



VEHICLE-GRID INTEGRATION COUNCIL

Unlocking EVs as a Strategic Grid Resource

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EVs represent untapped potential as flexible, distributed resources to support an affordable and just energy transition

Vehicle-Grid Integration Council is focused on unlocking the value of flexible charging and discharging

VGIC:

- *Prioritizes integrity and credibility*
- *Supports collaborative engagement with all VGI champions*

What is Vehicle-Grid Integration (VGI)?

VGI is the suite of ways EVs can reduce the total cost of vehicle ownership, unlock additional value for communities, and provide services to the evolving electric grid

- *V1G: one-direction, managed charging*
- *V2B/V2H: vehicle used to power a building or home*
- *V2G: bidirectional charging and discharging for grid services*
- *Station Demand Management: minimize time and cost for utility infrastructure upgrades*
- *Integrated DERs: co-located EV charging with solar and stationary storage*

Accelerating Transportation Electrification

- *Charge Energy Management led to 25% - 53% savings in annual charging costs in recent analysis for Stockton Unified School District*

Table 1: Summary of Charging Analysis Results by Scenario

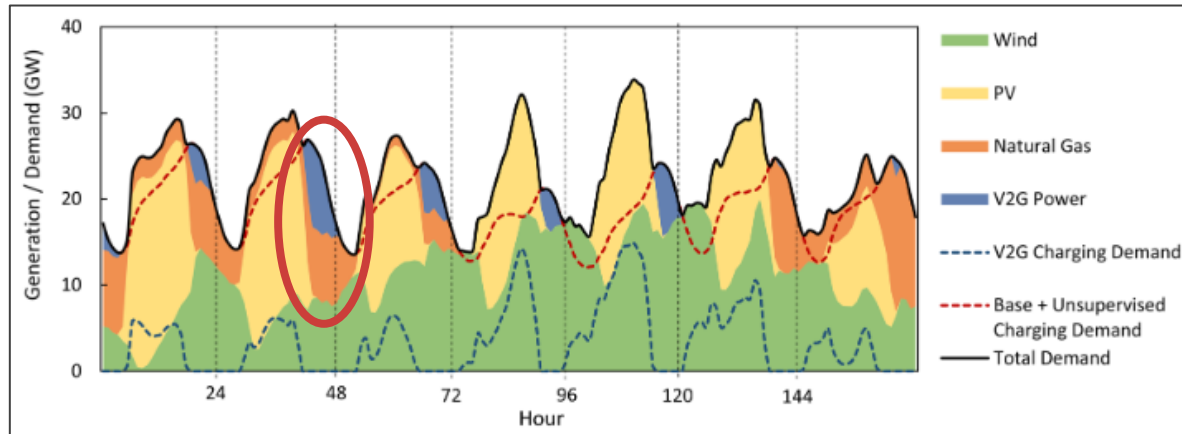
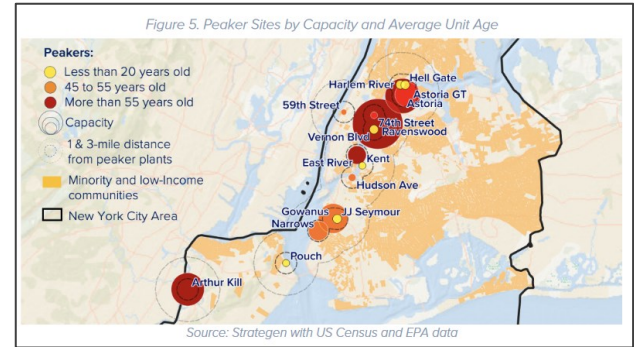
Scenario	AC Only	DC Only	AC + DC	AC + PV
Annual Energy Cost Without CEM	\$405K	\$399K	\$406K	\$287K
Annual Energy Cost With CEM	\$244K	\$237K	\$298K	\$134K
Energy Cost Savings With CEM	39.7%	40.6%	26.6%	53%

- *In Summer 2023, a school district in San Diego was paid over \$1,500 through V2G exports*



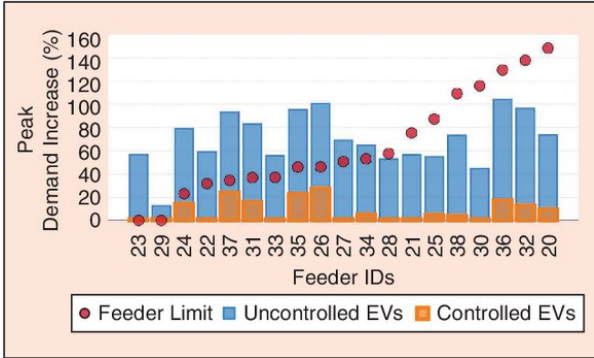
Support the Decarbonizing Power Sector

Managed charging and V2X discharging can help offset the use of old, polluting “peakers”



Increase Affordability of Electricity for All

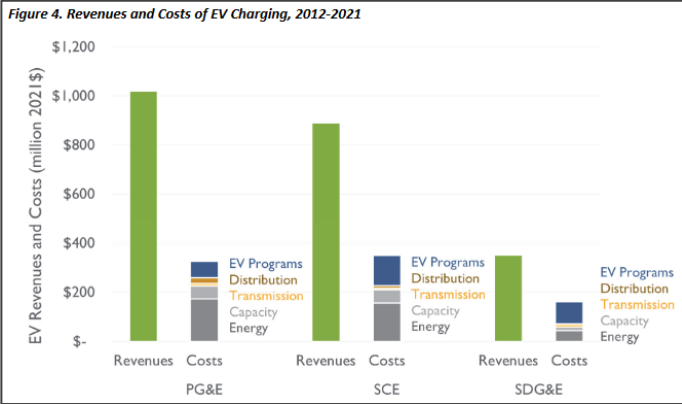
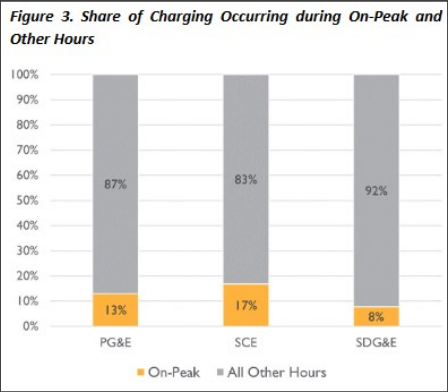
Uncontrolled EV charging can lead to significant infrastructure investments



$$\boxed{\text{Revenue Requirement}} \div \boxed{\text{kWh (total electric demand)}} = \boxed{\text{Rates}}$$

Increase Affordability of Electricity for All (continued)

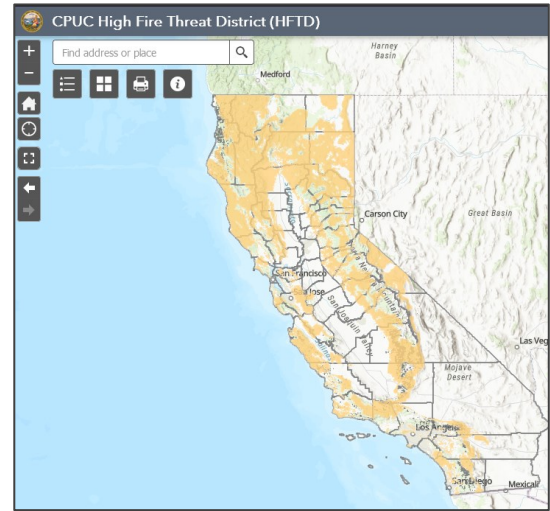
Smart charging rates/programs can shift charging away from On-Peak hours and accelerate EV adoption, increasing kWh consumption



$$\boxed{\text{Revenue Requirement}} \quad / \quad \boxed{\text{kWh (total electric demand)}} \quad = \quad \boxed{\text{Rates}}$$

Improve Community Resiliency

PG&E's evPulse program manages EV charging before a Public Safety Power Shutoff to ensure customers and fleets in high wildfire threat districts are not stranded



Alameda-Contra Costa Transit District is using bidirectional charging technology to provide emergency backup power to community centers in Oakland

First-of-its-kind vehicle-to-building resilience hub powered by transit buses

October 11, 2022 | Oakland, CA



- The Mobility House, CTE, AC Transit, New Flyer, Schneider Electric to deploy electric transit buses as mobile emergency backup power for community centers.

VGI Programs on the rise:

- **Codified rules for V2G charger interconnection**
- **Expansion of capacity-based battery payments to include V2X** (i.e., Demand Side Grid Support)
- **Novel EV aggregation program pays \$2/kWh for V1G/V2G during extreme load events** (i.e., Emergency Load Reduction Program)
- **Nation's first V2G equipment incentive and export rate** (i.e., PG&E V2X Pilots)
- **Large-scale PG&E pilot for managed charging** (i.e., evPulse) and **several large pilots with CCAs**
- **Several active commercial deployments of V2G school buses** (e.g., Oakland, Cajon Valley)
- **Adopted submetering protocol to increase EV rate participation**



Thank you!

Vehicle Grid Integration Council (VGIC) is a national 501(c)(6) membership-based trade association committed to advancing the role of electric vehicles and vehicle-grid integration through policy development, education, outreach, and research.

