



Smart Power Infrastructure Demonstration for Energy Reliability and Security (SPIDERS) Joint Capability Technology Demonstration (JCTD)

Phase 3 Status and Way Ahead

April 22, 2014

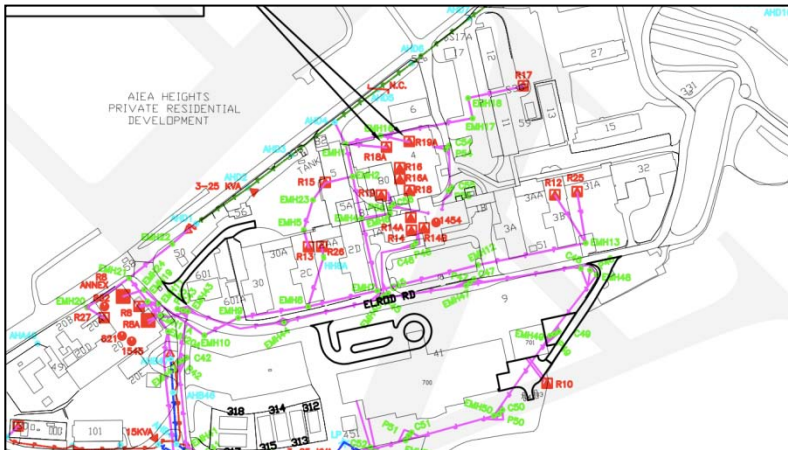
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Phase 3 Objectives

- Phase 3 is the entire Camp Smith installation
- Multiple integrated microgrids will support mission
 - Integration of existing rooftop PV and solar carports
 - More efficient fuel use during emergencies
- Highest level of cyber protection to date
- Ancillary services with electric utility
 - Tied to HECO Commercial Grid – Best Economic Advantage
 - Generates savings to defray the cost of energy security
 - Provides ancillary services to commercial utility





SPIDERS Phase 3 Progress



- **Sandia National Laboratories completed preliminary design**
- **100% Engineering Design Completed**
 - Design-bid-build contracting methodology
 - Design contract - Burns & McDonnell (Phase 1 & 2 System Integrator)
- **Construction RFP bids due 20 May 2014**
 - Solicitation Number: W912BU-14-R-0004
- **Technical Demonstration – March 2015**
- **Operational Demonstration – May 2015**
- **Transition Products & Lessons Learned – approx Aug 2015**





SPIDERS Phase 3 Quantifiable Measures (Projected)



Phase 3 (Entire Camp Smith Installation ~4.3 MW)				
	NORMAL	SPIDERS	DELTA	ANTICIPATED RESULTS
Runtime	TBD	TBD	TBD	The team is currently establishing the baseline numbers. However, we anticipate to meeting or exceeding our previous phases metrics by up to 20% while significantly improving the cyber security.
CO2 Emissions	TBD	TBD	TBD	
Fuel Consumption	TBD	TBD	TBD	

Anticipated Results:

- Serve the **entire installation (4.3 MW load)**
- Deliver an adaptable microgrid design to meet current/future utility ancillary services
- **Deliver an economic benefit analysis** (utility cost savings, utility incentive program on load reduction). Validate projected utility savings of \$35K-\$45K/month including O&M costs
- **Improve Reliability, Efficiency, and Emissions** by up to 20%
- **Cyber Security** - Phase 2 enhancement plus advanced cyber security measures (intrusion detection, whitelisting, enhanced enclaving, *CSNNI 1253 validation)

* CSNNI - Committee on National Security Systems Instruction. This is the security control overlay for Industrial Control Systems





Way Ahead



- Mission assurance for continuous operations is primary
- Renewable energy projects need to support mission
 - For DoD, contracts include contingencies (PPA, EUL, ESTCP, UESC)
 - Generation available to installation during outages
 - Microgrid ready, Inverters – four quadrant capable
- Stop thinking of energy services as related to buildings/loads
 - Mission assurance happens because one designs it around metrics
 - Buildings and loads change and the architecture for transmission and distribution must be smart
- Efficiency/Security are related to sys engineering & ownership
 - whole systems need master plans & O&M follow through
 - software optimization and HMI developments need design ctr approach

Future infrastructure upgrades based on mission requirements and economic benefits



