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TURN Presentation on Electric Vehicle Grid Integration

Presentation of Eric Borden for panel on 10/30.

Additional submitted attachment is included below.

Electric Vehicle Grid Integration

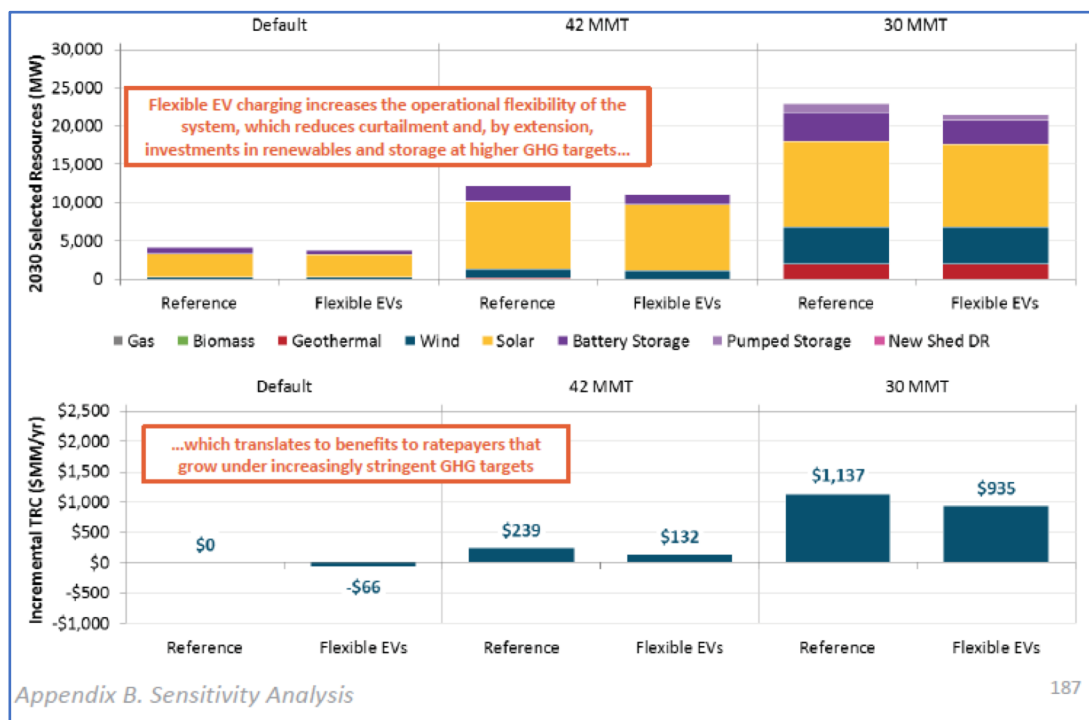
All Consumers Can Benefit from Flexible EV Load

Eric Borden, Energy Analyst, The Utility Reform Network (TURN)

Ratepayer Benefits of Flexible EV Load

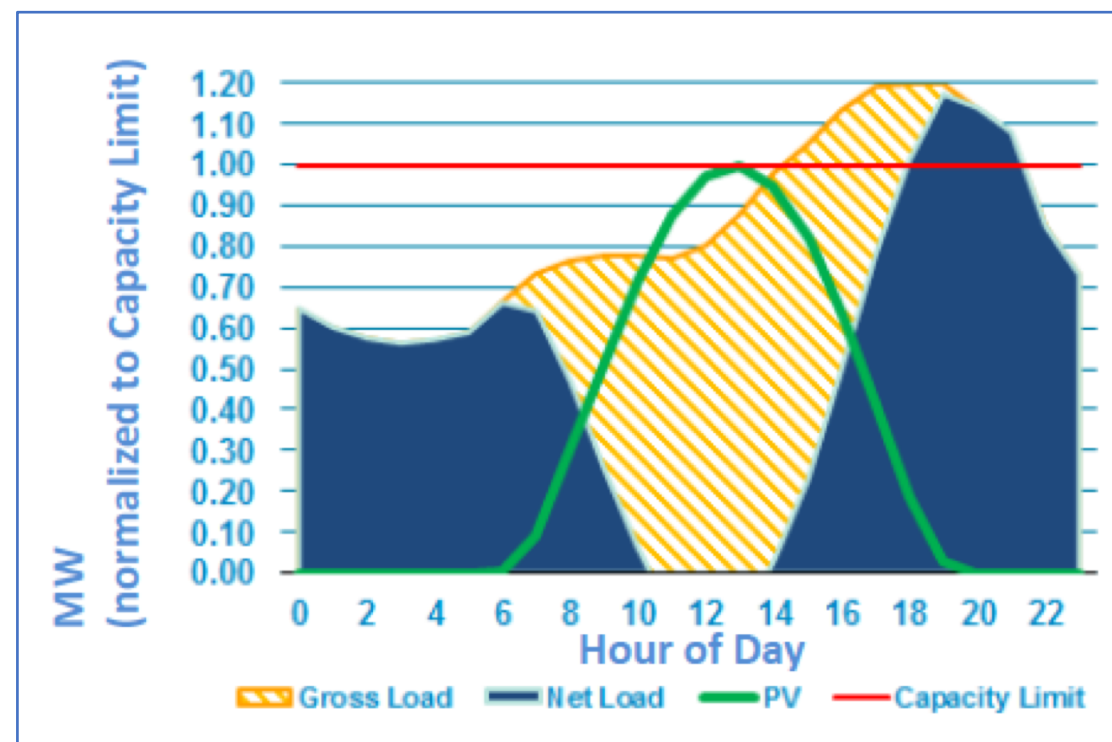
Generation (System)

- Shift load from on-peak to off-peak, particularly to low-cost, high solar hours
- Reduce investment in storage and renewables
- Reduce peak load



Distribution (Local)

- Shift load away from distribution peak to avoid distribution system capacity upgrades



Distribution Benefits of Flexible EV Load

- Even if realized, peak load shifting benefits are not obtainable under current utility distribution practices.
- Utilities assume max charging station load is added to peak.



- Obstacles-
 - Lack of data/experience
 - Safety/reliability concerns
 - Regulated utility business model
- Key enabling technology-
 - Data, interest, willpower.

Primary Tools to Achieve VGI Benefits

- **Demand response –**
 - A few hours with lots of value
 - Players- utilities and demand response aggregators
- **Rates**
 - Time of Use (TOU) rates that provide incentive to charge off-peak and during the day – fuel cost savings and system benefits
 - “VGI” rates that isolate distribution peak
 - Players- utilities, automakers/state (education)

EV Time-of-use Rates (Residential)

- Utilities have whole-house and separately metered residential EV rates in major utility territories
- Low uptake – e.g. approx. 15% of EV drivers in SCE territory
- Whole house rate may not be right for everyone and introduces rate design problems that would be resolved if able to isolate EV load

Key enabling technologies



- Education and outreach
 - Updated LCFS program for upfront rebate
 - Default TOU starting in 2020 – opportunity for EV drivers and education
 - Automakers should play key role
- Submetering – ability to isolate EV load and charge marginal costs
 - Solves issues with whole house rates and allows for low fueling costs off-peak
 - SDG&E residential rebate program
 - Obstacles
 - Utility business model doesn't incentivize
 - Billing integration issues

Takeaways

- Local benefits of shifting EV load cannot be realized under current utility practices
- Rates are Critical for VGI –
 - Few EV customers are signed up for EV TOU rates
 - Submetering allows for more targeted EV rates, lower cost of fueling, strong price signal to shift off-peak, and less potential for revenue shifts due to rate design
- Important to recognize and address where utility business model may run counter to capturing values of flexible EV load

Conclusion:

- All consumers can benefit from mass adoption of EVs with VGI as a critical component.