



Secure Microgrid[®] Project Development Healthcare Facility Microgrids

Primary Drivers for Healthcare Facility Microgrids

Power Supply

- Optimize Reliability/Resilience/Quality Factors
- Target zero downtime to Mission Critical loads

Power Cost

- Optimize economics of both the system capital cost and energy commodity
- Cost payback basis

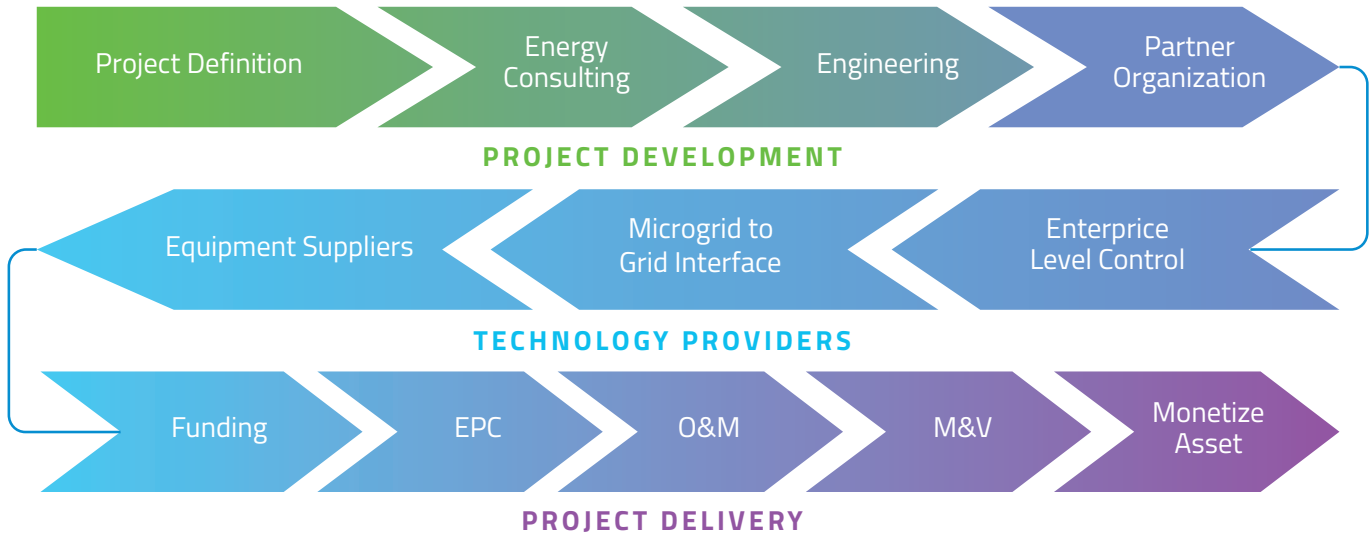
Environmental Sustainability

- Evaluate environmental impact of the power supply on an optimized basis relative to cost and security

Defining Resilience and Reliability

- Reliability: The ability of an electric power system to deliver the required quantity and quality of electricity demanded by end-users
- Resilience: The ability of an entity (e.g., asset, organization, community, region) to avoid, prepare for, respond to, adapt to, and recover from anticipated and unanticipated energy disruptions
 - Reducing the magnitude and duration of energy service disruptions
 - Process borne from US ARMY Directive 2017-07, "Installation Energy and Water Security Policy"; requires installations to secure critical missions with necessary energy and water for a **minimum of 14-days**

Secure Microgrid® Development Process U.S. Patent #9,026,260*



Two Primary Modes Of Operation

A. Grid-connected parallel mode:

Normal operating mode characteristics

- Energy supply to all facility loads from the utility grid and multiple in-situ sources (i.e., inside the fence, behind the meter, etc.)
- Multiple substation/power supply paths
- Cyber Security for Critical Infrastructure Protection (CIP)
- Self-healing capability to delivery system interruptions
- Active and passive protection against locally severe weather
- In situ supply of fossil fuel for generators
- SCADA functionality for directing predictive maintenance program
- Cost payback functions – Market participation, load control, utility bill reconciliation, energy culture change, etc.
- Environmental stewardship enablement – Interconnect renewable energy systems, facilitate improved environmental stewardship culture from improved communications

B. Disconnected island mode:

Power supply to mission critical loads isolated from the utility grid

- All power supply + design criteria from mode A., but no utility grid
- Switch to only supply energy to mission critical loads
- Automatically isolate from the grid electrically and digitally
- Automatically switch to emergency power to mission critical loads
- Automatically activate long term power supply systems
- Manual remote switching and power supply to discretionary loads