



2022 AQMP Mobile Source Working Group Meeting #2 – Zero Emission Infrastructure

**AQMP Advisory Group Meeting
February 4, 2022**



Agenda

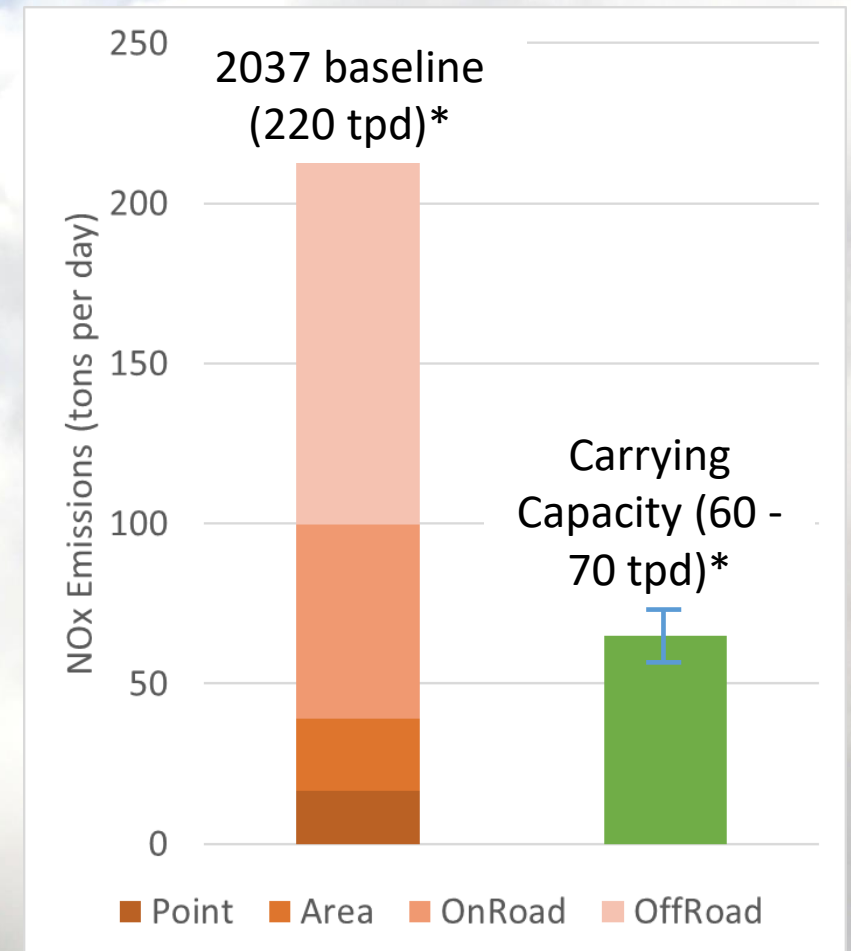


- Housekeeping remarks
- Introduction by South Coast AQMD and CARB
- Utility Presentations (10-15 minutes each)
 - Southern California Edison (SCE)
 - Los Angeles Department of Water & Power (LADWP)
 - City of Colton Electric Utility
 - Pasadena Water & Power
 - Southern California Gas Company (SoCalGas)
- Discussion

Background and Purpose



- 2022 AQMP currently under development
- Focused on attaining the 70 ppb 8-hour ozone National Ambient Air Quality Standard (NAAQS) by 2037
- ~70% reduction in NO_x emissions is needed
- On-road vehicles and off-road mobile sources represent the largest categories of NO_x emissions
- Large scale transition to zero emission technologies a key strategy



* Preliminary Draft

MOB-15: Zero-Emission Infrastructure for Mobile Sources



- Proposed control measure in draft AQMP to develop ZE infrastructure work plan for South Coast AQMD
- **Seeking feedback on components to include in workplan**
 - Potential components under consideration:
 - Funding needs
 - Demonstrations and implementation
 - Policy needs
 - How to address ZE infrastructure needs across different emissions sectors (e.g., on-road, off-road, stationary, etc.)
 - How to ensure ZE infrastructure resources are equitably distributed, are affordable, and yield direct local benefits
 - How to align AQMD control measures with other state/federal initiatives
 - How to address/consider infrastructure reliability



Current Estimates of ZE Infrastructure Needs



AB 2127 Report
(July 2021)

- 1.2 million public chargers to support 8 million LD ZEVs by 2030
- 157,000 high-power chargers to support 180,000 MD/HD ZEVs by 2030

EO B-48-18
(January 2018)

- 200 public H2 fueling stations by 2025 to support 250,000 FCEVs

- Specific estimates not yet developed for South Coast Air Basin
- Statewide policies seek rapid transition to ZE technologies
- Charging millions of ZEVs will introduce significant new load onto the electric grid (local impacts different than regional)
- Unprecedented growth in ZE infrastructure is needed
- ZE infrastructure needs for off-road, stationary, and area sources need additional planning and analysis

Topics for Working Group Meeting #2



Today's discussion will focus on the utilities' planning efforts for large scale ZE infrastructure development:

- What are the near and long-term planning needs for the next ~15 years to accomplish ZE infrastructure deployment at scale?
- What are some broad cost scenarios for each utility's customer base?
- What are specific technical or policy challenges and opportunities for ZE infrastructure deployment?
- What are potential actions South Coast AQMD can take to support your organization's efforts to plan, fund and build ZE infrastructure at scale?
- How will your utility include resiliency, equity, affordability, and reliability into ZE infrastructure planning?



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Transportation Electrification Programs and Planning

*Preparing Customers and the Grid for the Future of
Business Operations*

Aaron R Dyer

Senior Project Manager, eMobility

February 4, 2022

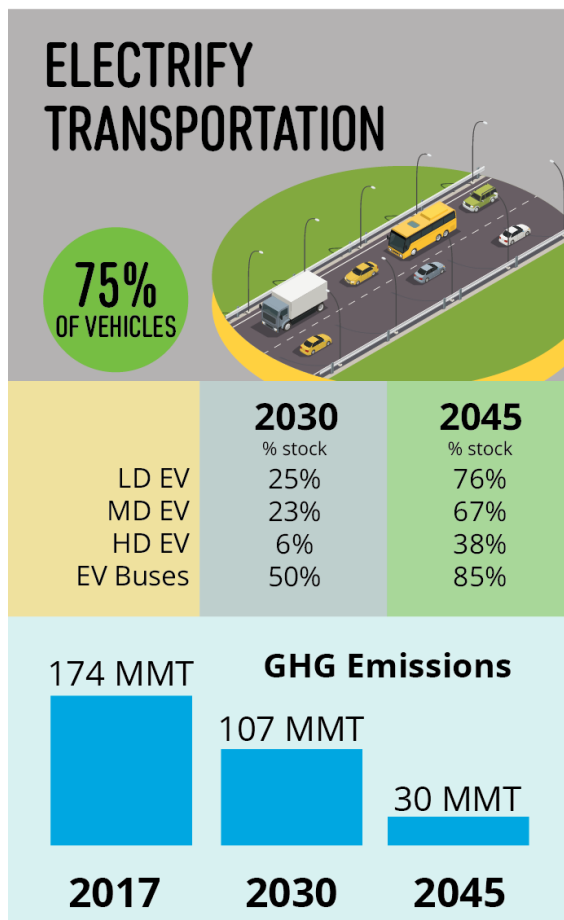


Agenda / Outline

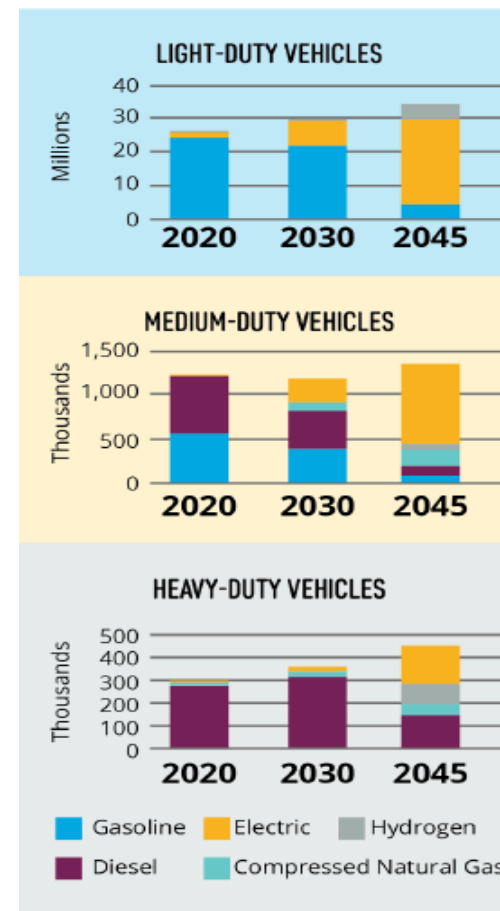
1. SCE and Electrification: an Overview
2. Electrification and Customers: Business-focused EV Programs
 - Charge Ready Transport
 - Transportation Advisory Services
 - Proposed Future Initiatives
3. Electrification and the Grid
 - Planning for future electrical load
 - System resiliency

SCE's Electrification Vision: Pathway 2045

Achieving California's ambitious climate goals is only possible by transitioning transportation to zero-emissions



- In addition to contributing to our state's greenhouse gas emissions, goods-movement activities are currently responsible for 42% of Southern California's NOx emissions
- By **2045, 26 million** passenger vehicles on the road need to be electric, which equals **three-quarters of all cars**.
- For **medium-duty vehicles two-thirds**, or **900,000** need to be electric and for **heavy-duty** the number of vehicles needed is **one-third** or **170,000**.
 - Low-carbon fuels play a significant role for heavy-duty vehicles and remove more than half of the carbon emissions in this segment



Electrification and Customers:

Business-focused EV Programs

Energy for What's Ahead[®]



SCE's Charge Ready Transport Program

- Launched in 2019, Charge Ready Transport is helping California achieve its GHG reduction goals by providing **infrastructure to support fleet electrification**
- Five-year program with an approved total program budget of **\$356.4M**
- Program will **design and build make-ready electrical infrastructure** on both the utility-side and customer-side of the meter for qualifying SCE fleet customers procuring or converting at least 2 MDHD EVs
- **Charging Equipment Rebate** available for **transit/school buses** and for eligible Participants installing charging equipment at **sites located in disadvantaged communities** where the Participant is not a Fortune 1000 company
- Striving to achieve minimum **870 sites** with **8,490 electric vehicles** procured or converted



Participating in Charge Ready Transport

On-road vehicles

Eligible Classes:

- Medium-Duty vehicles
- Heavy-Duty vehicles
- School Buses
- Transit Buses
- Truck Stop Infrastructure

Vehicles must have GVWR (max loaded weight) 6,000 lbs. and above (class 2-8)

Off-road vehicles

Eligible Classes:

- Yard trucks
- Forklifts
- Transportation Refrigeration Units (TRU)
- Airport ground support equipment (GSE)

Visit www.sce.com/crt to learn more!

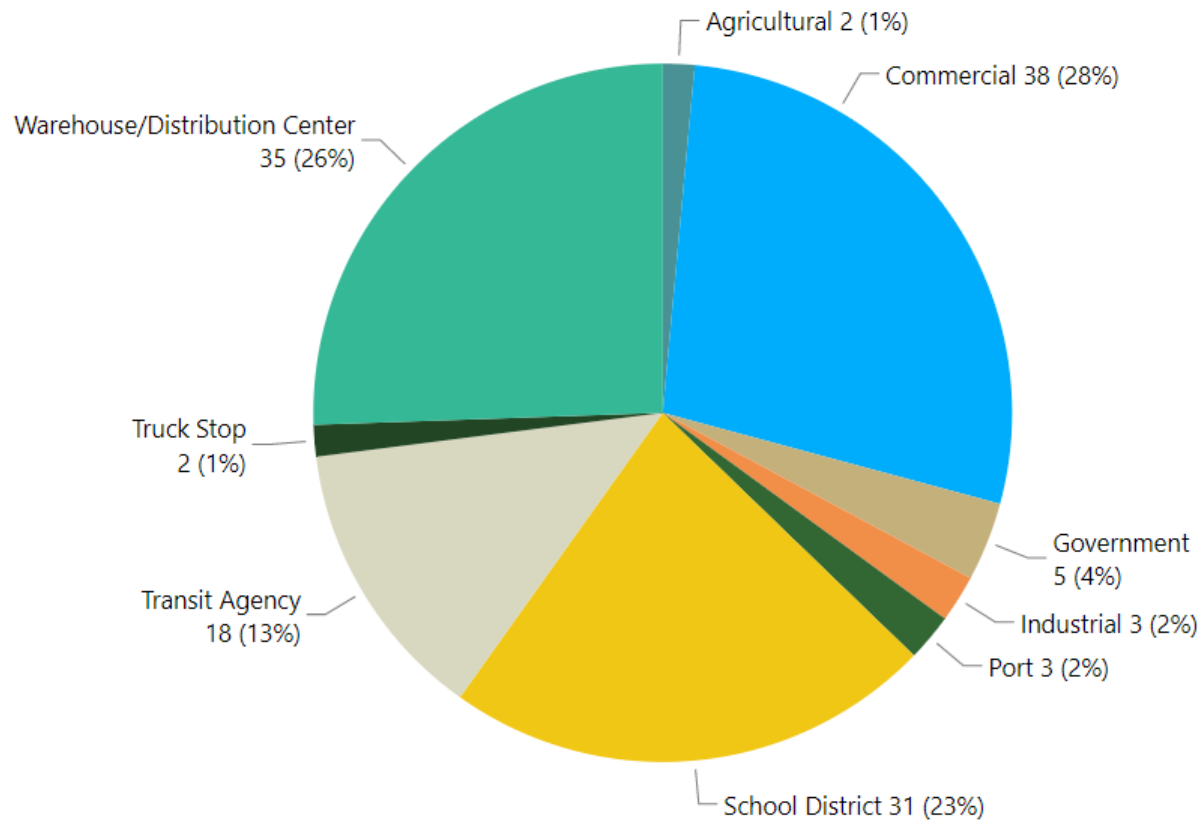
Program Requirements

- Lease or purchase **at least two medium- or heavy-duty battery-powered EVs** or convert at least two fossil-fuel vehicles to electric.
- Own or lease the property where chargers are installed
 - Project site must be located in SCE's service territory
- Select, purchase, and install [SCE-approved charging equipment](#)
- Keep chargers operational for at least 10 years
- Enroll in a time-of-use rate plan with separately metered EV charging
- Provide data related to charging equipment usage for a minimum of 5 years (on-road vehicles only)
- Provide a property easement for the SCE infrastructure
- Agree to Program terms and conditions

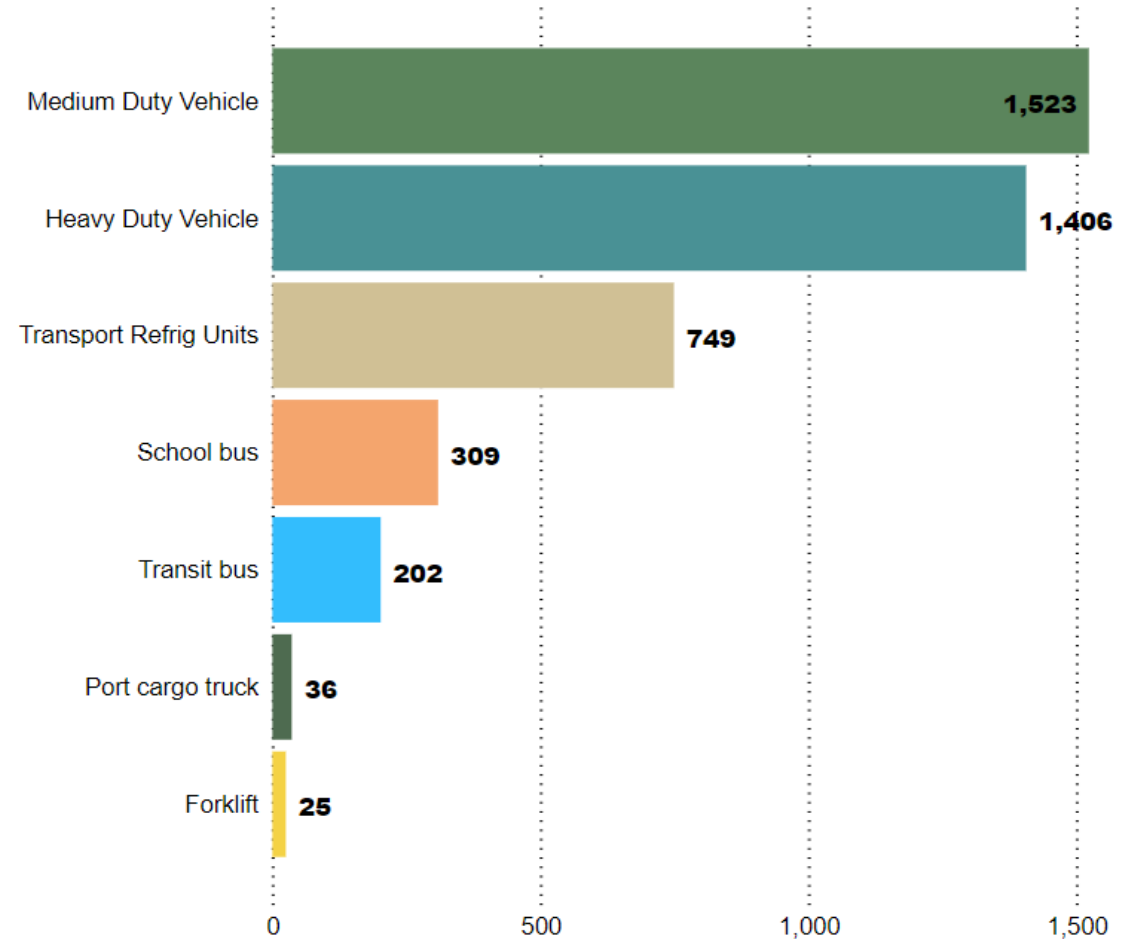
SCE is currently working with 137 sites that can potentially support over 4,000 MDHD electric vehicles

Due to the availability of vehicles, many sites are still early in the process, but early-engagements have increased in the last year

Distribution of Sites by Industry



Vehicle Count by Sector



TE Advisory Services: Assisting customers through the process

A four year, \$4.8M program, TE Advisory Services will provide customers with enhanced education, tools, and support as they electrify operations

Aspect:	EV Readiness Studies	Webinars/Workshops	Grant Assistance	Events
Objective:	Provide qualified customers with a high-level study of their proposed electrification project.	Offer free, quarterly webinars and workshops on various TE topics.	Assist qualified, small to mid-sized fleet commercial customers located in DACs apply for grants that fund the acquisition of electric vehicles.	Offer in-person events to give customers an opportunity to test new technology.
Target Audience:	<ul style="list-style-type: none"> MDHD Fleet Customers Multi-family Commercial 	<ul style="list-style-type: none"> MDHD Fleet Customers Multi-family Commercial Government Community Based Organizations 	<ul style="list-style-type: none"> MDHD Fleet Customers 	<ul style="list-style-type: none"> Fleet Customers
Service:	<ul style="list-style-type: none"> Fleet & Site Studies Site Only Studies 	Quarterly Educational Webinars or Workshops	<ul style="list-style-type: none"> Grant Writing Assistance Grant Package Review Tools & Resources 	<ul style="list-style-type: none"> Ride n' Drives Demonstration Site Visits
Timeframe:	July 2021	August – December 2021	February/March 2022	2022

SCE has proposed two new initiatives to help electrify commercial vehicles

SCE submitted its LCFS Implementation Plan with the CPUC on June 15th proposing rebates and financing assistance for small and medium businesses

Drayage Truck Rebate

- Rebate for registered drayage trucks in SCE Territory
- Applicants cannot be on the Fortune 100 List (same requirement in CRT)
- Not stackable with HVIP
- Non-ratepayer funded
- \$150,000 for Class 8 Trucks
- \$115,000 for Class 7 Trucks
- Funds expected to be reservable for customers in **Late-2022 (Pending Approval)**

Zero-Emissions Truck, Bus, and Infrastructure Finance Program

- A loan-loss reserve backstop financing guarantee operated in partnership with the California State Treasurer's Office
- Applicable on loans to small and medium businesses in disadvantaged or rural communities for electric vehicles and charging stations
- Stackable with other SCE and State incentives
- Additional goal to connect fleets with LCFS aggregators to ensure the value of a fleet's LCFS can be realized to help pay off loans.
- Anticipated to be available in **Late-2022 (Pending Approval)**

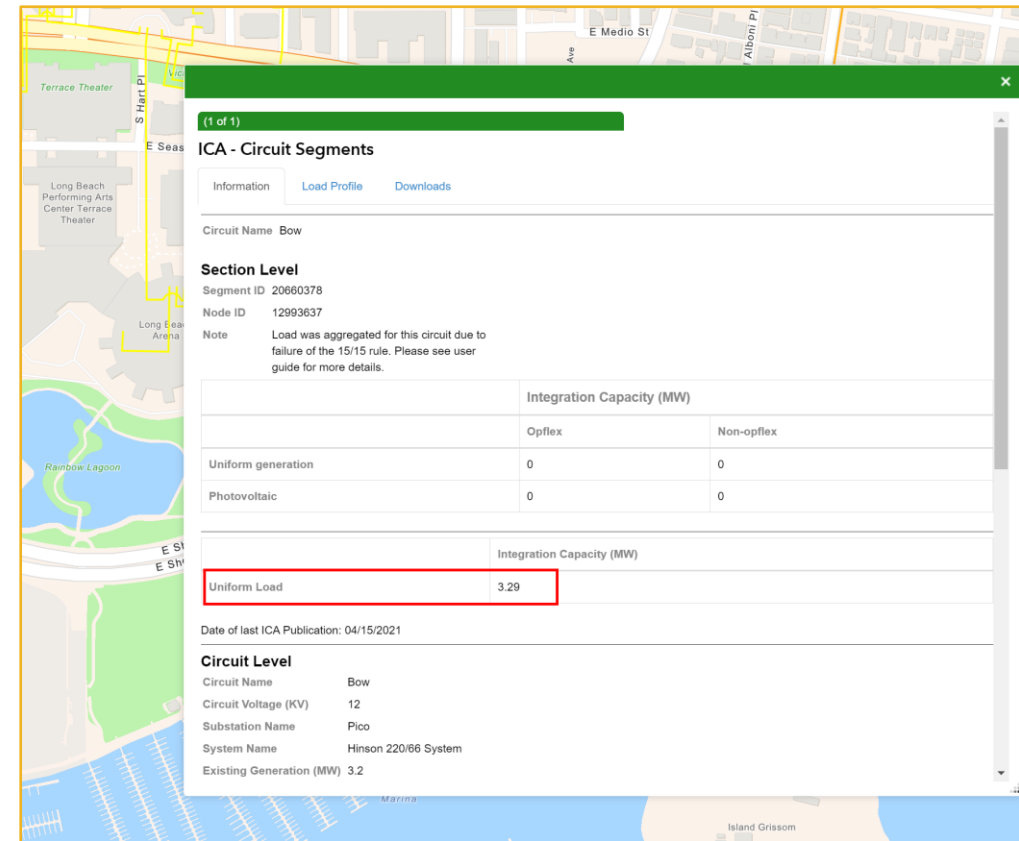
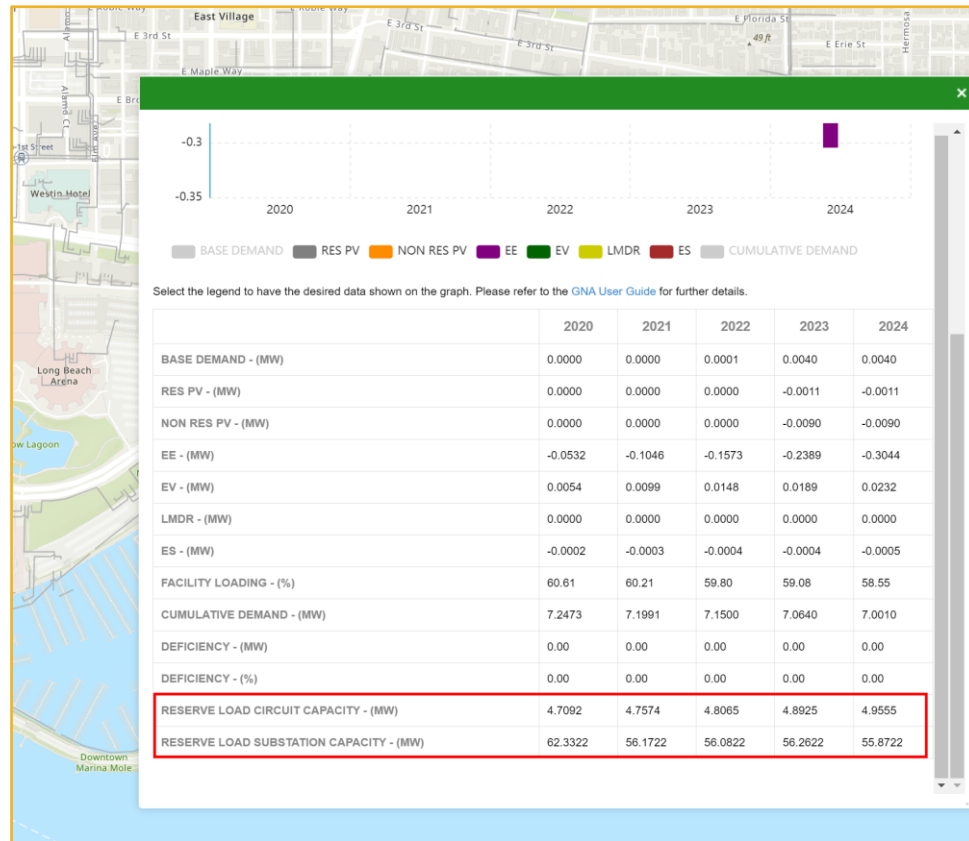
Electrification and the Grid

Planning for future load and resiliency

Energy for What's Ahead®



DRPEP informs available grid capacity locations



- SCE is continually upgrading the grid as a result of its annual system planning process, DER interconnections, and other programmatic work.
- The distribution system is dynamic in nature. The values shown on SCE's DRPEP are a snapshot in time but can be used as good reference points for customer site selection/prioritization.
- SCE strongly recommends customers to engage SCE early on regarding future load requests to help ensure circuit capacity will be available by the required date.

Proactive strategic grid planning to enable high electrification

Grid Planning Challenge 1: Chicken-egg dilemma

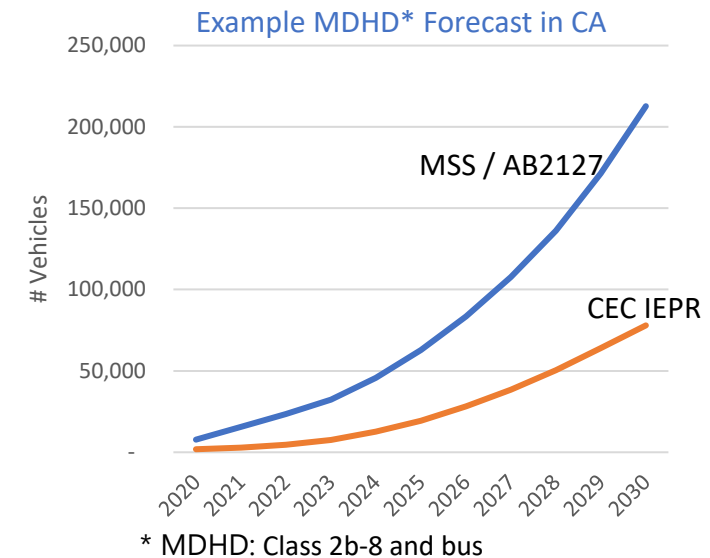
SCE has been actively working internally, as well as with CPUC and CEC on forecasting and planning advancement, including the current planning regulatory framework

- Forecasts used for capacity planning must reflect state policy in order to enable a high electrification future
- Scenario planning will enable utilities to make strategic no-regrets grid investment to accommodate the grid for a high electrification future

Grid Planning challenge 2: High uncertainties on when and where electrification will occur

SCE continuously improves EV forecasting and disaggregation

- Actual adoption plan is better than any forecast. CARB, AQMD data and customer actual adoption plans will be of great value to this process to ensure the grid investment is made at the right location and right time



The factors that impact system reliability are changing

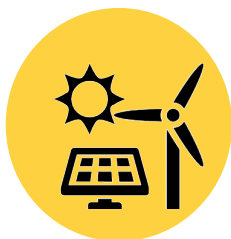
The future grid is becoming more complex with challenges that are changing the way we plan and operate the system

CUSTOMER



- Supporting **large adoption of DERs¹** on distribution systems
- **Higher usage and load density** largely due to electrification
- **More end-uses that are sensitive to power quality** (e.g., power electronics)
- Overall, **increased reliance on electricity**

SUPPLY



- **Integrating very high levels of renewables** (intermittent and far from load centers)
- **Ensuring Resource Adequacy** with an evolving mix of resources
- Maintaining grid stability and resilience under **lower levels of inertia** with conventional generation retirements

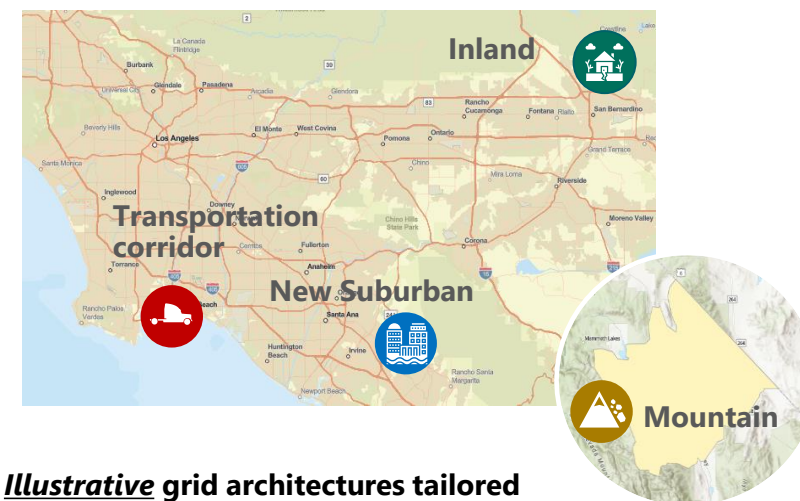
CLIMATE



- Direct impacts to **performance of grid assets** from climate risks such as extreme temperatures, wildfires, and floods
- Climate-driven changes in **customer needs and electric service continuity**

New tools and planning allow for specific solutions across the grid

Sample of SCE "representative communities" with distinct local needs and characteristics:



Illustrative grid architectures tailored to specific regions:

 : **Self-isolating grid** (mini/micro-grid)

 : **Distributed control grid** (autonomous/edge)

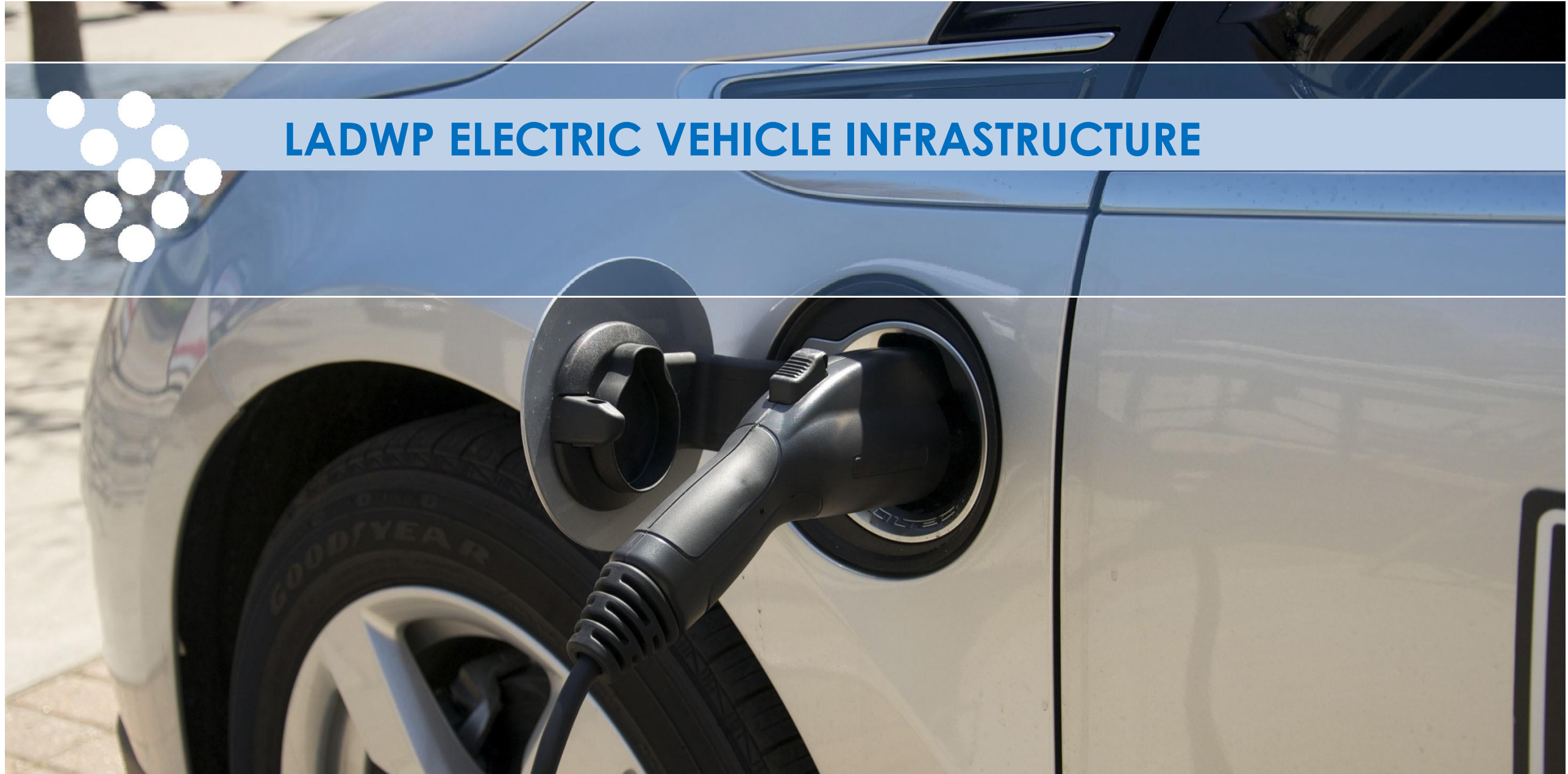
 : **High density/demand urban grid** (incl. DC²)

 : **Hybrid grid** (combined architecture)

1. Distributed Energy Resources.

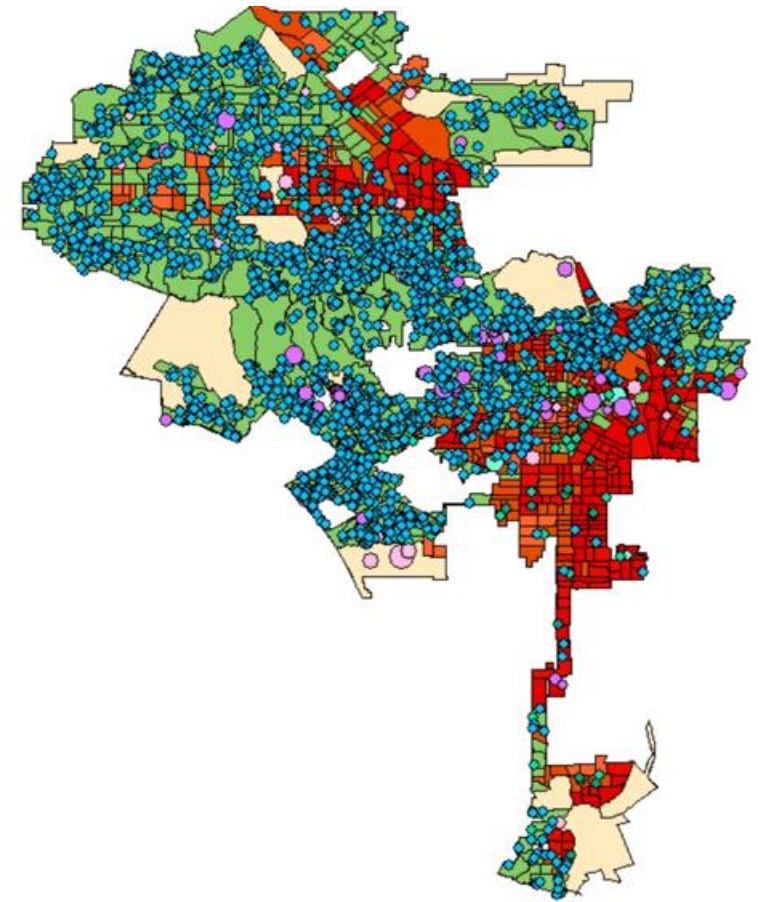


LADWP ELECTRIC VEHICLE INFRASTRUCTURE

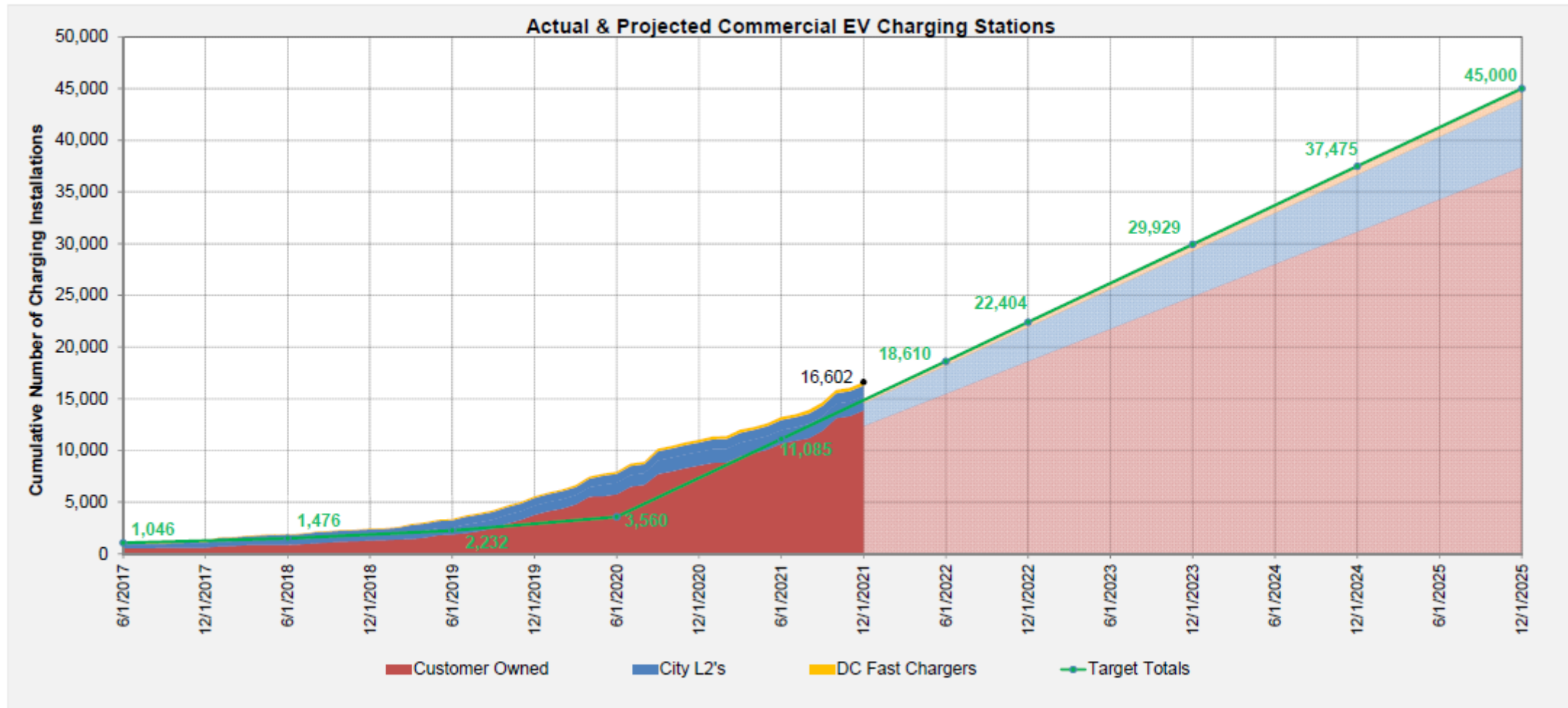


Current EV Market in Los Angeles

- › **9.06% EV (PHEV + BEV)** market share in CA in 2021
- › **68,719 EVs** in LA City as of 3/31/2021
- › **16,602** commercial charging stations, including 324 DCFCs



Current Progress Towards Targets



LADWP Preferred Utility Role

Escalating Utility Role in ET

Business as Usual (BAU)

- Provide service per existing tariffs
- Conduct normal infrastructure planning
- Provide basic ET customer information

Passive Supporter

- Deploy employee and internal fleet demos to generate data
- Conduct internal infrastructure impact assessments
- Participate in national stakeholder coalitions
- Develop broad customer education, outreach

Facilitator

- Programs to help infrastructure deployment by streamlining processes and offsetting high upstream costs
- ET tariffs to shape load
- Dedicated ET staff, and regional stakeholder coalition leadership
- Advocate for policies supporting utility engagement

Partner

- Programs that cost share infrastructure deployment (i.e. rebates, ratebase of makeready, etc.)

Owner

- Programs that primarily fund infrastructure deployment (i.e. ratebase of makeready and charging equipment)
- Third Party operates chargers

Owner/operator

- Programs that fully fund infrastructure deployment (i.e. ratebase makeready, charging equipment and operation)

Limitation, Resources and Funding Needs

- » Need for a secure, long-term program funding source to achieve enhanced targets
- » Need for dedicated staff within LADWP to match the pace of EV related service planning jobs and rebate applications
- » Low Carbon Fuel Standard Credit limitations
 - › Changes in regulation limit the types of programs that can be funded
 - › 35 – 45% of LADWP's LCFS credits must be provided to the California Clean Fuel Reward Program

Near-Term Initiatives

1. Educate and Streamline process and procedures for customer driven projects
2. Expand and improve Rebate Programs
3. Develop Utility owned DCFCs public Charging Stations
4. Support the installation of public charging stations on City of LA property through MOUs and partnerships with sister agencies
5. Develop a long-term EV Charger Maintenance Plan

Long-Term Initiatives

1. Secure a long-term program funding source to achieve enhanced targets
2. Target at least 40% of public charging stations in DACs
3. Develop simplified and cost-effective pricing and rate structures to attract public EV charging station developers/installer in LA
4. Ensure EV programs adapt to customer and grid needs. Promote accessibility, shared usage of chargers, and utilization of charging during off-peak hours

John Ferraro Building EV Infrastructure

- June 2020, added two 5,000 Amps switchboards at 480V equivalent of 7.5 MW capacity dedicated for EV
- Existing 355 Level 2 Chargers + 13 DCFCs.
Of which,
 - Fleet: 164 Level 2 Chargers + 10 DCFCs
 - Employee: 167 Level 2 Chargers
 - Public: 24 Level 2 Chargers + one 50 kW DCFCs + Two 175 kW DCFCs linked for 350 kW



Van Nuys Customer Service Center – Construction Phase

- Public: 14 Level 2 Chargers + 4 DCFCs
- Combination of Solar and EV DCFCs



**VAN NUYS CUSTOMER PAYMENT CENTER
SOLAR CARPORT & EV CHARGING STATION**
DESIGN ARCHITECT: GUILLERMO HONLES



Normandie Public DCFC Plaza – Feasibility Phase

- Public: Up to 40 parking spaces for EV DCFCs
- Combination of Solar, EV DCFCs, and Energy Storage



Questions





**Your Neighborhood.
Your City.
Your Power.**



City of Colton
ELECTRIC UTILITY

City of Colton Electric Utility (CEU) Overcoming Barriers



- Population – 55,480
- Size- 16 Sq. miles
- Fleet size approximately 280 vehicles
- According to the State of CA CalEnviroScreen Score 3.0 we are 95+% DAC





Planning Efforts for Large Scale ZEV Infrastructure

- Participated in the West Coast Clean Transportation Corridor study that evaluated the electrification of the I-5 corridor from Mexico to Canada.
 - Recommendation -Plan for EV plazas every 50-100 miles along the I-5 corridor (and major arterial highways) to support MHD EVs. (Colton I-10F is considered an arterial)
- A Memorandum of Understanding (MOU) for CA Electric Transportation Coalition Regional Charging Network is in works for member utilities IOUs and POUs to sign on.
 - Colton will sign on



Funding Consideration

- What are the high-level cost estimates for accomplishing this transition?
 - \$500,000 (Guess)
- What funding programs are planned or already available?
 - We do not have a funding source large enough



Funding Consideration

- Who will pay these costs? What programs have you planned to recover these costs?
 - If customer is installing the infrastructure they would pay the cost
- What is the short and long-term financial projection for ZE Infrastructure?
 - TBD but will seek grants



Barriers to Meeting ZE Infrastructure



- Large warehousing are not putting in EV infrastructure for trucks during plan check (Level II infrastructure only).
 - This supports the study for EV plazas because the business owners do not want to invest in it.
- Ideal policy levers that can be developed to encourage ZE infrastructure development?
 - Make it a Statewide Building Code requirement for all new construction to install EV chargers that coincide with parking requirements not just Infrastructure in the ground.

Barriers to Meeting ZE Infrastructure



- What should we as the Air Quality Management District and stakeholders know about your area (activities and jurisdiction)?
 - Colton supports EV infrastructure and electrification of vehicles and could support the infrastructure of private business needs for expansion if they are willing to take upfront investment .
- How is your organization reconciling future electric capacity with Transportation demand / domicile locations?
 - With renewables on the grid its an opportunity for load growth so capacity should not be an issue as long as we plan accordingly for the future.

Contact Information:

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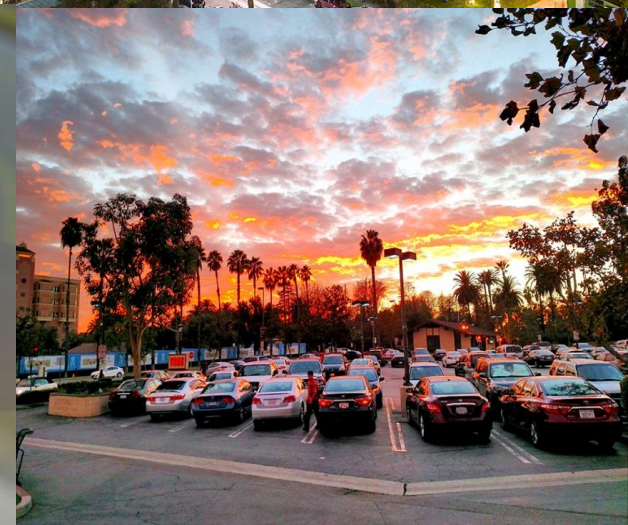
Thank You



Utility Zero Emission Infrastructure

Pasadena Water and Power

AQMD Workshop 2/4/2022





Types of EV Chargers

Pasadena Water and Power

Quick Overview of the EV Charging Landscape and Terms

Level 1 Charging

110v
~ 1.3 kW



Level 2 Charging

220v
~ 3.3 – 6.6 kW



DC Quick Charging

440v
~ 50 kW





Utility Role

Pasadena Water and Power

Electric Transportation Goals:

1. Increase EV adoption
2. Provide electric “fuel” competitive with petroleum
3. Assure there is adequate EV infrastructure to support the new technology.



Figure 1. This pyramid illustrates how likely PEV drivers are to need and use each type of charging infrastructure. Image from Argonne National Laboratory.



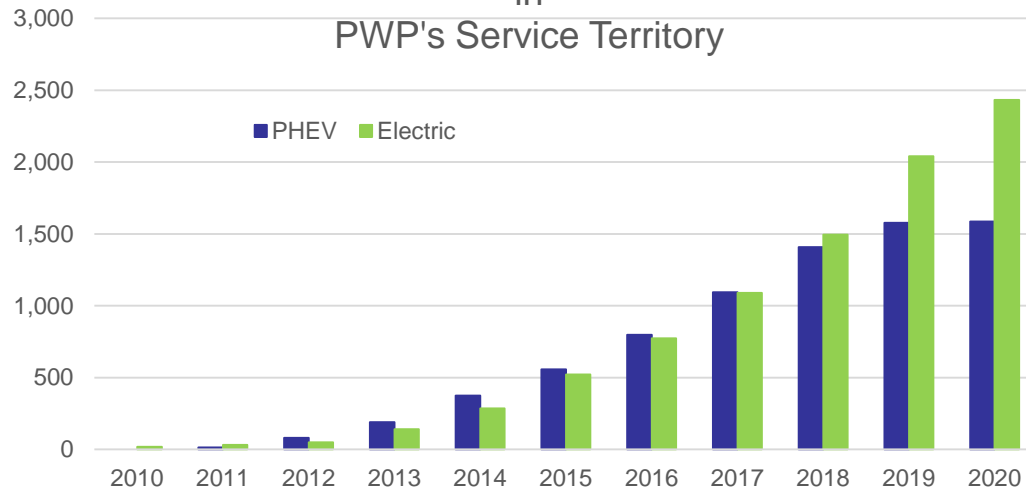


ZEV Projections in Pasadena

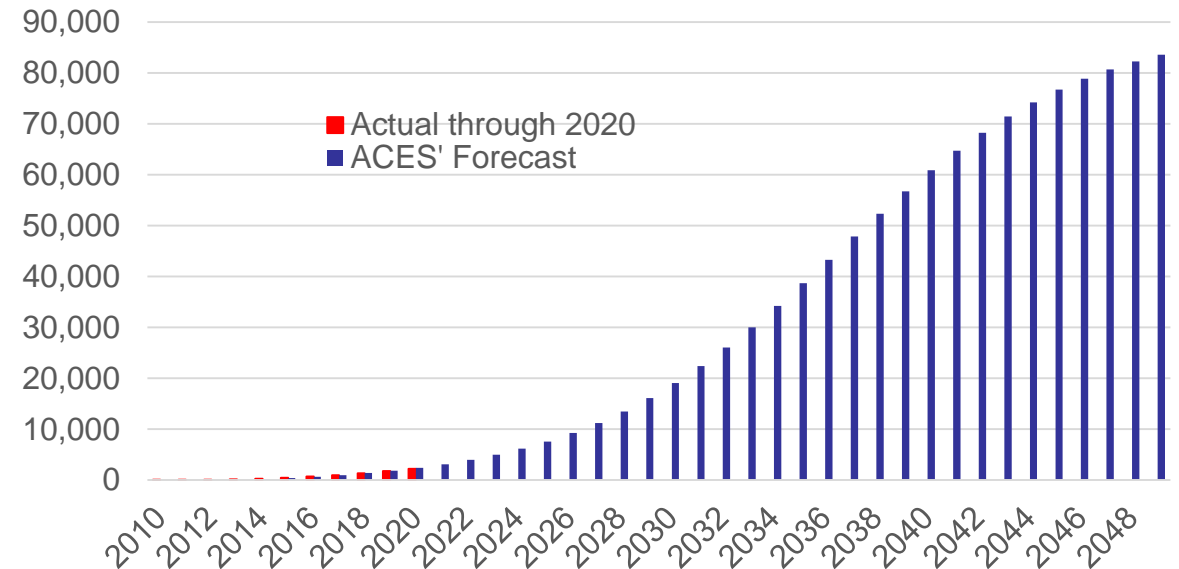
Pasadena Water and Power

- High EV Percent Registrations in Pasadena, 87% Estimate by 2048.
- PWP has generous incentives for customer purchase of new and used EV s and Infrastructure.
- PWP has an ownership model for Public Infrastructure.
- Light Duty and Transit are immediate markets.

Electric and Plug-In Hybrid Vehicles Registered in PWP's Service Territory



EV Registrations in Pasadena





Key Points about PWP's Charging Plazas

Pasadena Water and Power

- PWP does not use Rate Payer funds.
- Major funding from Low Carbon Fuel Standard (LCFS)
- Deliver the whole package. (\$, Installation, O&M)
- Partner with Others.
- Various Delivery Models
(Internal, Design/Bid/Build, Turnkey w/ O&M)



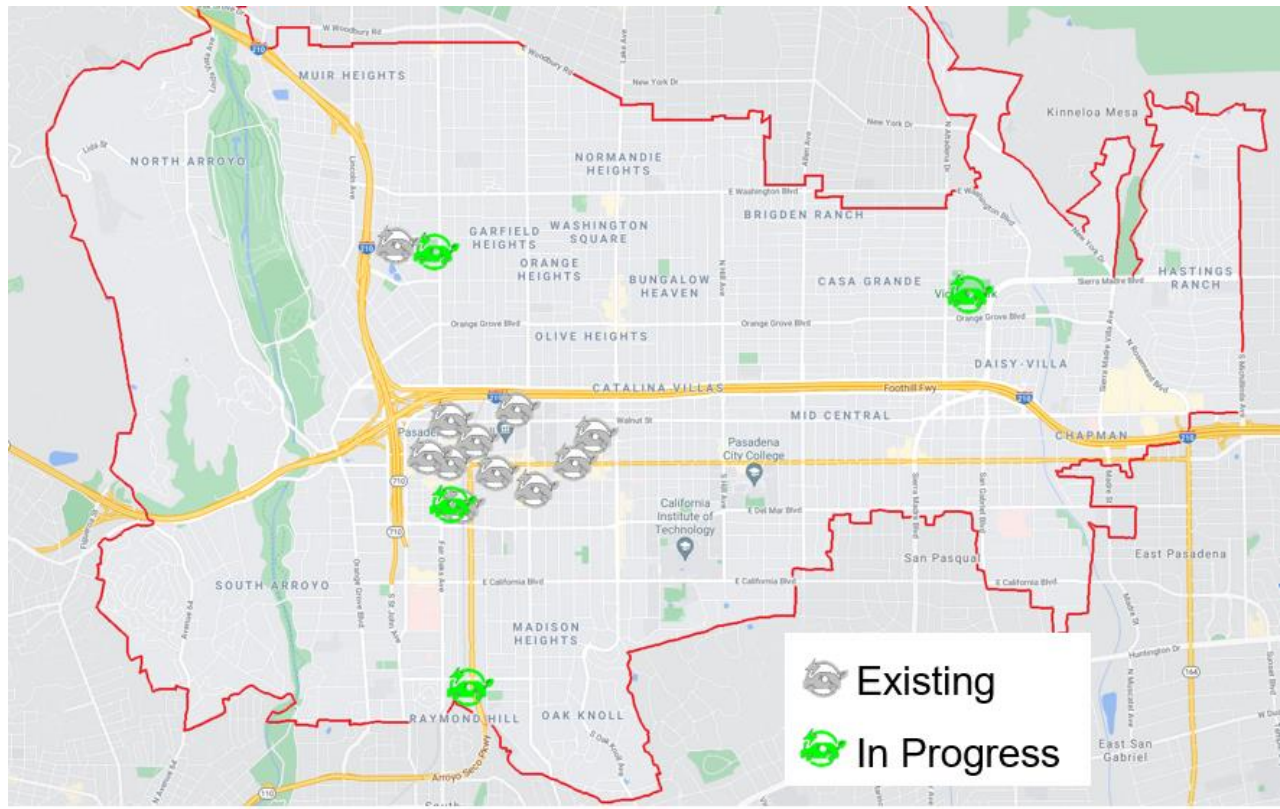


City Owned Chargers

Pasadena Water and Power

- 4 Large Installations Complete (3 Public)
- 3 Large Installations in Progress (All Public)
- Various Smaller Installations

LOCATION	Charging Stations		
	Total	Public	Fleet
Holly Garage	52	27	25
Los Robles Garage	10	5	5
Del Mar Garage (Level 2)	7	7	
Del Mar DCFC	2	2	
Marriot Garage	3	3	
School House Garage	2	2	
Marengo Garage (Level 2)	5	5	
Marengo Garage DCFC	20	20	
Playhouse Garage	2	2	
El Molino Garage	2	2	
Delacey Garage	3	3	
Main Library	2	2	
Arroyo Parkway DCFC	6	6	
City Yards (Level 2 Rear)	50		50
City Yards (Level 2 Front)	3		3
City Yards DCFC	2		2
Total	171	86	85





Pasadena City Yards

Pasadena Water and Power

- 53 Level 2 Chargers
- 2 DC Fast Chargers
- Fleet and Employee Use



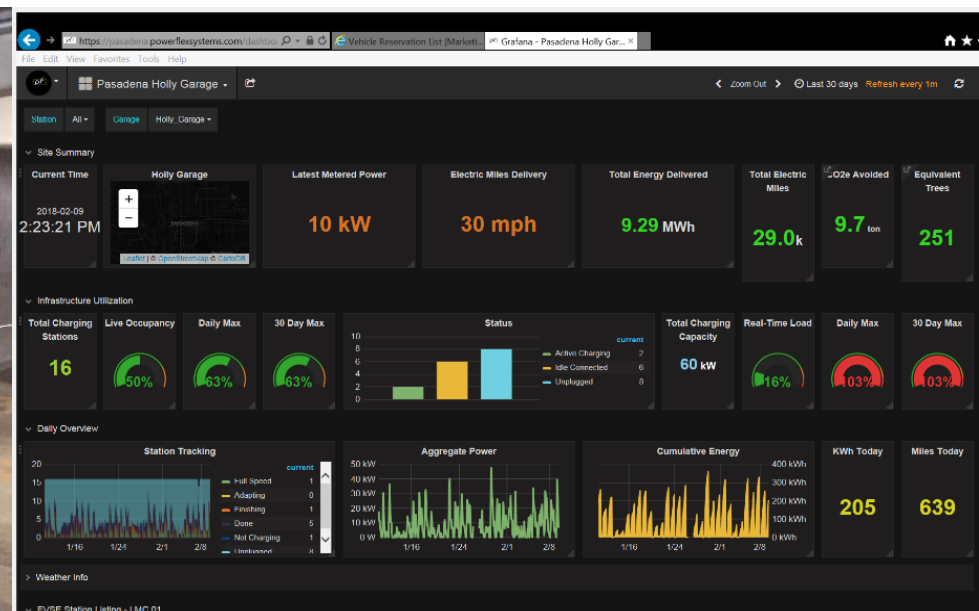
PASADENA



Pasadena Holly Garage

Pasadena Water and Power

- 52 Level 2 EV Chargers
- Connected to 200A 277/480V service with dynamic load sharing
- Fleet / Employee / Public Use





Marengo Charging Plaza

(Largest Public Fast Charging in USA!)

Pasadena Water and Power

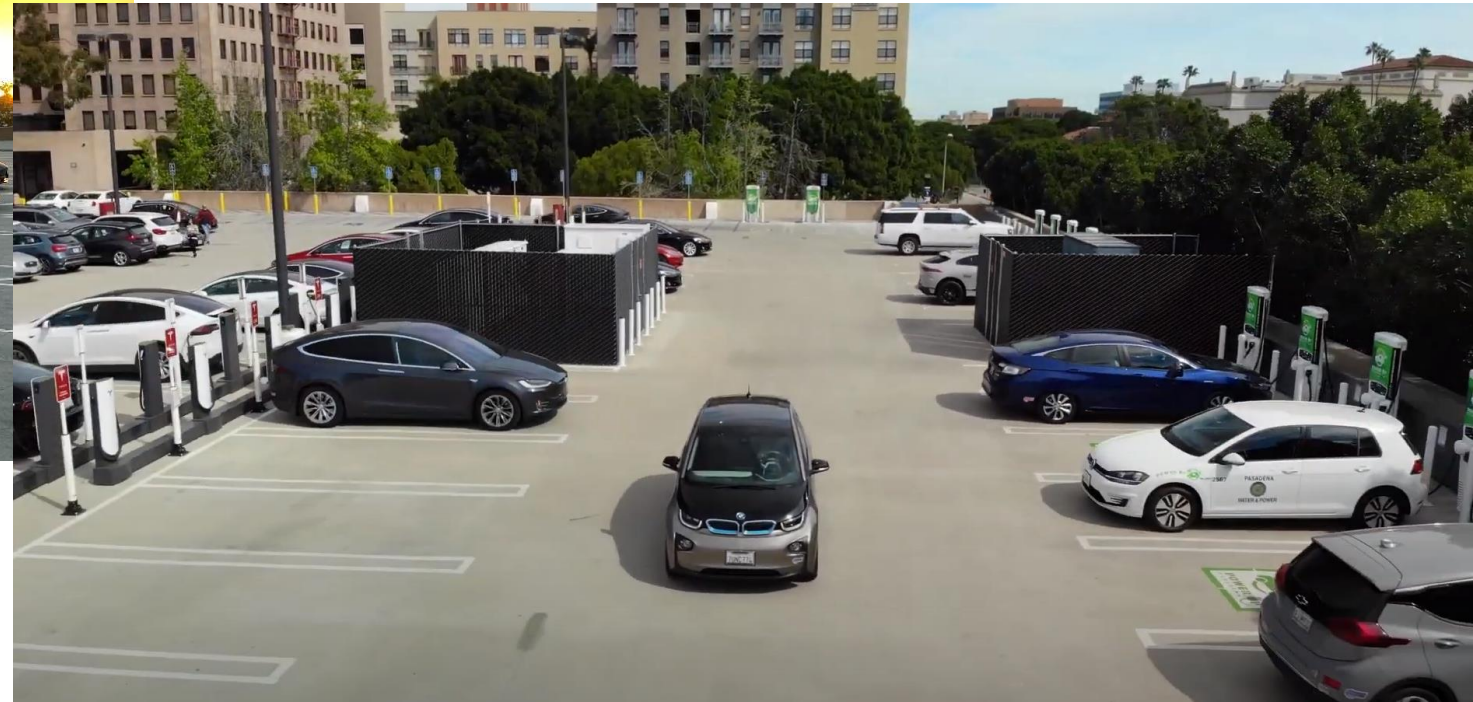
- 44 DCFCs
- (24 Tesla+20 PWP)
- Supports all DCFC Standards





Marengo – Completed Installation

Pasadena Water and Power





Marengo – PWP Chargers

Pasadena Water and Power





Arroyo Charging Depot

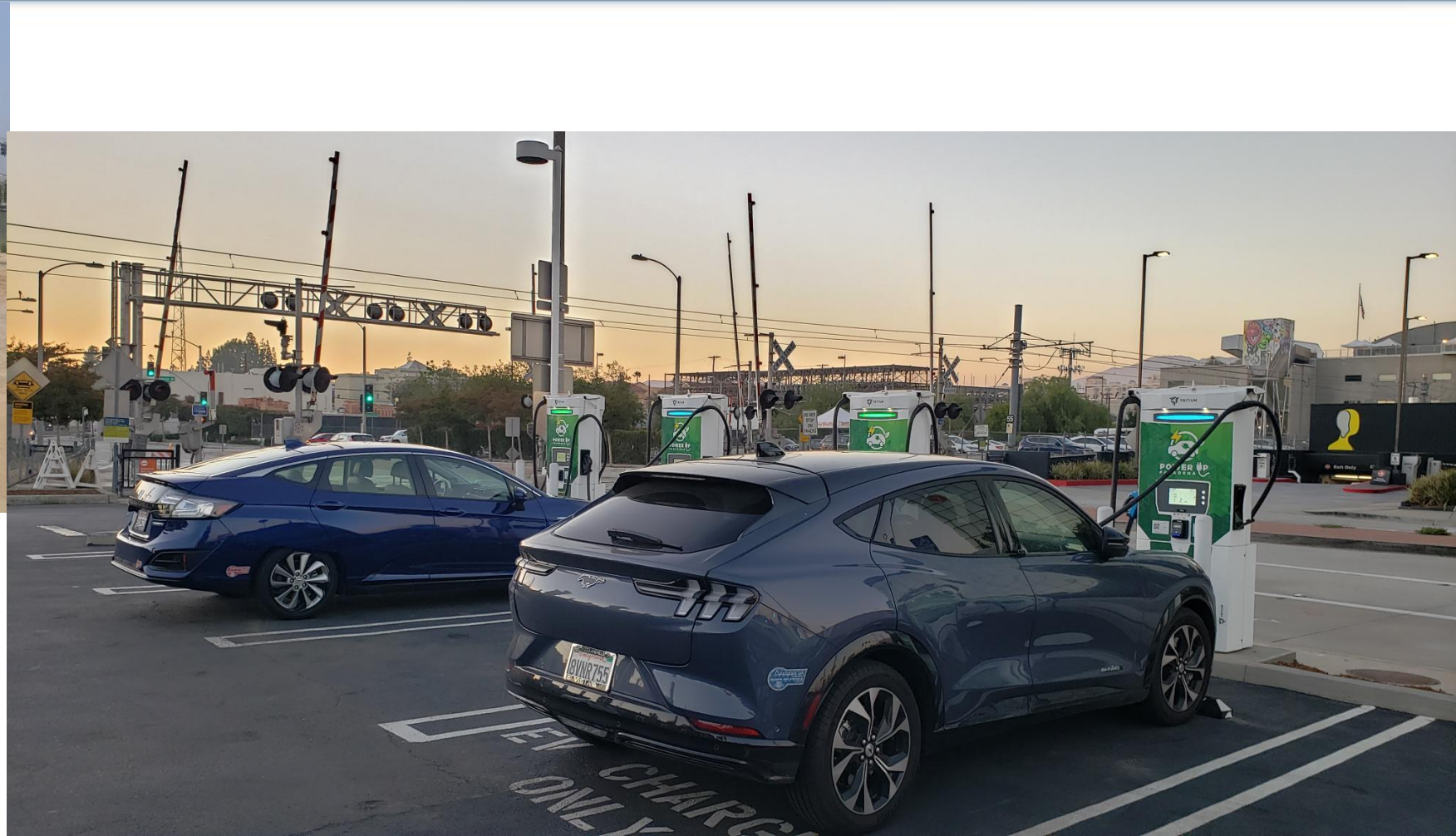
Pasadena Water and Power





Arroyo Charging Depot

Pasadena Water and Power



PASADENA

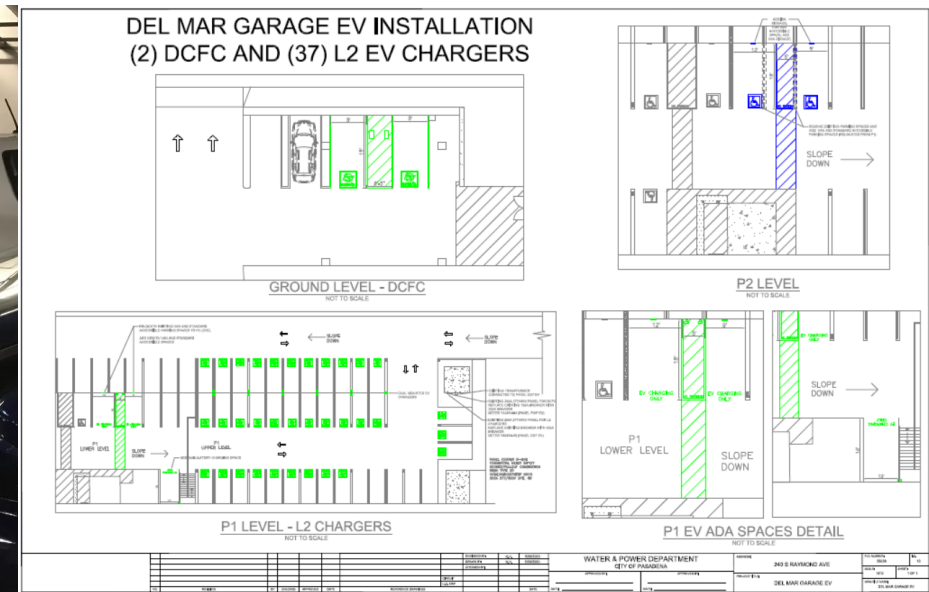


Pasadena Del Mar Garage Expansion

Pasadena Water and Power

(In Construction)

- Expansion is in construction
- Originally: 1 DCFC + 5 Level 2 chargers
- New: 2 DCFC + 37 Level 2 chargers with dynamic load sharing



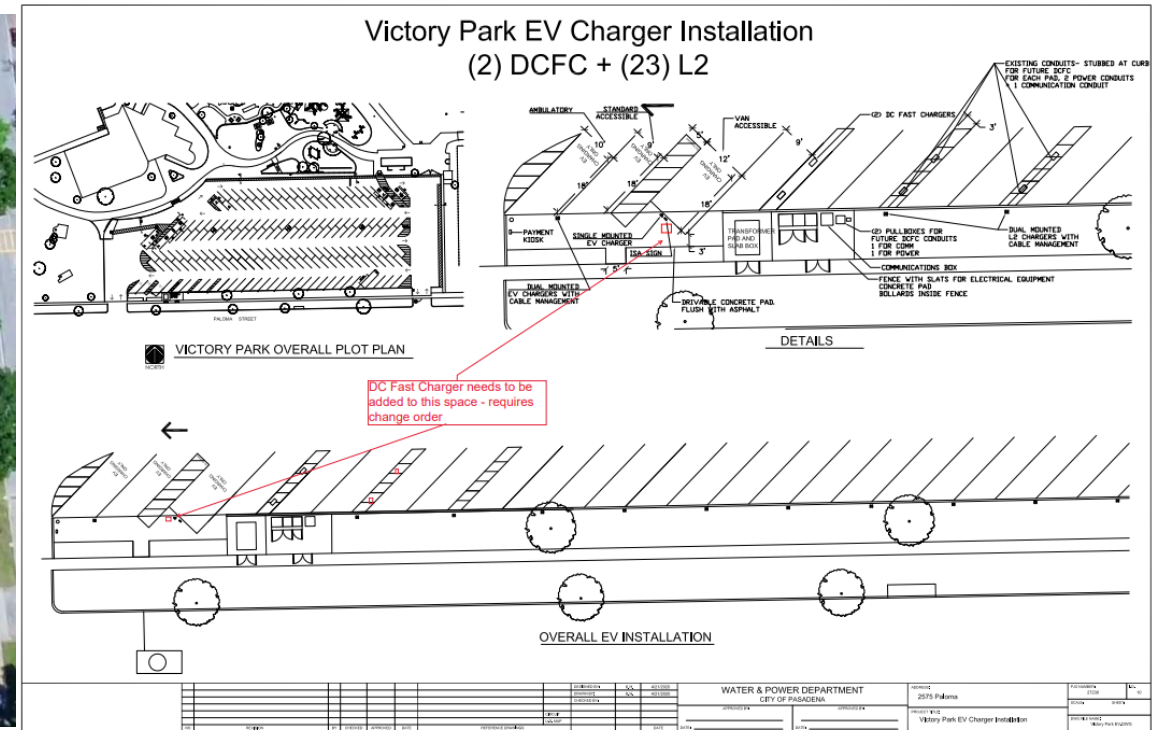


Pasadena Victory Park EV

Pasadena Water and Power

(Coming Soon)

- 23 Level 2 Chargers + 2 DCFC



PASADENA

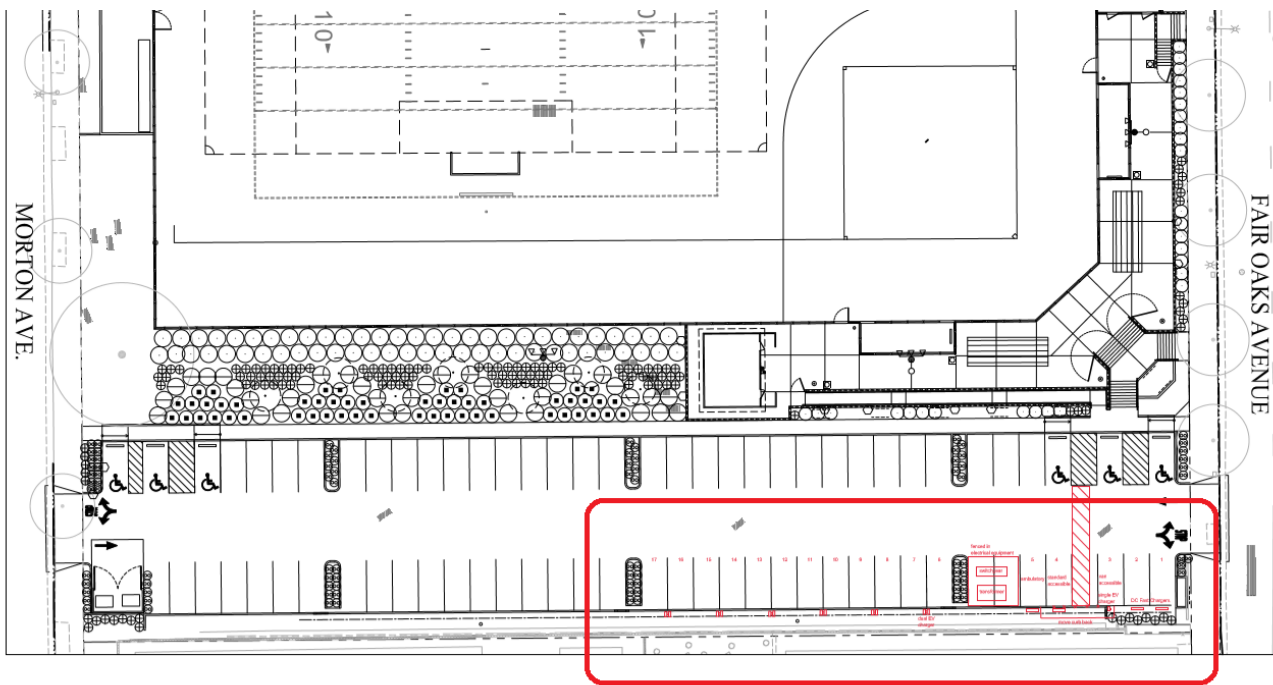


Pasadena Robinson Park EV

Pasadena Water and Power

(Coming Soon)

- 21 Level 2 Chargers
- 5 DCFC



ROBINSON PARK

EV Charger Area: 5 DCFC & 20 L2

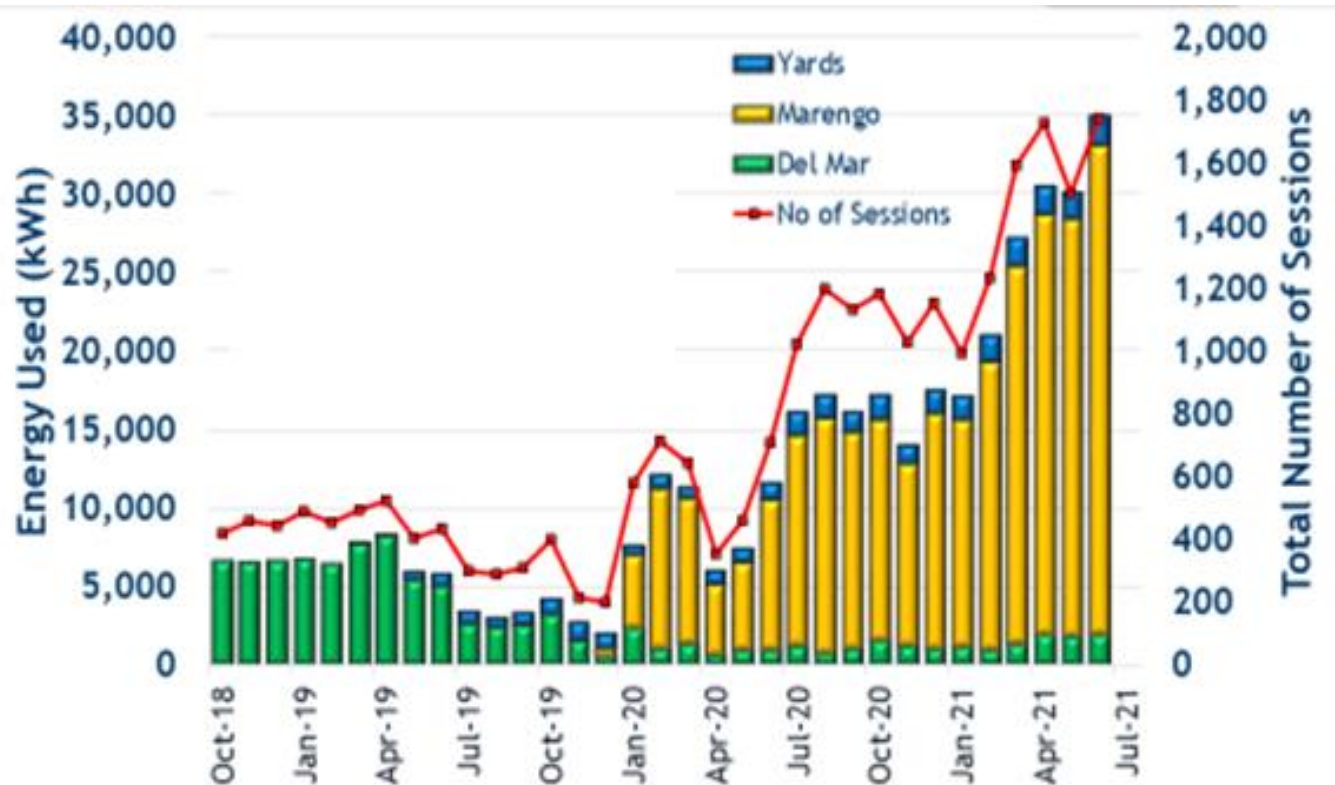




PWP Charger Usage

Pasadena Water and Power

- Upward Trend
- Promote Non-Peak Usage
- Maximize LCFS Credits





Customer Experience, Payments and Maintenance

Pasadena Water and Power

- Large Installations Support Availability for Customers
- DC Fast Charging is More Complex Than Level 2 (240V) Charging.
(Charger Mfg., Installer, Back Office Company, Maintenance Staff, Credit Card Vendor, Communications)
- Customer Payment Infrastructure and Back-Office is Expensive
- Moving Toward a Turnkey Approach for Projects
- Requiring a “Fail-Safe” design so it works even if coms are down.
- Maintenance requires a minimum response time w/ parts.



PASADENA



Challenges & Opportunities

Pasadena Water and Power

- Identify the business case by the sponsoring org.
- Community Leadership support is key to EVSE deployment.
- Site control is a challenge to EV infrastructure.
- EV ADA should be combined with General Parking ADA.
- Not an Issue: PWP can meet the projected EV loads.



THINK
BIG

PASADENA



Next Step.... PWP EV Programs!

Pasadena Water and Power

Maximize Usage...

Under Considerations:

- > Low Income Discounted Charging
- > Customer Loyalty/Subscription/Rewards/ “All-You-Can-Charge”
- > Targeted Subscriptions for Shared Mobility (Uber/Lyft)
- > Targeted Subscriptions for Delivery Vans (I.e. Amazon, FedEx, etc.)
- > Opportunities for Transit and Heavy Duty.



PASADENA



Questions

Pasadena Water and Power



PASADENA



THE ROLE OF CLEAN FUELS & GAS INFRASTRUCTURE TO REACH NET ZERO BY 2045

2022 AQMP Working Group

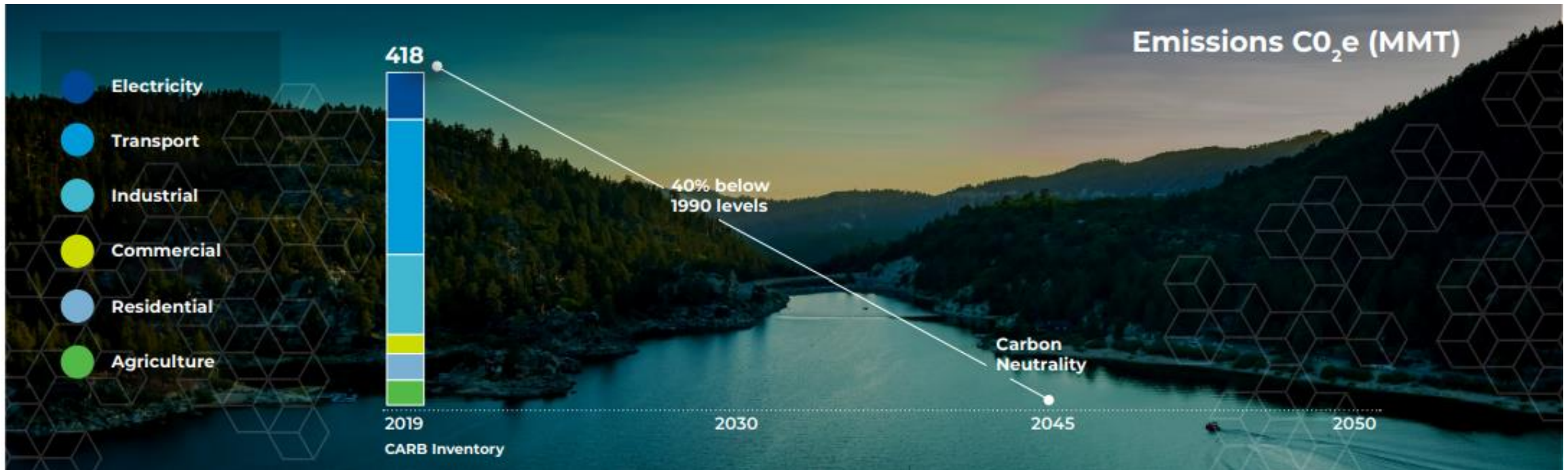
Zero-Emissions Infrastructure

February 4, 2022



California Emissions Targets for Net Zero by 2045

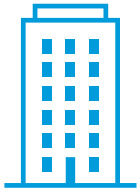
- » What role do clean fuels play?
- » What would a clean fuels network look like?



Source: SoCalGas, "The Role of Clean Fuels and Gas Infrastructure in Achieving California's Net Zero Climate Goal", October 2021 available at [Roles_Clean_Fuels_Full_Report.pdf \(socalgas.com\)](https://www.socalgas.com/roles-clean-fuels-full-report.pdf)

Annual Average CA NOx Emissions in 2020

Displayed Per Sector

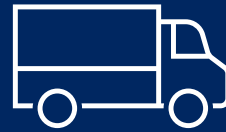


BUILDINGS¹

102

Tons Per Day

¹Service, commercial & residential

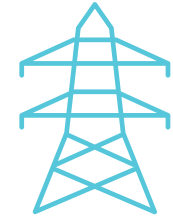


TRANSPORTATION²

1,166

Tons Per Day

²Passenger, off-road equipment, heavy duty truck buses, ships, planes, rail and other



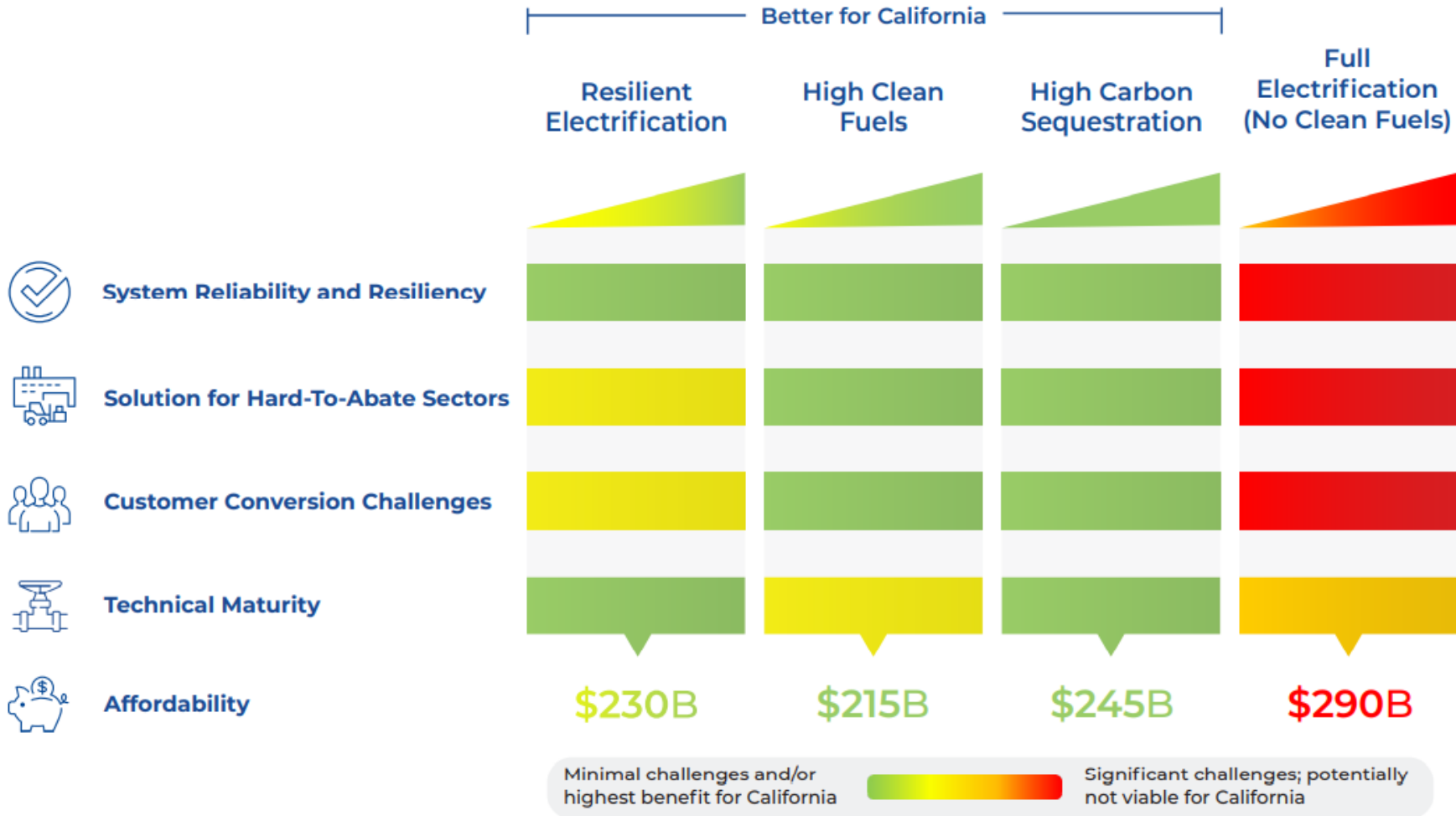
ELECTRICITY³

38

Tons Per Day

³Co-generation and utilities

High Clean Fuels Scenario Best for Hard-to-Abate Sectors



Source: SoCalGas, "The Role of Clean Fuels and Gas Infrastructure in Achieving California's Net Zero Climate Goal", October 2021 available at [Roles_Clean_Fuels_Full_Report.pdf \(socalgas.com\)](https://www.socalgas.com/roles-clean-fuels-full-report.pdf)

Scenario: 2

Resilient Electrification

» **High Clean Fuels**

High Sequestration

No Fuels Network

Carbon Sequestration Allowed

NO

Transportation Sales By 2035



BEV:
85%

FCEV:
15%



BEV:
50%

FCEV:
50%



Short Haul
BEV: **100%** FCEV: **0%**

Long Haul
BEV: **0%** FCEV: **100%**

Source: SoCalGas, "The Role of Clean Fuels and Gas Infrastructure in Achieving California's Net Zero Climate Goal", October 2021 available at [Roles_Clean_Fuels_Full_Report.pdf \(socalgas.com\)](https://www.socalgas.com/roles-clean-fuels-full-report.pdf)

Current Work to Accelerate Transition to Clean Energy

SoCalGas aims to accelerate the energy transition by increasing the delivery of clean fuels such as renewable natural gas; adapting our system for hydrogen; and supporting customer decarbonization.⁶

Strategies to accelerate the transition to clean energy:

- ▶ In collaboration with our research partners, fund \$400M for RD&D projects in the areas of clean fuels and hydrogen technology and infrastructure by the end of 2025⁷
- ▶ Complete five hydrogen pilot projects by 2025
- ▶ Develop hydrogen infrastructure solutions for the 2028 Olympics
- ▶ Deliver 20% renewable natural gas (RNG) to core customers by 2030⁸
- ▶ Demonstrate technical capability for gas distribution to safely support up to 20% hydrogen blend by 2030
- ▶ Establish a hydrogen industrial cluster by 2030

Source: SoCalGas, "ASPIRE 2045 Sustainability Strategy", January 25, 2022, available at [SoCalGas_Sustainability_Strategy-final.pdf](#)

Hydrogen Blending Policy

- SoCalGas' commitment to conducting the necessary work to safely introduce hydrogen into the Utility pipeline
- SoCalGas has presented and a filed a plan to identify hydrogen injection standard in near future as critical research is conducted and additional information is gathered to ensure safety and reliability

In Progress

- Ongoing research to inform development of hydrogen injection standard

Near Term (1-3 years*)

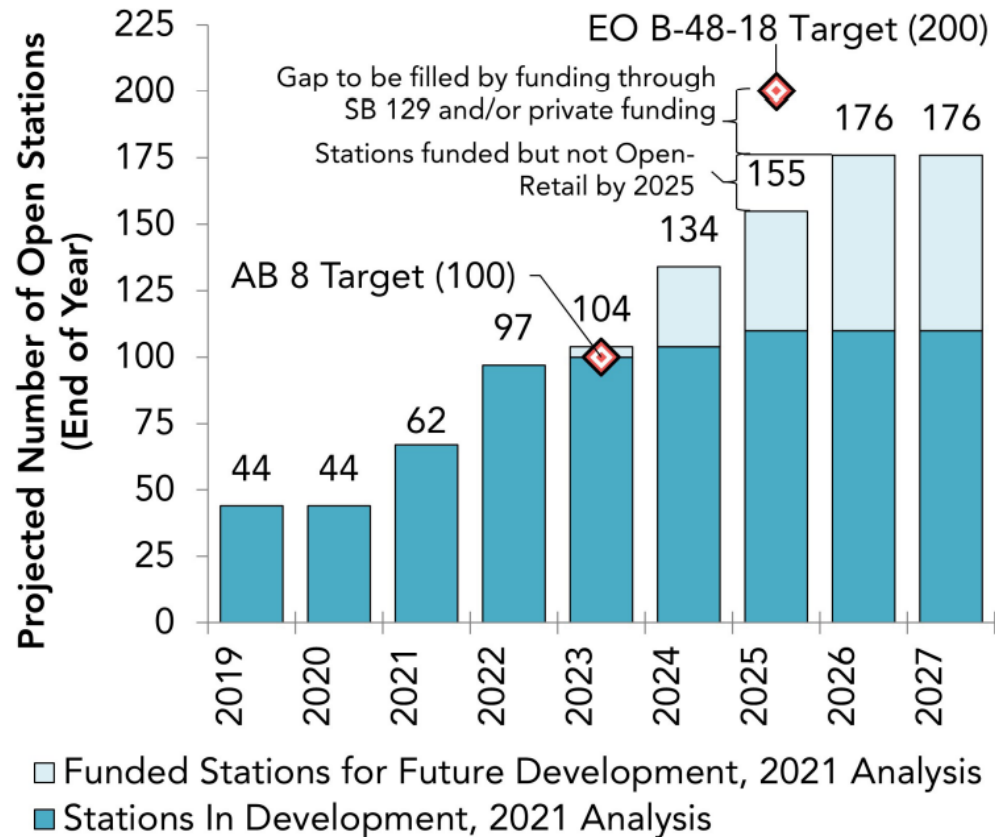
- Develop preliminary hydrogen injection standard, based on:
- Demonstration program
 - Data collected from ongoing research
 - Info from int'l pilots/ research/collaboration

Long Term (3+ years*)

- Identify final hydrogen injection standard
- Submit regulatory filings for approval

*As of 11/20/20 Application filing date

Hydrogen Light-Duty Refueling Infrastructure



Source: CARB, [2021 Annual Evaluation of Fuel Cell Electric Vehicle Deployment \(ca.gov\)](https://www.ca.gov)

- » January 2022, SoCalGas took delivery of **23** Toyota Mirais
 - February 2022 it will increase to **50**
- » Hyzon plans to deliver a **Class 3 FCEV utility truck** to SCG in 2022
- » Commitment to replacing **50%** of over-the-road vehicles with **ZEVs by 2025**
- » And **100% ZEVs by 2035**
- » Transform portions of SoCalGas distribution system for rapidly expanding hydrogen refueling

CALSTART Class 8 Hydrogen Fuel Cell Truck Commercialization Roadmap

Project Summary

Collaboration Partners	CALSTART, Cummins
Location	California
Start Date	Q4 2020
End Date	Q2 2022
Total Project Budget	\$216,000
SoCalGas RD&D Funding	\$216,000
Project Manager	Michael Lee
Last Update	09/09/21

Project Description:

The project will develop two roadmaps, Technology Commercialization Roadmap and Medium- and Heavy-Duty (MD/HD) Hydrogen Fueling and Infrastructure Roadmap. The Technology Commercialization roadmap will provide market projections and describe market scenarios for the new truck technology. The report will also compare fuel cell trucks to equivalent battery-electric vehicles to explore differences in cost, emissions, performance, and operational success between these two zero-emission solutions. The MD/HD Hydrogen Fueling and Infrastructure Roadmap will provide recommendations for strategically locating hydrogen fueling infrastructure and will estimate future hydrogen demand for the medium- and heavy-duty trucking industry. It will also analyze the viability of various hydrogen production and delivery pathways, comparing centralized production with trucked hydrogen, pipeline delivery of hydrogen, and distributed/onsite production.

Objectives:

- Develop hydrogen fuel cell class 8 commercialization roadmap
- Develop hydrogen fueling infrastructure roadmap for heavy duty trucks in California

Status:

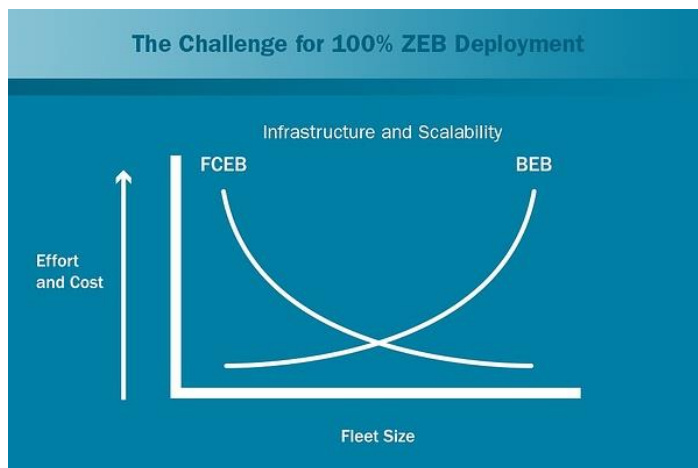
- CALSTART has surveyed fleets and is compiling feedback
- Commercialization Roadmap is

Other Information:

- Roadmaps will be used to supplement a Cummins Hydrogen Fuel Cell Class 8 Truck demonstration project awarded by the CEC

Benefits:

- Environmental: GHG Reduction, Environmental: Air Quality Improvement, Safety, Reliability, Improved Affordability, Operational Efficiency



GTI Hydrogen Fuel Cell Yard Truck Port of Los Angeles Demonstration

Project Summary

Collaboration Partners	CARB, GTI, Capacity, Frontier, HTEC, BAE, Ballard, TraPac, SCAQMD, POLA
Location	California
Start Date	Q3 2019
End Date	Q4 2021
Total Project Budget	\$12,055,413
SoCalGas RD&D Funding	\$322,500
CARB Funding	\$5,788,335
Project Manager	Michael Lee
Last Update	09/09/21



Project Description:

The California Air Resources Board (CARB) awarded GTI and its technology partners to develop and demonstrate two fuel cell electric hybrid yard trucks at the Port of Los Angeles, operated by TraPac for 12 months. There will be an extensive technology showcasing effort in order to maximize the impact of the demonstration. Yard trucks are the single largest source of emissions in all classifications of cargo handling equipment. The project is intended to demonstrate to port terminal operators that fuel cell powered, zero-emissions yard trucks is a safe, reliable, and operationally preferable solution to meet the port's clean air action plan. The trucks will be supported by HTEC's hydrogen fueling system, which provides fuel in a similar manner as diesel is currently provided.

Objectives:

- Develop and demonstrate two fuel cell electric hybrid yard trucks at the Port of Los Angeles, operated by TraPac for 12 months
- Develop and demonstrate HTEC's mobile hydrogen fueling system for the two - fuel cell electric hybrid yard trucks at the Port of Los Angeles
- Data collection and reporting for community outreach and technology showcase activities.

Status:

- First yard truck is in operation and being tested. The truck was showcased at the 2021 ACT Expo

Other Information:

- Awarded \$5,788,335 from California Air Resource Board: Zero- and Near Zero-Emission Freight Facilities Project Solicitation

Benefits:

- Reliability, Safety, Environmental Benefits, Operational Efficiencies

GTI Sierra Northern Hydrogen Switcher Locomotive Demonstration

Project Summary

Collaboration Partners	CEC, GTI, Sierra Northern Railway, Railpower, Ballard, Ricardo, SAQMD, UC Davis
Location	West Sacramento
Start Date	Q1 2021
End Date	Q4 2025
Total Project Budget	\$6,605,000
SoCalGas RD&D Funding	\$500,000
CEC Co-Funding	\$3,999,971
Project Manager	Michael Lee
Last Update	09/09/21



Project Description:

GTI and Sierra Northern Railway will design, build, and demonstrate a hydrogen fuel cell, zero-emission switcher locomotive in the seaport of West Sacramento. Sierra Northern Railway will replace the diesel engine of a switcher locomotive with a hydrogen fuel cell, eliminating 10,000 gallons of diesel fuel per year, improving local air quality, and eliminating GHG emissions. The locomotive will be demonstrated on Sierra Northern Railway's short-line operations, which serve the railyard and seaport in West Sacramento and will remain in service after the demonstration period. The integration of advanced fuel cell and battery technologies represent a new platform that will enable commercialization within a few years. Fueling for the demonstration will be provided by Shell as part of the "Multi-Modal Hydrogen Refueling Station Demonstration" also awarded by the CEC.

Objectives:

- Develop and demonstrate a hydrogen fuel cell, zero-emission switcher locomotive
- Develop and demonstrate a supporting multi-modal hydrogen refueling stations for on-road hydrogen fuel cell vehicles, locomotives, and surrounding port operations

Status:

- CEC contract and SoCalGas contract fully executed. GTI is working on contract negotiations with Sierra Northern Railway with project kick-off in Q4 2021

Other Information:

- Awarded \$3,999,971 from California Energy Commission: GFO-20-604-Hydrogen Fuel Cell Demonstrations in Rail and Marine Applications at Ports (H2RAM) - Fuel Cell Demonstration in Switcher Locomotives and Commercial Harbor Craft

Benefits:

- Reliability, Safety, Environmental Benefits, Operational Efficiencies

Thank You



Kevin Barker
Senior Manager, Energy Policy
kbarker@socalgas.com



[SoCalGas Sustainability Strategy-final.pdf](#)



THE ROLE OF CLEAN FUELS
AND GAS INFRASTRUCTURE IN ACHIEVING
CALIFORNIA'S NET ZERO CLIMATE GOAL
Summary Report



[Roles Clean Fuels Full Report.pdf \(socalgas.com\)](#)