Harnessing Mobile Energy Storage for Grid Resilience

December 18, 2020

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Climate Fridays Webinar

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Overview

- About Community Energy Resilience
- California V2G Policy Background
- Possible Next Steps

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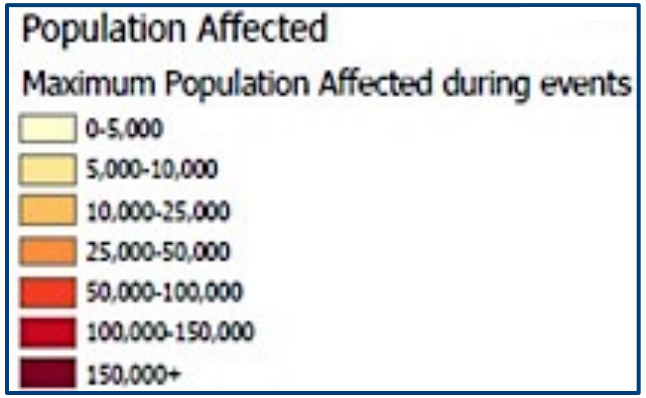
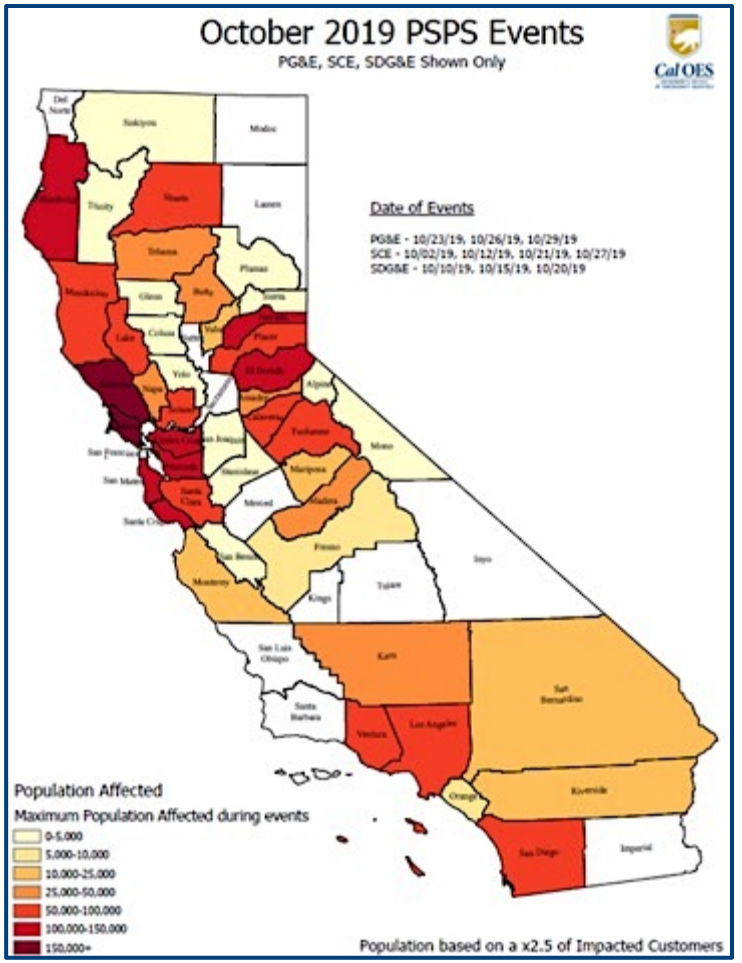
2019: Public Safety Power Shutoffs

- 940,000 meters cut off
- 1,670 cell towers down





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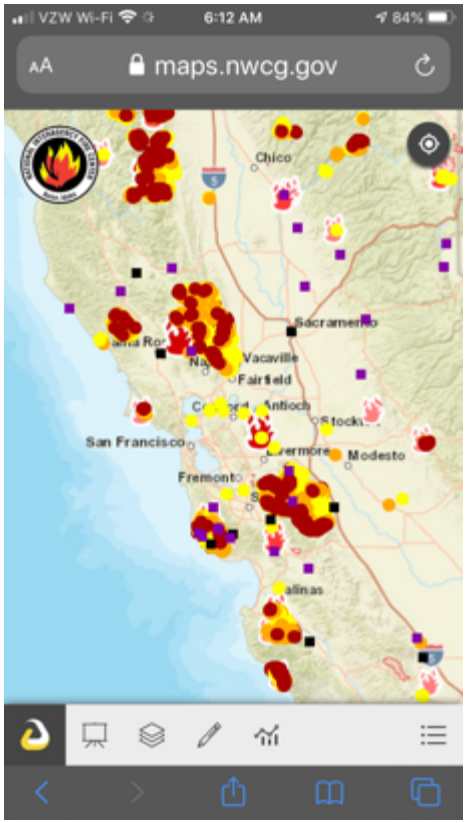
2020: Fires and Rolling Blackouts

Fires, Blackouts, a Heat Wave and a Pandemic: California's 'Horrible' Month

The nation's most-populated state is facing multiple crises, including 23 major wildfires raging while the daily death toll from the coronavirus is above 100.



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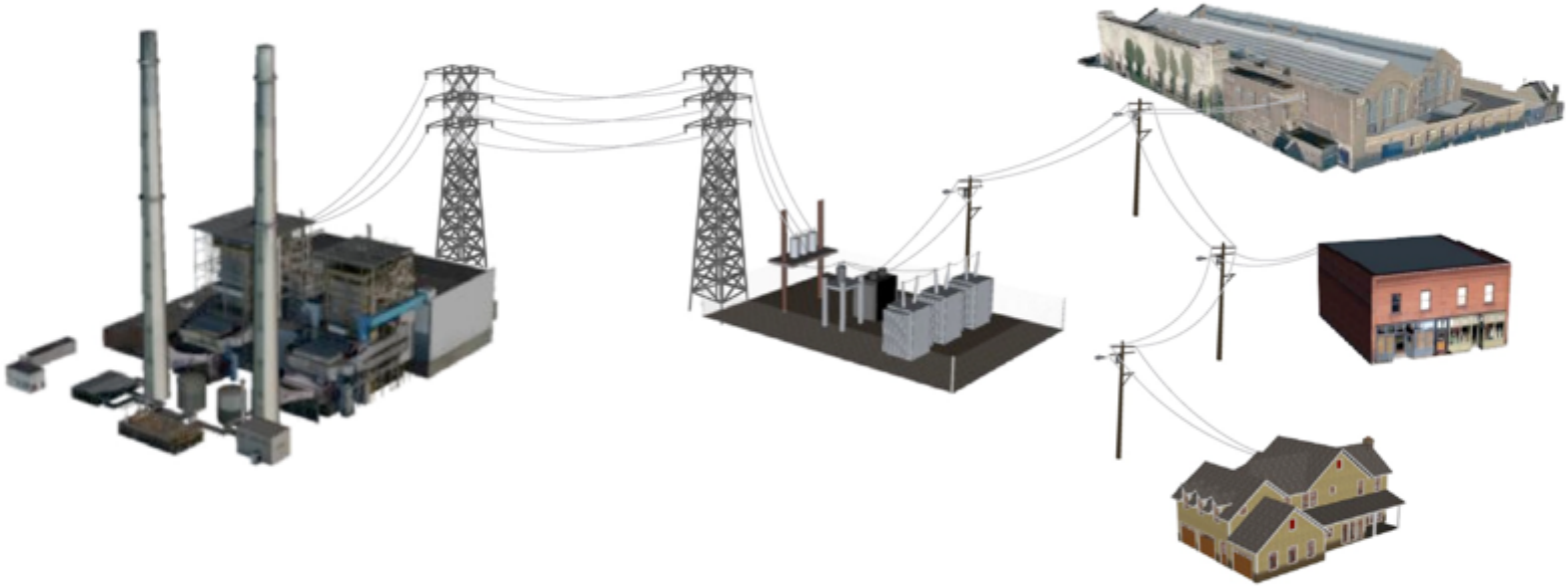
Community Energy Resilience: Our Vision

Instead of perpetuating a 100-year-old centralized grid system that has caused devastating wildfires and power shutoffs…



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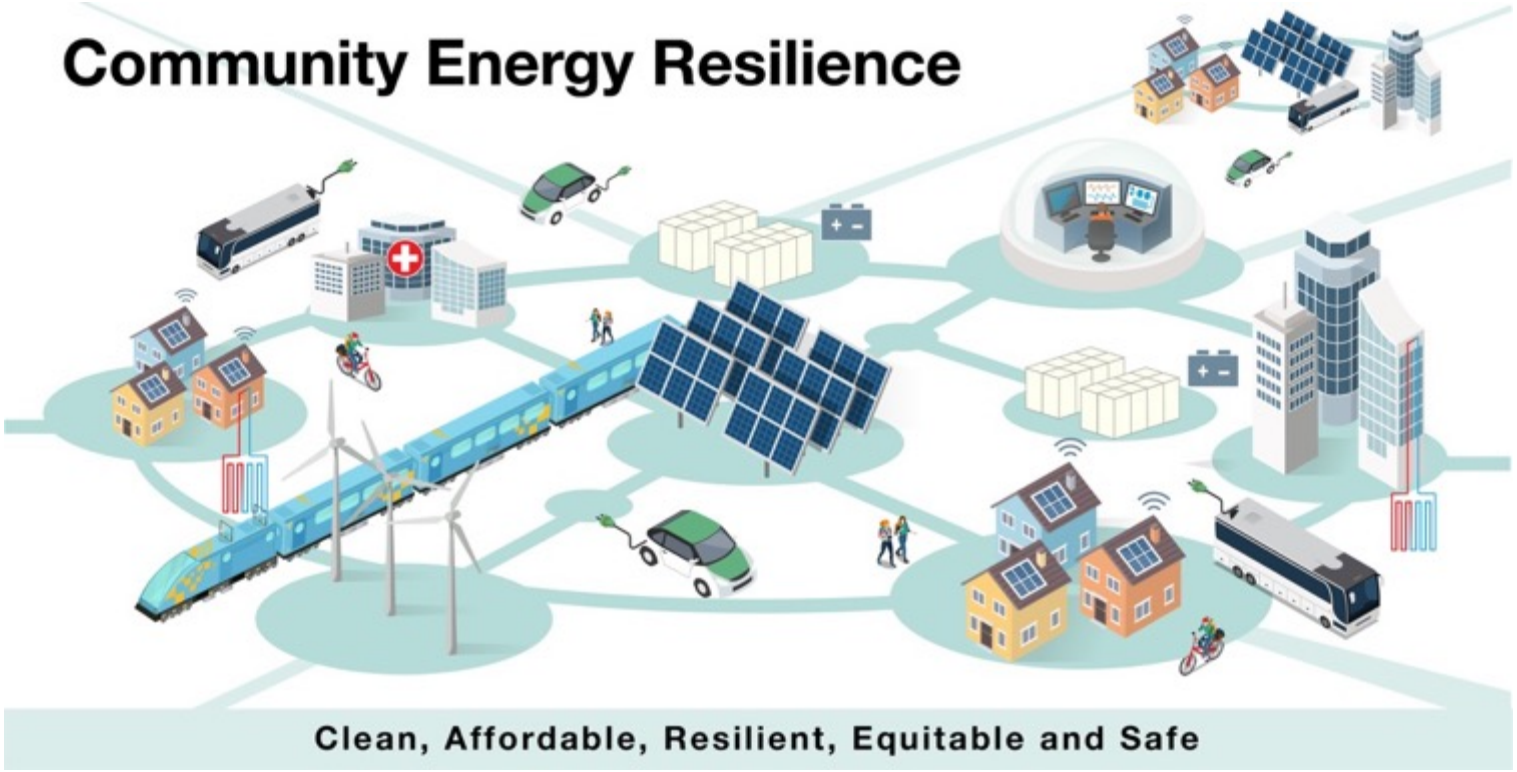
Create a resilient, decentralized and integrated power grid



1000s of local electricity systems, linked over the “macro grid”

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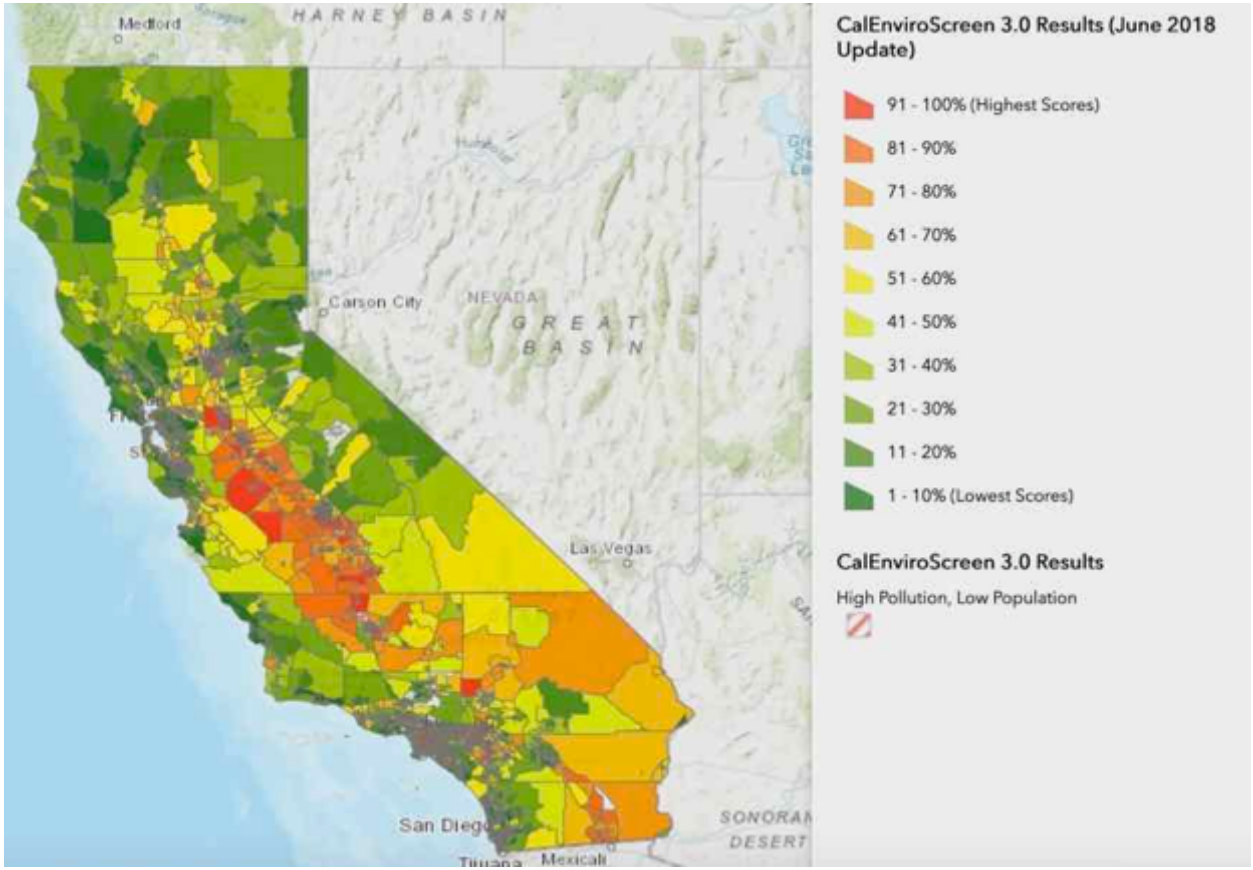
..Prioritizing local clean energy for low-income communities that suffer most from air pollution and power outages



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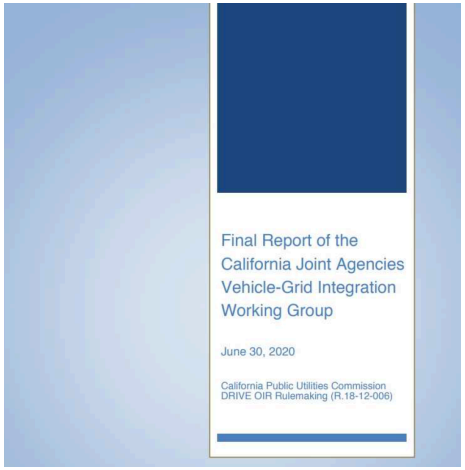
June 2020 Vehicle-Grid Integration Working Group Report: Why VGI?

Vehicle-Grid Integration (VGI):

- **Accelerates EV adoption** by providing owners with additional revenue streams
- **Lowers energy costs to ratepayers** by reducing congestion on existing infrastructure and replacing new fossil fuel generation
- **Advances decarbonization** by avoiding excess energy curtailment and providing grid support services
- **Reduces transportation sector emissions**
- **Improves grid resilience** by providing back-up generation (BUG) during power outages



See https://gridworks.org/materials-produced-by-the-vgi-working-group-2/

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Gov. Newsom's Fall Executive Orders: Elimination of ICE Vehicle Sales by 2035/45

Executive Orders N-79-20 and B-48-18:

- **100% passenger car/light-duty truck sales are zero-emission vehicles (ZEVs) by 2035**
- **Where feasible, 100% sales of drayage/off-road ZEVs by 2035; all other MD/HD by 2045**
- **1.5M ZEVs/250K public fast charging stations by 2025; 5M ZEVs by 2030**

Above: Governor Newsom signs a new Executive Order requiring 100% ZEV new car sales in California by 2035,

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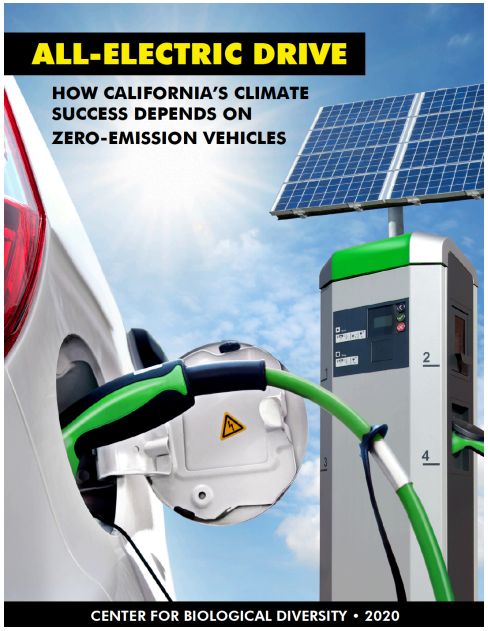
Yesterday's Joint Letter to Gov. Newsom: 100% Passenger Sales ZEV by 2030

"We ask you to direct the Air Resources Board to:

- **Adopt standards that will require 100% zero-emission vehicle (ZEV) sales for all passenger vehicles by no later than 2030**, and significant pollution reductions from all other cars and light trucks sold over the next decade — including a minimum 7% annual decrease in greenhouse gas emissions…
- **Pursue measures that promote equity and a just, green economic recovery** by creating good, family-supporting jobs, ensuring that low-income communities of color have **greater and more equitable access to zero emission vehicles** and their associated benefits, and collaborating with other state and local agencies to **improve public transportation and ensure safety and accessibility of our streets** for non-motorized transit.



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Additional Policy Drivers for Transportation Electrification and Grid Decarbonization

Innovative Clean Transit Rule:

- Public transit: gradual transition to 100% zero emission over coming decade(s)

Advanced Clean Trucks and Advanced Clean Fleets Rules:

- Medium/heavy-duty vehicle sales and fleets: transition to ZEV over coming decade(s)

Electric Vehicle Grid Integration (SB 676, 2019):

- Strategies and metrics to maximize vehicle grid integration

Energy Storage Systems (AB 2514, 2010):

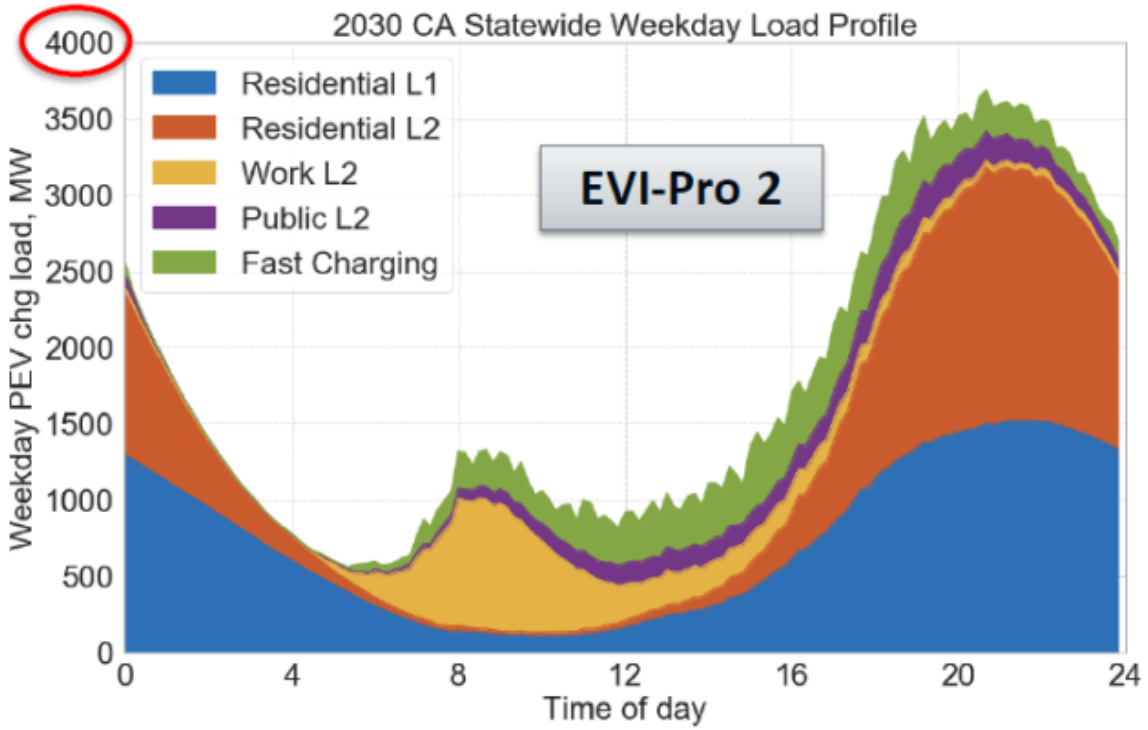
- Accelerate widespread deployment of distributed energy storage systems

Clean Energy and Pollution Reduction Act (SB 350, 2015):

- Increased use of zero-emission vehicles in disadvantaged communities
- Electricity sector greenhouse gas reduction goal of 40% below 1990 levels by 2030

Electrified Transportation and California's Duck Curve: Problem or Solution?

Representative weekday charging load profile for 5M passenger plug-in electric vehicles in 2030



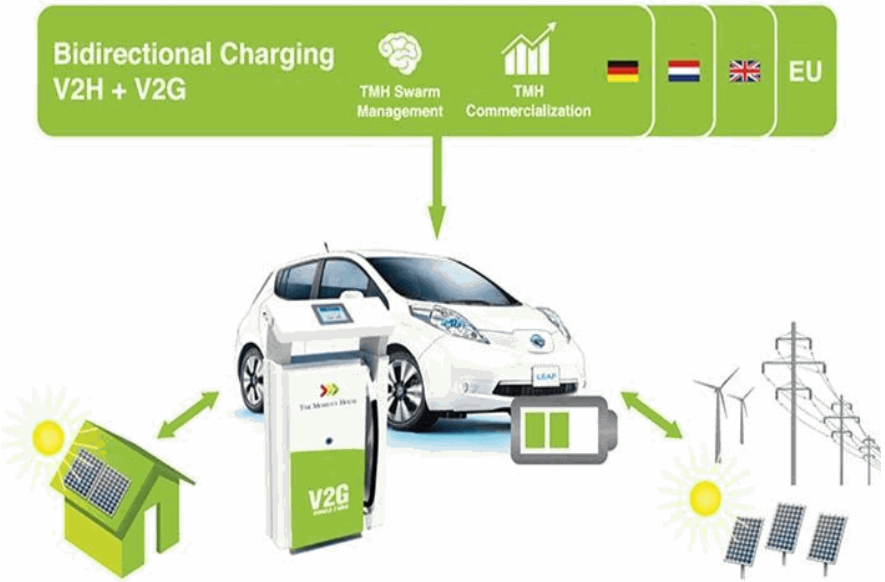
Preliminary results from EVI-PRO 2

https://www.energy.ca.gov/event/workshop/2020-08/session3-modeling-and-projecting-charging-infrastructure-commissioner

VGI Can Shift EVs from Grid Liability to Grid Asset

If the U.S. were to rapidly adopt electric vehicles, the power grid would need to change fast. // Mike Blake/Reuters

Is America's Power Grid Ready for Electric Cars?



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How VGI Can Work For Homeowners

- **Ideally: Solar + EV** at every home
- **Charge at work** capturing excess solar energy, then bring the energy home
- **Charge while you shop** using excess mid-day solar energy
- **Bring energy home, export to the grid** during evening peak
- **Power your home during PSPS events**

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How VGI Can Work For Business

- **Medium/Heavy-Duty EV Fleets** enable maximum on-site solar generation, increasing overall grid reliability/resiliency
- **Savings from Elimination of Fuel Costs**
- **Employee Vehicle Charging** adds storage capacity and offers savings value to employees
- **During outages, Fleet EVs can provide critical BUG services,** both on-site (VG1), to other properties (V2B) and the grid (V2G)

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Possible Next Steps

- **Implement VGI Report Policy Recommendations**
  - Some aspects were included in November 2020 CPUC Proposed Decision on VGI Implementing SB 676
- **Leverage fallout from August 2020 power outages to support VGI utilization** of mobile storage as a grid asset following possible allowance of export from behind-the-meter storage allowance
  - New reliability proceeding just getting underway to help better prepare for summer 2021
- **Pioneer development of school buses as grid resilience assets**, with prioritization of low-income communities through creation of community resilience hubs per APEN report

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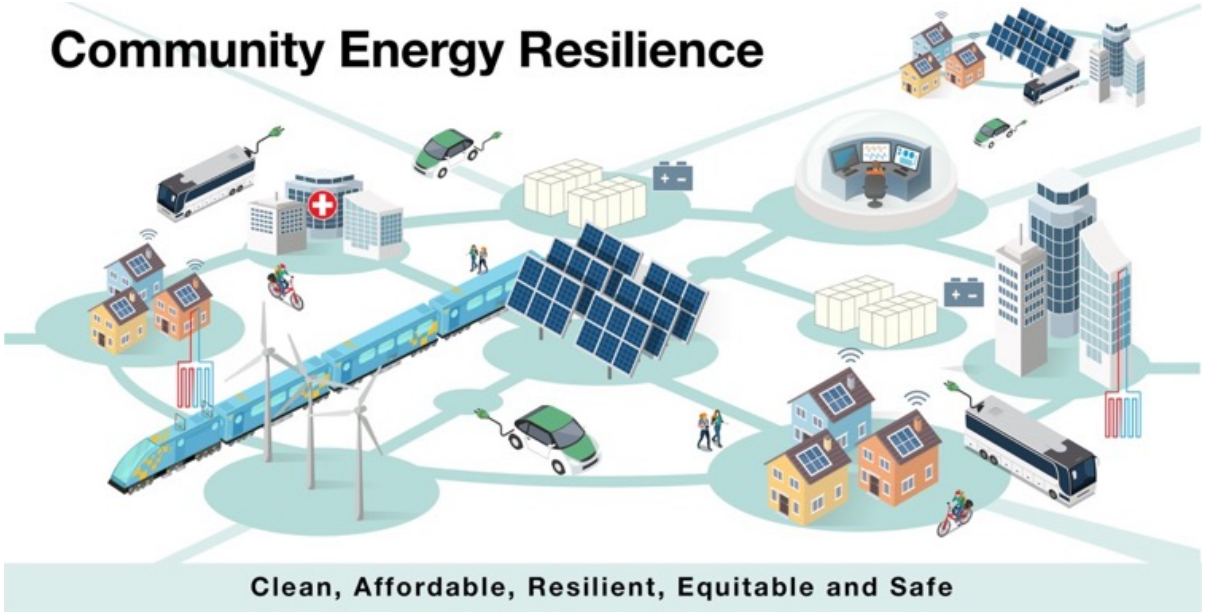
Thank You!



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