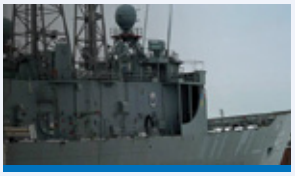
GE

Grid Solutions

GridNode Microgrid Solution

GE provides a full spectrum of products and services that can contribute to achieving the energy goals of our customers. GE designs, manufactures, and supplies electrical protection and automation products, microgrid control systems, network switches, gateways, and DER assets for this type of solution which guarantees fast and low-cost deployment. GE's GridNode Microgrid Solution includes control and automation features such as real-time operation management, transition management, dispatch control and optimization, operations planning, market participation and advanced reporting and analytics.



UTILITY	MILITARY	COMMERCIAL & INDUSTRIAL
Reliability	Resiliency	Reliability
Resiliency	Reliability	Energy Savings
Renewable	Security	Revenue Generation
Integration	Energy Savings	Renewable Integration

KEY DRIVERS

Key Benefits

- **Reliability enhancements** through real-time detection of unstable system behavior and isolation of the affected system ensuring your most critical infrastructure stays online until normal system operation is restored
- **Improve Resiliency** by providing a system that can self-isolate from the affected grid and continue to support its loads independently for desired periods of time
- **Energy Cost Reduction** through a solution that can efficiently manage and optimize your energy resources based on real-time energy market prices, operational costs and energy resource mix
- **Increase Revenue** providing the capability to your system to provide ancillary services to the grid such as Frequency Control, Reserve Capacity, and Demand Response
- **Energy Security** by effectively controlling, monitoring and optimizing your local energy assets reducing your need to rely on a centralized supply
- **High percentage of Renewables integration** through an energy management solution that will support the transition to new renewable energy targets and policies
- **Reduce Emissions** by optimal dispatch and management of your energy resource mix

Solutions and Services

- Engineering and Consulting Services
- Controls and HMI Development
- GridNode Microgrid Control and Automation Functions
- Protection, Control, Automation, and Communications Products
- Testing incl. Hardware-In-the-Loop Testing
- Integration and On-site Services
- Cyber Security Solutions
- Maintenance and Support

GridNode Control Functions

- Planned Islanding
- Seamless Unplanned Islanding and Fast Load Shedding
- Re-synchronization
- Blackstart
- Power Exchange with the grid
- Load Sharing
- Voltage and Reactive Power Management
- Power Factor Management
- Frequency Control
- Capacity Management
- Load Forecasting

GridNode Optimization

- Optimal DER Dispatch
- State of Charge Management
- Forecasting
- PV Smoothing

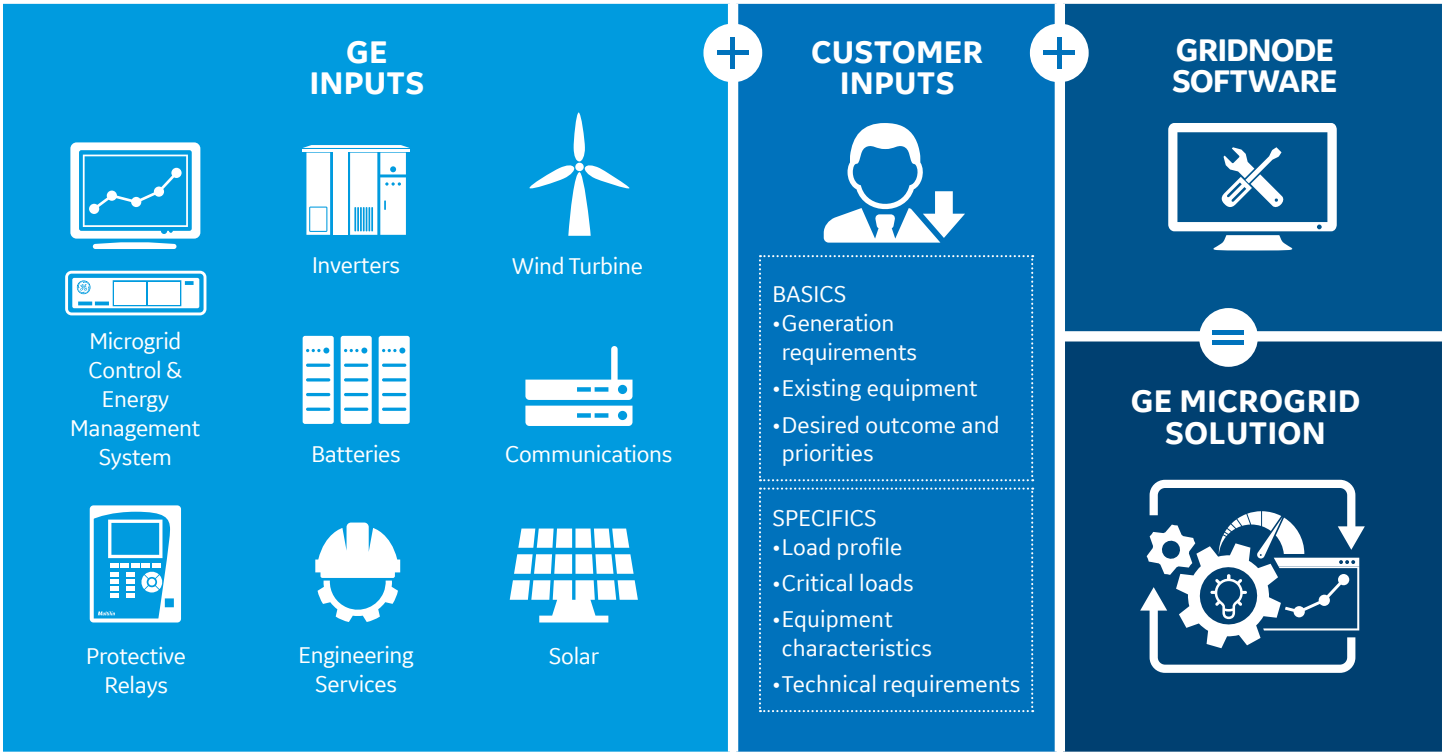
Market Interaction

- Ancillary Services Enablement
- IEEE 2030.5 for advanced utility and aggregator integration

GE Approach

GE partners with companies and customers to develop and design a system around desired outcomes. This approach enables GE to deliver a full turn-key microgrid solution from business case through to long-term support.

1	2	3	4
Business Case	**System Engineering**	**Engineering Solutions & Services**	**Service Agreement**
Cost-benefit Simulation Analysis	Feasibility and Planning Studies	Design, Configuration, Integration, Installation, Commissioning and Testing, Protection and Engineering Studies, Cyber Security	Training, Operation, Long Term Services



GridNode Microgrid Controller - Hardware

The GridNode Microgrid Controller is the hardware platform of choice for GE Grid Automation Microgrid solutions for providing a trusted, powerful, and expandable platform. GE's GridNode software completes the all-in-one solution, which includes:

- **Configurator:** used for programming HMI screens and configuring communications.
- **GridNode Functions:** provides designed, developed, and validated application function blocks that are flexible and configurable based on the customers network.
- **Viewer:** provides a GUI for controlling and monitoring substation systems from a station-level computer.
- **Concentrator:** runs on the GE Power Gateway (GPG) and is the communications driver that gathers data from IEDs and distributes data to different applications.
- **Logic Box:** includes the latest generation of IEC 61131-3 programming tools to develop complex substation logic.

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