



- **KEY POINT:** Army is a longtime, aggressive user of Energy Savings Performance Contracts (ESPC) and Utility Energy Services Contracts (UESC) Authorities with over \$1.81B of third party investment in ESPC since 1996 and over \$610M in utility services investment since 1992 (first UESC in Federal Government).
- The Army has the largest ESPC program in the Federal Government and second largest UESC program
- The Army was one of the few Agencies/Services to exceed its commitment under the first phase of the President's Performance Contracting Challenge (PPCC). The Army has awarded \$928M in 3rd party investment between Dec 11 – Oct 15; approximately 40% of the entire Federal Government implementation (by comparison Army is about 29% of total Federal Real Property Portfolio).
- We plan to annually invest \$3M of the Energy Program/Utilities Modernization Account into the development and validation of new UESC & ESPC projects. This funding level enabled 18 projects for \$326M of 3rd Party investment in FY14 and \$191M in FY15. The last 4 years have shown the highest annual awards in history of Army program.
- Direct correlation between installations with UESC/ESPC projects and success in meeting energy efficiency goals.
- Army intends to continue to award in the range of \$200M of UESC/ESPC investment for foreseeable future. With tightening budgets, Army is relying more heavily on alternative financing – almost half of all Army energy projects in FY14 were done with Alternative Financing.
- Increasingly using Utility Service Contracts (GSA Area-wide Exhibit A work) as partnerships with Utilities become more widespread.



Army Utilities Energy Services Contracts (UESC) /Energy Savings Performance Contracts (ESPC)

- Servicing Utilities/ Private Companies provide initial private capital investment to execute projects
- For UESCs & ESPCs, repayment is from realized energy savings paid from Utilities Services Program funds
- Army has most robust ESPC/UESC program in Federal government & improving – Over \$2.4B investment
- More UESCs & ESPCs awarded in FY14 (\$326M) than in any single year of the program. FY15 awards total \$191M.

ESPC:

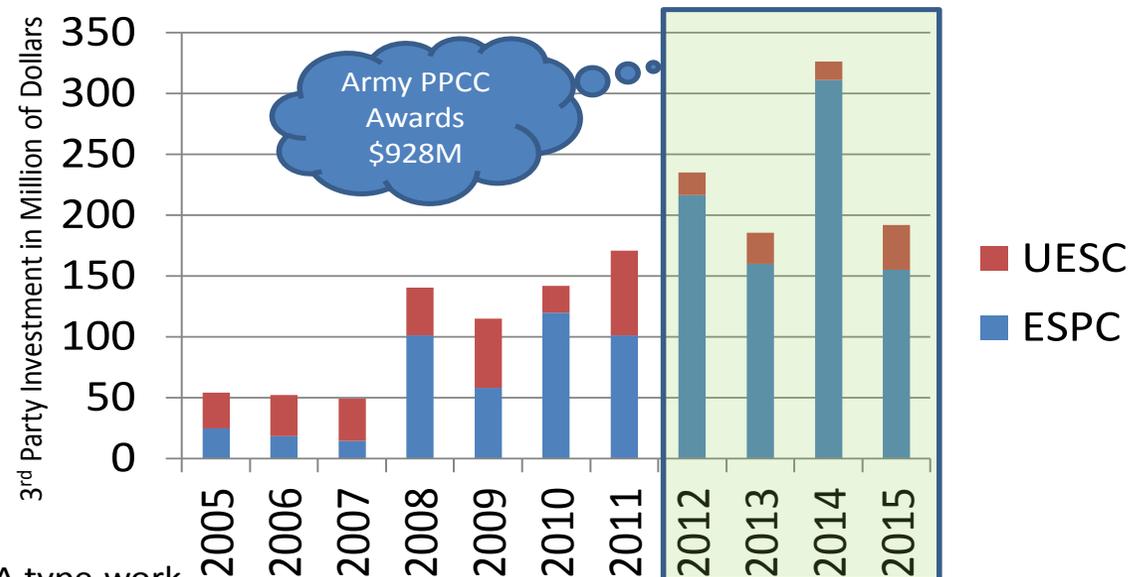
- 238 task orders/mods/ at 78 installations
- >8.19 Trillion BTU Energy Savings per year
- \$1.81 Billion of Private sector investments
- >\$300 Million more in development

UESCs:

- Over 373 task orders/ at 48 installations
- >4.23 Trillion BTU Energy Savings per year
- \$610 Million in Private sector investments
- \$50 Million more in development

USCs:

- Increasing utilization of GSA Area-wide Exhibit A type work



\$3M for development enabled up to \$326M in 3rd party investment in FY14 and \$191M in 3rd party investment in FY15

Army leads Federal Government in 3rd party financing.

FEDERAL UTILITY PARTNERSHIP WORKING GROUP SEMINAR

November 3-4, 2015
Houston, TX

Fort Rucker UESC Energy Conservation Project Completed Dec. 2014

Hosted by:



Fort Rucker, Alabama

- **Largest Helicopter Training Center in the World**
- **Home of U.S. Army Aviation Center of Excellence**
 - Training, Doctrine, Testing
 - Initial through advanced training pipeline for helicopter pilots
 - Warrant Officer Training School
- **Operational Units**
- **1st Aviation Brigade**
- **110th Aviation Brigade**
- **USAF 23rd Flying Training Squadron**

**Awarded DoD-wide 2014 Installation Excellence Award
by the Association of Defense Communities**

Source: www.defensecommunities.org



Fort Rucker's 2012 Energy Situation

- **Some HID lighting still in operation in hangars and at the Museum**
- **Training facilities and office buildings on the main post were:**
 - Served by oversized HVAC systems
 - Served by inefficient DX systems
 - In need of controls
 - In need of retro-commissioning
 - Opportunities for heat recovery
- **The three largest air fields had:**
 - Costly fuel oil boilers serving hangars and office bldgs.
 - Propane heaters serving some offices on air fields
- **Fort Rucker was motivated to meet:**
 - Recent Army direction calling for a 20% utility budget reduction.
 - Various Army mandates for energy efficiency and renewables



Key UESC Benefits Presented to Ft Rucker

- **Conservative energy savings calculations and assumptions should likely yield additional savings beyond what is shown**
- **Alabama Power and ESG provide assurances of performance**
- **No change orders (unless desired by Fort Rucker)**
- **No finance payments until late-2014 (after project acceptance)**
- **Long term sustainable solution**
 - Whole new chiller plant/loop included (20-30 year lifecycle)
 - Reduces maintenance burden on the Base Operations Contractor
- **Turnkey project, requires minimal Ft Rucker manpower to support**
- **Provides a hedge against higher utility rates in the future**

Alabama Power UESC Proposal Highlights

- **Reduce energy utility costs by nearly 10% across all of Fort Rucker**
 - \$1,527,440 energy utility cost savings per year (includes some directly related O&M savings)
 - Allows Fort Rucker to get half way to Army goal of 20% base-wide utility reduction
- **New central chiller plant loop in main cantonment area.**
 - A “needle moving” project with new extremely high efficiency chillers to run 21 buildings.
- **Fuel conversion to NG and Heat Pumps at three airfields: Hanchey, Lowe, and Cairns.**
- **Extensive use of innovative heat recovery chillers.**
 - Waste heat is captured to provide hot water while simultaneously making chilled water
- **A retro-commissioning initiative.**
 - Addresses years of building use changes and equipment add-ons to optimize operations
- **Renewable Energy.**
 - Upgrade existing solar hot water heating system at building 4605 pool/fitness center.
- **Leverages historically low finance rates to maximize energy conservation goals**
 - A “budget neutral” project since funding source is savings from the utility account.

Economic Analysis of Recommended Energy Conservation Measures (ECMs)

Energy Conservation Measure (ECM)	Total Energy Savings (Mbtu/Year)	Annual Utility Cost Savings (\$)	Initial Cost Avoidance (\$) ¹	Annual Cost Avoidance (\$)	Construction Cost (\$) ²	Simple Payback (Years)
ECM 01 - Lighting Upgrades	4,823	\$104,191			\$528,631	5.07
ECM 02 - Fuel Conversion (estimated cost, TBD SEAGD bid)	1,507	\$400,818		\$51,000	\$3,500,000	7.75
ECM 03 - Controls Upgrades	2,032	\$35,878			\$319,155	8.90
ECM 04 - Retro-commissioning	20,578	\$252,479			\$1,941,711	7.69
ECM 05A New Chiller Plant Loop (5102/4901)	20,317	\$528,090	\$1,200,000	\$80,000	\$9,284,557	13.30
ECM 07 - Mechanical Upgrades	10,056	\$63,296		\$2,000	\$555,367	8.51
ECM - 10A Solar Hot Water System (Bldg 4605)	1,248	\$9,688			\$111,269	11.49
Recommended Total	60,561	\$1,394,440	\$1,200,000	\$133,000	\$16,240,690	9.85

Note (1): Included to show full economic benefit

Note (2): Includes Project Management Cost

Alabama Power UESC Proposal Details

- **Lighting Upgrades**
 - Involved 20 buildings (warehouses, hangers, wash racks, museum)
 - Removed HID fixtures and replaced with T-5/T-8 lamps
 - Removed 400 watt MH and replaced with 250 watt pulse start MH
 - Daylighting controls utilized



Alabama Power UESC Proposal Details

- **Fuel Conversion**
 - Involved 25 buildings
 - Installed approx. 10 miles of underground NG piping
 - Replaced burners on 5 fuel oil boilers to allow for NG
 - Replaced 10 fuel oil boilers with new NG boilers
 - 14 fuel storage tanks were taken out of service
 - Eliminated need of weekly inspections of fuel oil systems
 - Replaced 11 propane systems with new Heat Pumps



Alabama Power UESC Proposal Details

- **Controls and Retro-commissioning**

- **Total of 29 buildings involved**

- Inspection of existing HVAC system and review of control sequences
 - Provided deficiency list for correction and calibrated sensors
 - Integrated demand ventilation strategy
 - Retrofitted constant volume multi-zone AHUs to variable volume system.
 - Optimized control sequences to minimize reheat energy consumption & improve the part load efficiency
 - VSDs for the fans.

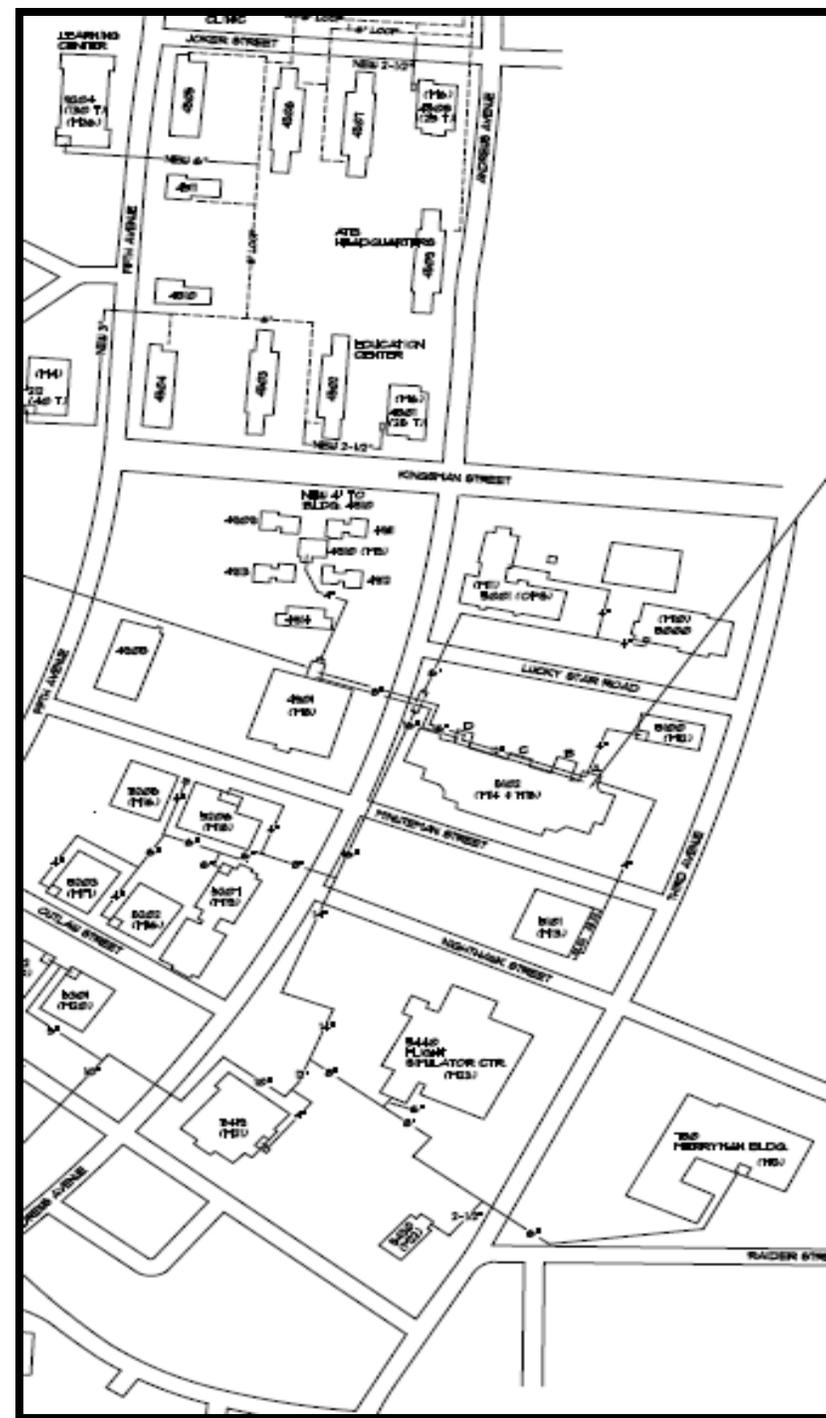
- **Building 5700**

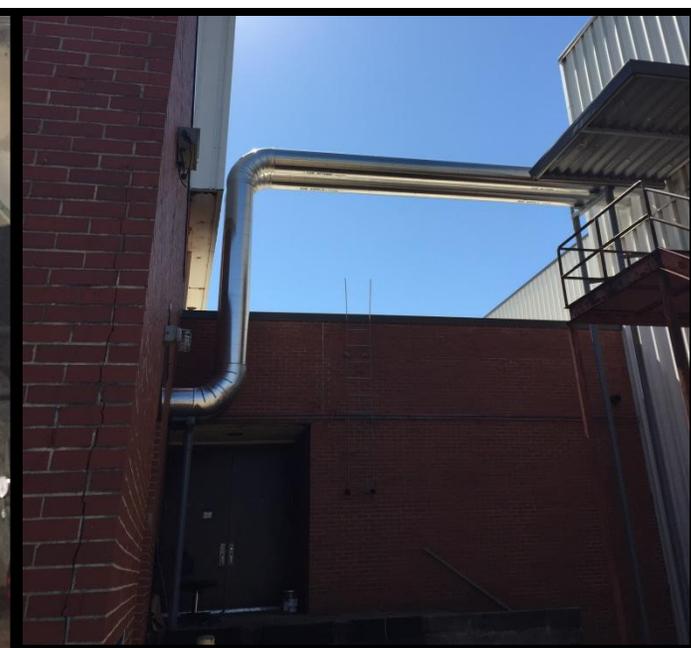
- Converted old generation Honeywell DDC to new Honeywell DDC
 - Calibrated sensors
 - Reset minimum flow at the VAV boxes to save energy at unoccupied hours
 - Optimized control sequences to minimize reheat energy consumption and improve part load efficiency



Alabama Power UESC Proposal Details

- **New Chiller Plant Loop**
 - Two 800 ton Magnetic Bearing Chillers
 - Serving 21 buildings (approx. 790,000 sqft)
 - Went from 31 existing chillers to 7 chillers and 6 backup chillers
 - 16 chillers went into storage and 4 chillers were retired
 - New load efficiency range - 0.3 to 0.5 kW / ton
 - VSDs for all buildings chilled water pumps
 - Approx. 21,000 ft. of chilled water pipe installed





Alabama Power UESC Proposal Details

- **Heat Recovery Chillers**
 - Four 20 ton systems were installed
 - Simultaneous Heating and Cooling
 - High operating COPs



Alabama Power UESC Proposal Details

- **Mechanical Retrofits**
 - **Building 30300**
 - Replaced a 275 ton chiller with a properly sized 125 ton chiller
 - Installed VSD on the Chilled water pump and AHUs
 - **Library**
 - Replaced the existing 40 ton DX
 - Replaced the AHU
 - Replaced the steam boiler with hot water boiler
 - Installed Controls
 - Installed dedicated AHU to serve a meeting room
 - Solved humidity issues



Alabama Power UESC Proposal Details

- **Solar Water Heating**
 - Heat the Swimming Pool at the Fitness Center
 - 88 Aquatherm 4x12 Pool Panels
 - Automatic Drain Back System



Proposal Results

- **Construction period was 16 months**
- **Project completed in December 2014**
- **Ft Rucker added Bldg 5700 controls project to the Scope of Work**
- **All “Change Orders” were no cost**
- **Maintenance Savings were on target**
- **Energy Savings is currently at 11% reduction**

Performance Assurance Approach

- **Collaborative approach development between Alabama Power and Fort Rucker to determine Risks & Responsibilities during IGA**
- **Performance Verification (M&V) Requirements / Frequency**
 - Baseline Development Post Construction As Built Savings Adjustments by APC
 - Full Performance Verification Analysis 12 months after project construction completion by APC
- **Ongoing Performance Verification provided to Fort Rucker with options on future years of Performance Verification**
- **Ongoing O&M / Retro-commissioning Activities**
 - Full commissioning at project completion
 - Comprehensive training and O&M services transition at project construction close-out with base operations contractor
 - Ongoing O&M / Retro-commissioning services provided by Fort Rucker with option to engage Alabama Power as needed

Questions?