reviews. We pre-populated our data collection instrument for each of the military services using data from the following sources:

- Project level data from DOD's Annual Energy Management Reports for fiscal years 2011 through 2015;
- A list of 10 USC 2922a PPA projects provided by Office of the Secretary of Defense officials;<sup>2</sup>

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<sup>1</sup>Pub. L. No. 109-58, § 203 (2005) (codified at 42 U.S.C. § 15852).

<sup>2</sup>Under 10 U.S.C. § 2922a, DOD can enter into power purchase agreement contracts for up to 30 years.



- Data from our prior reviews on renewable energy project financing using both appropriated funding and alternative financing arrangements and on ESPCs for the military services;<sup>3</sup> and
- Publicly available data from the Department of Energy on DOD projects funded using its indefinite-delivery, indefinite-quantity contract.

In order to obtain consistent data among the services, for each spreadsheet in the data collection instrument, we developed separate tabs containing the pre-populated data on the three types of alternative financing arrangements on which we focused our review. For each type of arrangement, we also developed a separate definitions sheet that explained the data we were requesting so that the services would be responding with consistent data. We provided these pre-populated spreadsheets to the military services and requested that they verify existing information, provide additional information, and add new projects, as appropriate, in order to obtain data on the universe of these projects for the specified time period. We then discussed with those officials any questions we had about the quality and completeness of the data that were provided. While we took these steps to identify all of DOD's alternatively financed energy projects since 2005, the data reflected may not represent the entire universe of projects.

In addition to the data above, we reviewed key guidance that DOD provides to the DOD components on managing installation energy, including DOD Instruction 4170.11, *Installation Energy Management*, and DOD guidance letters on developing energy projects.<sup>4</sup> We also reviewed the DOD instruction to learn about the requirement for the military departments to maintain a utility energy reporting system to prepare data, including data on energy consumption and costs, for the Annual Energy Management Report to determine DOD's visibility over the energy projects. We reviewed guidance from the Department of Energy's Federal Energy Management Program on alternative financing arrangements,

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<sup>3</sup>GAO, *Renewable Energy Project Financing: Improved Guidance and Information Sharing Needed for DOD Project-Level Officials*, [GAO-12-401](#) (Washington, D.C.: Apr. 4, 2012); *Energy Savings Performance Contracts: Additional Actions Needed to Improve Federal Oversight*, [GAO-15-432](#) (Washington, D.C.: June 17, 2015); and *DOD Renewable Energy Projects: Improved Guidance Needed for Analyzing and Documenting Costs and Benefits*, [GAO-16-487](#) (Washington, D.C.: Sept. 8, 2016).

<sup>4</sup>DOD Instruction 4170.11, *Installation Energy Management* (Dec. 11, 2009) (Change 1, Mar. 16, 2016) and DOD memorandums, *Guidance on Development of Energy Projects* (Nov. 3, 2016) and *Financing of Renewable Energy Projects Policy* (Nov. 9, 2012).

including its overviews of the different arrangements and national lab reports on agencies' use of these arrangements.<sup>5</sup> We reviewed the relevant statute to determine what, if any, requirements applied to DOD's data collection efforts related to energy projects.<sup>6</sup> We then reviewed the project information provided by the military services for the presence of certain data points, such as total contract costs, estimated cost savings, and the length of the contract, and compared the military services' tracking of their data on alternatively financed energy projects to DOD's guidance and statutory requirements for tracking such data. We reviewed the data we collected for completeness and accuracy and estimated the total number of ESPCs, UESCs, and PPAs for each of the military services as well as the total contract costs, where available. We excluded from our analysis those UESCs for which the military departments had identified a contract term of one year or less or for which a project had previously been identified in DOD reporting but had not ultimately been funded as an alternatively financed energy project. We assessed the reliability of the data we received by interviewing DOD officials and comparing the multiple data sets we received from the military services with data reported in the Annual Energy Management Report and obtained through prior reviews to ensure that there was consistency in the data provided. We determined that the data were sufficiently reliable for meeting our objective.

We compared DOD's data collection efforts with *Standards for Internal Control in the Federal Government*, which identify standards for collecting and providing accurate and complete data.<sup>7</sup> We also reviewed guidance documentation from the military services on developing and managing energy projects, including the Army's guide for developing renewable energy projects, the Air Force's instructions on cost analyses and business case analyses, and the Navy and Marine Corps energy project management guide. We met with officials from Office of the Secretary of

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<sup>5</sup>U.S. Department of Energy Federal Energy Management Program, *M&V Guidelines: Measurement and Verification for Performance-Based Contracts Version 4.0*, DOE/EE-1287-0286 (November 2015); U.S. Department of Energy, Federal Energy Management Program, *Utility Energy Service Contract Guide*, DOE/EE-0952 (Revised October 2016); and U.S. Department of Energy, Oak Ridge National Laboratory, *Reported Energy and Cost Savings from the DOE ESPC Program: FY 2013* (Oak Ridge, Tenn.: December 2013).

<sup>6</sup>10 U.S.C. § 2925.

<sup>7</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

Defense; the military departments; and the military departments' engineering, installation, or contracting commands to discuss their guidance and policies on how they managed and tracked their alternatively financed energy projects and the availability of data on such projects. Finally, we spoke with Office of the Secretary of Defense officials about the President's Performance Contracting Challenge, which challenged federal agencies to enter into a total of \$4 billion in performance-based contracts, including ESPCs and UESCs, by the end of calendar year 2016, to gain an understanding of the results of DOD's participation in this effort.

To assess the extent to which the military services reported achieving expected savings and verified the reported performance of selected projects, we reviewed agency-level guidance on the different levels of measurement and verification or performance assurance that are required for alternatively financed energy projects, such as DOD's instruction on installation energy management and the Department of Energy's most recent guidelines for measurement and verification and performance assurance, to determine requirements for measuring savings for the different types of projects.<sup>8</sup> Using the data on the alternatively financed energy projects that we obtained from the military services, we selected a nongeneralizable sample of 17 projects as case studies to discuss during our site visits and to evaluate how those projects reported achieving their estimated savings and the extent to which installation officials verified those reported savings. We then compared measurement and verification efforts for the 13 projects in our nongeneralizable sample that were already in operation with DOD guidance requiring measurement and verification for all energy projects to determine the extent to which installation officials followed guidance requiring verification of savings. We also collected and analyzed data and documentation on the expected and reported savings for the 17 projects in our sample to assess the extent to which the estimated savings compared to the savings that were reported and we documented reasons for any differences. We assessed the reliability of the project data by reviewing the internal controls DOD officials used to observe and corroborate the data contractors reported in their annual measurement and verification reports; the data collection and

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<sup>8</sup>Department of Defense Instruction 4170.11, *Installation Energy Management* (Dec. 11, 2009) (Change 1, Mar. 16, 2016); U.S. Department of Energy, Federal Energy Management Program, *M&V Guidelines: Measurement and Verification for Performance-Based Contracts Version 4.0*, DOE/EE-1287-0286 (November 2015); and U.S. Department of Energy, Federal Energy Management Program, *Utility Energy Service Contract Guide*, DOE/EE-0952 (Revised October 2016).

monitoring the officials did for performance assurance; and the data the officials used to assess project savings. We determined that the data were sufficiently reliable for our purposes of describing the extent to which the military services reported achieving expected savings and verified the reported performance of selected projects.

For the eight ESPC projects in our sample that were operational, we collected and analyzed the most recent measurement and verification report to identify the guaranteed savings that were expected and the savings that were being reported by the contractor. We then interviewed military service officials at the installations we visited to discuss these projects and the reported results of their latest measurement and verification report or other assessment. We also talked with officials from the installations and, in some cases, also with officials from the installations' supporting engineering or contracting commands, about how they verified the savings for the three UESC projects and the two PPAs in our sample and to learn about how they developed, managed, and tracked these alternatively financed projects. For UESCs, we reviewed DOD guidance outlining requirements to conduct measurement and verification and compared that with the requirements outlined in Office of Management and Budget guidance. We also contacted officials from the Office of the Secretary of Defense and the military departments to discuss their current and planned guidance related to measuring, verifying, and reporting the performance of UESCs during the contract performance period to assure that savings are being achieved.

To describe the benefits and disadvantages reported by the military services, as well as potential other costs, of using alternative financing arrangements for selected energy projects rather than using up-front appropriations, we reviewed previously discussed DOD, Department of Energy, and military service guidance on the use of alternative financing arrangements and their cost-effectiveness to determine the requirements for life-cycle cost analyses and how project costs are identified in contracts and other documents. For the 17 selected projects in our nongeneralizable sample, we collected project planning documentation and reviewed available life-cycle cost analyses and contract documentation for those projects to obtain information on how costs were identified and where they were documented. Additionally, we interviewed officials at the installations in our sample, their contracting or engineering commands, or their military service headquarters to discuss the projects in our sample, including the benefits and disadvantages of using alternative financing arrangements for those energy projects. We also discussed how the individual contracts identified the costs to operate and

maintain the energy conservation measures or power-generating equipment for the selected energy projects in our sample as well as any costs associated with the projects that might not be reflected in the total contract costs. For one ESPC in our sample, we also compared the costs of the alternative financing arrangement with the use of up-front appropriations by calculating the present value of the costs had the government directly incurred the debt to finance the amount that had instead been financed by the energy service company. In addition, the team interviewed officials from the Department of Energy's Federal Energy Management Program about federal policies and guidance related to alternative financing arrangements for energy projects and from the General Services Administration about that agency's area-wide contracts with utility companies to gain an understanding of issues related to the benefits and costs of such projects.

In order to select installations and identify case studies from which we gathered information for our objectives, we used data collected in response to our request to the military services. We developed a nongeneralizable sample representing 17 projects at 11 installations that had awarded an ESPC, a UESC, or a PPA between fiscal years 2005 and 2016. Our case studies included 11 ESPCs, 3 UESCs, and 3 PPAs. We selected our case studies to identify projects representing:

- Each of the military services, including one from the reserve components;
- The different types of alternative financing arrangements (ESPC, UESC, and PPA);
- The year the contract was awarded;
- The different types of contracting vehicles (Army or Department of Energy, General Services Administration area-wide, or standalone contract); and
- Different project types (energy efficiency, energy cost savings, and power generation).

We included at least three large-scale renewable energy projects, which we defined as projects with a generating capacity of 10 megawatts or greater. We also attempted to include projects that were both operational and had not been included in other recent audits by us or other audit agencies. Finally, we considered geographic variation when selecting sites. In addition to discussing these alternatively financed projects with installation officials, we also observed selected energy conservation

measures that had been installed.<sup>9</sup> Table 4 outlines the installations we visited or contacted during our review.

**Table 4: Installations Visited or Contacted During Our Review**

Organization or agency and location	Type of project	Year contract awarded
United States Army		
Fort Irwin, California	ESPC	2005
Fort Jackson, South Carolina	ESPC	2007
Joint Base Myer-Henderson Hall, Virginia	ESPC	2010
Fort Irwin, California	UESC	2012
Fort Irwin, California	ESPC <sup>a</sup>	2013
Fort Jackson, South Carolina	ESPC	2014
Arlington Hall Station, Virginia	ESPC	2014
United States Navy		
Naval Base Kitsap–Keyport, Washington	ESPC	2010
Naval Base Kitsap–Bangor, Washington	UESC	2011
Naval Air Weapons Station China Lake, California	PPA	2011
Naval Air Weapons Station China Lake, California	UESC	2012
Navy Renewable Energy Program Office, Washington, D.C.	PPA <sup>b</sup>	2015
United States Marine Corps		
Marine Corps Base Quantico, Virginia	ESPC	2006
Marine Corps Air Station Beaufort, South Carolina	ESPC	2009
United States Air Force		
Joint Base Charleston, South Carolina	ESPC	2005
Nellis Air Force Base, Nevada	ESPC	2005
Nellis Air Force Base, Nevada	PPA	2007

Legend: ESPC = energy savings performance contract; UESC = utility energy service contract; PPA = power purchase agreement

Source: GAO. | GAO-17-461

<sup>a</sup>We did not originally include this ESPC in our sample because, although the contract had been awarded in fiscal year 2013, it was not yet operational at the time of our site visit. However, installation officials wanted to discuss this project with the team, so we added it to our sample.

<sup>9</sup>We did not observe the energy conservation measures for the ESPC at Joint Base Meyer-Henderson Hall because of time constraints. We did not observe the Navy’s PPA for 14 Navy and Marine Corps installations in California because it covers multiple locations, the power is generated in Arizona, and it was not yet operational at the time of our site visit. Instead, we met with the officials in the Navy’s Renewable Energy Program Office that are managing this project.

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<sup>b</sup>Although the Navy's 14-installation PPA in California was not yet operational, we selected it for our case studies due to its unique nature, both in the amount of power-generating capacity and the number of installations covered by the agreement.

In addition, for each of our objectives, we contacted officials and, when appropriate, obtained documentation from the organizations listed below:

Office of the Secretary of Defense:

- Office of the Assistant Secretary of Defense, Energy, Installations and Environment

Army:

- Assistant Secretary of the Army (Installations, Energy and Environment), Deputy Assistant Secretary of the Army for Energy and Sustainability and its Office of Energy Initiatives
- Assistant Chief of Staff for Installation Management
- Headquarters, U.S. Army Corps of Engineers

Navy:

- Director, Shore Readiness Division (N46)
- Assistant Secretary of the Navy for Energy, Installations and Environment, Deputy Assistant Secretary of the Navy (Energy)
- Renewable Energy Program Office<sup>10</sup>
- Headquarters, Naval Facilities Engineering Command, and two Facilities Engineering Commands—Northwest and Southwest

Air Force:

- Air Force Installations, Environment and Energy
- Air Force Civil Engineer Center

Marine Corps:

- Marine Corps Installations Command, Facility Operations and Energy

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<sup>10</sup>On December 31, 2016, the Renewable Energy Program Office merged with the Naval Facilities Engineering Command Headquarters Energy Office to form the Resilient Energy Program Office.

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We conducted this performance audit from June 2016 to June 2017 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 findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.



# Appendix II: Comments from the Department of Defense



ENERGY,  
INSTALLATIONS,  
AND ENVIRONMENT

ASSISTANT SECRETARY OF DEFENSE  
3400 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3400

JUN - 6 2017

Mr. Brian Lepore  
Director, Defense Capabilities and Management  
U.S. Government Accountability Office  
441 G Street, N.W.  
Washington, DC 20548

Dear Mr. Lepore:

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, GAO-17-461, "DEFENSE INFRASTRUCTURE: Additional Data and Guidance Needed for Alternatively Financed Energy Projects" dated May 3, 2017 (GAO Code 100918). Detailed comments on the report recommendations are enclosed.

Sincerely,

  
Peter Potochney  
Acting

Enclosure:  
As stated

GAO Draft Report Dated May 3, 2017  
GAO-17-461 (GAO CODE 100918)

**“DEFENSE INFRASTRUCTURE: ADDITIONAL DATA AND GUIDANCE NEEDED  
FOR ALTERNATIVELY FINANCED ENERGY PROJECTS”**

**DEPARTMENT OF DEFENSE COMMENTS  
TO THE GAO RECOMMENDATION**

**RECOMMENDATION 1:** To assist the Department of Defense and Congress in their oversight of DoD’s alternatively financed energy projects, the Government Accountability Office (GAO) recommends that the Secretary of Defense direct the military services to collect complete and accurate data on their alternatively financed energy projects, including data on the service’s financial obligations and cost savings, and provide the data to DoD at least annually to aid departmental oversight.

**DoD RESPONSE:** Concur.

**RECOMMENDATION 2:** To help ensure that the military departments conduct the level of assessment required to assure the performance of the Utility Energy Service Contracts (UESC) projects over the life of the contract, the GAO recommends that the Secretary of Defense direct the Office of the Assistant Secretary of Defense (Energy, Installations and Environment) to update its guidance to clarify the requirements for the verification of savings for UESC projects.

**DoD RESPONSE:** The DoD nonconcur with this recommendation. Utility Energy Service Contracts (UESC) are service contracts. As these contracts are for utility services under section 201 of the Federal Property and Administrative Services Act of 1949, the only financial requirement on Federal agencies is the obligation of the annual costs for such contracts during each year that the contract is in effect. There is no statutory requirement for annual measurement and verification of the energy, water, or cost savings, or a contractual guarantee of those savings as there is for energy savings performance contracts in Section 801 of the EPAct, or in 10 U.S.C. Section 2913. However, DoD will continue to require DoD Components to accomplish necessary tasks to assure continuing performance of the equipment or systems installed in an UESC to ensure the expected energy and/or water consumption and cost reductions.

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# Appendix III: GAO Contact and Staff Acknowledgments

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## GAO Contact

Brian J. Lepore, (202) 512-4523 or [leporeb@gao.gov](mailto:leporeb@gao.gov)

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## Staff Acknowledgments

In addition to the contact named above, Kristy Williams (Assistant Director), Edward Anderson, Karyn Angulo, Michael Armes, Tracy Barnes, William Cordrey, Melissa Greenaway, Carol Henn, Amanda Miller, Richard Powelson, Monica Savoy, Matthew Spiers, Karla Springer, and Jack Wang made key contributions to this report.

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# Related GAO Products

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*Defense Infrastructure: Actions Needed to Strengthen Utility Resilience Planning.* [GAO-17-27](#). Washington, D.C.: November 14, 2016.

*Renewable Energy Projects: Improved Guidance Needed for Analyzing and Documenting Costs and Benefits.* [GAO-16-487](#). Washington, D.C.: September 8, 2016.

*Defense Infrastructure: Energy Conservation Investment Program Needs Improved Reporting, Measurement, and Guidance.* [GAO-16-162](#). Washington, D.C.: January 29, 2016.

*Defense Infrastructure: Improvement Needed in Energy Reporting and Security Funding at Installations with Limited Connectivity.* [GAO-16-164](#). Washington, D.C.: January 27, 2016.

*Defense Infrastructure: DOD Efforts Regarding Net Zero Goals.* [GAO-16-153R](#). Washington, D.C.: January 12, 2016.

*Defense Infrastructure: Improvements in DOD Reporting and Cybersecurity Implementation Needed to Enhance Utility Resilience Planning.* [GAO-15-749](#). Washington, D.C.: July 23, 2015.

*Energy Savings Performance Contracts: Additional Actions Needed to Improve Federal Oversight.* [GAO-15-432](#). Washington, D.C.: June 17, 2015.

*Electricity Generation Projects: Additional Data Could Improve Understanding of the Effectiveness of Tax Expenditures.* [GAO-15-302](#). Washington, D.C.: April 28, 2015.

*Defense Infrastructure: Improved Guidance Needed for Estimating Alternatively Financed Project Liabilities.* [GAO-13-337](#). Washington, D.C.: April 18, 2013.

*Renewable Energy Project Financing: Improved Guidance and Information Sharing Needed for DOD Project-Level Officials.* [GAO-12-401](#). Washington, D.C.: April 4, 2012.

*Defense Infrastructure: DOD Did Not Fully Address the Supplemental Reporting Requirements in Its Energy Management Report.* [GAO-12-336R](#). Washington, D.C.: January 31, 2012.

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*Defense Infrastructure: The Enhanced Use Lease Program Requires Management Attention.* [GAO-11-574](#). Washington, D.C.: June 30, 2011.

*Defense Infrastructure: Department of Defense Renewable Energy Initiatives.* [GAO-10-681R](#). Washington, D.C.: April 26, 2010.

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*Energy Savings: Performance Contracts Offer Benefits, but Vigilance Is Needed to Protect Government Interests.* [GAO-05-340](#). Washington, D.C.: June 22, 2005.

*Capital Financing: Partnerships and Energy Savings Performance Contracts Raise Budgeting and Monitoring Concerns.* [GAO-05-55](#). Washington, D.C.: December 16, 2004.

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