



FY 2015 Secretary of Defense

# Environmental Awards

Environmental Sustainability, Non-Industrial Installation  
Peterson Air Force Base

## Introduction

Nestled at the base of the Rocky Mountains, Peterson Air Force Base (AFB) is home to the 21st Space Wing (21 SW) and 53 mission partners, including Headquarters (HQ) North American Aerospace Defense Command, HQ Northern Command, HQ Air Force Space Command (AFSPC), the United States (U.S.). Army Space and Missile Defense Command/Army Forces Strategic Command, and the 302nd Airlift Wing (302 AW). Approximately 11,745 active duty, reservists, Canadian Forces members, civilians, and family members live and work on Peterson AFB's 1,392 acres. The installation provides and employs global capabilities to ensure space superiority and is the most geographically diverse wing in the U.S. Air Force (USAF), with 12 weapon systems operating from 25 locations and 6 installations in 9 countries around the world in 14 time zones. In addition to employing space control, space surveillance, and intercontinental ballistic missile surveillance and warning, Peterson AFB provides operational support for its mission partners and

support functions such as personnel, finance, supply, and transportation to Schriever AFB. Other neighboring military installations include Fort Carson, the USAF Academy, and Cheyenne Mountain Air Force Station (AFS), offering unique opportunities for collaboration with the U.S. Army and sister Civil Engineer squadrons. Peterson AFB's residents enjoy the hiking trails, scenery, and recreation the mountainous region has to offer—including the overshadowing 14,000 foot Pikes Peak—and have access to two major city parks within 5 miles of the installation. Through indirect job creation; annual expenditures on local service contracts; material, equipment, and supplies procurement; and payroll, Peterson AFB generates \$1.3 billion of positive economic impact to the local Colorado Springs, Colorado community.

## Background

The 21st Civil Engineer Squadron's Installation Management Flight Environmental Element (21 CES/CEIE) manages Peterson AFB's environmental policy, aspects, impacts, with associated objectives, targets, effective

monitoring, and senior leader management review process. The Environmental Office is directly responsible for and oversees environmental compliance at not only Peterson AFB, but at the 21 SW's four Geographically Separated Units (GSUs) and nine Air Force Space Surveillance Stations, which increases the work load. The Environmental Office consists of ten full-time civilian personnel and one contractor.

Peterson AFB's environmental commitment statement to the mission clearly addresses how sustainment remains one of the installation's highest priorities and will be a major factor in their disciplined decision-making process. Peterson AFB is dedicated to a sustainable management approach that reduces operating costs while maximizing mission effectiveness. The Pollution Prevention (P2) program manager acts as a Contracting Officer Representative for a \$90 million per year Base Maintenance Operations Contract that Peterson AFB manages on Thule AB with Danish government support. In addition to the four GSUs, the Natural and Cultural Resources program manages natural and cultural resources along nine Air Force Space Surveillance Stations that comprise a "Space Fence" across the southern U.S. These "Fence sites" host a space surveillance system erected during the Cold War era and are home to a handful of sensitive, threatened, and endangered species.

Under a fully conforming Environmental Management System (EMS), Peterson AFB's environmental personnel facilitate and collaborate with the EMS Cross-Functional Team (CFT) stakeholders that include Civil Engineer, Procurement, Logistics, Legal, and Public Affairs personnel to continuously evaluate environmental impacts on the installation and its GSUs. Due to the expansive geographic reach, the EMS also tracks and maintains dozens of legal compliance requirements that interact with Peterson AFB's operating mission:

- Three Title V Air Operating Permits
- One Restricted Emission Status Air Permit



#### **New Wind Turbines**

JB Cape Cod is now home to five wind turbines. The first three turbines were constructed in 2009 and 2011 to offset the cost of electricity associated with eight groundwater pump and treat systems and 100 percent of the power needed for the environmental cleanup. The newest wind turbines offset electric costs for a PAVE PAWS radar facility on the property.

- Eighteen Title I Air Operating Permits
- Emergency Planning Community Right-to-Know Tier II Report
- Five Integrated Natural Resources Management Plans in partnership with the U.S. Fish and Wildlife Service
- Five Integrated Cultural Resources Management Plans
- Two Wastewater Pollutant Discharge Elimination System Permits
- Stormwater Pollutant Discharge Elimination System
- Pesticide Pollutant Discharge Elimination System Permit
- Six Spill Prevention Control and Countermeasure Plans
- Underground Storage Tank Permit
- Four Hazardous Waste Management Plans

- Four Integrated Solid Waste Management Plans
- Inert Waste MonoFill Solid Waste Permit
- Qualified Recycling Program Business Plan
- P2 Plan
- Two Lead Based Paint Management Plans
- Two Asbestos Management and Operations Plans



#### **Porous Paver**

Peterson AFB has installed about 116,850 square feet of permeable pavers at various locations. The above parking lot supports the 4th Space Control Squadron and was master planned to double in size with no waste. Compared to asphalt, pavers provide a longer design life (45 years vice 25) and lower life cycle costs (about 75%), in addition to improved stormwater mitigation.

In managing their respective programs, Peterson AFB's environmental personnel incorporate goals and metrics from Department of Defense (DoD) Strategic Sustainability Performance Plans; Executive Orders (E.O.s) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*; and 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*. As part of a beyond-compliance and sustainable-minded management approach, Peterson AFB actively strives to reduce fossil fuel demand, greenhouse gas (GHG) emissions, solid and hazardous waste generation, water consumption, and energy intensity while promoting sustainable design

and procurement. Environmental Office personnel are active members of community groups that encompass the interests of on-base and external stakeholders. Peterson AFB management approach ensures the installation is abreast of the latest information and emerging requirements, including the Management Internal Control Toolset for the Air Force Inspection System that is dictated by the Inspector General to ensure self-evaluation of environmental compliance; the nationwide environmental management dashboard and document repository, eDASH; Air Pollution Information Management System for air quality and beta testing for cutting edge refrigerant management and Enterprise Environmental, Safety, and Occupational Health Management Information System (EESOH-MIS) for hazardous material and hazardous waste control.

Examples of recognition Peterson AFB has earned in the last three years alone for its unequalled commitment to environmental stewardship and sustainability include:

- 2012-2013 Tree City USA
- 2012 Tree City Growth Award
- 2012 AFSPC Energy Conservation Team Award
- 2013 AFSPC General Thomas D. White Environmental Quality Award for Installation Excellence

## **Summary of Accomplishments**

### **Alignment with Executive Orders**

Environmental aspects are activities that can interact with the environment. Peterson AFB identified 38 environmental aspects and provides manageable data to develop Specific, Measurable, Achievable, Realistic, and Timely (SMART) objectives and targets within Environmental Action Plans. Significant objectives and targets include:

- Improve energy efficiency and reduce GHG emissions associated with the Peterson AFB through reduction of energy use intensity by 3% annually through the end of fiscal year (FY) 2015,

or 30% by the end of FY 2015, relative to the baseline energy use in FY 2003. Peterson AFB exceeded these goals in 2012 and 2013 by achieving a 4% annual reduction.

- Increase amount of refuse diverted from landfills by 2% per year beginning in FY 2009.
- Ensure that at least half of the statutorily required renewable energy consumed within a FY comes from new renewable energy sources.

### **Reducing Fossil Fuel Demand/Use and GHG Emissions**

AFSPC and Peterson AFB advocated support up to Secretary of the Air Force (SECAF) and Secretary of Defense (SECDEF) levels to successfully fund projects at AFSPC's most energy intense installations, Thule AB and Clear AFS. Successes include the design of a \$23.5 million Energy Conservation Investment Program project to connect Clear AFS to the local electric grid. The decommissioning of an over 50-year-old oversized coal-fired power plant will eliminate 666,144 million British Thermal Units (MBTU) of wasted energy and 590 tons of GHGs annually. Connection to the local grid will provide a more reliable heat source to ensure continuity of air base and Intercontinental Ballistic Missile warning operations at Thule AB.

To meet stringent National Emissions Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines, Peterson AFB initiated a \$1.3 million project to add catalytic converters to ten emergency power generators. Modernizing the existing generators with catalytic converters eliminated the need to purchase more expensive compliant new generators will reduce GHG emissions by 70% and will ensure environmentally compliant emergency power backup for Cape Cod AFS and Cavalier AFS.

Projects at Thule AB included a \$9 million exhaust heat recovery system for its 15 megawatt (MW) power plant, saving 636,265 gallons of JP-8 (\$2,373,267 annually);



### **Arbor Day**

Col. Michael Hough, Peterson AFB vice commander, shows the Tree City USA award to children from the Peterson Child Development Center June 4. This marks the 20th year in a row that Peterson has received the Tree City award. The award, given by the Arbor Day Foundation, recognizes excellence in urban forestry management.

installation of a waste fuel burner boiler to generate energy from combusting 274,000 gallons of waste fuel, eliminating off-base disposal and \$1 million in heating costs; and remodeling of four facilities for a combined energy savings of 3,146 MBTU.

Four 1.6 MW wind turbines at Cape Cod AFS, which produced 5,511 megawatt-hour (MWH) of power, saved over \$804,904 and offset 48% of Cape Cod AFS's electrical consumption in FY 2014. Peterson AFB has achieved E.O. 13524 goals for reduced energy usage for 2014.

Tierra Vista Corporation, the Military Family Housing (MFH) partner on Peterson AFB, installed solar panels with a generating capability of 2.3 MW on 559 roofs throughout MFH via a 20-year Power Purchase Agreement. The estimated 20-year savings is \$1,024,768, and the effort supported Peterson AFB's renewable energy objective.



### **Abandoned Cable Study**

Innovative-recycling effort at Thule AB focuses on abandoned cable, which unveiled over 90 kilometers of scrap metal valued at \$2 million! These 50-year old cables are comprised of copper and aluminum. They once provided critical power for the Cold War defense sites.

### **Improving Water Resources Management**

There are only approximately 16.4 inches of annual precipitation on Peterson AFB. The base voluntarily imposed watering restrictions, which resulted in 130 million gallons (MGal), or 50%, reduction in water use intensity. The base also installed a central irrigation system, saving an additional 300,000 gallons and \$93,000 per year. Conversion of 20 acres of plant and mulch beds to drip system irrigation conserved another 4 MGal per year. An eye-pleasing xeriscaping project converted 10 acres of irrigated turf, reducing 14 MGal of water consumption per year and diverting \$43,000 in maintenance costs. AFSPC modeled the Peterson AFB turf reduction project and used it to develop a Command-wide Energy Conservation Investment Project for FY 2015 execution.

Waste and stormwater are important legal requirements for Peterson AFB. Three waste reduction units installed in the Dining Hall helped reduce organic content in wastewater below municipal standards, eliminating a \$50,000 permit fee and saving \$17,000 per year. Peterson AFB installed 116,850 square

feet of permeable pavers at various locations, making it the largest porous paver base in AFSPC. Compared to asphalt, pavers extend the design life by 20 years and lower life cycle costs (about 75%). With an infiltration rate of 100 inches per hour, the pavers mitigate erosion and stormwater peaks, and comply with Energy Independence and Security Act (EISA) Section 438 requirements to use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the pre-development hydrology of the property. 10-year flood events were eliminated, contributing to the increased navigability of base roads and the success of Peterson AFB's mission.

### **Material Management and Recycling**

Peterson AFB boasts an impressive solid waste management program focused on diverting 50% of solid waste by 2014. In 2014, 27%, or 4,598 tons of solid waste, has been diverted from Peterson AFB alone, saving \$649,000. Peterson AFB dormitories were among the 11 base facilities converted to co-mingled recycling. The dorm-recycling rate increased 22%; and after achieving a 70-ton per year reduction in solid waste and \$13,000 annual savings, co-mingled recycling is on target to start in all Peterson AFB facilities by September 2015. Over 100 dorm mattresses and furniture were reused, and an innovative furniture reuse program across the installation saved over \$220,000 mission funding. With a joint-minded approach, 12 Defense Logistics Agency deliveries reutilized an additional \$130,000 of USAF assets, and Peterson AFB sent 365 wood pallets to Fort Carson for composting. Finally, Peterson AFB's used tire program increased to 11 tons of rubber recycled.

Recycled used oil and batteries reimbursed the Qualified Recycling Program (QRP) \$6,000 and saved Peterson AFB \$389,000. Examples of diverted materials included 12,781 pounds of electronics; 104 tons of batteries; 10 tons of flammable liquid-contaminated rags; and 12,000 pounds of antifreeze. Hazardous



### **Scrap Metal Recycling**

Continuation of on-going scrap metal removal from Thule AB began in 2012 with a genesis of 3,500 tons. Removal efforts have grown to 80,000 tons in 2014 alone! Thule AB continues to consolidate facilities in a cost saving measure and generates recyclable and profitable scrap metal, which avoid landfilling and resulted in 50 cargo containers with an estimated \$179,000 profit to the QRP.

material usage was reduced by 13.4%, minimizing end disposal impacts. Scrap metal recycling at Peterson AFB recouped a laudable 12,000 metric tons of scrap metal (\$600,000 into the QRP coffers).

### **Education, Outreach, and Collaborating**

Peterson AFB has a significant presence among the Colorado Springs technical community. Environmental Office personnel spent 80 hours advising the Pikes Peak Area Council of Governments on regional sustainability and community/transportation planning. The El Paso County Emergency Planning Committee collaborates with the installation to manage emergency response activities in Colorado Springs and on Peterson AFB, increasing military readiness and ability to lend mission capabilities to the local community in times of need. A base environmental representative serves as vice chair for of El Paso County Solid Waste Technical Committee and was instrumental in driving recycling across both military and civilian communities.

Via a monthly newcomers briefing, 693 newcomers discovered the base's EMS and how they could help facilitate the base recycling initiatives, and further hazardous waste reduction. The *Space Observer* apprised 12,000 readers of the base environmental policy and sustainable improvements. Peterson AFB personnel responded to housing residents' environmental concerns through healthy social media dialogue and empowered residents to learn about sustainable efforts and how they can contribute.

To celebrate Earth Day, over 600 pamphlet handouts focusing on recycling and energy were distributed to base personnel. Earth Day recycling advertisements reached an audience of 18,000. This last Arbor Day, Peterson AFB celebrated 20 years of receiving the "Tree City" award for annual tree planting. Dozens of children listened to a U.S. Forest Service proclamation about the benefits a well-forested city provides for its residents.

Peterson AFB hosted a local Boy Scout troop to label stormwater inlets, resulting in protection of waters and enabling Boy Scouts to earn their engineer badges. Additionally, 10 construction inspectors were trained on Best Management Practices (BMPs) for stormwater. Expanded usage of BMPs decreased stormwater runoff by 13%.

### **Livable Communities, Master Planning and Green Buildings**

As part of master planning efforts, Peterson AFB approved an Installation Development Plan, which incorporates sustainability metrics into base development for the next 50 years.

Peterson AFB's objective is to promote sustainability in new and existing buildings. Leadership in Energy & Environmental Design (LEED) concepts are codified into the seven Front Range sites' (including the U.S. Army post, Fort Carson) construction contract specifications. Six sections include sustainability provisions, which will be conscientiously incorporated in new engineering requirements for the next five

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years. The 302 AW flying mission was enhanced by physically merging two facilities into one for C-130 operations. The existing parking lot was modified to allocate designated stalls for qualifying “low-fuel” vehicles. This effort promotes an environmentally friendly base transportation and commute incentive. Collectively, these methodic efforts led to LEED Silver certifiability.

The recently completed \$56 million Space Education Training Center (SETC) project provided a secure, flexible, technically advanced environment to support research and assessment of future technologies and space employment concepts to meet warfighter requirements. The SETC is the first facility on Peterson AFB to achieve LEED Silver certification and incorporates high performing sustainable building concepts such as:

- Rain gardens in the parking lot to maximize stormwater infiltration.
- Xeriscaping to achieve 20% irrigation water reduction and incorporating Force Protection principles through Peterson’s four B’s: berms, bushes, boulders, and bollards.
- High-efficiency, tandem-operation Heat Recovery Chillers to provide 252 thousand British Thermal Units (MBH) of energy reuse, reducing the facility sizing demand by 50%, and saving \$26,000 per year.

Peterson AFB constructed a green roof on the installation headquarters building—the first in the USAF. The initial cost was \$827,663. Study results indicate the project will extend the roof lifespan another 20 years, primarily due to heating, ventilation, air conditioning, and roof replacement savings. Air Force Institute of Technology students are investigating project transferability across the DoD.

A key initiative was the installation wide building re-commissioning program to review the energy use of each facility, adjust or replace components, and repair them to perform as designed. In all, 24 buildings received attention from a team of experts consisting of the private sector contractor (Johnson Controls), the Army Corps of Engineers, and

Peterson AFB. The re-commissioning report detailed a number of Energy Conservation Measures (ECMs) designed to save the base over \$147,000 in energy costs annually. The ECMs will have a payback period of fewer than 5.5 years and will reduce GHG by 1,357 tons over their lifetime.



### **Xeriscaping**

Peterson AFB transitioned ten irrigated turf acres to xeriscape. This reduced water consumption by 14 MGal per year and saved \$43,000 per year in maintenance costs. They also converted 20 acres of mulch and plant beds from tradition spray head irrigation to drip system, saving 4 MGal per year.

### **Green Procurement**

Green procurement improved Peterson AFB’s livability by reducing potential health, safety, and environmental impacts. Initiatives to replace seven R-22 chillers with three R-123 chillers had multiple environmental benefits. Compared to R-22, R-123 has both a lower ozone depletion potential and a lower global warming potential, and its use doubled the cooling efficiency of their respective facilities. Peterson AFB identified product substitutes to benefit the mission, such as replacing hydraulic fuel with vegetable oil to improve the ease of gate barrier spill cleanup. Over the past two years, 180 Government Purchase Cardholders and 90 Contracting Officer Representatives were trained in green procurement, ensuring green procurement continuity for the next several years.