

OpenDSO™ from Open Energy Solutions, Inc.

Execution at the Edge™ for a Smarter Grid

OpenDSO PORTFOLIO

INTEROPERABILITY SUITE

Our interoperable adapter framework and industry adapter library supporting UCAIug's OpenFMB™ standards to harmonize grid operations across vendors and protocols

EDGE INTEGRATION SUITE

Our core OpenDSO platform to enable the secure deployment, management and operation of edge applications and software tools for testing commissioning and deploying edge applications

EXECUTION AT THE EDGE™ APPLICATIONS

Our portfolio of edge applications to leverage, operate and optimize performance of distributed energy resources (DER) and electric vehicle (EV) charging infrastructure connected to the distribution grid



- Improve cost to serve metrics more than 25% when using edge intelligence in conjunction with distribution automation
- Reduce operational wear and tear up to 50% for distribution assets on circuits with elevated levels of intermittent renewable generation.
- Uplift energy and demand savings between 25 and 50% over traditional VVO and CVR schemes
- Reduce distribution transformer burnout risk up to 40% and required upgrades up to 10% through distributed EV charge management

Today's centralized distribution operations are well-suited for radial distribution models with unidirectional power flows from substations. However, traditional systems operations, as well as industry practices used in systems planning and asset maintenance for distribution assets are likely to fall short in an environment with >30% penetration of intermittent renewable resources and a potential doubling of system peaks from EV charging loads.

As seen from the graphic below, *the grid of tomorrow will require new solutions.*

	Traditional Grid Operating Model	The Challenge of Tomorrow
DER* Penetration	<10%	30-50% penetration of intermittent DER resources
Changing Load	Predictable load growth and patterns based on customer demographics	Potential doubling of load and shifting load patterns associated with 30-50% EV adoption
Customer Needs	Bespoke engineering for DER integration Basic incentives from utility to customer	Plug-n-Play DER integration Dynamic, transactive market for demand and supply
Asset Visibility	Static asset inventory reliant on as-built state in GIS and tribal knowledge	Real time and context sensitive view of grid connectivity and configuration
Control	Central management of utility-owned grid assets providing unidirectional power flow on radial feeders	Pockets of intermittent DER result in sub-optimal control outcomes and unnecessary asset operations
Asset Life	Predictable asset life based on predictable operations and planned maintenance schedules	Potential for increased asset breakdown / frequent maintenance from DER intermittency and EV loads
Security	Trust Based or "Security through Obscurity" for limited number of utility owned devices	Large numbers of customer / aggregator owned devices require a zero-trust framework
Asset Obsolescence	Limited number of grid devices with well defined lifespans	Large numbers of rapidly evolving smart devices with increased risk of lock-in and obsolescence

SUPPORTED EDGE USE CASE EXAMPLES

DYNAMIC TOPOLOGY

Increase accuracy of system topology models with real-time intelligence from the edge

DISTRIBUTED PEAK LOAD SHAVING

Real-time dispatch of energy storage and renewable resources in response to local peak conditions

SMART EV CHARGE MANAGEMENT

Manage EV charging operations at transformer to avoid sustained overloading / potential burnout

RENEWABLE FIRING

Dynamic smoothing of intermittency and ramp effects of renewable resources on a circuit section

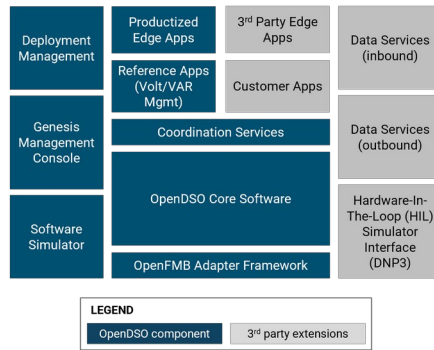
DISTRIBUTED VOLT-VAR OPTIMIZATION

Leverage local smart inverter and Volt/VAR regulation resources to complement centralized CVR / VVO

For more information on any of our products contact us at:

opendso@openenergysolutions.com

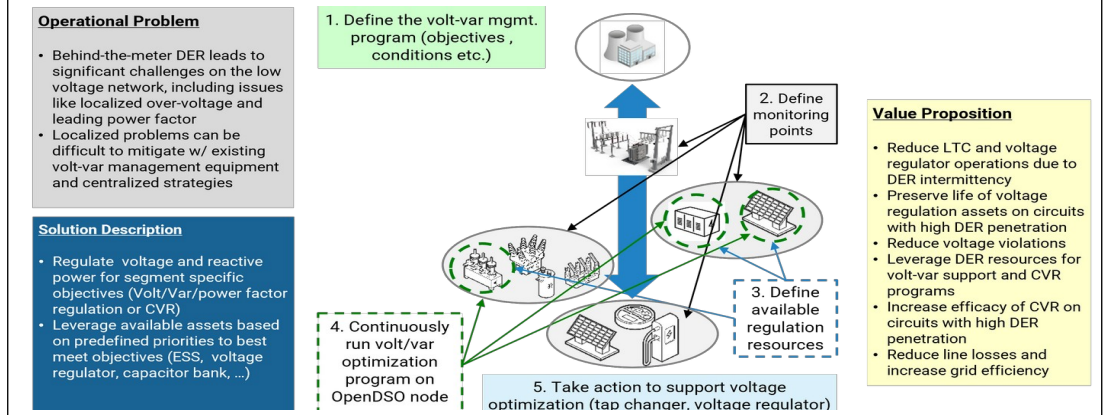
OpenDSO- transformative edge intelligence for tomorrow's grid



- Distributed, DER management focused application portfolio enabling use cases for DER integration harmonized with existing operations
- Containerized micro-services architecture featuring a rich suite of core 'grid-aware' services available to all deployed applications
- Full life-cycle development, verification, and management for utility, third party and OES developed applications
- Powered by a best of breed open-source software (OSS) stack
- Advanced edge platform featuring interoperable, scalable, near real-time communications
- Secured with zero trust security framework

OpenDSO in Action – Distributed VVO

The graphic below provides an example of an OpenDSO edge application at work and how it can complement traditional central schemes.



About Open Energy Solutions, Inc. (OES)

OES is an early-stage software company building software products and providing a range of technical services to its utilities clients as they plan and prepare for the integration of distributed energy resources (DERs) at scale. We see our purpose as deploying technology solutions to the utility industry that enable:

- Sustainability – Support
- Digital Transformation
- Distributed Intelligence