KISENSUM

EV Road Map
Portland, OR
July 2016

Agenda

- Kisensum Background
- Partners and Customers
- Commercial Projects
- Kisensum Capabilities

Kisensum's Expertise

- Founders leverage over 20 combined years of experience working with Utilities, ISO/RTO's, and Public Utility Commissions
- Executing complex projects with our expertise in software integration, energy management, and industry standard protocols
- Enabling energy storage to become grid assets for:
  - Ancillary Services Market participation
  - Peak reduction
  - Load Shifting

Customers and Partners

KISENSUM

BERKELEY LAB

SLAC NATIONAL ACCELERATOR LABORATORY

nrg EVgo

CTC

PG&E

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

SDGE

DEPARTMENT OF DEFENSE · UNITED STATES OF AMERICA

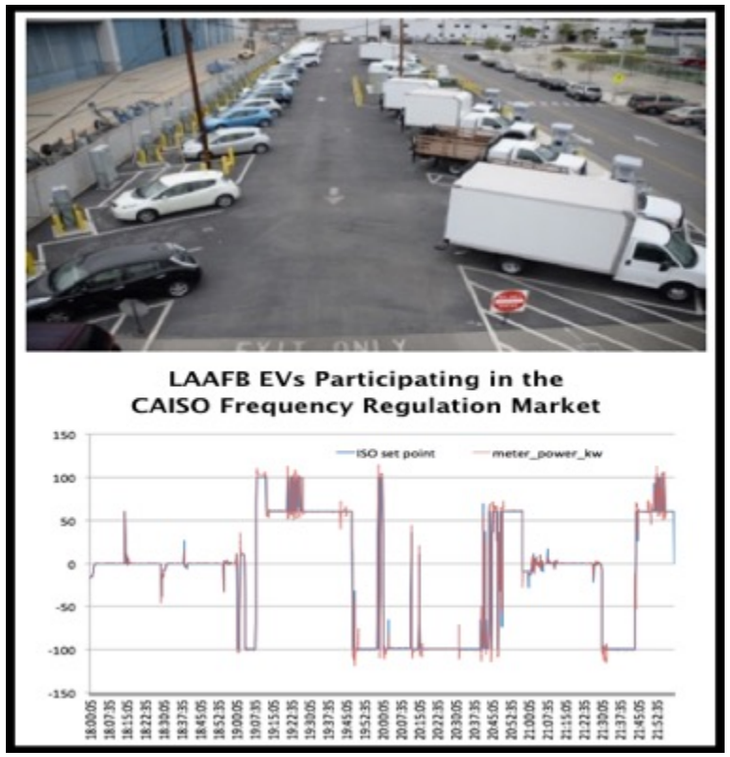
DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA

STATE OF CALIFORNIA · ENERGY COMMISSION

COUNTY OF ALAMEDA · CALIFORNIA

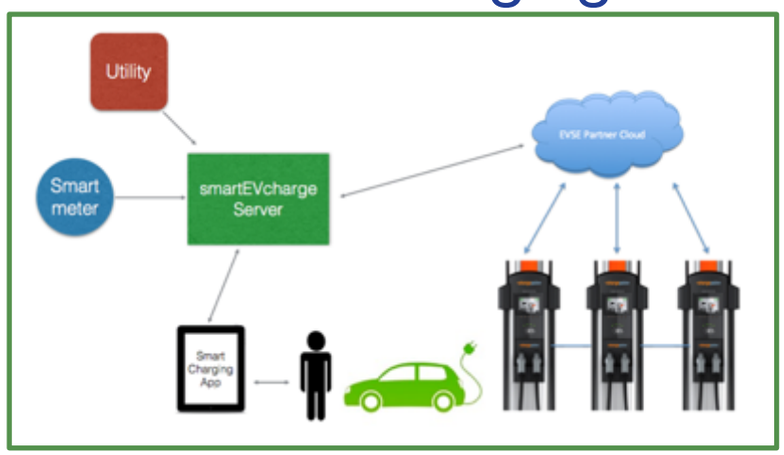
Kisensum Projects

V2G

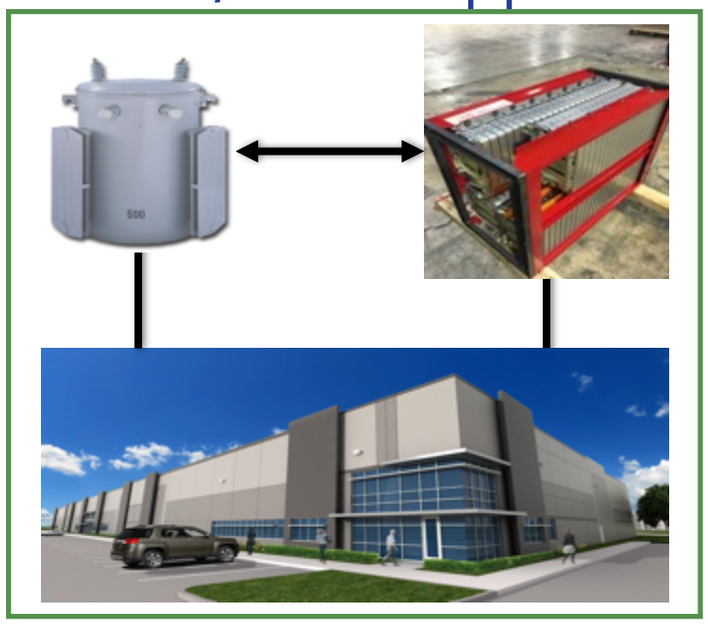


Demand Charge Management

Smart Charging

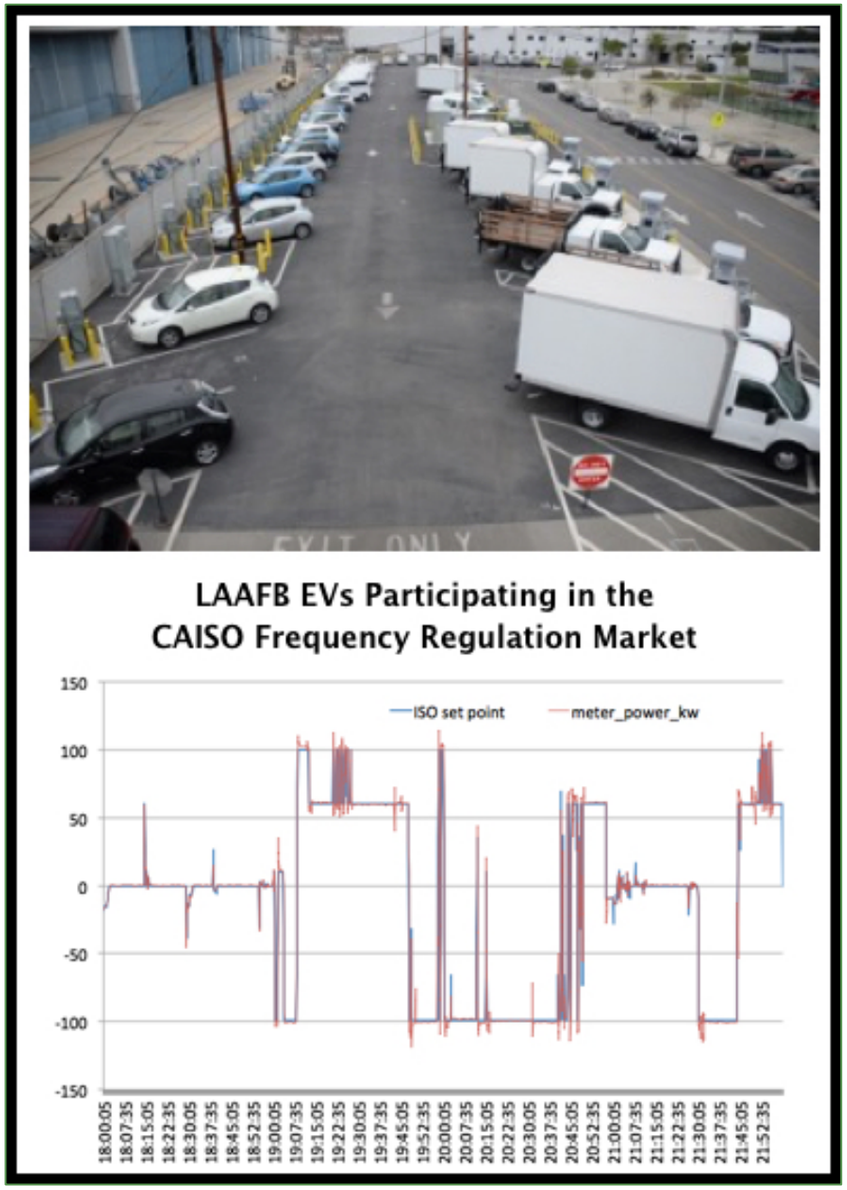


Volt / VAR Support



Vehicle to Grid

- Smart Charging and scheduling of vehicles
- Calculate optimal charging trajectories for driving & energy management
- Participation in Regulation Services Market
- Supporting CAISO, PJM, and ERCOT



Charge Control Dashboard

KISENSUM

LAAFB MIS Reports

Dashboard | FMS | CCM | GSM | ISO interface | Alerts | DB Admin | Reg $$ | Summary $$ | Welcome, **Paul**

Target (kw): 1000.0
Adjusted Target (kw): 297.5
Dispatched Target (kw): 118.0
Battery Power(kw): 17.1
Meter Power (kw): 25.8

Total EVSEs: 29
Disconnected: 2
Offline: 6
Error: 8

Connected Vehicles: 13
Off SOC Plan : 4
Below SOC Plan: 3
At or above SOC plan: 5

2016-06-02 16:03 Refresh Export

Dispatch: Update

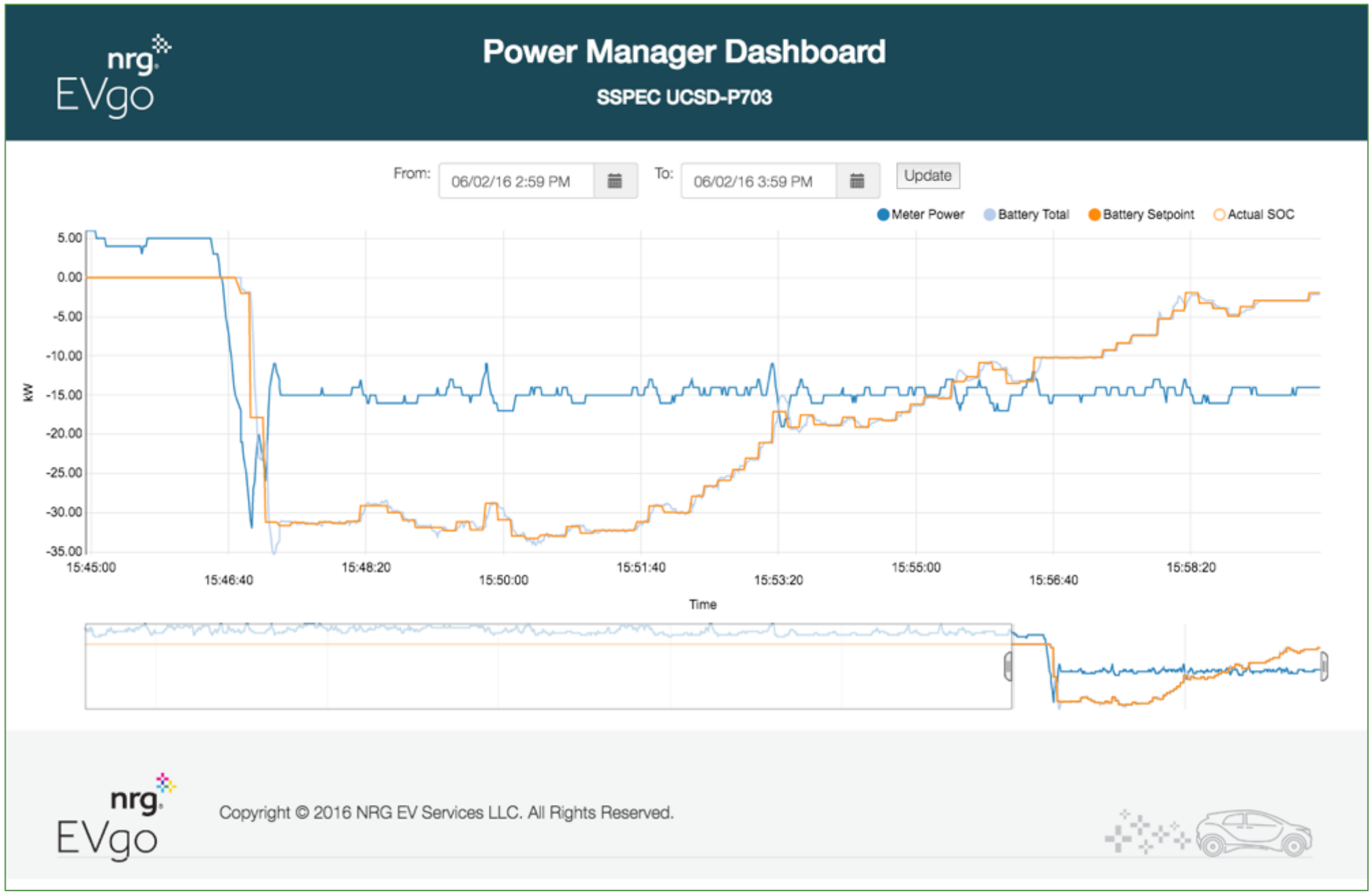
Control Setting: Manual

Space #	Protocol ID	Vehicle	Status	Setpoint (kW)	CSIM Power (kW)	Charger Power (kW)	SOC (kWh)	SOC %	TSOC (kWh)	Next Trip	Action
LA013	PPS02210	Nissan Leaf (12B80016)	Connected	1.0	0.9	0.9	18.20		8.50	Thu, 2 Jun 2016 00:59:57 -0700	Detail
LA004	PPS02217	Nissan Leaf (12B80018)	Connected	7.0	1.0	0.9	18.00		8.30	Thu, 2 Jun 2016 00:59:57 -0700	Detail
LA012	PPS02212	Nissan Leaf (12B80024)	Connected	1.0	0.7	1.5	18.90		8.95	Thu, 2 Jun 2016 00:59:57 -0700	Detail
LA003	PPS02213	Nissan Leaf (12B80021)	Connected	1.0	1.0	0.9	17.90		8.10	Thu, 2 Jun 2016 00:59:57 -0700	Detail
LA038	99	EVI 2Ton Stk Trk (14B80136)	Connected	45.0	-0.1	0.0	37.50		24.37	Thu, 2 Jun 2016 00:59:57 -0700	Detail
	100	EVI 2Ton Stk Trk (14B80133)	Connected	44.0	-0.1	0.0	38.87		0.34	Thu, 2 Jun 2016 00:59:57 -0700	Detail
LA028	96	13 Pax EV DV Van (14Z10434)	Connected	0.0	-0.1	0.0	83.25		42.55	Thu, 2 Jun 2016 00:59:57 -0700	Detail
	110	VIA 12 Pax Van (14Z10424)	Connected	0.0	0.0	0.0	13.00		6.50	Thu, 2 Jun 2016 00:59:57 -0700	Detail
	101	VIA 12 Pax Van (14Z10425)	Connected	15.0	3.5	-14.0	16.25		8.75	Thu, 2 Jun 2016 00:59:57 -0700	Detail

EVgo – UCSD Project

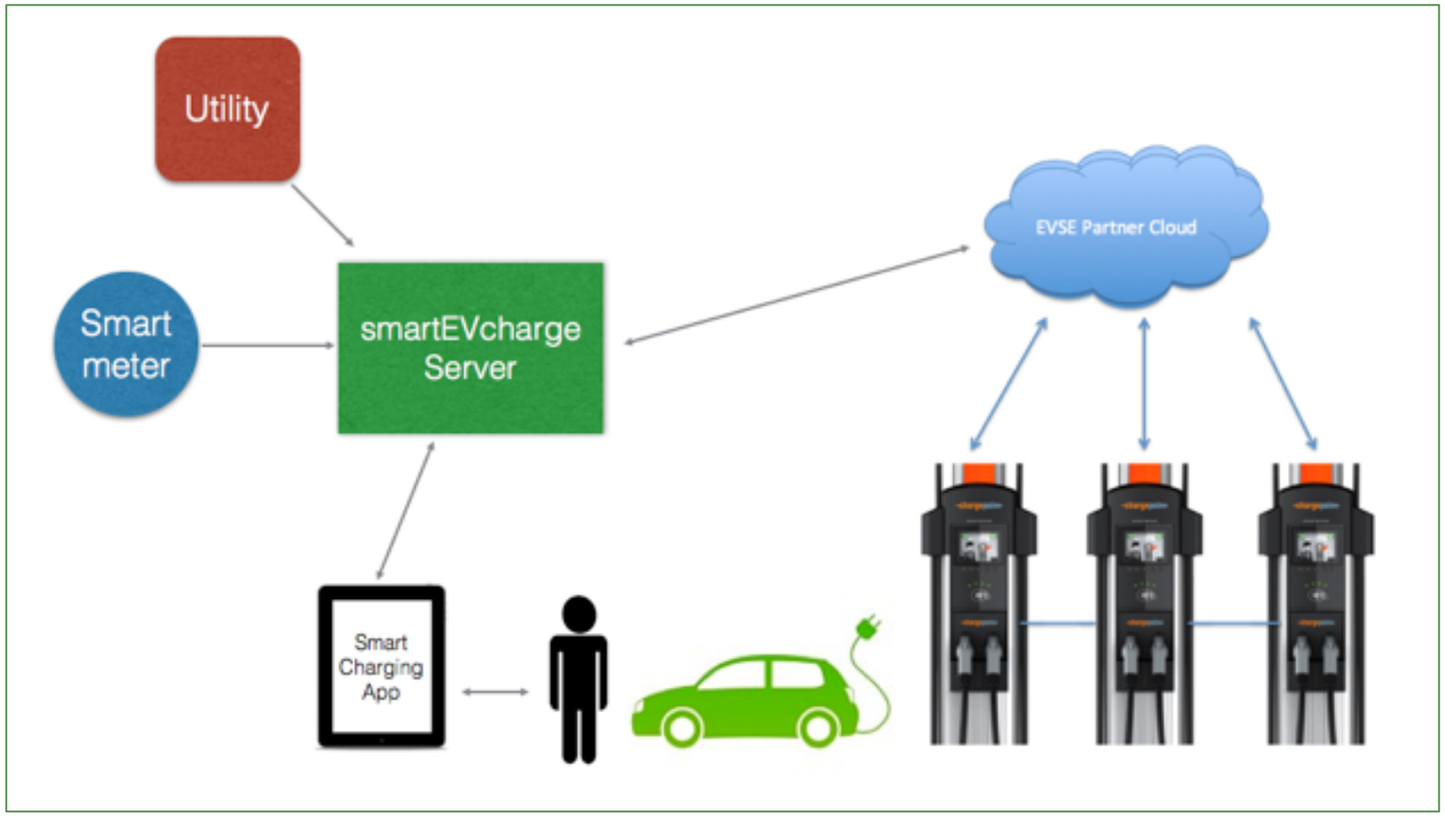
- Battery enabled DC fast charging demonstration
- Demand management with integrated PV
- Utilizing Kisensum's Microgrid Controller
- Kisensum acting as the full system integrator

UCSD Dashboard



Alameda County Smart Charging

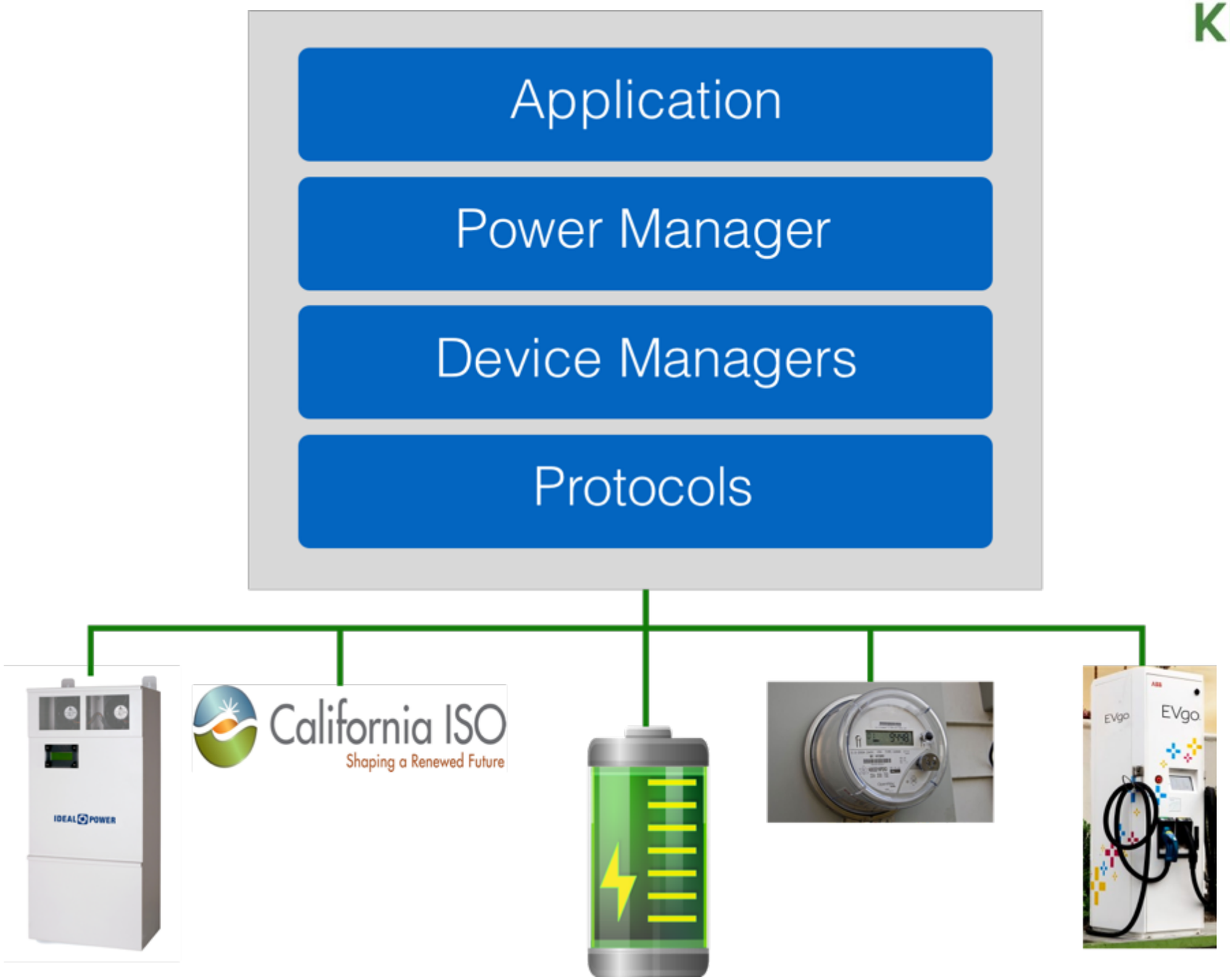
- Manages charging for both public and private fleet
- Demand management reduction
- Improve TOU rates from fleet vehicles



Open Standards

- SEP 2.0
- openADR (creators)
- OCPP
- MODBUS
- DNP3

Energy Storage Controller



Storage Stack

Applications

Demand Management	Frequency Regulation	Volt / VAR Support

Power Manager

Real Time Control	Optimizer	Historian	Analytics

Device Managers

Battery	Inverter	EVSE	Meter	ISO Outstation

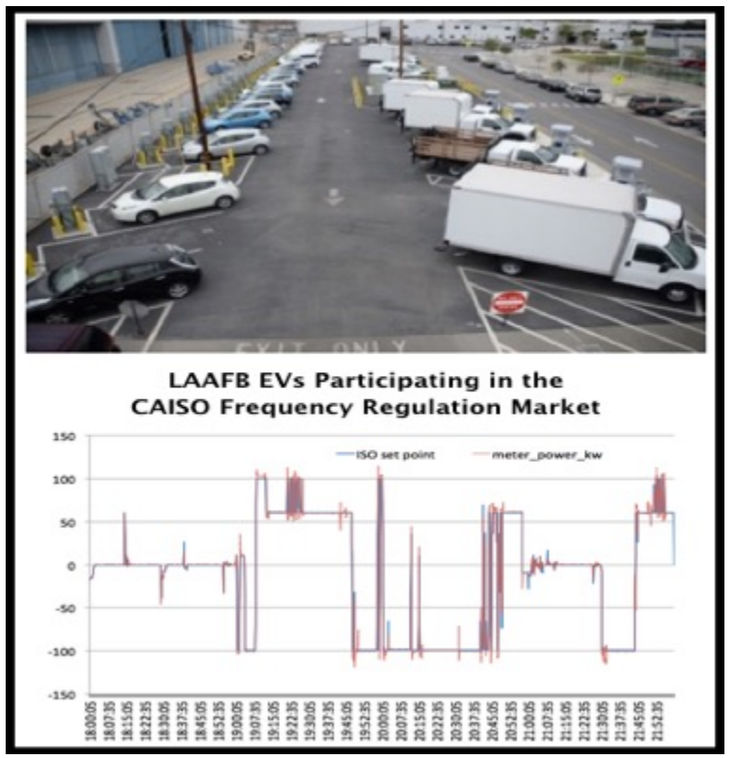
Protocols

Can bus	SEP2.0	OCPP	Modbus	DNP3

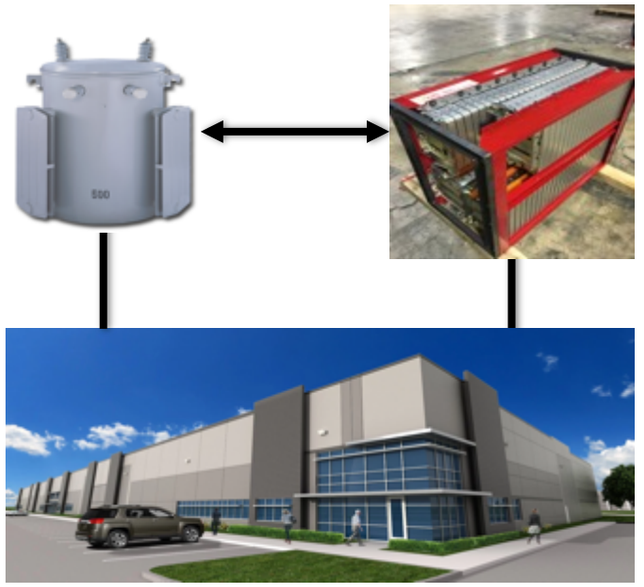
Microgrid Controller

Demand Charge Management

V2G



Volt / VAR Support



Smart Charging