



GRID EDGE SUPPORT & EFFICIENCY

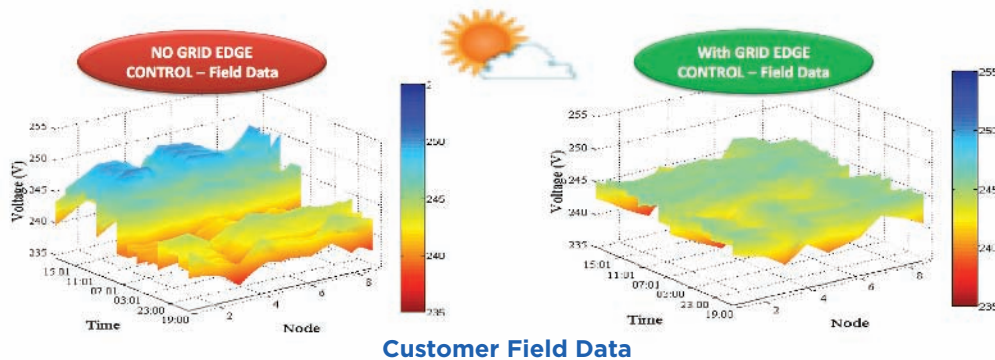
IMPROVE GRID INTEGRATION OF DISTRIBUTED PV SOLAR

Problem: Feeder voltage volatility and violation of voltage limits can be caused by today's PV solar systems.
Solution: Distributed, dynamic autonomous Grid Edge Volt-VAR Control enables integration of PV solar on the electrical distribution system.

Key Features

- » Fast acting, sub-cycle dynamic response to counter cloud impact
- » Stabilizes PV solar voltage variations at local node and feeder level
- » Coordinates with and reduces operation of utility primary assets
- » Utility volt-var objectives maintained with high PV solar

Varentec's Grid Edge Volt-VAR Control addresses voltage variability due to intermittent and peak solar energy, by stabilizing voltage at key points along a feeder.



Benefits

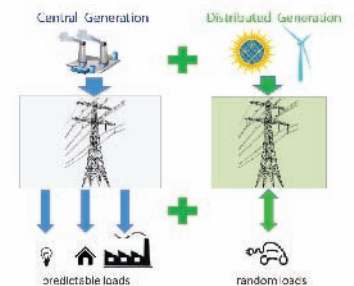
- » Enable better integration of PV solar onto a grid network
- » Bring high voltage and low voltage to a nominal / desired level
- » Lower cost compared to other stand-alone regulator solutions
- » Preserve VVO/VVC investments where there is high PV solar penetration
- » Improve grid efficiency and reduce carbon emissions
- » Extend lifetime of primary assets

Grid Integration of PV Solar

Primary-side assets are too slow, and not sufficiently distributed to solve for PV solar dynamics at a network level. ENGO™ units dynamically balance volts and VARs to maintain a flat voltage profile allowing full VVC benefits while increasing PV solar hosting capability on a feeder.

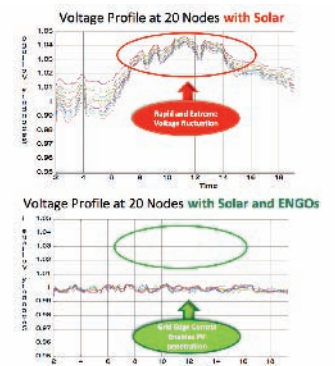
Challenges with Distributed Generation

- » 100,000's distributed sources
- » Voltage volatility
- » Intermittent & peak load patterns



Grid Edge Voltage Control with PV Solar

Varentec's solution addresses rapid and extreme voltage fluctuations caused by solar intermittency and changing irradiance which creates high-band violations under peak conditions. ENGO/GEMS solution delivers consistent voltage, enabling today's electric utilities to integrate PV solar onto the grid.



Real-Time Distributed Autonomous Volt-VAR Control at the Grid Edge