



Connected Energy® DER Management

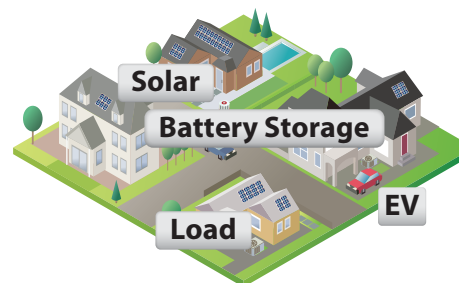
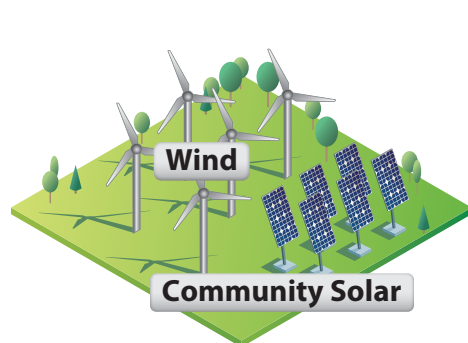
Integrated DER Management for Advanced Distribution Automation.

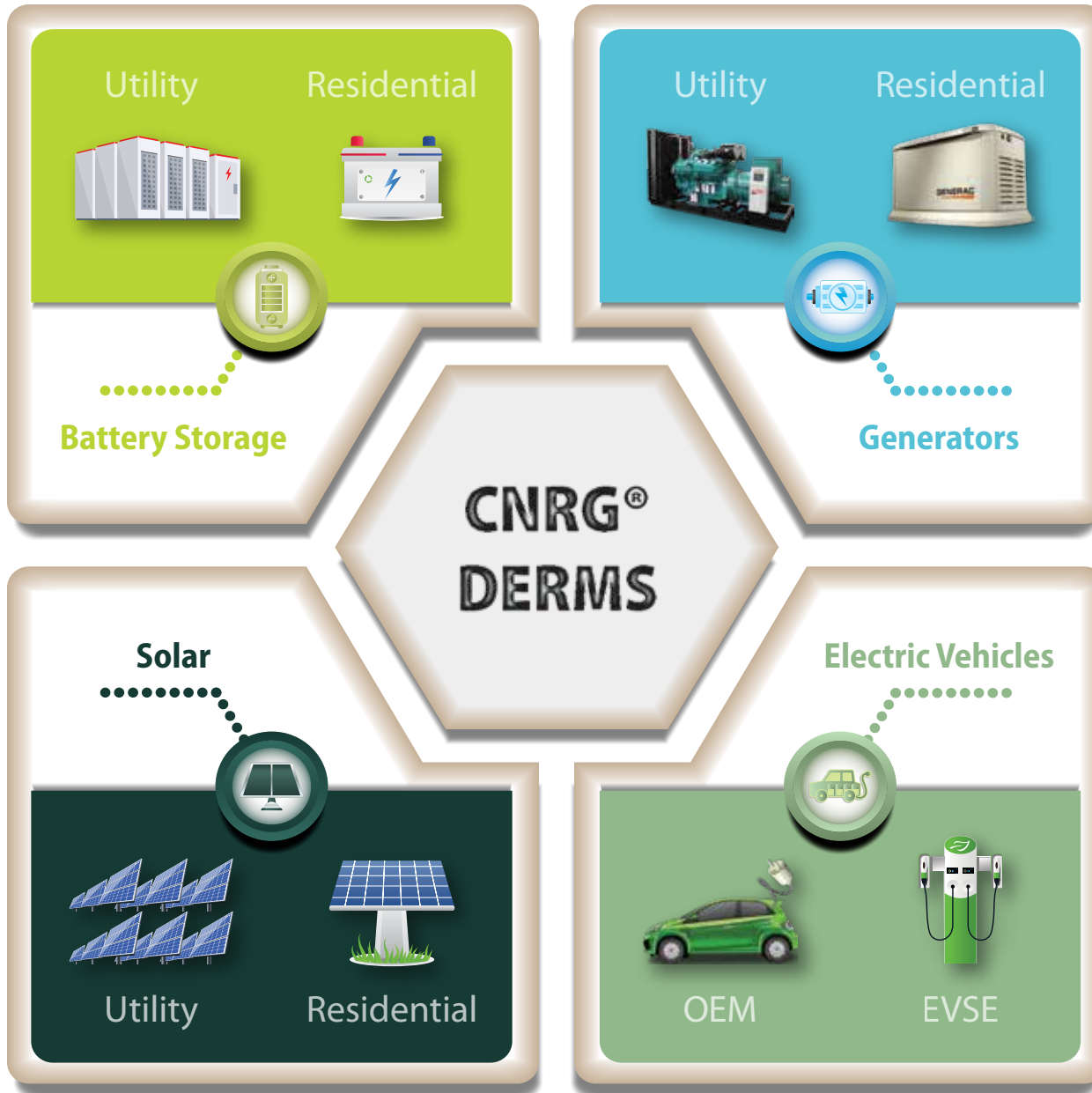
The utilization and penetration of Distributed Energy Resources (DER) into the distributed grid drives the need to integrate management of these DER that include renewable and distributed generation, energy storage, electric vehicle charging and managed load as an application of advanced distribution automation. If properly managed, DER offers untapped potential for enhanced grid efficiency, increased grid stability and improved return on investment (ROI). For the first time, utilities can manage supply and demand at the edge of the electrical network. Diverse DER assets can now be integrated to optimize operational, environmental and economic performance.

The Connected Energy® DER management solution coordinates capacity and load in order to meet reliability and efficiency requirements. Renewable and distributed generation, energy storage and load resource groups are constructed dynamically based on their attributes and applied using day ahead forecast and commitments generated by the system. This approach offers coordinated management of dissimilar DER assets at a granular level. It also enables a strong business case by maximizing the value of DER components using a unified control system.

Features & Functionality

- ⚡ Predictive forecasting drive real-time and planning-level business decisions
- ⚡ Unify management of multiple classes of DER assets in a single control system
- ⚡ Optimize DER asset utilization
- ⚡ Manage day ahead planning challenges for DER assets
- ⚡ Generate day ahead forecasts and commitments of DER assets
- ⚡ Develop and implement action plans for optimum use of DER assets





DER Energy Assets

Battery Storage – Leverage these diverse assets to tap into the many benefits and use cases available, while capturing a quicker return on investment. CNRG® DERMS offers multiple control strategies for multiple manufacturers from utility to residential scale.

Generators – A cost effective solution for both utilities and home owners, offering continuous power from the cleanest fossil fuel, natural gas, with 45% less CO₂ than coal. Connect to the many existing utility systems and start a residential generator rebate program for customers with natural gas available.

Electric Vehicles – Utilities are preparing and planning ahead for the increased electric demand driven by EV adoption. The CNRG® DERMS platform helps the grid become more stable and accelerates the growth of EV adoption and infrastructure around the country. Leverage any of the major OEM and EVSE manufacturers with a seamless customer opt-in process and notifications for planned energy management. The platform offers a secure, reliable, two-way data connection to customer EVs. Our solution can control charging and monitor battery state-of-charge, regardless of where the customer plugs in.

Solar – CNRG® DERMS adopts the SunSpec standards to connect to a wide variety of supported inverters to manage solar energy.

Smart Inverter Functions

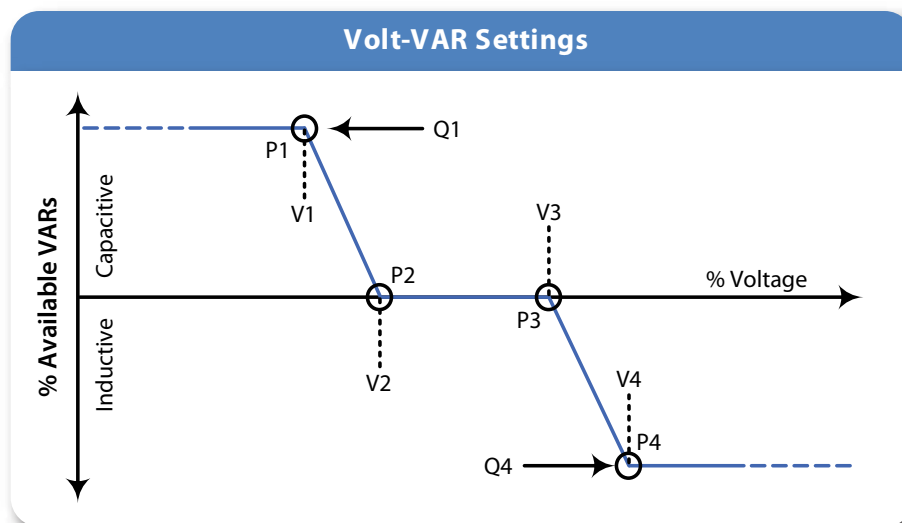
Since all distribution feeders have unique operational characteristics, each feeder should be modeled and studied separately. Based upon achieving targeted benefits for each feeder, specific inverter functions can be chosen to operate. The table on the right details the benefits that can be achieved using each inverter function.

Reduce Capacitor Switching Operations – The Intelligent Volt-VAR function of a smart inverter can reduce the average number of capacitor switching operations by improving voltage.

Reduce Feeder Losses – The Intelligent Volt-VAR function of a smart inverter can be used to hold the power-factor measured at the substation at unity by modifying the inverter settings in real-time. This requires metering at the feeder head, near real-time processing by the Connected Energy DERMS application and communication of updated settings to the inverter. This closed loop control operates as fast as possible, within seconds, limited mainly by the communication network.

This closed loop control provides rapid response and control of inverter outputs to alter grid operation and drive the desired benefits. Upon recognition of that need, the system would adjust the inverter outputs to deliver the incremental required VARs, creating a dynamic system of Volt-VAR management unmatched by currently installed capacitor banks.

Inverter Function	Benefits														
	Efficiency		Power Quality				Asset Life			Capital Deferral				Reliability	
	Reduce line losses	Improve CVR	Flatter voltage profile	Improve harmonics	Voltage variability	Overvoltage	Reduce LTC tap changes	Reduce regulator tap changes	Reduce switch cap changes	Defer capacitor installs	Defer line regulators	Defer reconductoring	Defer substation upgrades	Support during momentary	Support during automation
Intelligent Volt/VAR	✓	✓	✓			✓	✓	✓	✓	✓	✓				
Power Factor	✓		✓			✓				✓					
Dynamic Reactive Current					✓	✓								✓	✓
Remote Connect/Disconnect															✓
Power Curtailment						✓	✓	✓			✓	✓	✓		
Intelligent Volt/Watt		✓				✓									
Low/High Voltage Ride-Thru														✓	✓



DER Action Plan

DER Action Plans specify utilization of specific resources. For example, location, amount and period can be set for charging and discharging energy storage resources as well as curtailment of managed loads. Multiple, sequential DER Action Plans can be set up within the boundaries of configuration profiles that resolve overlapping resource commitments.

Current Day Tracking

Local Areas utilizing DER Assets are monitored for Capacity and Demand for the current day, tracking actual performance up to the current time as well as projected performance for the balance of the day. Statuses of DER Action Plans are also listed as well as the condition assessment of the grid such as normal, stressed, emergency or critical.

