

Sustainability Approaches Proven Successful at Naval Installations

Efforts Range from Using Facility Energy More Efficiently to Diverting Construction & Demolition Debris

EVERYONE IN THE Navy wants to see their installation run like a well-oiled machine—smarter, more efficiently, with less waste—to better accomplish the mission, and at lower cost—to do the right thing by the environment, not just now but for future generations. Sustainability brings together both of these concepts as successfully demonstrated by a number of naval installations.

1. The Continued Availability of Resources Critical to the DoD Mission is Ensured
2. DoD Readiness Maintained in the Face of Climate Change
3. The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution
4. Continuous Improvement in the DoD Mission Achieved through

ties Criteria. But making a sustainable Navy a reality doesn't happen at the top, it happens on the ground, on Navy installations. This article compiles examples of eight installations that have demonstrated effective approaches for improving the sustainability of their operations. Their stories provide tangible examples of ways to do things better, while often saving money in the process.

DoD defines sustainability as the ability to operate into the future without decline—either in the mission or in the natural and man-made systems that support it.

Conducting the Navy's day-to-day business sustainably makes sense, and it's Department of Defense (DoD) policy. Every June, the Under Secretary of Defense for Acquisition, Technology and Logistics submits the DoD Strategic Sustainability Performance Plan, which is built around four mission-oriented sustainability objectives:

Management and Practices Built on Sustainability and Community

Complementing this framework are policies such as the Secretary of the Navy goal for half of Navy installations to be net zero energy consumers by 2020, and a suite of DoD and Naval Facilities Engineering Command (NAVFAC) guidance documents and standards such as the Unified Facili-

Using Facility Energy & Potable Water More Efficiently

Performance Contracting: Paying for Projects with Savings

Naval Air Station (NAS) Whiting Field in Florida awarded a \$3.6 million Utility Energy Service Contract performance contract in April 2012 to reduce fossil fuel and water consumption by 12 facilities on the installation.



Just as large expanses of otherwise underutilized DoD land are ideal for solar projects, so are rooftops. Also, the protection provided by the panels can lengthen the lifespan of the roof.

In a performance contract, the service provider is paid from the savings in energy—and often water—generated by the improvements the provider implements under the contract. NAS Whiting Field had a broad range of work conducted under the contract for renewable energy and energy and water efficiency. The utility, Gulf Power, installed advanced building energy monitors and made upgrades to heating, ventilation and air conditioning

(HVAC) systems, including installing direct digital controls for HVAC equipment. It upgraded infrared heaters, chiller compressors, and lighting to more energy efficient models. Personnel were trained on how to optimally operate energy-intensive equipment, including scheduling its use to reduce peak demand for energy. For water efficiency, the contract included installing high efficiency plumbing fixtures. Finally, more than 8,000 square feet of solar window film was installed in the two bachelor quarters, and 1,200 solar photovoltaic panels were installed on the rooftops of two squadron training buildings. As a result of the work, the base is reaping annual saving of 14,850 million British thermal units in energy—a drop of 10 percent—and 1.3 million gallons of water, a dramatic reduction of 74 percent. This translates into avoided costs by the installation of more than \$300,000 every year.



Air duct inspection at Naval Station Rota in Spain. Many energy efficiency improvements are low cost and generate ongoing revenue from the resulting savings.

Partnering with Local Authorities for Reclaimed Water

In February 2012, NAS Corpus Christi and local council members entered into an agreement to bring reclaimed water from the city's wastewater plant—treated but not potable—to the installation golf course. The City of Corpus Christi Water Department arranged and paid for the infrastructure (purple pipe and associated pumps, valves and controls) to take the water from the wastewater treatment plant to the fence line of the base, a little under one mile away, through a \$1.0 million contract. The base Department of Morale, Welfare and Recreation handled the infrastructure on the base, at a cost of \$1.2 million. The cost to the base will be repaid quickly, however. With the new system, the base is using 96,000 gallons of reclaimed

water per year, which the City provides at no cost. This represents annual savings for the installation of \$384,000 over using potable water for a payback period of just three years and two months.

Increasing Renewable Energy

In January 2012, construction began at Naval Air Weapons Station China Lake on what will be the Navy's largest solar installation—a 13.8 megawatt photovoltaic array consisting of 31,680 panels. Under a 20-year power purchase agreement (PPA), a financier (an affiliate of MetLife, Inc.) purchased the solar system. It was designed and built by a private solar company (SunPower Corp.), which will also operate and maintain the system. The role of the installation is to provide the land for the project and purchase electricity from it, at a rate locked in below the current retail utility rate for 20 years. The 20-year term for the PPA—the first one of this duration with the

federal government—gives the Navy a significantly better rate than 10-year PPAs. The Navy incurs no upfront costs. The array is projected to meet approximately 30 percent of the installation's annual energy needs and reduce its energy costs by about \$13 million over the 20-year life of the contract. The components of the solar energy system are shipped in pre-assembled power block kits to facilitate rapid installation on the site.

Decreasing Vehicle Petroleum Use

In Fiscal Year (FY) 2009, Naval Station (NS) Everett began working with the NAVFAC Northwest Navy Operational Support Center to convert their non-tactical vehicle fleet to run on 100 percent alternative fuel. By February 2013 the transition was complete, creating a fleet of 200 light and medium duty vehicles. All vehicles in the fleet are either low speed electric vehicles, hybrid electric vehicles, or compatible with biodiesel or E85 (a

blend of 85 percent denatured ethanol fuel and 15 percent gasoline). This makes Naval Station Everett the first installation in the Department of Navy to have a vehicle fleet powered almost entirely by alternative fuels. (The fleet still uses some gasoline in E85 flex fuel vehicles because the fleet managers found that using gasoline for one out of every five tanks help keeps the engine running smoothly.) The installation accomplished this through a three-prong approach of:

- Installing a biodiesel and E85 filling station on-site
- Exchanging 46 full size vehicles for low speed electric vehicles
- Aggressively making use of the General Services Administration (GSA) schedule for acquiring, replacing and exchanging vehicles

Looking ahead, NS Everett is committed to expanding its electric vehicle charging infrastructure to support not only the current low speed electric vehicles, but future full-size electric vehicles and plug-in hybrids. As part of this effort, the installation is negotiating with GSA to run a pilot program for compact and mid-size electric vehicles.

Managing Stormwater Runoff

The construction contract for \$6.3 million in improvements at Naval Weapons Station Earle in New Jersey included the Navy's low impact development requirements as



Low-speed electric vehicles like this cargo van are well suited for vehicles confined to the installation grounds.

well as those of the State of New Jersey. Compared to pre-developed conditions, the state requires annual groundwater recharge to be maintained, and runoff rate, runoff volume, and total suspended solids to be reduced. The project's stormwater management measures included two underground precast concrete infiltration basins to accommodate the runoff from most of the impervious areas within the project site. The basins provide groundwater recharge for 100 percent of the site's annual preconstruction groundwater recharge volume, and completely infil-

more efficient, and improved the identification of opportunities for solid waste diversion, as well as other sustainability goals. Specific components of the Sustainable Solid Waste Program are as follows:

- The installation requires C&D debris contractors to submit a C&D Debris Monthly Diversion Report which summarizes their waste diversion efforts. The installation also provides these contractors with a list of local C&D recyclers at pre-construction meetings.

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trate runoff from a two-year storm. The project included the construction of a new building, and a rainwater collection and reuse system was installed to collect and store rainwater from the roof. The system not only reduces stormwater runoff, but the installation uses the harvested water to flush toilets. As a result of the measures, the annual runoff flowing from the site contains 80 percent less total suspended solids on average, and the peak runoff rates for 2-, 10-, and 100-year design storms are less than they were prior to the project.

Reducing Waste

Putting Construction and Demolition Debris to Work

The Sustainable Solid Waste Program at Naval Weapons Station, Seal Beach in California diverted almost 99 percent of its construction and demolition (C&D) debris away from disposal in FY 2012, avoiding over \$141,000 in disposal costs. The installation achieved this remarkable success by making clear demands of contractors and providing them with guidance, including information on avenues for reusing and recycling construction debris. The installation has an on-site manager for the Sustainable Solid Waste program who works collaboratively with the installation's Environmental Aspects and Requirements Review process. The process had been merged into the business processes of the base's Public Works Department for the planning, design and construction of all Facility Engineering and Acquisition Department projects. The partnership has improved the effectiveness of project reviews, improved compliance, made project execution

- Contract oversight of Facility Engineering and Acquisition Department projects now includes continuous monitoring of municipal waste dumpsters and construction sites.
- Contractors for projects that cost more than \$100,000 and generate more than one ton of C&D debris must submit a Solid Waste Management Plan. The Plan must be approved by the program's on-site manager, and must describe actions to be taken to reduce solid waste generation and approaches to be used in recycling and reuse. It must also estimate the types and quantities of waste to be generated, and include a target diversion percentage rate (at least 50 percent of the total generated) and a list of specific waste materials that will be either recycled or salvaged for resale or reuse.

To ensure that organic waste is recycled or composted, program management provides direction and assistance on scope of work specifications for projects that produce organic waste through vegetation trimming, clearing and grubbing.

Reclaiming Used Fuel

The Naval Supply Systems Command Fleet Logistics Center Pearl Harbor provides logistics support to the Pacific Fleet. At its Fuel Oil Reclamation Facility, the Center reclaimed 237,000 gallons of fuel in FY 2010 and FY 2011 that could not be used (was "not ready for issue") until it was reconditioned. Previously, the fuel would have been disposed of as



Hosting events at NBSD to turn in unwanted electronics ensures their environmentally sound disposition and frees up storage space.

oily waste, but its reclamation enabled the Center to sell the fuel to a local refinery instead, generating a net savings of \$3.9 million. The installation made the reclamation possible by changing the procedures used for offloading used fuel onto barges at Joint Base Pearl Harbor Hickam. The new procedures chemically test the material placed onto each barge to

ensure that all material loaded onto barges intended for reclamation can be recovered as Fuel Oil Reclaimed, and is not contaminated with other material. This allows the entire load on such barges to be discharged to the Fuel Oil Reclamation Facility, rather than disposing of it as oily waste.

Electronic Stewardship

Naval Base San Diego (NBSD) hosted its seventh Electronic Waste Recycling Event in March 2012, enabling 35 Navy commands to get rid of old appliances and electronic waste, while knowing the material would be recycled or otherwise properly processed for disposition through the Defense Logistics Agency's Disposition Services. This year Commands turned in four and half tons of appliances and 14 tons of electronic waste, valued at more than \$200,000, which was properly recycled or resold. "E-Waste" Recycling Events are a proven

approach for the base. It has hosted seven in the past three years, and so far the events have pulled in more than 87 tons of electronics and 30 tons of appliances for recycling and resale, saving over \$1 million in disposal costs. The event accepts a wide range of government-owned materials: computers, laptops, electronics of all sorts, refrigerators, microwaves, televisions, cell phones, video cassette recorders, copiers, printers, tape players, modems, compact disc players, radios, typewriters, scanners, telephones, washers, dryers, freezers, trash compactors, space heaters, water heaters, air conditioners, ovens, stoves, and dishwashers. The events are held in the base's "wet side" parking lot, open to active duty, reserves and civilian Navy personnel. NBSD has developed a guide on how to conduct the event, available at: www.cnic.navy.mil/navycni/groups/public/documents/document/cnicp_a300509.pdf.

This set of success stories illustrates the breadth of sustainability, and provides concrete examples that other naval installations can use in formulating their own paths to operations that are both smarter and more sustainable. A future issue of *Currents* will focus on sustainability successes with facility energy, water and buildings. If you would like to highlight in that issue a successful approach your installation has taken to improve sustainability, on these topics or any other, please submit your story directly to Judith Barry. [📧](#)

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