



**AMERICA'S ARMY:**  
THE STRENGTH OF THE NATION

**Army Energy**

# **Federal Utility Partnership Working Group (FUPWG) Spring Seminar**

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Energy and Sustainability**

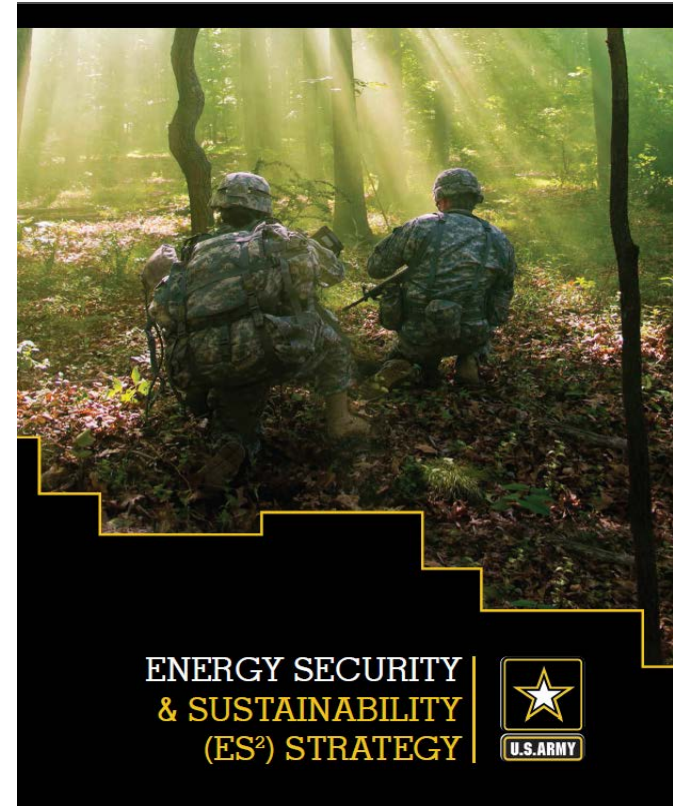
12 April 2017



## ES<sup>2</sup> Strategy is the Army's Foundation

### Army Energy Security & Sustainability Strategic Goals

1. Inform Decisions
2. Optimize Use
3. Assure Access
4. Build Resiliency
5. Drive Innovation

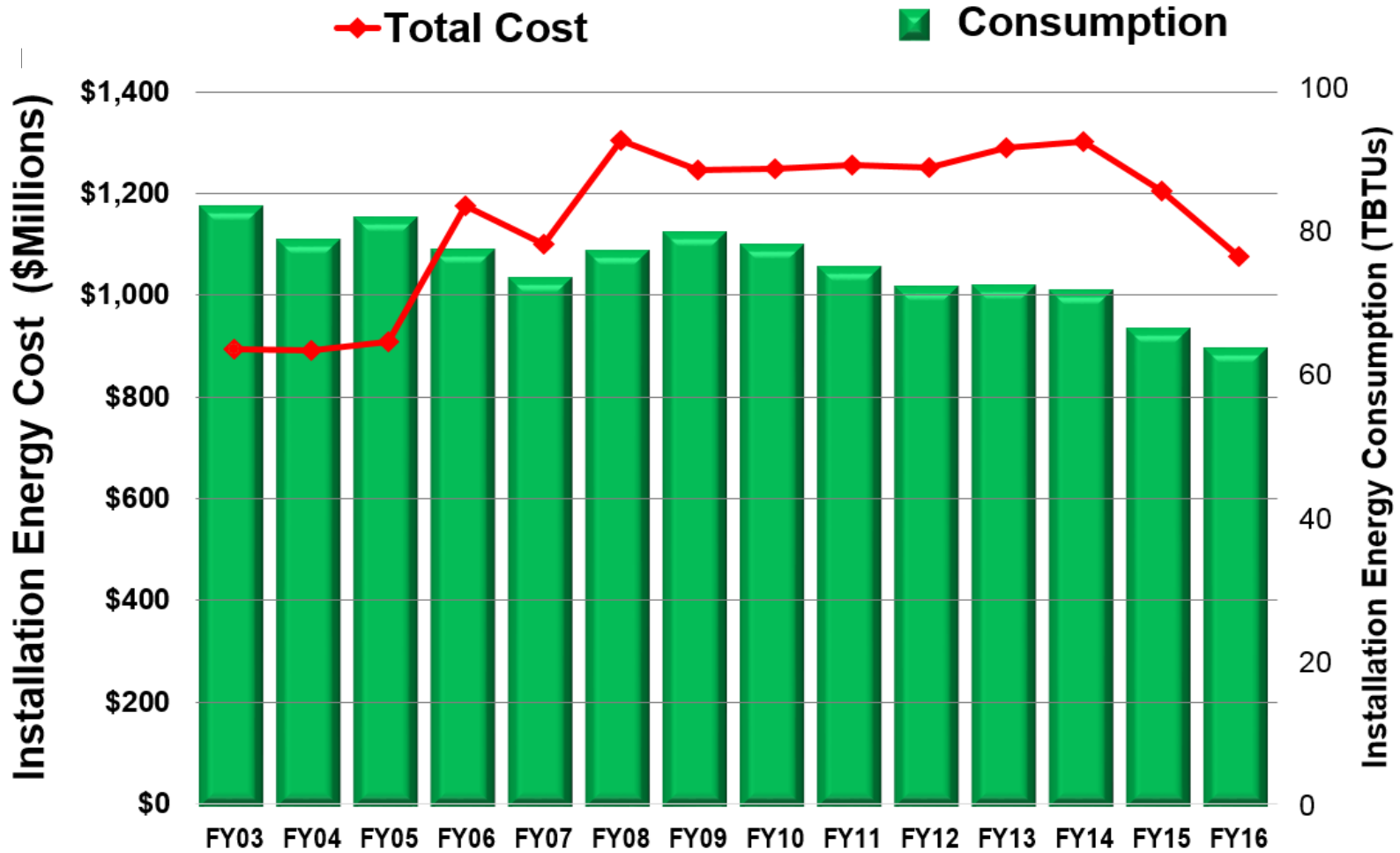


***“RESILIENCE: The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions. (Executive Order 13653)***

<https://www.army.mil/e2/c/downloads/394128.pdf>

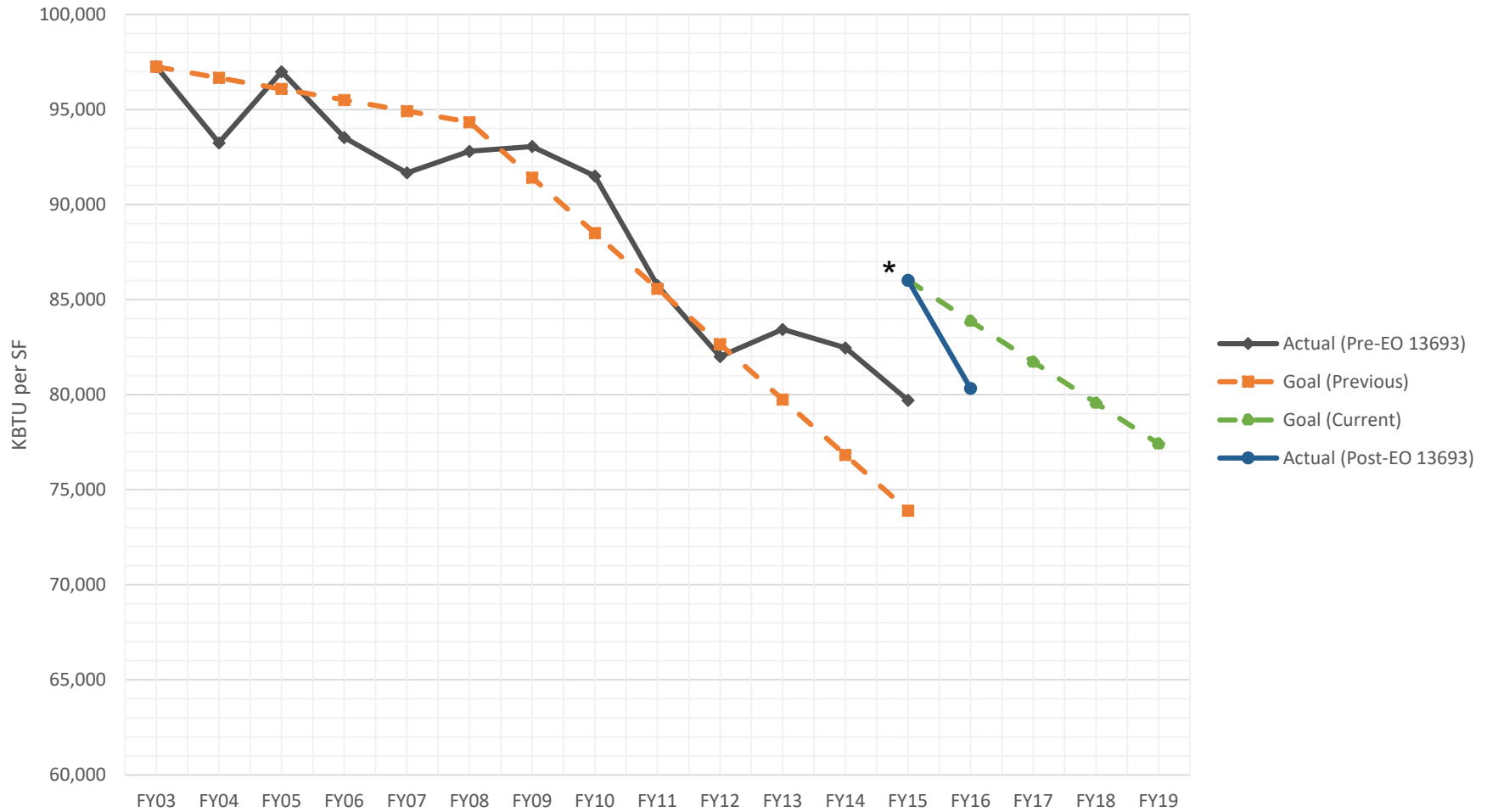


# Installation Utility Costs vs Total Consumption





Energy Intensity Consumption - Service Comparison



\* FY15 established new baseline - Army Materiel Command Government Owned Contractor Operated square footage added.

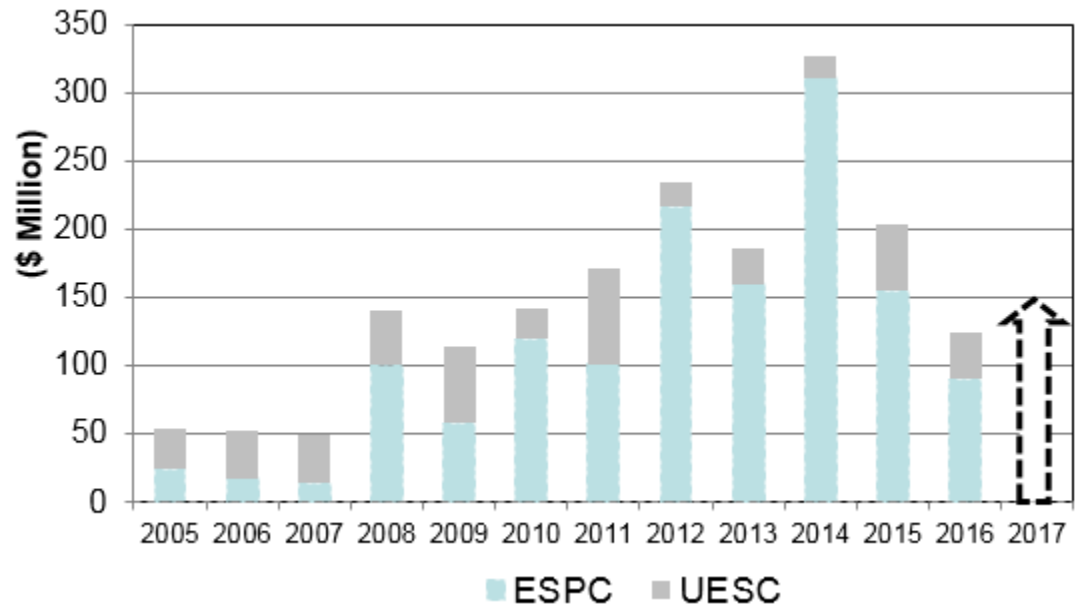


## Energy Savings Performance Contract (ESPC) / Utility Energy Service Contract (UESC)

### Program Summary

- 634 task orders/mods at 95 installations
- > 12.7 Trillion BTU saved per year
- Approximately \$2.6B in Private sector investments
- > \$350M more in development

Task Order Awards



Army avoided over \$180M in utility cost in FY16



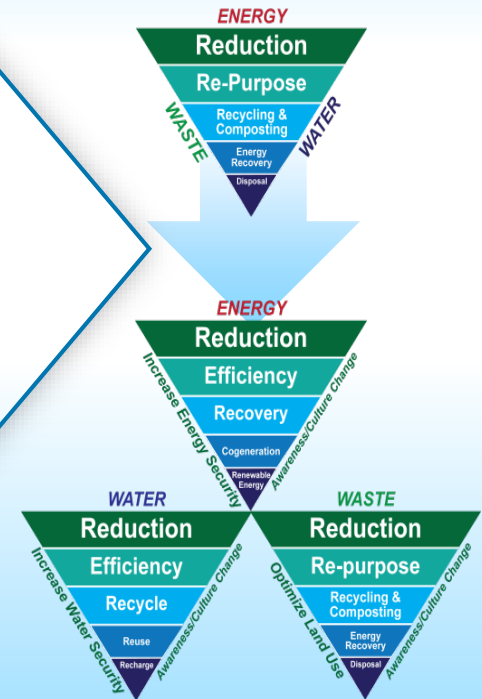
## Drivers

- Energy security, surety, and reliability
- Water scarcity
- Increasing energy prices/ Fully burdened costs of fuel
- Foreign energy sources
- Environmental concerns
- Federal and DoD mandates
- Improved operational capabilities
- Risk reduction

## 17 Pilot Installations



## Evolution of the Hierarchy

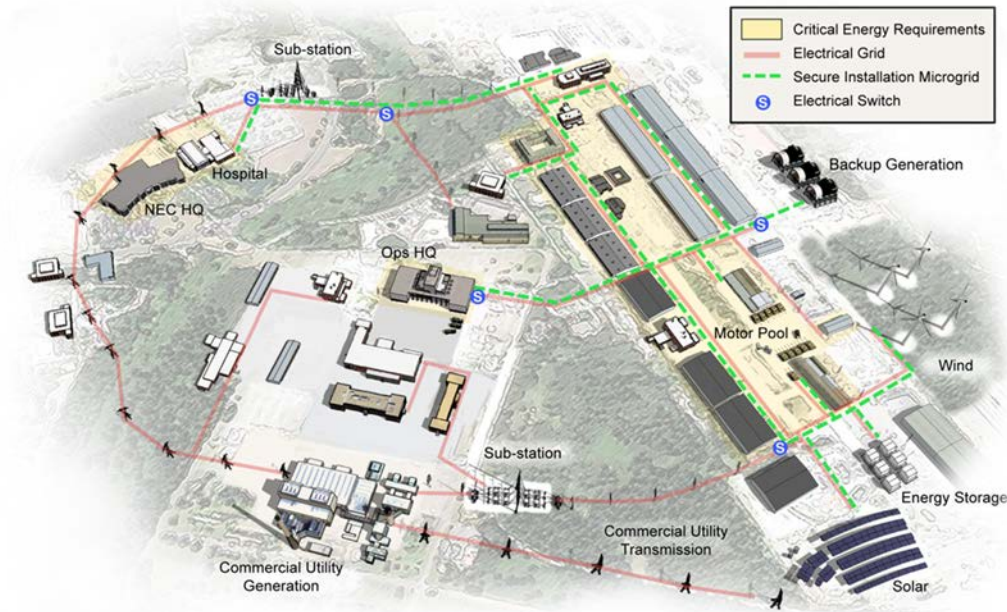


*Drivers for Change Resulted in Creation of Net Zero Programs for Energy, Water, and Waste, 1 October 2011*



## Intent

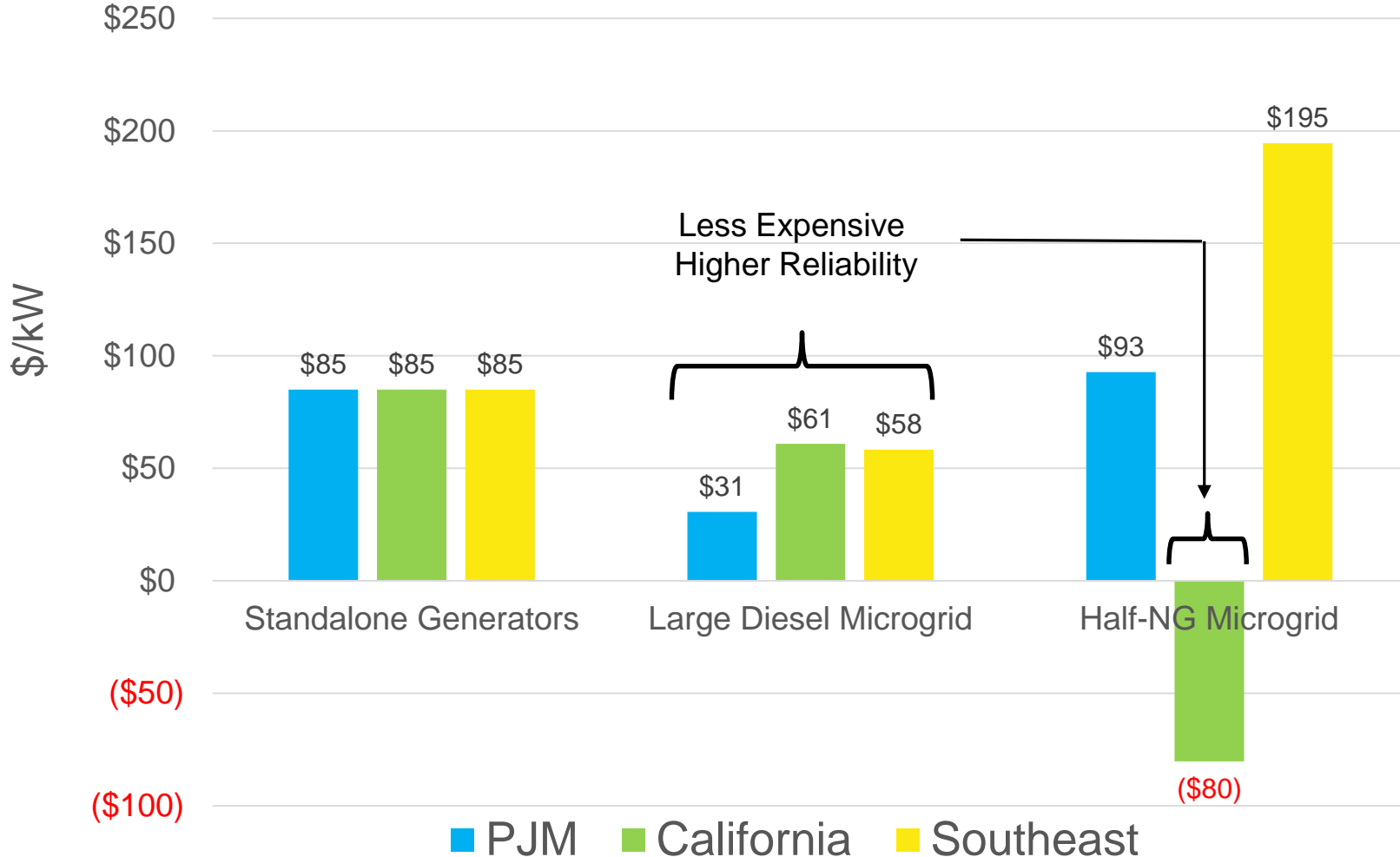
Army microgrid investments at the locations of strategic importance with the greatest risks





## Annual Net Cost of Protection (\$/kW of Critical Load)

(<http://www.pewtrusts.org/en/research-and-analysis/reports/2014/01/16/power-surge-energy-security-and-the-department-of-defense>)



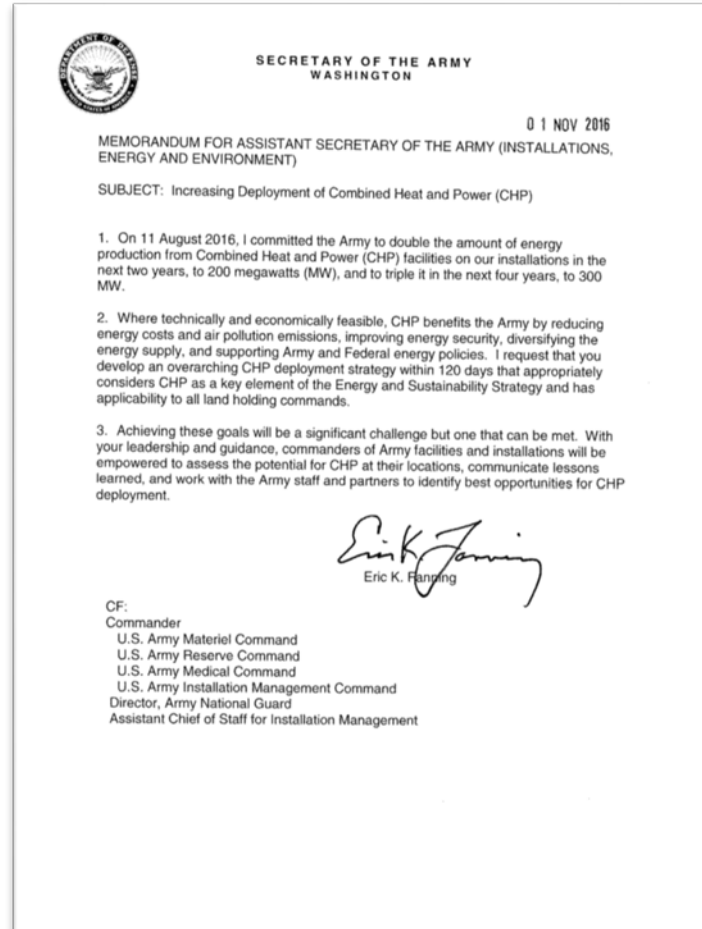




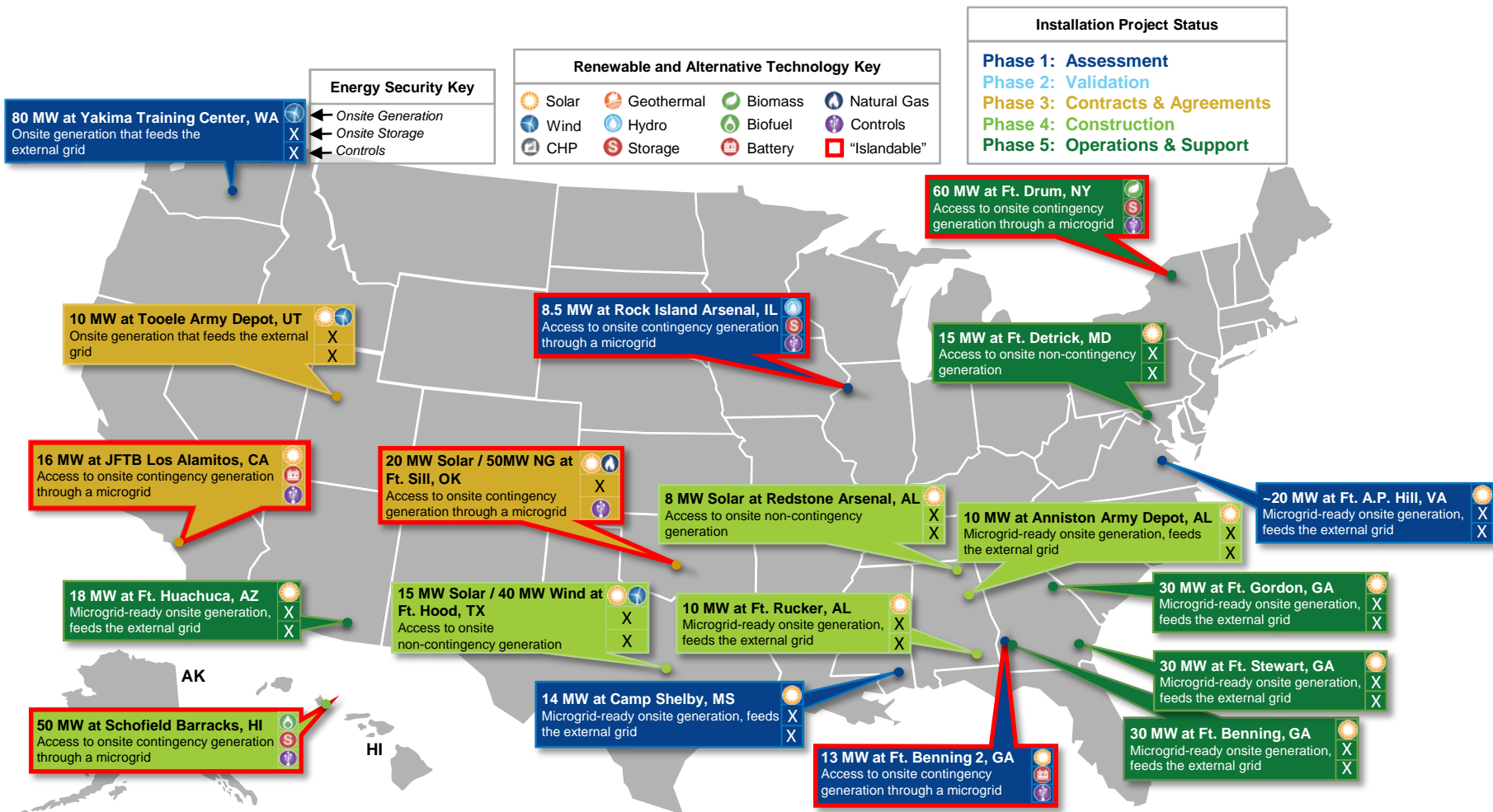
## Army Goal: Double the deployment of CHP to 200 MW by end of CY 2018 and triple it to 300 MW by end of CY 2020, from a 100 MW baseline

- **Army CHP Summary:**
- Currently Operating:**  
**109.2 MW**
- **Prime Applications:**
- ✓ **Facilities with high heating and/or cooling demands**
- ✓ **Large barracks, dining halls, hospitals, fitness centers, hangars, labs, manufacturing, & maintenance facilities**

**CHP ENHANCES ENERGY RESILIENCY**



- **Energy Efficiencies of 80% are routine with this technology**
- **Life Cycle Cost (LCC) less than conventional technology**
- **CHP Recommendations:**
- ✓ **Consider as either a one or a multiple-ECM Task Order;**
- ✓ **Explore multiple funding vehicles: ESPC/UESC, ERCIP, UP, MILCON & SRM.**
- ✓ **Opportunities exist across the full spectrum, from as small as 25 kW to as large as 50 MW.**
- ✓ **Micro-CHP can decrease or eliminate the need for on-site boilers.**
- ✓ **Size project to the thermal requirement, versus electrical load, and to run almost continuously.**



**Increasing Energy Security and Resiliency Across Army Installations**



## Army outgrant of 270 acres at Fort Gordon

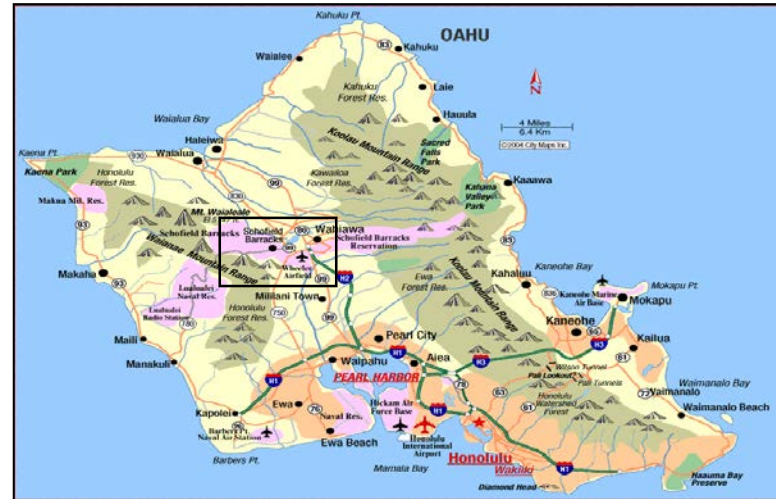


- Georgia Power owns, operates, and maintains 30 MWs of solar power, or about enough to power 4,300 homes per year
- Power flows off-base (through Army substation) to grid serving Fort Gordon and surrounding community
- Additional requirements for storage and microgrid would need to be scoped to “island” critical load in the event of a grid outage



## Army outgrant of 10 acres at Schofield Barracks

- Hawaiian Electric will construct, own, operate and maintain a 50 MW biofuel-capable power generation plant
- During normal ops, power will flow off-base to grid serving Army and Oahu
- During contingency ops, plant will provide 50 MW of “first call” and blackstart capability to three Army installations simultaneously; 5 days of fuel storage onsite at plant and 30 days of fuel storage on island
- 50 MW of firm power is sufficient to meet 100% of peak electricity requirements at Schofield Barracks, Wheeler Army Airfield, and Field Station Kunia

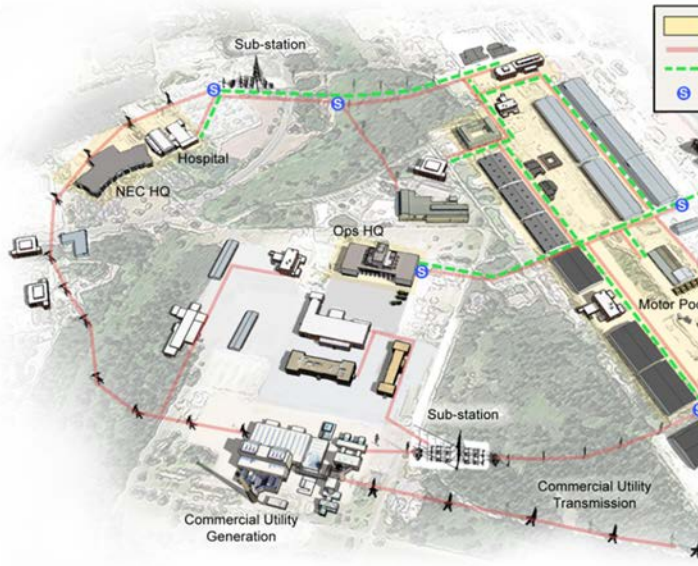




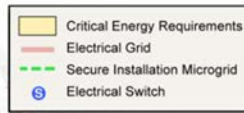


**Army proposed outgrant of 115 acres at JFTB Los Alamitos**

- Developer would construct, own, operate and maintain 16 MWs of solar power, energy storage, and microgrid components
- During normal ops, the developer sells power to the grid
- During contingency ops, the developer would provide islandable power for critical loads for min 7 – max 30 days



**Notional Army Microgrid**



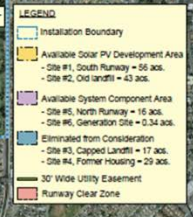
**Project Development Concept**



Energy Storage Project Site

Generator/Microgrid Controls Easement

Solar/Storage Project Sites





- **ASA(IE&E):** <http://www.asaie.army.mil/>    **ACSIM:** <http://www.acsim.army.mil/>    **USACE:** <http://www.usace.army.mil/>
  
- **Renewable Energy on Army Lands**
  - Large Scale Renewable Energy Projects (>10MW): <http://www.asaie.army.mil/Public/ES/oei/>
  - DoD Siting Clearinghouse: <http://www.acq.osd.mil/dodsc/>
  
- **Science and Technology**
  - Army Acquisition Business Website: <https://acquisition.army.mil/asfi/>; Base Camp Integration Laboratory: <https://pmfss.natick.army.mil/>
  - Communications-Electronics Research, Development and Engineering Center: <http://www.cerdec.army.mil/business/index.asp>
  - Natick Soldier Research, Development and Engineering Center: <http://nsrdec.natick.army.mil/business/index.htm>
  - National Defense Center for Energy and Environment: <http://www.ndcee.ctc.com/>
  - Network Integration Evaluation: <http://integration.army.mil/>; Rapid Equipping Force: <http://www.ref.army.mil/>
  
- **Facilities Energy Innovation**
  - Net Zero: <http://www.asaie.army.mil/Public/ES/netzero/>
  - Strategic Environmental Research and Development Program (SERDP) & Environmental Security Technology Certification Program (ESTCP): <http://www.serdp.org/>; Energy Security & Sustainability (ES2) Strategy: <http://usarmy.vo.llnwd.net/e2/c/downloads/394128.pdf>
  
- **Vehicle Innovation**
  - Tank Automotive Research, Development and Engineering Center: <http://www.army.mil/tardec>
  - Aviation & Missile Research, Development & Engineering Center: <http://www.redstone.army.mil/amrdec/Business/index.html>
  
- **Small Businesses**
  - Army Small Business Innovation Research Program: <https://www.armysbir.army.mil/sbir/Default.aspx>