DOCKETED	
Docket Number:	22-EVI-06
Project Title:	Vehicle-Grid Integration
TN #:	273653
Document Title:	Enabling Bidirectional EV Charging at Home (V2H) - California Energy Commission Presentation - 2026-11-10
Description:	N/A
Filer:	Spencer Kelley
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	11/16/2026 11:59:30 AM
Docketed Date:	11/16/2026



Enabling Bidirectional EV Charging at Home (V2H)

Fuels and Transportation Division webinar – November 10th, 2026 – 10:00 a.m.

Housekeeping

- Webinar is recorded on Zoom
- Virtual Participation via Zoom during the Q&A periods
  - Questions can be asked in the Q&A section of the Zoom application or by using the raised hand feature.
- Submit comments to the Vehicle-Grid Integration Docket **22-EVI-06** E-Comment page: Link to the CEC commenting page for the docket 22-EVI-06
- Comment Deadline: Friday, December 4, 2026

Webinar Overview

(Times are approximate)

10:00 – 10:05	**Welcome and opening remarks**
10:05 – 10:10	**Opening comments from FTD Director Spencer Reeder**
10:10 – 10:25	**CEC background on Vehicle-to-Home**
10:25 – 10:55	**Feedback and lessons learned from REDWDS program**
10:55 – 12:15	**Panel 1: automakers' solutions for Vehicle-to-Home**
Break	
1:00 – 2:00	**Panel 2: equipment providers' solutions for Vehicle-to-Home**
2:00 – 2:20	**Public comments**
2:20 – 2:30	**Closing remarks & adjourn**

Opening Comments from **Spencer Reeder**

Director of the Fuels and Transportation Division

Vehicle-to-Home Background

California Clean Energy and Electrification Goals

100% NEW ZEV Sales by 2035

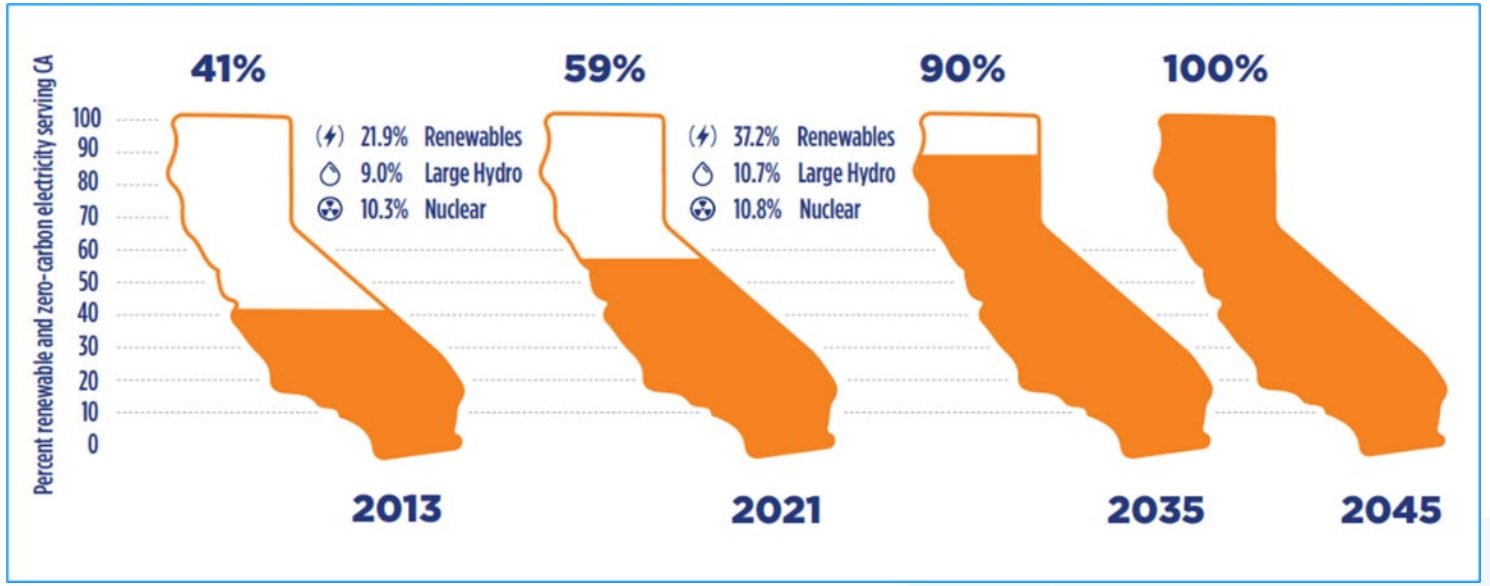
100 %
of in-state sales of new passenger cars and trucks will be zero-emission by 2035.

100%
of medium- and heavy-duty vehicles in the State will be zero-emission by 2045 and by 2035 for drayage trucks.

100%
of off-road vehicles and equipment will be zero-emission by 2035.

Source: www.business.ca.gov per EO N-79-20 (reaffirmed in 2025)

100% CLEAN ELECTRICITY BY 2045



Source: California's Clean Energy Transition Plan, May 2023

Fuels & Transportation Division Workstreams

Key policies to support EV adoption

- **Assess EV charging infrastructure needs**
- **Support EV charging infrastructure deployment**
- **Improving the Driver Experience**
- **Enabling Vehicle-Grid Integration at Scale**

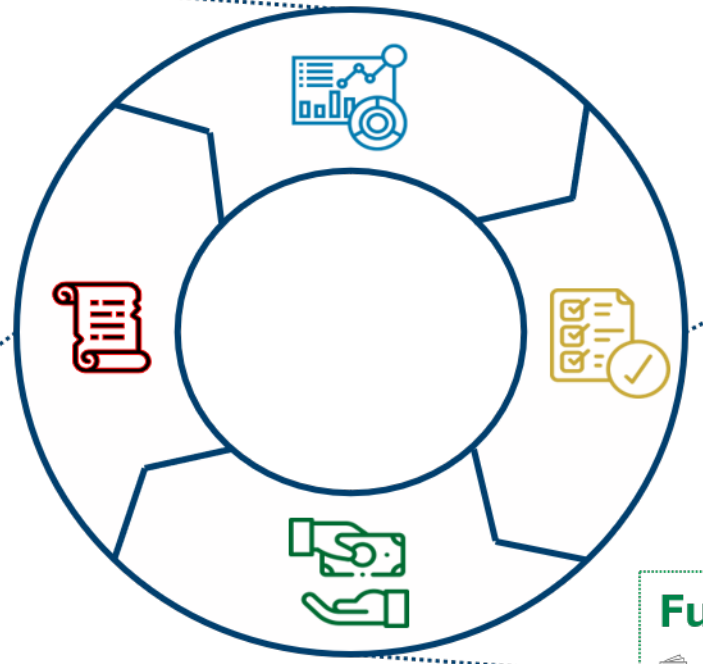
CEC Actions in Support of Scaling VGI

Modeling and Analysis

- AB 2127 Assessment
- IEPR Forecast
- Demand Flex Potential Modeling
- Bidirectional Charging White Paper

Regulatory Authority

- SB 59 Bidi-Capable Vehicles
- SB 49 Flexible Demand Appliance Standards
- Load Management Standards



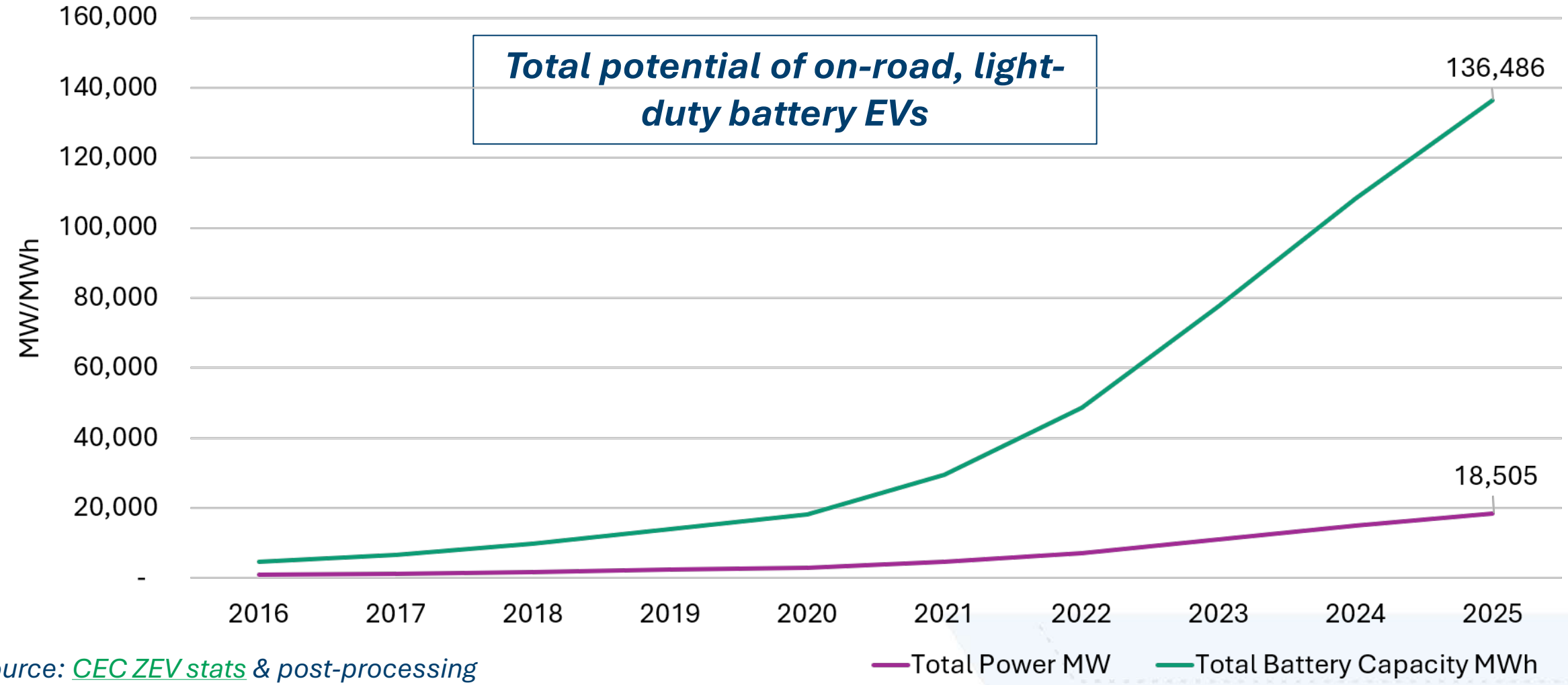
Technology Standardization

- Interoperability and Conformance Testing Labs
  - ViGIL
  - Charge Yard
- V2G Equipment List

Funding Programs

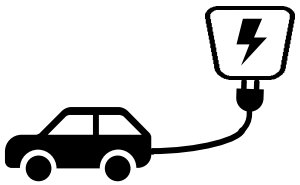
- REDWDS (Clean Transportation Program funds)
- EPIC (IOU ratepayer R&D funds)
- DSGS (Strategic Reliability Reserve Fund)

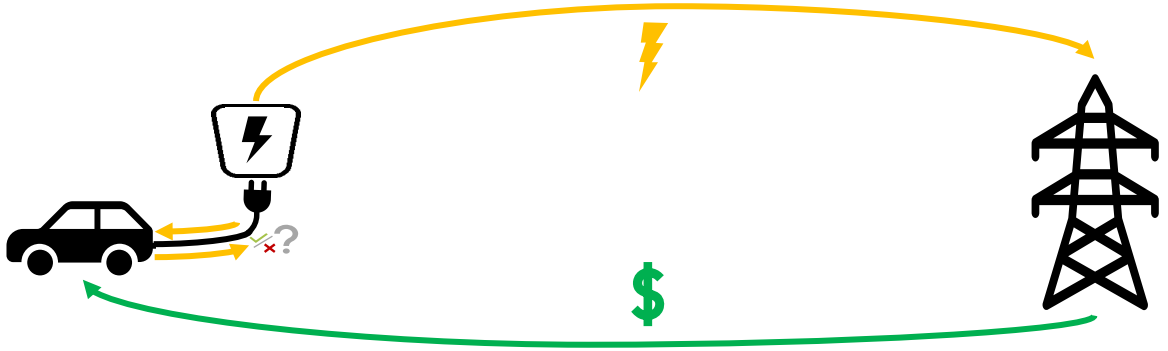
California's Electric Vehicles (EVs) are a Substantial Potential Energy Resource



Source: CEC ZEV stats & post-processing

Critical Barriers to Bidirectional Adoption





Emerging Product Offering	Interconnection	Revenue Opportunities
How do vehicle owners unlock the capability?	Do utilities approve installation of bidirectional products?	Do vehicle owners and ratepayers have a value case?
DRIVER EXPERIENCE	**SAFETY**	**COSTS & BENEFITS**

Source: CEC - www.energy.ca.gov/filebrowser/download/9487?fid=9487

Vehicle-to-Home is a Valuable First Step

- CEC staff white paper outlines and models the potential benefits of vehicle-to-home adoption for drivers and the grid
- Industry momentum for V2H is growing

Vehicle-to-Home Potential in 2030		
Discharging during peak hours of 4 to 9 p.m.	**Grid Disconnected**	**Grid Connected**
EVs able to discharge at least once per week	2.3M (51.7% of EVs*)	2.36M (53% of EVs*)
Average total bill savings per EV (June to September – TOU rates)	$262**	$321**
Max grid load reduction (% residential load)	**4.1 GW** (9.4%)	**5 GW** (11.6%)

Source: CEC and NLR

**based on 4.5M EVs in 2030*
***based on existing TOU rates*

CEC Efforts to Advance V2H

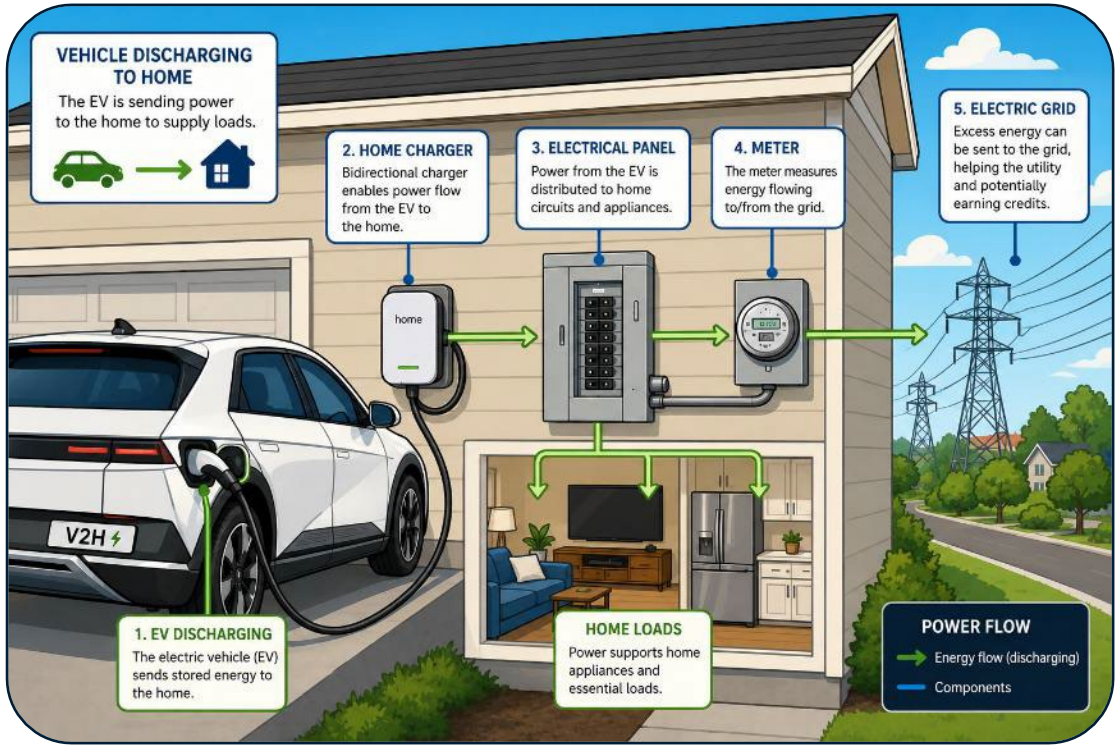
- Near term CEC actions advancing Vehicle-to-Home implementation:
  - Bidirectional deployments in REDWDS
  - Capital Charge Yard launch
  - V2G Equipment list update

- **Looking to broaden stakeholder engagement**
- **Focus on driver experience**
  - **Addressing practical implementation and interoperability issues**

Broad Definition of Vehicle-to-Home

"When the vehicle discharge happens at home"

- Different discharge methods
  - AC or DC
- Different grid topologies and use cases
  - Grid isolated (grid forming)
  - Grid parallel (grid forming or following)
    - Non-export
    - Export
- Different end-user contexts
  - EV as sole generator
  - EV used in conjunction with other DERs



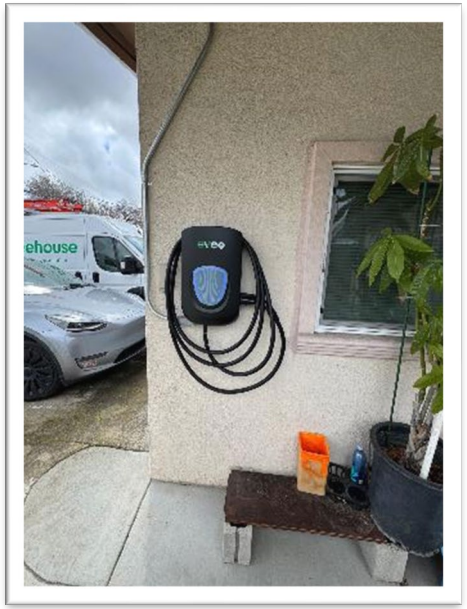
Source: AI generated image

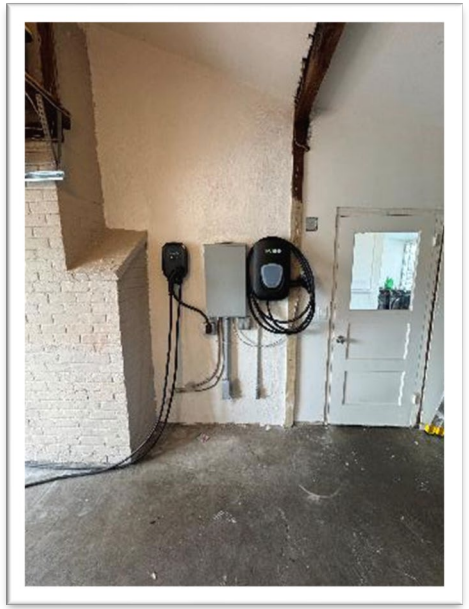
Feedback and Lessons Learned from REDWDS

REDWDS Overview

Responsive, Easy Charging Products with Dynamic Signals

- **CEC grant solicitation** released in March 2023, agreements executed in 2024
- **Purpose:** deploy vehicle-grid integration (VGI) at scale and demonstrate dynamic rate benefits
  - Deploys smart and bidirectional chargers across light-, medium-, and heavy-duty vehicles
  - Dynamic rates save drivers money, improve grid reliability, and reduce emissions
- **Ten projects were awarded, including 4 with bidirectional deployments**







REDWDS Presenters



Frances Bell
CEO



Daniel Fletcher
Chief Business Officer

BIDIRECTIONAL ENERGY

dcbel

Questions and Answers – Panel 1

Two ways to ask questions:

Please state your name and affiliation. Keep questions under 3 minutes to allow time for others.

1. **Use the raise hand function in Zoom**
   Zoom Phone Controls:
   - *6 – Toggle mute/unmute
   - *9 – Raise hand
2. **Type questions in the Zoom Q&A Box**

Panel 1: Automaker Solutions for V2H

Panel Presentation – EV Manufacturers



Alex Pawlowski
Regulatory Strategy Manager



Ethan Sprague
Head of Sales



Emily Lederman
Staff Product Launch Manager



Tony Reinhart
Director of Government Affairs



Maddy Strutner
Grid Services Manager

Webinar Overview - Break

10:00 – 10:05	**Welcome and opening remarks**
10:05 – 10:10	**Opening comments from FTD Director Spencer Reeder**
10:10 – 10:25	**CEC background on Vehicle-to-Home**
10:25 – 10:55	**Feedback and lessons learned from REDWDS program**
10:55 – 12:15	**Panel 1: automakers' solutions for Vehicle-to-Home**
BREAK	
1:00 – 2:00	**Panel 2: equipment providers' solutions for Vehicle-to-Home**
2:00 – 2:20	**Public comments**
2:20 – 2:30	**Closing remarks & adjourn**



Enabling Bidirectional EV Charging at Home (V2H)

Lunch Break

WEBINAR WILL RESUME AT 1:00PM

Webinar Overview - Resume

10:00 – 10:05	**Welcome and opening remarks**
10:05 – 10:10	**Opening comments from FTD Director Spencer Reeder**
10:10 – 10:25	**CEC background on Vehicle-to-Home**
10:25 – 10:55	**Feedback and lessons learned from REDWDS program**
10:55 – 12:15	**Panel 1: automakers' solutions for Vehicle-to-Home**
Break	
1:00 – 2:00	**Panel 2: equipment providers' solutions for Vehicle-to-Home**
2:00 – 2:20	**Public comments**
2:20 – 2:30	**Closing remarks & adjourn**

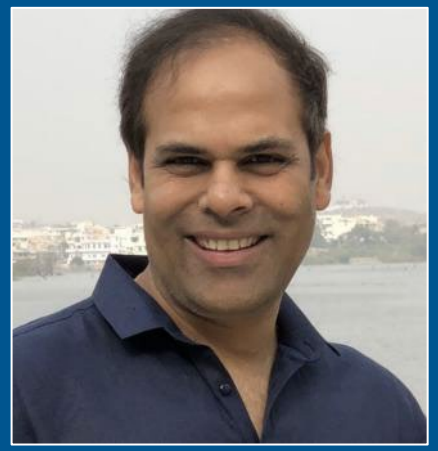
Panel 2: Equipment Providers' Solutions for V2H

Panel Presentation – Equipment Manufacturers



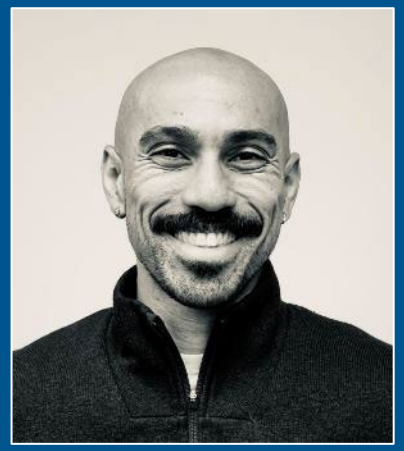
Chris Taylor
Hardware Product Manager

emporía



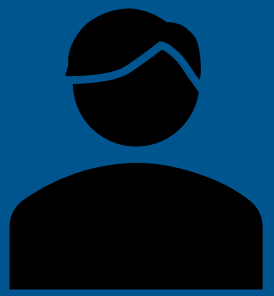
Jayant Somani
Senior VP of Digital Business Unit

ENPHASE



Rey Holmes
VP of Product

SPAN



Ronald Harris
Program Manager
Solar & EV Deployment

wallbox

Questions and Answers – Panel 2

Two ways to ask questions:

Please state your name and affiliation. Keep questions under 3 minutes to allow time for others.

1. **Use the raise hand function in Zoom**
   Zoom Phone Controls:
   - *6 – Toggle mute/unmute
   - *9 – Raise hand
2. **Type questions in the Zoom Q&A Box**

Public Comments

Public Comment Guidelines

Please state your name and affiliation

Keep your comment under 2 minutes to allow time for others.

- **Use the raise hand function in Zoom**
  Zoom Phone Controls:
  - *6 – Toggle mute/unmute
  - *9 – Raise hand

CEC Prompts for additional Public Comments

1. What other aspects and perspectives of V2H were not addressed today?
2. What role should the CEC play and what action should it take on V2H?
3. What other segments (e.g. school buses, medium- and heavy-duty, public charging, multi-family) should the CEC prioritize in its bidirectional charging work?
4. What would you like to hear and see in a future webinar on bidirectional charging?

Submitting Public Comments

- **The CEC encourages the use of its electronic commenting system**. Visit the e-commenting page for docket number 22-EVI-06 at Link to the CEC commenting page for the docket 22-EVI-06

- **Alternatively, Comments may be emailed to the Docket Unit at:** docket@energy.ca.gov Include docket number 22-EVI-06 and Vehicle-to-Home in the subject line

- Deadline to submit Comments: Friday, **December 4**, 2026, 5:00 p.m. PST

Thank You!

Comments due December 4, 2026, by 5:00 p.m.

Diving Deeper

- **EV Driver Experience webpage**: https://www.energy.ca.gov/programs-and-topics/topics/transportation/improving-electric-vehicle-driver-experience
- **Charge Yard:** GFO-24-609 - Charging Interoperability and Collaboration Yard ("Charge Yard")
- **V2G Equipment List :** URL to V2G equipment list
- **A Roadmap to Unlocking the Benefits of Bidirectional Charging white paper**: URL to bidirectional white paper
- **Interoperability Statement:** URL to Interoperability Statement