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.
Agenda

• 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
Ways to Reduce Transportation Emissions

Total Vehicle Emissions = Miles x GHG / 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

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
- Residents: 36%
- Commuters: 29%
- Visitors: 35%

2019 to 2030 EMISSIONS TARGETS
- Residents: 80,000 MT of CO2e
- Commuters: 100,000 MT of CO2e
- Visitors: 120,000 MT of CO2e
Transportation Related Emissions to Reach 80 x 30

To reach 80x30:
~60% Reduction of metric tons of carbon dioxide equivalent (MT CO2e)

GHG Emission in MT of CO2e

Emissions in 2019

2030 Target

Palo Alto Residents
Commuters
Visitors
EV Total Cost of Ownership

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.

Source: Based on AECOM Assessment

EV Cost Estimate AECOM - Shiva
Why EVs Make So Much Sense

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

- 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 $\sim 10\%$ 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

Alliance for Automotive Innovation, Registered vehicles as of January 2020
Electric Vehicle Ownership % in Palo Alto

Share of EVs registered in Palo Alto in 2020

- **Non-EVs** 90%
- **EVs** 10%
  - **Commerical EVs**
  - **SFH EVs**
  - **Multi-family EVs**

**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
Distribution of Electric Vehicles in Palo Alto

EVs Registered in Palo Alto

- **EVs @ Single Family (SF) Homes**
- **EVs @ Multifamily Residences (MFR)**
- **EVs @ Non-Residential**

2020: 5,000
2030: 25,000

Total EVs Registered:
- 2020: 5,000
- 2030: 25,000

CITY OF PALO ALTO

Acting Now for A Resilient Future
• 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 an EV?

- A Rebate: 45%
- More Public or Workplace Charging: 32%
- EV Electricity Rate: 32%
- Assistance Installing an EV Charger at home: 30%
Strategies for Accelerating EV Penetration

- Raise Awareness
- EV Incentives
- Charging Infrastructure
## EV Charging Infrastructure Needs

### Number of EV Charging Ports (Public and Shared)

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<thead>
<tr>
<th></th>
<th>2020</th>
<th>Estimated Needs by 2030</th>
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<tr>
<td>California</td>
<td>67,000</td>
<td>970,000</td>
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<tr>
<td>Palo Alto</td>
<td>1,000 – 1,500</td>
<td>15,000 – 17,000</td>
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Sources:
- CEC IEPR 2020 (fig ES5)
- CPAU EV Forecast and SCAP EV Modeling Project
## Current Programs

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

- **Raise Awareness**
- **EV Incentives**
- **EV Charging Infrastructure**
Funding Sources for EV Charging Infrastructure

California Air Resource Board’s LCFS Program

Low Carbon Fuel Standard

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

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<th>STATUS</th>
<th>~$8M to date</th>
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<td>$1.5 to $2.5M per year</td>
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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
Collaboration

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
Refuse Collection Fleet Electrification

GreenWaste of Palo Alto’s All-Electric Trucks

- **Fully Automated Side Loader**: Used for residential garbage collection. 265 kWh battery capacity, 10 miles per charge.
- **Rear Loader**: Used for the residential Clean Up Day program. 205 kWh battery capacity, 65 miles per charge.
- **Flatbed**: Used for bin and cart deliveries. 221 kWh battery capacity, 120 miles per charge.
- **Wash Truck**: Used for commercial bin and cart washes. 221 kWh battery capacity, 120 miles per charge.
Fleet Overview

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

- 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 in CO₂e emissions.
### Other Planned Programs 2021-2022

#### 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
Other Planned Programs

E-Cargo Utility Bike

Focus on e-Bikes

3 wheel bike w/ 880 lb. capacity

Solar and Pedal Powered Trike

2 seater - 25 MPH for about 15 miles
Challenges

Solidarity in Struggles

Challenges
Fletcher Middle School
## Proposed 2021-2024 Key Actions for EVs

<table>
<thead>
<tr>
<th>Work Item / Key Action</th>
<th>Carbon Impact</th>
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<tr>
<td><strong>E1</strong> Launch comprehensive residential program services and incentives to promote voluntary electrification including single-family residence panel upgrades and EV charger installation.</td>
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<td><strong>E2</strong> Launch non-residential program services and incentives for electrification as well as workplace EV charging.</td>
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<td><strong>E4</strong> Develop electric rate options for electrified homes, EV charging, and solar + storage microgrid customers.</td>
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<td><strong>EV1</strong> Raise awareness of emission savings of EVs, alternative transportation modes and micromobility (such as e-bikes and e-scooters).</td>
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<td><strong>EV2</strong> Enhance multi-family and workplace EV charging program including bike facility evaluation and alternative commute promotion.</td>
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<td><strong>EV7</strong> Convert all compact sedan Palo Alto municipal vehicles to EVs when an e-bike is not an operationally acceptable replacement.</td>
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<td><strong>C3</strong> Complete study to identify any additional Energy, EV, or Mobility key actions needed to achieve 80% reduction in GHGs by 2030.</td>
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<td><strong>C4</strong> Complete a study, including legal analysis, of the staffing and funding needed to operate programs, services, and related City processes.</td>
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<td><strong>C5</strong> Present options for Council consideration to accelerate EV, Mobility, and Energy emissions reduction activities identified in this Plan through mandates or price signals.</td>
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<td><strong>C6</strong> 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.</td>
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<td><strong>EV3</strong> Study incentives available for small EVs like e-bikes and e-scooters.</td>
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<td><strong>EV4/E3</strong> Study EV affordability and other barriers for low-income residents.</td>
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<td><strong>EV5</strong> Evaluate a residential EV credit or rate mechanism that creates an electric bill discount for registered EVs.</td>
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<td><strong>EV6</strong> Evaluate mandates or other mechanisms to ensure EV charging capacity needed to support EV growth.</td>
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## Policy Options to Meet 80 X 30

### Residents
- Explore carbon pricing to encourage EV adoption
- Explore mandating charger installation
- Provide additional incentives for income qualified customers

### Commuters
- Explore mandates, pricing schemes, and parking regulations to encourage alternative commute and EV adoption.

### Visitors
- Regional partnerships to promote EV adoption and "perks," such as preferred parking in commercial garages for EVs.

### Policy Options

<table>
<thead>
<tr>
<th>Residents</th>
<th>Residential EV Credit for low-income customers</th>
<th>ICE Usage Fee</th>
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<tr>
<td></td>
<td>Explore mandating charger installation</td>
<td>Multi-Family Charger Installation Mandate</td>
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<tr>
<td></td>
<td>Provide additional incentives for income qualified customers</td>
<td>Low-income Charger Installation Incentive</td>
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<tr>
<td>Commuters</td>
<td>Alternative Commute Mandate</td>
<td>Alternative Commute Incentive</td>
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<td>Workplace Parking</td>
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<tr>
<td>Visitors</td>
<td>Preferred Parking</td>
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Conclusion

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.
Conclusion

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
Questions and Comments from S/CAP Ad Hoc
Public Comment

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
History of PaloAltoGreen

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
Palo Alto Green Electric Participation and Net Revenue

2011 Net Revenue: $717,000
2012 Net Revenue: $706,000

Administration  Revenue

$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
Potential Future PaloAltoGreen Opportunities

- 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.
Questions and Comments from S/CAP Ad Hoc
Upcoming S/CAP Ad Hoc Committee Meeting

December 9

• Transportation
  – Mobility Programs
  – How Land Use Affects Emissions
Thank You!

Please submit questions or comments to sustainability@cityofpaloalto.org