Session 5: Strategies for Getting Started with ZEB’s

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Electric Buses

Proterra battery-electric buses
E2 Series with 440 KWH energy capacity
Plug-in Charging @ < 4.5 hr. to charge

VTA ZEB program will help meet ambitious state goal of 1.5 million zero emission vehicles (ZEVs) on California roadways by 2025.

“About 279,000 barrels a day of fuel won’t be needed this year due to EV’s”
Jeremy Hodges Bloomberg Technology
VTA Cerone Yard
Averaging $450K per year

Maintenance
Mid Life Overhaul
Operations/Dispatch

675 KWH Generator
650KWH Generator
1,300 KWH Generator

960 KWH Solar
1200 KWH Solar

6 Smart Chargers
5 Smart Chargers
Electric Buses – Energy Cost

Per EV bus = $7.0K to $10.2K of electricity per year

Depot evening Charging only

First 5  $ 35.0K  $ 51.0K
25 buses  $175.0k  $225.0k

Extended operation with 2 Depot charging cycles
AM run => Mid day charge => PM run => Night Charging

VGI project
5% to 20% Impact
Vehicle to Grid Integration (VGI) Collaboration: PARTNERS

VTA working with Prospect Silicon Valley, and Bay Area tech companies to pilot a cutting-edge system that will manage charging and energy consumption on electric buses while reducing the impact on the state’s electricity grid.

Funding from the California Energy Commission will serve as a major case study for transit agencies throughout the country.

Connected & Making Real Time Decisions
Primary Goals of the VGI Solution

1. Ensure buses are charged and ready to go before pullout time
2. Provide visibility into charging process
3. Send alerts when issues in the charging process or during daily operation need to be addressed
4. Support the assignment of bus to block process
5. Minimize PG&E utility bill
6. Simulate Grid interactions with system
7. Simulate New Block & Charging Options
Operational Analysis and Simulation Strategy

Leverages the National Renewable Energy Lab’s expertise in analysis and modeling of Electric Vehicles

Analysis Development
- Develop the analytic
- Develop operational & cost models

Models being used to predict and recommend operational parameters during the pilot and post implementation analysis to validate the effectiveness.
- Analyze operating conditions
- Recommendations.
- Fleet wide Analysis

Comparison of distance versus travel time for each block
So What is the Big Deal?

Data Flow & Connected

Core Application = Kisensum

EMP = Energy Management Platform

**Inputs**
- Trapeze-FX
- Trapeze-Ops
- SAP
- ChargePoint
- Clever Devices
- Grid Signals
- Electric Meter
- Proterra Bus

**Outputs**
- Trapeze-OPS
- ChargePoint
- Clever Devices
- Operators
What Are The Major Innovations?

- Creating charge plans that support more buses than charge stations.
- Energy Management Platform that interoperates with VTA and Grid systems.
- Dashboard and alerting system supporting vehicle Charging & operations.
- Realtime cost minimization process through demand leveling and Time of use aware charging.
- Performing Grid Service simulations while not jeopardizing the bus charging operations.