



U.S. Department of Energy  
Office of Inspector General  
Office of Audits and Inspections

# Audit Report

Management Alert on Planned  
Actions Related to the National  
Energy Technology Laboratory's  
Simulation-Based Engineering User  
Center



OAS-RA-11-08

April 2011



**Department of Energy**  
Washington, DC 20585

April 22, 2011

MEMORANDUM FOR THE ACTING ASSISTANT SECRETARY FOR FOSSIL ENERGY

FROM:   
Gregory H. Friedman  
Inspector General

SUBJECT: INFORMATION: Management Alert on “Planned Actions Related to the National Energy Technology Laboratory’s Simulation-Based Engineering User Center”

BACKGROUND

The Department of Energy's National Energy Technology Laboratory (NETL) initiated plans to utilize \$20 million of American Recovery and Reinvestment Act of 2009 funds to develop the Simulation-Based Engineering User Center (User Center) – part of the Carbon Capture Simulation Initiative program. According to project documentation, \$3 million of the total cost will be dedicated to acquiring and installing a Performance Optimized Data Center (POD) at NETL's Morgantown, West Virginia, site. And, the remaining funds will be spent equipping and supporting the POD with a high performance computing system. In March 2011, NETL was given final approval for the project from the Department's Chief Information Officer.

IMMEDIATE CONCERN

We concluded that the plan to acquire and install the POD at a cost of \$3 million may not be the least costly available option. Specifically, we noted that over 3,000 square feet of the usable space in the NETL's existing data center is not currently utilized nor are there firm plans to use this space in the future. The unutilized 3,000 square feet of space represents about 70 percent of the data center's entire capacity. Despite this fact, project documentation submitted to the Chief Information Officer indicated NETL's intent to acquire additional capacity to support the User Center initiative. We do not question the need for the User Center. However, we concluded that documentation submitted to the Chief Information Officer to describe how the project will be implemented contained a number of analytical flaws and unsupported assumptions that, in our view, require reconsideration. Because decisions to proceed with the proposed acquisition are expected shortly, we are bringing these matters to your attention in the expedited form of a management alert.

These issues were discovered during our on-going audit of *Efforts by the Department to Ensure Energy-Efficient Management of its Data Centers*.

Analysis of Alternatives

NETL's User Center project plan was submitted to the Office of the Chief Information Officer and used to support budgetary information provided to the Office of Management and Budget.

However, we found that the conclusions reached in the project plan related to the viability and cost of modifying the existing Morgantown data center versus the use of a POD may have been based on an incomplete analysis. In particular:

- In the User Center project plan, it was asserted that the use of a POD was necessary because most of the available square footage at the existing data center was earmarked for other initiatives. However, officials from the Information Technology Division, Site Operations Division, and Office of Research and Development told us that they were unaware of any such initiatives or were unable to provide details to support any intended future use.
- The project plan disclosed that while the cost to increase existing data center capacity or build a new facility would vary based on a number of factors, it estimated that such modifications would have a rough order of magnitude cost of \$3 million. Although NETL's estimate included costs such as expansion of existing office space and construction of raised-flooring space to increase data center space, we noted that these costs should not have been included because existing raised-flooring space was already available in the Morgantown data center.
- A detailed analysis of the costs associated with expanding the existing data center's power and cooling capacity was not included in the User Center project plan used to justify funding for the project. While the project plan explained the amount of power and cooling that would be required for the new system, it did not fully analyze the comparative cost of upgrading the existing data center to meet those needs. Using data available from recent upgrades to the cooling and electrical infrastructure for NETL's Pittsburgh data center, we estimated that these elements of the Morgantown data center could be renovated for less than the cost to purchase and install the POD. Furthermore, the project plan suggested that there could be problems with construction delays and disruptions in existing data center operation should the space be used. Yet, we learned that NETL's data center in Pittsburgh had cooling units replaced in a manner that did not impact mission-related operations, while electrical upgrades occurred during a holiday weekend.
- Certain factors considered as part of the project plan's analysis appeared to be internally inconsistent. For example, the project plan estimated that information technology hardware costs associated with maintaining the project in the existing data center would be \$12.5 million. However, estimated hardware costs associated with the POD were calculated to be \$9.6 million. NETL's analysis did not explain the inconsistency between hardware costs for the data center and POD options.
- The project plan noted that further analysis was required to better understand NETL's overall data center strategy and how those requirements aligned with the overall User Center strategy prior to determining the appropriate cost for each option. However, when

the project plan was updated in March 2011, no additional analysis of NETL's data center strategy had been performed and, as a consequence, overall project costs had not been further definitized.

- The use of the existing data center was partially discounted due to potential delays in construction that would not allow for the new computing capacity to come online for at least 18 months. However, while the project plan cited the POD's ability to be rapidly deployed and add capacity quickly, we noted that the project time line indicated that the POD would not be fully operable until July 2014 – 37 months after the project's specifications were anticipated to be finalized.

#### Coordination Issues

Based on discussions with NETL personnel who had responsibility for data center operations and facilities, respectively, we also determined that a lack of coordination existed related to the Office of Research and Development's preparation of the User Center project plan. Specifically, while the project plan noted that the vacant space in the Morgantown data center was already earmarked for other uses, other responsible officials stated that currently there were no plans for the space. Further, NETL's Site Operations Division had not been informed of the project until November 12, 2010, three days prior to our interview with officials and nearly three months after the project charter was approved.

#### Program Impacts and Path Forward

Based on our review, we believe that the acquisition of additional data center space could undermine efforts to more effectively utilize existing real property and promote energy-efficiency of data centers. In addition, the use of Recovery Act funds to procure what may be unnecessary data center space raises serious concerns about the effective use of the Department's finite resources. We recognize that decisions such as the one proposed for the User Center are often more complex and nuanced than they might appear. However, we wanted to ensure that Department decision makers were aware of our concerns before resource commitments were made regarding the path forward.

Accordingly, we recommend that the Acting Assistant Secretary for Fossil Energy require the Director, National Energy Technology Laboratory, to:

1. Fully analyze future data center needs and the costs and benefits of utilizing existing space in the Morgantown data center;
2. Ensure costs and assumptions are consistent across all alternatives prior to continuing plans for acquisition of the POD; and,
3. Coordinate efforts among all affected NETL parties, including the Office of Research and Development, the Information Technology Division, and the Site Operations Division, when analyzing User Center alternatives.

## MANAGEMENT REACTION AND AUDITOR COMMENTS

Management stated that it concurred with the recommendations and factual accuracy of the Management Alert. However, management explained that while many of the concerns we identified were accurately described, a number of them were already being addressed as part of the site's project management process. For example, officials noted that an Integrated Project Team had been recently established to better coordinate the User Center activities. In addition, after full funding for the project was obtained in March 2011, NETL began an in-depth analysis of alternatives, including POD and data center build-out options, to aid officials in determining the best alternative for housing the User Center.

In addition, management explained that NETL operated under the Department's established capital planning and project management processes in determining the best option for housing the User Center's computing equipment. Management informed us that the POD had been documented as the preferred alternative in the project plans and Office of Management and Budget Exhibit 300. Specifically, management noted that while it acknowledged the project plan was not complete, it needed to develop support to get funds obligated by the September 30, 2010, deadline established by the Recovery Act. Furthermore, management commented that the project management plans we reviewed were preliminary in nature and did not reflect a final acquisition decision, which is not expected until May 2011.

We commend management for initiating action to address a number of the issues identified in our report. We disagree, however, with a number of management's comments in response to our draft report. For instance, NETL officials commented that a decision had not been made as to which computer center alternative would be selected. Yet, reviews of three versions of project plans indicated that the POD or computer center had been identified as the preferred alternative. Specifically, the most recent project plan, dated March 13, 2011, stated that after an analysis of the most viable options, the POD approach was determined to be the best use of NETL's computing investment. In addition, communication from a NETL official in February 2011 indicated that "based on our analysis, the POD architecture seems to be the overwhelming best choice considering projected capital and operating cost savings." Further supporting the conclusion that the POD alternative had already been selected was the fact that NETL reported the User Center as a separate data center for purposes of Federal Data Center Consolidation Initiative reporting requirements in FY 2010.

While we encourage NETL to select the User Center option that best meets mission needs at the lowest cost, we also remain concerned that incorrect information concerning this matter may have been submitted to the Office of the Chief Information Officer and to the Office of Management and Budget. Although NETL's current action to initiate a detailed study of the various User Center options is consistent with our recommendations, it is important that the Department, in consideration of alternatives, emphasize the principles established in Executive Order 13514, October 5, 2009, relating to *Federal Leadership in Environmental, Energy, and Economic Performance*, specifically those related to Federal data center management.

cc: Deputy Secretary  
Acting Under Secretary of Energy  
Associate Deputy Secretary  
Chief of Staff  
Director, National Energy Technology Laboratory  
Chief Information Officer

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