



SUNVERGE

2021 Company Summary

Martin Milani, CEO



About the Delmarva Elk Neck Project

- Virtual Power Plant of behind-the-meter battery energy storage systems
- 0.5 MW / 1.5 MWh capacity for reliability and resiliency (110 homes)
- Targeting “south of the park” on Elk Neck Peninsula
- Sunverge real-time DER control, orchestration and aggregation platform, providing multi-service, multi-asset VPP capabilities

Battery Energy Storage System

- Sunverge Infinity Intelligent Gateway Controller with LG Electronics DC-coupled Integrated ESS (Inverter + Batteries)
- Integrated revenue grade meter and automatic transfer switch
- 5 kW rated power / 19.6 kWh usable capacity per system
- UL9540, IEEE1547.1, UL1741SA, CA Rule 21, HECO compliant

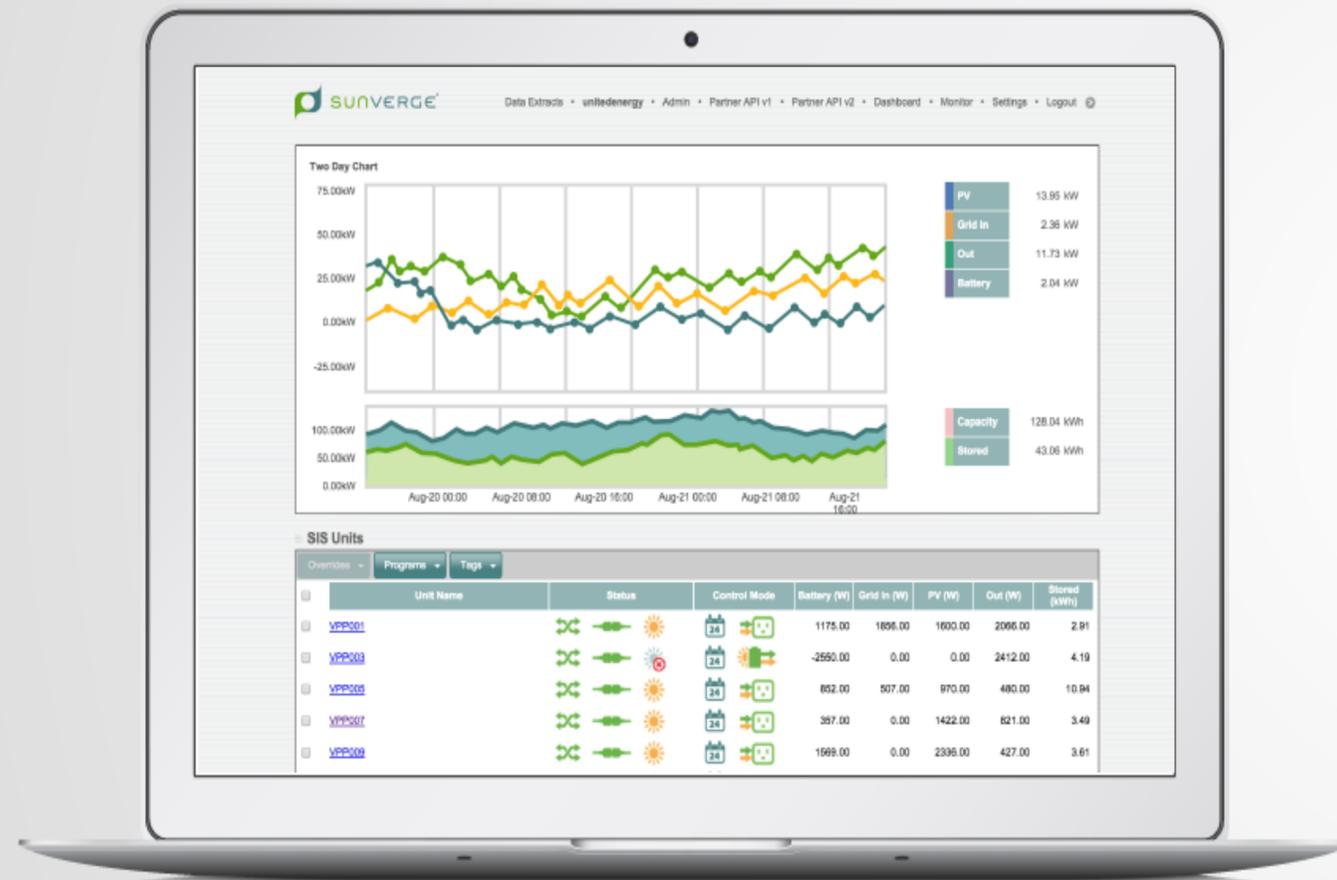


About the LG Chem RESU10H Battery

- One of the most popular residential batteries in the world
- The LG Chem RESUH battery cells use the NMC (Nickel, Manganese, Cobalt) chemistry
- LG Chem’s L&S (Lamination & Stacking) process minimizes dead space, enables higher energy density, and enhances the sustainability of cell structures
- LG Chem’s SRS[®] (Safety Reinforced Separator) increases the mechanical and thermal stability of battery cells



The Sunverge real time DER control, orchestration and aggregation Platform



- **Real-time visibility, control, orchestration and optimization** of behind-the-meter DER's such as PV, Storage, Thermostats, AC, smart home appliances, digital circuit breakers, EVs and EV charging- managing site as a nonogrid (Consumer Services)
- **Real-time Controlling, orchestrating and aggregating** of fleets of Distributed Energy Resources (DERs) into Dynamic, multi-service and multi-asset Virtual Power Plants (DVPP) (Grid Services)
- **Dynamic and real-time orchestration and aggregation** of DER assets to better manage utility distribution network load, operations, critical supply events, Grid modernization efforts and T&D Non-Wire Alternatives
- **Manage and facilitate** bidding of excess and emergency energy supply into wholesale Energy Markets- Demand Response, Capacity, Operating Reserve, Resource Adequacy, Frequency Regulation, etc. (Market Services)
- **Dynamic Multi-objective optimization and value stacking** of behind the meter consumer/prosumer, grid services, market services
- **Drive the Integration** of Demand-Side Management and Grid Management – **Long sought-after Holy Grail**
- **Enabling the emergence of Distribution level transactional Markets (DSO) and tangential ancillary service markets**

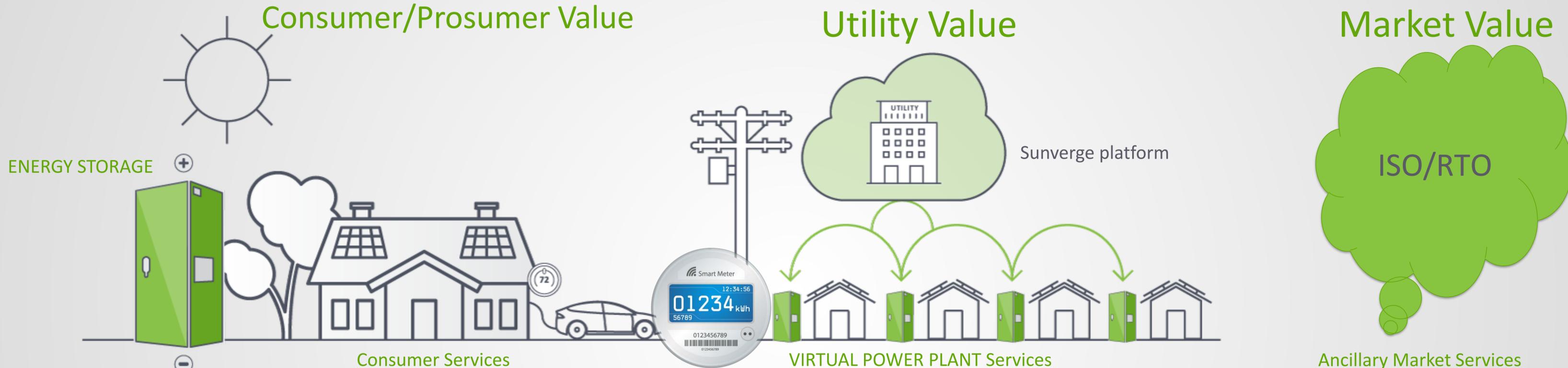
Multi-objective optimization of Consumer/Prosumer, Grid, Market Services

Deliver value for both sides of the meter

Consumer/Prosumer Value

Utility Value

Market Value



Consumer Services

VIRTUAL POWER PLANT Services

Ancillary Market Services

Increased PV self-consumption, backup power, time-of-use and dynamic pricing bill management
Real time granular visibility and control of behind the meter DER resources

Aggregate and orchestrate fleet of distributed energy resources

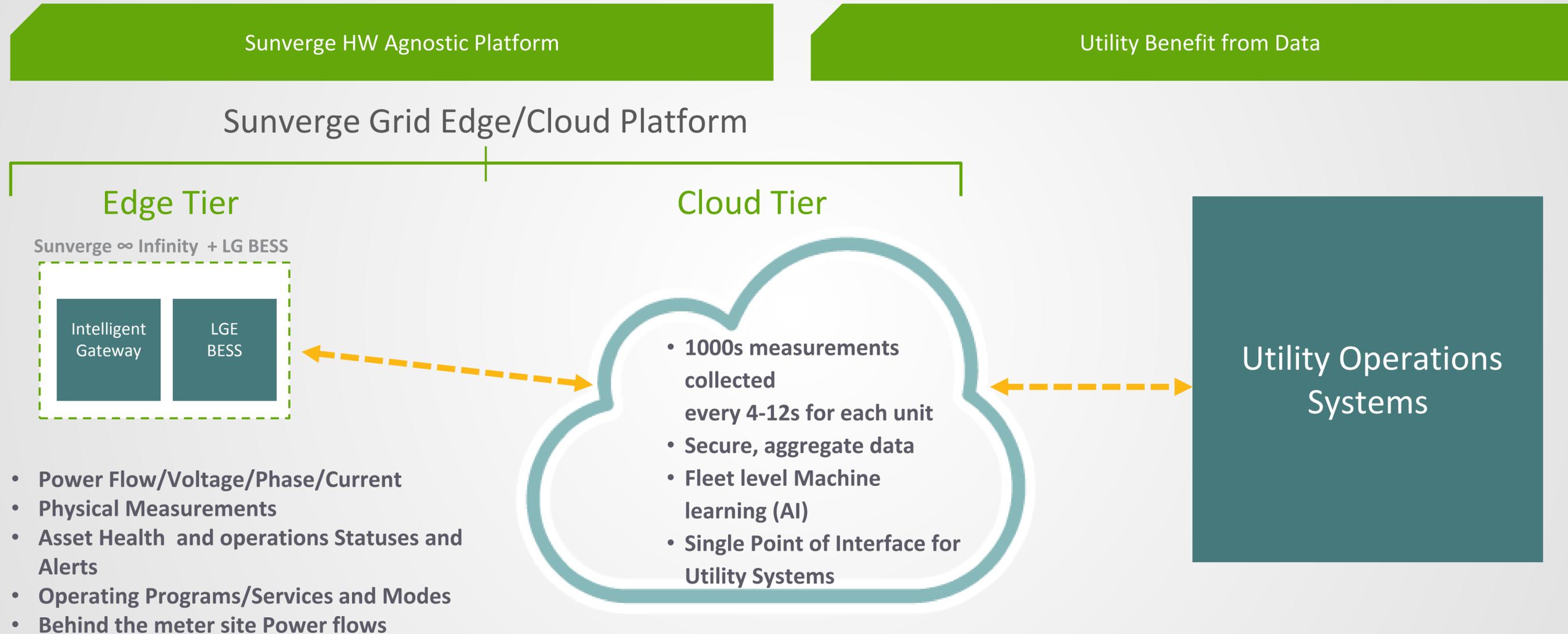
- Capacity
- Frequency Regulation/Response
- Voltage Regulation
- Spinning Reserve
- Resource Adequacy
- Contingency Reserve
- Energy

- PV self consumption
- Demand charge management
- Time-of-use rate management
- Backup power
- DR participation
- Transactive Energy participation

- Near real-time Grid Edge network visibility
- Frequency Regulation and Response
- Voltage support and response
- Peak reduction & shifting
- PV integration & firming
- Resource adequacy and contingency dispatch
- Energy or capacity market arbitrage
- Wholesale market participation
- Transactive Energy/Blockchain
- Resource Capacity and NWA

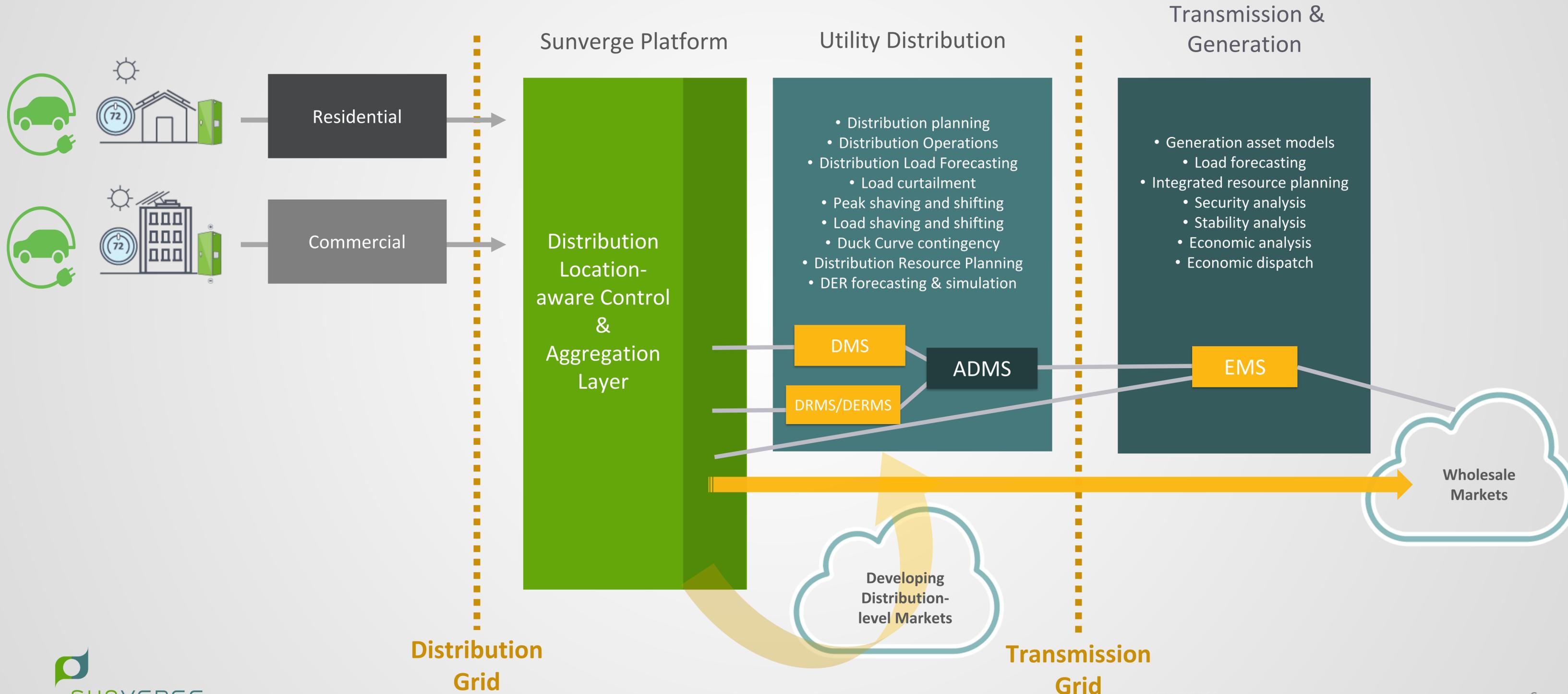
The Sunverge Grid Edge/Cloud Platform architecture

High resolution and high frequency visibility and control enabling real-time dynamic and adaptive management



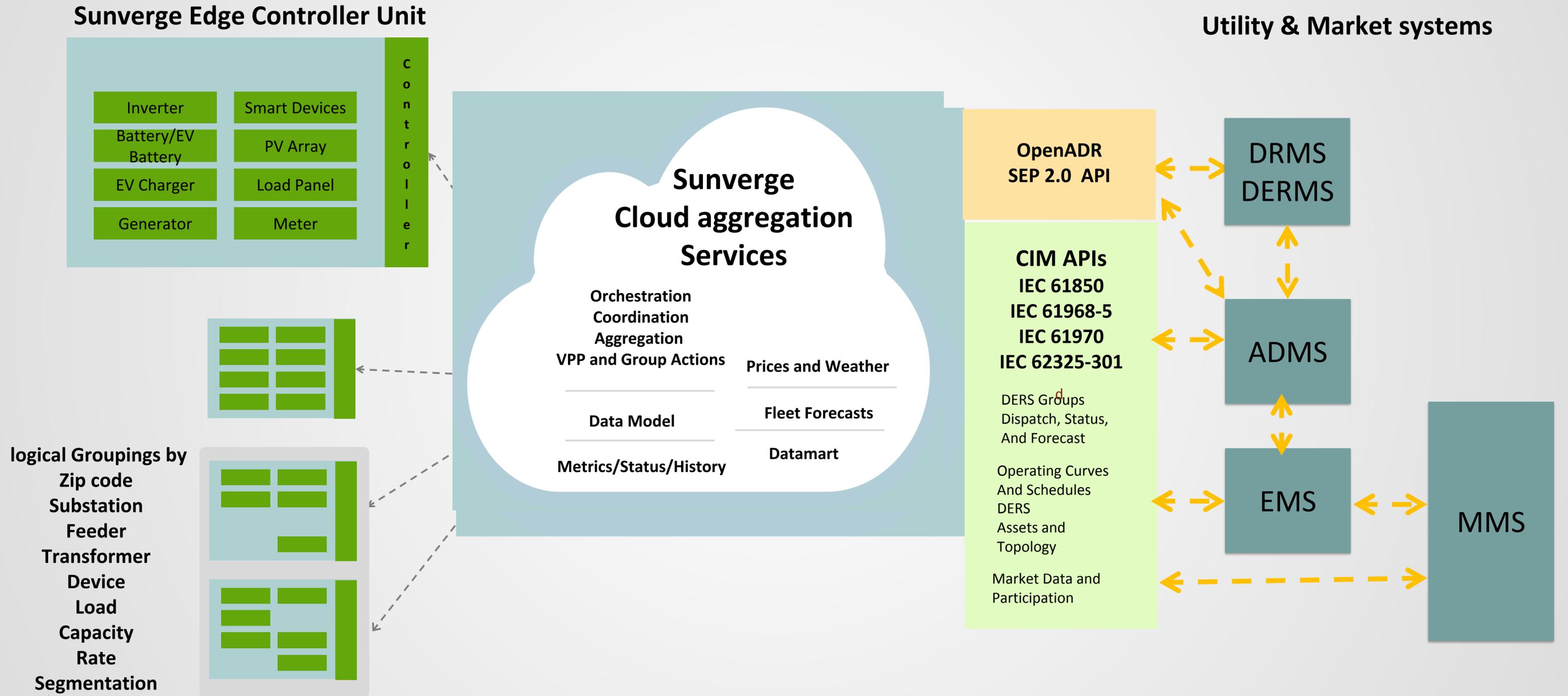
The Sunverge real time DER control, orchestration and aggregation Platform

Real time integration of DERs into core utility operations

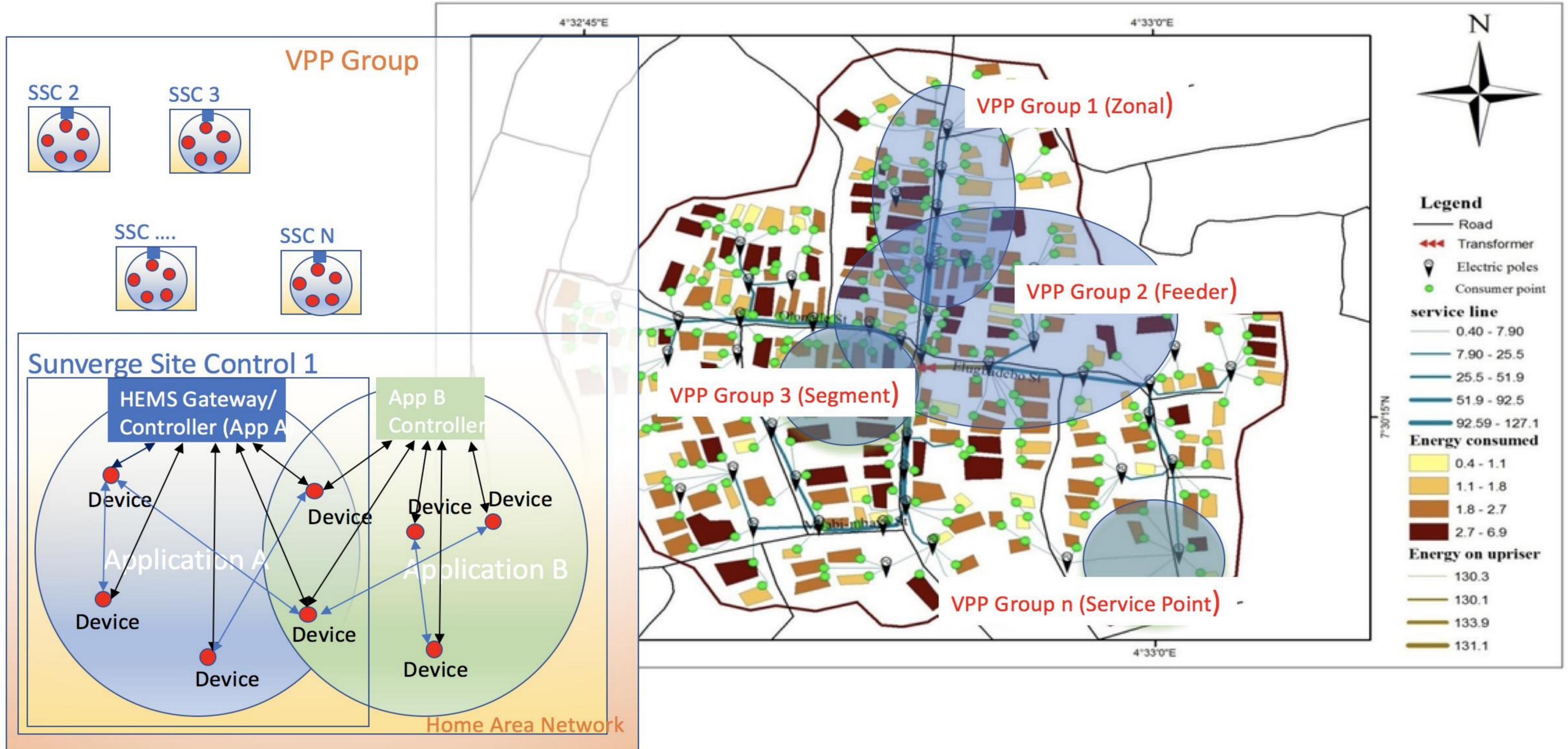


Standards based ADMS/DMS/EMS integration

Distribution Systems Operations & Market Participation



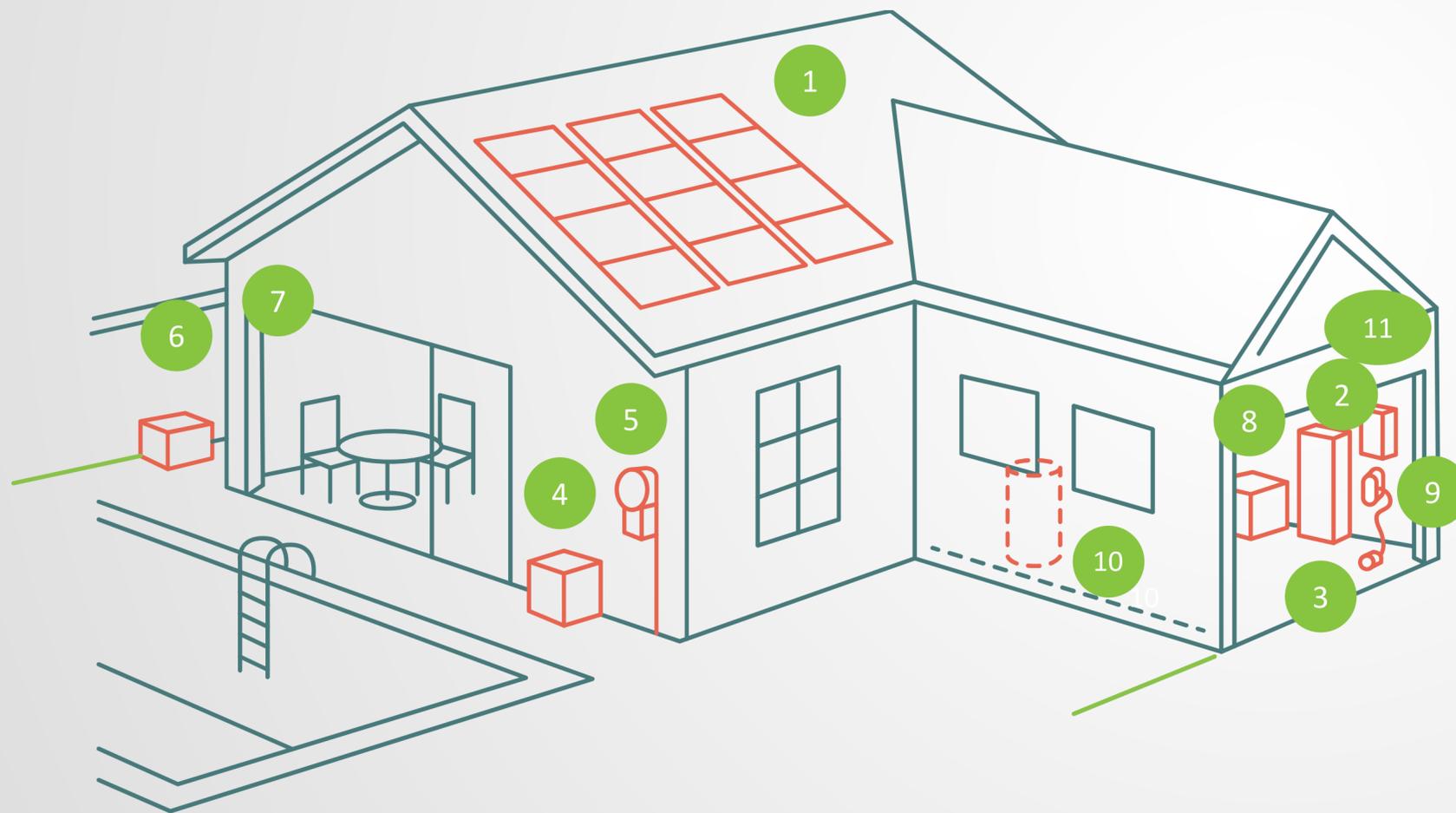
Real-time control and operations



Multi-Asset Edge-Level Intelligent Unit Control and Optimization

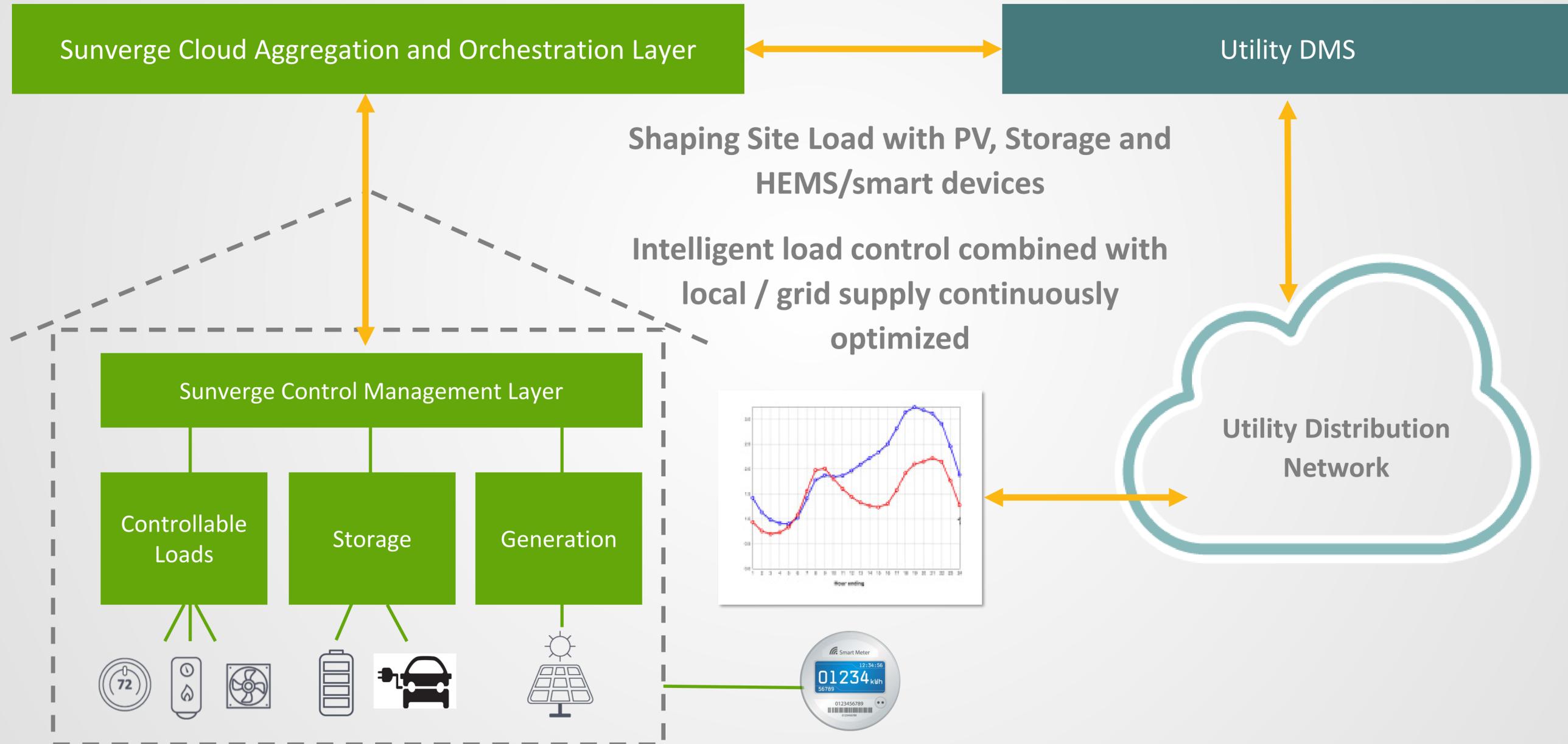
Multi-Service Cloud-level Dynamic Fleet Control, Aggregation & Orchestration

Sunverge's platform incorporates Solar, Storage, EV & EV Charging, and Home intelligent device operation for intelligent, automated, dynamic flexible load management, and multi-service (grid and consumer) and multi-asset operations and optimization

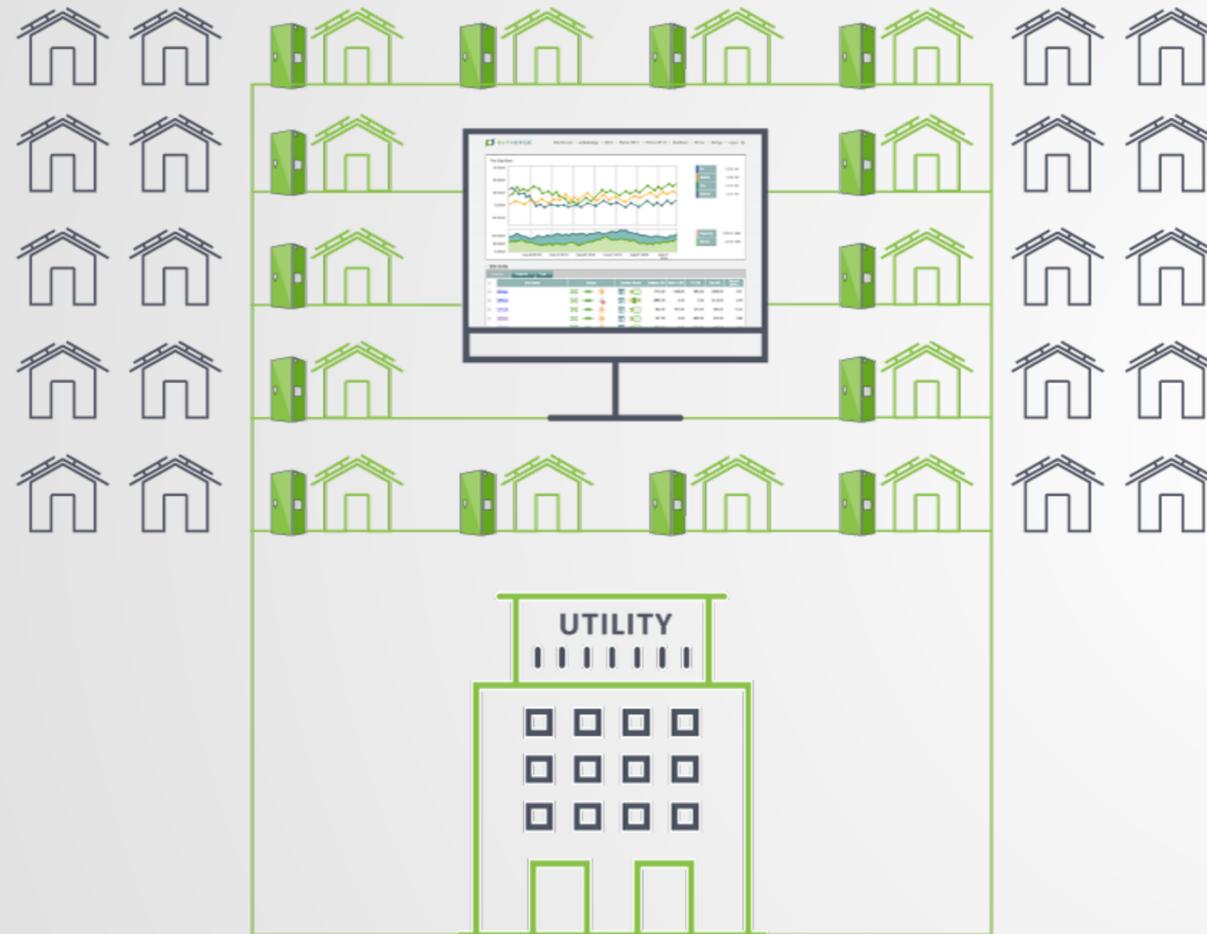


- 1 Solar PV
- 2 Sunverge Infinity Gateway
- 3 Sunverge One Energy Storage System
- 4 HVAC
- 5 Smart Meter
- 6 Pool Pump Loader Controller
- 7 Smart Thermostat
- 8 Electric Clothes Washer and Dryer
- 9 Electric Vehicle Charging Station
- 10 Smart Water Heater
- 11 Smart Digital Circuit Breaker

Real-time Control, Optimization and Orchestration of Local Generation, Storage, & Controllable Loads



Real time, Dynamic, Adaptive, Multi-Service, Multi-Asset Virtual Power Plants



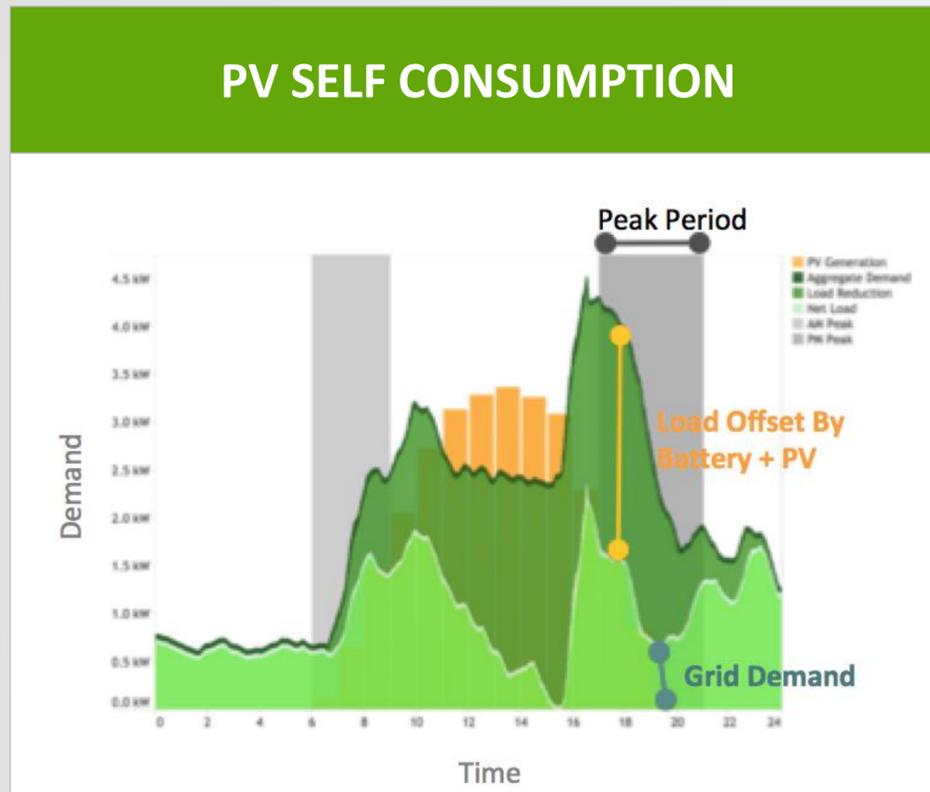
Intelligent and dynamic control, orchestration and aggregation

- Real-time and Intelligent orchestration and aggregation of Distributed Energy Resources to provide the same essential services as peaker plants and traditional centralized power plants
- Greater feeder-level visibility, resiliency and reliability
- Better efficiency for Distribution system operations
- Lower transmission and distribution costs
- Greater overall system efficiency
- Environmental/societal benefits
- Granular and near real-time locational data visibility into the performance of DERs and the Distribution Grid

Consumer/Prosumer Services

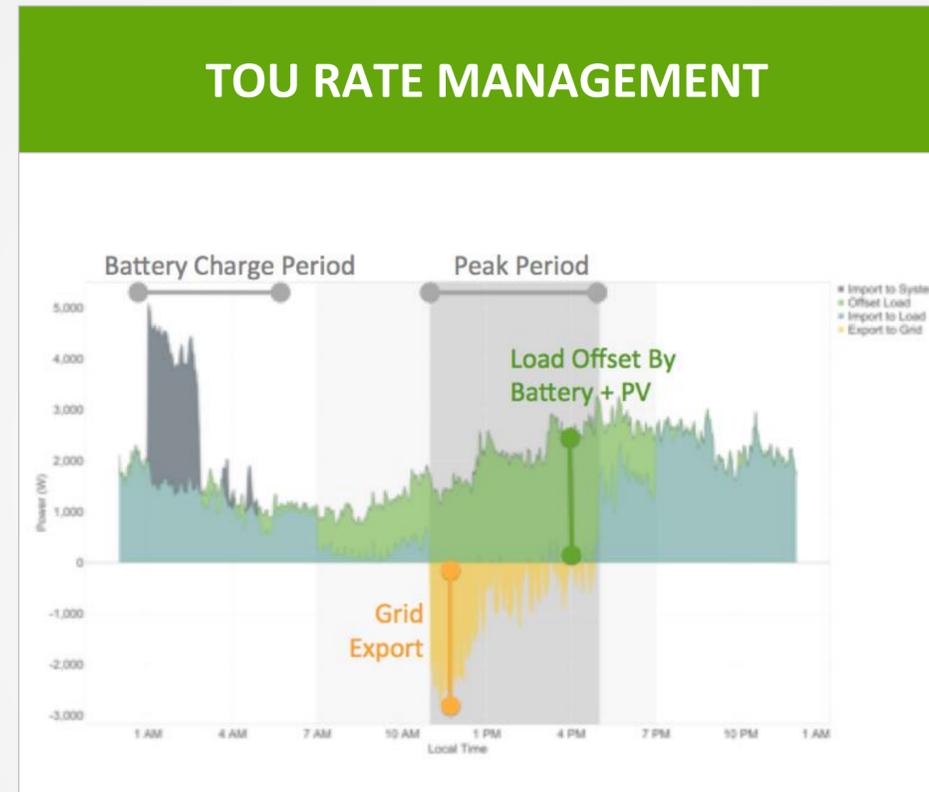
Cost, Comfort, Convenience, Resilience

PV SELF CONSUMPTION



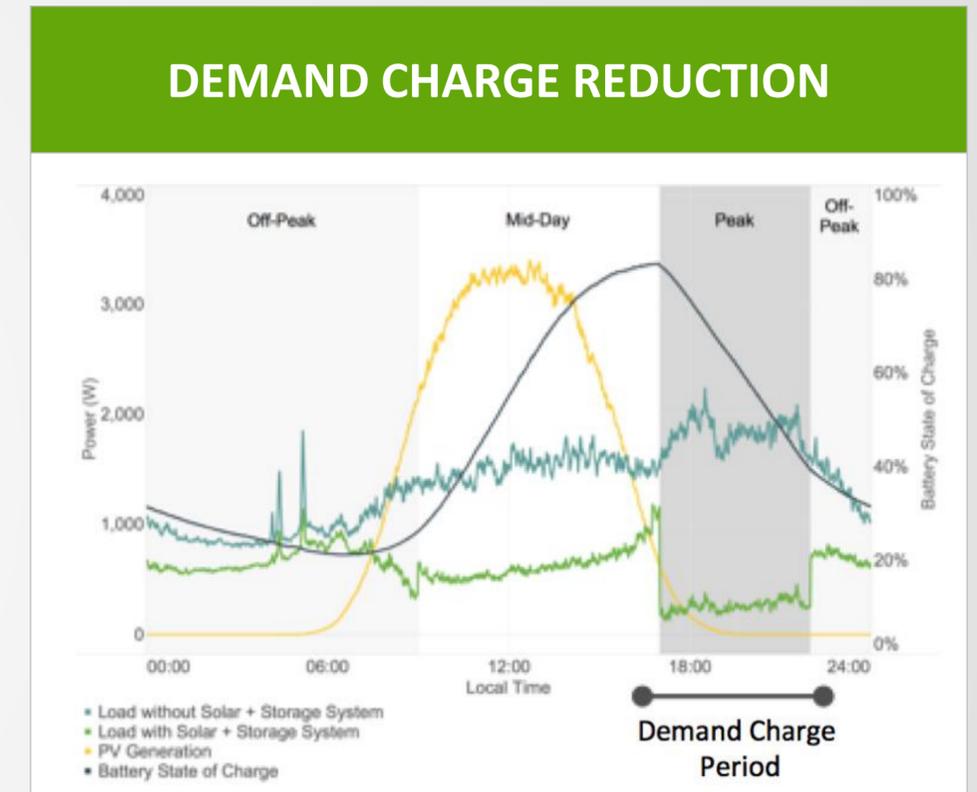
By predicting load and solar PV generation, the platform automatically operates the battery to maximize PV self consumption.

TOU RATE MANAGEMENT



Using a time-varying energy tariff, Sunverge optimizes between energy consumed and exported to maximize customer bill savings.

DEMAND CHARGE REDUCTION



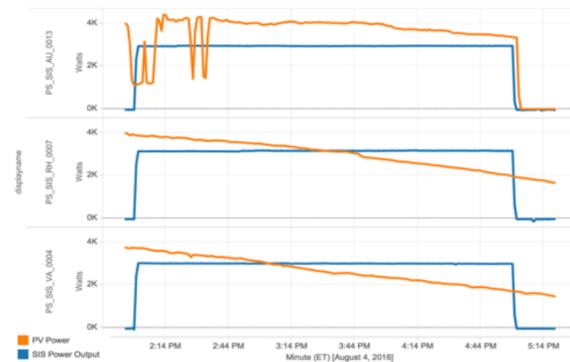
The platform works to minimize customer demand according to a residential demand charge rate structure, to optimize customer savings.

Bill Management, Solar Self Consumption, Demand Charge Reduction, Backup power

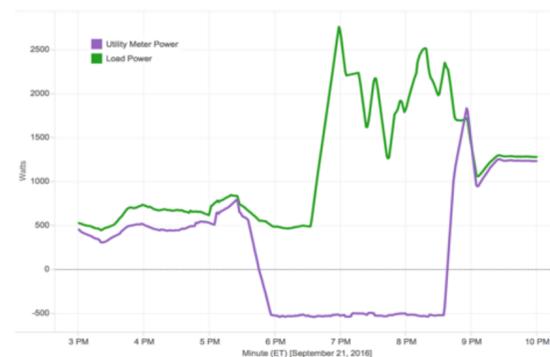
Grid and Market Services

Voltage Response, Frequency Regulation, Operating Reserve, Peak shaving and shifting

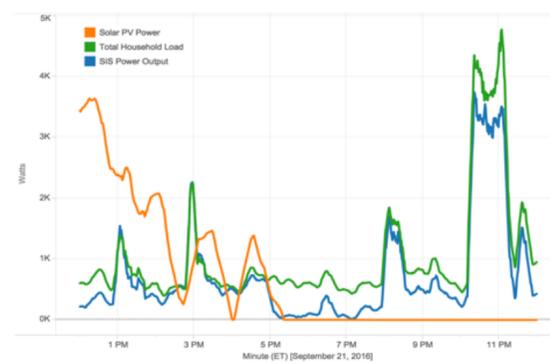
Peak Reduction



Peak Shaving



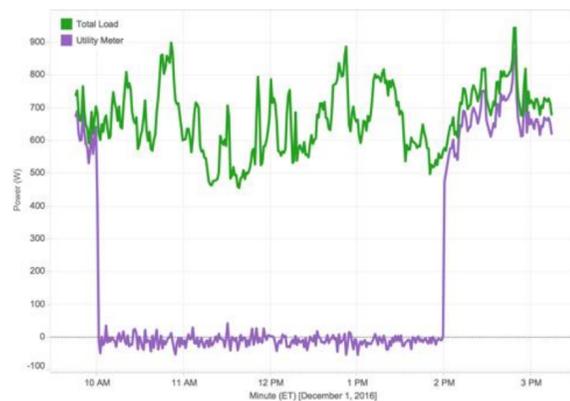
PV Time Shifting



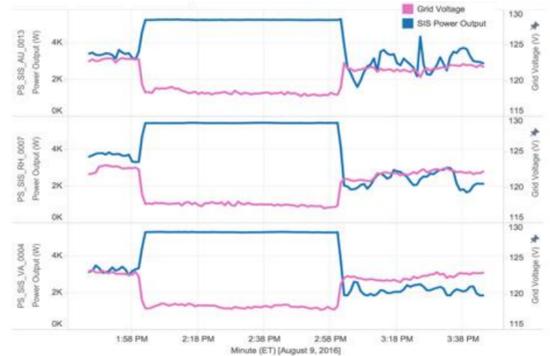
PV Firming



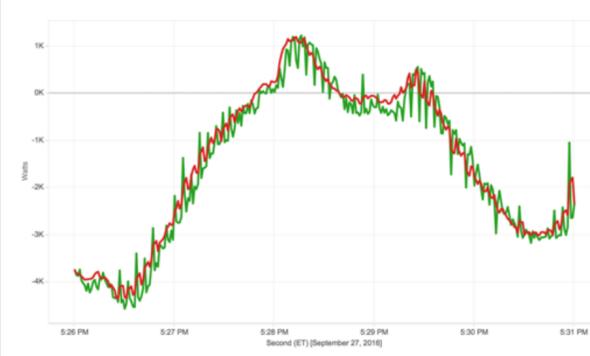
Demand Response



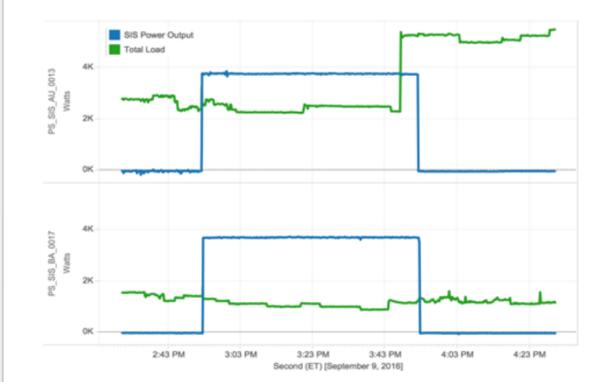
Voltage Response



Frequency Regulation

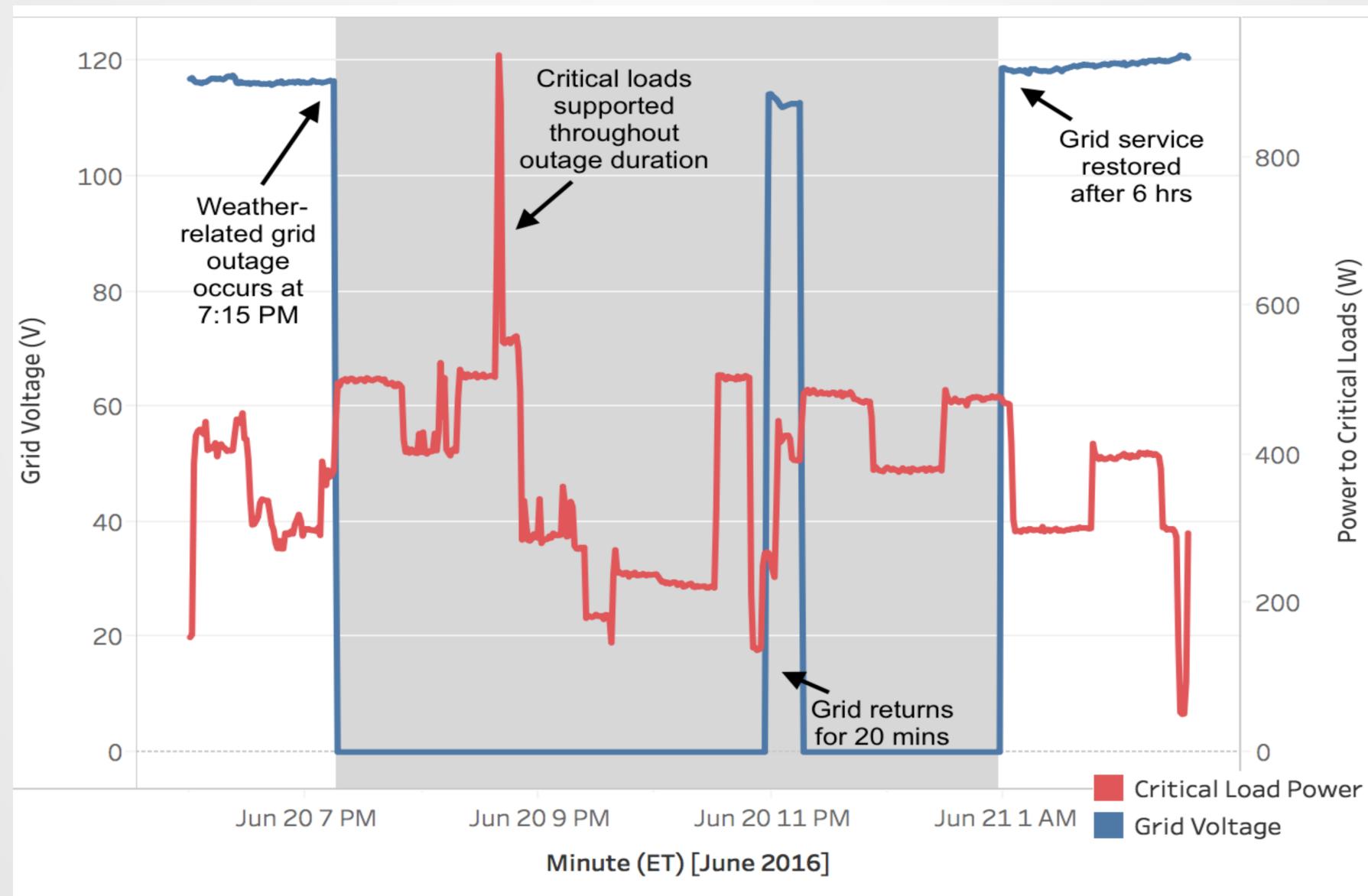


Operating Reserves



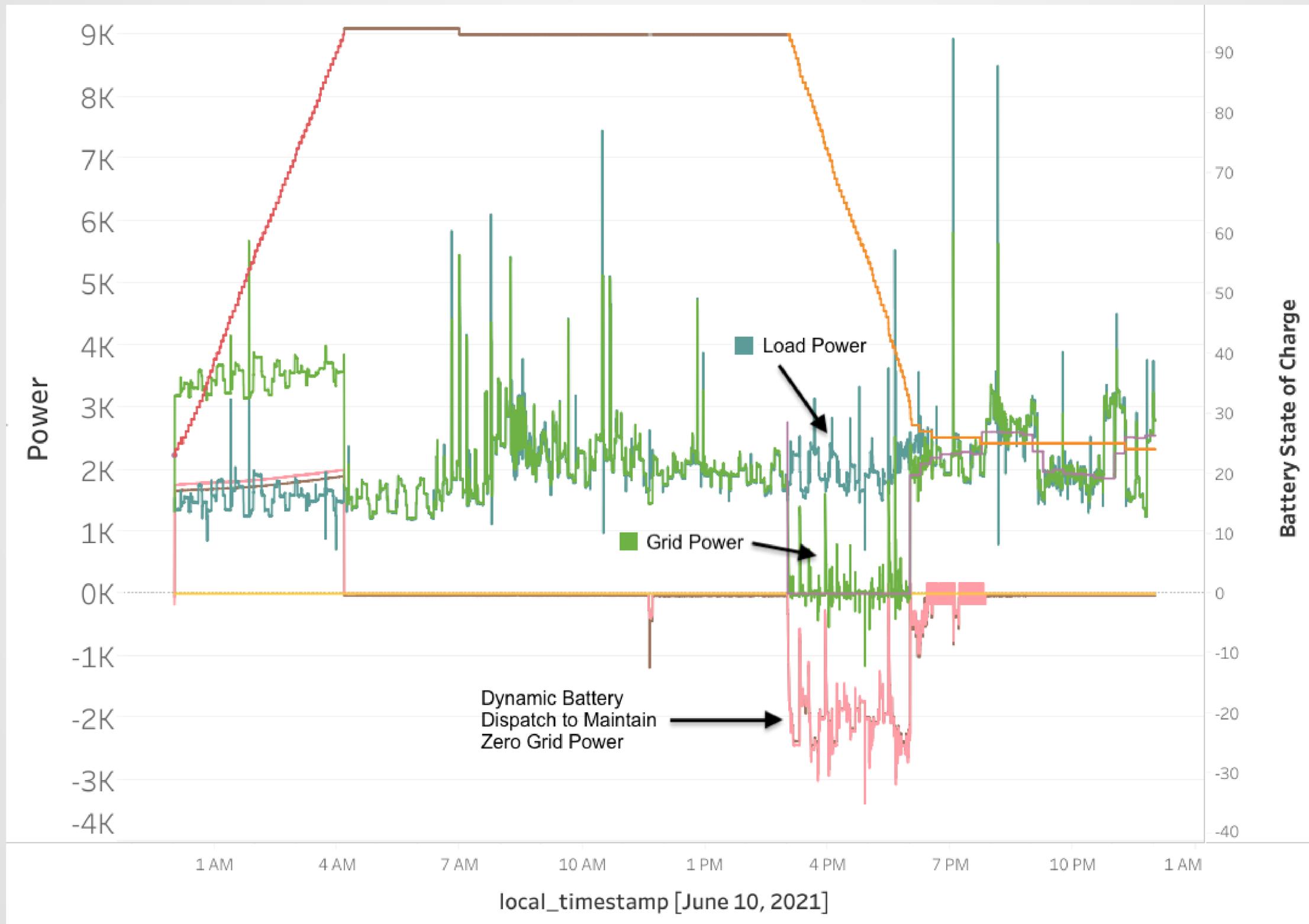
Backup Power

- Customer Backup Power
 - Automatically disconnects from the grid consistent with UL1741 and IEEE1547, isolating the premise, and providing Uninterruptible Power Supply (UPS) to critical loads.



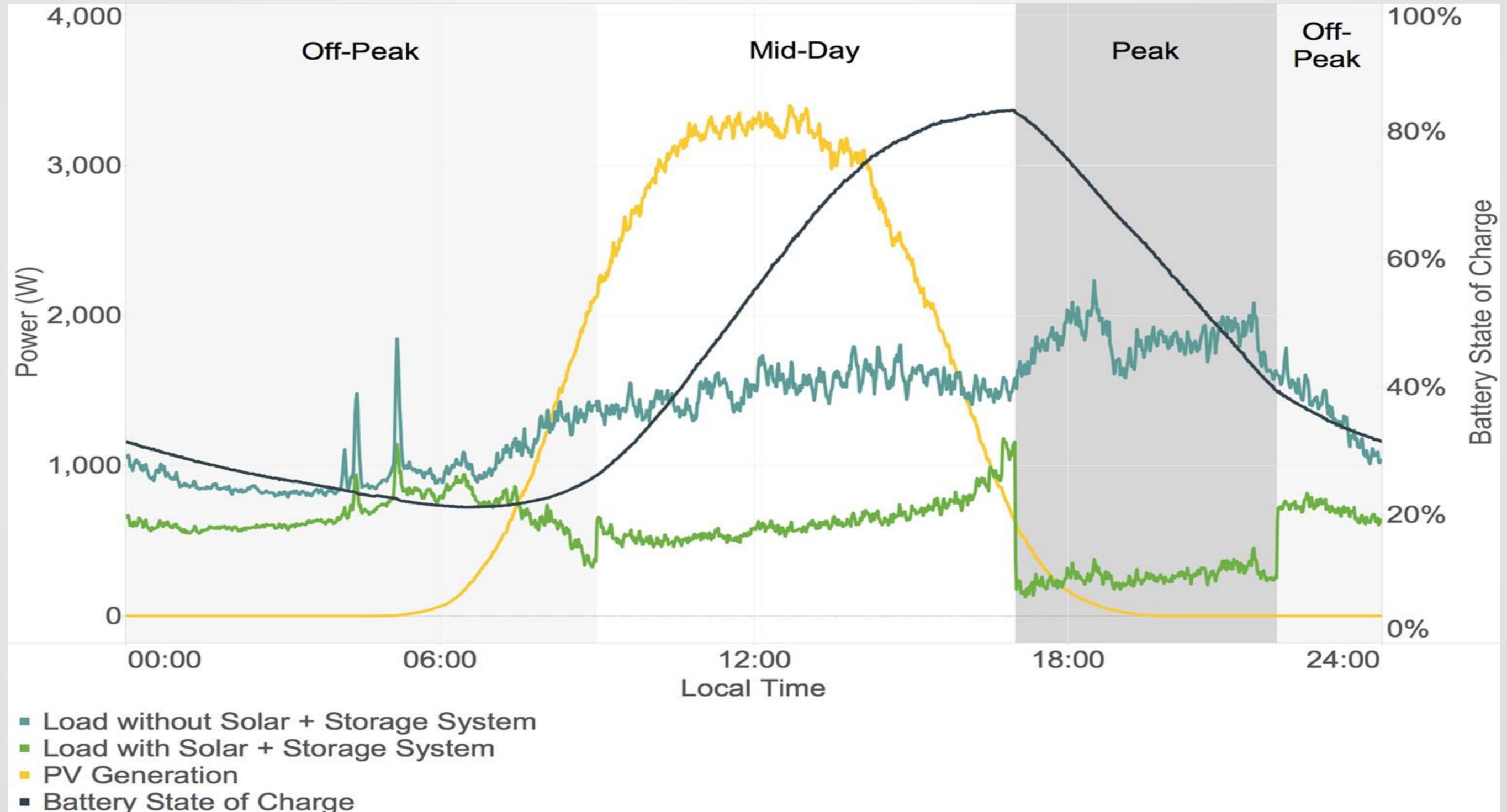
Example of Feeder Peak Load Reduction for Asset Upgrade Deferral

- Charge from grid overnight.
- Maintain target of zero grid power from 3pm to 6pm.



Energy Arbitrage

- Offset load using the battery at peak times, supporting both fixed Time-of-Use tariffs and dynamic pricing based on day-ahead and real-time market prices including critical peak pricing/demand charges.



Recognized as the Pioneer and the Leading Platform for controlling and aggregating DERs into Dynamic & multi-service VPPs

“Sunverge remains the only company in the market with a commercially functioning and advanced DER orchestration solution for residential storage.”

“We had studied many companies in this space and in our opinion Sunverge has the most technically advanced platform.”

Sunverge is the only leader with a complete Edge/Cloud platform to deliver near real-time visibility, control, aggregation and orchestration of DERs, enabling unparalleled ability to scale and real-time multi-optimization of services on both sides of the meter

Traction through Utilities





sunverge.com