Kisensum Background

- 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

Customers & Partners

KISENSUM

Kisensum VOLTTRON Projects

- Working with SLAC on two DOE VOLTTRON projects
  - VOLTTRON Testing Tool Kit (VTTK)
    - Visual Debugger
    - Simulation Testing Framework
    - Reference App
    - Database Historian Agent
    - 2 VOLTTRON workshop events
  - VOLTTRON Common Message Protocol Project (CMPP)
    - SEP2 DRLC & DER
    - ChargePoint
    - DNP3
    - Microgrid Optimization and Analytics

Background on the PG&E CBP OpenADR application

- What is the PG&E Capacity Bidding Program ?
- What is OpenADR ?
- What are sub-LAPs?

PG&E CBP Program

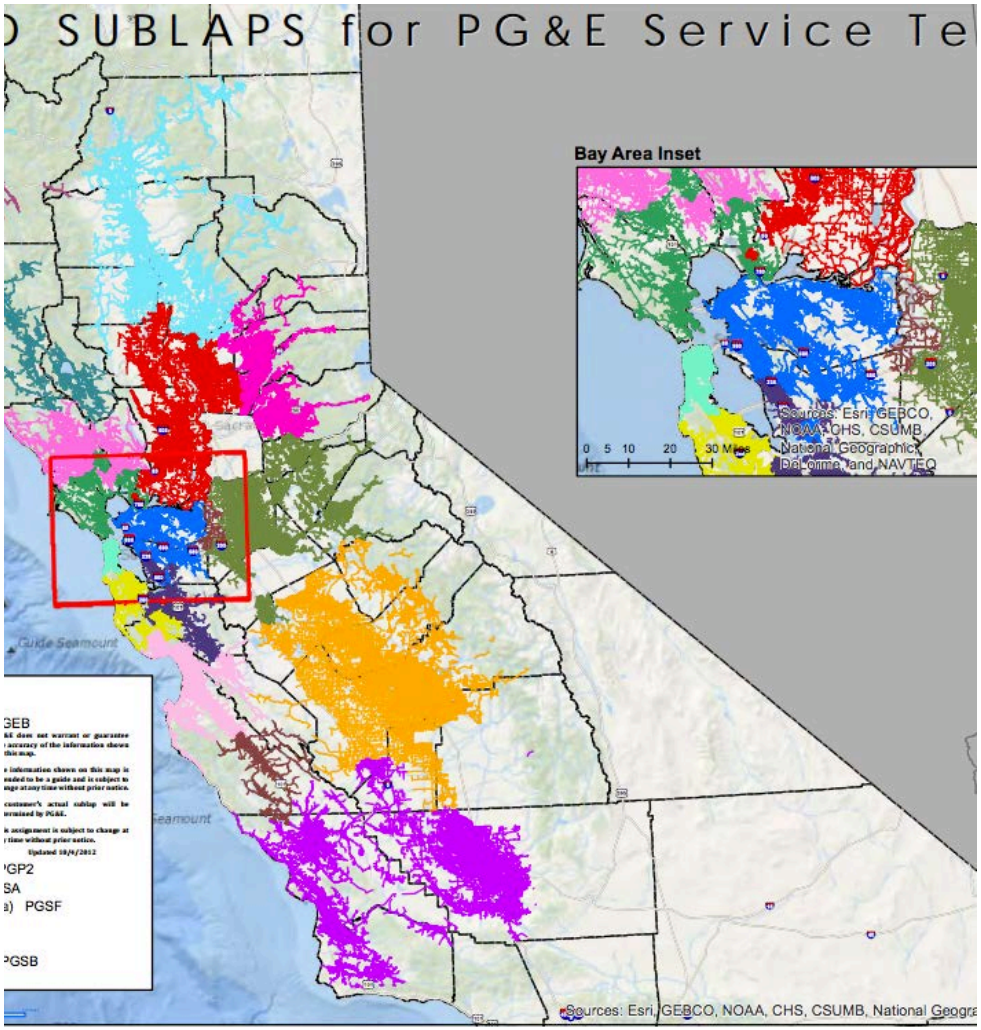
- Capacity Bidding Program – Developed for aggregators and self-aggregators of Demand Response
- Aggregators nominate sites for participation in a CBP product monthly
- Products are Day Ahead, Day Of with 1-4 hour, 2-6 hour and 4-8 hour options.
- Examples of self-aggregators are big box chain stores

OpenADR

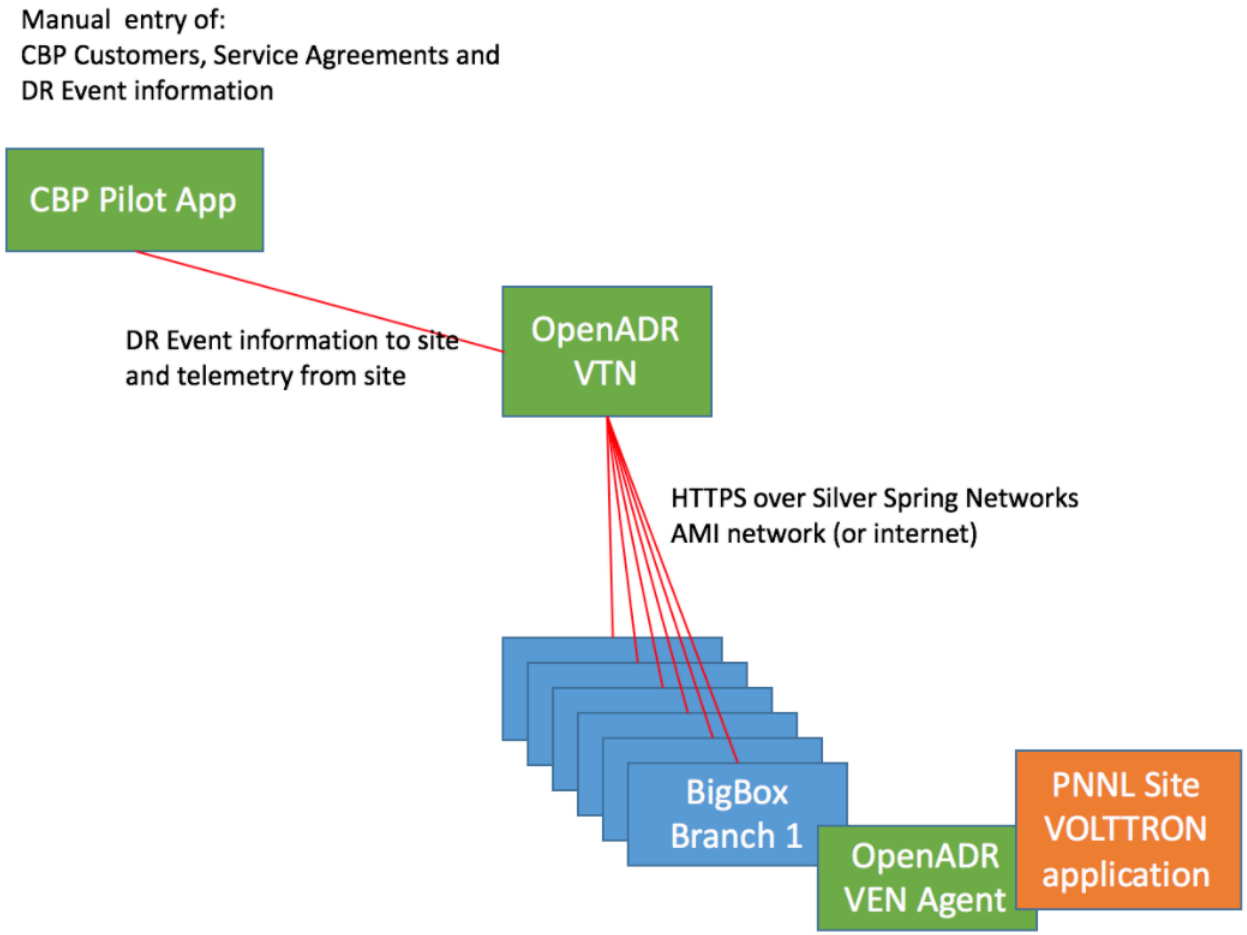
- ADR: Automated Demand Response
- Demand Response: "Changes in electric usage by end-use customers from their normal consumption patterns"

CAISO Load Aggregation Points (sub-LAPs)

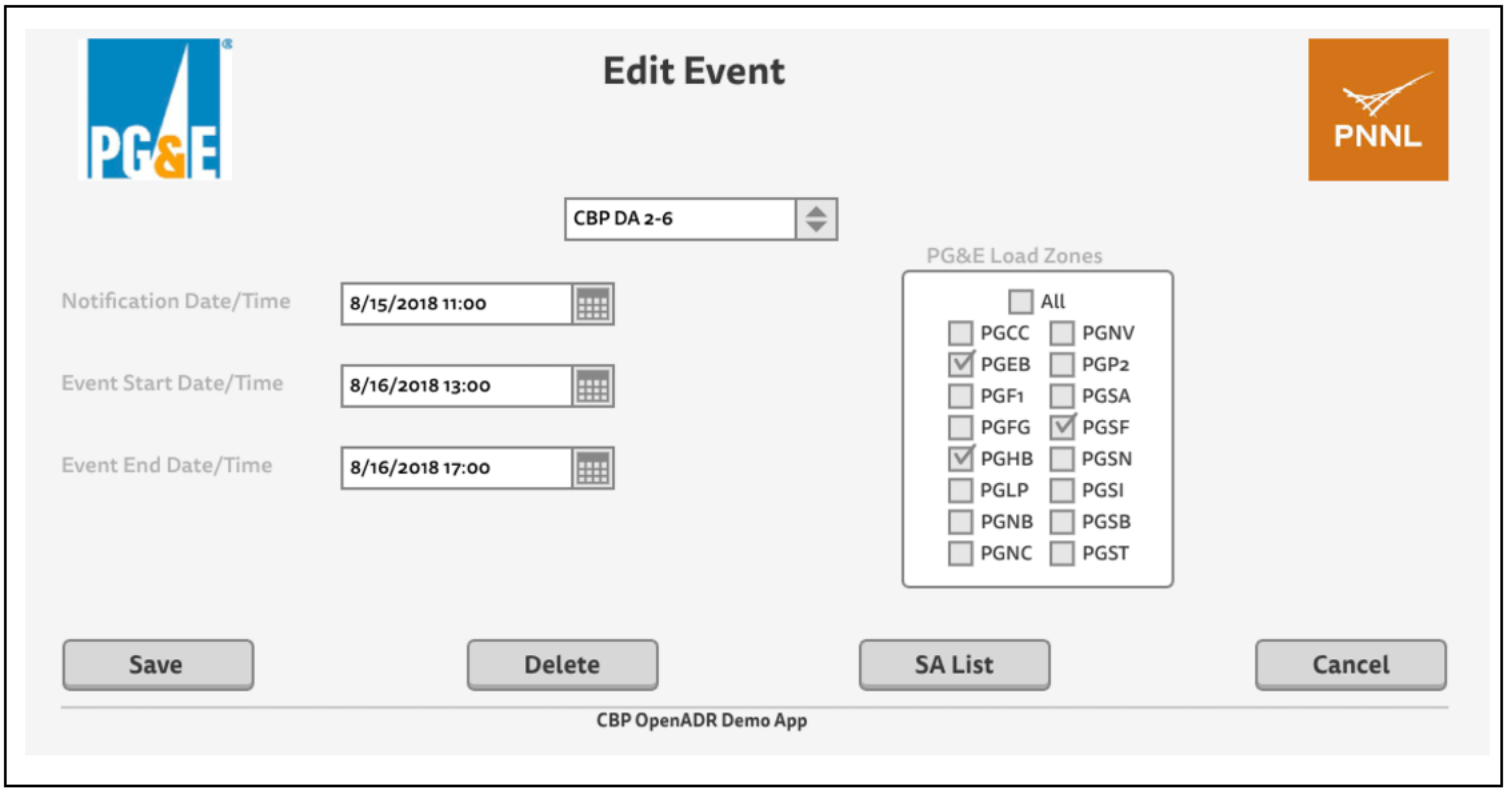
- CBP can be called by Sub-LAP
- PG&E Customers expected to respond with shed in only effected stores
- Considered a Proxy-DR bid into the ISO market



PG&E CBP Application



PG&E Operator Event Selection



Note: Screen mockup intended to demonstrate functionality. Screens not yet reviewed with PG&E.

OpenADR VTN

- Virtual Top Node (VTN) will send EIEvent Messages to VOLTTRON Virtual End Node (VEN) at the local site
- VTN will receive EIReport messages with site Telemetry
- PG&E application will display on site performance of the event in real time.
- Administration and enrollment will be managed by the PG&E application

VOLTTRON VEN Agent Implementation

- VEN will have static vip identity so that it will be well known to all VOLTTRON agents (like Actuator)
- VEN Agent will publish event information to the VOLTTRON message bus.
  - Event Information will include event schedule, event state, energy prices and other event specific parameters
- VEN will provide rpc interface for accepting telemetry data from the site.
  - Telemetry will include real-time meter data, calculated baseline, current shed amount
- VEN will send telemetry to VTN with an EIReport message

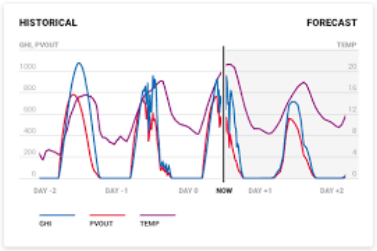
VOLTTRON Application in the building

- Building application being developed by PNNL
- Building application will:
  - Connect to VTN Agent and subscribe to event signals from VTN
  - Collect meter data in real-time and store in local Historian
  - Calculate baseline according to PG&E rules: 10-10 morning (40% max) adjusted baseline
  - Issue shed commands during DR events
  - Report on building performance via remote procedure calls to VTN agent
- The application and the VEN will be resident on a Raspberry Pi device and installed in the building

Contribution to the OpenSource Community

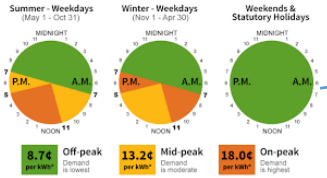
- At the conclusion of this project all of the source code will be placed in OpenSource repositories
- The VOLTTRON VEN agent will be submitted into the development and eventually main branch of VOLTTRON
- The PG&E application and the VTN will be available in a to be agreed upon open source repository

Kisensum Energy Architecture



Forecasts

Energy Market info



Kisensum Smart Energy Controller

Real Time site data

Controllable Resources