

# ENVIRONMENTAL AWARDS

## *SUSTAINABILITY NON-INDUSTRIAL INSTALLATION AWARD: JOINT BASE ELMENDORF RICHARDSON*

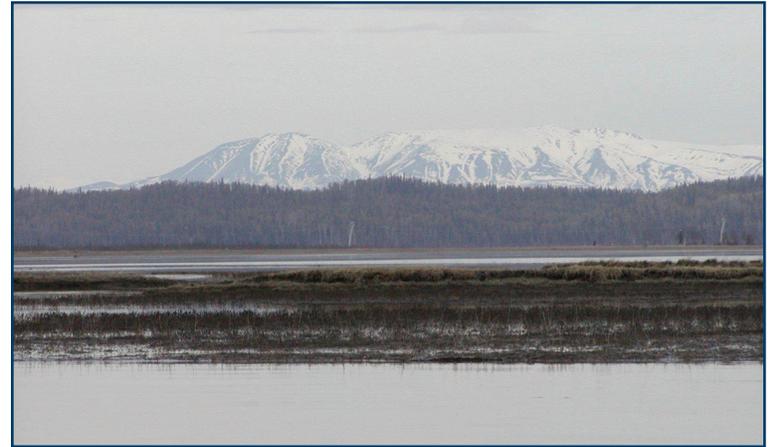
### INTRODUCTION

Possessing rugged natural features and subject to a harsh climate, Joint Base Elmendorf-Richardson (JBER) is situated adjacent to Alaska's largest metropolitan area, Anchorage. Perched between commercial and residential development to the south and Cook Inlet waters to the north, JBER's 74,600 acres support Air Force flying missions for the F-22 Raptor and C-17 Globemaster; U.S. Army Alaska (USARAK) and the Pacific's only Airborne Brigade; and National Guard units. JBER is the gateway to Alaska's 1.6 million acres of military lands. Home station training capabilities include over 22 small arms ranges; 6 mortar, artillery, and demolition ranges; 16 multi-purpose live-fire ranges; 50,000 acres of maneuver training lands; and over 75 drop/landing zones.

The 673d Air Base Wing (673 ABW) hosts the headquarters for the Air Force Alaskan Command, 11th Air Force, and 3rd Wing, as well as, the U.S. Army Alaska 4-25 Airborne Brigade Combat Team and 2nd Engineer Brigade. The 673 ABW maintains the \$11.4 billion joint-base infrastructure, and supports roughly 16,000 Arctic Warriors, 21,000 family members, 3,000 civilian employees, and 75 associate/tenant units.

JBER's unique and diverse lands range from tidal wetlands to alpine ridges. JBER's high value natural infrastructure supports healthy populations of moose, brown and black bears, bald eagles, wolves, and all five species of Pacific salmon. The endangered Cook Inlet beluga whale inhabits marine waters adjacent to the base. Wintertime conditions with temperatures below -25 degrees Fahrenheit and fewer than six hours of daylight present challenges to sustainability and energy efficiency.

JBER is committed to environmental excellence, leadership, and stewardship all focused toward successful completion of joint-base missions and our primary management responsibilities: reduce waste through pollution prevention; assure responsible use of energy; conserve natural resources; and, minimize environmental impacts. JBER's commitment extends beyond compliance with the law by striving for continual improvement in environmental performance through integration of sound environmental practices in daily decisions and activities.



JBER encompasses unique and rugged terrain, ranging from tidal wetlands to mountains, that supports a variety of wildlife including bears, moose, wolves, salmon, and the endangered Cook Inlet beluga whale.

### BACKGROUND

At JBER, the primary means of addressing sustainability is through the frameworks of the Environmental Management System (EMS) and Asset Optimization (AO). These programs are administered by the 673d Civil Engineering Squadron, specifically the Environmental and Asset Optimization Elements. Program management and review is conducted by a cross-functional team (CFT) of senior leaders from Air Force, Army, and tenant organizations. CFT members have responsibility for ensuring the programs are implemented within their respective units. The 673 ABW Commander sets policy and provides oversight to ensure compliance with directives. Positive and engaged leadership has been the key to program success.

The JBER EMS is based on requirements outlined in Executive Orders 13423 and 13514, Department of Defense policy, and United States Air Force guidance documents. The JBER EMS framework, an integration of both Air Force and Army efforts, is the International Organization for Standardization (ISO) 14001. The JBER EMS embraces the principals of Executive Order 13423 and is implementing sustainable practices for:

- Improvement in energy efficiency and reduction in greenhouse gas emissions
- Use of renewable energy
- Reduction in water consumption

- Sustainable acquisition
- Reduction of the use and disposal of toxic and hazardous chemicals and materials
- Waste prevention and recycling programs
- High performance and sustainable buildings
- Vehicle fleet management

All of these aspects are important, but the most significant aspects currently being addressed are energy (renewability and efficiency), and hazardous waste and materials management. These are the primary risk and financial drivers affecting sustainability in an Arctic environment with high energy demands, reduced recycling opportunities, and limited options for waste disposal.

As the EMS program continues to develop, the program elements of sustainability have become an ingrained element in the daily lives of the Soldiers, Airmen, and civilians at JBER. JBER has developed a rigorous environmental training program, the Environmental Quality University (EQU) that facilitates base-wide training on EMS. All members of the base who have the potential to impact the environment must receive EMS Awareness Training. The program goals are to stress the importance of sustainability and the need for every member of the JBER community to look for means and methods to reduce consumption of precious resources that will otherwise impact the mission by limiting the availability of funding for training.

Another important sustainability function is AO, a program tasked with best management of base-wide resources such as real property and energy. As a component of AO, the JBER Energy Management Team (EMT) is changing the culture of military and civilians at the base. The EMT has a mandate to reach the milestones outlined in Executive Order 13514 to reduce facility energy use, and to seek out renewable energy sources. The EMT has developed a JBER Energy Policy with a three-pillar approach: 1) reduce demand for energy, 2) increase the supply through renewable means, and 3) change the JBER culture to an energy-conscious one. The EMT is a perfect example of how a small subset of the base community can have a major impact on the long-term sustainability of military assets. The team continues to undertake energy projects that save precious resources needed to support mission requirements.

## ACCOMPLISHMENTS

### **JBER Turns Landfill Gas into Energy**

For years the Anchorage Municipal Solid Waste Landfill, adjacent to Joint Base Elmendorf-Richardson, collected and burned landfill gas, primarily methane, to comply with EPA regulations. With an eye to the future, officials at JBER, the Municipality of Anchorage and Doyon Utilities collaborated to find a way to convert the landfill gas into usable energy for the base. What resulted was the JBER Landfill Gas Waste-to-Energy Plant that is projected to generate more than 56,000 megawatt hours or 26.2% of JBER's electrical load. The plant will reduce greenhouse gas emissions (methane) by 13,944 tons annually and is projected to save \$73.6 million over the 46-year project lifecycle. The landfill gas plant began producing electricity in 2012 and preliminary analysis of performance factors indicates that plant energy production is exceeding expectations.

The plant ensures JBER will more than exceed renewable energy goals established by Executive Orders 13423 and 13514, and Section 203 of the Energy Policy Act of 2005. These mandates require that federal agencies use renewable energy to meet at least 7.5% of total electric consumption beginning in 2013. Not only is the plant important from a regulatory standpoint, but it was the right thing to do in a sustainable environment.



The JBER Landfill Gas Waste-to-Energy Plant was constructed with 4 generator units designed to run on methane gas that is produced by the breakdown of wastes buried in the landfill. A 5th generator unit is expected to come on line in 2013, producing 26.2 % of JBER's electrical load.

## Energy Management and Sustainability

The JBER EMT proactively developed projects to reduce energy consumption and associated long-term maintenance costs. The EMT pursued projects focused at eliminating inefficient lighting systems in facilities base-wide. The projects are ongoing and several completed projects are described below:

- Incorporated individually programmable ballasts into a high-bay lighting project at the Buckner Physical Fitness Center with cost savings of \$39,000 annually
- Renovated office space to take advantage of natural daylight using existing clerestory or high windows; summer lighting load decreased by 37%
- Conducted lighting upgrade projects base-wide; resulting energy and cost savings of \$138,000 annually
- Focused replacement of incandescent and fluorescent lights with LEDs; reduced JBER energy demand with savings of \$61,000 annually

One of the largest energy reduction projects at JBER is an advanced meter-reading system, or Energy Management Control System (EMCS). Meters have been installed in over 125 high-energy-use facilities and provide a real-time energy use that allows energy management personnel to show building users how to reduce their overall impact. JBER has one of the most expansive and sophisticated EMCSs in the Air Force and hired an analyst who focuses strictly on using the system to find energy savings. Currently the EMCS is saving \$350,000 a year in energy costs, and new buildings are being added on a regular basis. JBER received an Air Force Reduce Energy Appreciation Program (REAP) award for these efforts, which resulted in overall energy reductions of about 45%.

Another project enhanced building envelopes for primary facilities on the base. A thermal scanner was used to examine insulation, doors and other aspects to determine where thermal energy was leaking from the buildings. The scans clearly showed where maintenance personnel could fix holes and cracks and add weather stripping or insulation to prevent energy loss.

With nearly 20 hours of daylight in the summer and the opposite in winter, occupancy sensors make sure lights are off in unoccupied rooms and buildings, and parking lot patrols look for outdoor lights burning during daytime hours. JBER engineers are also looking ahead to future renewable energy opportunities with the goal to become Net-Zero within the next ten years.



Base-wide lighting upgrade projects resulted in \$138K annual energy cost savings and better lighting in high-bay facilities such as this Army vehicle maintenance shop.

## Van Pooling Saves Energy

JBER is a huge proponent of the Share-A-Ride program and of the 63 vans in the program, 32 are transporting employees to and from JBER on a daily basis. Each van can take up to 11 cars off the road, which not only saves fuel and energy, but reduces traffic congestion and pollution.

Based on calculations using an average commuting distance for JBER employees and an average vehicle fuel economy, the program is estimated to eliminate about 2 million miles of vehicle travel on an annual basis. This equates to eliminating the annual consumption of 82,368 gallons of fuel, eliminating generation of 807 tons of green house gases (CO<sub>2</sub> equivalent), and overall reduction of the JBER carbon footprint.

## Recycling and Integrated Solid Waste Management

With a minimum shipping distance of 2,500 miles to major recyclable commodity markets, recycling in Alaska is a challenge that requires innovative solutions for sustainment. In FY12, the JBER Qualified Recycling Program (QRP) leveraged the proceeds from small arms brass recycling to offer the first-ever JBER office paper collection and cardboard recycling program. The QRP recycled 208,000 pounds of paper and cardboard from over 100 Army and Air Force facilities. JBER is improving quality of life for Soldiers and Airmen by providing an on-base recycle center and 24-hour drop off locations. Program growth was bolstered by building partnerships with the Solid Waste Association of North America (SWANA) and a local cellulose insulation

manufacturer that turned over 50 tons of JBER cardboard into insulation that is now keeping Alaskan homes warm. JBER engaged other Alaska military installations for regional approaches to sustainable recycling through the Alaska Regional Military Recycling partnership. Involving base personnel and the local community through the “JBER Recycles” site on Facebook, community newsletters, and sharing lessons learned helped increase recycling awareness and participation.



JBER Recycle Center workers load shredded paper into a shipping container bound for the Port of Tacoma, WA. JBER Recycled 84,000 pounds of paper in 2012, up from 0 pounds in 2011.

Waste diversion efforts have always been a challenge in Alaska where limited recycling opportunities have historically resulted in low diversion rates. This difficulty is especially heightened because the Richardson side of JBER pays no fees for landfill disposal. JBER implemented the following initiatives to meet Strategic Sustainability Performance Plan goals for waste diversion:

- Implemented a comprehensive Construction and Demolition (C&D) waste diversion program resulting in 23,500 tons of C&D diverted from landfill disposal and a 65% diversion rate
- Opened a recycling center and initiated paper/cardboard recycling
- Mandated downstream recycling in Defense Reutilization and Marketing Office (DRMO) disposal contracts
- Conducted a comprehensive study of recyclable materials resulting in new opportunities, such as recycling silver paint coatings with significant cost recovery of \$55,000
- Recycled over 20,000 gallons of used oil

### Sustainability Outreach and Awareness Training

JBER continues to build awareness by involving base personnel, process owners, residents, and the local community in sustainability initiatives through robust outreach programs. JBER strives to provide real-time information, reaching beyond our borders through multi-media channels. With over 11,000 friends, the official JBER Facebook page provides pivotal, up-to-date outreach. Initiatives and programs are shared through Facebook pages dedicated to JBER Energy Conservation, the Wildlife Education Center, and JBER Recycles. For Earth Day 2012, JBER combined individual activities into a series of connected outreach events titled “JBER Earth Aware: 30 Days of Blue and Green.” Additionally, JBER created a YouTube channel with four videos to advertise activities supporting Earth Day, Arbor Day, and National Bike to Work Day – all were a great success.

To meet mission requirements, JBER began a process to centralize environmental training through a program called Environmental Quality University (EQU). JBER saved \$40,000 by offering regulatory-required environmental training through the in-house EQU training program that covers nine core environmental areas. Over 1,000 essential JBER personnel, including shop-level environmental unit coordinators, hazardous waste/material managers, storm water managers, and facility managers have been trained at EQU. Training tools developed through the EQU include manuals and a comprehensive Environmental Handbook with over 50 “how to” factsheets on topics ranging from pet waste disposal to recycling gel cell batteries.



673d Air Base Wing Vice Commander, Colonel Mark Prior, reads an Arbor Day proclamation to JBER students. In 2012, JBER was awarded its 15th consecutive designation as a Tree City USA Community.

Partnerships with external organizations are essential to upholding local community support and developing regional solutions to sustainability challenges. JBER is involved with local organizations including: Green Star of Alaska; SWANA; Association of Environmental Professionals; Society of American Military Engineers; and the Alaska Forum on the Environment. JBER hosts cultural events with the Native Village of Eklutna and partners with native organizations to conduct archaeological surveys and cultural resources management.

### Natural Infrastructure Management and Sustainable Training Lands

JBER's connection to the natural environment is unmistakable, from the 673 ABW vision of "Arctic Tough" to frequent on-base encounters with wildlife, including bears and moose. Bird aircraft strike hazard (BASH) is a critical mission concern. JBER biologists and seasonal technicians annually assess BASH risk by conducting in-house bird surveys. These surveys identified 30 nesting bald eagles that are actively managed to prevent bird aircraft strike hazards. The JBER natural resources program partnered with civil engineer operations to remove and replace invasive or ornamental bird-attracting vegetation in airfield areas. This partnership also resulted in the innovative use of excess soils from construction sites to build earthen berms that deflect noise and deter grazing birds from airfield operational areas.

JBER partnered with the Army's Sustainable Range Program (SRP) to manage training areas under the operational control of the Army. This cooperative management strategy resulted in projects to clear fire trails, reforest training lands, and recover forested materials for firewood. In 2012, volunteers hand planted more than 3,000 seedling trees to restore beetle-killed white spruce habitat.

JBER has active partnerships with state and other federal agencies to manage the natural environment. Biologists from JBER and the National Marine Fisheries Service partnered to conduct acoustic and visual behavior studies of the endangered Cook Inlet beluga whale. This collaborative effort led to the implementation of a ground-breaking passive acoustic monitoring system with the ability to detect whale presence in real-time, and to broadcast those detections to a home base. These efforts are critical to maintaining Air Force and Army missions at JBER, and to the recovery of the endangered beluga whale.



A sustainable environment and military training are not mutually exclusive. A beluga whale calf and mother observed in Eagle Bay, just outside the coastal boundary of Eagle River Flats, an Army impact area located on JBER.

### Sustainable Design and Development

The basic tenets of the Joint Base Installation Master Plan (JBIMP) are sustainable design and development. Practicing the principles of sustainable design is a "JBER-smart" business practice. Protecting natural resources and reducing impact on the natural environment is achieved through energy efficient, healthy, high-performance, and safe buildings. The JBIMP provides a comprehensive 50-year vision of the joint-base environment and integrates the needs of both Air Force and Army components. Critical to the success of sustainable design and development is JBER's commitment to the Integrated Design Process (IDP), a collaborative effort to integrate design strategies among all disciplines and all players in the project delivery process. Building users and facility managers join with architects, engineers, and planners to develop the vision and goals for new facilities.

The arctic environment at JBER reinforces the need for energy efficient and sustainable development. JBER, in partnership with the U.S. Army Corps of Engineers – Alaska District, has pursued sustainable development through the Leadership in Energy and Environmental Design (LEED) program. The LEED program is transforming the way JBER facilities are designed, constructed, and operated. New building projects have incorporated state-of-the-art features in materials, electronics, and utility systems. All JBER projects are required to meet a minimum LEED Silver rating with a focus on the mandates of Executive Orders 13423 and 13514 to reduce energy consumption for new construction and renovations and integrate sustainability considerations into agency processes.

The holistic visions of the JBIMP and IDP, matched with LEED program criteria, have resulted in newly constructed and renovated facilities that fit well within the natural environment. Examples of successful projects are the development of the \$200 million F-22 Fighter Town area which incorporates natural elements in the design while meeting the mandates for long-term sustainability. Rather than expanding into previously undisturbed areas, JBER sited the Army Airborne's Maneuver Enhancement Brigade Complex in the heart of existing cantonment to maximize use of existing transportation infrastructure and enhance pedestrian connectivity. However, reutilization presented significant challenges when planning these facilities within previously developed areas. The early involvement of all project stakeholders streamlined this example of sustainable development and design.

Another aspect of the JBIMP has been integrated development of privatized housing areas within JBER. Privatized housing initiatives resulted in the demolition of 1950s-era houses that had very low energy efficiency ratings and replacement with 4+ Energy Star rated facilities that use 30% less energy.



The Troop Medical Clinic built on the Richardson side of JBER is an example of sustainable master planning that incorporated LEED principles into a visually appealing design.