U.S. GOVERNMENT ACCOUNTABILITY OFFICE

441 G St. N.W.
Washington, DC 20548

January 12, 2016 Accessible Version

Congressional Committees

Defense Infrastructure: DOD Efforts Regarding Net Zero Goals

In 2008, the Department of Defense (DOD) and the Department of Energy (DOE) began a joint initiative to address military energy use by identifying specific actions to reduce energy demand and increase use of renewable energy on DOD installations. Early attention was given to the possibility of net zero energy military installations. Achieving net zero within DOD generally means producing as much energy from renewable energy sources as is consumed by an installation, limiting the consumption of water in order to not deplete the local watershed, and reducing, reusing, and recovering waste streams to add zero waste to landfills.

House Report 114-102, accompanying a bill for the National Defense Authorization Act for Fiscal Year 2016, included a provision for us to review DOD's progress and savings from net zero installation initiatives. This report describes the extent to which DOD: (1) developed policies and goals for an integrated net zero strategy for energy, water, and waste management at its military installations; and (2) identified the potential costs and benefits of implementing net zero initiatives. We briefed the congressional defense committees in October 2015. This report formally transmits updated briefing slides regarding the final results of our work in response to the provision in House Report 114-102 (see encl. I).

To conduct our work, we obtained and reviewed relevant federal mandates, statutes, and DOD and service-specific policies and reports to determine DOD's net zero strategy and goals for energy, water, and waste management. We also interviewed or requested information from relevant officials within DOD and the services about funding, monitoring, potential costs and benefits, and lessons learned. We visited the DOE's National Renewable Energy Laboratory and Fort Carson, CO and contacted 10 Army installations to obtain information regarding policies, goals, potential costs, and benefits of implementing net zero initiatives.[1]

We conducted this performance audit from June 2015 to January 2016 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.

In summary, we found that DOD has not established an integrated net zero strategy or policy. DOD officials stated that this is because until recently there had been no statutory goals regarding net zero. According to DOD officials, as of September 2015, DOD is working with the services to develop implementation guidance to address the net zero goals included in Executive Order 13693*, Planning for Federal Sustainability in the Next Decade*, issued March 19, 2015. These goals include incorporating net zero into planning for new facilities over 5,000 gross square feet, among others. According to DOD officials, DOD expects to issue the

[1]We visited Fort Carson, CO because it is one of two installations the Army identified as a pilot for energy, water, and waste management. We also obtained information from 10 additional installations, selected based on their progress toward meeting energy, water, and solid waste diversion goals in fiscal year 2014. Though this information was not generalizable to all installations, these installations were: Carlisle Barracks, PA; Fort Detrick, MD; Fort Hood, TX; Fort Hunter Liggett, CA; Fort Irwin, CA; Fort Jackson, SC; Fort Leavenworth, KS; Fort Riley, KS; Joint Base Lewis-McChord, WA, and Picatinny Arsenal, NJ.

guidance in January 2016. None of the military departments have established net zero as a funded program, according to DOD officials. The military departments have established broad net zero goals and the Army has a net zero program, which it referred to as the Net Zero Initiative.

In addition, DOD has not fully identified the potential costs of implementing net zero initiatives. The only funding we identified that DOD has spent on net zero initiatives involved studies to establish baselines and assess the feasibility and costs of net zero at various DOD installations. Service officials told us they believe that fully achieving net zero is unrealistic and ultimately cost prohibitive. However, service officials also stated that net zero can help generate interest in conservation and sustainability, and successful sustainability and conservation projects help support net zero goals.

We are not making any recommendations in this report.

Agency Comments

We provided a draft of this report to DOD and DOE for review and comment. DOD provided technical comments (see encl. II), which we have incorporated as appropriate, and DOE had no comments.

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

If you or your staff have questions concerning this report, please contact me at (202) 512-4523 or 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 key contributions to this report include Maria Storts (Assistant Director), Tracy Barnes, Scott Behen, Mary Jo LaCasse, Sharon Reid, and Erik Wilkins-McKee.

Brian J. Lepore
Director
Defense Capabilities and Management
Enclosure

List of Committees
The Honorable John McCain
Chairman
The Honorable Jack Reed
Ranking Member
Committee on Armed Services
United States Senate
The Honorable Mark Kirk
Chairman
The Honorable Jon Tester
Ranking Member
Subcommittee on Military Construction, Veterans Affairs, and Related Agencies
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 Charlie Dent
Chairman
The Honorable Sanford Bishop, Jr.
Ranking Member
Subcommittee on Military Construction, Veterans Affairs, and Related Agencies
Committee on Appropriations
House of Representatives

Enclosure I: Updated Briefing for Congressional Defense Committees

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DOD Efforts Regarding Net Zero Goals

Information Provided to Congressional Committees

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Introduction

- In 2008, the Department of Defense (DOD) and the Department of Energy (DOE) began a joint initiative to address military energy use by identifying specific actions to reduce energy demand and increase use of renewable energy on DOD installations. Early attention was given to the possibility of net zero energy military installations.
- Achieving net zero within DOD generally means producing as much energy from renewable energy sources as is consumed by an installation, limiting the consumption of water in order to not deplete the local watershed, and reducing, reusing, and recovering waste streams to add zero waste to landfills.
- Net zero supports compliance with a variety of federal mandates and statutes such as those contained in Executive Order 13693 (March 2015), the Energy Policy Act of 2005, and the Energy Independence and Security Act of 2007.
- Section 332 of the National Defense Authorization Act for Fiscal Year 2010 mandated that DOD assess the feasibility and cost of developing net zero energy installations.

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Source of Work and Objectives

- House Report 114-102 accompanying a bill for the National Defense Authorization Act for Fiscal Year 2016 included a provision for GAO to review DOD's progress and savings from net zero installation initiatives.
- This briefing describes the extent to which DOD:

  (1) developed policies and goals for an integrated net zero strategy for energy, water, and waste management at its military installations; and

  (2) has identified the potential costs and benefits of implementing net zero initiatives.

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Scope and Methodology

- To describe the extent to which DOD developed policies and goals for an integrated net zero strategy at its military installations, we obtained and reviewed relevant federal mandates, statutes, and DOD and service-specific policies and reports to determine DOD's net zero strategy and goals for energy, water, and waste management.
- To describe the extent to which DOD has identified the potential costs and benefits of implementing net zero initiatives, we interviewed or requested information from relevant officials within the Offices of the Assistant Secretary of Defense (Energy, Installations, and Environment), the Assistant Secretary of the Air Force (Installations, Environment, and Energy), the Assistant Secretary of the Navy (Energy, Installations, and Environment), and the Assistant Secretary of the Army (Installations, Energy, and Environment), and the Army Office of Energy Initiatives about funding, monitoring, potential costs and benefits, and lessons learned.
- For both objectives, we visited the DOE's National Renewable Energy Laboratory (NREL) and Fort Carson, CO and contacted 10 Army installations to obtain information regarding policies, goals, potential costs, and benefits of implementing net zero initiatives.[1]
- We received technical comments from DOD, which we have incorporated as appropriate.

[1]We visited Fort Carson because it is one of two installations the Army identified as a pilot for energy, water, and waste management. We also obtained information from Carlisle Barracks, Forts Detrick, Hood, Hunter Liggett, Irwin, Jackson, Leavenworth, and Riley, Joint Base Lewis-McChord, and Picatinny Arsenal. We selected these installations based on progress toward meeting energy, water, and solid waste diversion goals in fiscal year 2014, though this information was not generalizable to all installations.

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Background—Executive Order 13693

- Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*, issued March 19, 2015, includes the following net zero goals:

  (1) Ensuring, beginning in fiscal year 2020 and thereafter, that all new construction of federal buildings greater than 5,000 gross square feet that enters the planning process is designed to achieve energy net zero and, where feasible, water or waste net zero by fiscal year 2030;

  (2) Identifying, as part of the order's planning requirements, a percentage of the agency's existing buildings above 5,000 gross square feet intended to be energy, waste, or water net zero buildings by fiscal year 2025 and implementing actions that will allow those buildings to meet that target; and

  (3) Diverting from landfills at least 50 percent annually, of non-hazardous solid waste, including food and compostable material but not construction and demolition materials and debris, and pursuing opportunities for net zero waste or additional diversion opportunities.

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Summary

- DOD has not established an integrated net zero strategy or policy, according to DOD officials. As of September 2015, the officials stated that DOD is working on implementation guidance to address the net zero goals included in Executive Order 13693 and expects to issue the guidance in January 2016.
- None of the military departments have established net zero as a funded program, according to DOD officials.
- The military departments have established broad net zero goals, and the Army has a net zero program, referred to as the Net Zero Initiative.
- Service officials stated that fully achieving net zero is unrealistic and ultimately cost prohibitive, although net zero can help generate interest in conservation and sustainability, and successful sustainability and conservation projects help support net zero goals.

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The Extent to Which DOD Has Developed Policies and Goals for an Integrated Net Zero Strategy

- According to DOD officials, DOD has not established an integrated net zero strategy or policy because there had been no statutory goals regarding net zero.
- In June 2015, the White House Council on Environmental Quality, Office of Federal Sustainability, issued implementation guidance for all federal agencies regarding Executive Order 13693.
- As of September 2015, DOD officials reported they were working with the services to develop DOD-specific implementing guidance for Executive Order 13693. According to DOD officials, DOD expects to issue the implementing guidance in January 2016.
- None of the military departments have established net zero as a funded program, according to DOD officials.
- The military departments have established broad net zero goals and the Army has a net zero program, referred to as the Net Zero Initiative.

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The Extent to Which DOD Has Developed Policies and Goals for an Integrated Net Zero Strategy

Navy

- Navy officials stated that the Navy does not have a net zero program.
  - 2011: The Navy issued a policy establishing a goal to achieve net zero energy at 50 percent of its installations by 2020.
  - According to Navy officials, while the 2011 net zero goal has not been rescinded, it is not being actively pursued either. Instead, the Navy has pursued conservation efforts to reduce costs.

Air Force

- Air Force officials stated that the Air Force does not have a net zero program. Instead the Air Force established a net zero goal that calls for using, to the extent possible, existing energy, water, and waste programs and resources to meet related goals.
  - 2012: The Air Force issued a policy that established end-state goals to achieve a net zero posture. The policy states that the Air Force intends for the policy to refocus existing energy, water, and waste investments on finding cost savings or cost avoidance opportunities while achieving net zero goals, without creating a new program.
  - Air Force officials told us that various energy conservation, waste reduction, energy purchase contracts, and enhanced use lease projects all could and are seeking cost savings or cost avoidances, but these projects are not done specifically to achieve net zero.

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The Extent to Which DOD Has Developed Policies and Goals for an Integrated Net Zero Strategy

Army

- Army officials described the Army's net zero efforts, in part, as an awareness campaign intended to generate interest in conservation and sustainability at the installation level.
- 2010: The Army announced the creation of a Net Zero Initiative in October 2010 and subsequently, in April 2011, identified 17 net zero pilot installations. The Army reported that the pilot installations are to serve as test beds to identify lessons learned and best practices to be institutionalized across the Army.
- 2014: The Army issued a directive that "commands will implement Net Zero to the maximum extent practical and fiscally prudent...and are expected to move toward the Net Zero goals using existing programs and resources where practical."
- August 2015: Army officials stated they are developing a process for measurement of net zero accomplishment.
  - According to Army officials, once that process is complete, Army Commands will be able to provide documentation for their installations' achievements in striving toward net zero energy, water, and/or waste.

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The Extent to Which DOD Has Identified the Potential Costs and Benefits of Implementing Net Zero Initiatives

- DOD has not fully identified the potential costs of implementing net zero initiatives and service officials stated that achieving net zero would be cost prohibitive, though net zero can help generate interest in ongoing conservation and sustainability projects. In 2012, we found that, although DOD evaluated the feasibility of net zero energy installations, it did not address the cost aspect of the issue.[2] At that time, DOD reported that it had identified pilot installations and that a more-comprehensive, in-depth net-zero feasibility study for each installation would be required to develop cost estimates.
- Net zero is not a funded program in any of the services, according to DOD and service officials. The only funding we identified that DOD has spent on net zero initiatives involved studies performed by Department of Energy entities such as the NREL and the Pacific Northwest National Laboratory, as well as the Federal Energy Management Program, to establish baselines and assess the feasibility and costs of net zero at various DOD installations. Specifically,
    - The Army reported spending approximately $14.2 million on net zero studies from fiscal year 2011 to 2013.
    - The Navy reported spending approximately $2.6 million on net zero studies.
    - The Air Force reported spending almost $80,000 in 2012 to fund an implementation plan.

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

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The Extent to Which DOD Has Identified the Potential Costs and Benefits of Implementing Net Zero Initiatives

- According to service officials, fully achieving net zero is unlikely.
  - According to service officials, fully achieving net zero is unrealistic because, in most cases, it would be cost prohibitive.
  - In September 2011, NREL reported that at Fort Carson, it would cost $842 million in capital expenditures to attain 92 percent of its net zero energy goal, which means Fort Carson would then be generating 92 percent of its total annual energy usage on the installation.[3] This amount does not include the costs for attaining the other 8 percent in renewable energy generation or the cost for achieving net zero in either water or waste management.
  - According to Army officials, to gain approval at the Command and Headquarters level to use funding to support an energy project, proposals in areas such as renewable energy or energy efficiency need to achieve either cost savings or at least parity over costs for current energy purchases at the installation.
  - According to service officials, installations that have access to lower cost energy are challenged to find energy savings from areas other than conservation and energy efficiency.

[3]Michael Callahan, Kate Anderson, Sam Booth, Jessica Kelz, and Tim Tetreault: *Lessons Learned from Net Zero Energy Assessments and Renewable Energy Projects at Military Installations*, NREL/TP-7A40-51598 (September 2011).

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The Extent to Which DOD Has Identified the Potential Costs and Benefits of Implementing Net Zero Initiatives

- Army officials stated that net zero pilot installations collaborated and shared ideas regarding sustainability and conservation efforts.
  - At the beginning of the Army's net zero efforts monthly meetings were held among the installations chosen as net zero pilots. Since 2014, these meetings have been held on a quarterly basis, according to Army officials.
- Fort Hood and Fort Carson officials stated there may be benefits to their being selected as net zero pilot installations.
  - Fort Hood officials told us they believe approval to upgrade the installation's recycling facility to a single-stream recycling facility, which does not require the sorting and separation of materials prior to pick up, happened earlier than it might have had the installation not been part of the net zero pilot program.
  - Commercial entities have approached Fort Carson to test various energy saving technologies at the installation.
  - Participation has brought increased attention and emphasis on sustainability and conservation goals. For example, Fort Carson's Department of Public Works received approval to begin a net zero Unit Contest. This contest will award up to $70,000 for units achieving energy and water conservation, and solid waste reduction via recycling.

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The Extent to Which DOD Has Identified the Potential Costs and Benefits of Implementing Net Zero Initiatives

- According to Army officials, all successful renewable energy or conservation projects that shrink the amount of energy or water usage, reduce the amount of waste sent to a landfill, or increase the amount of renewable energy generated on the installation, move the installation closer to becoming net zero.
    - Consequently, these officials stated that any project funded by appropriated funds or other funding mechanisms, including military construction and energy saving performance contracts, among others, if successfully implemented, could move an installation closer to net zero even though net zero is not identified in the rationale supporting such projects.
- Army officials said net zero is beneficial in generating interest in conservation and sustainability, though sustainability and conservation projects are not funded specifically as net zero projects.

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Enclosure 2: Comments from the Department of Defense

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
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ENERGY,
INSTALLATIONS
AND ENVIRONMENT

DEC 29 2015

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

Dear Mr. Lepore:

This is the Department of Defense (DoD) response to the GAO Draft Report GAO-16-153R, "Defense Infrastructure: DOD Efforts Regarding Net Zero Goals," dated December 4, 2015 (GAO Code 352034).

The Department believes that the first bullet on Slide 10, relating to the Army, would be more accurate if "as an" were changed to "as, in part, an." The Net Zero awareness campaign is only one component of the Army's overall strategy.

Sincerely,

Peter J. Potochney
Performing the Duties of the Assistant Secretary of Defense
(Energy, Installations and Environment)

(352034)