Sacramento Municipal Utility District
Electric Bus Support

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SMUD historical support for electric buses

Electric School Bus and Shuttle Bus efforts in the late 1990’s / early 2000’s
Recent Electric Bus Support

- $1M Commitment to support SMAQMD / Sac RT Electric Bus Proposal (Federal and State)
  - SMUD AB32 credit auction revenue funded
  - Charging equipment and grid upgrades
  - Scope included other transit agencies and mixture of charging infrastructure

- SMAQMD Electric School Bus Proposal Support (State)
  - Grid upgrade preliminary estimation

- Low Carbon Fuel Standard Credit Calculation Support

- Analysis of EV Commercial rate without a demand charge
Why do demand charges exist?

**Power: kW**
- Costs that scale with power
  - ‘Peaker’ capacity
  - Transmission lines
  - Transformers

**Energy: kWh**
- Costs that scale with energy
  - ‘Baseload’ capacity
  - Fuel
  - Renewable capacity

Chart courtesy of the Electric Power Research Institute (7-2014 ARB Workshop)
Total electricity bill changes with utilization (for any load)

Chart courtesy of the Electric Power Research Institute (7-2014 ARB Workshop)
SMUD has developed an energy only rate for low utilization electric vehicle business cases

- $0.2015 Flat rate on demands up to 299kW

- Designed to support Light Duty Vehicle Fast Charging
  - 20kW to 299 kW range
  - Low utilization (160 minutes a day / 11% Utilization Factor)
  - No on-peak versus off-peak variation
  - Easy billing transfer to EV drivers (gasoline style billing)
    - Forward looking to support retail transactions

- System Infrastructure Fixed Charge per month per meter, $23.10
For larger operations demand charges can lead to lower costs

- A electric bus transit oriented cost analysis achieved a bulk average $\approx 13\$ /kWh$ with demand charges
  
  - Qty. of 10 80kW Chargers 7 hours at night with some day time charging
  
  - Single 200kW DC Fast Charger (with a peak charge operation)
  
  - Approximately a 20% utilization factor
Other ways Utilities can help reduce fueling costs

- Charger location / sizing support to minimize electrical service upgrade costs
- Detailed rate / operational analysis to find the best rate
- Operational Energy Analyses to find ways to structure operations to lower cost
- Subject Matter Expert support for lessons learned from other projects
Summary

• SMUD has supported Bus Electrification for a long time and continues that support today

• Demand Charge rates are complex but can have benefits

• Fleet operations need to be analyzed on a case by case basis to get the best value for the customer

• Rate options needed to provide flexibility and customer value

• Utilities have wide range of expertise to support customers