Audit Report

OFFICE OF THE INSPECTOR GENERAL

USE OF ENERGY CONSERVATION FUNDS

Report No. 97-070

January 15, 1997

Department of Defense

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Acronym

DUSD(IA&I)	Deputy Under Secretary of Defense (Industrial Affairs and Installations)

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
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January 15, 1997

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION AND TECHNOLOGY
DEPUTY UNDER SECRETARY OF DEFENSE (INDUSTRIAL AFFAIRS AND INSTALLATIONS)

SUBJECT: Audit Report on the Use of Energy Conservation Funds (Report No. 97-070)

We are providing this audit report for review and comment. We conducted the audit in response to a request by the Assistant Secretary of Defense (Economic Security), now called the office of the Deputy Under Secretary of Defense (Industrial Affairs and Installations).

DoD Directive 7650.3 requires that all recommendations and potential monetary benefits be resolved promptly. Because Management did not comment on a draft of this report, we request that Management provide comments on the final report by February 18, 1997

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. Terry L. McKinney, Audit Program Director, at (703) 604-9288 (DSN 664-9288) or Mr. Bruce A. Burton, Audit Project Manager, at (703) 604-9282 (DSN 664-9282). See Appendix D for the report distribution. The audit team members are listed inside the back cover.

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Office of the Inspector General, DoD

Report No. 97-070 **January 15, 1997**
(Project No. 6CF-5018)

Use of Energy Conservation Funds

Executive Summary

Introduction. This audit was requested by the Office of the Assistant Secretary of Defense (Economic Security) to provide feedback on the effectiveness of the Energy Conservation Investment Program and the Federal Energy Management Program. The Office of the Assistant Secretary of Defense (Economic Security) ASD(ES) disestablished and its duties were incorporated into what is now the Office of the Deputy Under Secretary of Defense (Industrial Affairs and Installations). The Federal Government is the largest user of energy in the United States. DoD consumes approximately 70 percent of the Federal Government's facilities energy use. DoD energy consumption for buildings and facilities in FY 1995 was 248.5 trillion British thermal units at a cost of $2.6 billion.

To meet the requirements of the Energy Policy Act and to identify all energy projects with a 10-year or fewer payback, the Deputy Under Secretary of Defense (Industrial Affairs and Installations) recently estimated that DoD needed $4.4 billion to develop energy conservation projects that will ultimately save $982.9 million annually.

Audit Objectives. The audit objectives were to determine whether the Military Departments used funds that DoD provided through the Energy Conservation Investment Program and the Federal Energy Management Program for their intended purposes, and whether the Military Departments correctly computed paybacks and executed projects within planned time frames. The audit also assessed the management control program as it applied to the administration of the energy conservation program. We examined 41 energy conservation projects costing $68 million that estimated cost reductions of $354 million.

Audit Results. Military Departments used energy funds for energy conservation purposes; however, the commitment of DoD to energy conservation needed improvement. DoD has no assurance that funds were used as effectively as possible in achieving program objectives and goals. Of the 41 projects reviewed, 38 did not have adequate supporting documentation for the estimated cost and/or energy reductions cited. Further, 8 projects had computation errors resulting in no energy reductions when the computations were done correctly. There is no firm basis to believe that Federal energy goals will be attained, or that opportunities to reduce DoD infrastructure costs through reduced facilities energy use are being fully exploited. See Part I for a discussion of the audit results.

Summary of Recommendations. We recommend that the Under Secretary of Defense for Acquisition and Technology, establish an integrated process team to evaluate DoD resources in relation to management's commitment to meeting mandated energy reduction goals. We also recommend that the Deputy Under Secretary of Defense (Industrial Affairs and Installations) issue instructions to the Military Departments to strengthen management and oversight of the energy program.

Management Comments. The Under Secretary of Defense for Acquisition and Technology and the Deputy Under Secretary of Defense (Industrial Affairs and Installations) did not respond to a draft of this report. Therefore, we request that the Under Secretary of Defense for Acquisition and Technology and the Deputy Under Secretary of Defense (Industrial Affairs and Installations) provide comments on the final report by February 18, 1997.

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Part I - Audit Results

Audit Background

This audit was requested by the Office of the Assistant Secretary of Defense (Economic Security) in October 1995 to provide feedback on the effectiveness of the Energy Conservation Investment Program and the Federal Energy Management Program. The Office of the Assistant Secretary of Defense (Economic Security) was replaced by the Deputy Under Secretary of Defense (Industrial Affairs and Installations) (DUSD[IA&I]) and is subordinate to the Under Secretary of Defense for Acquisition and Technology.

DoD Energy Use. The Federal Government is the largest energy consumer in the United States. DoD consumes approximately 70 percent of the Federal Government facilities' energy use. DoD energy consumption for buildings and facilities in FY 1995 was 248.5 trillion British thermal units at a cost of $2.6 billion. DoD reported that it reduced energy consumption in buildings and facilities 13.3 percent from 1985 through 1995.

Energy Conservation Legislation and Funding. The President and Congress have addressed the issue of improving energy efficiency in facilities and operations several times since the mid-1970s. The most recent initiatives include the Energy Policy Act of 1992 and Executive Order 12902, signed on March 8, 1994, which set forth goals for energy conservation. Congress and DoD have set aside two centrally resourced and managed funding programs to assist in accomplishing energy conservation projects. The Energy Conservation Investment Program, which became centrally managed in 1991, and the Federal Energy Management Program, established in 1994, are designed to supply funding for projects to meet energy conservation goals. From 1991 through 1996, $200 million of Energy Conservation Investment Program funds have been provided to the Military Departments. From 1994 through 1996, $258 million of Federal Energy Management Program funds have also been provided to the Military Departments. Other funding for energy conservation projects includes "shared energy savings contracts" in which private contractors provide financing, "energy savings performance contracts" in which contractors fund up-front costs, and "demand side management" in which utility companies provide financing.

The Energy Policy Act of 1992. The Energy Policy Act of 1992 amended previous legislation by requiring energy consumption per-gross-square-foot to be reduced by 20 percent by the year 2000 from 1985 baseline levels on a British-thermal-unit-per-gross-square-foot basis. The Energy Policy Act of 1992 also requires that all projects with a payback of 10 years or fewer be identified and implemented in all Government-owned Federal buildings by the year 2005. Payback in 10 years means that savings achieved through energy reduction will equal the costs of the project within 10 years.

Executive Order 12902. Executive Order 12902, signed on March 8, 1994, increased the energy reduction goal of the Energy Policy Act of 1992. Under Executive Order 12902, energy is to be cut 30 percent from 1985 levels by the year 2005.

Energy Conservation Investment Program. The Energy Conservation Investment Program is funded using military construction funds. To qualify for Energy Conservation Investment Program funding, a project must have at least a 1.25 savings-to-investment ratio which refers to the amount realized for every dollar invested, and a 10-year-or-fewer payback period. A special fund has been set aside to finance Energy Conservation Investment Program projects. Therefore, Energy Conservation Investment Program projects do not compete with other mission-related military construction projects for funding. However, Military Departments compete among each other for Energy Conservation Investment Program funds based on savings-to-investment ratios of valid energy projects.

Federal Energy Management Program. The Federal Energy Management Program which is larger than the Energy Conservation Investment Program uses operations and maintenance funds and can also use funds for minor military construction projects. Federal Energy Management Program projects also must have at least a 1.25 savings-to-investment ratio and a 10-year-or-fewer payback period. Once Federal Energy Management Program funds are distributed to the Military Departments, that money can be used for other projects with the restriction that the replacement project must save energy or water and be cost-effective.

Energy Consumption Measurement. The DOD uses the Defense Utility Energy Reporting System,* an automated management information system, to monitor its supplies and consumption of energy.

In addition, estimates for the funds needed to accomplish the goal of the Energy Policy Act were derived from the Army Construction Engineering Research Laboratory's Renewable Energy Resources Planning model. The Renewable Energy Resources Planning model uses local real property data, energy costs, and weather data to evaluate the cost-effectiveness and potential for energy and water conservation opportunities.

Audit Objectives

The primary objective of the audit was to determine whether the Military Departments used funds that DoD provided through the Energy Conservation Investment Program and the Federal Energy Management Program for their intended purposes. The audit determined whether the Military Departments correctly computed paybacks and executed projects within planned timeframes. In addition, the audit examined the management control program at each

*Originated as Defense Energy Information System, February 1974, after the Arab oil embargo.

Military Department as it applies to the other stated objectives. See Appendix A for a discussion of the audit scope and methodology and for the results of the review of the management control program and appendix B for a summary of prior audits and other reviews.

Energy Conservation Funds Management

DoD's commitment to energy conservation needs improvement because the Office of the Secretary of Defense and Military Departments did not sufficiently manage the Federal Energy Management Program and Energy Conservation Investment Program. Specifically,

o funding was insufficient and too unstable to execute timely projects and achieve maximum energy reductions,

o headquarters and installations did not commit sufficient personnel toward achieving energy conservation goals,

o DoD lacked the emphasis and oversight needed to ensure that installations were implementing their best energy projects and achieving optimum energy reductions, and

o installations developed projects that were incomplete, not well documented and contained errors in the computation of savings-to-investment ratios.

As a result, DoD has no assurance that funds were well spent or resulted in energy reductions for 38 of 41 projects reviewed, including 18 projects with overstated savings-to-investment ratios. Furthermore, Federal energy goals may not be attained and DoD will miss opportunities for infrastructure cost reductions unless OSD and the Military Departments make a strong commitment to energy conservation.

Energy Commitment

To comply with mandates contained in the Energy Policy Act of 1992 and Executive Order 12902, DoD needed to provide guidance and oversight for the energy conservation program and commit necessary personnel and funds towards reaching the goals. DoD commitment to energy conservation needs improvement. DoD energy conservation guidance and oversight is lacking, and commitment of personnel and funds towards reaching the goals has been insufficient.

Energy Conservation Funds

DoD commitment of personnel and funds has been insufficient to achieve maximum energy reductions to support energy reduction goals. DoD has neither received stable and adequate funds for energy conservation, nor has

DoD Management taken action to increase the use of other funding sources such as shared energy contracts, and demand side management contracts to stabilize and supplement the program shortfall. Congress provided substantially less energy funds for FY 1996 than DUSD(IA&I) requested, and energy funds for FY 1997 will also be substantially less than requested.

DoD Energy Funding Requests. Two centrally resourced and managed funding programs were established to develop energy conservation projects to support the goals set forth in the Energy Policy Act of 1992 and Executive Order 12902 of 1994: the military-construction-funded Energy Conservation Investment Program and the operations-and-maintenance-funded Federal Energy Management Program. The following tables show the amount of Federal Energy Management Program funds that DUSD(IA&I) requested and received from 1994 through 1997 and the amount of Energy Conservation Investment Program funds that DUSD(IA&I) requested and received from 1991 through 1997.

Table 1. Amount of Federal Energy Management Funds

FY	Requested (millions)	Received (millions)
1994	$ 59.0	$ 59.0
1995	174.0	170.7
1996	234.7	29.0
1997	117.0	20.0

Table 2. Amount of Energy Conservation Investment Funds

FY	Requested (millions)	Received (millions)
1991	$ 0.0	$10.0
1992	36.0	36.0
1993	50.0	14.4
1994	50.0	50.0
1995	50.0	50.0
1996	50.0	40.0
1997	50.0	47.0

The Federal Energy Management Program, which was expected to provide most of the current and future funding for energy projects, experienced the biggest reductions.

Energy Funding Patterns. DoD has not received consistent Energy Conservation and Investment Program and Federal Energy Management Program funding. Although Energy Conservation Investment Program funding patterns showed some inconsistency, the Federal Energy Management Program showed high inconsistency. Figure 1 shows the amount of funding by year.

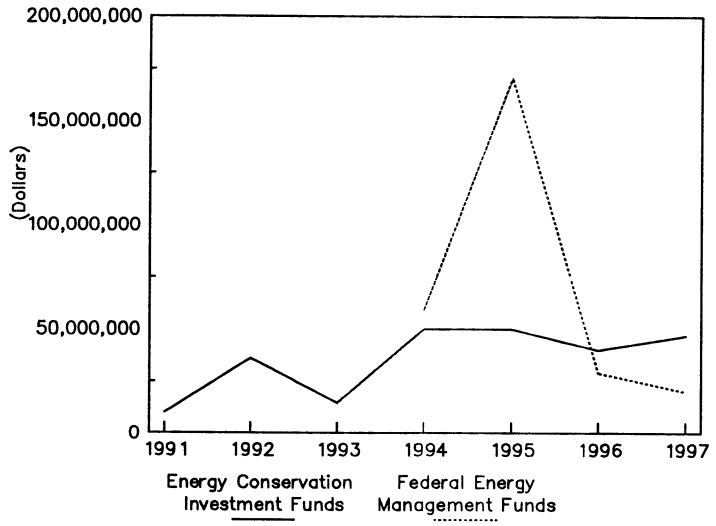

Figure 1. DoD Energy Conservation Investment Program and Federal Energy Management Program Fund Distribution

The primary reason for inconsistent Federal Energy Management Program funding was the congressional decision to remove Federal Energy Management Program funds originally requested in the President's FY 1996 budget from the energy management program and the subsequent reduction in funding. The congressional change in funding has frustrated Military Departments' efforts to plan, design, and execute energy conservation projects effectively. However, DUSD(IA&I) and Military Departments should also have taken action to ensure that other funds were used to supplement and stabilize the energy conservation program since mandated energy reduction requirements continued to apply to the Military Departments.

Reduced Energy Conservation Funding. In FY 1996, the Military Departments developed energy conservation projects based on anticipated Energy Conservation Investment Program and Federal Energy Management Program funding contained in the President's FY 1996 budget for energy and water conservation and to meet the requirements of the Energy Policy Act of 1992. Figure 2 depicts the disparity between the amount of Federal Energy Management Program funds that DoD requested for energy conservation in FY 1996 and the actual amount of Federal Energy Management Program funds received.

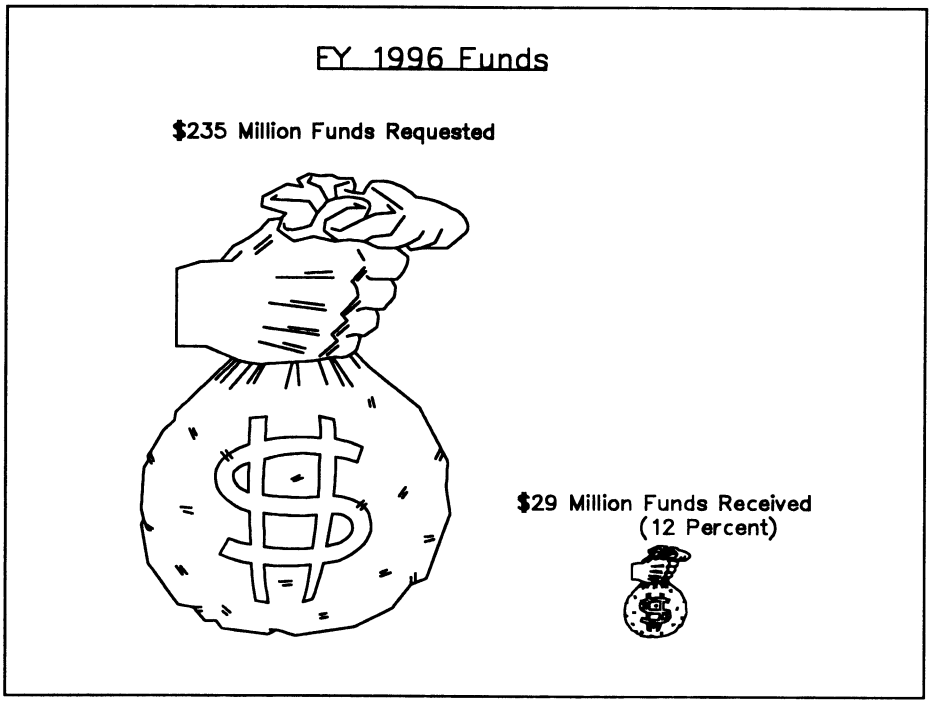

Figure 2. Anticipated Versus Actual FY 1996 Federal Energy Management Funds

DoD requested $234.7 million in Federal Energy Management Program funds in FY 1996. Congress authorized $29 million for the Federal Energy Management Program in FY 1996 and moved $205.7 million of requested energy funds into the Services' general operations and maintenance accounts. The funds could then be used for purposes other than energy conservation.

DUSD(IA&I) officials appealed the congressional decision to transfer the funds to the regular operations and maintenance accounts because of concerns that the "unfenced" money would not be used to support energy programs, but they did not address the issue with the Under Secretary of Defense (Comptroller). Officials at DUSD(IA&I) believed that installation commanders would view other base needs as higher priority, and energy projects would suffer. Their concerns were confirmed during our visits. Energy managers were unable to implement planned energy projects because of funding shortfalls. Energy managers were also concerned that the short term nature of commanders' tours and long time period before energy reduction benefits are realized were often incompatible and that commanders would opt for more immediate results of money spent.

After Congress denied the appeal and transferred the funds, DUSD(IA&I) officials took no action to ensure that funds would be used for energy conservation purposes. In addition, Military Departments did not mandate that the money be used for energy conservation purposes. OSD and the Military Departments did not establish any mechanism to track how much, if

any, of the transferred funds were used to support the energy program. DUSD(IA&I) officials stated that the Military Departments have provided no documentation to show that the $205.7 million has been used for energy purposes.

Future Energy Conservation Funding. Future funding, previously set aside for energy projects, will be either partially or totally rolled into the Military Department's operations and maintenance accounts. As a result, funding will no longer be "fenced" for energy purposes. Unless higher level DoD management internally establishes requirements for the money, installation commanders will have final authority to decide whether or not to execute energy projects.

Use of Energy Funds. Military Departments did not use existing energy funds as effectively as possible. Because the lack of funding did not override mandates of the Energy Policy Act of 1992, installations continued to develop projects to fulfill the requirement to identify and execute all projects that have a payback period of 10 years or fewer. As a result, energy managers developed significantly more energy and water conservation projects than could be funded with the energy funds provided. Figure 3 shows the disparity between the number and value of Energy Conservation Investment Program and Federal Energy Management Program projects submitted for approval and the number and value approved.

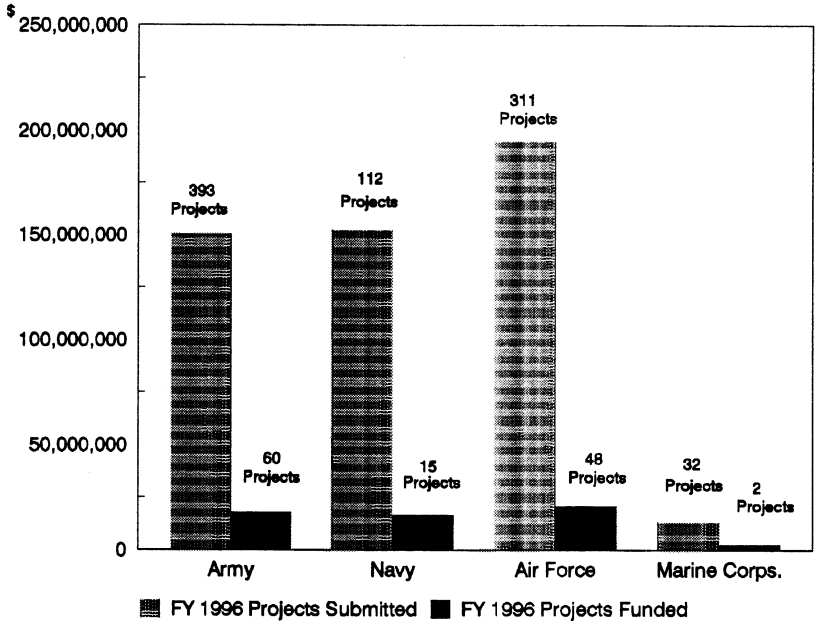

Figure 3. FY 1996 Submitted Versus Funded Energy Conservation Improvement Program and Federal Energy Management Program Projects

Military Departments developed, approved, and submitted to DUSD(IA&I) 848 Energy Conservation Investment Program and Federal Energy Management Program projects, estimated to cost $510.9 million in FY 1996. DoD received $40 million in Energy Conservation Investment Program funds and $29 million in Federal Energy Management Program funds in FY 1996. Actual energy funds received were 13 percent of the estimated cost of projects developed. As of the third quarter of FY 1996, Military Department documentation identified 125 energy conservation projects, estimated at $58.4 million, as being executed in FY 1996.

Military Departments were not even able to maximize use of FY 1996 Federal Energy Management Program funds received because of energy mandates. For example, the Navy submitted 106 Federal Energy Management Program projects, estimated at $127.4 million for Federal Energy Management Program funding. The Navy only received $6 million in Federal Energy Management Program funds in FY 1996. However, instead of using all the funds received to execute as many of the 106 projects submitted as possible, the Navy used $1.7 (30 percent) of the $6 million to develop 22 additional FY 1997 energy projects. Similarly, the Marine Corps submitted 27 FY 1996 Federal Energy Management Program projects, estimated at $9.1 million, but only received $925,000. The Marine Corps did not use that amount to execute energy projects. Instead, the Marine Corps used the funds to develop additional projects, to purchase equipment, and to conduct energy training classes. Regarding the funded projects, energy managers did not adequately support estimated costs and reductions and, in many cases, overstated the benefits.

The effect was twofold. Not only did the Military Departments spend money to develop projects that would be significantly delayed or not done, but they also lost the opportunity to implement valid projects that were already developed. The Military Departments have many projects developed that have had to be put on hold until funds become available to implement them. With low funding levels, a majority of the projects may never get implemented, and even for those that are funded at a later date, those projects will have to be revalidated, costing the Military Departments additional time and money. We believe that DoD needs to establish an integrated process team to evaluate DoD commitment to accomplishing the legislative requirements and to determine what actions can be taken to improve DoD commitment.

Energy Reduction Goals. Based on the Military Departments' energy reductions from 1985 through 1995, reduced funding of energy conservation may prevent DoD from meeting the goals of the Energy Policy Act of 1992 and Executive Order 12902. According to officials at DUSD(IA&I), requested funding through 1998 is insufficient to meet the 20-percent energy reduction goal. To meet the 20-percent goal and also the 30-percent goal, commitment is needed. Figure 4 shows Military Departments' energy reductions from 1985 through 1995.

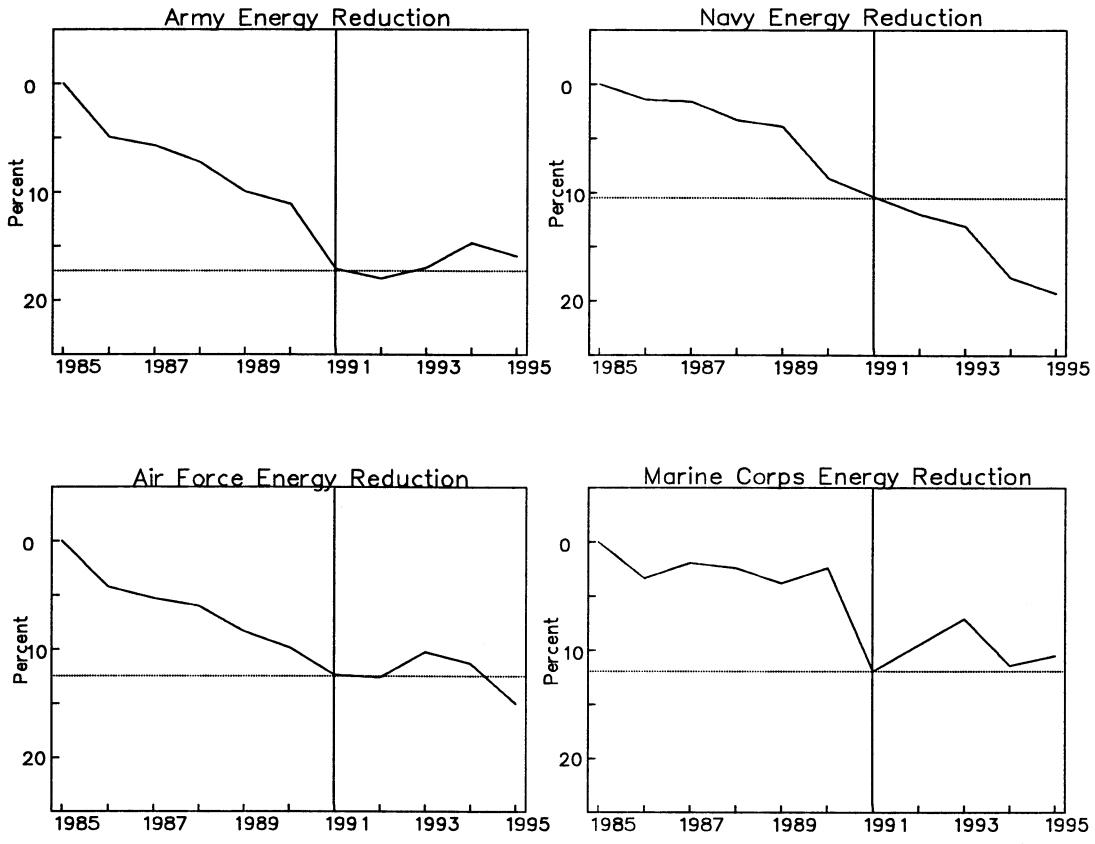

Figure 4. Military Department Energy Reduction FYs 1985 Through 1995

Military Departments provided data that showed their energy consumption reductions. Overall, the data showed DoD with a 13.3 percent reduction from 1985 through 1995. The data showed that the Army, the Air Force, and the Marine Corps reduced their energy consumption approximately 11 percent in the 7 years from FY 1985 through FY 1991. However, in the last 4 years, reduction progress has stagnated, and energy consumption for the Army, Air Force and Marine Corps has decreased less than 1 percent. Energy consumption is determined by calculating the number of British thermal units consumed per square foot. For example, Army documentation showed that while energy consumption decreased 17 percent from 1985 through 1991, energy consumption increased by 1 percent from 1992 through 1995. On the other hand, the Navy reported that it continued to reduce energy consumption on a relatively consistent basis, which may be partly attributable to additional staffing support at regional Naval facilities offices. Navy documentation showed that energy consumption decreased 10.3 percent from 1985 through 1991 and another 8.9 percent from 1992 through 1995.

If DoD management determines that it is committed to meeting the goals mandated by congressional acts and executive orders, it must either internally "fence" funds specifically for energy conservation, or it must persuade Congress to allocate funding in amounts sufficient to achieve the goals.

Energy Personnel

Military headquarters and installation energy offices were understaffed, and energy mandates only exacerbated the staff problems. Military headquarters and installation energy offices were only able to apportion a small percent of time to developing energy projects even while the mandates required that they develop all projects that could be paid back in 10 years or fewer. Military headquarters offices devoted few personnel to overseeing energy programs even while requirements continued to increase. For example, while typically staffed with one individual, the number of projects requiring oversight increased into the hundreds during the mid 1990's. Nine of the installations visited lack staff, with one energy manager who often had many other energy- and utility-related duties. In addition, because of the magnitude of projects developed, even less time was spent developing individual projects. The lack of time may have contributed to our finding that funded projects, in most cases, were incomplete, lacked documentation and contained errors. The lack of management also was a likely factor in the failure of the validation review at the headquarters level, which allowed the incomplete and inaccurate projects to pass through the approval process. Military Departments should evaluate their resource requirements and adjust staffing accordingly to oversee energy conservation functions.

Energy managers were also concerned about cutbacks in normal preventive maintenance and staffing of maintenance personnel. Several energy managers stated that fewer personnel were devoted to maintenance functions and that maintenance was only performed on an emergency basis. A shortfall in maintenance increases energy consumption and slows progress toward energy-reduction goals. Our observations of facilities also found poor maintenance conditions in many facilities. We believe that an integrated process team should evaluate the aspect of preventive maintenance as a part of the overall management of energy conservation.

Management Emphasis and Oversight

DoD lacked the emphasis and oversight needed to ensure that Military Departments were implementing their best energy projects and achieving optimum reductions. DUSD(IA&I) did not provide sufficient program oversight, including project validation. In addition, DUSD(IA&I) allowed each Military Department, which in turn allowed each Military installation, to develop and implement its own plan to meet the mandated energy management requirements without sufficiently detailed guidance to ensure that implementation was consistent across Military Departments or even across installations within Military Departments. The DUSD(IA&I) also did not establish a system to verify and track actual energy consumption savings from energy projects or provide close scrutiny of projects that saved energy cost but not energy use. The Military Departments exhibited a lack of emphasis and oversight for the energy conservation program. Participation in developing

projects was left to the discretion of the installation commanders, detailed guidance was often lacking, and energy managers were unaware of current guidance. Also, DUSD(IA&I) and the military headquarters did not validate projects or track and compare actual energy reductions from energy projects.

Guidance and Participation. Because each Military Department and installation was allowed the discretion to implement its own energy plan, detailed guidance was important to ensure that programs were consistent across Departments, and that Departments were competing on equal footing for energy funds. However, DUSD(IA&I) and Military Departments did not provide sufficiently detailed guidance on all aspects of the energy management program and did not ensure that energy managers were aware of all current guidance. Specific guidance was lacking for evaluating projects with only cost savings against projects with both cost savings and energy savings and for tracking actual savings of implemented projects. Energy managers were left to generate ideas for energy projects without adequate feedback or direction from military headquarters-level staff about highly profitable potential projects or successfully completed projects at other installations. DoD should establish a management structure to provide oversight and feedback to Military Departments on optimum energy reduction projects. DoD should consider use of an interactive internet site, to help share information on energy conservation projects and answer questions.

In addition, DUSD(IA&I) and military headquarters personnel viewed participation as voluntary and stated that support for the program was dependent on individual commanders. Their view was that if a commander was supportive, then the installation would implement energy conservation measures. Participation varied significantly from one installation to the next and, in some cases, was almost nonexistent. DUSD(IA&I) should establish a management structure that makes energy conservation participation mandatory instead of voluntary.

Validation. DUSD(IA&I) and military headquarters did not validate energy projects that installations submitted. In most cases, DUSD(IA&I) and military headquarters neither required submission of detailed supporting data for life-cycle cost analyses nor performed a cursory review of cost summaries. DUSD(IA&I) approved projects that were incomplete and outdated, that contained errors, and that used inconsistent bases for developing estimated energy reductions.

In addition, DUSD(IA&I) and Military Departments did not provide close scrutiny to energy projects that were developed to save cost but not energy. DUSD(IA&I) and Military Departments evaluated projects based on savings-to-cost ratios; however, they did not give additional consideration to projects that saved energy as well as cost. As a result, a cost-savings-only project had an equal chance of being selected over a cost-and-energy-savings project, which would have supported the energy reduction goals. The lack of scrutiny was significant because DUSD(IA&I) and Military Departments were not validating projects. Military installations did not develop cost reductions based on long-term forecasts even though reductions were, in most cases, projected over 15 to 25 years. As an example, one project estimated cost

reduction of approximately $16 million based on differences in fuel prices. The project was not approved for several years, and when approved, it was not validated, even though supporting documentation was about 5 years old. As a result, short-term fuel costs had changed and all of the cost reductions disappeared. Military Departments should validate installations' energy projects, particularly considering long-term fuel prices. Also, DUSD(IA&I) should determine whether funds are best spent on cost-savings-only projects.

Actual Savings. DUSD(IA&I) and the military headquarters did not develop a system to track actual energy reductions from energy projects that Military installations implemented. As a result, DoD cannot determine how much if any of the estimated reductions were realized and whether the projects supported the energy reduction goals. The information would be important to establish the best options for future use of money. It would also provide an independent measure of control to verify reductions when DoD enters into agreements with contractors and utility companies on shared savings contracts. Military Departments should establish a system to track the actual energy reductions.

Energy Projects

Military Departments competed for Energy Conservation Investment Program and Federal Energy Management Program funds based on those projects that produced the highest savings-to-investment ratio and shortest payback period. Military installations developed energy projects that were incomplete and that contained errors in the computation of savings-to-investment ratios. Project files did not contain much of the documentation supporting estimated reductions, and almost half of the projects reviewed had overstated reductions.

Project Selection. The selection process under both the Energy Conservation Investment Program and the Federal Energy Management Program was marred by the inaccuracies in the estimated costs and savings, which caused overstated savings-to-investment ratios. As a result, projects selected for the program contained erroneous, overstated savings-to-investment ratios that would not have been high enough for project selection had the information been correct. Other projects that were not selected may have resulted in more energy and cost savings.

Project Documentation. Military installations did not follow guidance that required them to maintain documentation to provide an auditable trail showing how they determined and validated energy reductions. The economic analyses prepared for the 41 energy conservation projects reviewed were, in most cases, unsupported. Of the 41 projects reviewed, 38 did not include adequate supporting documentation for the estimated cost and/or energy reductions described in the economic analyses. Energy managers could not even describe how estimated energy costs and savings had been computed for approximately a third of the projects. See Appendix B for a summary of projects reviewed.

In addition, the Military Departments did not adequately support the estimated energy and cost savings to be derived from implementing energy conservation projects.

Estimated Energy Reductions. The 41 projects (estimated cost of $68 million) included documentation estimating energy reductions of approximately $354 million. Military Departments incorrectly computed energy savings and costs, which resulted in overstated savings-to-investment ratios. Of the 41 projects, 18 included overstated savings-to-investment ratios, including 8 projects, with estimated energy reductions of $48.6 million, that actually would have resulted in no energy reductions when the computations were done correctly. We were unable to determine the accuracy of the savings-to-investment ratios on the remaining projects because of the lack of supporting documentation. Military Departments should independently validate, at a higher level, the accuracy of energy projects generated by installations.

Summary

The lack of sustained DoD and Congressional commitment to energy conservation resulted in assignment of insufficient personnel, inconsistent funding, and no assurance that funds were well spent. The OSD and the Military Departments need to make a strong commitment and solicit more consistent Congressional support to attain energy reduction goals established in the Energy Policy Act of 1992 and Executive Order 12902.

In addition, OSD and the Military Departments need to strengthen oversight to support uniformity and consistent energy management and increase participation in energy conservation programs.

Recommendations and Management Comments

1. We recommend that the Under Secretary of Defense for Acquisition and Technology establish an integrated process team to evaluate the DoD resources (personnel and money) and management commitment to meeting mandated energy reduction goals. Specifically, the integrated process team should:

a. Analyze the requirements of the Energy Policy Act of 1992 and Executive Order 12902 and determine the resources (personnel and funds) needed to obtain the congressional goals.

b. Establish a management structure having adequate oversight and feedback procedures to assess accomplishments against the goals and emphasizing mandatory energy conservation awareness.

c. Analyze criteria requiring identification and implementation of all 10-year payback projects and the 30-percent conservation reduction in light of current funding constraints and determine whether congressional relief from the requirements should be requested.

d. Evaluate the role of preventive maintenance in achieving energy conservation goals and determine whether Military Departments need to increase preventive maintenance.

e. Determine methods to stabilize funding to the Energy Conservation Management Program.

2. We recommend that the Deputy Under Secretary of Defense (Industrial Affairs and Installations):

a. Establish measures to validate that installation commanders use "unfenced" money intended for energy conservation to accomplish projects that save energy.

b. Determine whether the use of Energy Conservation Investment Program and Federal Energy Management Program funds for "cost-savings-only" projects is compatible with the energy reduction goals and represents the best use of those funds.

c. Issue guidance to the Military Departments to:

(1) Evaluate their resource requirements and, if deemed necessary, add staffing to oversee energy conservation functions.

(2) Independently validate at a higher level the accuracy of energy projects generated by installations with special emphasis on whether energy cost savings projects considered long-term fuel prices.

(3) Establish a system to track actual reductions from projects performed with Energy Conservation Investment Program and Federal Energy Management Program funding if feasible or otherwise, at least on a sample basis verify that actual savings approximate estimated savings.

(4) Develop a list of high payback project opportunities for dissemination to all installations.

(5) Make energy conservation mandatory instead of voluntary.

d. Establish a communications method, such as an internet web site, to share ideas on energy conservation and answer questions related to energy conservation.

Management Comments

The Under Secretary of Defense for Acquisition and Technology and the Deputy Under Secretary of Defense (Industrial Affairs and Installations) did not respond to a draft of this report. Therefore, we request that the Under Secretary of Defense for Acquisition and Technology and the Deputy Under Secretary of Defense (Industrial Affairs and Installations) provide comments to the final report.

Part II - Additional Information

Appendix A. Scope and Methodology

Scope of the Audit

Projects Reviewed. We reviewed documentation from FYs 1991 through 1996 related to 41 energy conservation projects, valued at $68 million. Specifically, we examined the project descriptions, savings-to-investment ratios and payback computations, and miscellaneous correspondence. We did not validate data from DUSD(IA&I) or the Military Departments. We also interviewed energy management personnel.

Audit Period, Standards, and Locations. We performed this economy and efficiency audit from November 1995 through July 1996 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD. We included tests of management controls considered necessary. We did not use computer-processed data or statistical sampling procedures for this audit. We visited or contacted individuals and organizations within DoD. Further details are available upon request.

Management Control Program

DoD Directive 5010.38, "Internal Management Control Program," April 14, 1987,* requires DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of the Management Control Program. We reviewed management control procedures regarding the administrative processing of energy conservation projects at various installations. We also reviewed management's self evaluation of those management controls.

Adequacy of Management Controls. We identified material management control weaknesses as defined by DoD Directive 5010.38. The Military Departments' management controls for the administrative processing of energy conservation projects was not adequate to ensure that 38 projects were properly supported and that savings-to-investment ratios for 18 projects were computed properly. If management implements the recommendation to improve

*DoD Directive 5010.38 has been revised as "Management Control Program," August 26, 1996. The audit was performed under the April 1987 version of the directive.

headquarters oversight of the energy conservation program including project validation, the Military Departments can improve the quality and accuracy of the energy conservation projects submitted to high-level decisionmakers.

Adequacy of Management's Self-Evaluation. The Military Departments did not identify energy conservation as an assessable unit, did not conduct management control reviews of energy validation under any assessable units, and, therefore, did not identify the material management control weaknesses identified by the audit.

Appendix B. Summary of Prior Audits and Other Reviews

Inspector General, DoD

During the past 5 years, two audits have discussed energy conservation and the Energy Policy Act of 1992.

Inspector General, DoD, Report No. 93-055, "Implementation of the Energy Policy Act of 1992," February 18, 1993, states that the DoD implementation of energy initiatives was commendable. DoD reported reduced energy consumption of 27.3 percent from FYs 1975 through 1985; however, DoD needed improvements to better implement energy conservation policies at selected Military Department and Defense Logistics Agency installations. This audit primarily addressed whether DoD had developed a system to determine if energy initiatives were being implemented. The audit did not evaluate the occurrence of reported energy reductions and addressed periods prior to the time frames addressed by this audit. The audit also did not evaluate the use of energy conservation funds.

The report recommended that the Military Departments update energy management plans annually and that the Marine Corps establish an energy management plan. It also recommended that the Defense Logistics Agency establish procedures to verify that field installations maintain awareness of and implement energy management plans.

The Military Departments and the Defense Logistics Agency concurred with the recommendations.

Air Force Audit Agency

Air Force Audit Agency Report No. 95052012, "Management of Energy Costs," was issued August 29, 1996. The report concluded that the overall management of the base program could be improved. Although the energy conservation program was effectively achieving its goal, the bases reviewed did not properly identify or bill all utility costs nor correctly compute utility rates. Also, bases did not properly manage energy reduction projects. Air Force management concurred with the recommendations and agreed to take corrective actions.

Appendix C. Summary of Energy Reduction Projects Reviewed

Project Number	Description	Cost	Reduction	Inadequate Documentation
1. P-274	Boiler Plant	$ 1,367,486	$ 22,070,323	X[1,2]
2. P-645	400 HZ Converter	264,710	707,877	X[1]
3. P-891	Peak Shaving Generator	1,250,000	8,291,776	X
4. P-652	Lighting Retrofit	901,520	5,291,776	X
5. P-648	Lighting Retrofit	2,300,000	7,663,836	X
6. P-168	Lighting Retrofit	750,000	2,833,302	
7. P-155	Electric Substation	3,788,000	13,400,000	X[1]
8. P-414	Natural Gas Conversion	1,100,000	18,364,827	X[1]
9. P-887	Lighting Retrofit	1,850,000	5,768,109	X
10. P-884	Lighting Retrofit	2,330,000	8,209,000	X
11. P-314	Natural Gas Conversion	7,300,000	40,111,045	X[1,2]
12. P-124	Photovoltaic Energy Generator	1,500,000	4,288,951	X
13. P-165	Change in Kilo Volt Service	4,250,000	25,796,000	X[2]
14. R9-95	Lighting Retrofit	661,000	2,000,000	X
15. R62-94	Lighting Retrofit	999,744	2,804,289	
16. P-013	Photovoltaic Heating	500,000	2,268,000	X[1,2]
17. P-944	Peak Shaving	1,311,000	4,612,513	X[2]
18. TP9647	Exit Lights	17,600	259,189	X[2]
19. P-059	Lighting Retrofit	938,000	15,752,314	X[1,2]
20. P-115	Natural Gas Conversion	1,211,000	19,149,920	X[1]
21. TP418R	Energy Management Control System	857,000	8,154,780	X
22. P-552	Photovoltaic Hybrid System	1,000,000	2,303,410	X
23. P-046	Electric Substation	2,700,000	12,482,000	
24. P-972	Replace Windows and Doors	900,000	1,782,759	X[1,2,3]
25. P-983	Replace Windows and Doors	486,000	1,339,650	X[1,3]
26. P-990	Replace Windows and Doors	584,000	1,118,988	X[1,3]
27. 93-135	Electric Substation	2,835,000	11,171,000	[1,2]
28. 36445B	Energy Management Control System	3,550,000	14,891,340	X
29. 36445A	Energy Management Control System	3,850,000	20,888,320	X
30. 36077	Natural Gas Pipeline	2,550,000	16,221,000	X[1,2,3]
31. 41165	Photovoltaic System	1,700,000	6,247,002	X[1,3]
32. 42336	Photovoltaic System	3,500,000	13,142,808	X[1,3]

See footnotes at the end of appendix.

Appendix C. Summary of Energy Reduction Projects Reviewed

Project Number	Description	Cost	Reduction	Inadequate Documentation
33. FW2893J	Air Conditioning	$ 253,000	$ 905,740	X[2]
34. FW2903J	Air Conditioning	253,000	905,740	X[2]
35. 00029P	Lighting Retrofit	396,979	1,406,962	X
36. 43386	Lighting Retrofit	665,000	4,695,725	X
37. 45891.1	Hydroplant Turbine Renovation	1,200,000	4,312,000	X[1,2]
38. 45891.2	Hydroplant Turbine Renovation	1,200,000	4,312,000	X[1,2]
39. 45891.3	Hydroplant Turbine Renovation	1,200,000	4,312,000	X[1,,2,3]
40. 45891.4	Hydroplant Turbine Renovation	1,200,000	4,312,000	X[1,2,3]
41. 42319	Hydroplant Modernization	3,250,000	9,719,000	X
Total		**$68,720,039**	**$354,268,711**	

[1]The savings-to-investment ratio was overstated.
[2]Energy managers could not describe how reductions were computed.
[3]The project did not have a valid savings-to-investment ratio, or resulted in no savings.

Appendix D. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology
  Director, Defense Logistics Studies Information Exchange
  Deputy Under Secretary of Defense (Industrial Affairs and Installations)
  Deputy Under Secretary of Defense (Logistics)
  Director, Defense Procurement
Under Secretary of Defense (Comptroller)
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  Deputy Comptroller (Program/Budget)
Assistant to the Secretary of Defense (Public Affairs)

Department of the Army

Assistant Secretary of the Army (Financial Management and Comptroller)
Auditor General, Department of the Army

Department of the Navy

Assistant Secretary of the Navy (Financial Management and Comptroller)
Auditor General, Department of the Navy
Commander, Naval Facilities Engineering Command
Commandant, U.S. Marine Corps

Department of the Air Force

Assistant Secretary of the Air Force (Financial Management and Comptroller)
Auditor General, Department of the Air Force

Other Defense Organizations

Director, Defense Contract Audit Agency
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Office of Management and Budget
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Senate Subcommittee on Defense, Committee on Appropriations
Senate Subcommittee on Energy and Water, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Energy and Natural Resources
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on National Security, Committee on Appropriations
House Subcommittee on Energy and Water, Committee on Appropriations
House Committee on Commerce
House Subcommittee on Energy and Power, Committee on Commerce
House Committee on Government Reform and Oversight
House Subcommittee on National Security, International Affairs, and Criminal Justice, Committee on Government Reform and Oversight
House Committee on National Security

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