Concurrent Technologies Corporation

Grid Technologies Panel

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Who We Are

Concurrent Technologies Corporation

CTC's capabilities include: Advanced Engineering and Manufacturing; Environment and Sustainability; Intelligence, Information Technology and Security; Logistics, Management and Acquisition; Power and Energy; Readiness, Preparedness and Continuity; Safety and Occupational Health; and Special Missions.

Technology Transition is Our Goal

- **Trusted Partner**: 501(c)(3) nonprofit established in 1987
- **Experience**: 1,100+ professionals at more than 50 locations
- **Excellence**: Top 100 Government Contractor
- **Certifications**: SANS / CISSP / ISSEP / DODD 8570 compliant
- **Facilities**: Labs / Conference Centers / SCIF Space
- **Secure Communications**: JWICS / SIPRNET / NSANet / NGANet
- **Quality Systems**: ISO 9001 / ISO 14001 / AS9100 / CMMI-SE/SW

2012 WORLD'S MOST ETHICAL COMPANIES WWW.ETHISPHERE.COM

CTC has recently been named to the list of the World's most Ethical Companies by Ethisphere Institute, a leading international think-tank

2013 WORLD'S MOST ETHICAL COMPANIES WWW.ETHISPHERE.COM

Power & Energy

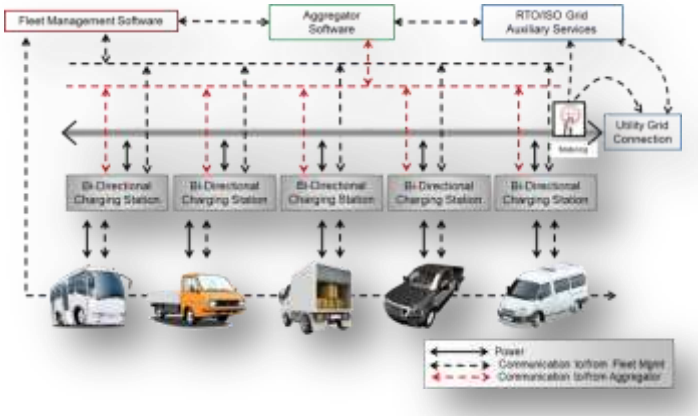
Innovation:

Evolving Capabilities in Power and Energy

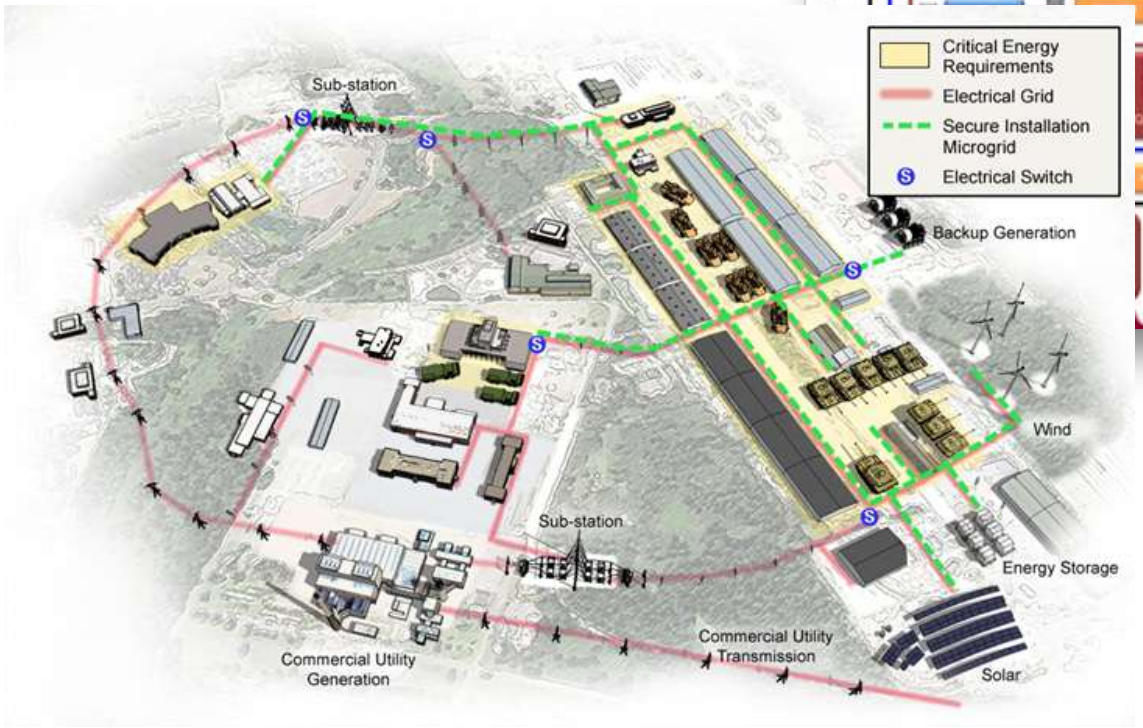
Power & Energy Services
Power & Load Management
Energy Supply & Management

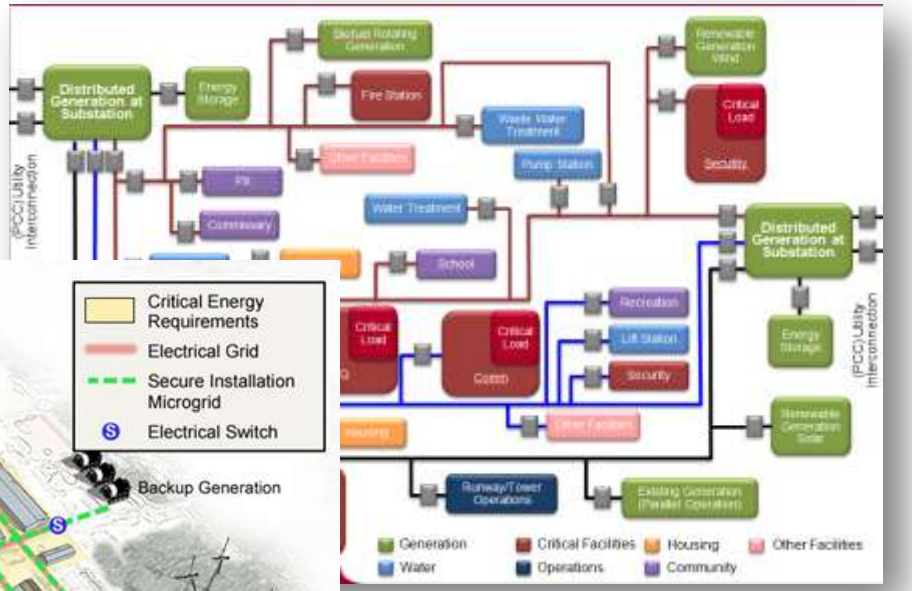
Power & Energy Experience

- Energy Security Assessment and Conceptual Microgrid Design
- Army Net Zero Initiative
- Energy Policy/Analysis
- Army Energy Initiatives Task Force
- DOD PEV-V2G Initiative
- AFRL Technology RDT&E



DoD Energy Security

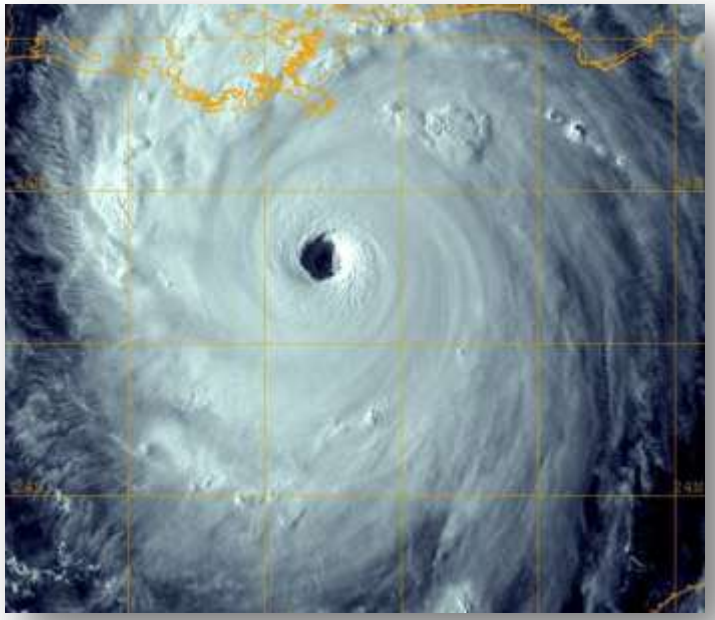




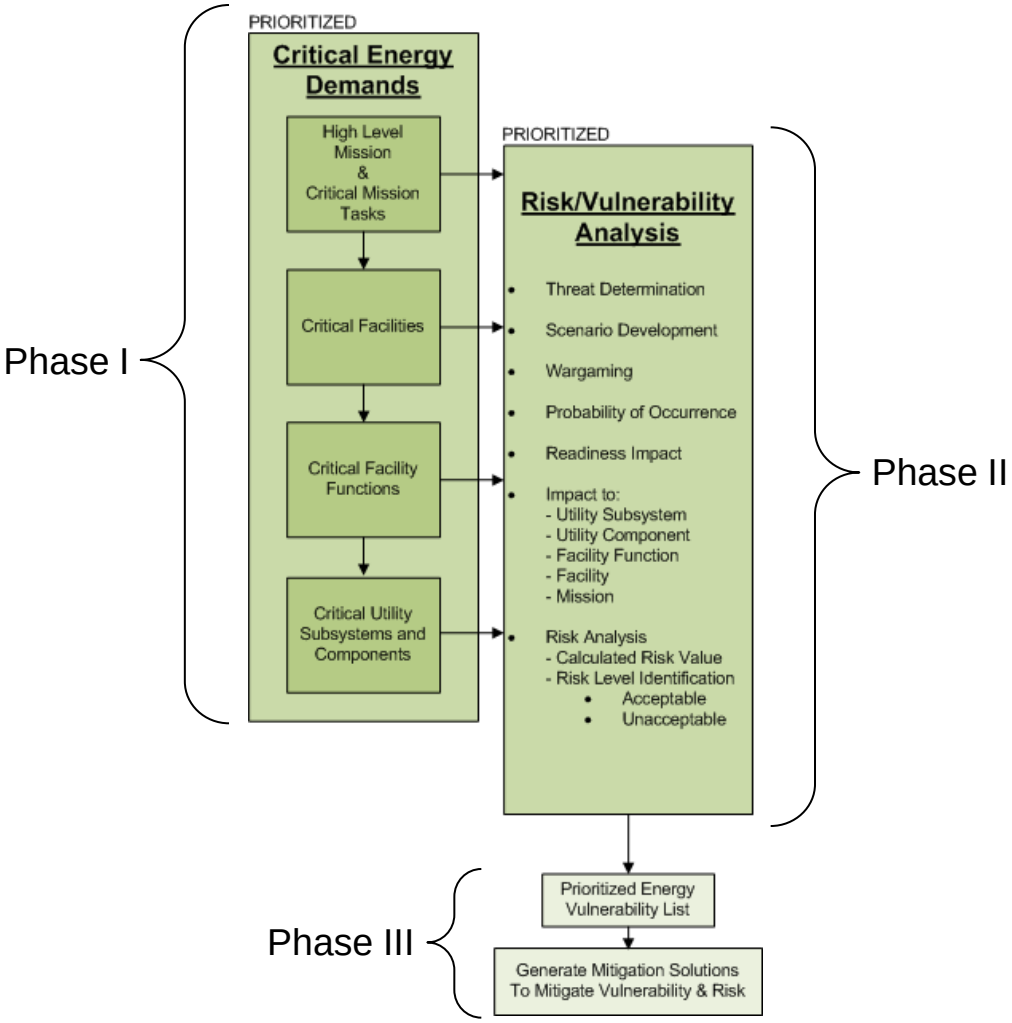
Large-Scale Alternative Energy that supports an Installation's Mission Critical Utility Infrastructure

What is the State of your Energy Security?

- Are the critical missions and corresponding critical facilities identified?
- Are all the mission critical equipment connected to the auxiliary generators?
- Are your auxiliary generators capable of long-term continuous operation?
- Can the generation be grid connected and operate in parallel?
- Do you have large prime power generators on site? Are they connected to the distribution system?
- Can the installation distribution system be operated independently from the commercial electric utility supply?



ESA Methodology for the Army – Three Phases



Summarized Results from Phase I Prioritized Critical Energy Needs

Phase I*	ESA #1	ESA #2	ESA #3	ESA #4	ESA #5
Number of Missions Evaluated	12	20	6	13	16
Critical Tasks	13	19	6	19	18
Facilities	50	63	41	131	137
Facility Functions	64	146	123	146	172
SPFs	128	83	107	120	110

*Working with 3 other Army Installations in FY14

❖***The decomposition of critical missions at each facility resulted in identifying SPFs, making site personnel aware of their energy dependencies to accomplish missions.***

Summarized Results from Phase II Risk and Vulnerability Analysis

Phase II*	ESA #1	ESA #2	ESA #3	ESA #4	ESA #5
Threats Analyzed	6	16	16	15	23
Total Risks	456	415	645	236	983
Vulnerability	31	52	13	2	74
Concern	105	0	24	4	47
Observation	104	38	12	41	210
Findings	216	325	596	189	652
Unconventional Concerns	29	2	10	9	12

*Working with 3 other Army Installations in FY14

- ***Phase II mathematically analyzes and uncovers plausible threats and their consequential risks to the mission. The qualitative/quantitative prioritization can be used as mitigation justification.***

Summarized Results from Phase III Potential Mitigation Solutions

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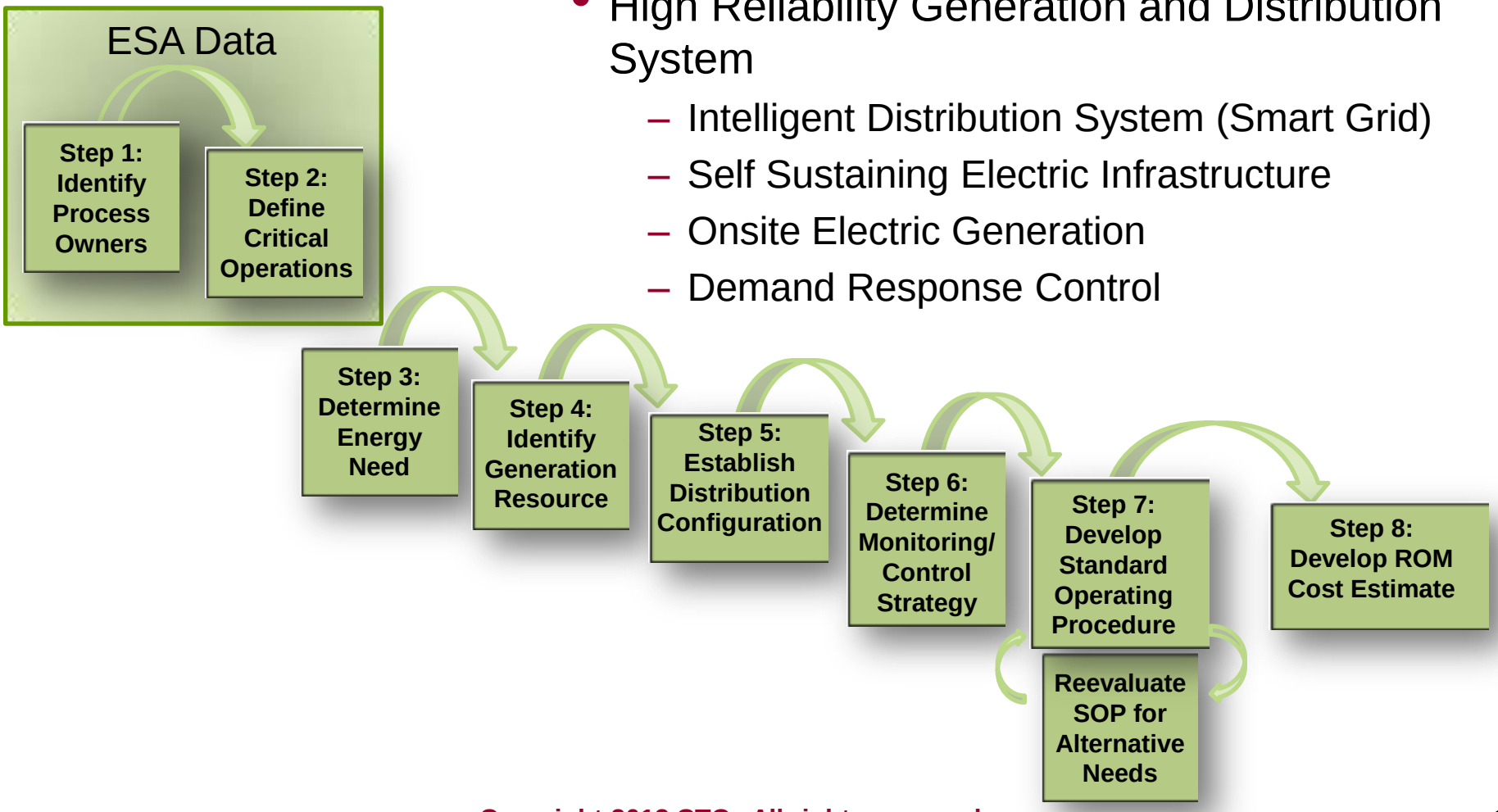
Phase III*	ESA #1	ESA #2	ESA #3	ESA #4	ESA #5
Mitigation Solutions Identified	121	405	645	236	983

*Working with 3 other Army Installations in FY14

- ***Through prioritization and mission owner input, the ESA identified weaknesses in the existing energy security posture and provided actionable solutions for leadership to implement.***
  - Determined multiple solutions with varying complexity and ROI
  - Provided solutions in a format that can be easily migrated to a form or template for recommended funding channels
  - Provided a decision point for installation leadership

Mission Critical Utility Infrastructure Methodology

Planning as a Mitigation Solution



- High Reliability Generation and Distribution System
  - Intelligent Distribution System (Smart Grid)
  - Self Sustaining Electric Infrastructure
  - Onsite Electric Generation
  - Demand Response Control

MCUI Conceptual Design

- **Missions are constantly changing**
  - Island concept can enable real-time changes to critical facilities supported based on mission cycles
- **Allows flexibility to provide service for Non-Critical Facilities**
  - Critical Missions not always dependent on energy
  - Some facilities could be supported before critical operations depending on event
- **Completed 3 Army Installations Designs**
- **Currently working with 3 Army Installations**

Conceptual Design Considerations
Critical Load (MW)
Installed Generation[1] (MW)
Available Generation[1] (MW)
Tiered Critical Buildings (#)
Total Cost ($M)
- Distribution Upgrades ($M)
- Engineering ($M)
- Generation Equipment ($M)
Recommended Fuel Storage (days)

[1] UFC mandates two backup generators (N+1) for prime power generating plants

Lessons Learned/Challenges

- On-site automation for outage data collection and analysis
- Open source interoperability between components and systems
- Specifications for systems
- Cyber secure solutions for data management
- Lack of auxiliary generators and/or required mission critical support equipment
- Decrease demand in critical facilities will lower generation requirements
- Interoperability of renewable energy systems to be grid-connected and grid independent
- UPS Standardization
- Grid-scale energy storage
- Low cost and less maintenance intensive solutions

Q&A

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