Microgrids - Building a Flexible, Secure, and Resilient Base for Today and Tomorrow

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Army Office of Energy Initiatives (OEI)

Established by the Secretary of the Army first as a task force in 2011, then as a permanent office in 2014

- Serves as central management office for Army’s development, implementation and oversight of large-scale renewable and alternative energy projects that leverage private financing

- Secures Army installations with energy that is resilient, affordable and sustainable

- Focused on creating an “islandable” capability – energy security projects that include onsite generation, storage/supply, and controls

*Redstone Arsenal, Alabama: 10 megawatt (MW) alternating current solar project with Army’s first privately funded, commercially available battery storage solution*

*Fort Hood, Texas: 65 MW AC Hybrid Wind & Solar Projects; Expected to provide $100 million in cost avoidance over the term of the 30-year contract*
Army Office of Energy Initiatives (OEI)
Renewable and Alternative Energy Resilience Projects

Resilient Power Generation Stats
Percentages Based on Megawatt (MW) Per Hour Produced
- 88% with Onsite Generation
- 47% with Onsite Storage or Supply
- 51% with Onsite Controls
- 51% Islandable *
* An islandable project is defined as a project able to maintain operations when the electric grid goes down.

Project Status
- Phase 1: Assessment
- Phase 2: Validation
- Phase 3: Contracts & Agreements
- Phase 4: Construction
- Phase 5: Operational

Renewable & Alternative Energy Key
- Biomass
- Diesel
- Natural Gas
- Battery Storage
- Biofuel
- Generation
- Storage / Supply
- CHP
- Solar
- Controls
- Wind
- Hydro
- "Islandable"
- No Storage
- No Controls

Increasing Energy Security and Resilience Across Army Installations

As of November 21, 2017
“Soldier readiness starts at home, on top-quality Army installations”
- Chief of Staff of the Army Gen. Mark A. Milley

Army needs resilient/secure energy infrastructure to:

– Support troops at home and overseas
– Support communities near installations during national emergencies

Installations face significant infrastructure risk and increasing threats

Army approach to addressing these risks has evolved from a focus on meeting mandates to a focus on mission requirements
NDAA 2012: “energy security”…having assured access to reliable supplies of energy and ability to protect/deliver sufficient energy to meet mission essential requirements

DoDI 4170.11, Mar 2016: “energy resilience”…The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from service disruptions

Army Directive 2017-07 (Installation Energy and Water Security Policy), Feb 2017: requires installations to secure critical missions with necessary energy and water for a minimum of 14 days
Notional Installation Scenario

| 114 | Backup Diesel Generator Sets |
| 14 mi. Dispersal; **82** w/ in 6 mi. dia |
| 21 | Fuel Tank Sizes (50-8,000 gal) |
| 40k | Add’l Gallons Bulk Fuel Onsite |
| 10 | Manufacturers |
| 70 | Unique Model Numbers |
| 2 | Maintenance Personnel Onsite |

<table>
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<tr>
<th>Factors Affecting Backup Generators Ability to Supply Power for 14 Days</th>
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<tr>
<td>• Maintenance cycles</td>
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<td>• Spare parts</td>
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<td>• Emergency operating permit limits</td>
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<td>• Trained staff availability during a contingency</td>
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<td>• Supply contracts</td>
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<td>• Onsite fuel storage availability</td>
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Fuel Logistics: Using 75% day/ 25% night load factor, localized tanks deplete in 2-3 days. Re-supply ops begin, 11 to 44+ ops/24hrs. Mission becomes dependent on centralized refueling capability, 24/7 operations. All fuel depleted after 6-7 days (local/ bulk), absent external resupply.

Observation: In this notional scenario, current backup genset, fuel, and re-supply paradigm could be challenged in the event of a 14-day grid outage. Projects that increase onsite generation and storage, and diversify supply could extend backup capability and enhance installation resilience.
Notional Resilience Microgrid Concept
Energy Security Project, Under Construction: Schofield Barracks, HI

**Project**
Hawaiian Electric will construct, own, operate and maintain a 50 MW biofuel/conventional fuel power generation plant on Schofield Barracks

**Army Benefit**
Project will provide 50 MW of “first call” and “black start” capability to three Army installations simultaneously; 5 days of fuel storage onsite, 30 days of fuel storage on island

**Utility Benefit**
Hawaiian Electric will gain a critical generation facility above the tsunami strike zone, which will power the Oahu grid during normal operations

**Community Benefit**
As the only baseload power generation facility on Oahu located above the tsunami strike zone, this project enhances grid resiliency and could provide power to part of the surrounding community in the event of a grid outage
Energy Security Project Concept:
Fort Sill, OK

Project Concept
50 MW natural gas fueled grid-facing peaking plant and 20 MW solar array, with controls to “island” Fort Sill critical load in the event of a grid disruption

Army Benefit
The project would enhance energy security by locating generating assets on Fort Sill that supply reliable power to support the installation’s mission, even during a commercial grid outage

Utility Benefit
Utility gains a distributed asset enhancing grid reliability in normal operations. Power from project would flow directly to grid servicing the town of Lawton and Fort Sill

Community Benefit
The project could further improve electrical service for the surrounding community with additional operational flexibility for the grid that serves Lawton, OK
Energy Security Project Concept: JFTB Los Alamitos, CA

**Project Concept**
Developer would construct, own, operate and maintain 16 MW of solar power, energy storage, and microgrid components

**Army Benefit**
Project will enhance energy security through a developer providing “islandable” capability to power critical missions for a minimum of 14 days, during grid emergency

**Developer Benefit**
During normal operations, the developer will benefit from selling power to customers via the CA grid

**Community Benefit**
The project will enhance grid reliability by alleviating transmission line congestion in an area severely impacted by closure of a nuclear power plant
Contingency Microgrid RFI

Request for Information (RFI)
Joint Forces Training Base
Los Alamitos, CA

The Army is interested in gathering information on the feasibility of seeking competitive proposals from private, public or not-for-profit entities interested in leasing land at the Installation for the development of solar photovoltaic energy, energy storage or combination of technologies with microgrid type controls to electrically island the installation during external electrical grid outages or other threats to the security of JFTB - LA. JFTB - LA is a strategic asset for military units and other national, state and local organizations, including emergency operations for Southern California.

Responses are due by 11:59 pm Eastern on December 22, 2017. The RFI is posted on FedBizOpps:

https://www.fbo.gov/spg/USA/COE/DACA09/SPL09-AM-17-1101/listing.html
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