



CITY OF
PALO ALTO

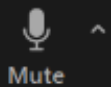
Sustainability and Climate Action Plan Ad Hoc Committee

November 4, 2021

cityofpaloalto.org/ClimateAction

Acting Now for a Resilient Future

Click on Q&A anytime during the presentation to ask questions



Mute



Chat



Raise Hand



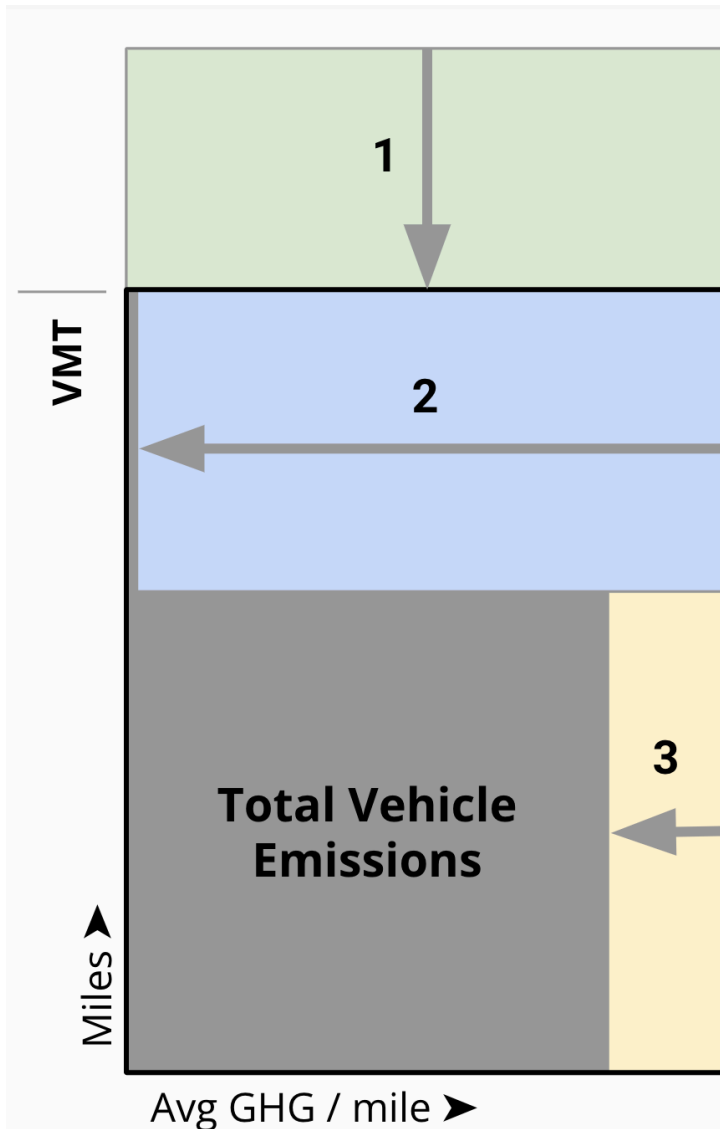
Q&A

Leave

- **Recap of October S/CAP Ad Hoc Meeting**
- **Transportation – Electric Vehicles and Building EV Charging Infrastructure**
 - Overview
 - What we are doing and why
 - Programs – Current and Proposed
 - Challenges - Can we get to 80x30 with programs alone?
- **History of PaloAltoGreen and Potential Future Options**
- **Discussion**



- 14 Questions, covering the following themes:
 - Technical questions about switching appliances
 - Financing suggestions
 - Transitioning off natural gas
- 9 Suggestions, covering the following themes:
 - Assistance for electrification
 - Technical ideas
 - Marketing ideas



$$\text{Total Vehicle Emissions} = \text{Miles} \times \text{GHG} / \text{Mile}$$

Emissions can be reduced by:

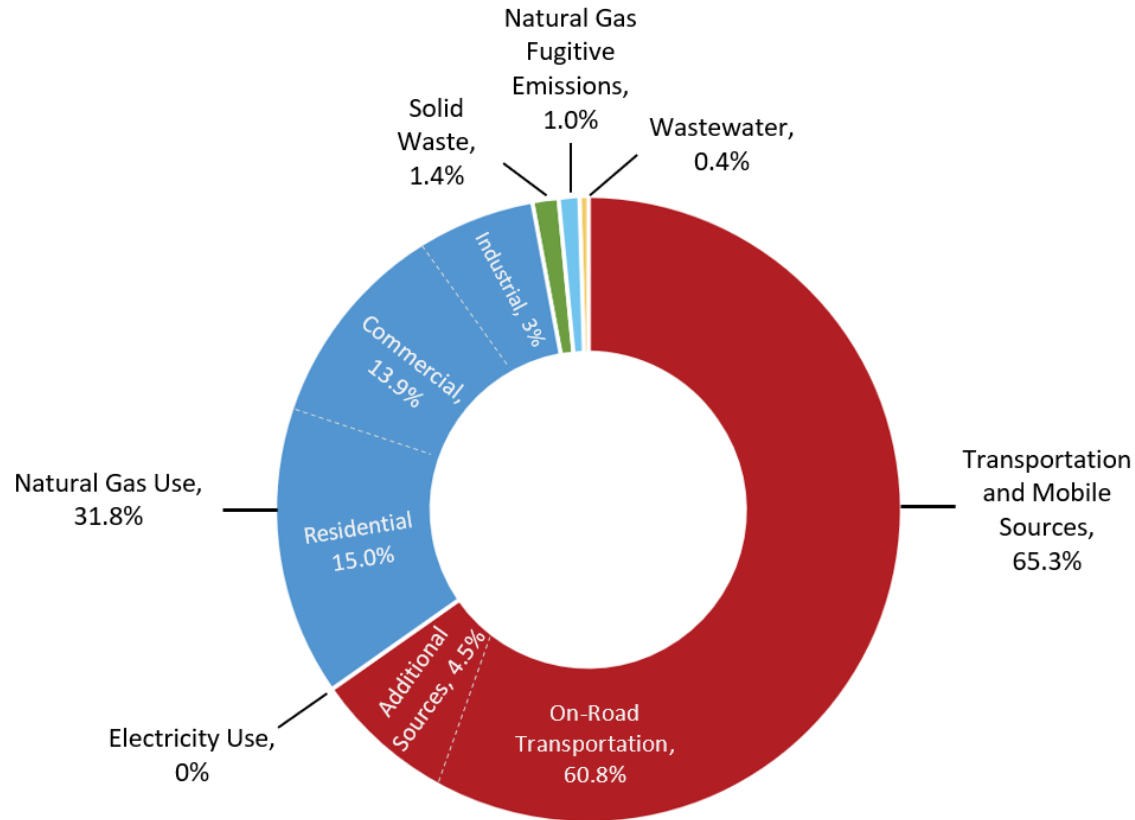
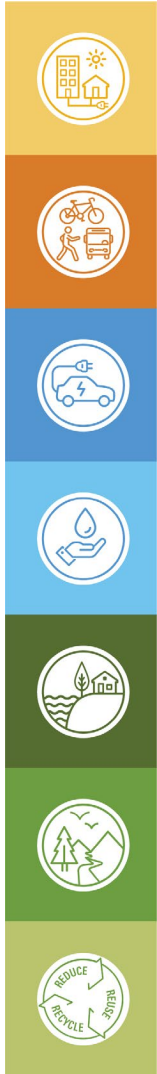
1. Reduce Vehicle Miles Traveled (VMT)

Reduce travel demand - teleworking, more housing
Increase non-vehicle travel - walk/bike, public transit, carpool

2. Electrify Vehicle Travel: each VMT driven by an EV using renewable electricity has negligible emissions

3. Improve ICE efficiency: improving MPG reduces GHG / mile

Transportation Related Emissions

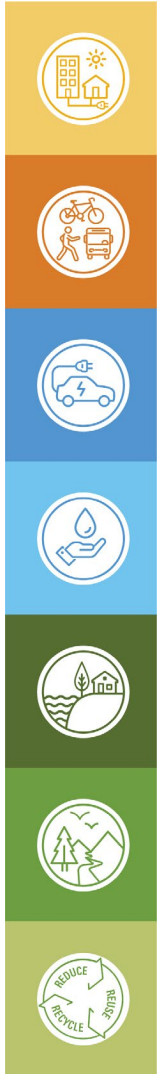


Source: 2019 Palo Alto Municipal Operations & Community GHG Emissions

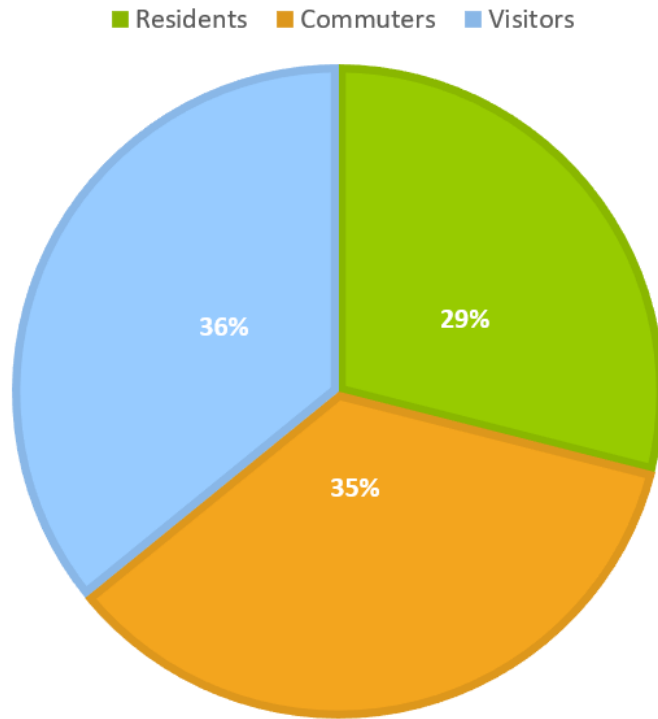
2030 Targets:

- 44% of vehicles registered are EVs and 85% of new vehicle sales to be EVs
- Vehicle Miles Traveled (VMT) is reduced 6% for residents, 19% for commuters and 10% for visitors
- 55% of resident VMT is fulfilled by EVs, 40% of commuters and 30% of visitors
- 33,000 residential, workplace and public charging ports needs to be installed
- Increase in conventional vehicle efficiency to an average of 38 MPG

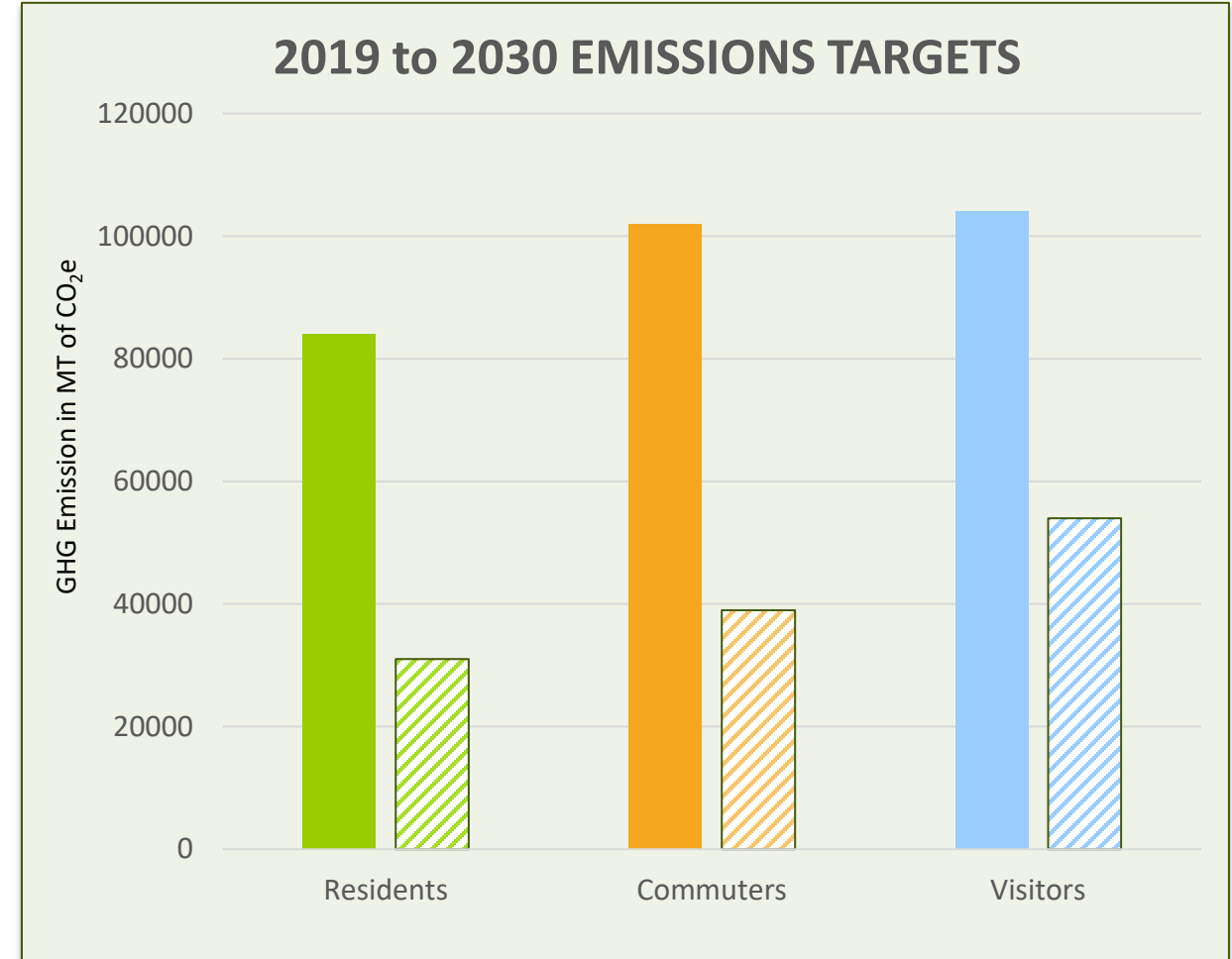
Transportation Related Emissions to Reach 80 x 30



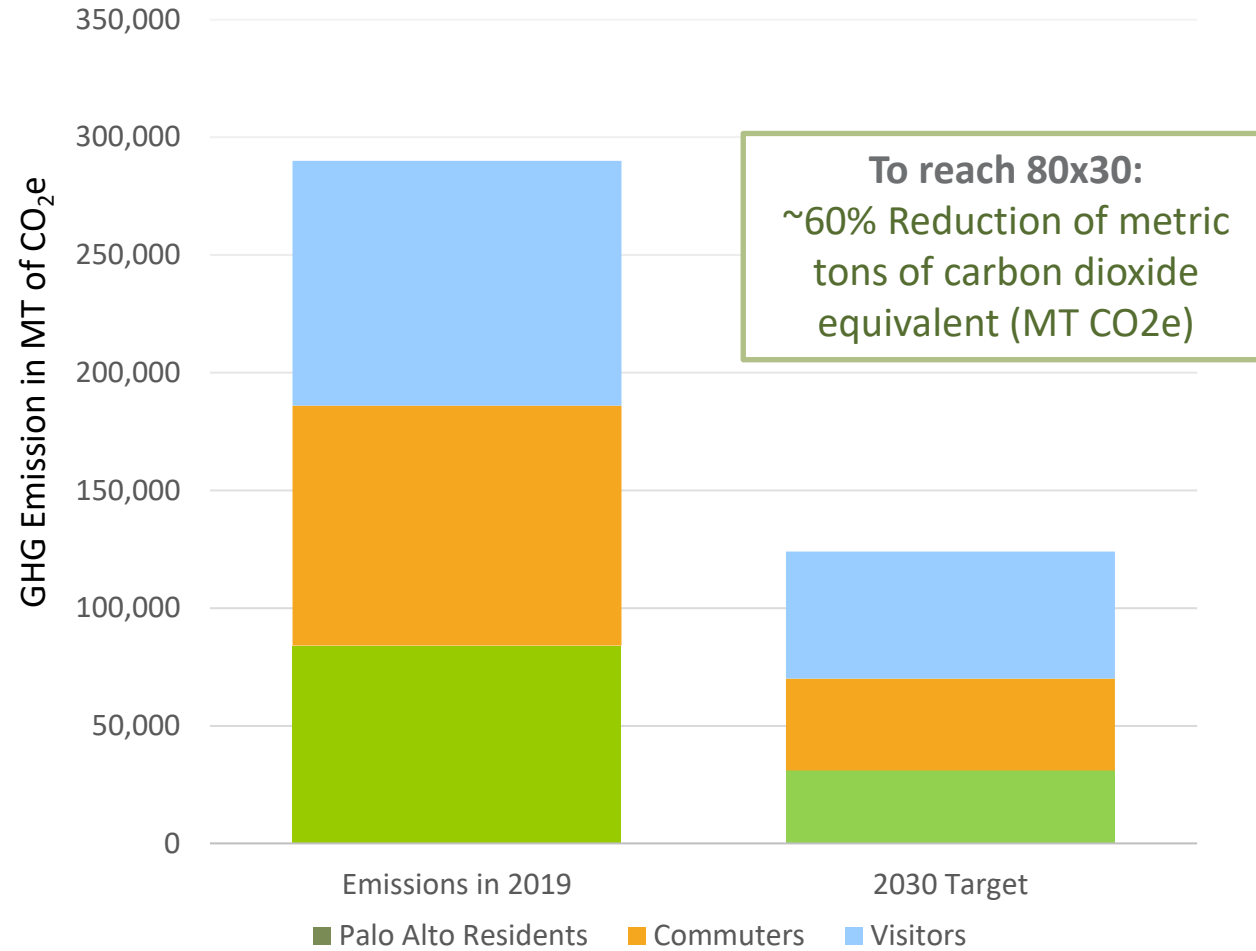
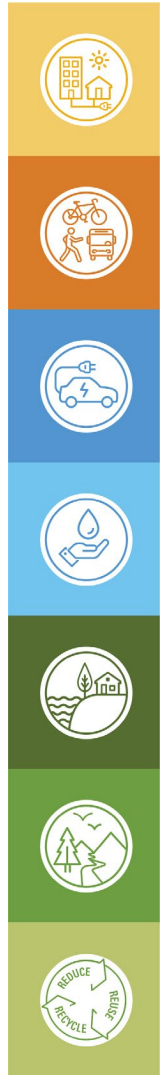
2020 ROAD TRANSPORTATION EMISSIONS



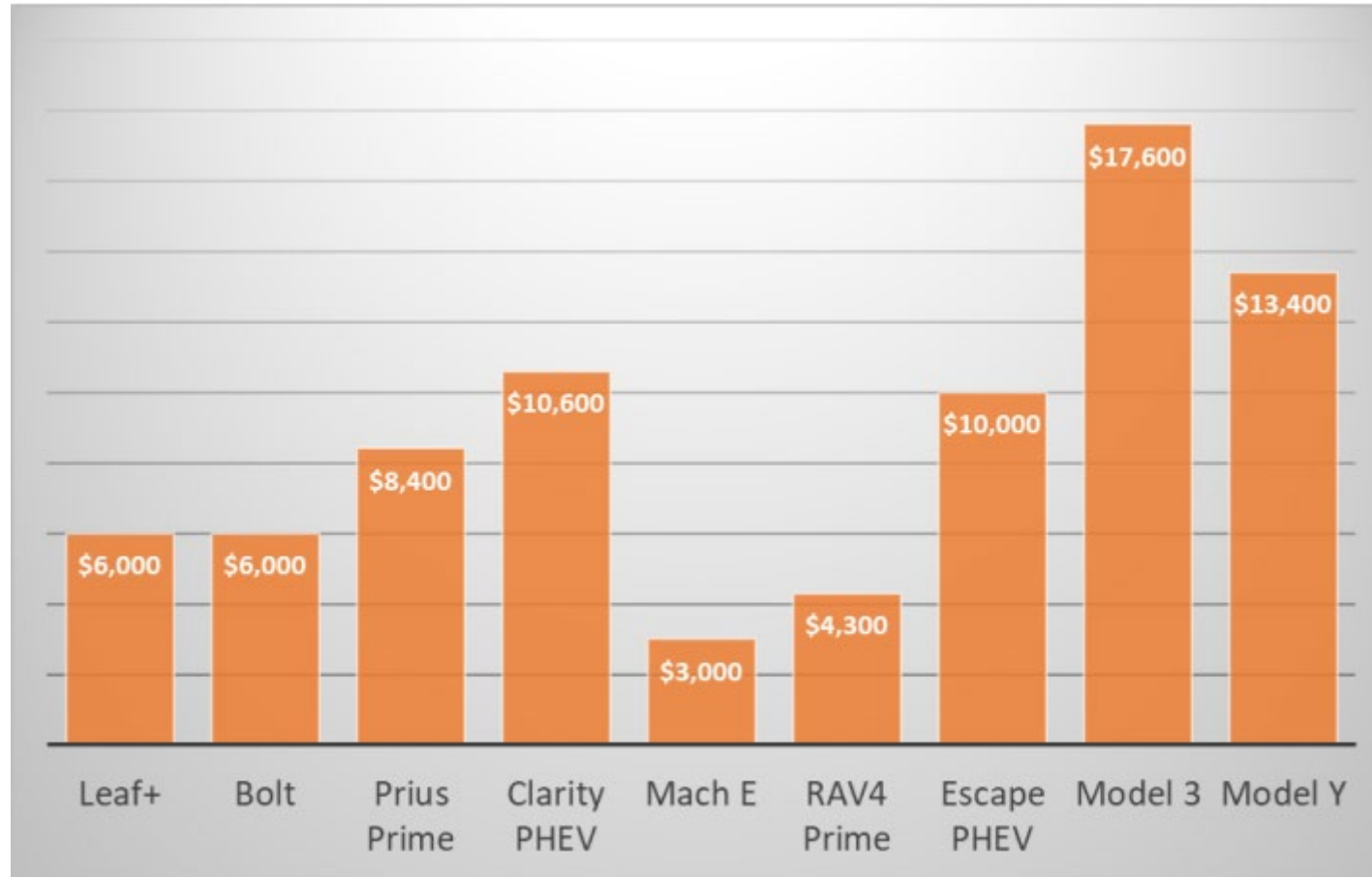
2019 to 2030 EMISSIONS TARGETS



Transportation Related Emissions to Reach 80 x 30

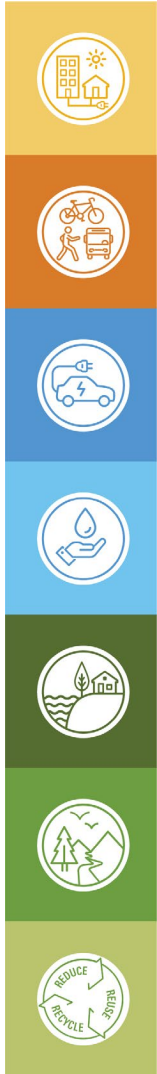


Lifetime Savings From EVs vs. Best Selling ICE Vehicles in Their Class



Source: [Consumer Reports Electric Vehicle Ownership Costs Report](#)

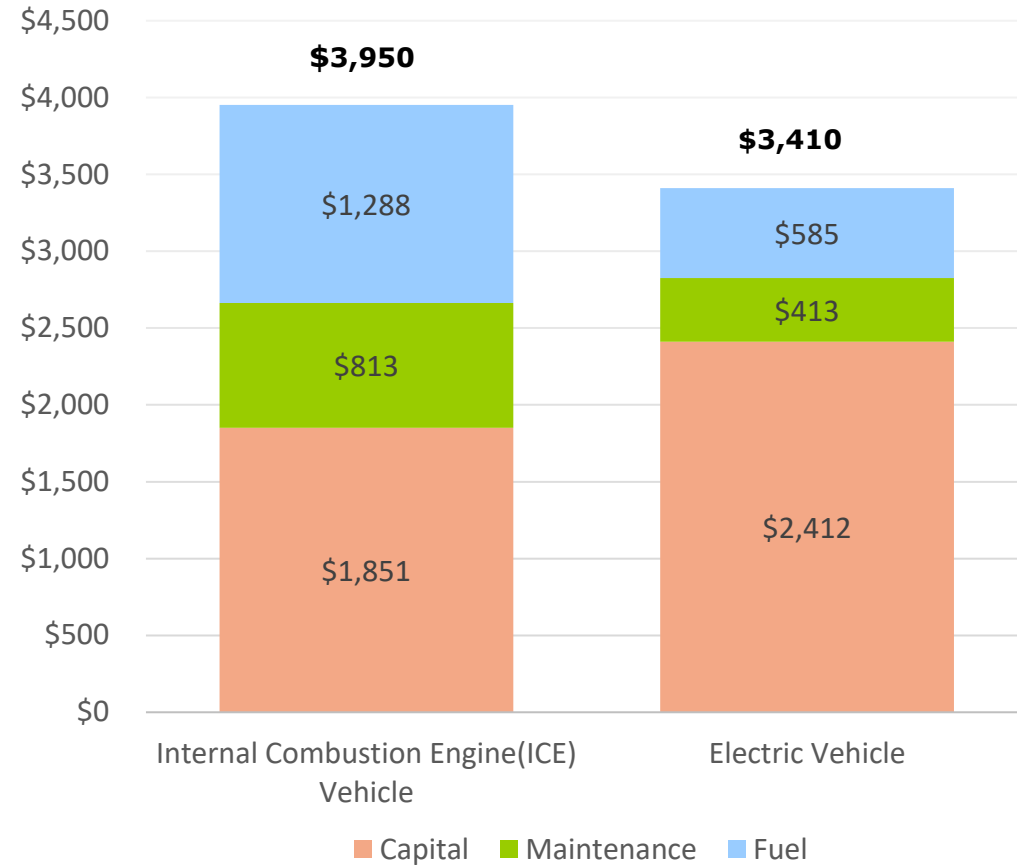
EV Total Cost of Ownership



EVs will yield an average ~\$600 savings per year - AECOM

We already know that electric vehicles are cheaper to drive than gas vehicles and will result in sizeable savings in Total Cost of Ownership (TCO) for the community. As we look at the overall cost of emissions reductions that will be incurred for reaching our 80 x 30 goal, the transition to EVs contributes to savings.

ANNUALIZED COST OF OWNING ICE VEHICLE VS. EV



Source: Based on AECOM Assessment
[EV Cost Estimate AECOM -Shiva](#)



WHY ELECTRIC VEHICLES?

- 65% of emissions are from transportation
- Multiple benefits:
 - Cheaper to drive
 - Lower maintenance costs
 - Produce no emissions
- Charging in Palo Alto especially makes sense given the City's carbon neutral electricity supply and low electric retail rates.

EVs and California Context



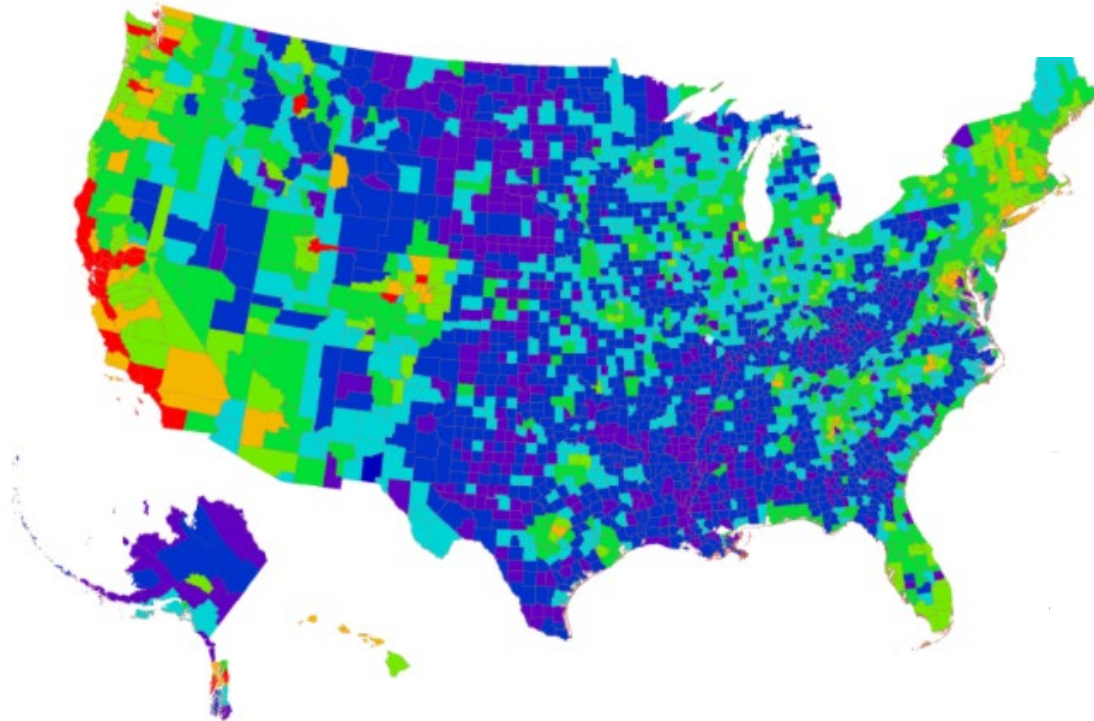
991,494

CA EV Sales



2,255,072

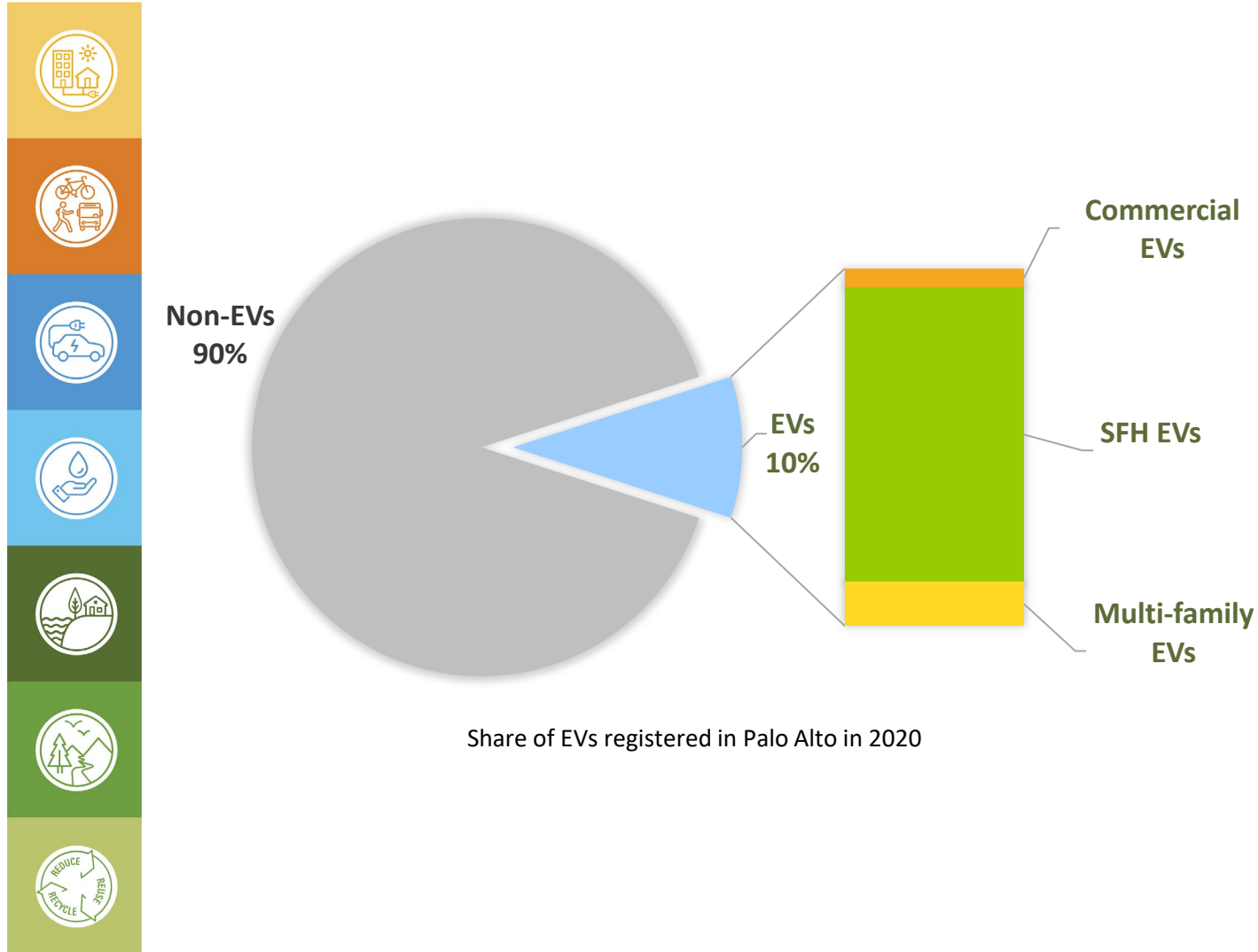
U.S. EV
Sales



Alliance for Automotive Innovation, Registered vehicles as of January 2020

- 25+ million registered light duty vehicles and a leader in EV adoption
- California Air Resource Board's Zero Emissions Vehicle regulation is now adopted by 13 other states requiring ~10% of new vehicles to be electric vehicles in 2025.
- State goal: 5 million ZEVs by 2030 and 100% of new vehicles by 2035
- Low Carbon Fuel Standard provides a unique source of funding

Electric Vehicle Ownership % in Palo Alto

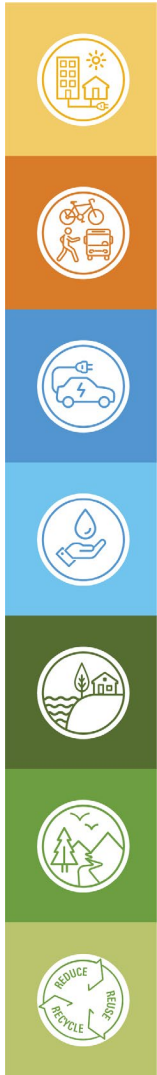


Gap in EV ownership between multi-family (MF) and single family (SF) residents

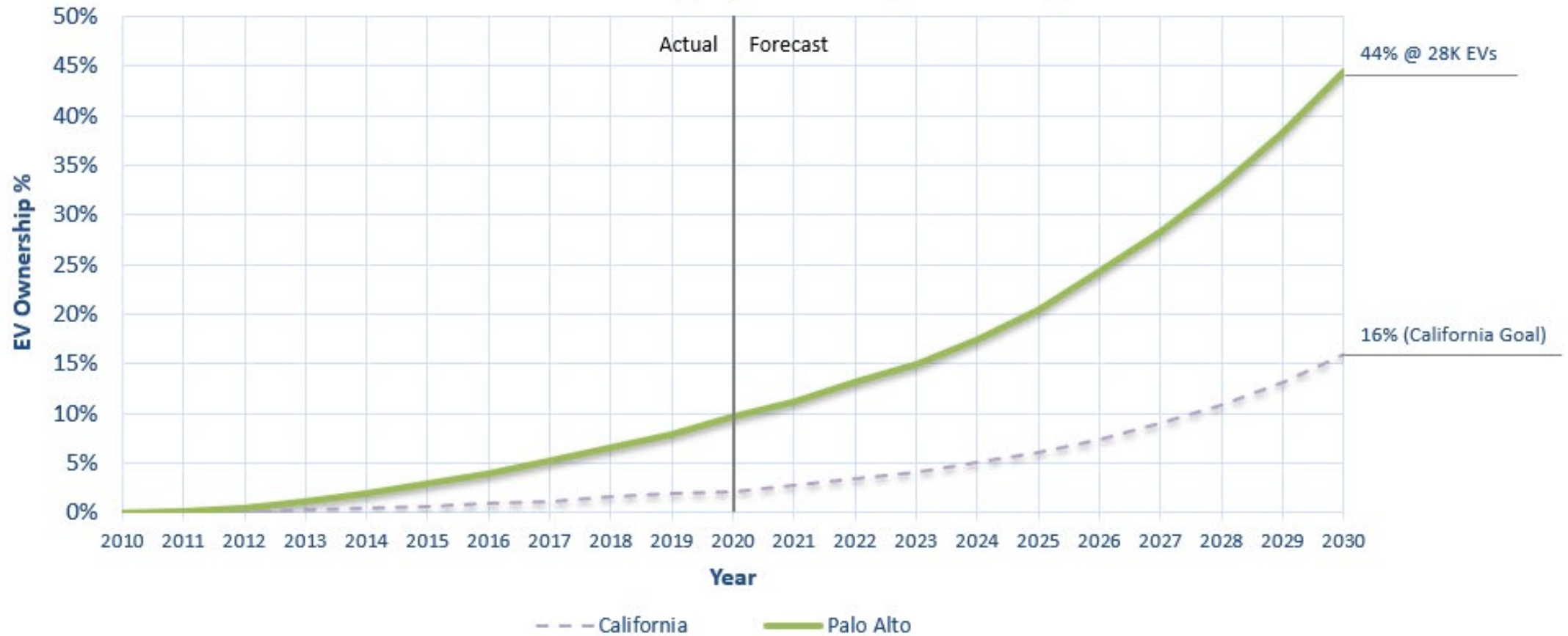
- 10% all vehicles registered in PA are EVs
- 12% of SF residential vehicles are EVs
- 4.5% of MF residential vehicles are EVs

Source: DMV and SCAP EV Modeling Project

EV Goals – State vs. Palo Alto (2020)

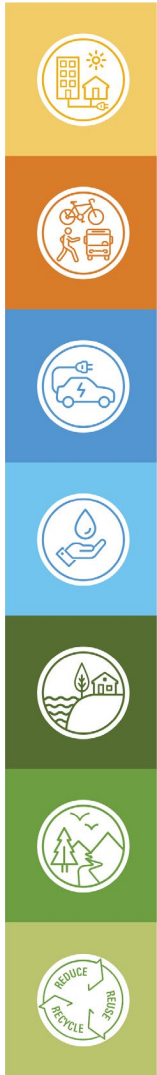


Electric Vehicle (EV) Ownership Percentage

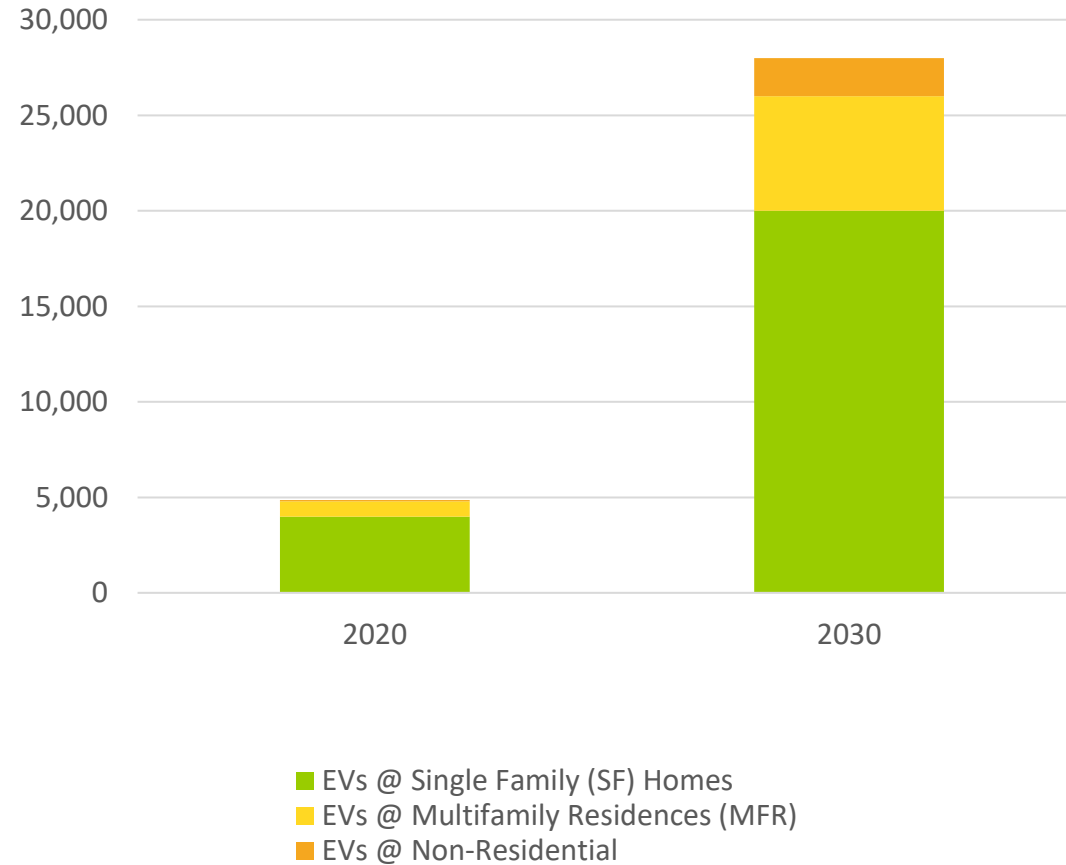


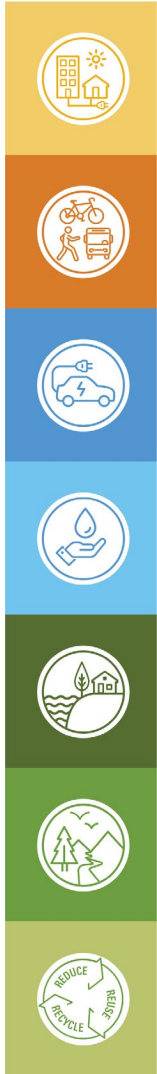
* Data shows year-end figures; Light-Duty Vehicles only; excludes Hydrogen Fuel Cell Vehicles
 Sources: Palo Alto DMV Registrations as of 12/31/2020; California Energy Commission (2021). California Energy Commission Zero Emission Vehicle and Infrastructure Statistics. Data last updated 04/30/2021. Retrieved 09/22/2021 from <https://www.energy.ca.gov/zevstats>

Distribution of Electric Vehicles in Palo Alto

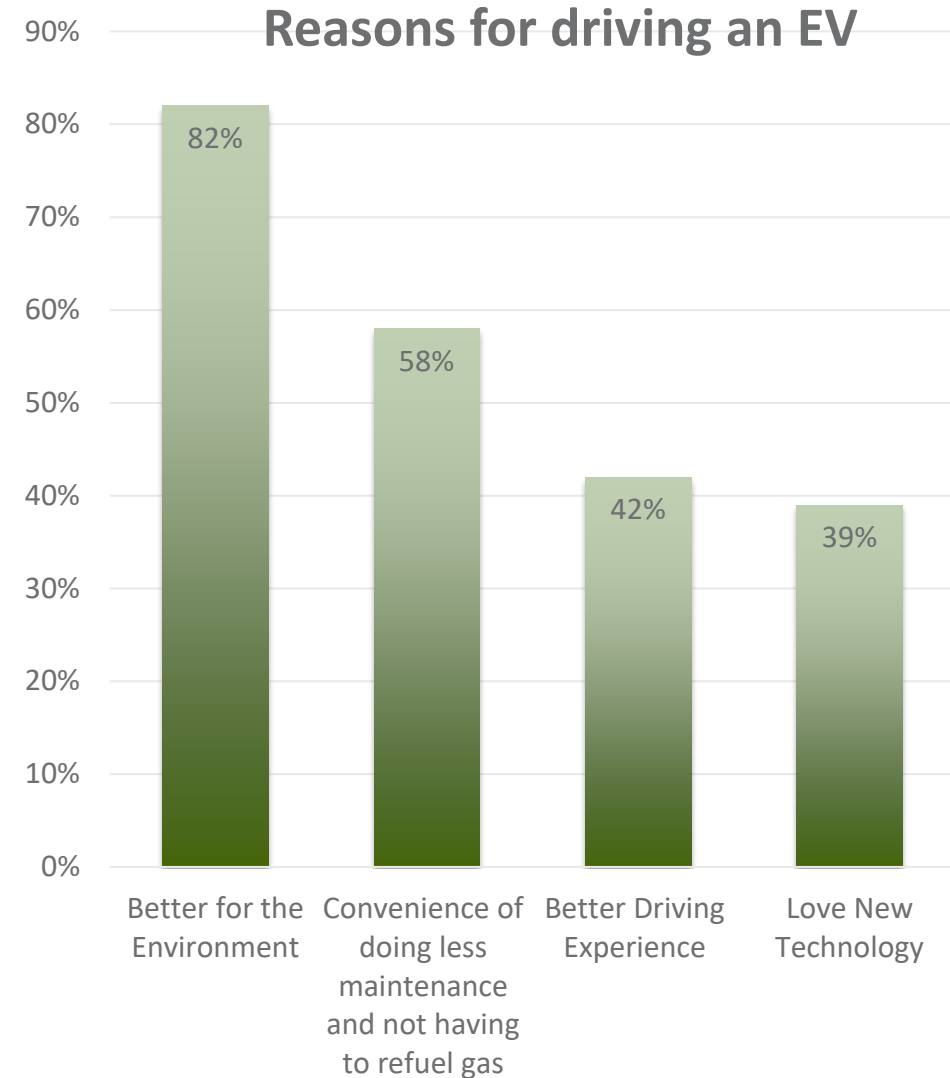


EVs Registered in Palo Alto

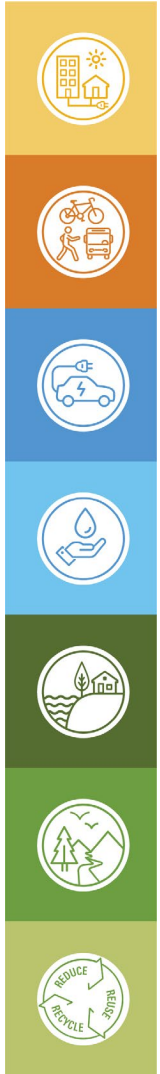




- **1 in 6 households already has an EV (2020)**
- 1 in 3 new vehicles in Palo Alto was an EV in 2017
- 73% charge at home
- 26% of PV owners own an EV
- 7 in 10 current EV drivers say they are likely to get a 2nd EV

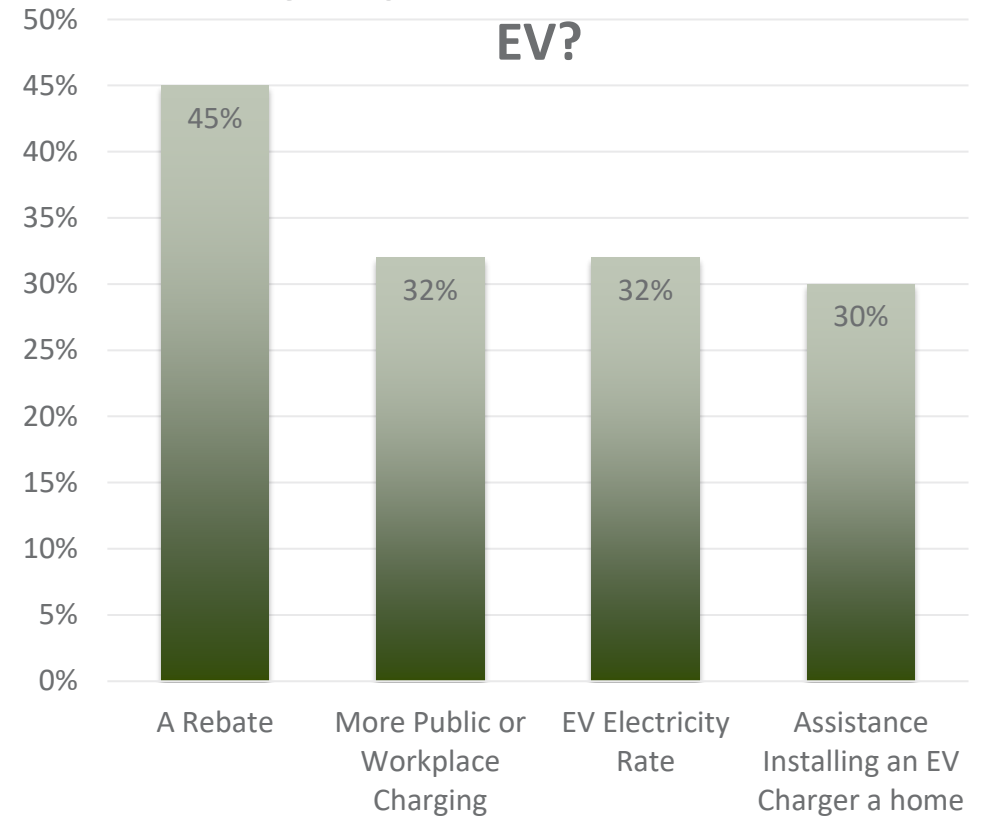


2018 Palo Alto Survey Results

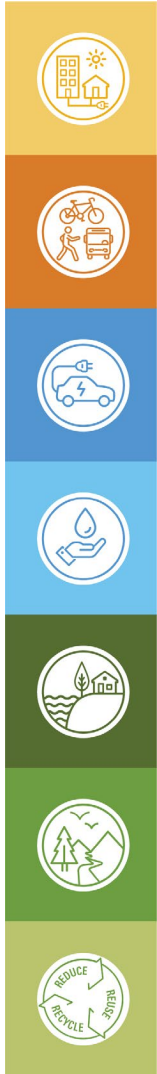


- 85% of surveyed did not drive an EV (2018)
- 37% are considering an EV; of which 35% feel they won't have access to charging at home
- **70% are very to extremely interested for their next vehicle to be an EV if they knew EV charging would be readily available**

What would make you more likely to purchase or lease and EV?



Strategies for Accelerating EV Penetration



Raise Awareness

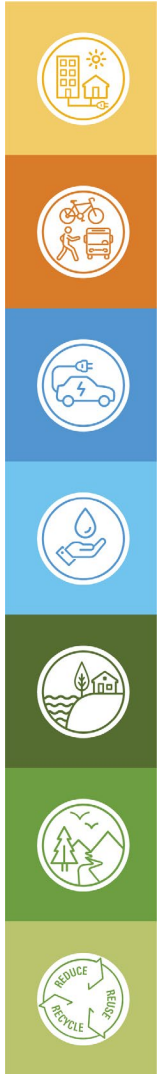


EV Incentives



Charging Infrastructure






























Number of EV Charging Ports (Public and Shared)		
	2020	Estimated Needs by 2030
California	67,000	970,000
Palo Alto	1,000 – 1,500	15,000 – 17,000

Sources:
[CEC IEPR 2020](#) (fig ES5)
 CPAU EV Forecast and SCAP EV Modeling Project

Current Programs

		Residents	Commuters	Visitors
   	Programs for MF and Non-Profits EV Charger Rebates Transformer Upgrade (Utility Service Capacity Fee) EV Charger Technical Assistance Program (EVTAP)		- 	
	Curbside Charging Pilot Program			
	City-owned EV Chargers			
 	EV Workshops and Events		-	-
	California Clean Fuel Rewards Program (CCFR)		-	-
	California Electric Vehicle Infrastructure Project (CALeVIP)			

Legend

- Raise Awareness 
- EV Incentives 
- EV Charging Infrastructure 

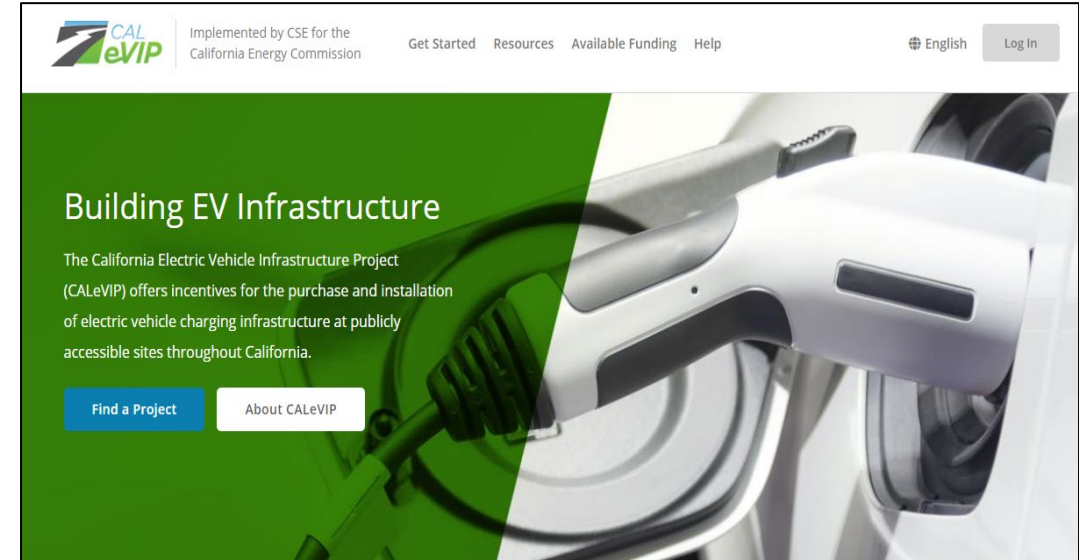
California Air Resource Board's LCFS Program



Funds generated from the sale of alternate fuel credits, provided to CPAU for providing electricity to EVs

STATUS
~\$8M to date
\$1.5 to \$2.5M per year

California Energy Commission's California Electric Vehicle Infrastructure Project (CALeVIP)



CEC funded grant program to improve EV charging infrastructure in San Mateo and Santa Clara counties

STATUS
\$2M (\$1M grant + \$1M matching funds)

Program Results

For Multi-Family & Non-Profit Customers

EV Charger Technical Assistance Program (EVTAP)

48 sites enrolled → 230 Level 2 and 34 Level 1 ports

EV Charger Rebates

62 new ports installed @ 12 sites

Transformer Upgrade (Utility Service Capacity Fee)

Learning and preparing for 50% of EVTAP projects to require a transformer upgrade



For all residents

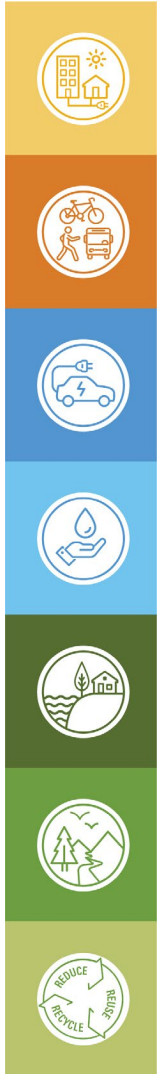
California Clean Fuel Rewards Program CFR

633 rebates since Nov 2020 → highest per capita participation in CA

For all commercial customers

CALeVIP

Fully subscribed and expected to result in 100 Level 2 ports and 12 to 14 DC Fast Chargers

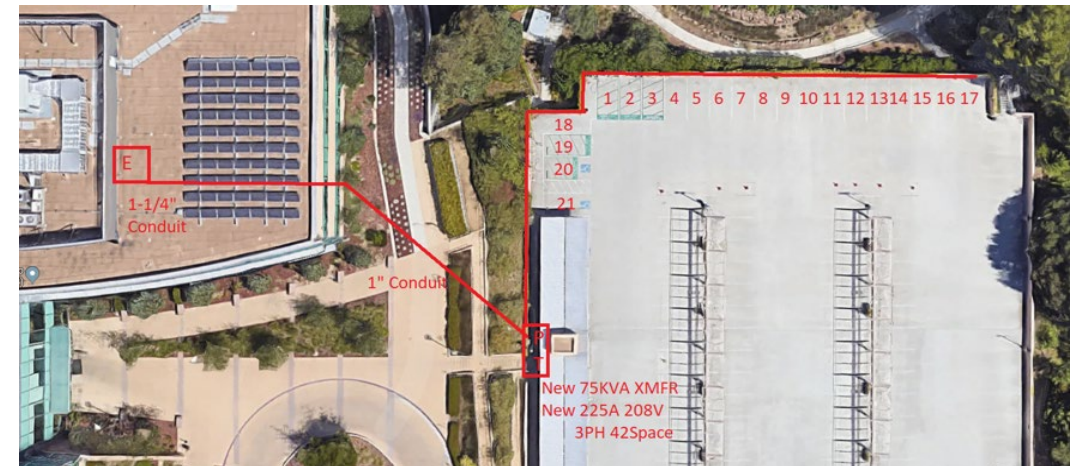


Regional and State Collaboration

- CALeVIP
- Bay Area Air Quality Management District (BAAQMD)
- CLEAResult – EVTAP
- Community Choice Aggregators (CCAs)
- California Clean Fuel Rewards (CCFR)
- Northern California Power Agency (NCPA)

Partnering with Large Employers

- SAP
- Stanford Healthcare



GREENWASTE OF PALO ALTO'S ALL-ELECTRIC TRUCKS



FULLY AUTOMATED SIDE LOADER 295 kWh battery capacity 50 MILES per charge
Used for residential garbage collection



REAR LOADER 295 kWh battery capacity 65 MILES per charge
Used for the residential Clean Up Day program



FLATBED 221 kWh battery capacity 120 MILES per charge
Used for the bin and cart deliveries



WASH TRUCK 221 kWh battery capacity 120 MILES per charge
Used for commercial bin and cart washes





Fleet Overview

- 352 total vehicles assessed in the Fleet Electrification Study
- 240 light duty vehicles
- 66 medium duty vehicles
- 46 heavy duty vehicles





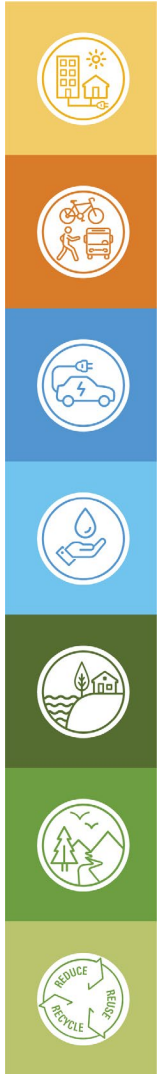
- Availability of electric medium-duty and heavy-duty vehicles
- California Air Resources Board – Advanced Clean Fleets Draft Regulation
- Lack of dedicated EV charging infrastructure

Reducing GHG Emissions with Renewable Diesel

- The City is switching to renewable diesel for all vehicles and equipment.
- It is estimated that we could realize up to a 75% reduction

Your fleet's annual diesel consumption
64 750 gallons





Awareness

- Monthly online EV classes
- E-Bike workshop
- EV block parties
- Financial Incentives clinics with one-on-one case management for Income Qualified (IQ) customers

Incentives

- Group buy EV discount campaigns
- Consider rebates for IQ customers
- Office of Transportation - Electrification of on-demand transit

Infrastructure/ Technical Assistance

- Direct Install EVTAP for Income Qualified Multifamily Properties
- Integration of Level 1 port installations into EVTAP program for eBikes
- EV charger installations and panel upgrades through the Home Efficiency Genie Program
- Utilities Engineering and Operations facilitating customer requests for utility service upgrades
- Facilitate Curbside Charging Pilot Program

Utility Rates

- EV charging rates for DC Fast Chargers
- Electric Rates for all-electric homes

Focus on e-Bikes



E-Cargo Utility Bike

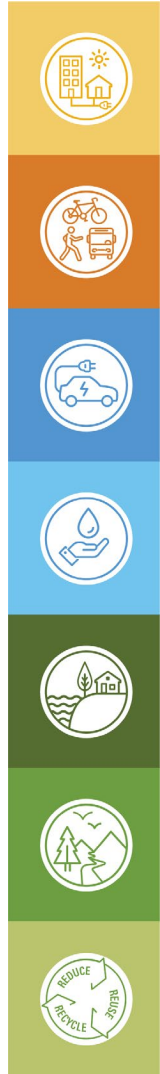


3 wheel bike w/ 880 lb. capacity

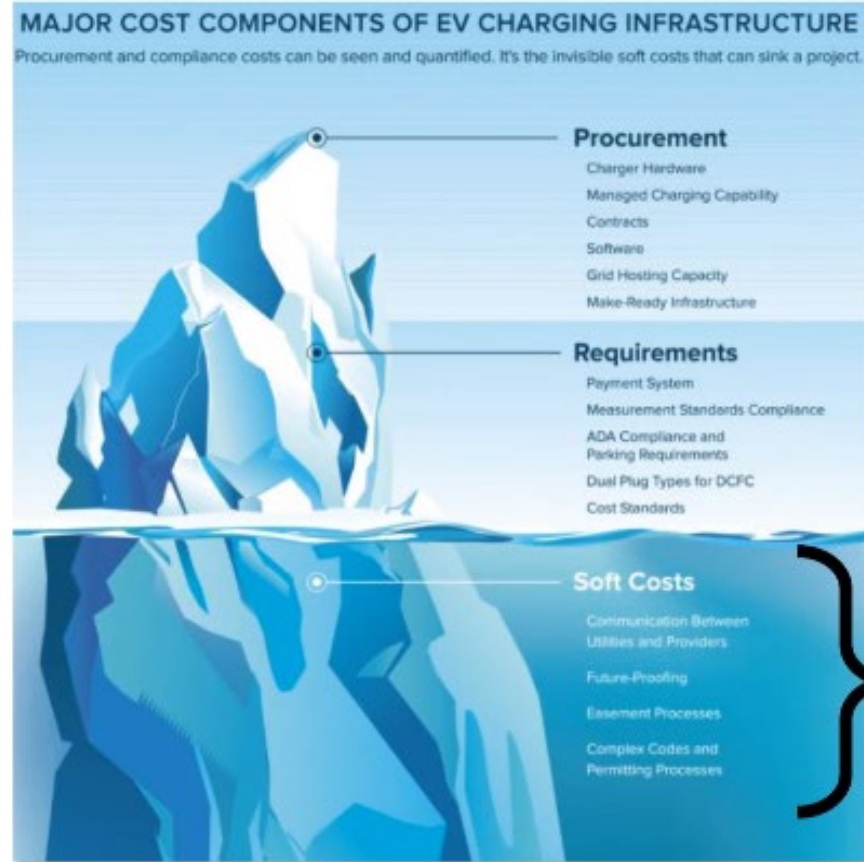
Solar and Pedal Powered Trike



2 seater - 25 MPH for about 15 miles



Solidarity in Struggles

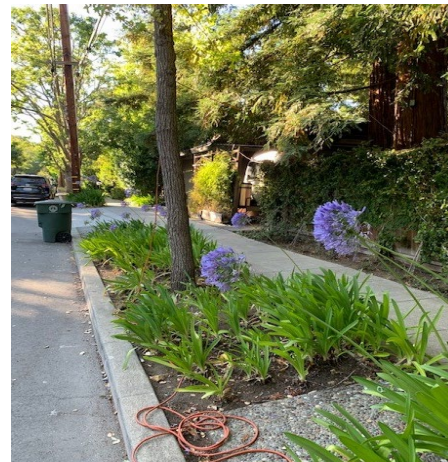
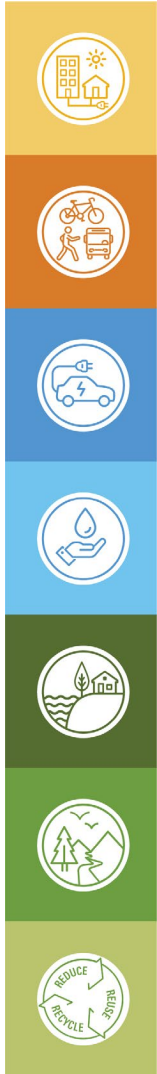


Soft Costs

- Communication Between Utilities and Providers
- Future-Proofing
- Easement Processes
- Complex Codes and Permitting Processes

Source: <https://rmi.org/wp-content/uploads/2020/01/Major-cost-components-of-EV-charging-infrastructure-1-e1578526192871.png>

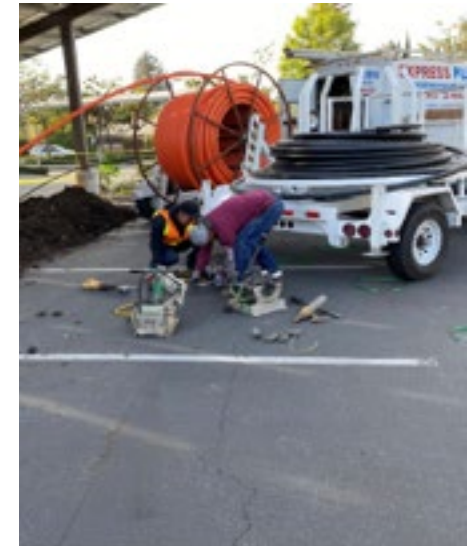
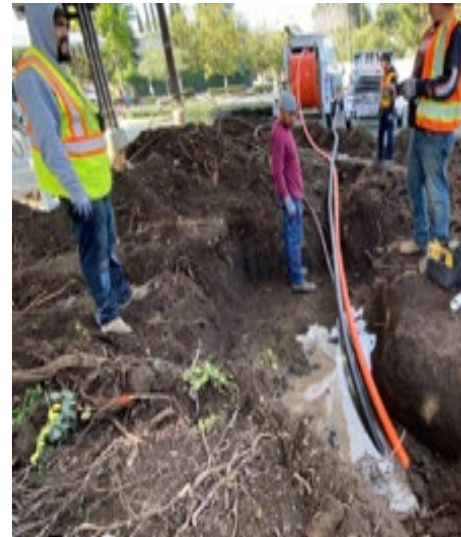
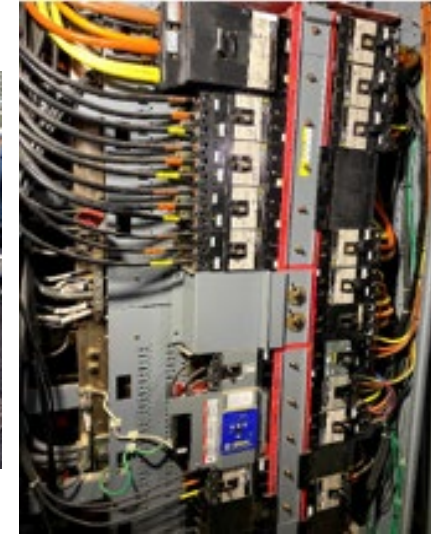
Challenges















Behind the Scenes



Fletcher Middle School



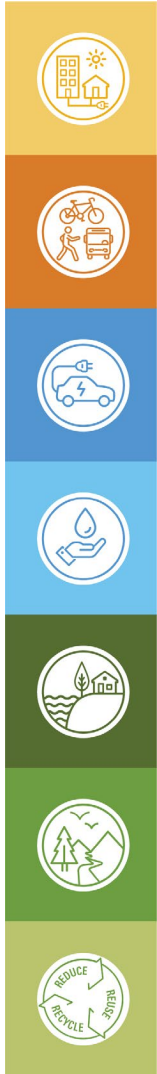
Proposed 2021-2024 Key Actions for EVs

Work Item / Key Action		Carbon Impact  (low CO ₂ impact)  (high impact)
E1	Launch comprehensive residential program services and incentives to promote voluntary electrification including single-family residence panel upgrades and EV charger installation.	
E2	Launch non-residential program services and incentives for electrification as well as workplace EV charging.	
E4	Develop electric rate options for electrified homes, EV charging, and solar + storage microgrid customers.	n/a
EV1	Raise awareness of emission savings of EVs, alternative transportation modes and micromobility (such as e-bikes and e-scooters).	
EV2	Enhance multi-family and workplace EV charging program including bike facility evaluation and alternative commute promotion.	
EV7	Convert all compact sedan Palo Alto municipal vehicles to EVs when an e-bike is not an operationally acceptable replacement	
C3	Complete study to identify any additional Energy, EV, or Mobility key actions needed to achieve 80% reduction in GHGs by 2030	
C4	Complete a study, including legal analysis, of the staffing and funding needed to operate programs, services, and related City processes.	
C5	Present options for Council consideration to accelerate EV, Mobility, and Energy emissions reduction activities identified in this Plan through mandates or price signals.	
C6	Complete a technical and legal study of alternatives available to fund post-2025 key actions, such as a carbon tax, parcel taxes, or other community funding mechanisms.	
EV3	Study incentives available for small EVs like e-bikes and e-scooters.	
EV4/E3	Study EV affordability and other barriers for low-income residents.	
EV5	Evaluate a residential EV credit or rate mechanism that creates an electric bill discount for registered EVs.	
EV6	Evaluate mandates or other mechanisms to ensure EV charging capacity needed to support EV growth.	

Policy Options to Meet 80 X 30

Policy Options

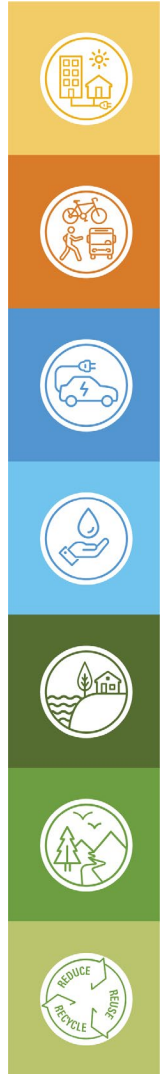
Residents	Explore carbon pricing to encourage EV adoption	Residential EV Credit for low-income customers
		ICE Usage Fee
	Explore mandating charger installation	Multi-Family Charger Installation Mandate
	Provide additional incentives for income qualified customers	Low-income Charger Installation Incentive
Commuters	Explore mandates, pricing schemes, and parking regulations to encourage alternative commute and EV adoption.	Alternative Commute Mandate
		Alternative Commute Incentive
		Workplace Parking
Visitors	Regional partnerships to promote EV adoption and "perks," such as preferred parking in commercial garages for EVs.	Preferred Parking



1. A collaborative effort to achieve a seismic shift on how each of us transports ourselves.
2. Let the City know what we can do, to support the transition to transportation electrification.
3. Evaluate mandates or other mechanisms to accelerate the adoption of EVs.

By 2030

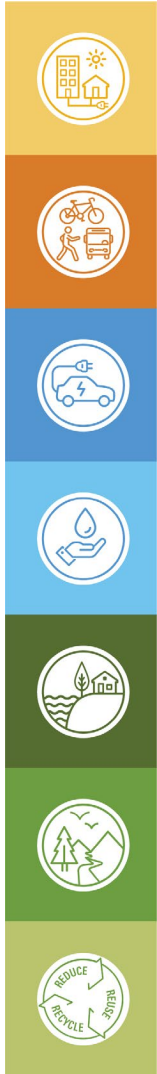
- 44% of all vehicles in Palo Alto need to be electric
- 85% of new vehicle sales in Palo Alto needs to be EVs
- Reduce overall VMT
 - Resident EV VMT: 10% → 55%
 - Non-resident EV VMT: 3% → 30-40%
- EV ownership incentivized and ICE usage disincentivized
- Widespread charging infrastructure in place with equitable access for renters, multi-family residents, and lower income residents
- Major employers and public parking would have policies in place to accelerate EV usage





1. What are your ideas on the best ways to encourage people to switch to an EV?
2. What are your ideas on the best ways to encourage people to use alternative modes of transportation such as an e-Bike or e-Scooter?

You can also submit comments and questions to sustainability@cityofpaloalto.org





PaloAltoGreen Electric

- Started in 2003, residential program ended 2013
- Voluntary program involving purchase of 100% renewable electricity
- Replaced with Carbon Neutral Electricity program
- Current commercial program continues for LEED compliance

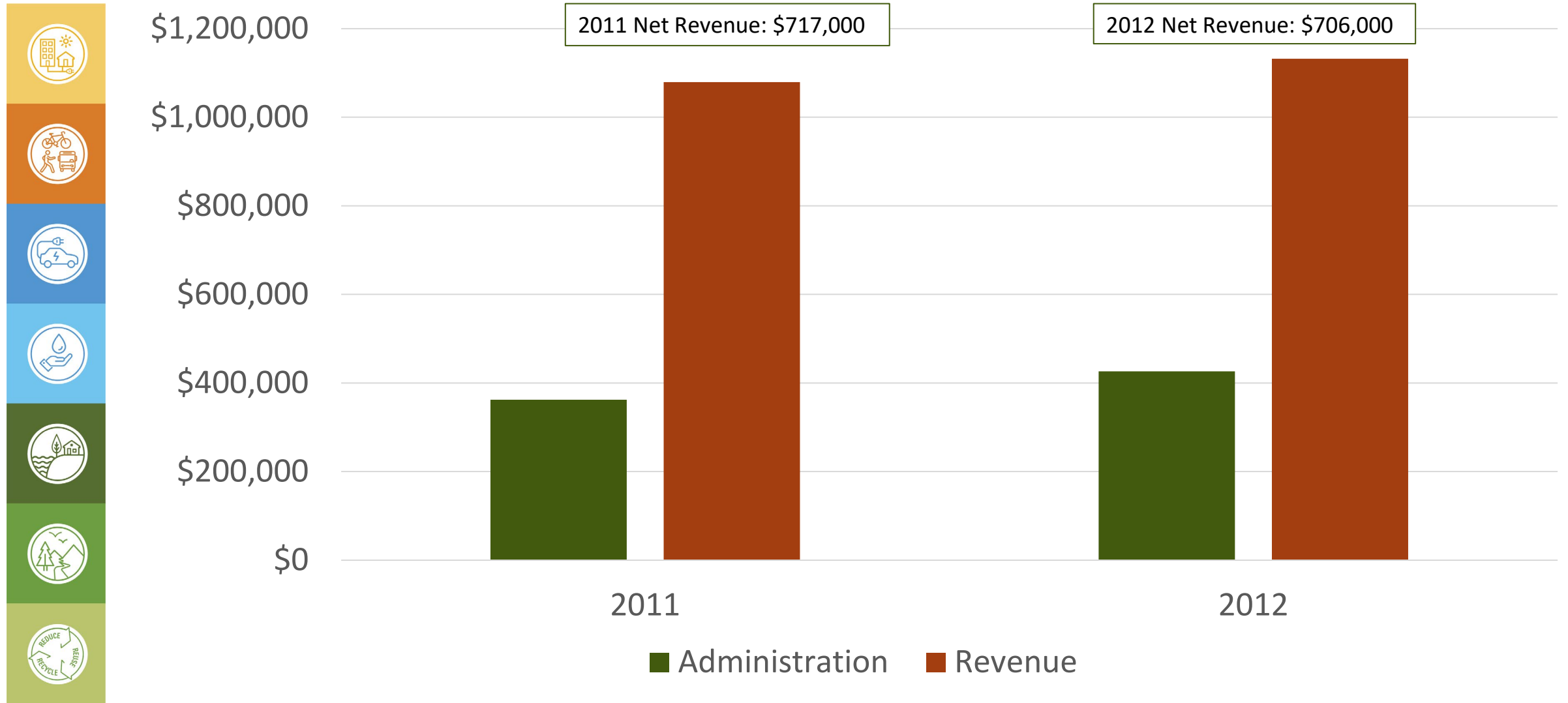


PaloAltoGreen Gas

- Started in 2014, ended in 2017
- Voluntary program for purchase of offsets to mitigate carbon impacts of natural gas use
- Replaced with Carbon Neutral Gas program

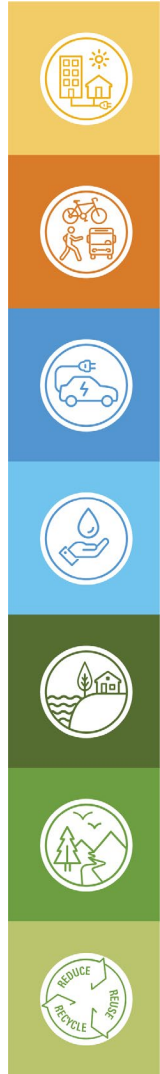


PaloAltoGreen Electric Participation and Net Revenue





- PaloAltoGreen voluntary program to fund electrification
- PaloAltoGreen voluntary program for carbon removal or offsets
- PaloAltoGreen recognition program to recognize residents who take steps towards electrifying
- Questions for discussion:
 - What are the goals of the program?
 - Is funding from PaloAltoGreen needed? Several electrification funding sources already exist. Funding from PaloAltoGreen small relative to need.
 - What would a resident get in exchange for participation?
 - Would funding arrive in time to make a difference in achieving 80x30 goals? Previous PaloAltoGreen program took time to achieve profitability.





December 9



- **Transportation**

- Mobility Programs
- How Land Use Affects Emissions





SUSTAINABILITY & CLIMATE ACTION PLAN

Thank You!

Please submit questions or comments to
sustainability@cityofpaloalto.org

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