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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

FEB 4 1983


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Mr. James N. Juliana
Principal Deputy Assistant Secretary
of Defense
(Manpower, Reserve Affairs, and Logistics)

Dear Mr. Juliana:

Subject: Validating Energy Savings from Projects Funded by Energy Conservation Investment Program

The purpose of this letter is to present our views and comments on an August 31, 1982, Department of Defense (DOD) memorandum discussing implementation of the Energy Conservation Investment Program (ECIP). Our comments address the memorandum's sections concerning validating energy savings from projects funded through ECIP.

We are providing our comments at this time because we understand your staff is modifying the August memorandum to clarify certain aspects of the ECIP energy savings validation process and plans to issue a clarifying memorandum in the near future. Our comments should be viewed as input to this effort.

We reported previously 1/ that DOD did not have a systematic method of identifying energy savings resulting from completed ECIP projects. Our report also recognized that DOD had plans to develop a system to determine progress being made in meeting ECIP goals. While we are encouraged by DOD's efforts to improve its ECIP validation program, we are concerned about whether the monitoring program will adequately meet the oversight needs of the Congress. Thus, we have some comments which we believe should be considered in the current effort to modify the validation procedures. Our comments, which are based on limited work, primarily focus on the recognition of a variety of validation procedures and the selection of projects to be validated.

Our work included reviewing DOD regulations and congressional hearings, interviewing DOD officials at the installation through the Office of the Secretary levels, reviewing the types of ECIP projects funded and the validation efforts planned and completed, and reviewing other related DOD reports. We performed

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1/"The Department of Defense's Energy Conservation Investment Program Needs Closer Monitoring," EMD-82-4, January 13, 1982.

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our work in accordance with generally accepted government auditing standards.

PERSPECTIVE

DOD implemented ECIP in fiscal year 1976. Through fiscal year 1982, the Congress has made available over $960 million to fund ECIP projects. For military buildings and facilities, ECIP is expected to contribute 12 of the 20 percent energy savings goal established by the President for 1985.

In order to determine the progress of ECIP in contributing to DOD's energy savings goal, DOD issued guidance in 1977 which provided for representative monitoring of the actual energy and cost savings achieved from completed ECIP projects. The information gained from this monitoring would have assisted the military services in managing the program as well as provide the Congress with a measure of the program's effectiveness.

With respect to meeting congressional oversight needs, various subcommittees have expressed concern about the quality of information available to evaluate ECIP's effectiveness. In December 1981, the Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce questioned the credibility of data reported by DOD. Further, the Subcommittee on Military Construction Appropriations, House Appropriations Committee, as part of its fiscal year 1983 appropriations hearings, questioned the status of DOD progress toward reducing energy consumption and specifically questioned DOD's data collection and monitoring of actual energy savings from ECIP projects.

DOD was aware that the services were not monitoring enough projects to provide the information needed by either ECIP program management or the Congress. As of the end of FY 1982, only 7 ECIP projects had been monitored out of approximately 800 projects completed. In an attempt to increase ECIP project monitoring, DOD revised its program guidance in a memorandum issued on August 31, 1982. This memo requires more monitoring by setting minimum levels of validation for every year. It also attempts to encourage monitoring by allowing the services to use less burdensome techniques to determine a project's energy use.

ECIP PROJECT VALIDATION PROGRAM

The ECIP project validation procedure set forth in the August memorandum further refines DOD's previous validation efforts by providing more explicit direction on what is to be done by the services to conform to the requirements of the validation program. Given the limited success of DOD's previous validation efforts in providing needed information on the results of ECIP projects, we believe a reassessment of the overall approach to program validation could lead to a more effective program which meets both DOD and congressional needs.

ECIP Project Validation Procedures

The August memorandum's provisions emphasize one procedure for validating energy savings. This is the comparison of a project's energy consumption for at least one year prior to, with one year after construction. The memorandum is flexible in suggesting how the services meter to collect actual energy use data for this comparison. While we recognize the value of actual energy use data as a measure of project results, we have some concerns that collecting actual energy use data may be too costly and unnecessary for some types of ECIP projects. In addition, when collecting actual energy use data is considered necessary for project validation, means other than collecting such data over a 2-year period may be appropriate. In our view, flexibility in validating ECIP projects is likely to result in a more effective program.

Under current ECIP program guidance, projects are identified by type and are classified into 10 categories. The 10 categories include:

- Heating, Ventilating and Air Conditioning Systems
- Lighting Systems
- Electrical Energy Systems
- Energy Monitoring and Control Systems
- Weatherization
- Solar
- Steam and Condensate Systems
- Boiler Plant Modifications
- Energy Recovery Systems
- Facility Energy Improvements

In our view, projects designed and completed in certain categories could be expected to achieve the level of energy savings projected through engineering estimates if such projects were installed or constructed properly. For example, the energy savings from relamping with more efficient lights can easily and accurately be computed by knowing the number of fixtures changed and their hours of operation. With respect to weatherization projects, an inspection following project completion to assure proper installation of weatherization materials could, in our view, provide sufficient assurance that an engineering estimate of project performance reasonably represents actual project results. Thus, validating the results of these types of projects could be accomplished through a final engineering estimate by inspecting the completed project and conforming assumptions used in the most recent engineering estimate of expected energy savings to actual project installation. We would emphasize such estimates not be relied upon without assurance that the assumptions used reflect actual conditions and that the project was properly installed.

On the other hand, more complex projects or ones which have experienced problems, such as energy monitoring and control systems, would justify more extensive validation efforts to assure that they are performing as expected. For such projects, metering actual energy use and analyzing that data would seem more appropriate. However, we suggest that alternatives to collecting actual use data over a two-year period (one year prior to and one year after project completion) be considered. For example, for projects with the capability of being turned on and off, compare changes in energy use when such projects are operating and not operating. Another possibility would be to compare the energy use of similar buildings on a base, one without any modifications (the control group) and one with the ECIP project installed. Both of these methods could reduce the costs of validation by eliminating the need for metering data before construction and reducing the need to adjust the results to account for the affects of weather.

Overall, we believe an assessment of validation procedure options for specific types of ECIP projects would provide a basis to develop an effective validation program which meets both DOD and congressional needs. We believe that the projects funded by ECIP are too diverse to be validated by only one type of procedure. Given the importance of developing efficient and effective validation programs, we suggest that DOD explore the use of alternative validation procedures and provide appropriate guidance to the services in its revised program validation memorandum.

Selection of Projects for Validation

The August memorandum requires each service to monitor at least one project per year in each of the 10 ECIP project categories. Under this approach, the services' validation efforts will be directed equally toward each project category regardless of the number of projects in that category or their need for validation. The memorandum, however, does not provide guidance on when projects should be selected. We suggest that DOD consider an alternative project selection process and provide guidance on when projects are to be identified for validation.

We are concerned that the current project selection process will result in ineffective or unnecessary validation coverage in some project categories. If the August 1982 instructions had applied to ECIP projects funded from 1976 to 1982; and if the services had annually validated only one project per category (the minimum amount of coverage), the extent of validation would have varied from all projects being validated in some categories to around 3 percent of the completed projects being validated in other categories. Included in those project categories receiving much less than 100 percent evaluation coverage would have been Energy Monitoring and Control Systems, the type of project which appears to need more extensive validation of its effectiveness because these projects have experienced many problems, are complex, and have received high congressional interest.

As an alternative to the current requirement, we suggest that DOD establish a selection process that takes into account the number of projects classified into each category and their need for validation. We believe that DOD could achieve this type of selection process by adopting an annual percentage quota which would for each category of ECIP project, identify the number of projects to be validated. Quotas could be individually set in such a way that monitoring efforts would focus on those project categories which tend to be more costly and complex, which have experienced developmental problems, or for which projected energy savings estimates are highly subjective. This approach could avoid the comparatively excessive validation of those categories with few projects and could allow for reducing individual services' validation efforts by establishing quotas for individual project categories on a DOD-wide basis rather than on an individual service basis.

For any project selection process to function properly, however, projects must be classified consistently between the services. Based on our work, we found that problems may arise when an ECIP project is composed of smaller projects representing different categories. Although the August memorandum provides that such projects are to be classified in the Facilities Energy Improvement Category, we were told that the individual military services, in some cases, have classified such projects in the one category representing the major cost or energy savings portion of the project. Therefore, we suggest that the program instructions be more definitive in its treatment of how such projects are to be classified so that the validation program can be appropriately developed and implemented.

With respect to when projects should be selected for validation, the current practice is to wait until the Congress approves the construction of specific projects during the appropriation process before identifying projects for validation. However, at least 30 percent of the design work for those projects has been completed prior to submitting the project to Congress for approval. Should metering be selected as the validation procedure following congressional approval of the project, redesign work involving additional expense may be required to provide for effective validation. In addition, a metering decision at this point in the project development process may not provide enough time to collect sufficient pre-construction energy consumption data. We suggest, therefore, that the decision on which specific projects should be validated be made earlier in the project design process; possibly at the time the services decide which projects will ultimately be submitted to the Congress for approval.

Explanation of Validation
Program's Purpose

The August memorandum states that representative monitoring will be used to verify the accuracy of design construction estimates. We believe, however, that more clearly setting out the importance of project validation could improve the overall program's implementation. ECIP program validation efforts should be more effective if the services are fully committed and understand the need for validating ECIP projects. As a first step in gaining that commitment, the services need to know that validation is more than just verifying the accuracy of an engineer's efforts to develop design estimates. For example, the results of the validation program will be used by the Congress in its annual authorization and appropriation process. We suggest, therefore, that the ECIP instructions provide a more comprehensive and convincing basis for carrying out an effective validation program.

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We trust that our comments will be useful in your efforts to modify the August 1982 ECIP program instructions. We appreciate the cooperation extended to our staff during our review. We will be happy to discuss further our comments with you or your staff. Copies of this letter will be sent to the House and Senate Military Construction Appropriation Subcommittees and will be made available to other interested parties upon request.

Sincerely yours,

F. Kevin Boland

F. Kevin Boland
Senior Associate Director