

**Project name:**  
City of Palo Alto S/CAP

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# Memo

**Subject:** S/CAP Action Evaluation Memo

## INTRODUCTION

The primary goal of Palo Alto's 2020 Sustainability and Climate Action Plan (S/CAP) is to develop actions that can reduce greenhouse gas (GHG) emissions 80% below the city's 1990 levels by 2030. Implementation of many S/CAP strategies will also likely provide additional co-benefits that may not be accounted for in a typical GHG analysis. For example, actions designed to address climate change can also improve local air quality, reduce the cost of living, or increase productivity. Assessing the impact of actions, whether positive or negative, against a selected set of co-benefits helps provide a holistic picture of the actions' broader impact. During the action development process, co-benefit evaluation can help identify opportunities to refine draft actions to increase their co-benefit impact. It can also be useful for an action prioritization process by providing various points of comparison between actions and can also be viewed alongside action feasibility evaluations if such an analysis is performed.

The City of Palo Alto selected nine co-benefit evaluation criteria (revised through public feedback) that align with community priorities and apply to multiple S/CAP issue areas (e.g., Energy, Electric Vehicles, Zero Waste). The criteria were used to qualitatively evaluate the draft S/CAP actions to demonstrate each action's impact on these community values. The results of this analysis can ultimately inform the City's final prioritization of its near-term climate actions selected to help achieve the 2030 GHG reduction target.

## EVALUATION CRITERIA

As a first step, AECOM and the City team developed a draft list of co-benefit criteria that reflected both municipal and community priorities. As the primary function of evaluation criteria is for action comparison, co-benefits were selected that applied broadly to different action types instead of only relating to a specific kind of action (e.g., a co-benefit of "Increased Mobility" would only apply to transportation actions, and would not be particularly useful in evaluating the relative impact of non-transportation actions).

The draft criteria were posted on the City's S/CAP website for review and public comment. Based on community feedback, the City modified the draft co-benefit definitions and added a new evaluation criterion to assess action impact on lifecycle emissions. The following table lists the final co-benefits and definitions used to evaluate the S/CAP actions:

Co-Benefit Criteria	Definition
Air Quality	Improve air quality through reduced exposure (indoor and outdoor) to particulate matter (PM2.5 and PM10), nitrous oxide (NO <sub>2</sub> ), ozone (O <sub>3</sub> ), sulfur dioxide (SO <sub>2</sub> ) or airborne toxins.
Public Health	Improve public health through reduced incidents of diseases and/or death attributed to increased active transport, water quality, etc. (Note: air pollution-related health impacts are included under Air Quality).

Co-Benefit Criteria	Definition
Public Safety	Improve public safety through reduced traffic, incidents of traffic accidents, gas leaks, and number of people/assets/services exposed to climate hazards such as flooding, extreme heat/cold, and extreme weather events.
Regional Benefit	Provide benefits that extend beyond the city, such as generating jobs, expanding the electric vehicle charging network, implementing flood reduction projects, etc.
Resource Conservation	Increase resource conservation through water conservation, material consumption and waste reduction, and natural environment conservation, creation, or regeneration.
Lifecycle Emissions*	Reduce emissions associated with the extraction, manufacture, and transport of fossil fuel energy resources (e.g., natural gas distribution, coal production, etc.).
Cost of Living	Reduce upfront costs and provide savings (e.g., utility costs, travel costs, etc.) to residents.
Productivity	Increase productivity through reduced commute times and reduced traffic, prioritized housing near transit, improved thermal comfort in buildings, reduced economic activity losses from climate-related events (e.g., flooding, power outages), etc.
Equity	Address an existing inequity in the community, such as disproportionate poor air quality, access to transit, flood risk, etc.

\*Added after draft criteria were posted publicly

## EVALUATION PROCESS

To evaluate climate actions, AECOM used the *C40 Cities Action Selection and Prioritization (ASAP) tool* and methodology available at: <https://resourcecentre.c40.org/resources/action-selection-and-prioritisation>. This excel-based software tool supports the climate action decision-making process by documenting actions and providing outputs to streamline action comparison. It is worth noting that the ASAP tool is designed to *support* decision-making, not to *make* decisions itself, and that different stakeholders can reach different conclusions when assessing the co-benefits of specific actions. The subjective and qualitative assessments facilitated through the ASAP tool are not intended to be perfect, but are helpful in highlighting important action impacts to consider during the S/CAP development process. The results from the tool can be used to further assess and prioritize actions as well as communicate the benefits and feasibility of the actions.

The ASAP evaluation process can be used to assess the impact of actions in three separate categories, including primary benefits (i.e., GHG emissions and/or climate risk reduction), co-benefits (e.g., public health, economic prosperity), and feasibility (e.g., authority level, financial need). For this project, the City only used the ASAP tool to evaluate action impacts in the co-benefit category. This provided additional action information to supplement a separate primary benefit analysis of the actions' GHG reduction potential.

The ASAP tool uses a Likert rating scale to quantitatively evaluate an action's co-benefit impact. For a given action, each of the nine chosen co-benefits was rated on a qualitative ranking scale based on the degree to which implementation of the action will positively or negatively impact the co-benefit. Each action and co-benefit pair received one of the five impact ratings shown in the table below:

Rating	Score	Rating Definition
Very Positive	2	The action has a positive impact across the community
Somewhat Positive	1	The action has a positive impact across a small portion of the community or a slightly positive impact across the entire community
Neutral	0	The action has no impact, the impact is unknown, or the positive and negative impacts may negate each other

Rating	Score	Rating Definition
Somewhat Negative	-1	The action has a negative impact across a small portion of the community or a slightly negative impact across the entire community
Very Negative	-2	The action has a negative impact across the community

AECOM and the City team clarified the definitions and ratings of each co-benefit criteria and integrated public feedback through a series of project meetings. Once the criteria were finalized, AECOM used the ASAP tool to rate each action for its impact on all co-benefit criteria, except for the Equity criterion which was evaluated by the City’s internal S/CAP teams. The City’s teams also reviewed AECOM’s initial ratings and made adjustments based on their interpretation of the draft S/CAP actions. Below is an example of the Air Quality criterion rating scale and example actions that match each rating option; note that the first three example actions were draft S/CAP actions and the final two rating example actions are provided for comparison but were not included as draft S/CAP actions:

Criterion	Rating	Score	Rating Definition	Example Action
<b>Air Quality:</b> Improve air quality through reduced exposure (indoor and outdoor) to particulate matter (PM2.5 and PM10), nitrous oxide (NO <sub>2</sub> ), ozone (O <sub>3</sub> ), sulfur dioxide (SO <sub>2</sub> ) or airborne toxins.	Very Positive	2	The action has a positive impact across the community	Ban Registration of Gas Vehicles <i>Rationale: Applies to community-wide vehicle fleets</i>
	Somewhat Positive	1	The action has a positive impact across a small portion of the community or a slightly positive impact across the entire community	Electrify Municipal Fleet <i>Rationale: Applies to a small portion of total community vehicle fleet</i>
	Neutral	0	The action has no impact, or the impact is unknown	Community Outreach - EV Education <i>Rationale: Outreach/education/information is an indirect action – project team assumed no co-benefits associated with this action type</i>
	Somewhat Negative	-1	The action has a negative impact across a small portion of the community or a slightly negative impact across the entire community	Reduce Parking Pricing in Downtown/Commercial Districts (not a draft S/CAP action) <i>Rationale: Induces additional vehicle travel in a specific area</i>
	Very Negative	-2	The action has a negative impact across the community	Roadway Expansion to Decrease Congestion (not a draft S/CAP action) <i>Rationale: Induces additional vehicle travel across community</i>

Using a five-point rating allows a long list of potential actions to be evaluated relatively easily and consistently but can limit the amount of nuance that can be reflected in the evaluation process. Prior to action evaluation, AECOM and the City team established certain rating rules to ensure consistency when applying the action ratings to similar action types. In addition to the more generic rating rules, AECOM and the City team defined the following evaluation approaches for three special circumstances that apply to specific action types:

- EV charging installation and incentive actions will promote EV use and therefore indirectly impact Air Quality and Lifecycle Emissions, so similar actions received positive ratings for these co-benefit criteria.
- Any advocacy, outreach, education, plan creation, or assessment actions produce a neutral impact on co-benefits unless they result from cooperating with neighboring agencies, in which case they received a positive rating for the Regional Benefit criterion.
- Electrification actions have the potential to both increase and decrease cost of living, so most of these actions received a neutral Cost of Living rating.

**RESULTS**

The ASAP tool produces a series of scores and graphic outputs that aid in evaluating the strengths, weaknesses, and tradeoffs of the actions evaluated. These outputs enable comparison between actions to support decision-making and prioritization while intuitively communicating the benefits of individual actions to stakeholders and the public.

The following co-benefit criteria scoring chart displays the top 30 actions by co-benefit criteria scores\*:



\*The Health and Wellbeing category includes Air Quality, Public Health, and Public Safety; Environment includes Regional Benefit, Resource Conservation, and Lifecycle Emission; Economic Prosperity includes Cost of Living and Productivity; Inclusivity and Civil Society includes Equity; no Essential Public Services criteria were selected within the ASAP tool for use in Palo Alto

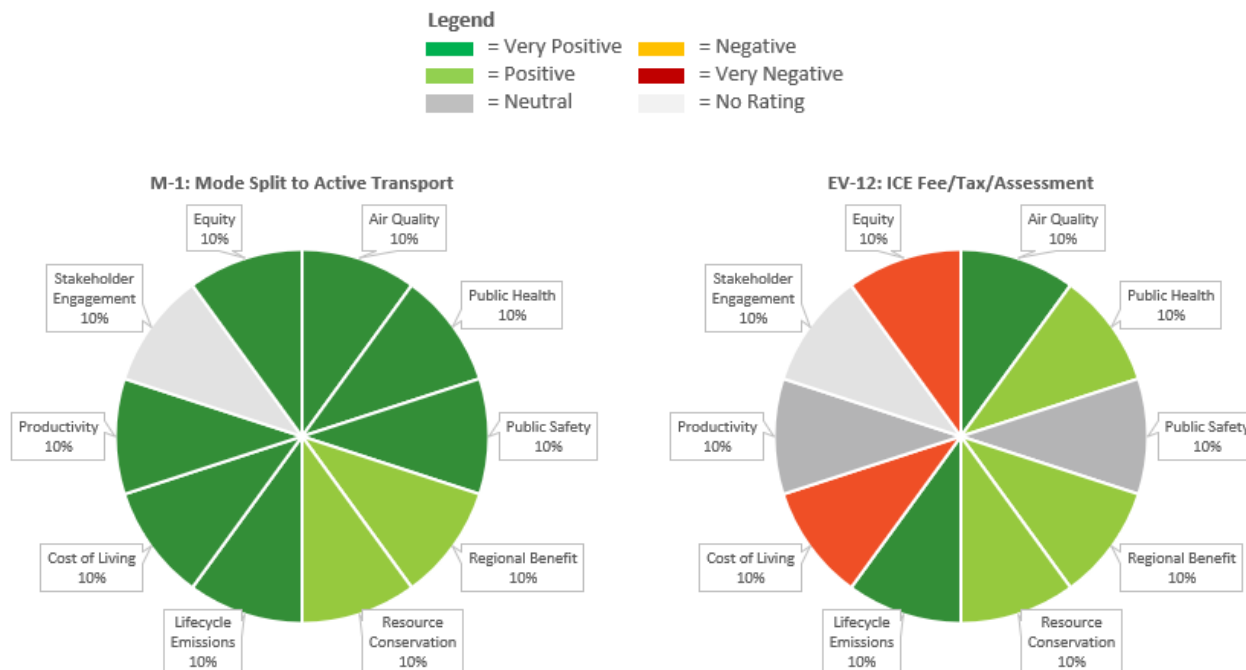
The highest-scoring actions identified in this chart include:

1. Mode Split to Active Transport
2. Transportation Demand Management (TDM) Program
3. Sea Level Rise (SLR) Adaptation Plan
4. Reduce Vehicle Miles Traveled (VMT) through Land Use

These actions produce the largest positive impact based on the selected co-benefits. Overall, no actions produced a net negative score for co-benefits. In particular, no actions scored negatively for the Air Quality, Public Health, Public Safety, Regional Benefit, Resource Conservation, Lifecycle Emissions, and Productivity criteria. However, some actions received negative scores in the Equity and Cost of Living criteria. The actions that received the lowest negative scores for these criteria include:

1. Internal Combustion Engine (ICE) Fee/Tax/Assessment
2. Natural Gas Disconnect in Residential Buildings by 2030
3. Ban Registration of Gas Vehicles
4. Single Occupancy Vehicle (SOV) Pricing

The ASAP tool also allows action co-benefits to be assessed individually in co-benefit pie charts. These charts provide a clear visual representation of the positive or negative impact of each action, and can be used to quickly compare the overall co-benefit evaluation results from one action to another. Note that the ASAP tool allows users to weight certain criteria more heavily than others, which would result in variation in the pie chart wedge sizes; Palo Alto did not apply any co-benefit weighting in its analysis, so all co-benefits provide an equal share of the total evaluation score.



Appendix A on the following pages provides a color-coded summary table showing all rating results by action and evaluation criteria.

**LEGEND**

Very Positive
Somewhat Positive
Neutral/Unrated
Somewhat Negative
Very Negative

Action	Air Quality	Public Health	Public Safety	Regional Benefit	Resource Conservation	Lifecycle Emissions	Cost of Living	Productivity	Equity
E-1: Community Engagement - Electrification									
E-2: Electrification - Streamlined Permitting									
E-3: All-Electric Utility Rate									
E-4: Existing SFR Remodel Electrification									
E-5: Existing MF Retrofit - Gas Wall Furnace to Electric Heat Pump									
E-6: SF Home Sale - Electrification Evaluation and Education									
E-7: SFR Home Sale Electrification									
E-8: SFR Home Electrification									
E-9: Natural Gas Disconnect in Residential Buildings by 2030									
E-10: Residential Electrification On-bill Financing									
E-11: K-12 Electrification - Space and Water Heating									
E-12: Non-Residential Retrofit - Gas Packaged Rooftop Units to Electric Heat Pumps									
E-13: Non-Residential NC - All-Electric Mandate									
E-14: Public Buildings - 80% Electrification									
E-15: Existing Commercial >25,000 sq. ft. - Carbon Emissions Intensity Target									
E-16: Assess Opportunities - Distributed Energy/Microgrids									

**LEGEND**

Very Positive
Somewhat Positive
Neutral/Unrated
Somewhat Negative
Very Negative

Action	Air Quality	Public Health	Public Safety	Regional Benefit	Resource Conservation	Lifecycle Emissions	Cost of Living	Productivity	Equity
E-17: Identify Funding - Electrification Infrastructure Preparation									
E-18: Identify Funding - Building Electrification									
M-1: Mode Split to Active Transport									
M-2: Reduce SOV use through Parking Requirements									
M-3: Implement CIP Transit Projects									
M-4: Smart Traffic Signaling									
M-5: TDM Programs									
M-6: Reduce VMT through Land Use									
M-6a: Trees Along Pathways/Bikeways									
M-7: Private Transit GHG Reduction									
M-8: Support Telecommuting Infrastructure									
M-9: SOV Pricing									
M-10: Eliminate Gasoline Vehicle Use									
M-11: Advocacy of Transit Options									
EV-1: Incentivize Private EV Charging Stations									
EV-2: Charging Network Plan									

**LEGEND**

Very Positive
Somewhat Positive
Neutral/Unrated
Somewhat Negative
Very Negative

Action	Air Quality	Public Health	Public Safety	Regional Benefit	Resource Conservation	Lifecycle Emissions	Cost of Living	Productivity	Equity
EV-3: Electrify Municipal Fleet									
EV-4: Community Outreach - EV Education									
EV-5: Advocate for State EV Rebate Program to Include Motorcycles/Bicycles									
EV-6: Increase Light EV VMTs + Reduce ICE VMTs									
EV-7: Plan to Encourage EV Adoption of Inbound Vehicles									
EV-8: Lower Electric Retail Rates for EV Charging									
EV-9: Lobby State for Stricter Emission Standards									
EV-10: MF Parking Spaces - 25% with EV Charging									
EV-11: Existing Commercial Parking - EV Charing Requirements									
EV-12: ICE Fee/Tax/Assessment									
EV-13: Electrify Private Bus Fleets									
EV-14: Ban Registration of Gas Vehicles									
EV-15: Evaluate Funding for EVs									
W-1: Education and Incentives - Water Efficiency									
W-2: Water Reuse Project									
W-3: Green Stormwater Infrastructure									



**LEGEND**

Very Positive
Somewhat Positive
Neutral/Unrated
Somewhat Negative
Very Negative

Action	Air Quality	Public Health	Public Safety	Regional Benefit	Resource Conservation	Lifecycle Emissions	Cost of Living	Productivity	Equity
W-4: Salt Removal Facility									
W-5: One Water Portfolio									
W-6: Baseline and KPIs for Reduction of Impervious Surfaces									
A-1: SLR Vulnerability Assessment									
A-2: SLR Adaptation Plan									
A-3: Review SAFER Recommendations									
A-4: Discuss SLR Levee Alignment Alternatives with Surrounding Community									
A-5: Coordinate Regionally, Act Locally									
NE-1: Tree Planting									
NE-2: New Construction Plant Selection - Biodiversity and Soil Health									
NE-3: Urban Forest Master Plan + Parks Master Plan									
NE-4: WELO Requirements for Native and Drought Tolerant Species									
NE-5: Green Stormwater Infrastructure Plan									
NE-6: No Net Tree Canopy Loss									
NE-7: Reduce Pesticides									
NE-8: Enhance Pollinator Habitat in Parks									

**LEGEND**

Very Positive
Somewhat Positive
Neutral/Unrated
Somewhat Negative
Very Negative

Action	Air Quality	Public Health	Public Safety	Regional Benefit	Resource Conservation	Lifecycle Emissions	Cost of Living	Productivity	Equity
NE-9: Baseline and KPIs for Tree Carbon Storage	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated
ZW-1: Deconstruction and Construction Materials Management Ordinance	Very Positive	Neutral/Unrated	Neutral/Unrated	Somewhat Positive	Very Positive	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated
ZW-2: Disposable Foodware Ordinance -- Eliminate Single-Use Cups and Containers	Neutral/Unrated	Somewhat Positive	Neutral/Unrated	Neutral/Unrated	Very Positive	Neutral/Unrated	Somewhat Positive	Neutral/Unrated	Neutral/Unrated
ZW-3: Commercial Food Generators -- Require Food Waste Prevention and Recovery	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Somewhat Positive	Very Positive	Neutral/Unrated	Somewhat Positive	Neutral/Unrated	Very Positive
ZW-4: Residential Food Waste Reduction	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Very Positive	Neutral/Unrated	Very Positive	Neutral/Unrated	Neutral/Unrated
ZW-5: Incentivize Reusable Diapers	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Somewhat Positive	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated
ZW-6: Champion a Circular Economy	Neutral/Unrated	Neutral/Unrated	Neutral/Unrated	Somewhat Positive	Somewhat Positive	Neutral/Unrated	Somewhat Positive	Neutral/Unrated	Somewhat Positive