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Docketed Date:	12/15/2020

Light-Duty Electric Vehicle Infrastructure Allocation Workshop

Funding Ideas for Light-Duty Electric Vehicle Charger Infrastructure Projects

Fuels and Transportation Division
December 17, 2020 | 9:00 am

Workshop Agenda

9:00 am Welcome and Introductions
- Housekeeping
- Commitment to Diversity
- Empower Innovation

AB 2127 Report Development

CEC Light-Duty (LD) EV Infrastructure Funding
- Past LDEV Infrastructure funded projects
- Block Grants (CALeVIP & Future programs)

Equity

Public Comment

Workshop Agenda

9:50 am Potential Project Category – Rural Charging

Potential Project Category – Ultrafast charging at airports

Public Comment

Potential Project Category – Advanced Technologies

Potential Project Category – Level 1 and Level 2 Charging at Multi-Unit Dwellings (MUDs)

Additional Concepts

Public Comments

12:00 pm Adjourn

Housekeeping

- Workshop is being recording.
- Workshop Event Webpage: https://www.energy.ca.gov/event/workshop/2020-12/staff-workshop-funding-allocations-future-electric-vehicle-infrastructure
- Virtual Participation through Zoom
  - Q&A period after the main presentation
  - Raise Hand or Q&A feature
- Written Comments to Docket # 20-TRAN-04: https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-TRAN-04
  Deadline: Friday, January 8, 2021 by 5:00 PM

Commitment to Diversity

The CEC adopted a resolution strengthening its commitment to diversity in our funding programs. The CEC continues to encourage disadvantaged and underrepresented businesses and communities to engage in and benefit from our many programs.

To meet this comment, CEC staff conducts outreach efforts and activities to:

- Engage with disadvantaged and underrepresented groups throughout the state;
- Notify potential new applicants about the CEC's funding opportunities;
- Assistant applicants in understand how to apply for funding from the CEC's programs;
- Survey participants to measure progress in diversity outreach efforts.

Diversity Survey

Scan the code on a phone or tablet with a QR reader to access the survey.

One Minute Survey

The information supplied will be used for public reporting purposes to display anonymous overall attendance of diverse groups.

Zoom Participants, please use the link in the chat to access the survey or scan the QR code on the left of the screen with a phone or table to access the survey.

Survey will be closed at the end of the day.

Survey Link: https://forms.office.com/Pages/ResponsePage.aspx?id=RBI6rPQT9k6NG7qicUgZTiK5n71Bj-xKonSFbzOHxQpURDdSMTNRRjdVTkxLVFIwVkwyNjAxUlc5MS4u

Clean Transportation Program Background

- Formerly known as the Alternative and Renewable Fuel & Vehicle Technology Program (ARFVTP)
- Established in 2007 by Assembly Bill 118 (2007).
- Extended to January 1, 2024 by Assembly Bill 8 (2013)
- Provides approximately $95 million of funding per year through 2023.
- Investment Plan to determine funding allocations across various categories.


CALIFORNIA ENERGY COMMISSION

California Energy Commission

REVISED LEAD COMMISSIONER REPORT

2020–2023 Investment Plan Update for the Clean Transportation Program

Gavin Newsom, Governor

September 2020 | CEC-600-2020-003-REV

Purpose of the Clean Transportation Program

Provides approximately $95 M of funding per year through the end of 2023

"…to develop and deploy innovative technologies that transform California's fuel and vehicle types to help attain the state's climate change policies."

Complementary goals:

- Improve air quality
- Investments in low-income and disadvantaged communities
- Promote economic development
- Increase alternative fuel use
- Reduce petroleum dependence

Thank you!

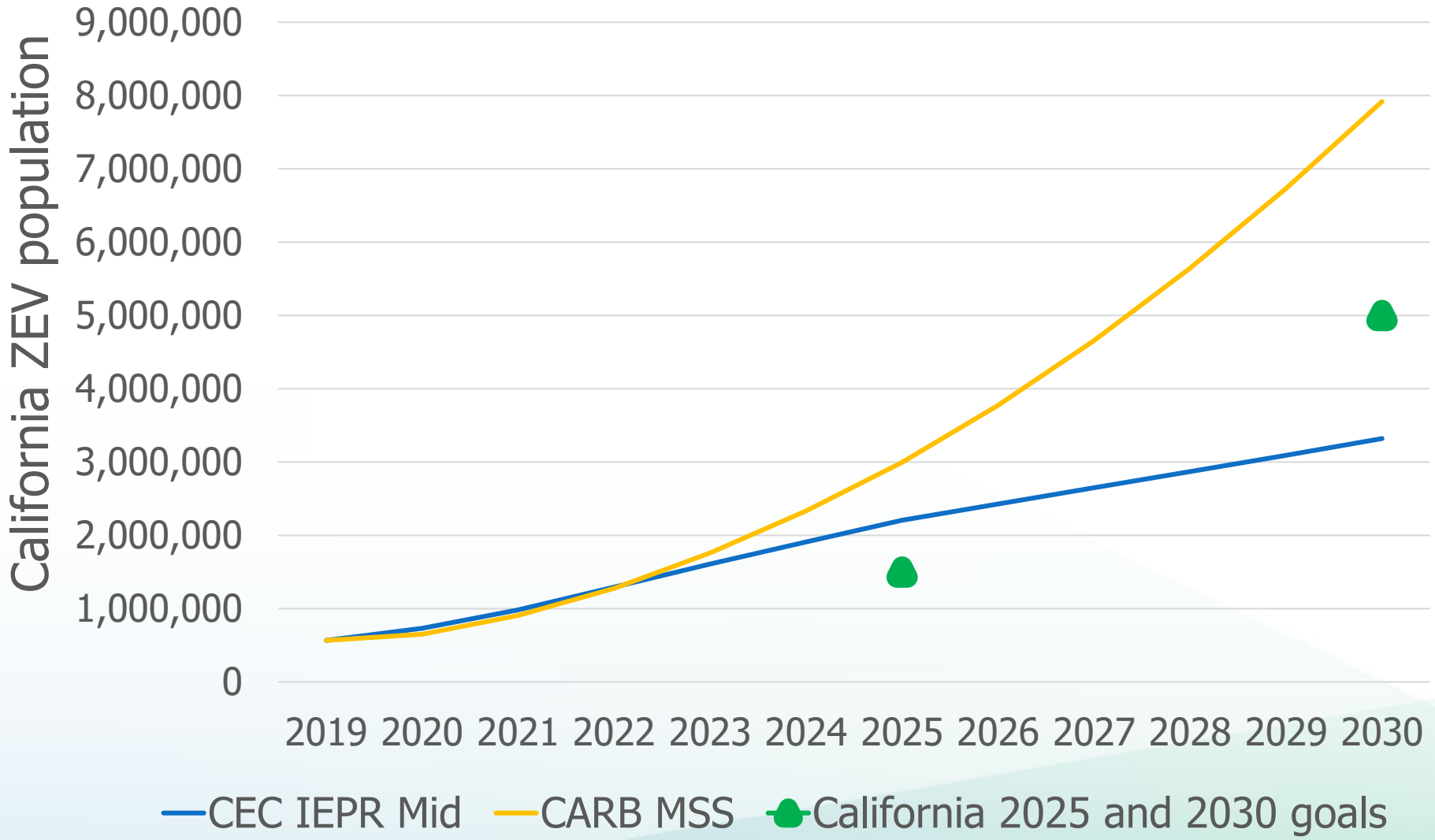
AB 2127 Development

Raja Ramesh
Air Pollution Specialist

AB 2127 and N-79-20

- "…a statewide assessment of the electric vehicle charging infrastructure needed … [for] at least five million zero-emission vehicles on California roads by 2030, and of reducing emissions of greenhouse gases to 40 percent below 1990 levels by 2030." (AB 2127)
- "…shall update the biennial statewide assessment of zero-emission vehicle infrastructure required by Assembly Bill 2127 (Chapter 365, Statues of 2018) to support the levels of electric vehicle adoption required by this Order." (Executive Order N-79-20)

ZEV Trajectories



Development Process

- August 2020: IEPR workshop on modeling charging infrastructure needs
- December 2020: Release Staff Draft
- January/February 2021: Workshop on Staff Draft and additional modeling out to 2035
- Spring 2021: Revised Staff Report

AB 2127 Scope

	Road and Highway Electrification				Other EVs
Existing Chargers	***Counting Chargers***				
	Including in Low-income Communities ***(SB 1000)***				
Future Chargers	***Electric Vehicle Infrastructure Projections (EVI-Pro 2)***	***EVI-Pro RoadTrip***	***Widespread Infrastructure for Ride-hailing EV Deployment (WIRED)***	***Medium- & Heavy-Duty EVI-Projections (HEVI-Load)***	***Off-Road, Port and Airport Electrification***

Charging Hardware and Software ***(Interoperability and Equipment Standards)***

Tailor Solutions to Local Needs ***(Building Codes, EDGE: EVSE Deployment & Grid Evaluation)***

Other Programs to Accelerate the Adoption of Electric Vehicles ***(Incentives, Investment, others)***

Quantitative Modeling

- Generate transportation demand
  - ZEV population
  - BEV/PHEV split
  - Vehicle attributes by class
  - Charger utilization
- Output
  - Number of chargers needed at a statewide level
    - Broken down by charger type and location type
  - Statewide load profile

Questions

Happy to provide clarification on any of the points presented during the question period.

Thank You!

A Quick History of the CEC's EV Infrastructure and Related Projects

Jennifer Allen

Supervisor EVIU

Statutes and Executive Orders

Clean Transportation Program

Formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program

Established by AB 118 (Nunez, 2007) and extended by AB 8 (Perea, 2013)

Has an annual budget of approximately $100 million

"…to develop and deploy innovative technologies that transform California's fuel and vehicle types to help attain the state's climate change policies."

- California Health and Safety Code 44272(a)

Landmark Initiatives

State GHG emissions to 1990 levels by 2020 and to 40% below 1990 levels by 2030.

EO B-55-18 – Carbon neutrality ASAP and no later than 2045.

SB 100 built on state GHG goals to reduce emissions enough to avoid catastrophic climate change.

Executive Order B-16-2012

1.5 million ZEVs by 2025

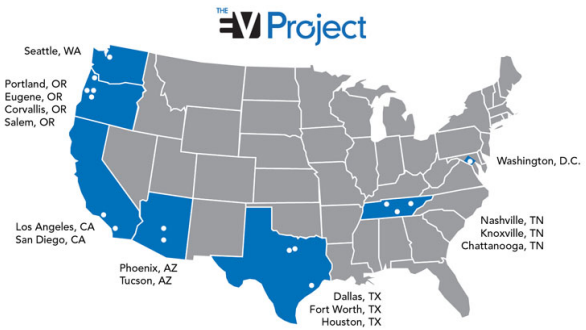
State agencies ensure infrastructure will support 1 million ZEVs by 2020

Executive Order B-48-18

5 million ZEVs by 2030

250,000 EV chargers by 2025 including 10,000 DCFC

Charging Infrastructure



2010

Partner with the US Department of Energy for American Recovery and Reinvestment Act Projects

2012

Partner with local coalitions for Regional Readiness Planning. Upgrade Legacy Chargers.

2014

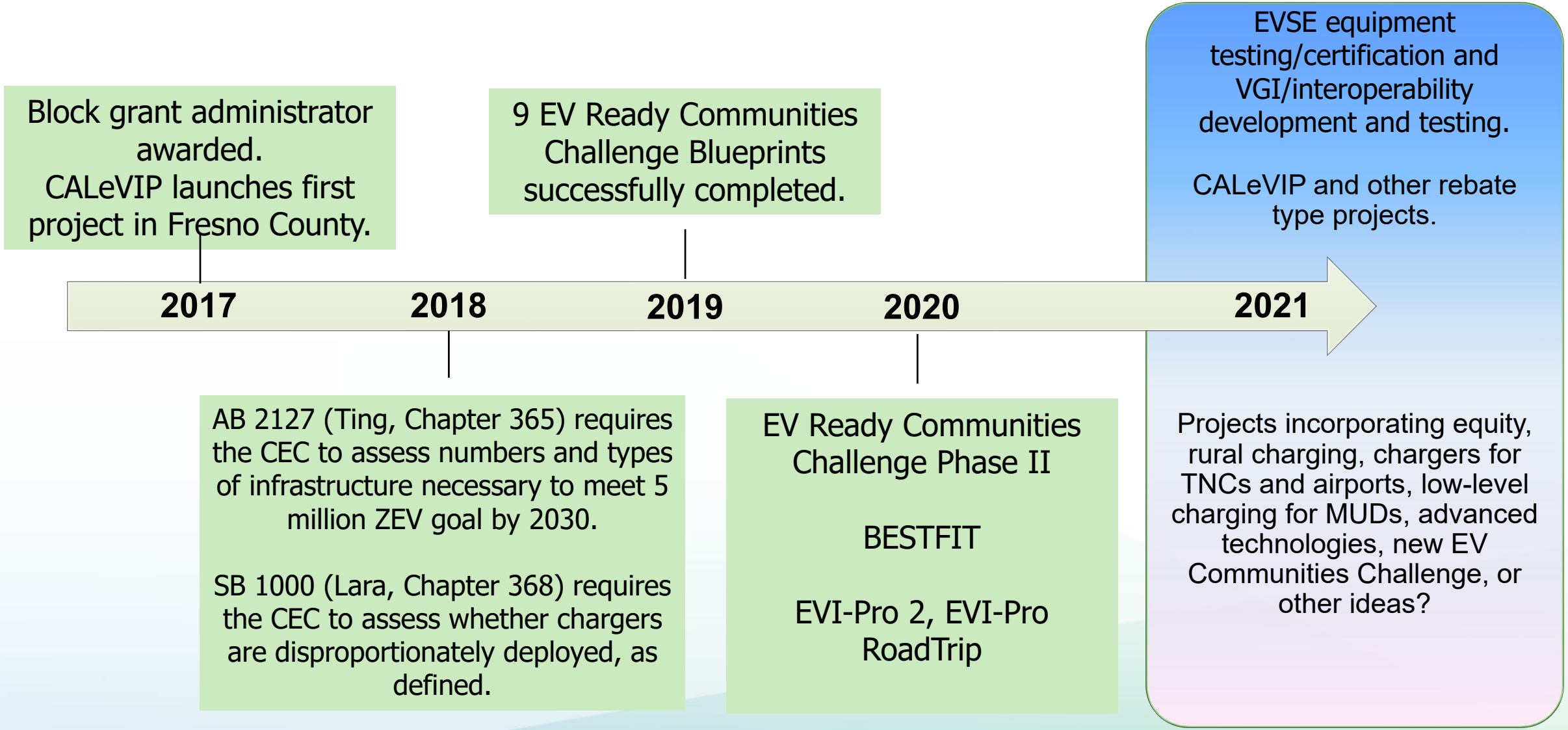
Fund chargers to increase numbers and meet local specific charging needs.

2016

Fund fast charging along major highway corridors to allow travel from Oregon to Baja and from coast to eastern border.

WEST COAST ELECTRIC HIGHWAY

Charging Infrastructure



CALeVIP
California Electric Vehicle Infrastructure Program

CALeVIP Existing Projects

Incentive Project	Launch Date	Counties	Funding	Technologies
Fresno County	December 2017	Fresno	$4 million	Level 2
Southern California	August 2018	Los Angeles Orange Riverside San Bernardino	$29 million	DC Fast Chargers
Sacramento County	April 2019	Sacramento	$15.5 million*	Level 2 & DC fast chargers
Northern California	May 2019	Shasta Humboldt Tehama	$4 million	Level 2 & DC fast chargers
Central Coast	October 2019	Monterey Santa Cruz San Benito	$9 million*	Level 2 & DC fast chargers
San Joaquin Valley	December 2019	San Joaquin Kern Fresno	$14 million	Level 2 & DC fast chargers
Sonoma Coast	July 8, 2020	Mendocino Sonoma	$6.75 million*	Level 2 & DC fast chargers
San Diego County	October 27, 2020	San Diego	$21.7 million*	Level 2 & DC fast chargers
Peninsula-Silicon Valley	December 16, 2020	San Mateo Santa Clara	$55.2 million *	Level 2 & DC fast chargers
		Total:	$159.15 million	

CALeVIP Future Projects

Incentive Project	Counties	CEC Funding	Technologies
Inland Counties	Butte, El Dorado, Imperial, Kings, Merced, Napa, Nevada, Placer, Solano, Stanislaus, Sutter, Tulare, Yolo	$17.5 million	Level 2 & DC fast chargers
South-Central Coast	San Luis Obispo Santa Barbara Ventura	$7.1 million	Level 2 & DC fast chargers
Alameda County	Alameda	$14.5 million	Level 2 & DC fast chargers
Southern California Level 2	Los Angeles Orange Riverside San Bernardino	$22 million	Level 2
		Total: $62 million	

Block Grant

Second Block Grant for Light-Duty Electric Vehicle Charger Incentive Projects

- Current CALeVIP agreement will reach $200 million cap
- New solicitation for next block grant implementer
- Pre-solicitation Workshop on December 17, 2020 at 1:00 pm
- Second Block Grant Draft Concepts: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=20-EVI-01

Thank You!

CEC Light Duty EV Infrastructure Funding

Jennifer Allen

December 17, 2020

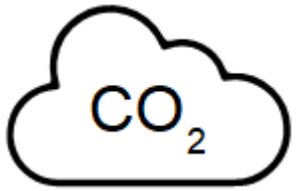
Clean Transportation Program: Equity

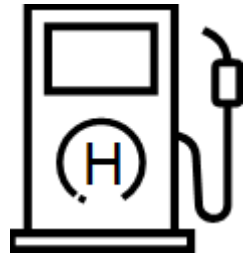
Larry Rillera, Air Pollution Specialist
Transportation Policy and Analysis Office
CEC Fuels and Transportation Division

Clean Transportation Program Benefits to California

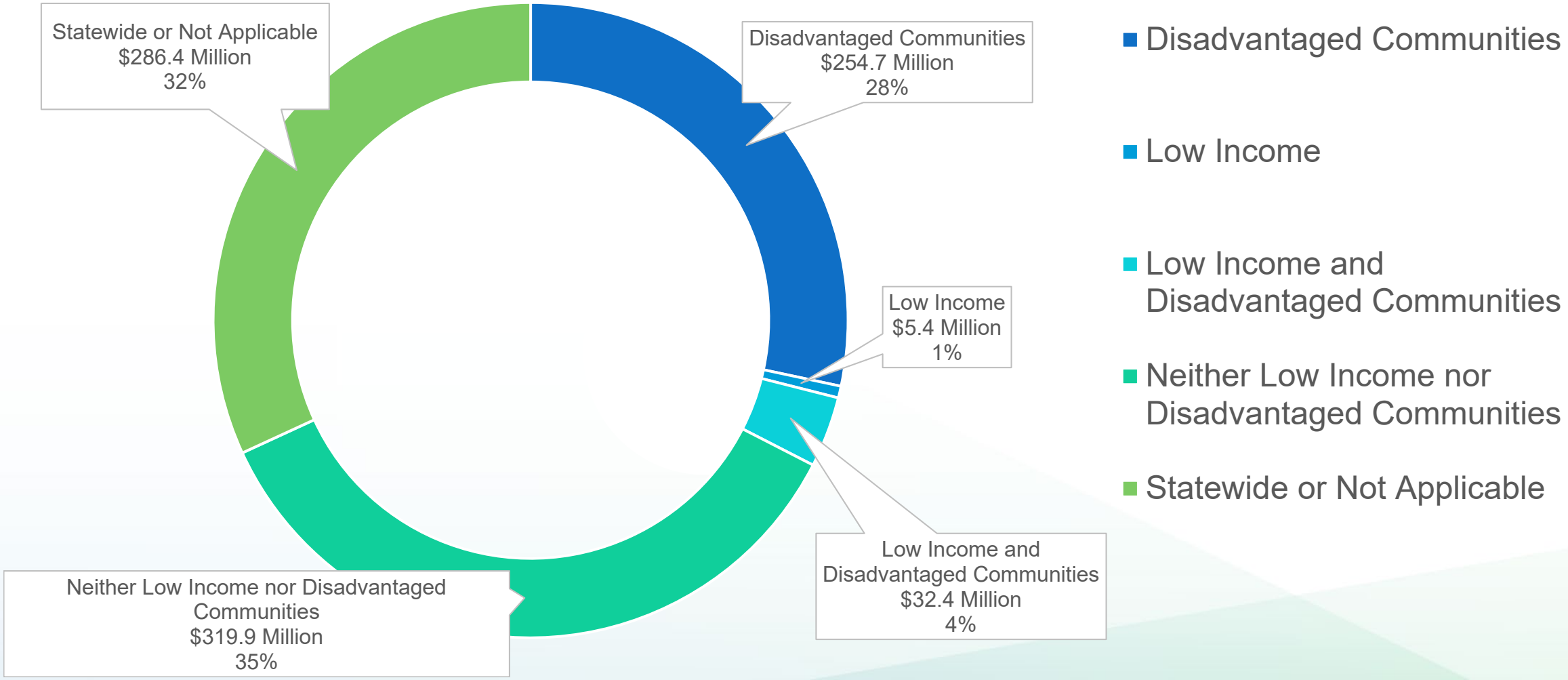
The Clean Transportation Program plays an important role in achieving:

- California's ambitious goals on climate change
- Petroleum reduction
- Adoption of zero-emission vehicles
- Improved air quality
- Economic development and recovery
- **Investment in low-income and disadvantaged communities**
- Job growth and workforce development





Clean Transportation Program Funding Toward Disadvantaged and/or Low-Income Communities



Note: As of May 1, 2020

Commitment to Inclusion, Diversity, Equity and Access

- Collaboration with the Disadvantaged Communities Advisory Group
- Prioritize and invest in proper community outreach and engagement
- Partner with local community-based organizations
- Develop metrics that go beyond funding locations
- Seeking to provide 50% of Investment Plan funds to benefit low-income and disadvantaged communities

SB 1000 Electric Vehicle Charging Infrastructure Deployment Assessment: Equity

- Senate Bill 1000 (Lara, Ch. 368, Stats. 2018)
- "…assess whether light-duty charging station infrastructure is disproportionately deployed by population density, geographical area, or population income level, including low-, middle-, and high-income levels. This includes whether direct current fast charging stations are disproportionately distributed and whether access to these charging stations is disproportionately available."
- Inform proportionate deployment of charging station infrastructure and to increase access to public electric vehicle infrastructure in all California communities including Level 2 and DCFC charging access and distribution in low-income communities.
- SB 1000 findings will inform the Clean Transportation Program Investment Plans

EV Charging:
Inclusion, Diversity, Equity, and Access

Let's think, discuss, and embed:

- Equity in Rural EV Charging
- Equity in EV Charging for Transportation Network Companies
- Equity in Advanced Technology Advancements for EV Charging
- Equity in Level 1 and Level 2 Charging in Multi-Unit Dwellings
- Equity in Additional Concepts for EV Charging

Public Comment/Discussion Period 1

Zoom Participants

- Use the "raise hand" feature to make verbal comments
- Use the Q&A feature to type in your question

Telephone Participants:

- Dial *9 to raise your hand
- Dial *6 to mute/unmute your phone line.

Written Comments

https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-TRAN-04

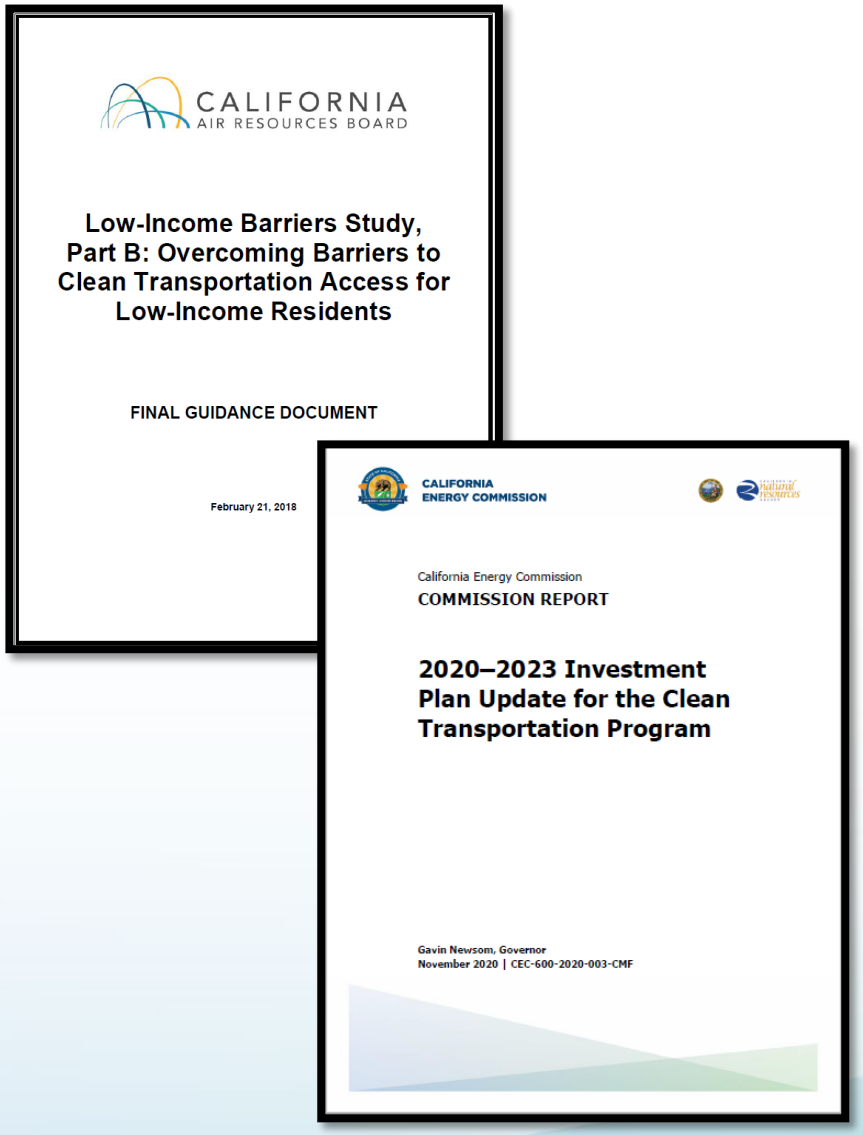
Deadline for comment: Friday, January 8, 2021 by 5:00 pm.

Resilient Rural Charging

Shaun Ransom

Associate Energy Specialist

Why Rural?



- **Assembly Bill 8** directs transformative investments
- CEC 2020-2023 **Investment plan**
- **SB 350** Barriers Studies

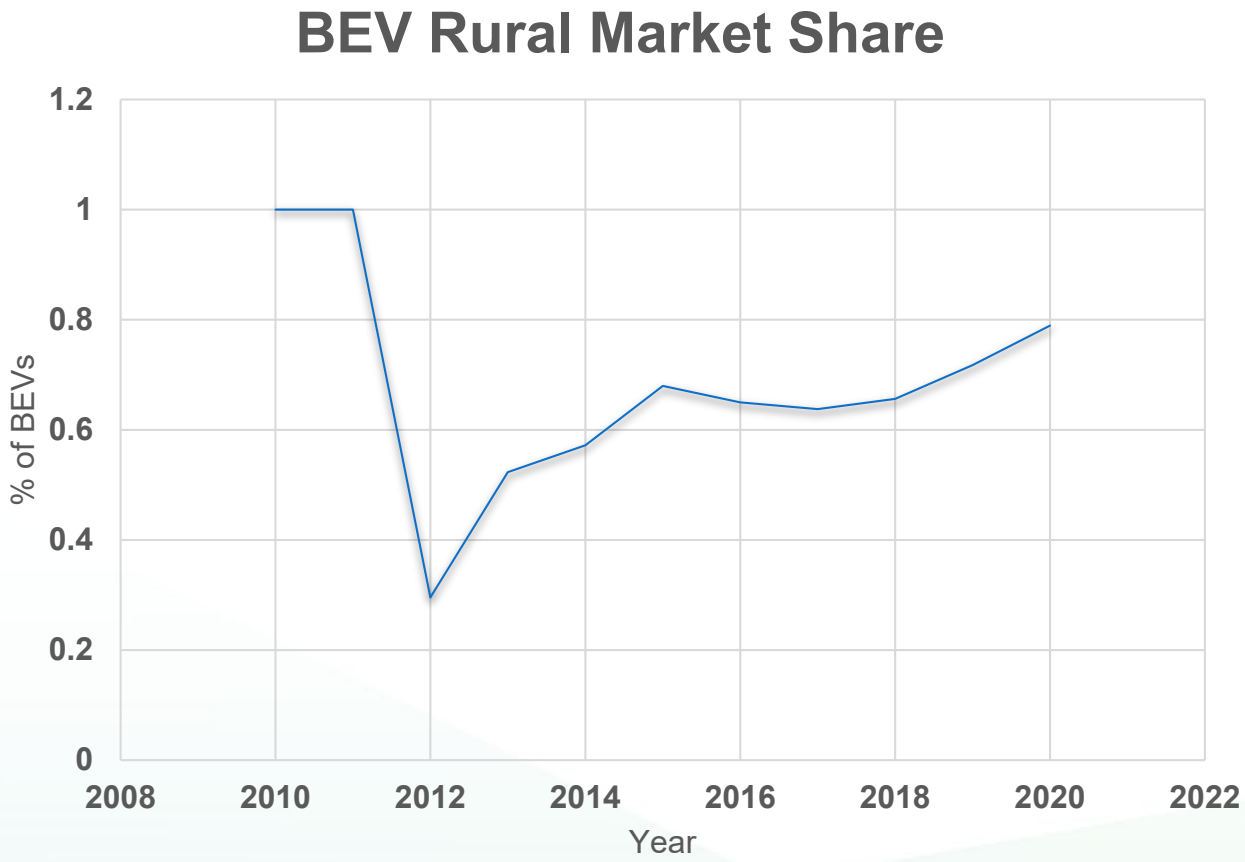
EV Charging

Source: AFDC

- EV charging sparse in rural areas
- Charging concentrated in urban areas
- Charging per capita is higher in rural areas, but chargers per square mile is much lower
- Large percentage of chargers along major highways

Vehicles: Rural CVRP

- 5% of statewide EV sales
- Adopters moving towards BEVs with longer range like the Bolt and Tesla
- Pre-DCFC vehicles are abundant and presumably still operating



Source: CVRP

Barriers to Adoption and Project Considerations

- Limited EV adoption
- Technology barriers
- Overlap with low-income communities
- Education and outreach
- Rural vehicle preferences
- Market maturity
- Uncertainty of grid availability and capacity

Public and Private Investments

CEC – **Bolt to College**
- Rural Ride-sharing program

Electrify America - **Rural Charging**
- Rural solar and EV charging

CARB - **Miocar**
- Rural car-sharing program in Tulare County

Resilient Rural Charging Pilot

- Supports local travel demand
- Support new and old EVs
- GRID tied and ability to operate autonomously
- Maximizes renewable energy and clean benefits
- Increases confidence in availability
- Hub functionality for shared mobility

Questions

- What are the key considerations in demonstrating rural charging?
  - What locations and use cases (e.g., local, commuter) have the greatest needs and opportunities?
  - What technologies or charging infrastructure can best help to provide reliable charging in rural regions?
  - What kind of project or funding would be needed?

Thank You!

Shaun Ransom
Shaun.ransom@energy.ca.gov

Future Projects:
TNC Friendly Airport Fast Charging

Jeffrey Lu
Fuels and Transportation Division

Why TNCs and airports?

Clean Miles Standard targets rising eVMT for TNCs[1]

50%

eVMT by 2027

90%

eVMT by 2030

Rapid growth in TNC usage at California airports[2]

19% → 71%

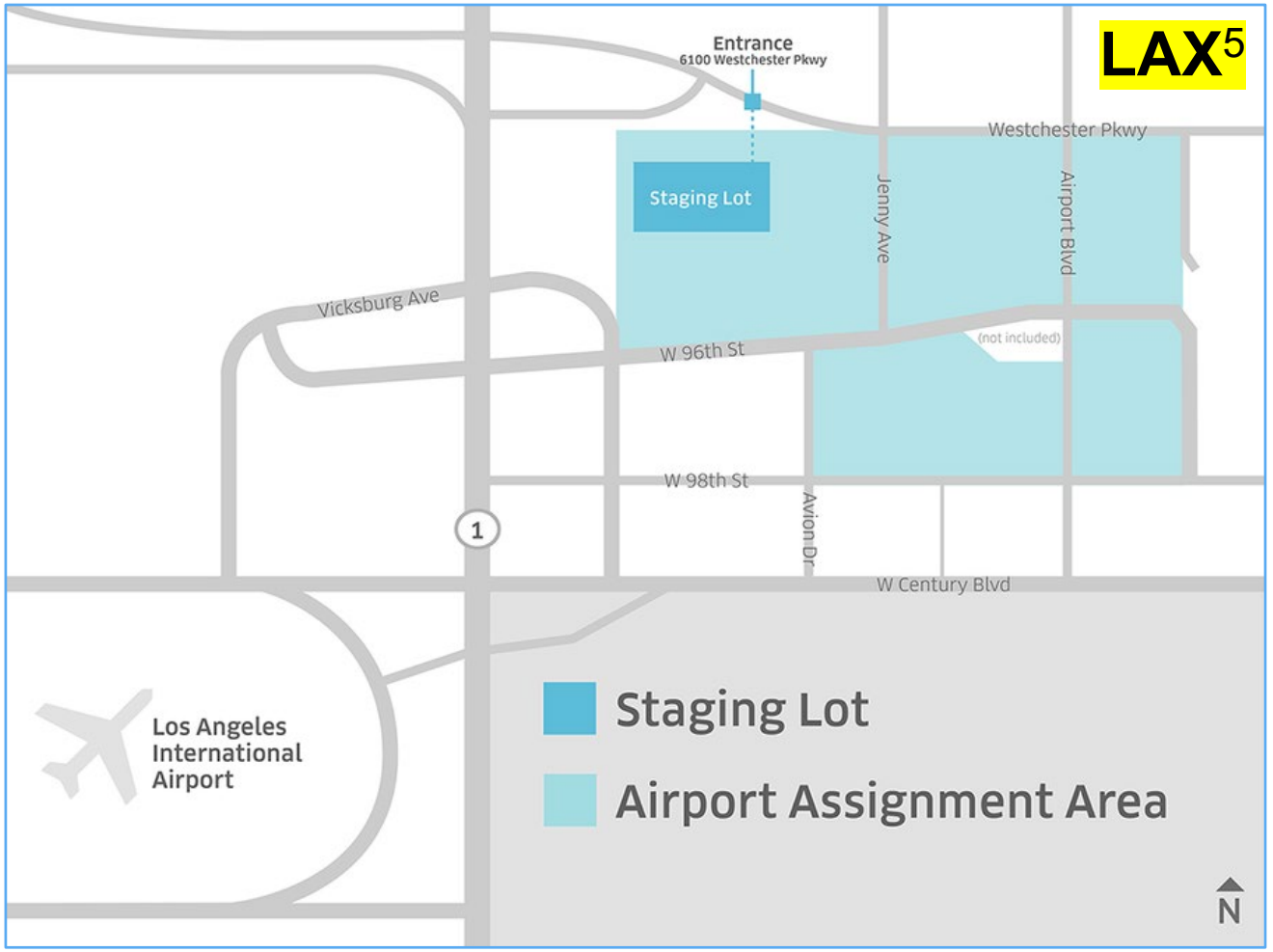
TNC share of commercial ground transportation trips at SFO in 2014 vs. 2017

Significant emissions benefits from electrifying TNC vehicles[3]

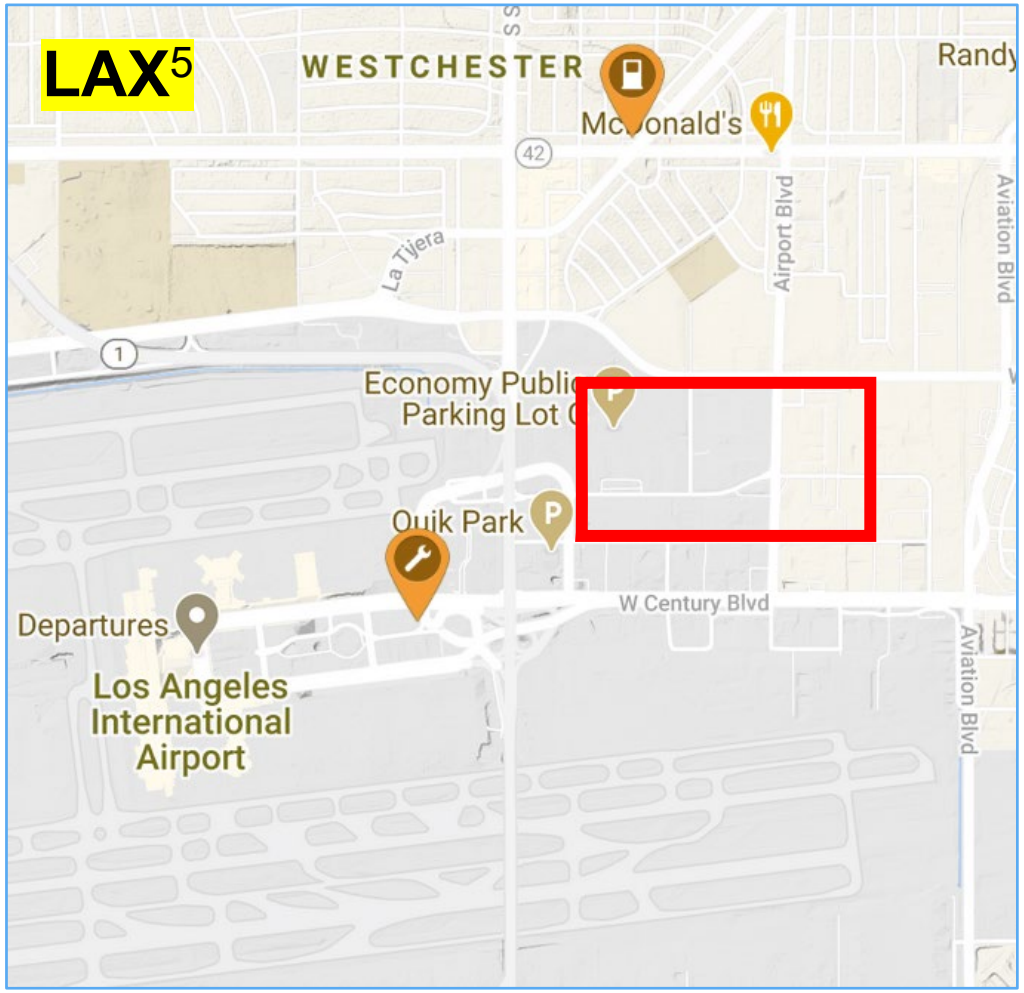
Nearly 3x

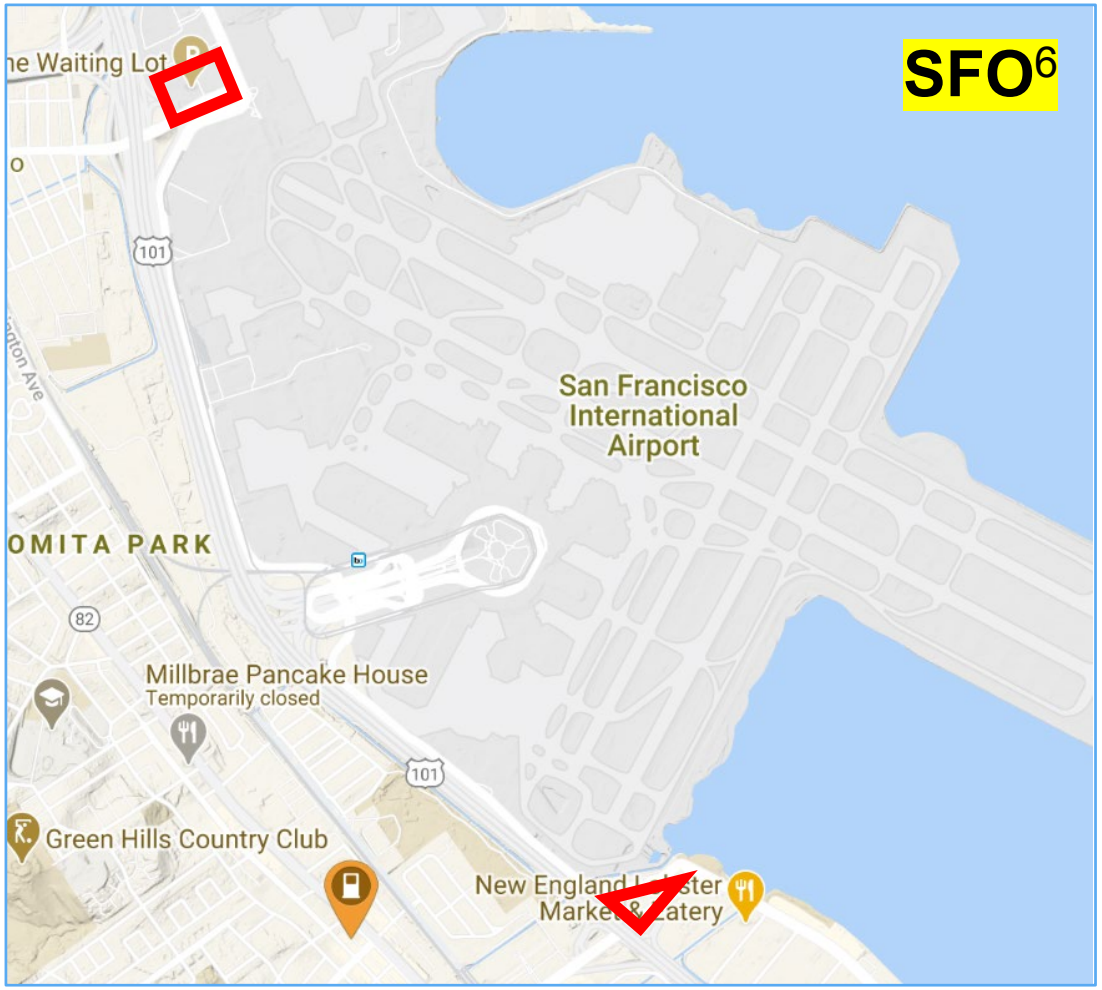
Emissions savings from electrifying a TNC vehicle vs. electrifying the average California driver's vehicle

TNCs at airports: FIFO geofence



Existing conditions: LAX, SFO

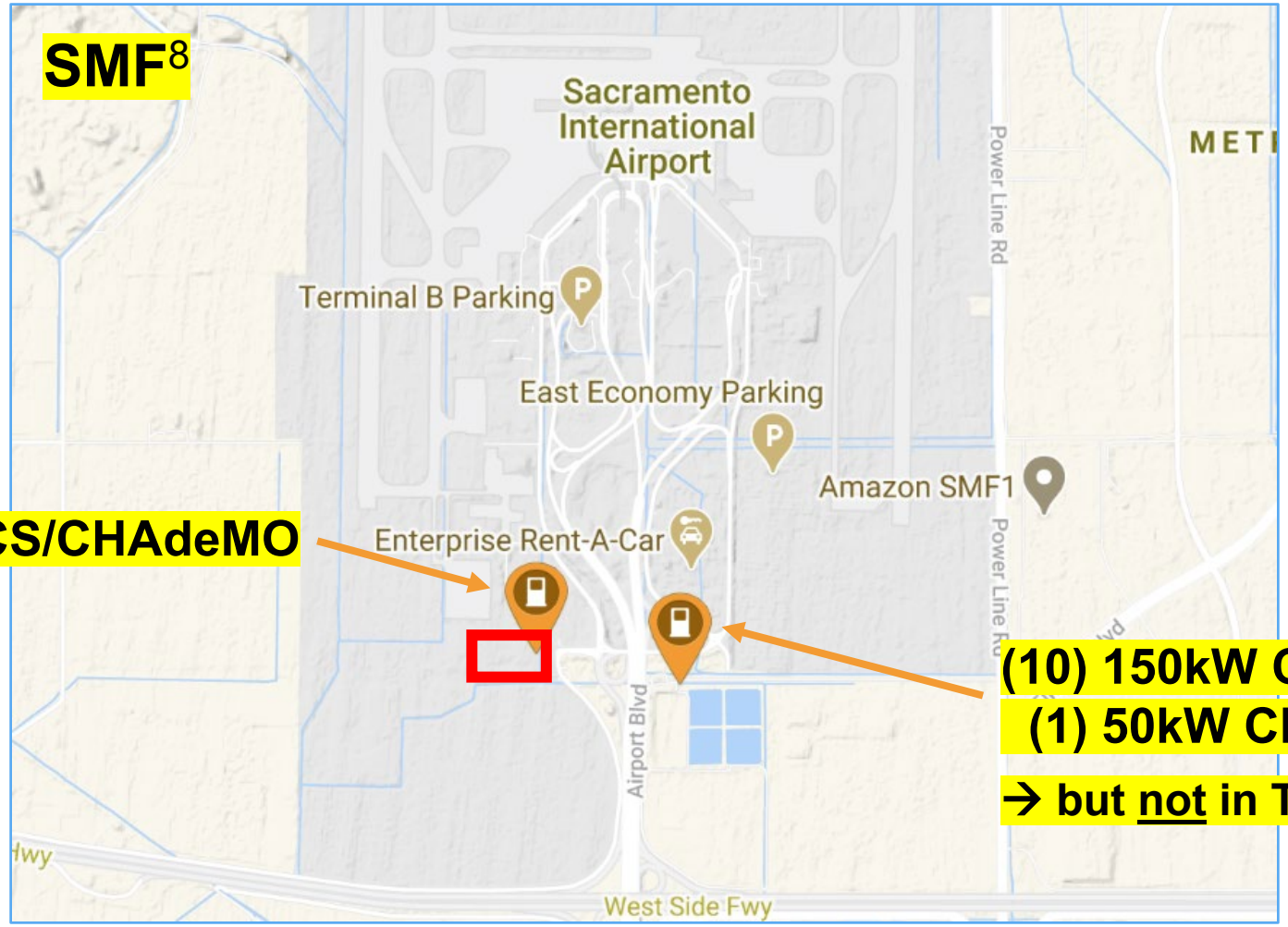




= TNC airport geofence

= Existing DCFC

Existing conditions: SMF



= TNC airport geofence

= Existing DCFC

Project Example

Goal: High power, high utilization, TNC friendly airport fast charging

- Accommodate TNC drivers serving airport passengers (geofence friendly)
  → **Cell phone lots are sometimes excluded from TNC airport geofence**
- Target quick turnaround, high power, high utilization
  - 350+ kW → 102 miles in 5 minutes
  - CCS, with CHAdeMO support
  - Plug and Charge capable (minimize authentication time)
- May accommodate other EV drivers and/or airport shuttles
- Prioritize electric miles in disadvantaged areas, priority charger access and pricing
- Grid considerations: Power sharing, DERs, incentivize midday charging

Questions

1. Could a project like this serve TNC and taxi drivers?
   A. How long do TNC drivers serving airport passengers typically wait to be assigned a trip? Is this enough time for a brief charge session (5-15 min)?
   B. Can TNC-friendly fast charging stations near airports accommodate other EVs, including electric airport shuttles?
2. What are the barriers or other considerations?
   A. What barriers exist to installing high power (350 kW) chargers near airports, particularly within the TNC designated geofence?
   B. What barriers exist to modifying current TNC geofences to include existing public fast charging stations?
3. How can chargers help prioritize electric miles for low-income drivers or vehicles traveling in areas disproportionately burdened by pollution?

References

1. CARB is implementing the Clean Miles Standard under Senate Bill 1014: CARB. (November 2020). Clean Miles Standard Draft Regulation Order. https://ww2.arb.ca.gov/sites/default/files/2020-11/CMS%20Draft%20Regulation%20Order.pdf
2. SFO. (September 2017). Transportation Network Companies at San Francisco International Airport Whitepaper. https://sfoconnect.com/sites/default/files/document/TNCWhitePaper.pdf
3. Jenn, Alan. (2019). Emissions Benefits of Electric Vehicles in Uber and Lyft Services. https://escholarship.org/uc/item/15s1h1kn
4. Uber. (Accessed December 2020). Information for Drivers SNA. https://www.uber.com/us/en/drive/orange-county/airports/john-wayne-airport/
5. Uber. (Accessed December 2020). Information for Drivers LAX. https://www.uber.com/us/en/drive/los-angeles/airports/los-angeles-international-airport/
6. PlugShare. (Accessed December 2020). Map Display of LAX Area. https://www.plugshare.com/location/11497
7. PlugShare. (Accessed December 2020). Map Display of SFO Area. https://www.plugshare.com/location/199176
8. PlugShare. (Accessed December 2020). Map Display of SMF Area. https://www.plugshare.com/location/180122

Public Comment/Discussion Period 2

Zoom Participants

- Use the "raise hand" feature to make verbal comments
- Use the Q&A feature to type in your question

Telephone Participants:

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Written Comments

https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-TRAN-04

Deadline for comment: Friday, January 8, 2021 by 5:00 pm.

Future Projects: Advanced Technologies

Matt Alexander

Air Pollution Specialist

Background

- The CEC is interested in advanced charging technologies to make charging:
  - Safe
  - Simple
  - Smart
  - Cost-effective
  - Accessible
  - Ubiquitous

Summary of Proposals

1) Targeted proposals based on specific technologies and/or use cases
   a) Wireless Charging
   b) Automated/Robotic Charging
   c) V2X Charging
   d) Mobile Charging

2) Broader proposals based on overarching themes and/or challenges in the market
   a) Vehicle-Grid Integration
   b) “Hands-Free Charging”
   c) Alternative “Home Charging”

Proposal 1a: Wireless Charging

Background:

SAE recently published industry standards for wireless charging (J2954 and J2847/6), which will help facilitate the market adoption of this technology.

Value:

Wireless charging has the potential to become a ubiquitous, simple, and hands-free charging solution to enable further EV adoption.

Future Project:

Focus on supporting demonstrations and/or deployments of wireless charging technologies using the J2954 standard to raise consumer awareness and highlight the value of this solution.

Proposal 1b: Automated/Robotic Charging

Background:

The need for automated/robotic charging is expected to grow dramatically as autonomous vehicles start to emerge in the market.

Value:

Automated/robotic charging presents a seamless, convenient, and optimized solution that could support an autonomous fleet, encourage EV adoption, and reduce space requirements and costs.

Future Project:

Focus on demonstrations and/or deployments of automated/robotic charging solutions to support this earlier-stage technology.

Proposal 1c: V2X Charging

Background:

V2X charging is becoming an increasing area of focus to address resiliency due to recent public safety power shutoff events.

Value:

Interoperable V2X charging solutions can provide power to homes and critical facilities during grid outages, increase the benefits of alignment with renewable energy generation, provide cost savings to EV owners, and more.

Future Project:

Focus on demonstrations and/or deployments of interoperable V2X charging solutions to support mainstream adoption and resiliency. This could be further broken down into specific use cases, such as vehicle-to-home (V2H), vehicle-to-building (V2B), etc.

Proposal 1d: Mobile Charging

Background:

As EVs move beyond early adopters and into the mainstream market, charging solutions will have to support increasingly difficult use cases to electrify.

Value:

Mobile charging can provide a flexible solution for challenging and/or niche use cases, such as multi-unit dwellings and rescue charging.

Future Project:

Focus on demonstrations and/or deployments of mobile charging solutions, which could include mobile DER systems, charging packaged into another vehicle, etc.

Proposal 2a: Vehicle-Grid Integration

Background:

VGI is a key area of focus for the State Agencies to maximize the benefits of electric vehicles and protect grid infrastructure.

Value:

VGI can optimize charging to maximize alignment with renewable generation, minimize grid impacts, and result in savings for EV owners and ratepayers.

Future Project:

Focus on demonstrations and/or deployments of hardware and software solutions that enable VGI technology and communications. This will help prove the value of the technology and accelerate the time to market.

Proposal 2b: “Hands-Free” Charging

Background:

Advanced charging solutions are emerging that remove the need to physically plug in a charger, such as wireless and robotic solutions.

Value:

Simplifying the charging experience will make the switch to EVs more convenient, spurring increased EV adoption for personal vehicles and fleets. Hands-free solutions also present a safer option for charging.

Future Project:

Focus on demonstrations and/or deployments of hands-free charging solutions, which could include wireless, robotic, and automated technologies.

Proposal 2c: Alternative “Home Charging”

Background:

As EVs move into the mainstream market, many drivers will not have access to conventional home charging, limiting their desire or ability to switch to an EV.

Value:

Finding public charging solutions that can act as a viable and reliable alternative to conventional home charging will provide the security and confidence for drivers to make the transition to EVs.

Future Project:

Focus on demonstrations and/or deployments of charging solutions such as high-powered chargers and downtown core curbside charging to determine if these can provide a viable alternative to conventional home charging. Could also include innovative business models.

Questions

- Is there a preference between:
  - Targeted projects focused on specific technologies and/or use cases
  - Broader projects focused on overarching themes and/or challenges in the market

- What scale of project would be needed to sufficiently advance these types of technologies, move towards wide-scale deployment, and grow consumer awareness?

- Which of these concepts would have the highest value in advancing our goals? Are we missing any innovative and advanced technologies or concepts?

- Are there any challenges you see in the market that could be addressed with advanced technologies that were not discussed in this presentation?

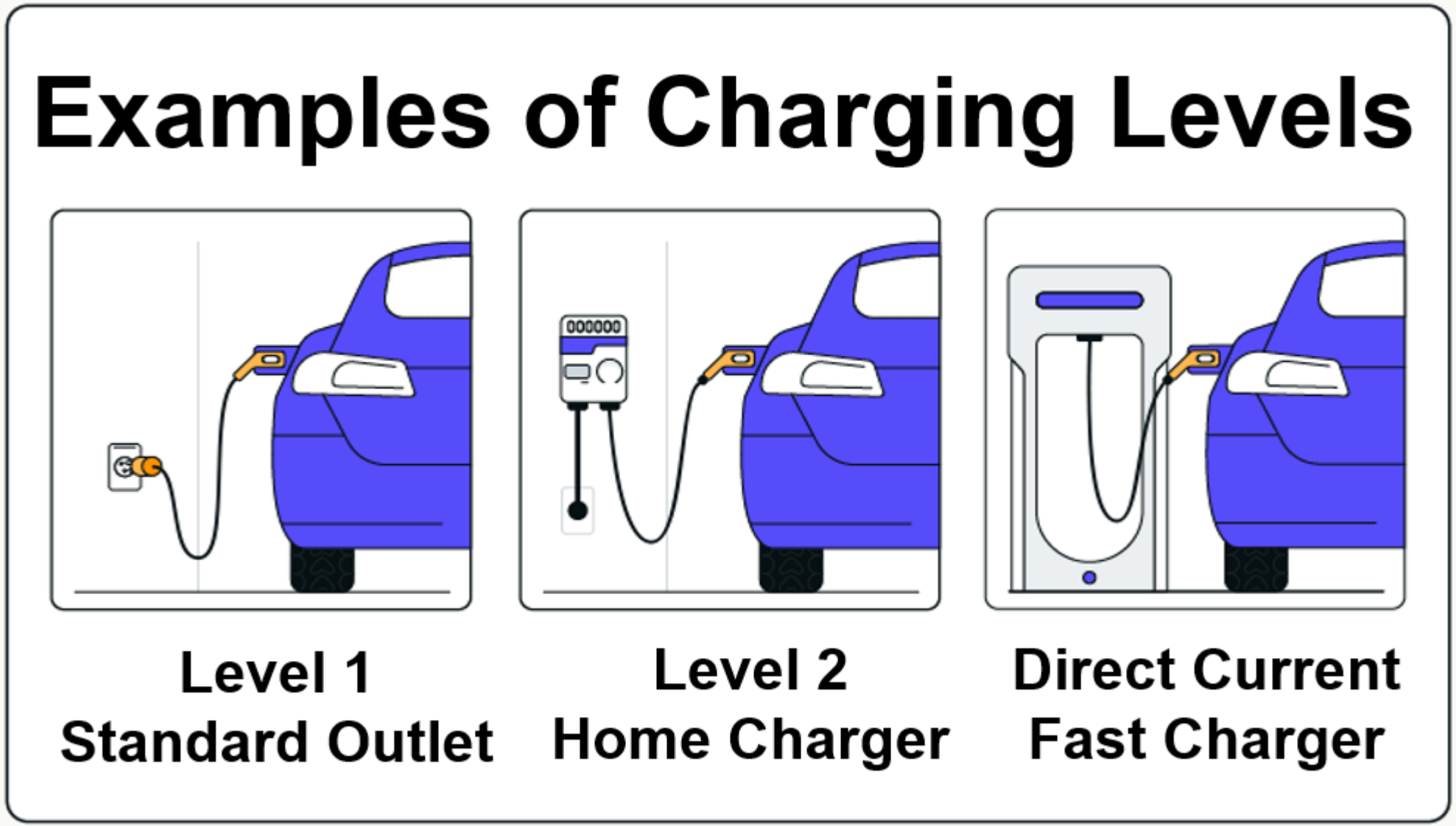
Thank you!

Level 1 and Level 2 Charging at Multi-Unit Dwellings

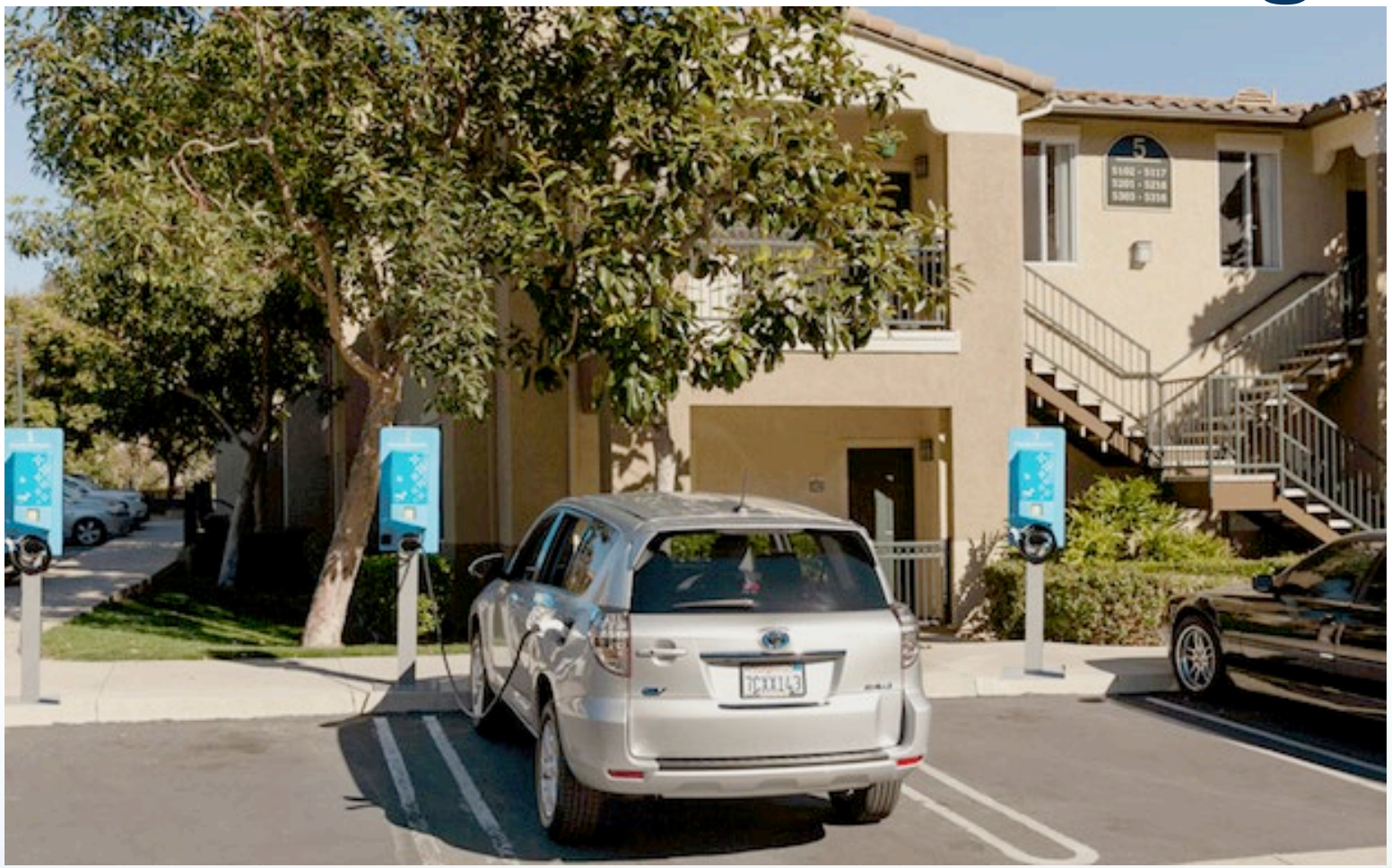
Sharon Purewal

Associate Energy Specialist

Background


Examples of Charging Levels
Level 1
Standard Outlet
Level 2
Home Charger
Direct Current
Fast Charger

Multi-Unit Dwelling (MUD) Challenges



- Property Operator Interest
- Parking
- Costs
- Electrical System Limitations

Options

- Level 1 or low power Level 2
- Smart Outlets
- Other innovations such as mobile chargers or solar panels over parking

Considerations

- Charge time
- Building Codes
- Load Management
- Vehicle to building/grid integration may not be available

Questions

- Would L1 chargers and low power L2 chargers for MUDs be a viable investment area?
- If dedicated parking is not an option at an MUD, are mobile charging, solar charging, or opportunity charging areas of further research and consideration?
- Additional/alternative suggestions?

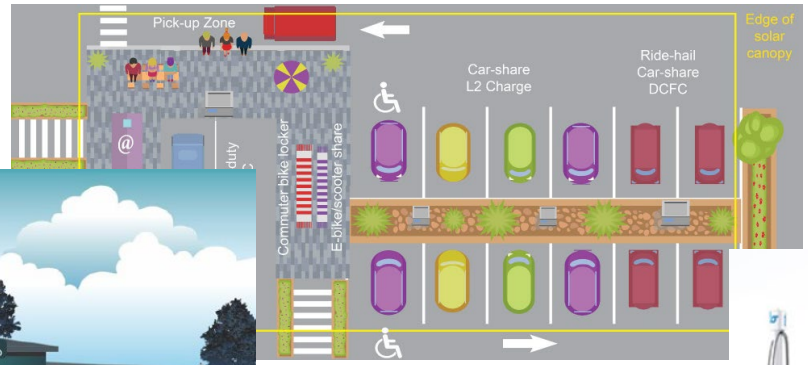
Thank You!

Additional Concepts

Jennifer Allen
Supervisor EVIU

Expand Advanced Charging Concepts

e-Mobility Depots/Hubs for vehicle sharing, TNCs, transit centers.



Curbside chargers.

Multiple chargers located around urban core.

Mobile charging units—MUDs, retail, workplace?

Other Ideas

- Chargers for K – 12 schools with an educational program for students.
- Funding chargers for new or renovated buildings for CalGreen code pre-compliance.
- Add infrastructure for buyers of new or used EVs.
- New or retrofit funding for high power charging (350 kW).

General questions

- Which of the concepts discussed today have the highest value? What other concepts should CEC consider?
  - What projects will best advance equity?
  - What projects would advance infrastructure and technology deployment?

Thank You!

CEC Light Duty EV Infrastructure Funding

Jennifer Allen

December 17, 2020

Public Comment/Discussion Period

Zoom Participants

- Use the "raise hand" feature to make verbal comments
- Use the Q&A feature to type in your question

Telephone Participants:

- Dial *9 to raise your hand
- Dial *6 to mute/unmute your phone line.

Written Comments

https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-TRAN-04

Deadline for comment: Friday, January 8, 2021 by 5:00 pm.

Submit Comments to Docket 20-TRAN-04

Electronic Commenting System

Visit the comment page for this docket at:
https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-TRAN-04

Comment by E-mail

E-mail: docket@energy.ca.gov

Subject Line: "20-TRAN-04 LDEVI Allocation"

All comments due by 5:00 pm on January 8, 2021

Thank you for participating remotely.