DOCKETED	
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Submission Date:	10/12/2021 4:32:15 PM
Docketed Date:	10/12/2021

Joint Agency Workshop:
Accelerating Electric Vehicle Charging Infrastructure Deployment and Grid Integration

Workshop will begin shortly.

WELCOME!

Joint Agency Workshop:
Accelerating Electric Vehicle Charging Infrastructure Deployment and Grid Integration

It's Zoom Poll Time!

Workshop Agenda

9:30 am	Open Workshop, Housekeeping, and Zoom Poll
9:35 am	Welcome by CEC Commissioner Monahan and CPUC Commissioner Rechtschaffen
9:50 am	Opening Remarks, Hannon Rasool, CEC
10:00 am	Panel 1: Local Permitting for EVSE Installations
11:15 am	Panel 2: Rate Structures for Public EV Charging
12:30 pm	*Lunch Break*
1:30 pm	Panel 3: Opportunities for Accelerating EVSE Interconnection and EV Grid Integration
3:15 pm	Public Comment
3:30 pm	Adjourn

Panel 1
Local Permitting for Electric Vehicle Supply Equipment Installations

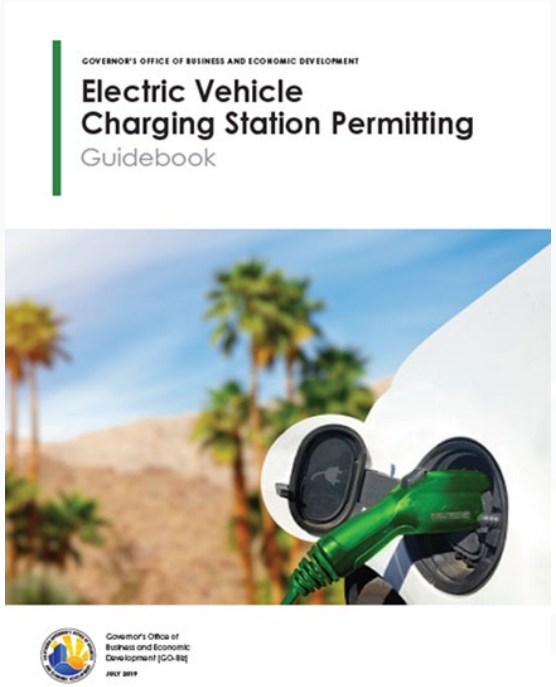
Moderator: Tyson Eckerle, Governor's Office of Business and Economic Development (GO-Biz)

Panelists:

- Tessa Sanchez, Tesla
- Jeff Hoyos, San Diego Association of Governments
- Jennifer Venema, City of Sacramento
- Paul Francis, Keep It Green Tech (KIGT)

EVCS Permit Streamlining Panel

Joint Workshop

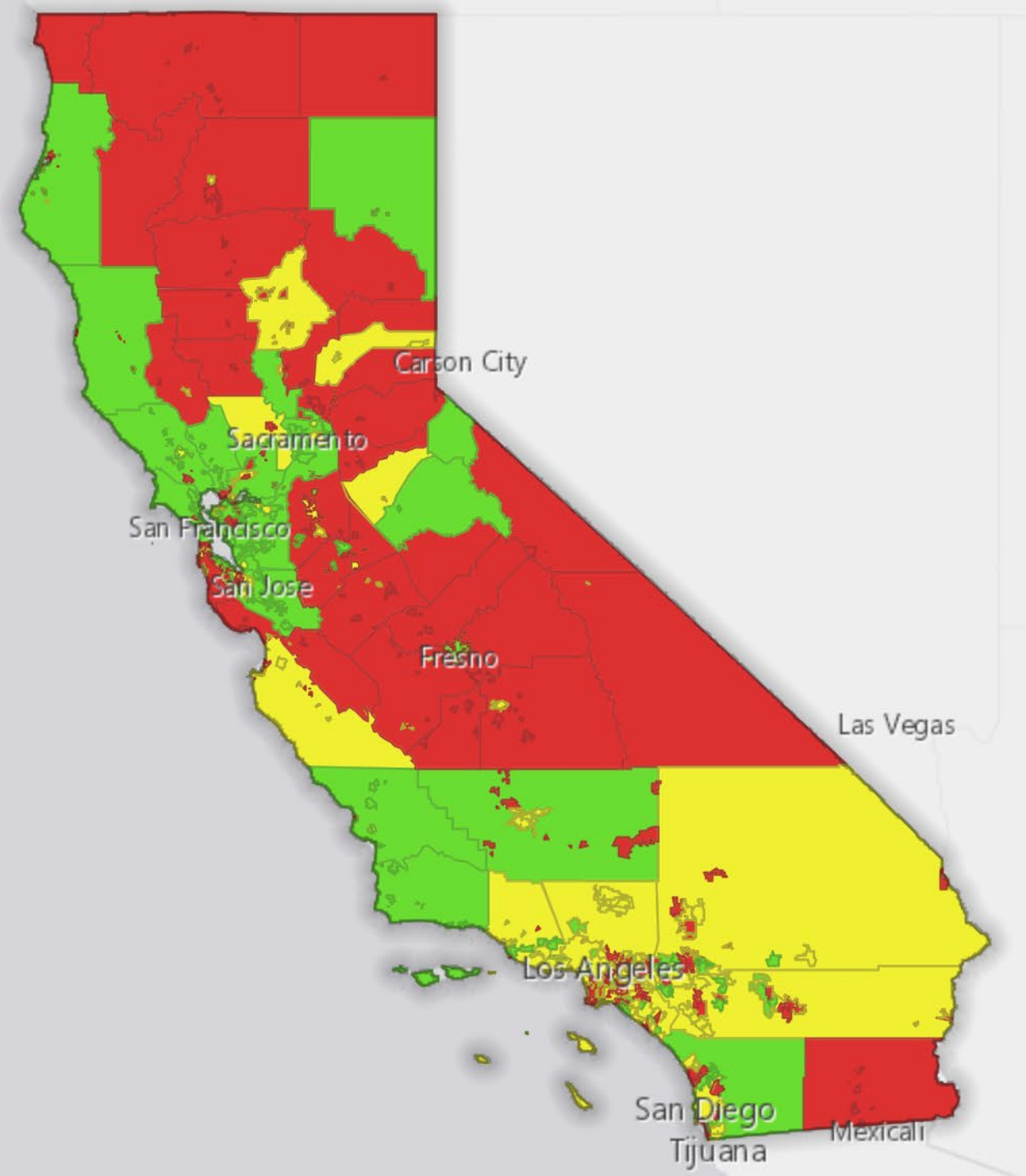


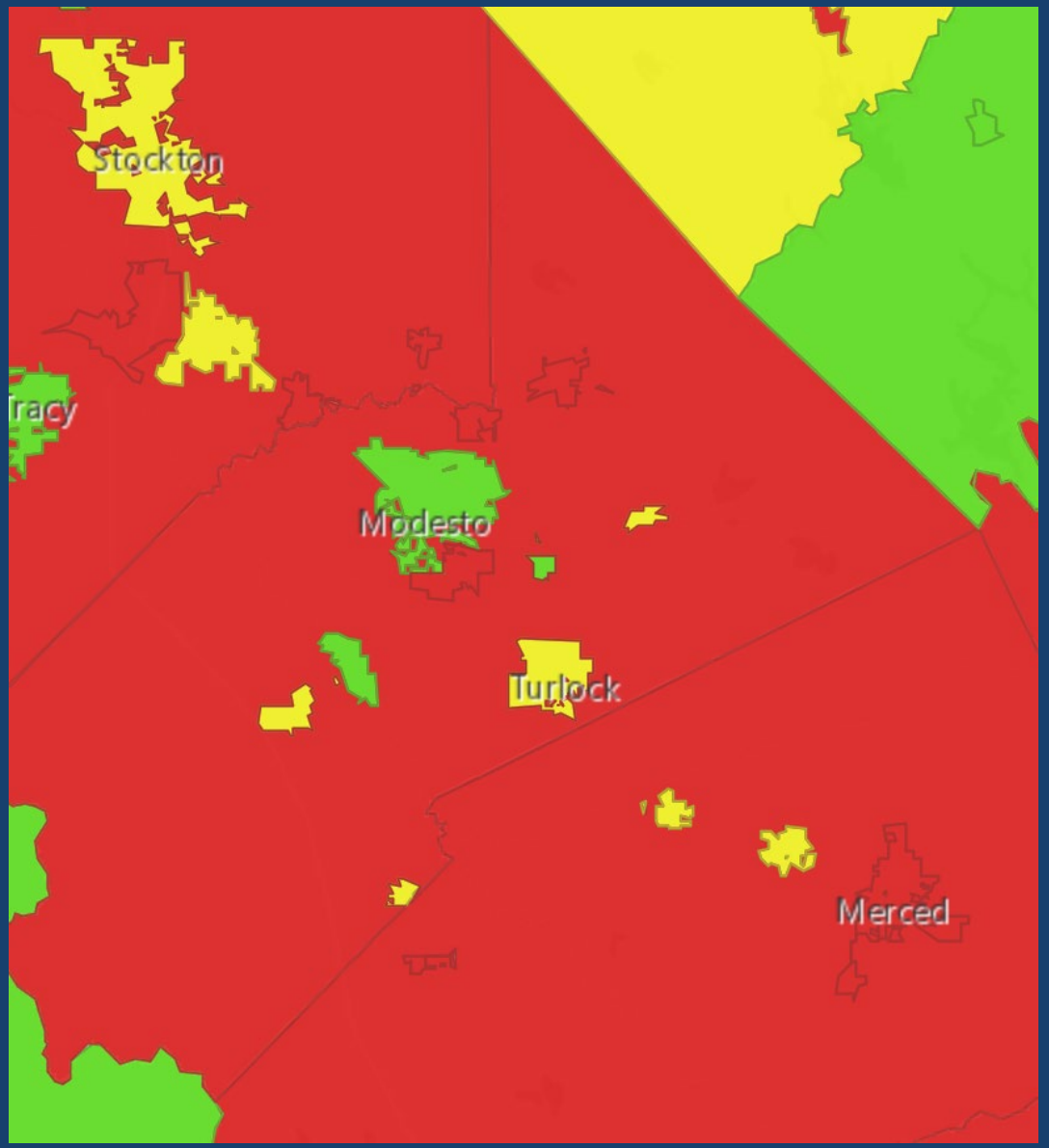
October 12, 2021

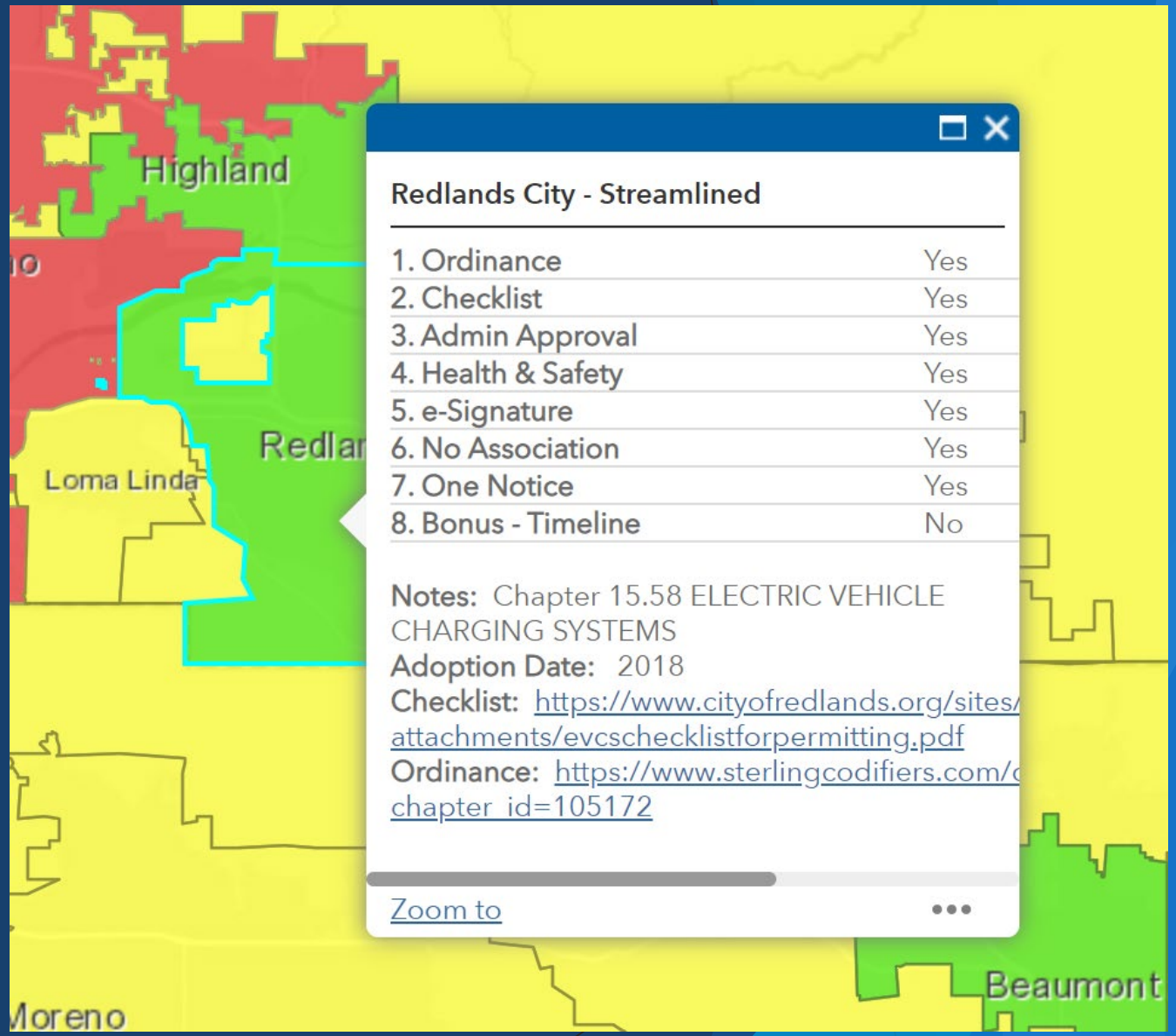
CA Electric Vehicle Charging Station Permit Streamlining Map

*Interactive map available here

EVCS Permit Ready Score:
Green – City or County is EVCS Permit Ready, charging infrastructure permitting is streamlined
Yellow – City or County EVCS permit streamlining is in progress, or partially complete
Red – City or County is **not** streamlined for EVCS permitting





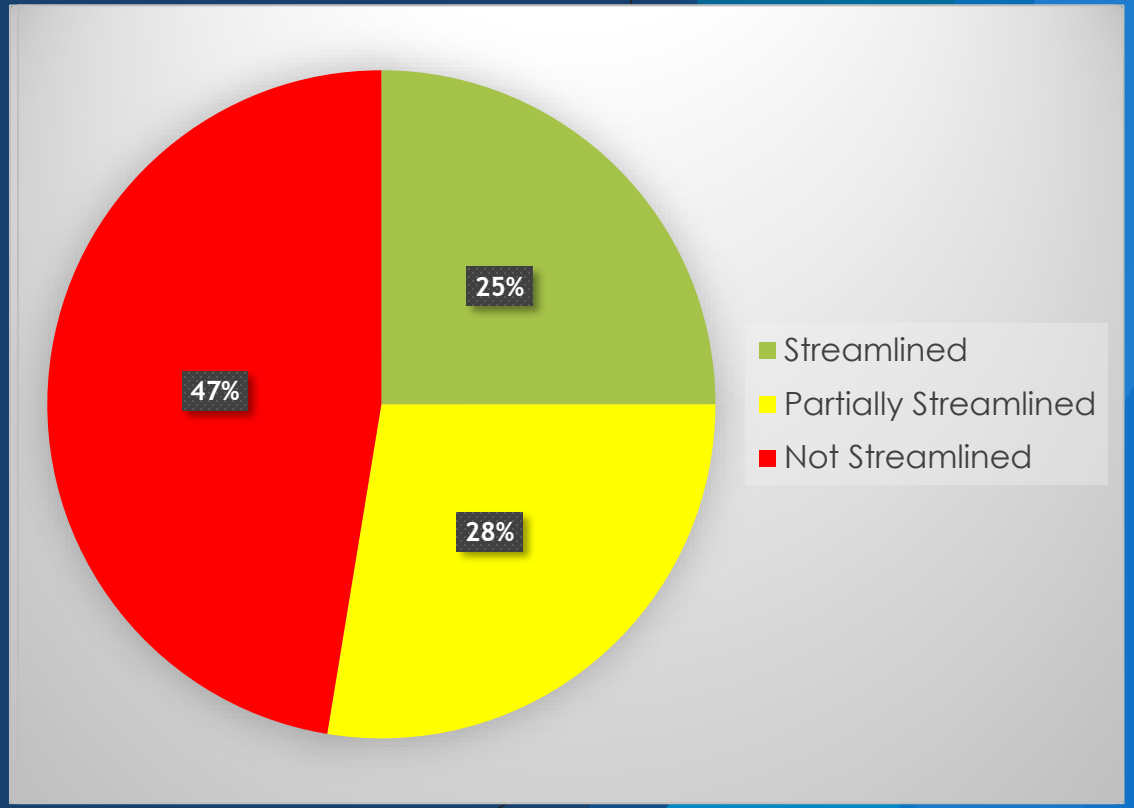


*See https://business.ca.gov/industries/zero-emission-vehicles/plug-in-readiness/ for updated map

Status of the State as of 10/11/21
- Cities and counties

- **Streamlined - 135**
- **Streaming in Progress - 149**
- **Not Streamlined – 256**

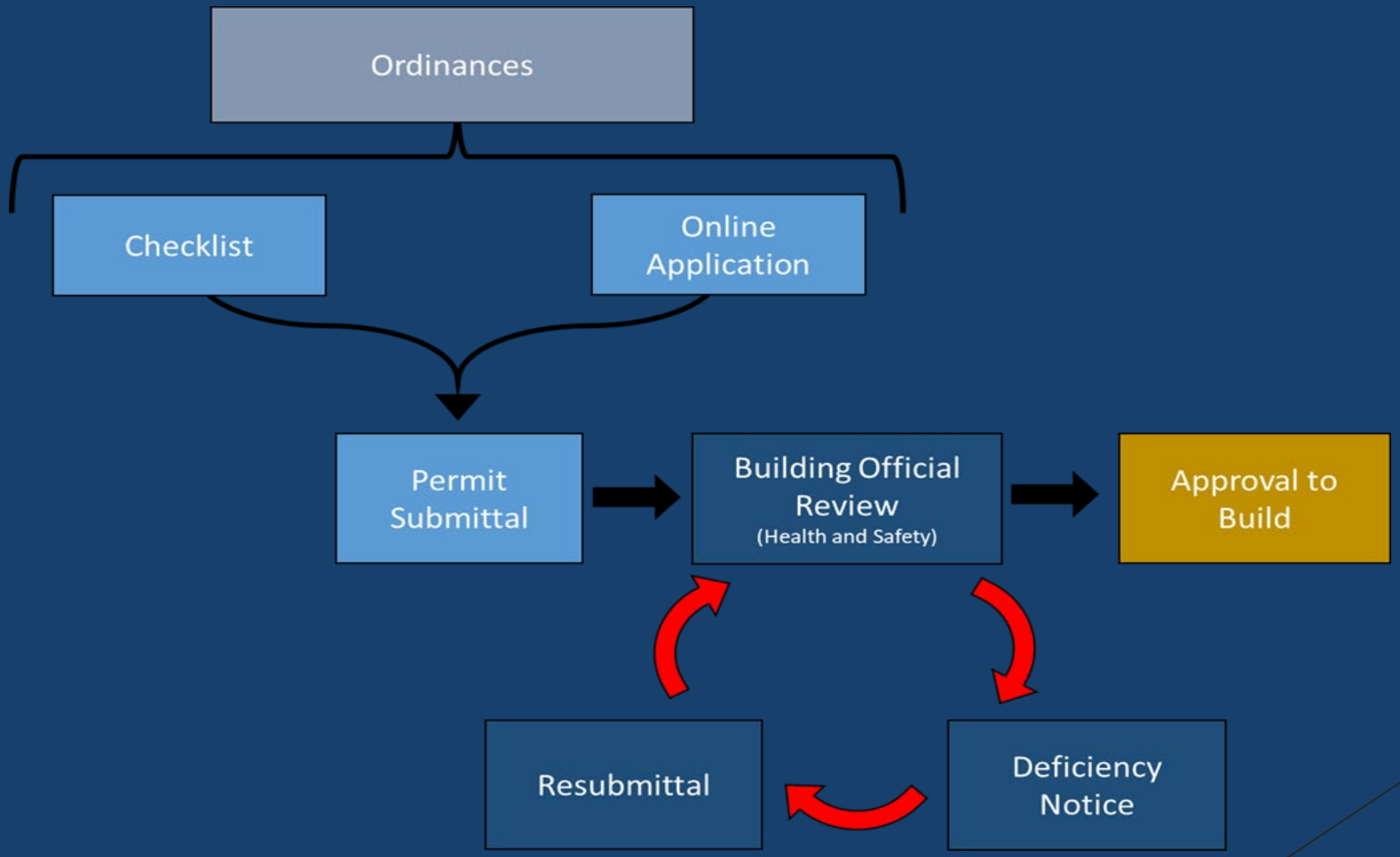
Only 25% of California has streamlined its EVCS permitting



- *71 cities or counties have improved their grade through outreach*

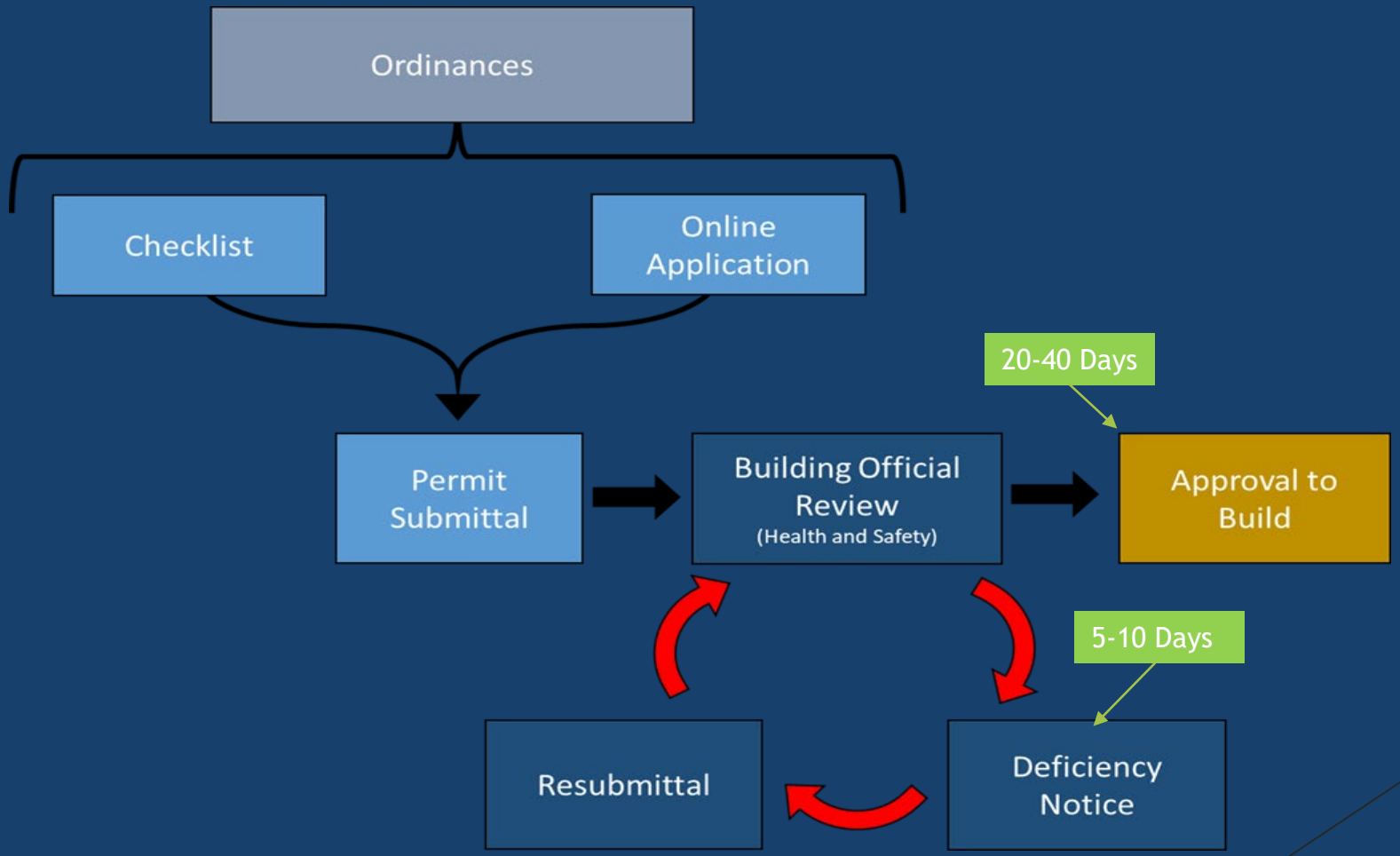
Permitting

- Assembly Bill 1236 Permit Streamlining Law



Permitting

- Assembly Bill 1236 Permit Streamlining Law (2015)
- **Plus AB 970 (2021)**



AB 970 Considerations

- Parking = non-issue
  - If EV Charging Stations & Support Equipment take place of parking spaces, city/county is required to reduce the number of required parking spaces.
- Shorter timeframes (5 days to deem application incomplete/complete, 20 days for approval to build) for projects with 25 or fewer chargers
- Longer timeframes for projects larger than 25 chargers (10 days to deem incomplete/complete; 40 days for approval to build)
- Jan 1, 2022 for large cities/counties; Jan 1, 2023 for cities/counties below 200,000 residents.

Panel 2
Rate Structures for Public Electric Vehicle Charging

Moderator: Commissioner Cliff Rechtschaffen, California Public Utilities Commission (CPUC)

Panelists:

- Sara Rafalson, EVgo
- Jeni Reynolds, San Diego Gas & Electric
- Bill Boyce, Sacramento Municipal Utility District
- Mike Campbell, California Public Advocates Office
- Terry Travis, EVNoire

CEC Workshop

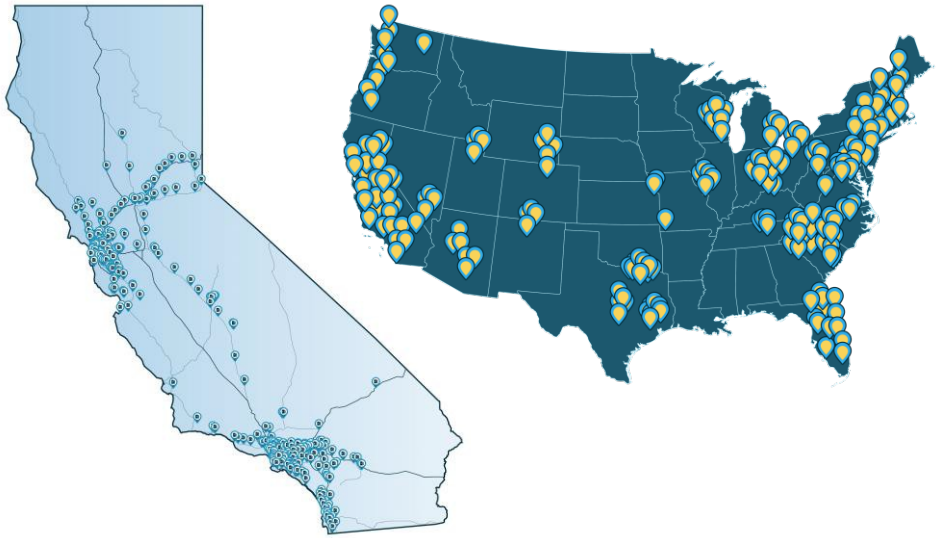
Sara Rafalson |VP, Market Development & Public Policy

October 12, 2021

America's Largest Public Fast Charging Network

EVgo

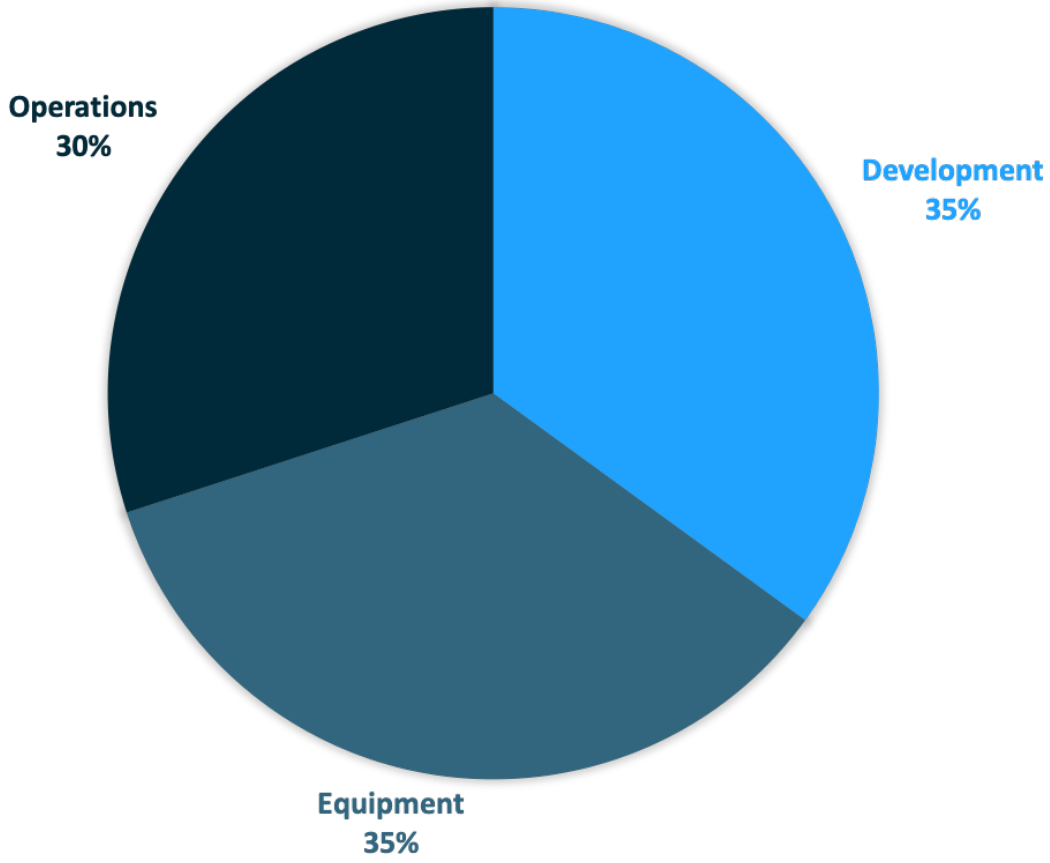
Develop | Finance | Own | Operate



- **We build, own, & operate the nation's largest network of public DC fast chargers**
- **80% of Californians live within a 15 minute drive of an EVgo charger**
- **300,000+ customer accounts**
- **Over 800 fast charging locations nationwide**
- **Best in class industry uptime and reliability**
- **Over 300 Locations in California**

EVgo FAST CHARGING

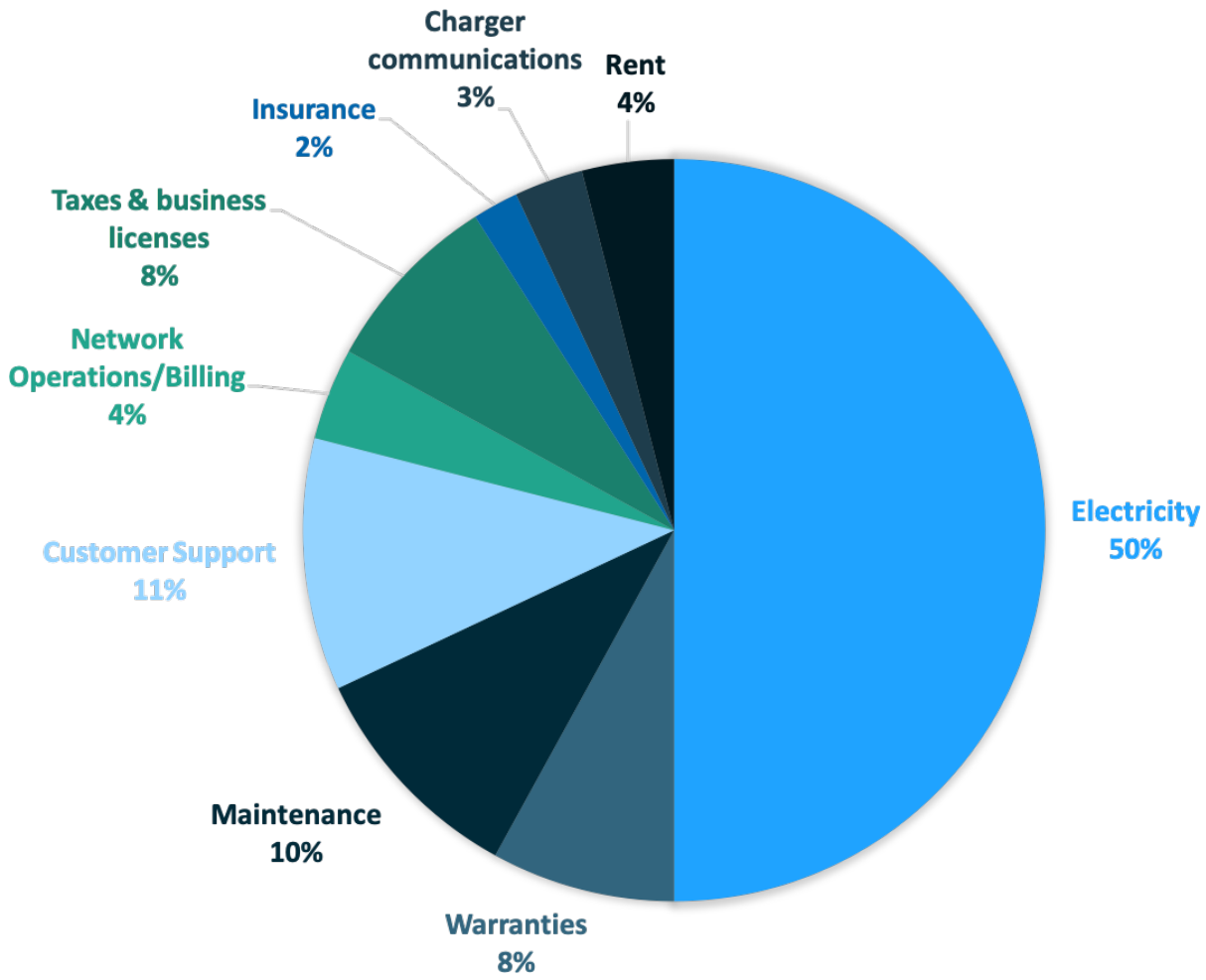
DCFC Cost Stack: Major Cost Categories



1. Equipment Costs (35%)	2. Development Costs (35%)	3. Operations Costs (30%)
Charger Hardware	Network Design	Electricity / RECs
Utility Interconnect (e.g. switchgear, conduit)	Site Development	Rent
Software	Legal Contracts	Warranties
Credit Card Reader	Site Surveys	Maintenance
Communications Hardware	Engineering	Charger Communications
Wheel Stops	Utility Review	Customer Care/Call Center
Signage	Permitting	Network Operations / Billing
Security	Construction (e.g. boring, trenching)	Taxes & Business Licenses
Additional Technology Tools	Bollards, pads, & ADA	Insurance
Utility Service Upgrade	Project Management	Web/App/Digital Services
		Reporting

EVgo FAST CHARGING

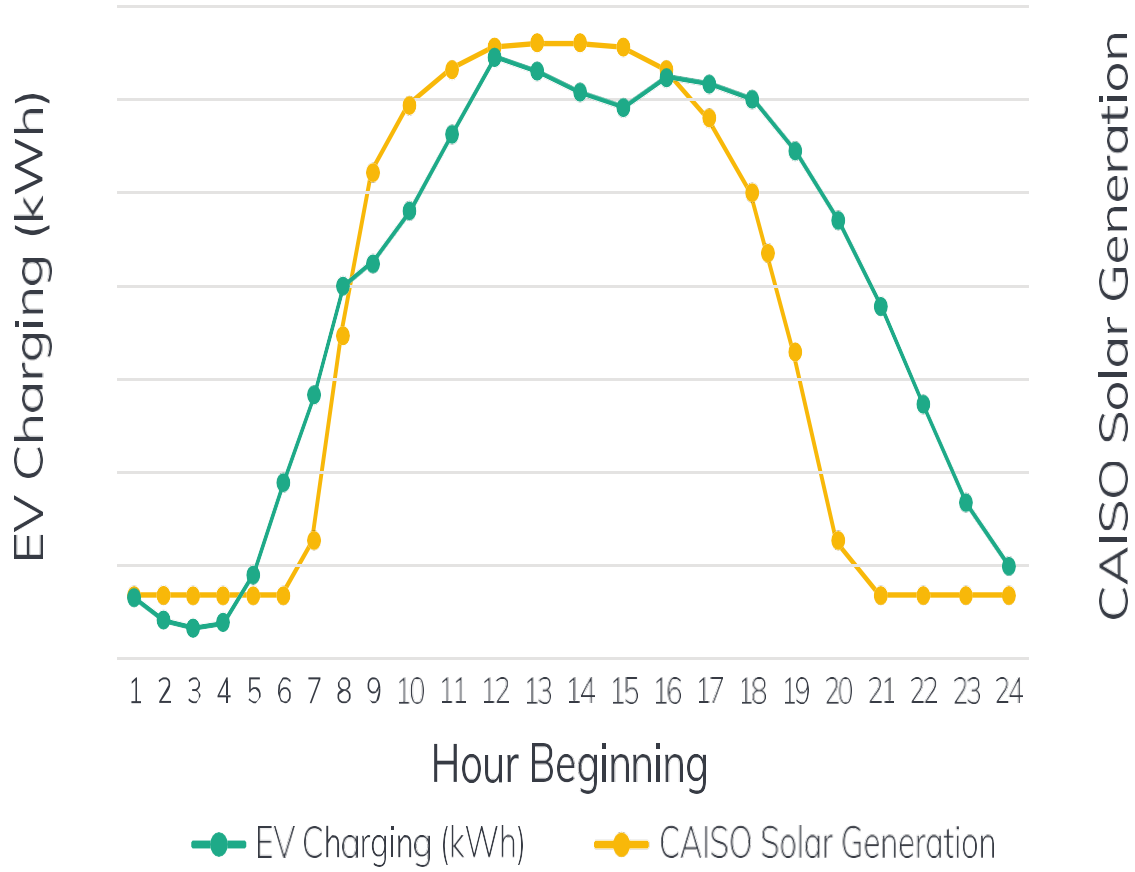
DCFC Cost Stack: Operating Costs



3. Operating Costs (30%)
Electricity / RECs
Rent
Warranties
Maintenance
Charger Communications
Customer Care/Call Center
Network Operations/Billing
Taxes & Business Licenses
Insurance
Web/App/Digital Services
Reporting

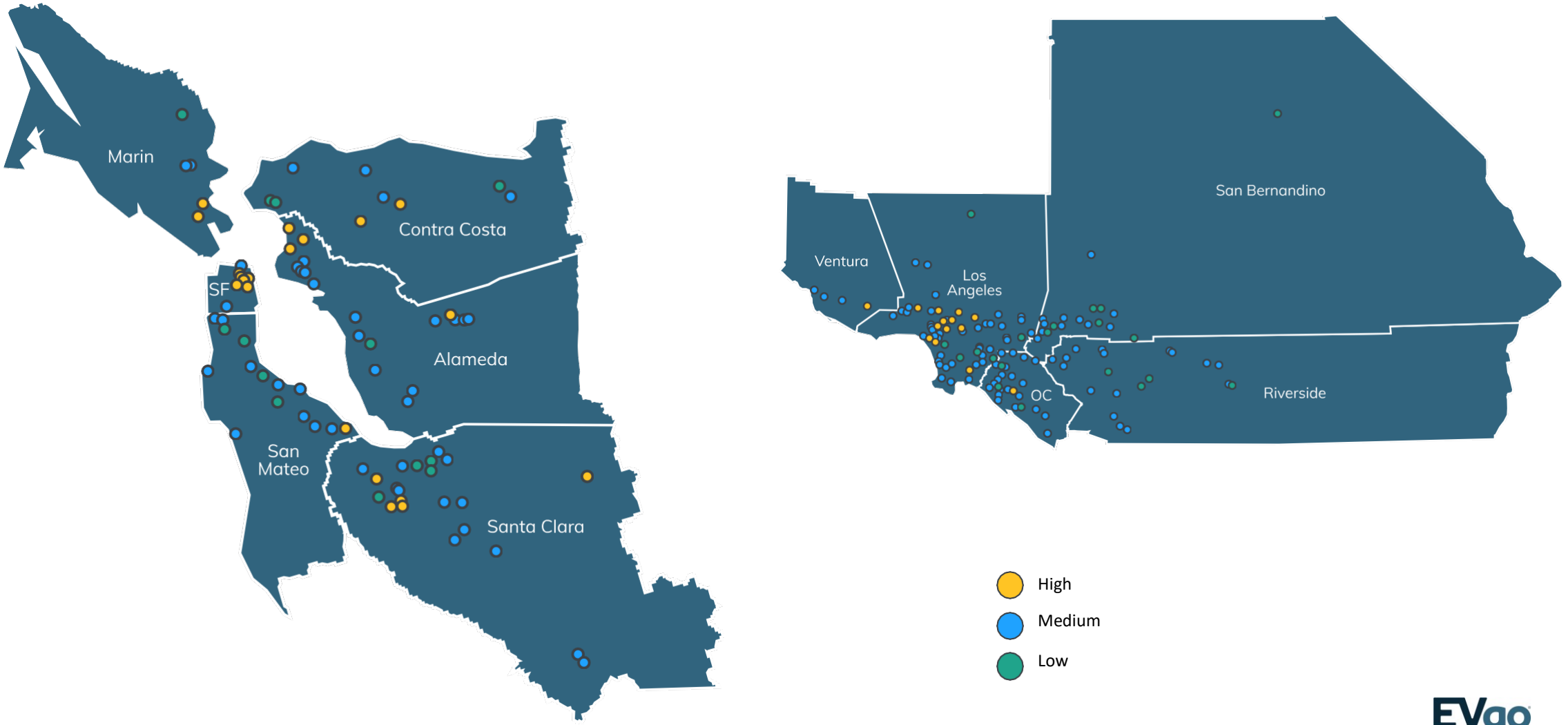
EVgo FAST CHARGING

New Pricing Pilot: TOU



EVgo FAST CHARGING

New Pricing Pilot: Location-based



EVgo FAST CHARGING

CA Rate Design: The Next Frontier

- POUs
  - SB 437:
    - "**details of the utility's electrical service rate design that support transportation electrification**, and existing or planned incentives to support transportation electrification, including rebates. The rate design shall include details for all applicable transportation sectors, including, but not limited to, on-road and off-road vehicles in the light-, medium-, and heavy-duty sectors."
- Technology Neutral Low Load Factor Rates

EVgo FAST CHARGING

Sacramento Municipal Utility District Commercial EV Rates History

Bill Boyce

October 12, 2021

Powering forward. Together.

SMUD™

Cost recovery scales for different factors

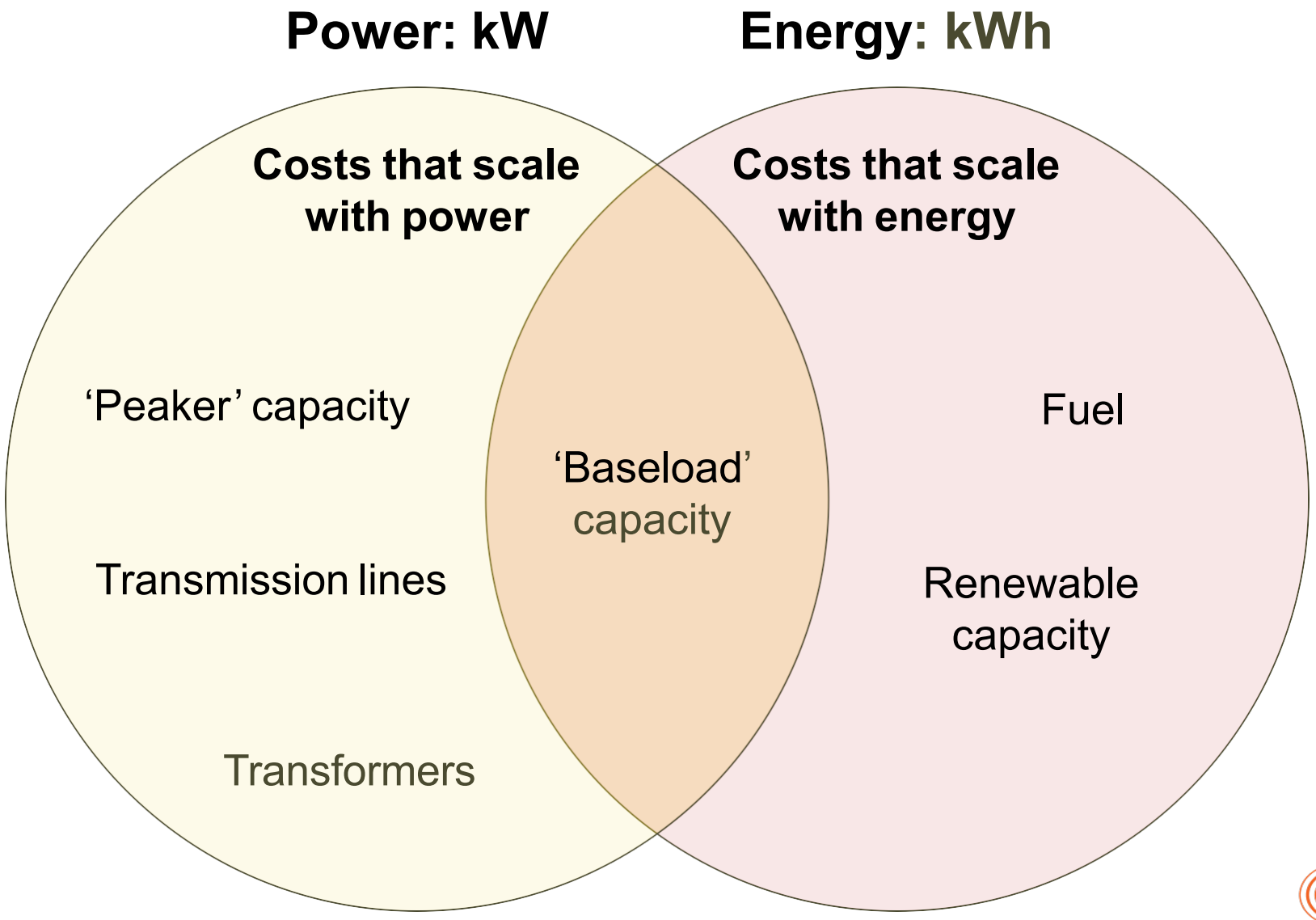


Chart courtesy of the Electric Power Research Institute (7-2014 ARB Workshop)

SMUD™

Total electricity bill changes with utilization

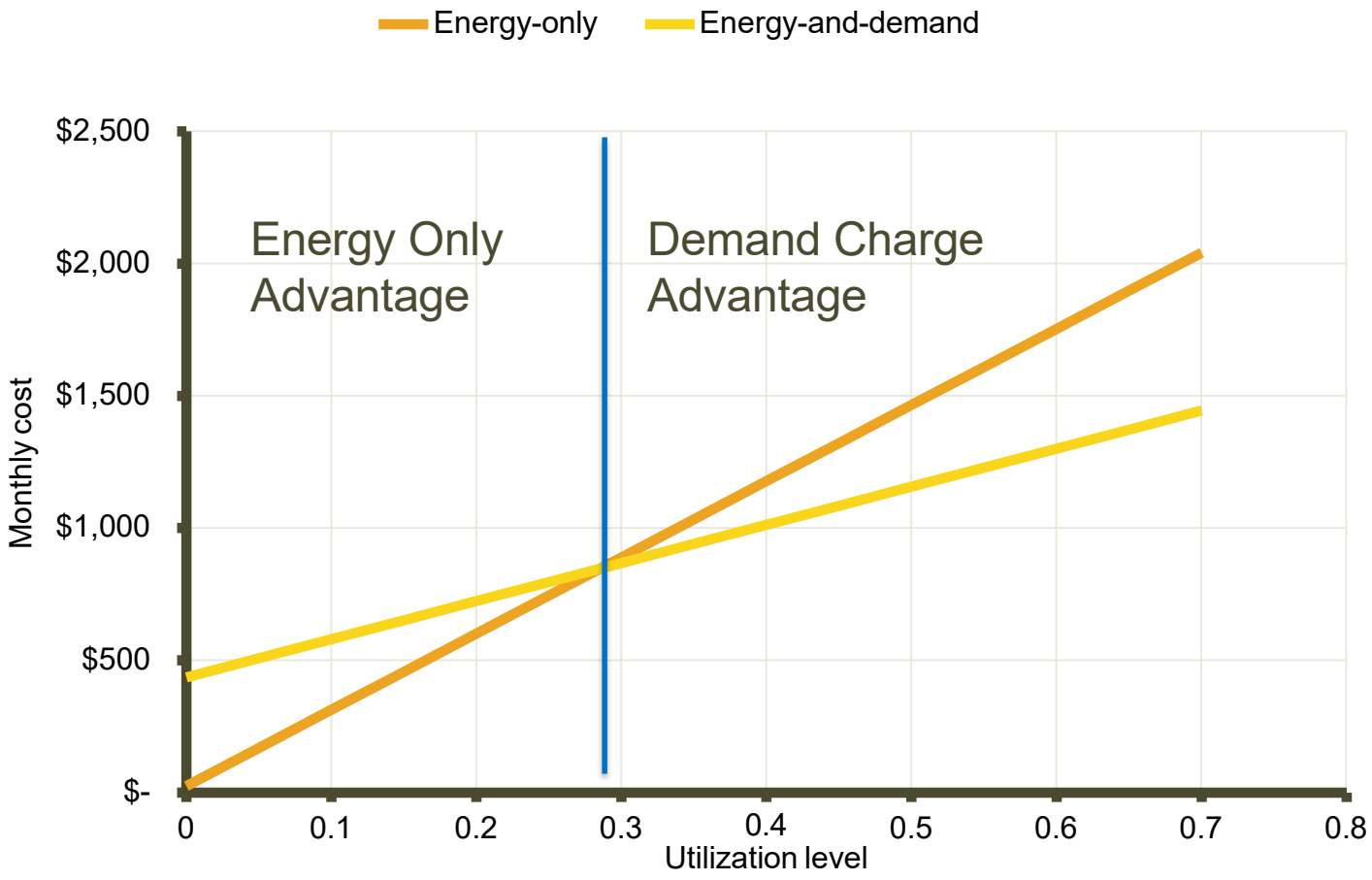


Chart courtesy of the Electric Power Research Institute (7-2014 ARB Workshop)

SMUD™

SMUD EV Rates/Programs developed to address demand charges

- Commercial Rate loophole for uses less than 7300kWh/month
  No demand charges

- $0.2117 Pilot Flat EV rate on demands up to 299kW (discontinued)
  No demand charges

- Storage Shares Program uses energy storage to address demand charge exposure (SMUD capitalizes the storage battery, customer gets benefits as if they own the battery themselves).

- New pilot Commercial EV rate being considered that varies demand and energy rate elements according to utilization level

SMUD™

Lunch Break

The Joint Agency EVSE Workshop will resume at 1:30 PM

Panel 3
Opportunities for Accelerating Electric Vehicle Service Equipment Interconnection and Electric Vehicle Grid Integration

Moderator: Delphine Hou, California Independent System Operator (CAISO)

Panelists:

- Ed Pike, CPUC
- Arielle Romero Cox, Silicon Valley Power
- Jacqueline Piero, Nuvve
- Matthew Nelson, Electrify America
- David McCreadie, Ford

VGI and Rule 21 Interconnection Overview

October 12, 2021

Ed Pike, P.E.

California Public Utilities Commission

Overview

- Rule 21 and Interconnection
- Senate Bill 676/ Vehicle-Grid Integration Decision
- Related effort

Rule 21 Interconnection Status

- Generator Interconnection Pathway established for Vehicle-2-Grid
  - DC coupled EVSEs containing a compliant inverter can utilize the standard interconnection process as of September 2020 (Decision 20-09-035)
  - AC coupled EVSEs can interconnect within pilots

  - Seeking comments on draft CPUC Resolution E-5165 - would address pilots for AC coupled EVs that export; provide coordination between Load and Generation Interconnection Processes
  - Specifies protection required and process for requesting additional AC interconnection pilots
  - DC projects initially connected as load-only can go through the Rule 21 interconnection process for permission to enable bidirectional operation
  - Directs coordination of load and generation interconnection processes
  - Comments due on October 20, 2021

Decision 20-12-029 (VGI and SB 676)

- SB 676 (Bradford, 2019) requires the Commission to establish strategies and quantifiable metrics to maximize the use of feasible and cost-effective EV integration into the electrical grid by January 1, 2030.

- CPUC Decision Issued December 2020

- Long term strategies such as (Decision Section 5) :
  - Bidirectional charging; avoiding distribution grid upgrades; considering strategies to provide credit for export; interconnection; other technical standards
  - Not tied to specific action items
- Near-term action item such as (Decision Section 6):
  - VGI pilots
  - Use of Automatic Load Management to avoid electrical system upgrades

VGI Pilots

- PG&E and SCE July 15, 2021 Advice Letters propose seven VGI pilots with a total budget of ~ $28 million
  - Overcome practical barriers to deployment of demonstrated technologies
  - PG&E: focus on residential and commercial vehicles/ EVSE that support export capabilities
  - SCE: focus on managing one-way charging for demand response

Pilot proposals are currently under review by the CPUC.

Example of Related Efforts

- Summer Reliability (R20-11-003) August 16, 2021 Staff Concepts Paper
  - Includes proposed “VGI aggregation”, including managing one-way charging and also export from vehicles
  - Still pending review and potential adoption by the CPUC

Appendix: Additional Details - IOU Proposed VGI Pilots

PG&E Proposed VGI Pilots

- PG&E Advice Letter 6259-E proposed residential and commercial "V2X" pilots
  - V2X = export power from EVs to buildings and/or the grid
  - PG&E proposes testing a variety of "use cases", including back-up power; providing grid services; participating in wholesale markets

- Proposed pilots would address a variety of barriers
  - Encourage technology deployment; integration between technologies/market actors; develop customer engagement strategies; develop utility IT systems; evaluate solutions to policy barriers

SCE Proposed VGI Pilots

- SCE Advice Letter 4542E focused on a passenger vehicle demand response pilot that would leverage telematics and other technologies
- SCE also proposed smaller pilots for commercial, government fleets

Public Joint CEC CPUC Commissioner Workshop: Accelerating Electric Vehicle Charging Infrastructure Deployment and Grid Integration

NUVVE

Who is Nuvve ?

- Our founders invented the concept of V2G at the University of Delaware in 1996
- Holds an International Patent Portfolio for V2G
- Nuvve Corp. has been in operation for 10 years, HQ in San Diego
- V2G Projects and Operations in multiple countries
- Longest V2G operation: 4.5 years of operation in Denmark
- Series A investors Dec 2017:
  - EDF Renewable Energy
  - Toyota Tsusho
- Joint Venture in Europe for commercial V2G
- Nuvve announced a SPAC merger in Nov 2020
- Nuvve is a public company and started trading on Nasdaq March 23rd 2021

V2G Operations

Awards:

There has been real progress:

- Reconciling dual nature of a V2G system: A true Multiple Use Application resource
- Confirming interconnection pathways in CA, New York, Delaware, Massachusetts, Illinois, Denmark, UK, Japan, and more
- Allowing V2G inclusion in transportation electrification programs
- Inclusion in ELRP
- Elsewhere in US/world, V2G value streams developing
- CEC's school bus program enabled design of production V2G models now being sold across the US
- FERC addressing V2G as DER

NUVVE

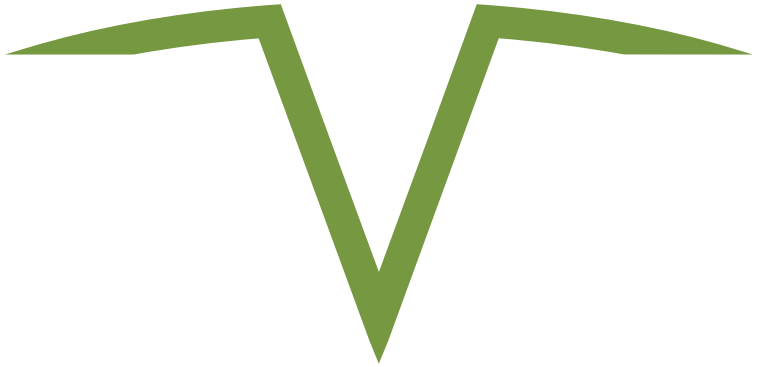
Accelerating interconnection of VGI and V2G

- Revision of SB350 and subsequent programs to enable VGI use cases
- Complete EV submetering protocol
- Develop single integrated process for R15/16 and R21 for V2G installation, energization, and interconnection
  - Draft resolution e-5165 addresses this! Thank you CPUC!!!
- CEC's Grid-Supportive Inverter List does not include V2G inverters
  - Appreciate REDS efforts to deal with this issue!
  - Question why this list needs to continue to exist at all
- **VGI means integrating EV policy with DER policy**: High DER, UNIDE, DER Action plan, microgrid, RA, MUA, should have EVs front and center

NUVVE

Thank You

Contact: Jackie@nuvve.com

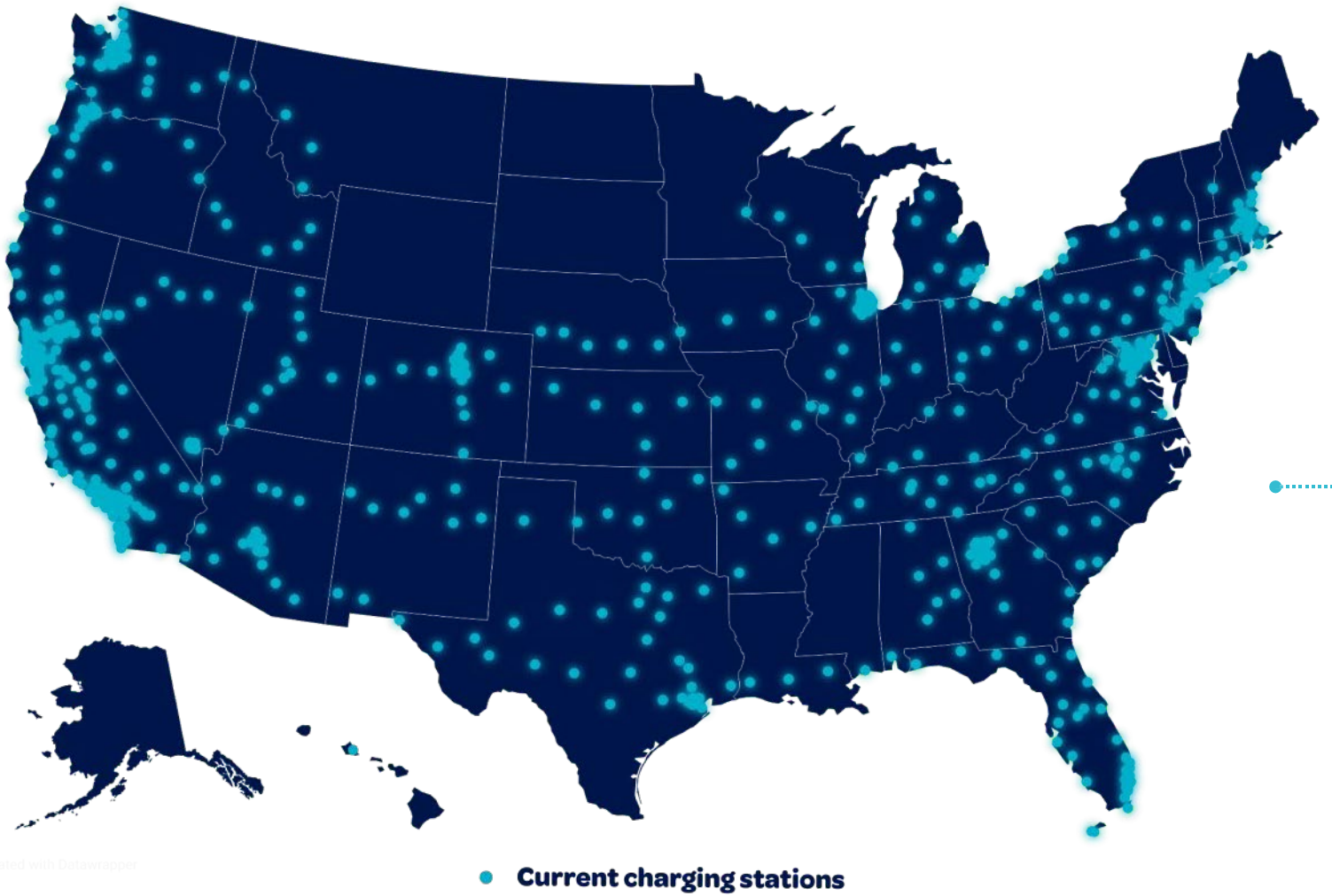


Electrify America Overview

CEC/CPUC Joint Agency EVSE Workshop
October 12, 2021

electrify america

Electrify America is the largest open ultra-fast network



NUMBER OF STATIONS

May 2018
1

Today
671

December 2021*
800

December 2025*
1,700

NUMBER OF CHARGERS

May 2018
4

Today
2,882

December 2021*
3,500

December 2025*
9,500

*Installed or Under Development

Electrify America builds customer-centric ultra-fast charging stations

End-Zone Site Layout

End-Zone

Side-by-Side

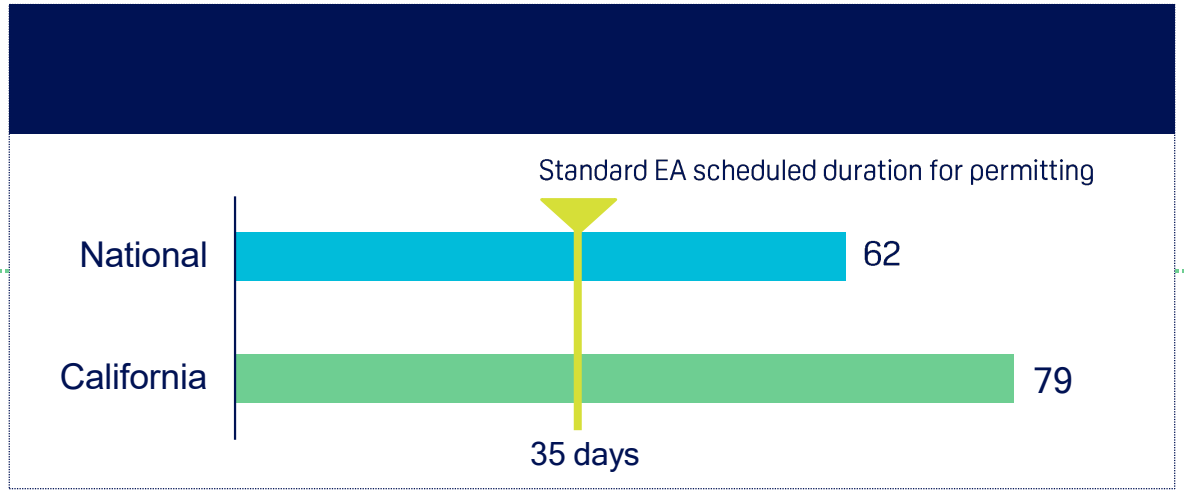
Understanding California's challenges is the key to tackling them

Remaining challenges in California include soft costs, permitting and utility interconnection timeframes

California Average Station Cost

34%

Higher than National

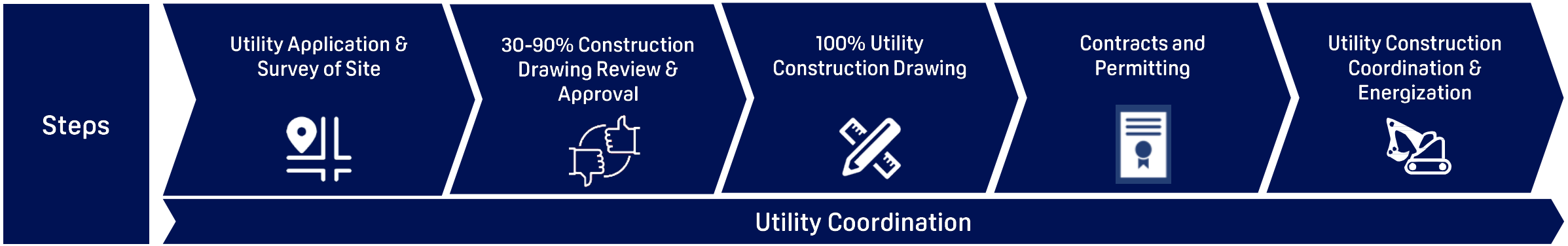


Average Utility Interconnection Timeframe

39

Weeks

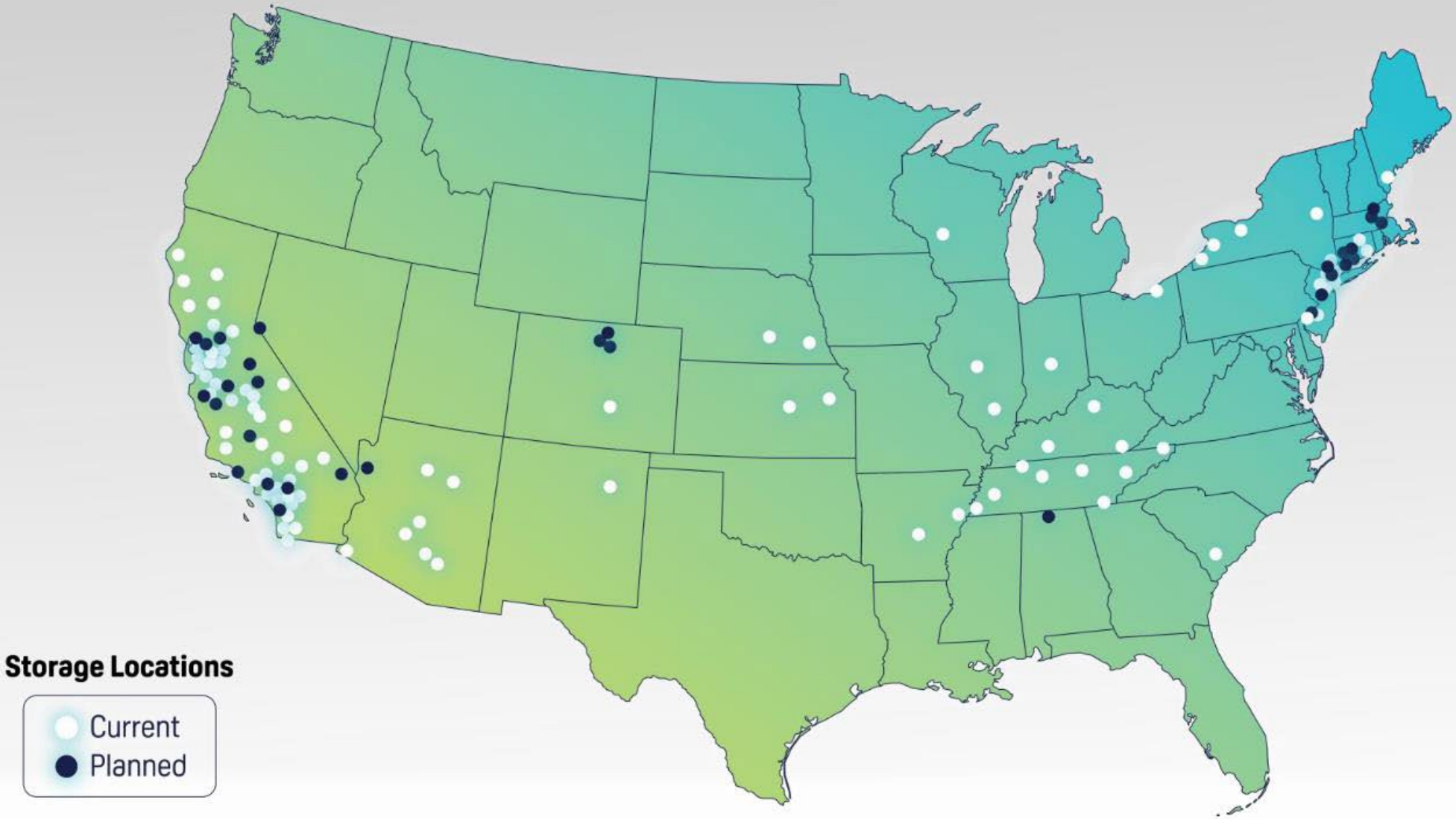
Reducing utility interconnection complexity and delays is crucial



To help speed deployment we hope that utility partners can provide

1. Single point of contact who understands EV charging company service requirements
2. Upfront validation to determine feeder capacity issues and three-phase power availability
3. Flexibility around projected peak loads and usage for EV charging companies
4. Dedicated ROW agent who can identify necessary 3rd party easements
5. Clear timeline and expectations around the construction process
6. Stakeholder engagement meetings around potential EV rates
7. Standard application and review timelines for battery interconnection applications

Electrify America has the largest deployment of battery storage systems coupled with DC fast charging in the United States



electrify america

Matthew Nelson, Director of Government Affairs
matthew.nelson@electrifyamerica.com

Public Joint CEC CPUC Commissioner Workshop:

Accelerating Electric Vehicle Charging Infrastructure Deployment and Grid Integration

October 12, 2021

Ford's VGI Perspective

- Ford's approach to VGI for active load management is through the OVGIP OEM collaboration
- Over past 2 years, OEMs and OVGIP platform have developed and deployed capability that we have been using in several large pilots across the US
  - Customer enrollment (leverage multi-channel connections with customer)
  - DR
  - Virtual TOU
  - Day-ahead hourly pricing
  - M&V
  - (V2H for grid resiliency coming soon)
- Primary focus has been to leverage the embedded communications and controls in EVs to provide the most cost-effective load management with broadest reach
- Ford and partner OEMs were very happy to see the December 2020 decision to direct $35M for VGI pilots. We believe this will be a great investment to promote scaled VGI through learnings about customer expectations and behaviors, VGI value, and operational costs at scale.

OVGIP – Open Vehicle-Grid Integration Platform

Utilities

Get *Data* and *Energy* services for resource planning, load balance, renewable integration

EV-Grid Services Platform

Single interface point for Utilities to gain access to widest base of EVs as grid resources

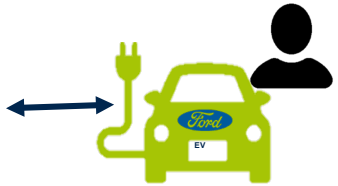
Ford

GM

BMW

Honda

.....



Ford and OEMs

Enroll EV drivers and dispatch charging schedules to EVs

EV Driver

Paid financial rewards by Utility; no impact to daily mobility needs

Public Comments

Written Comments

- If you would like to submit written comments, we encourage use of the e-commenting page for 21-TRAN-03 which can be found at https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=21-TRAN-03.
- Written comments may also be submitted by email. Include docket number "21-TRAN-03" and "Zero Emission Vehicle Infrastructure Barriers and Opportunities" in the subject line and email to docket@energy.ca.gov.
- A paper copy may be sent to:

  California Energy Commission
  Docket Unit, MS-4
  Docket No. 21-TRAN-03
  715 P Street
  Sacramento, California 95814

Public Comment

Zoom:

- Use the “raise hand” feature to make verbal comments.

Telephone:

- Dial *9 to raise your hand.
- Press*6 to mute/unmute your phone line. You may also use the mute feature on your phone.

When called upon:

- Your microphone will be opened.
- Unmute your line.
- Spell your name for the record, state your affiliation if any, then state your comment.

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Limited to 1 representative per organization and 3 minutes per speaker.

3-Minute Timer

Public Comment

Zoom:

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When called upon:

- Your microphone will be opened.
- Unmute your line.
- Spell your name for the record, state your affiliation if any, then state your comment.

Limited to 1 representative per organization and 2 minutes per speaker.

2-Minute Timer

Public Comment

Zoom:

- Use the “raise hand” feature to make verbal comments.

Telephone:

- Dial *9 to raise your hand.
- Press*6 to mute/unmute your phone line. You may also use the mute feature on your phone.

When called upon:

- Your microphone will be opened.
- Unmute your line.
- Spell your name for the record, state your affiliation if any, then state your comment.

Limited to 1 representative per organization and 1 minute per speaker.

1-Minute Timer

Adjournment