• **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

Army leads Federal Government in 3rd party financing.

$3M for development enabled up to $326M in 3rd party investment in FY14 and $191M in 3rd party investment in FY15
Fort Rucker UESC Energy Conservation Project
Completed Dec. 2014

Hosted by:
FEMP
Federal Energy Management Program

CenterPoint Energy
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)

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

*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
• **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?