

2014 Annual Secretary of the Army Energy and Water Management Award
Installation: Fort Stewart/Hunter Army Airfield
Category: Energy Efficiency/Energy Management
Award Type: Installation

FY2013 Accomplishments

1. Project Description

Fort Stewart implemented several energy efficient projects in the past two fiscal years. The major impetus for this effort was to meet EPACT 2005 energy goals, to improve deteriorating infrastructure and to improve the quality of life for our soldiers and family members. The following is a brief description of each energy conservation measure.

A. The Fort Stewart energy team installed natural gas fired condensing boilers and water heater as a replacement strategy for a failing high temperature water distribution system located at Hunter Army Airfield's Central Energy Plant (CEP). The original system used two boilers, each with an 18,000 MBTU output, to provide heating and domestic hot water to 13 facilities. The on-line boiler would cycle on and off excessively due to over-sizing. Five of these facilities were on a high temperature water (HTW) system and the other facilities were on a low temperature water (LTW) system. The HTW system provided heat to a LTW system through a heat exchanger. The HTW distribution system was failing and the installation chose not to replace the HTW piping for the following reasons: 1) Cost to install the new HTW piping, 2) Ample space in mechanical rooms to install package condensing boilers, 3) Availability of natural gas and 4) Trained in-house workforce able to install the boilers. Condensing boilers and gas water heaters were chosen for their increased thermal efficiency, ease of stack installation and very compact footprint. The boilers were sized to match the buildings actual heating load instead of the design heating load, which was determined to be oversized most the year. Condensing hot water heaters were sized to support actual domestic loading. Both the boilers and heaters have the ability to modulate their output to maximize efficiency.

B. The Fort Stewart energy team installed state of the art street lighting control system to reduce and remotely monitor street lighting energy consumption. This lighting efficiency project achieved energy savings by reducing electrical demand and total hours of operation. Operations and maintenance cost avoidance will be realized due to longer lamp life and less frequent replacements. The street lighting control system is a simple retrofit utilizing wireless technology. It consists of a mesh network of intelligent photo control sensors, or nodes, used to control 70-1000 watt, 120-480 volt, LED, HID and other fixtures. Nodes monitor fixture performance and operating conditions while executing commands based on inputs such as schedules and ambient light levels. Information collected about fixtures

performance is wirelessly transmitted to a gateway and passed on to a pre-configured server, where it is graphically displayed at a workstation. More than 1400 street lighting fixtures have been retrofitted with this lighting control technology.

C. The Fort Stewart energy team launched a program to replace inefficient HVAC pumps and chillers/cooling towers with variable frequency drive (VFD) equipped systems. The Fort Stewart energy team surveyed our installations and identified pumps and chillers in need of replacement and compiled all necessary technical data about these systems. Fort Stewart energy team completed a life cycle economic analyses and determined that this project was cost effective and energy efficient. The project was completed in FY13 with the DPW in-house workforce, which significantly improved the project cost effectiveness and return on investment.

2012 Utilities

Utility	Unit(Reported)	Unit (Mbtu)	Utility Cost(\$)
Electricity	257,695 Mwh	879,255	16,555,649
Natural Gas	214,065 Mcf	220,701	33,765
Propane	55,227 Gal	5,274	1,796,453
Fuel Oil #2	252 Gal	1,456	109,182
Wood	20,045 Ton	180,405	541,215
Total		1,287,091	19,036,264

2013 Utilities

Utility	Unit(Reported)	Unit (Mbtu)	Utility Cost(\$)
Electricity	246,029 Mwh	839,451	15,045,458
Natural Gas	252,888Mcf	260,728	2,204,813
Propane	57,701 Gal	5,510	111,263
Fuel Oil #2	642 Gal	3,740	98,976
Wood	17,318 Ton	155,862	467,586
Total		1,265,291	17,928,096

2. Actions Taken

The steady decline of the Fort Stewart energy glide path can be attributed to the command emphasis, awareness campaign, and replacement of inefficient oil fired boilers with natural gas condensing boilers, street lighting control upgrade and HVAC pumps / chillers fitted with VFD. The Fort Stewart/Hunter Army Airfield Garrison Commander places special emphasis on the incorporation of energy conservation measures into daily operations. The energy saved through these programs creates substantial savings that are used to fund additional programs. These programs directly contribute to quality of life for soldiers and enhance total mission readiness. The Commander also places emphasis on the energy program by ensuring soldiers are briefed on energy conservation during in processing. Energy Conservation is also included as an underlying theme in the unit's standard operating procedures. Metering of the barracks, company headquarters and battalion headquarters buildings are part of the commander's plan for energy conservation and testing. This metering was completed in FY2013. Command support and soldier education have made the Fort Stewart / Hunter AAF Energy Program highly effective.

3. Transferability and Innovation

Fort Stewart's continued success in energy use reduction is due to on-going upgrade of the Base Energy Monitoring and Control Systems (EMCS), implementation of condensing boilers, Variable Frequency Drives (VFD) and street lighting control technologies. All the techniques and technologies that have been utilized at Fort Stewart are adaptable to other US Army Installations.

4. Effectiveness of Investment

Completion of the energy conservation measures (ECM) presented in this nomination took place in FY13. The ECM with their expected savings and simple payback are as follows:

ECM	Saving	Simple Payback
Replacement of Inefficient Oil Boilers with NAG	\$353,474	4.5 yrs
Street Lighting Controls Upgrades	\$406,452	8.3 yrs
HVAC Pump/VFD Upgrade	\$600,015	8.9 yrs

5. Outreach, Education, and User Behavior

The success of the Fort Stewart's energy conservation program relies heavily on command emphasis, public awareness/education, enforcement of the Energy Policy Act of 2005 and implementation of energy efficiency projects. The energy conservation program is an on-going effort and is incorporated into daily and long-range operations. This program identifies energy inefficiency or waste and develops long-term solutions.

The Garrison Commander (GC) places special emphasis on the incorporation of energy conservation measures into the Command's daily operations. The GC ensures that, through policy letters and meetings, the importance of energy conservation is part of the Fort Stewart /Hunter AAF culture. The substantial cost avoidance realized over the years has directly contributed to soldier well-being and mission readiness. The Garrison Commander directed the DPW to implement the Building Energy Conservation Officer (BECO) Program in FY2013. This program provides a valuable subject matter expert at the unit level, thus increasing the overall energy programs efficacy.

Energy Awareness through media support is a part of the energy awareness campaign of the Directorate of Public Works (DPW). The DPW distributes energy conservation leaflets periodically to the community. This on-going effort has had a sustained positive effect on the continuing reduction of energy use and cost in our community.

6. Environmental Benefits

These projects provide Fort Stewart/Hunter AAF with solutions that provide the following benefits:

- Improvement in the comfort of the working environment and safety of its soldiers, civilians and families due to improved indoor air quality. Installation of new, more efficient systems reduces indoor humidity, temperature fluctuations and provides more thorough air filtration. The result is the elimination of mold and a significant reduction in airborne allergens.
- Reduced demand on the local energy grid reduces the installations total carbon foot print. This, coupled with our expanded use of renewable fuels, moves us ever closer to achieving net zero.