

Sacramento Municipal Utility District Electric Bus Support

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Powering forward. Together.



SMUD historical support for electric buses

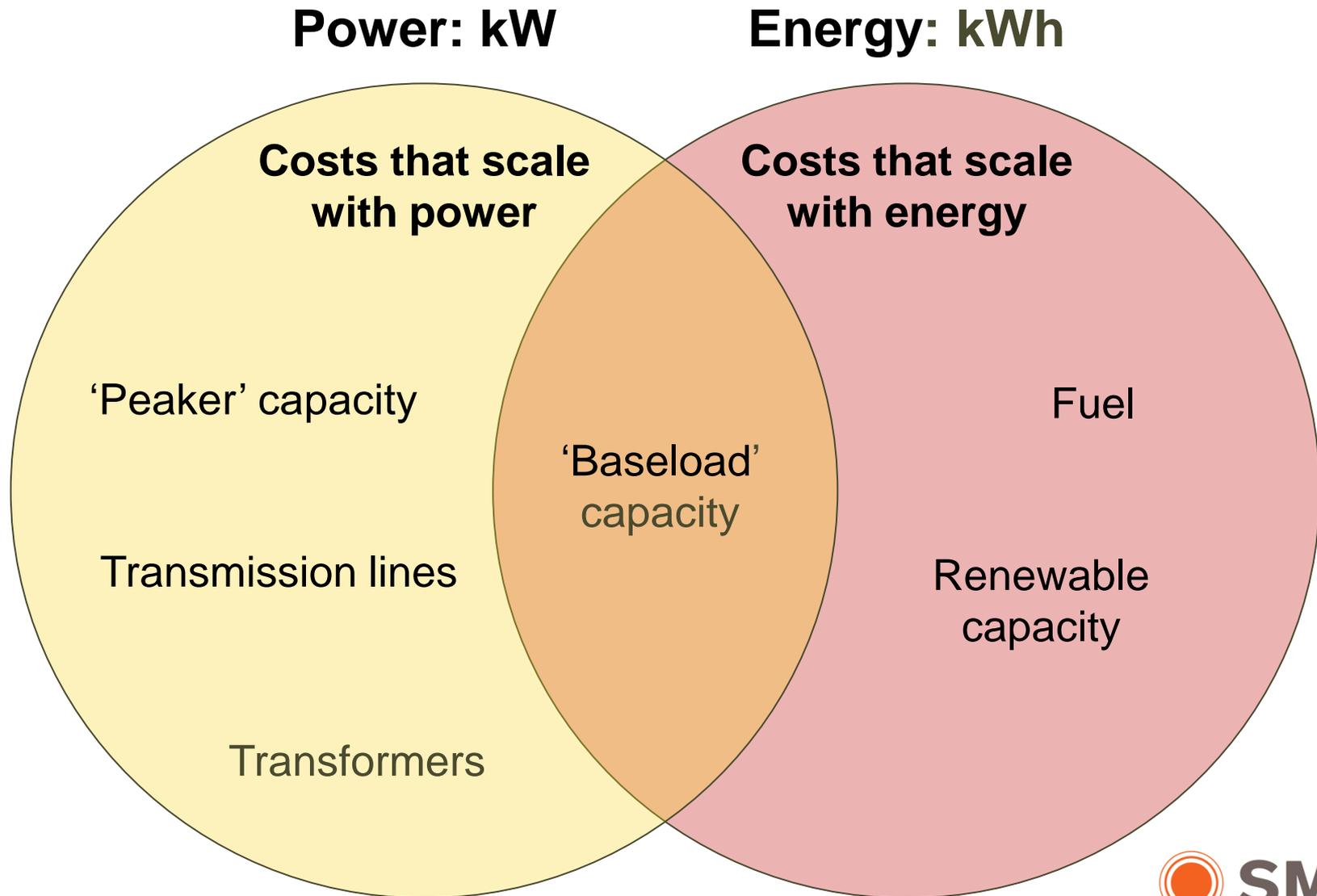


Electric School Bus and Shuttle Bus efforts in the late 1990's / early 2000's

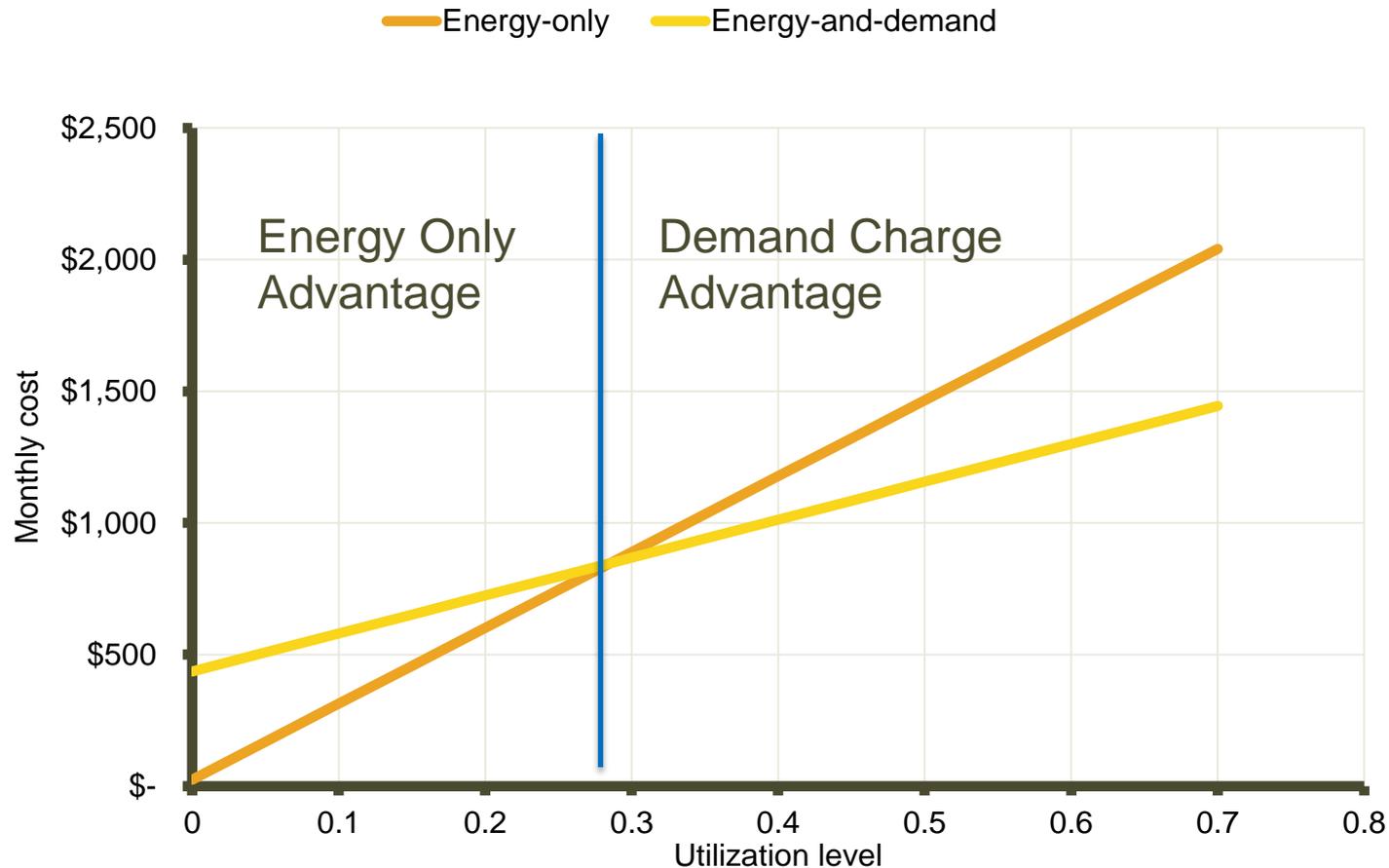
Recent Electric Bus Support

- \$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?



Total electricity bill changes with utilization (for any load)



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 ≈ 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