

Apr 11, 2017



FY 2016 SECRETARY OF DEFENSE ENVIRONMENTAL AWARD
OFFICE OF PREPARATION AND SECURITY REVIEW
NAVAL SUPPORT ACTIVITY MECHANICSBURG
SUSTAINABILITY,
NON-INDUSTRIAL INSTALLATION



Introduction: Naval Support Activity Mechanicsburg (NSA-M) consists of three installations located in Pennsylvania. The bases are the command namesake NSA-M, Naval Support Activity Philadelphia (NSA-P) and the Philadelphia Naval Yard (PNY).



Figure 1: NSA Philadelphia	Figure 2: NSA Mechanicsburg	Figure 3: Philadelphia Navy Yard
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NSA-P	NSA-M	PNY
<ul style="list-style-type: none"> • 135 Acres • 38 Buildings • 34 Tenant commands • 2.25 Million square feet of occupied space 	<ul style="list-style-type: none"> • 806 Acres • 150 Buildings • 35 Tenant commands • 8.4 Million square feet of occupied space 	<ul style="list-style-type: none"> • 262 Acres on 9 parcels • 42 Buildings • 8 Tenant commands • 2.6 Million square feet of occupied space

Background and Mission: NSA-M’s mission is to provide facilities and functions to tenants with operations including research and development, foundry services, storage for inactive ships, data center services, logistics for ships, submarines, and aviation and administrative space for over 12,000 employees at 75 tenant commands with a \$2 billion economic impact.

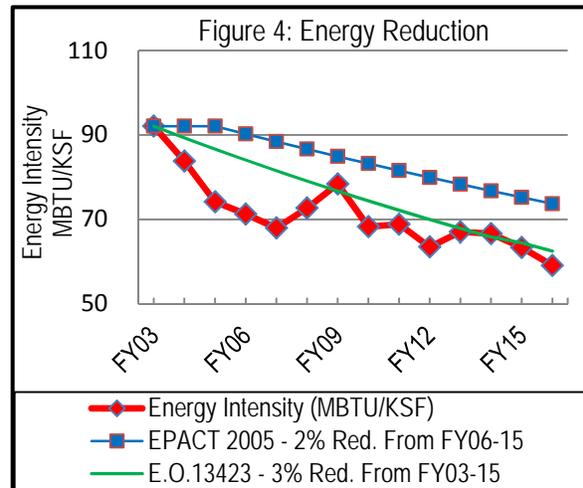
Major Accomplishments During the Award Period:

- Replaced over 1,700 conventional bulbs with LED bulbs creating a direct savings of 900 megawatt hours and \$88,000 annually.
- Maintained a waste diversion rate over 60% for the past six years and recycled over 9,500 tons of material during FY 2015-2016.
- Reduced energy use by 7.8%, and saved over \$3 million during the award period. This exceeded EISA 2007 energy goals and is tracking to exceed E.O. 13693 energy goals.
- Reduced greenhouse gas emissions by 57%, ahead of the E.O. 13693 goal.
- Converted 20 buildings from central steam to boilers and added centralized controls reducing greenhouse gas emissions 12 million lbs. and saving \$2.2 million a year.
- Introduced novel energy recirculation equipment that will save over 2 million gallons of fuel, avoid the production of 43 million lbs. of carbon dioxide and save over \$7 million in fuel annually.
- Partnered with over fifteen local stakeholder groups on sustainability projects including the University of California to test an aerosol sealing technology for older buildings.
- Earned the PLATINUM SECNAV Energy award in 2014, and the GOLD Energy Award and Installation Excellence Award for Small Installations in 2015.

A Team Commitment to Sustainability: NSA-M has integrated sustainability into both strategic and day-to-day decision making from the executive suite to the shop level. Implementing both Executive Order (E.O.) 13693 goals and the DOD Strategic Sustainability Performance Plan, NSA-M has made excellent progress in reducing energy intensity, reducing greenhouse gas emissions, implementing zero emissions vehicles and infrastructure, and reducing waste by recycling. During the award period NSA-M has implemented over one hundred projects to improve the sustainability of Navy facilities and operations. NSA-M has shared these successes with the City of Philadelphia, University of Pennsylvania and other surrounding businesses through demonstrations and partnerships.

Meeting Executive Order 13693 Energy Goals:

NSA-M has reduced energy use by 35% from 2003, exceeded EISA 2007 and EO 13423 energy goals requiring each installation to achieve a 30% reduction (3% annually) by FY15 from an FY03 baseline. In addition NSA-M is on track to exceed the EO 13693 energy intensity goal to reduce energy intensity in federal buildings by 2025 by 25%. The key to meeting these goals has been the establishment of a building monitor and energy audit program and implementing energy saving projects. During the award period NSA-M has conducted over 50 building monitor training workshops and executed over 20 energy specific projects to improve efficiency. These initiatives have saved over 48 Million British Thermal Units (MBTU), and \$1.1M during the award period.



During the award period energy audits were conducted in 34 facilities totaling over 4.1 million square feet. These audits provided a list of future energy savings projects and conservation measures with the potential to save an additional 4,731 MBTU.

Meeting Executive Order 13693 Greenhouse Gas Goals:

Between 2008 and 2016 NSA-M decreased greenhouse gas emissions over 57%. This puts NSA-M ahead of the E.O. 13693 goal to reduce greenhouse gas emissions by 40% by FY2025 from a FY2008 baseline. NSA-M exceeded this goal through a combination of programs including shifting from central steam to high efficiency package boilers, switching from conventional lights to LEDs, installing centralized building controls to optimize HVAC, introducing zero emissions vehicles and conducting individual building energy audits.

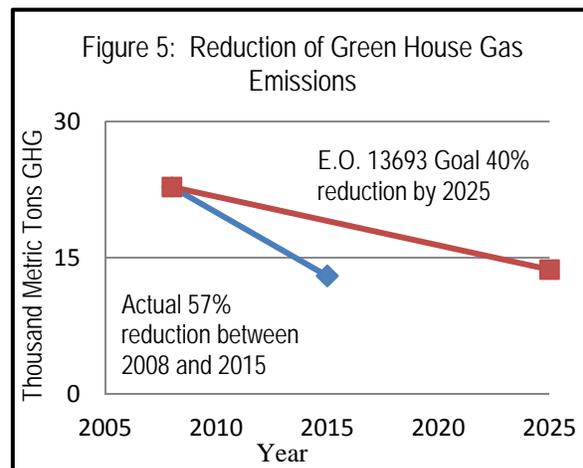




Figure 6: Employees optimizing the HVAC system using the digital data control interface.

FY2015 was the start of a performance period for the conversion of twenty buildings from a 1940's central steam system to high efficiency natural gas boilers employing Digital Data Controls to optimize building heating. This project has resulted in reducing greenhouse gas emissions 12 million lbs. and saving \$2.2 million a year.



Figure 7: High efficiency boiler units that replaced central steam.



Figure 8: LED replacement lights installed in a high bay facility.

During the award period NSA-M has replaced over 1,700 conventional bulbs with LED bulbs. The new lights and improved controls, created a direct savings of 900 megawatt hours and \$88,000. These replacements helped successfully complete the E.O. 14328 goal of reducing energy 3% annual between 2003 and 2015 and have provided a blue print to achieving the E.O. 13693 goal to reduce energy intensity by 2.5% annually between 2015 and 2025. In addition to the direct savings, these bulbs create multiple secondary savings because they last three times as long as conventional bulbs reducing cost, waste and mission disruption from bulb replacements. While many of the bulb replacements are in office spaces (which are easy to replace) some are in high bay buildings used for research and development. Decreasing bulb replacement frequency in the high bay areas, such as the facility shown at left, creates significant savings and minimizes mission down-time for re-lamping.

Introducing Novel Energy Saving Technology:

In recognition of NSA-M's reputation as an energy innovator, the installation was chosen to host a demonstration project with the University of California Davis and the Environmental Security Technology Certification Program. This demonstration project is currently testing a new aerosol sealant product at an older energy challenged building. The study will determine the products ability to reduce air infiltration and leakage in old facilities to improve energy efficiency with an anticipated HVAC savings in older buildings of over 10%



Figure 9: Aerosol sealant product being tested to reduce air infiltration and improve building efficiency.



Figure 10: Equipment used for an energy recirculation project that will save over 2 million gallons of fuel, avoid the production of 43 million lbs. of carbon dioxide and save over \$7 million in fuel procurement annually.

Research and development operations are a major consumer of fuel and source of air emissions. PNY is hosting an innovative energy recirculation project as part of the energy conservation investment program. This project will integrate with the existing building utility system and recover over 80% of the energy used for a research and development facility. The use of this equipment will save over 2 million gallons of fuel, avoid the production of 43 million lbs. of carbon dioxide and save over \$7 million in fuel procurement annually. This project supports the mandates of the Energy Policy Act of 2005, E.O. 13423, the Energy Independence and Security Act of 2007, and the Navy Sustainability Plan directing Federal Agencies to increase the efficiency with which they use energy in facilities.

Building an Energy Efficiency Team:

During the award period, the NSA-M Installation Energy Board made significant progress in improving sustainability and energy performance. NSA-M's leadership is committed to sustainability as demonstrated by the efforts of the installation Energy and Encroachment Leadership Council. This leadership initiative has accelerated the change in employee culture towards energy conservation. This commitment was demonstrated by a 7.8% reduction in energy use and a 17.9% reduction in utility costs (over \$3 million saved) during the award period.

Energy Awareness:

NSA-M has run an aggressive energy awareness campaign over the last several years and has worked to inform employees about energy conservation both at work and at home. NSA-M staff has worked with the local Navy Yard developer Philadelphia Industrial Development Corporation (PIDC) for the past four years to host an Energy Awareness Festival. Participants included Delaware River Keeper, Clean Air Council, Environmental Protection Agency, NAVFAC, Pennsylvania Environmental Council, Philadelphia Gas Works, and Philadelphia Water Department. NSA-M has also worked with PIDC to support an electric vehicle demonstration of the Navy's fleet.



Figure 11: Navy Energy Booth at the Partnered Sustainability Day at PNY with over 22 vendors and 400 occupants in attendance.



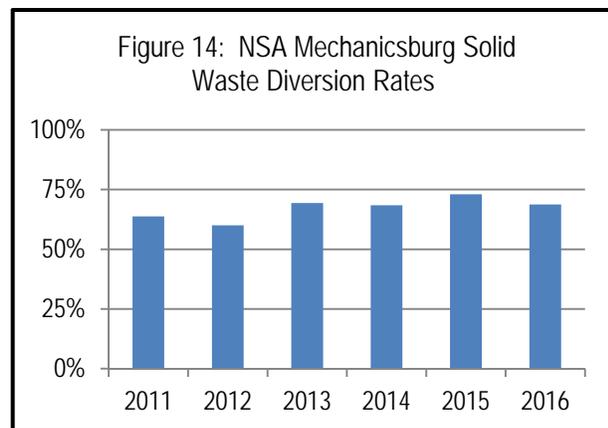
Figure 12: An electric vehicle in use at NSA Mechanicsburg

Zero Emissions Vehicles and Charging Stations: E.O. 13693 section 3(g)(v) has a goal that by December 31, 2020 zero emission vehicles or plug-in hybrids account for 20% of all new agency passenger vehicles. NSA-M is contributing to this goal by testing electric vehicles and installing charging stations at all three locations.



Figure 13: Electric charging station at PNY

Recycling Program: The recycling program at NSA-M has maintained a diversion rate over 60% for the past six years exceeding the E.O. 13693 goal of 50%. To maintain this level of sustained success the program has support throughout the organization and waste avoidance and recycling is build into every process and contract. During the award period the NSA-M recycling program has recycled over 9,500 tons of material including over:



- 14 Tons of print toner cartridges
- 954 Tons of metal including aluminum cans
- 18 Tons of lead acid batteries
- 15,000 Gallons of oil
- 5,000 Tons of foundry materials
- 22 Tons of tires
- 891 Tons of paper
- 9 Tons of florescent bulbs
- Hundreds of items of e-waste
- 1,500 Tons of construction debris

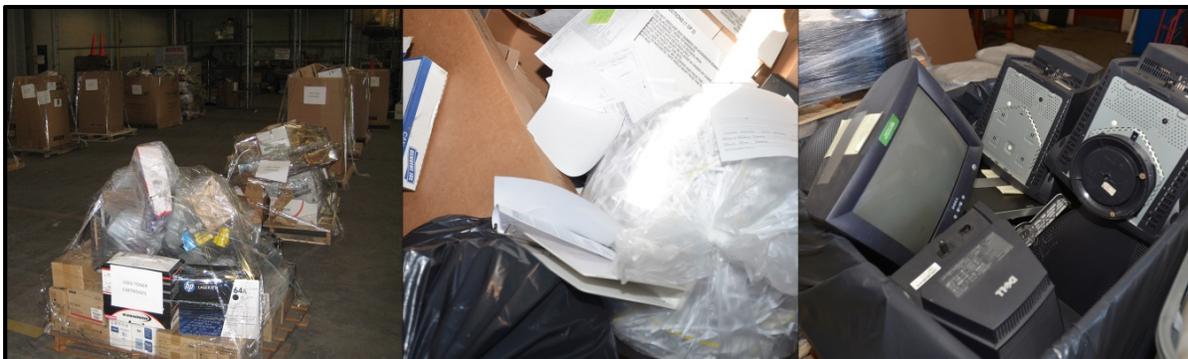


Figure 15: Toner cartridges, paper and e-waste as part of NSA-M's recycling program. These products contributed to a diversion rate of over 60% for the past 6 years with over 9,500 tons of material being recycled during FY2015/2016.

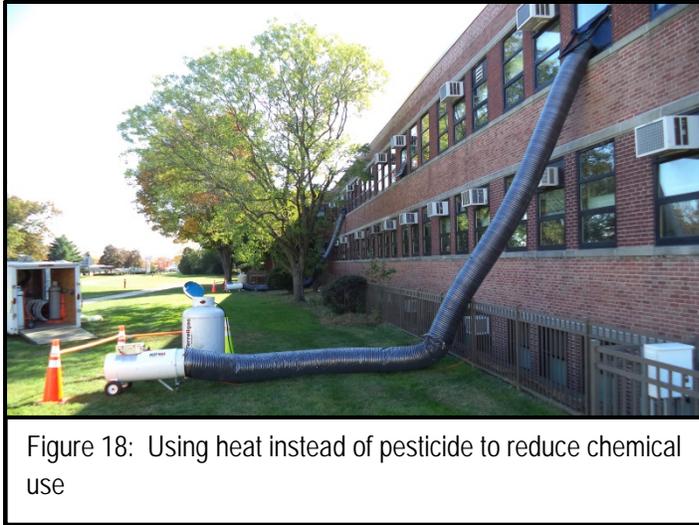


Figure 16: Metals, lead acid batteries, oil, print cartridges, florescent bulbs, and recycling dumpsters all part of NSA-M's recycling program. These products contributed to a diversion rate of over 60% for the past 6 years with over 9,500 tons of material being recycled during FY2015/2016.

Recycling Through Building Deconstruction: In 2015 NSA-M demolished a 200 * 600 foot warehouse. Since the warehouse was primarily constructed of wood this provided an excellent opportunity to recycle the entire superstructure of the building. The wood from the building was disassembled and reused to construct three cabins at a Boy Scout camp in upper state New York. This single action kept over 350 tons of wood out of a landfill and supported the E.O. 13693 section 3(j)(iii) goal of “Diverting at least 50 percent of non-hazardous construction and demolition materials and debris”.



Figure 17: The material from a demolished ware hours (left) was repurposed and used to build cabins at a Boy Scout camp (right). This single action kept over 325 tons of wood out of the landfill.



Implementing Sustainable Pest Control: To manage a recent pest problem NSA-M employed heat treatment. This technology uses heat which is pumped into the building to raise the buildings internal temperature to 130 degrees for several hours. The process uses no pesticides and eliminates all risks associated with human exposure to poisons. This action supports the E.O. 13693 Section 3(j)(iv) goal to “reducing or minimizing the quantity of toxic and hazardous chemicals and materials.”

Building Sustainable Partnerships: The importance of sustainability is continually stressed as part of the Installation Environmental Management System, Installation Energy Board and in partnerships with local municipal and stakeholder groups. These partnerships optimize resources by creating multidiscipline, multifunctional teams that leverage each group’s core competencies in implementing sustainable practices and programs. During the award period, NSA-M has built partnerships with the community and tenant commands including:

- Participated with the Philadelphia Planning Commission on implementation of the 2035 Development Plan goals.
- Partnered with Hampden Township, Borough of Mechanicsburg, Cumberland County Conservation District, Capital Region Council of Governments, West Shore Chamber of Commerce, Cumberland County Planning Commission, and Cumberland Area Economic Development Corporation on proposed Joint Land Use Planning Study.
- Participated with the Philadelphia Industrial Development Corporation on land use planning and micro grid planning.
- Participated in the Delaware Valley Regional Planning Commission Taskforce.
- Enrolled 2.5 MW of capacity in an emergency demand response program generating \$75,000 in annual savings. PNY participates in an Emergency Demand Response Program with the local utility supplier by conforming to demand reduction strategies.
- Partnered with NAVFAC HQ and MIT/Lincoln Labs at PNY and NSA P on an energy resiliency study to support growing mission requirements and securing mission dependency.
- Partnered with Pennsylvania Environmental Council to provide Stormwater Best Management Workshops to engineering, planning, environmental staff including Tenant Commands, as well as production personnel.
- Supported security agencies during the Papal visit and Democratic National Committee meetings in Philadelphia to ensure sustainable practices were incorporated in the mission.
- Partnered with the local utility on a multiyear planning effort to replace old and deteriorated water lines at NSA-M. Once complete the project will reduce water consumption and increase necessary pressure for fire protection systems.