

Fort Carson, Energy Savings Performance Contract



Fort Carson received the first deployment of a peak-shaving battery at a federal facility through an energy savings performance contract, an innovative solution developed by AECOM to deliver energy savings and support overall installation resiliency.

Client

United States Army Corps of Engineers - Huntsville

Location

Colorado Springs, Colorado, U.S.

Contract Value

\$14 million

Year(s)

2017 - 2021

Annual Savings

Cost: \$961,780

Electrical: 4,123,538 kWh, 2,279 kW

Natural Gas: 2,861,540 therms

Project Overview

Fort Carson is a major U.S. Army training facility with a reputation for superlative energy management. As this was the fifth energy savings performance contract (ESPC), many simple and short-payback energy conservation measures (ECMs) were implemented as part of previous ESPC efforts. In addition, installations had an extremely low energy rate (4.4 cents/kWh on peak). AECOM's efforts to achieve deep energy savings were aimed at highly complex strategies through implementation of cutting edge ECMs. We mixed traditional lighting and HVAC improvement ECMs with advanced strategies including a smart energy management control system (EMCS) and a battery energy storage system (BESS) with predictive controls that reduces peak electrical demand charges. The BESS was the first deployment of a "peak-shaving" battery for a U.S. Army ESPC.

To deliver a comprehensive ESPC program that delivers on Fort Carson's current and future goals, our team developed a master plan using AECOM's Sustainable Systems Integration Model Energy Vision (SSIMe™).

Using the SSIMe process enabled AECOM to present various project options in a dynamic and transparent framework, allowing the team to analyze several options in a live "game-boarding" environment. SSIMe also enabled the team to easily manipulate critical project factors such as scope of work, financial inputs, utility rates/escalation, and project phasing to evaluate the project options against Fort Carson's program goals.

Client Benefits

Despite implementing four previous ESPCs, the overall impact of AECOM's ESPC program includes:

- More than \$960,000 in annual savings with a 15 year payback
- Improved energy resiliency to more effectively meet mission requirements

Savings from the BESS are achieved by charging the system during off-peak periods for discharge during peak demand. The BESS will also produce time-of-use savings by providing demand response, time-of-use shifting, solar-firming, frequency, and voltage support and microgrid support with the BESS eventually connected to the installation's solar assets.

This strategy is getting a lot of attention from U.S. Army leaders at all levels for its ground-breaking approach, a first-of-its-kind for an ESPC at a federal facility. In addition to impressive cost savings, the BESS provides Fort Carson a new asset to bolster resiliency. Having the ability to store 8 MWh of energy for use during times of emergency is a tremendous bonus.

A differentiator from other companies in our industry is that AECOM is vendor neutral and technology agnostic. We bring a variety of unique skills and capabilities to our clients, but we do not manufacture, sell, or represent any specific equipment or technology. We look for the best technology and vendor for every individual project application. For this endeavour, we implemented this first-of-its-kind project combining AECOM's development, integration, and construction expertise with Lockheed Martin's modular, resilient GridStar™ energy storage units and Geli, Inc.'s predictive analytics control software.

Work Performed

To help Fort Carson reduce its energy costs and improve resiliency, AECOM provided a feasibility study, design engineering, project and construction management, training, quality controls, site safety, commissioning, incentive procurement, measurement and verification, and operations & maintenance. This ESPC included:

- Upgrading building controls and employing energy efficient, occupancy-based control strategies to reduce energy usage, and minimizing operating costs at 42 facilities. This work replaced obsolete building controllers and JAVA Application Control Engines with new units that adhere to current Department of Defence cybersecurity and Risk Management Framework requirement
- Upgrading interior lighting to high LEDs to improve light quality, reduce energy usage, and reduce operation and maintenance costs. The retrofit will address 2,889 interior light fixtures including linear LED tube retrofits and high-bay fixture replacements
- Converting air handling units equipped with inlet guide vanes to variable speed operation by installing variable frequency drives that reduce energy consumption and minimize operating costs
- Converting constant volume hydronic pumping systems to variable flow operation to reduce pumping energy and electrical cost
- Implementing a BESS to reduce electrical demand charges
- Improving building envelopes and insulation to improve building efficiency.

Work Performed

- BESS
- Lighting
- HVAC
- EMCS
- Fans, pumps, and drives
- Building envelopes

The BESS reduces Fort Carson's billed peak electric use by about 9 percent per month, saving the base around \$500,000 per year.
