



# **Energy Resilience Greater Kansas City SAME**

**Lessons Learned:  
DoD Energy Security**  
**Building a World of Difference.®**



# Energy Security Solutions for the Military

## Meet Our **Experts**



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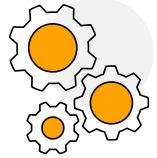


**Larry Almaleh, PE, PMP**

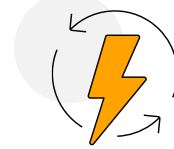
Project Manager  
Black & Veatch, Federal

# Energy Security for the DoD

Provide power continuity and energy sustainment to enable military mission assurance



**Reliability:** Reduce probability of mission critical failure



**Resilience:** Increase ability of DoD to respond to adversity

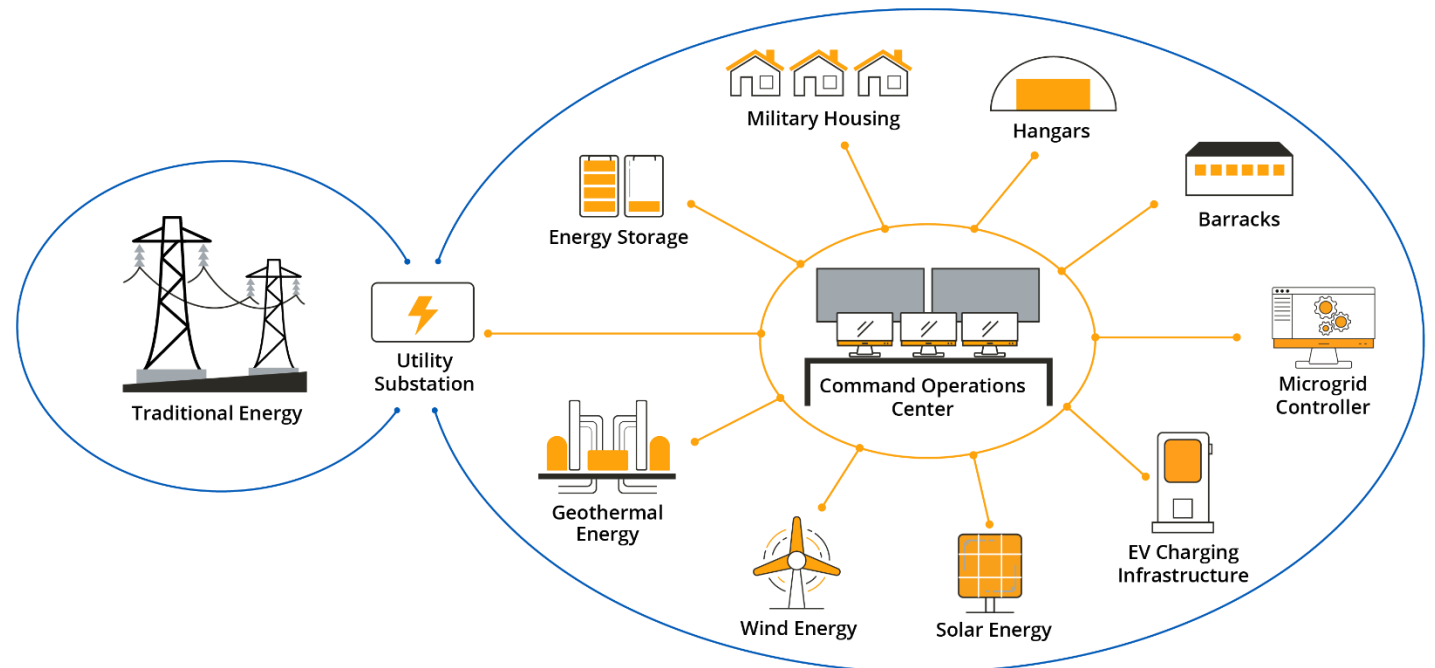


**Sustainability:** Ensuring your future is more secure the present

## Energy Security

*requires framework that considers both the*

**customer**  
*and*  
**community**

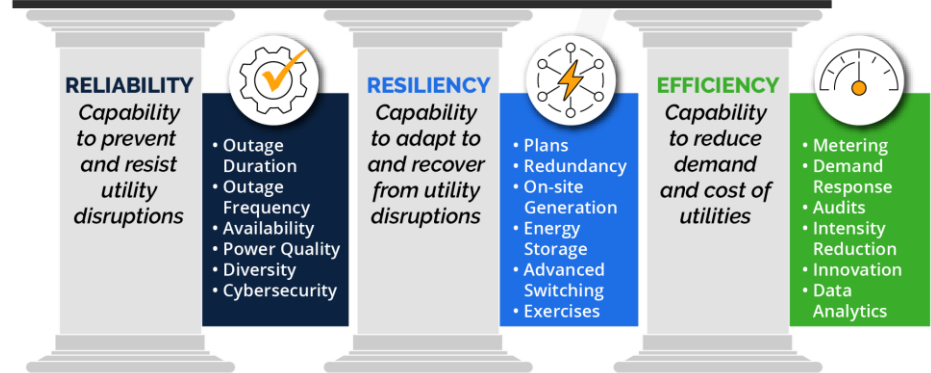


# Energy Security Policy Updates

## DoD policies establish resiliency baselines

- 2022 FEB: Army Climate Strategy
  - “The Army will be a resilient and sustainable land force able to operate in all domains with effective mitigation and adaptation.”
  - Intermediate Goal #1: Install a microgrid on every installation by 2035
- 2021 MAY: Metrics and Standards for Energy Resilience at Military Installations Memorandum (OUSD)
  - Provide for a minimum of 14 days of energy disruption.
  - Establishes target power availability of 99.9%-99.9999%.
    - 99.9999%: Mission Critical Facilities, e.g., HQ, Communications, Airfield.
    - 99.99999%: Most Critical Facilities, e.g., Missile Defense, Satellite Control, Cyber operations
- National Defense Authorization Act (NDAA)
  - Promote multiple and diverse sources of energy; favor energy resources originating on installation (2021)
  - Promote microgrids; Favor full-time energy sources rather than emergency generation (2021)
  - Identify potential renewable or clean energy resources, or related technologies such as advanced battery storage capacity, to enhance resiliency (2022).

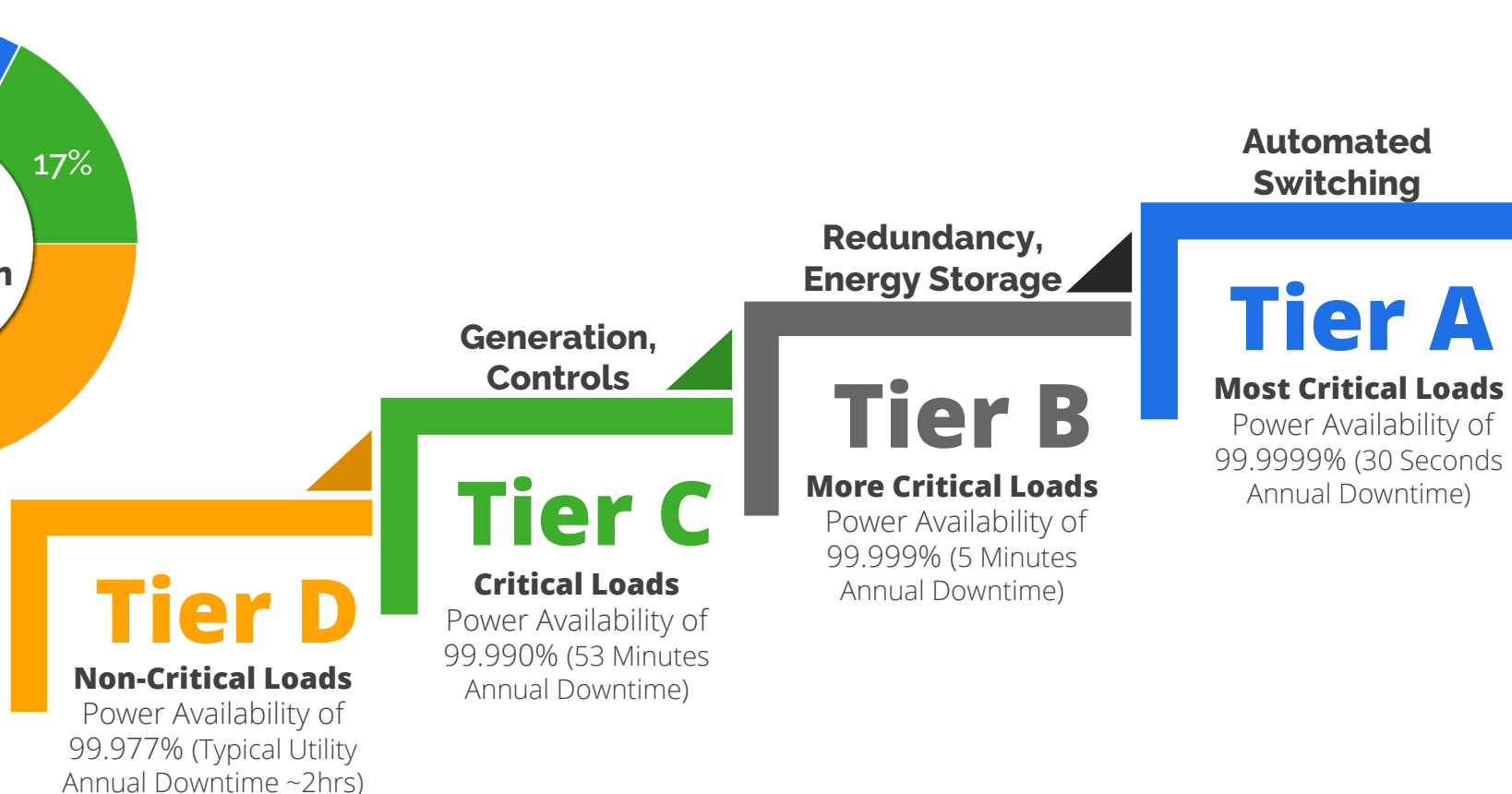
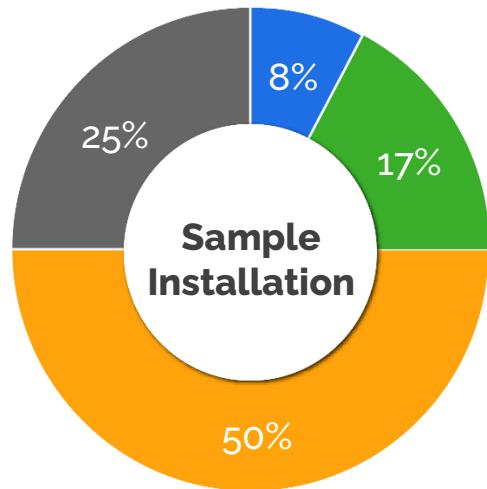
## 3 PILLARS OF ENERGY SECURITY (P-602)



- U.S. Federal Sustainability: Executive Order (EO) 14057
  - 100% Carbon Pollution-Free Electricity by 2030, including 50% on a 24/7 basis
  - Climate resilient infrastructure and operations
- Federal policies driving proliferation of DER and catalyzing market access, e.g., FERC 841, 2222
- State policies guide market participation and economic viability of energy projects
  - Regulated vs de-regulated energy markets
  - State policies and incentives [Reference DSIRE]
- Upcoming: Funds for Resilience investments, microgrids, and R&D (Bipartisan Infrastructure Package); Standalone ITC for energy storage (Energy Storage Tax Incentive and Deployment Act of 2021)

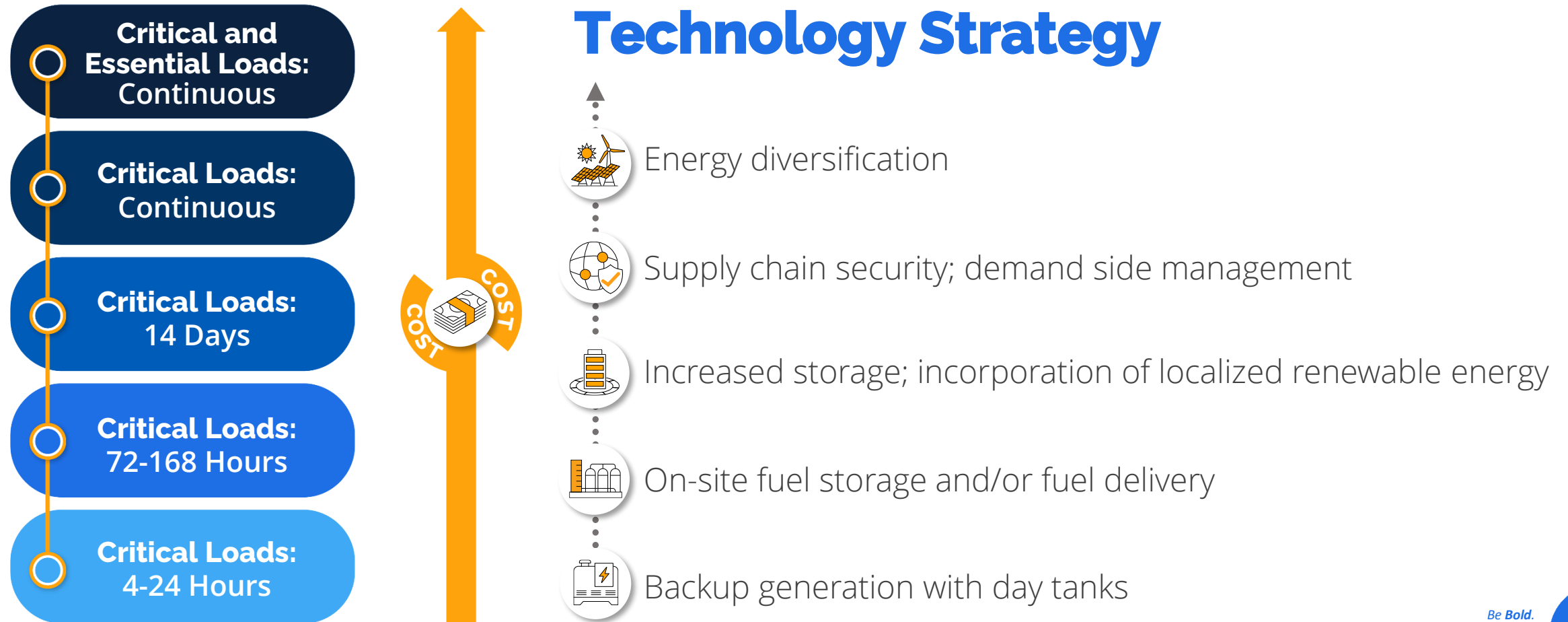
# Applied Approach for Scalable Energy Security

Design can be optimized for unique mission requirements.



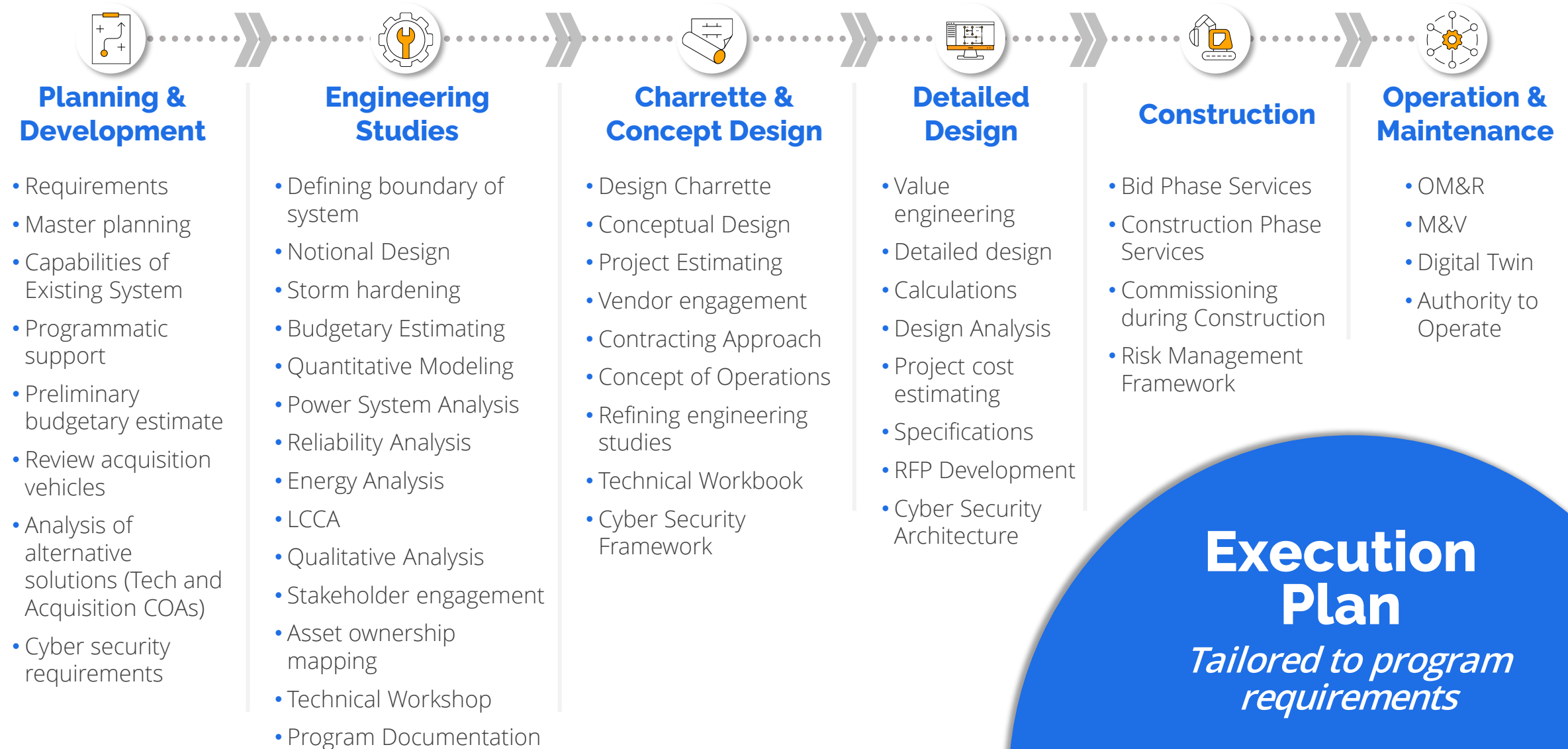
# Applied Approach for Scalable Energy Security

Mission autonomy requires energy diversity and supply chain security.





# Program Execution



# Miramar





# Aerial View: MCAS Miramar



356kW Thin-Film PV Roof Systems



3.2MW Landfill Gas Energy Plant



Microgrid Backup Power Plant

- 4MW Diesel Generator Set
- 3MW Natural Gas Generator Set
- Central Microgrid Controller
- Energy Storage



Energy Operations Center



250kW / 1MW Battery Storage



511Kw & 435kW PV Carports

# Marine Corps Air Station (MCAS) Miramar Power Plant and Microgrid

State-of-the-art energy system operated out of the air station's Energy and Water Operation Center (EWOC). This advanced DoD microgrid is the first of its kind to:

- Successfully integrate a separate landfill power generation system into the microgrid, *a feat not previously achieved*, powering the entire installation
- Operated in **fully automated mode** when microgrid power was restored to the critical loads automatically by the microgrid Power Control System (PCS) software after a simulated utility power outage.
- Operated in **economic mode** when the microgrid manages the landfill power, PV and plant generation assets to provide most economic power sources.



## Miramar Lessons Learned

- Provide ample space within facility considering maintenance and constructability
- Procure systems, not components
- Microgrids require a greater level of integration both (i) for components within the power plant, and (ii) with the interface to the existing distribution and SCADA system.
- The operating manager should be on-board early to help define controls and HMI
- CIO needs to be engaged from the beginning to define cybersecurity requirements for ATO and RMF
- Limitations of existing system need to be well understood

*"Our microgrid delivers capabilities that will make MCAS Miramar one of the most energy-forward defense installations in the nation,"* said Col. Charles B. Dockery, commanding officer, MCAS Miramar





# **Additional Considerations and Recap**



# Summary: Lessons Learned



- **Programmatic**
  - Align project requirements to policies
  - Define program priorities: Resiliency, efficiency, etc...
- **Planning and Development**
  - Define mission critical requirements and load prioritization
  - Define operational requirements (e.g., automation)
  - Understand data limitations
- **Engineering Studies**
  - Perform analysis and modeling to validate feasibility and optimize system configuration and operation
- **Design**
  - Consider compatibility with existing systems (e.g., SCADA)
  - Engage CIO early to define cybersecurity requirements
  - Consider operability and maintainability
- **Procurement and Construction**
  - Procure systems, not components
  - Understand limitations of existing system
  - Confirm vendor warranties and supply chain constraints
- **Operation**
  - Involve operations manager early in project development
  - Define and execute plan for measurement and verification





**BLACK & VEATCH**

# Contact Us

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