

Implementing a DOD Net-Zero Strategy

A balanced, thoughtful energy strategy will help DOD address financial, social and ecological interests while supporting the operational mission.

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Various recent executive orders and public laws establish a requirement for federal agencies to make big changes in their approaches to management of energy and other resources. Additionally, the *Quadrennial Defense Review* highlights the military significance of managing water, energy and waste in efficient and resource-conserving ways, especially in light of climate change and its broadening impacts. As a consequence of these drivers, and in the interest of economics and consolidation of effort, it makes sense for the Department of Defense (DOD) to consider a net-zero strategy for sustainable energy, waste and water management at military installations. For reference, the DOD and Department of Energy's Net-Zero Energy Initiative (NZEI) Task Force has defined net-zero military installations as those producing as much energy on or near the installation as it consumes in its buildings and facilities. This will, of course, come as a result of maximizing the use of renewable energy resources.

From an installations perspective, the goal is to enhance an installation's capability to support the operational mission while addressing the triple bottom line of financial, social and ecological interests. A sound net-zero strategy makes investments designed to reduce energy and water consumption and waste generation, increases the supplies of renewable and alternative energy sources, and provides efficient handling of sewage, stormwater and solid waste. These practices have the added benefit of helping DOD achieve sustainability goals established by the various federal mandates. To that end, the military services are all looking at various net-zero initiatives to include net-zero installations. No doubt the first net-zero installations will be well-studied, drawing on all available government and private-sector expertise to better guide the way forward.

BACKGROUND

This proposed net-zero initiative builds upon years of increasingly creative and well-integrated progress executed around the country. Several DOD installations have made noteworthy progress on improving sustainability in terms of building construction, supporting infrastructure, and operations and training. Many have saved money in the process. However, installations have often focused on one area, such as energy, with little or no integration between energy, water and waste goals. This is unfortunate, as there are numerous examples that demonstrate the merit of combining solutions to these problems for greater benefits and cost savings.



Members of Naval Mobile Construction Battalion 1 drilled three 800- to 1,000-ft-deep holes for the U.S. Navy Geothermal Program Office to support research on local geothermal energy potential at Twentynine Palms, Calif.

NAVY PHOTO BY MASS COMMUNICATION SPECIALIST SEAMAN ERNESTO HERNANDEZ

DOD leaders recognize integrated resource management practices can help achieve synergistic energy, water and waste management to best attain efficiencies in infrastructure operations while capturing resource streams previously “wasted” such as “waste” heat and “waste” water. DOD also recognizes the potential benefits of tapping private investment for infrastructure and energy-efficiency improvements. This means harnessing the latest techniques used by the private sector to help achieve net-zero goals. Fortunately, a growing number of private developers, and also investors willing to form public-private partnerships, have gained experience in this arena. DOD hopes to leverage that experience and expertise.

Fundamentally, sustainable systems are cyclical, rather than one-way processes. However, we typically do not design most infrastructure and other built systems this way, so there exists a broad category of untapped room for improvement. Cyclical infrastructure systems enable the capture of outputs from one process as inputs to another process, rather than allowing the value of those outputs to be lost. For example, an agency can design or retrofit sewage treatment systems to allow utilization of heat from sewage digestion for district heating and cooling, much like ground-source geothermal systems; it can design treatment plants to capture combustible gases and use them for cogeneration (reducing greenhouse gas emissions and producing energy); and it can convert biosolids to compost for application as a soil amendment conducive to water conservation. In total, these types of systems can reduce water and energy demand by 50 percent or more. This approach represents a systems-approach assemblage of existing technology, interconnected to function much like an ecosystem. Results from this approach include the possibility of substantial cost savings, and in certain cases revenue generation.

SUPPORTING MILITARY OPERATIONS

From an operational perspective, energy and water availability affect military operations in some very direct ways. Without question the most devastating impact to DOD and our nation come from the casualties incurred while pro-

tecting convoys carrying fuel and water to support missions in hostile areas. Reducing the level of demand through improved technology and behavior patterns has great potential to reduce this risk; accomplishing this objective will require culture change supported by updates in planning, purchasing, training and other areas.

Prudent and resourceful conservation of water, energy and waste can promote greater resiliency in the face of climate change and may also make incremental contributions to its mitigation. As climate change alters sea level, rainfall patterns and seasonal extremes of temperature, the demand for energy and water may lead to local shortages, price increases and, in the worst cases, conflicts. If we do not consider an integrated management approach, efforts to resolve these problems may improve, for instance, energy supply while increasing pressure on other resources and thus undermining broad conservation outcomes.

Military operations have a unique opportunity to facilitate development and spread familiarity with methods of net-zero resource management and to reduce vulnerability both within and outside DOD in the process. To that end, the Secretary of the Navy (SECNAV) has directed the Office of the Chief of Naval Operations to research the viability of making U.S. Navy installations net-zero energy installations. This initiative is aligned with SECNAV energy goals that state 50 percent of Navy installations will be net-zero installations by 2020.

SECNAV established several other energy goals to increase warfighting capability, both tactically and strategically. Tactically, the objective is to use energy sources available on location and increase energy efficiency to reduce the volatility and risk associated with long fuel supply lines. From a strategic perspective, the objective is to reduce reliance on fossil fuels. The Navy’s energy strategy centers on energy security, energy efficiency and environmental stewardship while maintaining maritime dominance. The key objectives recognize that energy security is critical to mission success.

The Navy energy branch has taken the initiative to explore future net-zero opportunities and has aligned FY2011 funds for net-zero studies (to focus on renewable sources of energy). In parallel with this ef-

fort, the Department of Energy’s Federal Energy Management Program, via the National Renewable Energy Laboratory, funded the first in-depth pilot NZEI study in the first quarter of FY2011 at Naval Support Activity South Potomac to study potential renewable energy resources with “region-diverse challenges.”

IN SUMMARY

DOD is evaluating strategies and will prioritize those with the highest merit based on highest performance and best value rather than lowest cost. By viewing energy, water and waste infrastructure and management strategies as fully integrated elements within a functional ecosystem, DOD can assess and evaluate both positive and negative resource impacts, costs and revenues. The results will help DOD focus efforts towards achieving the greatest return on investment for military installations and surrounding energy, environmental and ecological systems, measured by both financial merits and environmental integrity.

The benefits of the approach are its applicability across installations with different missions in varying geographies. This approach also allows maximization of lifecycle cost savings through installation-specific adaptive management of measures addressing technological, enterprise, economic, regulatory and other factors to significantly impact the performance of net-zero strategies across energy, water and waste. DOD expects significant long-term savings in terms of resource conservation and reduced utility bills, plus improved operational security and reduced risk. A well considered net-zero strategy can help DOD achieve these expectations.

TIME

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