MEMORANDUM

DATE September 4, 2019

TO Andrea Chow, Sustainability Analyst, City of San Mateo

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SUBJECT Climate Action Plan Update – Summary of GHG Reduction Measure Draft Results

This memo presents a summary of the draft results of assessing the GHG reduction potential from the GHG reduction measures (a process called quantification) selected for inclusion in San Mateo's updated Climate Action Plan (CAP). The quantification process involves making assumptions about the level of participation in the measure (for example, what percent of existing homes will conduct energy efficiency retrofits) based on scientific studies and reports, case studies from other jurisdictions, and professional understanding of the reduction effort. The project team selected participation levels that we deemed reasonable and appropriate for San Mateo. There are opportunities to change these participation levels if City staff and Sustainability & Infrastructure Commission members believe that higher or lower rates of participation are feasible, which would lead to increased or decreased GHG reduction depending on the change in assumptions.

GHG REDUCTION MEASURE DEVELOPMENT

The project team prepared the GHG measures for San Mateo's updated CAP based on direction and guidance from several sources, including comments by members of the Sustainability and Infrastructure Commission, feedback from community workshop participants, discussions with City staff, best practices, and review of regional GHG reduction efforts being prepared as part of the RICAPS effort. Based on these sources, the project team identified 29 distinct GHG reduction measures, some of which are updated versions of measures in San Mateo's current CAP (see Attachment A). The measures are organized into the following categories:

- BE: Building electrification
- RE: Renewable energy
- EE: Energy efficiency
- ME: Municipal energy efficiency
- CF: Clean fuels
- ST: Sustainable transportation
- SW: Solid waste
- WW: Water and wastewater
- OR: Off-road

PROGRESS TO TARGETS

The City's current and adopted GHG reduction community-wide GHG reduction targets include reducing GHG emissions 15 percent below baseline (2005) levels by 2020 (equivalent to 1990 levels), 35% percent below 2005 levels by 2030, and 80% below 1990 levels by 2050. As noted in the state's initial 2008 Climate Change Scoping Plan, local GHG reduction targets to reduce emissions 15 percent below 2005-2008 baseline levels by 2020 is the approximate equivalent of the community's 1990 levels. The City's 2020 and 2050 targets are consistent with existing state guidance, but the 2030 target is not consistent with state guidance. As part of the CAP Update, the City has indicated interest in revising the 2030 target to be consistent with state guidance which would be to reduce community-wide emissions 40 percent below 1990 levels (or the City's 2020 target) by 2030 or to 6.0 $MTCO_2e$ per capita.

While best practice still supports community-wide or absolute GHG emissions reduction targets, the 2017 Climate Change Scoping Plan recommends that communities adopt per-capita GHG reduction targets of 6.0 $MTCO_2e$ per capita by 2030 and 2.0 $MTCO_2e$ per capita by 2050. Communities may adopt different 2030 and 2050 targets, provided that these targets are generally consistent with state guidance and GHG reduction efforts.

As indicated in **Table 1** of **Attachment B**, at current participation levels, the measures will reduce emissions to the following levels:

- 2020: Absolute community-wide emissions are reduced to 24.03 percent below baseline levels, surpassing the 2020 target by 9.03 percent (59,680 $MTCO_2e$).
- 2030: Absolute community-wide emissions are reduced to 35.22 percent below the 2020 target, leaving a gap of 4.78 percent (26,840 $MTCO_2e$). When measured on a per-capita basis, emissions are reduced to 2.95 $MTCO_2e$ per capita, surpassing the 6.0 per capita target by 3.05 $MTCO_2e$ per capita.
- 2050: Absolute community-wide emissions are reduced to 67.55 percent below the 2020 target, leaving a gap of 12.45 percent (69,930 $MTCO_2e$). When measured on a per-capita basis, emissions are reduced to 1.27 $MTCO_2e$ per capita, surpassing the 2.0 per capita target by 0.73 $MTCO_2e$ per capita.

RESULTS TABLE

Table 2 of Attachment B presents the full results of the quantification process. The table is organized by individual measure, with the following information provided for each measure for the years 2020, 2030, and 2050:

- Assumptions: The level of participation assumed for the measure. As noted above, this participation level is based on the project team's familiarity of what is reasonable and

appropriate for San Mateo, with the understanding that these numbers are flexible and may be changed.

- Performance standards: The number of San Mateo community members (e.g. residents, households, businesses, etc.) who would need to participate in the measure to achieve the assumed participation rate. The performance standards provide a manner for San Mateo to track progress toward implementation of each measure.
- Activity reduction: The amount of activity data (kilowatt-hours, therms, VMT, etc.) that would be reduced by implementing the measure at the indicated levels. Note that some measures do not affect activity data levels. Measures that involve electrification of buildings or vehicles will increase the level of electricity used, showing a negative activity reduction (i.e. an activity increase).
- GHG reduction: The level of GHG reductions that would be achieved by implementing the measure at the indicated levels. GHG reductions are given in metric tons of carbon dioxide equivalent ($MTCO_2e$) units.

Note that, due to space constraints, the implementation actions for each measure are not shown. Attachment A, Draft GHG Reduction Measures, provides the list of implementation actions for each measure.

Quantification results are not currently available for two measures: ME-1 (energy efficiency for new municipal buildings) and ST-3 (shared mobility). For ME-1, the project team needs information about the projected level of new municipal construction before the results can be quantified, to avoid double-counting GHG reductions or setting unrealistic performance levels. For ST-3, the project team has not yet been able to identify feasible assumptions about participation levels that would not be redundant with other GHG reduction measures.

NEXT STEPS

The results presented in **Attachment B** are draft, intended for discussion and review. We encourage City staff and Sustainability & Infrastructure Commission members to review the results and identify desired changes, including alterations to the assumptions and performance levels as necessary to meet the City's desired GHG reduction targets. Following these discussions, the project team will present a revised set of quantification results that incorporate changes to the quantification methods and assumptions.

ATTACHMENT A: SAN MATEO CLIMATE ACTION PLAN UPDATE, DRAFT GHG REDUCTION MEASURES

BUILDING ELECTRIFICATION

BE 1: All-electric new construction

- Adopt a reach code to encourage residential and commercial new construction be built to an all-electric standard, including electric heating, cooling, and water heating.
- Explore the feasibility of reducing permitting fees if builders elect to construct all-electric buildings instead of natural gas.

BE 2: All-electric existing buildings

- Encourage residents and businesses to purchase electric technologies (e.g., air source heat pumps, heat pump water heaters, electric dryers, and electric stoves).
- Encourage residents and businesses to upgrade electric panels to accommodate electric technologies including solar PV, battery storage, air source heat pumps, heat pump water heaters, electric dryers, and electric stoves.
- Support training and outreach to contractors, vendors, and installers about preferable electric equipment replacement technologies.

RENEWABLE ENERGY

RE 1: Peninsula Clean Energy

- Encourage residents and businesses to participate in Peninsula Clean Energy.
- Encourage residents and businesses participating in PCE to opt up to ECO 100.
- Support PCE's outreach to direct access customers to encourage use of carbon free electricity.

RE 2: Renewable energy systems for new and existing residences

- Adopt reach codes to require residential developments to install renewable energy systems, including solar photovoltaics or solar water heating, as needed to exceed State requirements.
- Provide education and outreach to residents and contractors on the benefits of pairing battery storage with solar PV systems.
- Explore the feasibility of reducing or eliminating solar permitting fees.
- Provide information to property owners about discounts, incentives and financing programs for renewable energy systems, including solar bulk purchase programs and financing programs that allow property owners to incrementally pay for renewable energy systems.
- Provide education and outreach to stakeholders on the benefits of retrofitting existing residential buildings to be zero net energy.
- Promote the installation of renewable energy and energy storage systems as part of major home retrofit projects.

RE 3: Renewable energy systems for new and existing nonresidential buildings

- Adopt reach codes to require nonresidential developments to install renewable energy systems, including solar photovoltaics or solar water heating, as needed to exceed State requirements.

- Promote financing programs that allow developers, property owners, and tenants to incrementally pay for renewable energy systems.
- Explore the feasibility of reducing or eliminating solar permitting fees.
- Work with appropriate property owners to identify potential sites for a microgrid demonstration project. Provide education and outreach to these property owners on the multiple benefits of developing a microgrid including reliability, cleaner energy, and cost savings.
- Encourage property owners to pair battery storage systems with solar PV systems.
- Support development of a local rebate program for on-site renewable energy systems.

ENERGY EFFICIENCY

EE 1: Residential energy efficiency retrofits

- Establish a time of sale residential energy conservation program that requires an energy audit by a certified energy professional. Audit results would be disclosed to the buyer.
- Educate homeowners, real estate agents, rental property owners and tenants about the benefits of residential energy retrofits, the availability of financing options, and how to participate.
- Provide energy retrofit information to project applicants seeking permits for renovation or expansion work on existing houses.
- Host residential energy outreach events such as evening workshops and local learn-at-lunch sessions, provide energy retrofit information at community events, and distribute information on residential energy retrofit online and in public buildings.
- Promote existing financing programs that allow homeowners, rental property owners and tenants to incrementally pay for energy efficiency retrofits.
- Provide funding to support energy efficiency education and low-cost retrofits for low-income households.
- Offer low- or no-cost energy audits to rental property owners who agree to disclose a unit's energy efficiency results to tenants.
- Encourage property owners to participate in energy benchmarking efforts.
- Work with tenant groups and property management companies to identify actions tenants can take within the bounds of their lease to improve energy efficiency.
- Provide incentives such as direct subsidies and reduced fee permitting to rental property owners who make energy efficiency improvements to their units beyond any minimum actions required by the adopted energy code.

EE 2: Nonresidential energy efficiency retrofits

- Develop policy requiring reporting of energy use (ENERGY STAR performance score) by commercial and multifamily buildings. Apply benchmarking ordinance to smaller commercial and multifamily buildings, below the minimum size threshold for mandatory benchmarking under AB 802, and require commercial buildings to receive an energy assessment every five to ten years depending on size.
- Educate property owners and tenants about energy efficiency retrofit programs and financing options.
- Work with property owners to offer green leases for tenants, allowing tenants to specify energy efficiency improvements to the space or to help finance energy efficiency retrofits in exchange for reduced occupancy fees.

Promote a green lease addendum template that can be used by nonresidential property owners to incorporate green lease language into future leases.

- Promote financing programs that allow property owners and tenants to incrementally pay for renewable energy systems.
- Support participation in demand-response programs.
- Offer low-cost energy audits for business or office parks, including identification of most cost-efficient savings for weatherization or appliance upgrades.
- Offer reduced fee permitting to project applicants undergoing specifically defined energy retrofit measures, such as a retrofit to achieve Zero Net Energy in an existing commercial building.
- Promote San Mateo County Green Business program to help encourage energy efficiency and sustainable actions in local businesses.

EE 3: Residential Tree Planting

- Establish City program to provide free or subsidized shade trees for buildings with eastern, western, or southern exposures to reduce energy use associated with cooling homes.
- Partner with community organizations and applicable professional associations to support education and outreach on the benefits and best practices of strategic tree planting to provide shade and cooling. Develop guidance on the preferred tree types and recommended approach to selecting locations for tree plantings that support energy conservation and efficiency.

MUNICIPAL ENERGY EFFICIENCY AND ELECTRIFICATION

ME 1: Energy efficiency for new municipal buildings

- Seek grant funding or low- or no-interest loans to implement energy saving efforts and renewable energy systems at municipal facilities at time of construction or substantial renovation.

ME 2: Energy efficiency at existing municipal buildings

- Implement energy efficiency upgrades (including lighting and HVAC systems) at municipal buildings as needed.

ME 3: All-electric municipal buildings and facilities

- As feasible, design and build all-electric municipal buildings and facilities, including electric heating, cooling, and water heating.
- Evaluate existing buildings and facilities to identify opportunities for retrofitting to all-electric, including electric heating, cooling, and water heating.
- Explore feasibility of establishing microgrid at new or existing municipal facilities to capture multiple benefits of microgrids, including reliability, clean energy, and cost savings.

CLEAN TRANSPORTATION FUELS

CF 1: Electric vehicle charging infrastructure

- Update reach codes to exceed the state-mandated minimum percentage of EV parking spaces designed to accommodate the future installation of electric vehicle supply equipment in new residential and commercial development.
- Explore mandate the installation of EV charging supply equipment in multifamily residential building and commercial buildings.
- Promote incentives to encourage the expansion of EV charging infrastructure in existing public and private properties, including parking structure, hotels and motels, multi-unit dwellings, and workplaces.
- Partner with other agencies to incentivize for property owners who install EV charging stations.
- Install additional public EV charging stations in desirable, high-volume, and prominent City-owned locations.
- Encourage the expansion of EV charging infrastructure in existing buildings.
- Encourage pairing EV charging infrastructure with battery storage systems.

CF 2: Electric vehicle education and outreach

- Provide information about the benefits of EVs and PHEVs through the City's electronic media systems and at public events, including creating opportunities for public EV/PHEV test drives.
- Conduct educational outreach to homeowners, commercial property owners, and developers about the benefits of EV charging stations.
- Identify and distribute resources to assist community members seeking to install an EV charging station on their properties.
- Work with local and regional partners to explore providing additional incentives to community members who purchase an EV or PHEV.
- Evaluate opportunities to regulate or incentivize transportation network companies (TNCs) to increase adoption of electric vehicles as regulatory conditions allow.

CF 3: Clean City fleet

- Purchase EVs or PHEVs as replacements for gasoline, diesel, or conventional hybrid city fleet vehicles that have not been converted to CNG vehicles, as available and cost-effective.

CF 4: Clean fuel

- Support efforts to build fueling stations in San Mateo for other clean fuels, including hydrogen and sustainably sourced biofuels, as supported by market conditions.

SUSTAINABLE TRANSPORTATION

ST 1: Bicycle mode share

- Host bicycle safety and awareness efforts for bicyclists, pedestrians, and drivers.
- Support bike-to-school commutes through the Safe Routes to School program.
- Install bike racks and long-term bike storage lockers in the public right-of-way and at City facilities and transit facilities.

- Secure funding for design and construction of the infrastructure improvements identified in the adopted 2019 Bicycle Master Plan.

ST 2: Pedestrian mode share

- Improve pedestrian safety through education and outreach efforts.
- Support walk-to-school efforts through the Safe Routes to School program.
- Secure funding for design and construction of the infrastructure improvements identified in the adopted Pedestrian Master Plan and Green Infrastructure Plan.

ST 3: Shared mobility

- Launch shared mobility program to provide first- and last-mile connections for residents and commuters in San Mateo.
- Work closely with shared mobility operator(s) to monitor program and encourage ridership.

ST 4: Public transit service

- Support the development of new rapid bus transit routes.
- Work with transit providers to improve safety and comfort at transit stops.
- Work with Caltrain to improve the frequency of Caltrain services, particularly to the Hayward Park station.
- In partnership with transit providers, explore the feasibility of transit priority signals and other infrastructure improvements to speed up transit service.
- Increase ridership for public transit by enhancing pedestrian and bicycle access to high quality transit and encouraging incentive programs to decrease reliance on single-occupancy vehicles.

ST 5: Commuter programs

- Conduct an outreach campaign to San Mateo residents and employees about available shuttle and vanpool options to support increased use of these existing programs.
- Work with regional partners and employers to offer microtransit services to provide first-mile and last-mile connections with key job and housing centers
- Provide outreach for carpool incentive programs to San Mateo residents and employees.
- Encourage existing employers to participate in Transportation Demand Management efforts.
- Support efforts by employers to provide telecommuting as a viable option for appropriate employees.

ST 6: Transportation Demand Management

- Require new developments of at least six multifamily units and/or 10,000 square feet of nonresidential space to implement a suite of TDM strategies to comply with the appropriate trip reduction target identified in applicable area plans and the future San Mateo Downtown TDM Plan.
- Require developments of at least 20 multifamily units and/or 50,000 square feet of nonresidential space undergoing additions or alterations (as defined in San Mateo Municipal Code Section 23.06.012) to implement TDM strategies consistent with the targets in relevant area plans and the future San Mateo Downtown TDM Plan.
- Educate developers working on projects in San Mateo not located in a TDM area about ways to reduce vehicle miles traveled and the resultant benefits.
- Publicize developments and businesses with successful TDM programs.

- Work with regional partners to fund successful TDM strategies for existing developments that can be implemented with little or no cost to property owners.

ST 7: Transit-oriented developments

- Increase transit-oriented developments along El Camino Real, within one-half mile of Caltrain stations, and in the Rail Corridor Transit Oriented Development and Hillsdale Station Area Plan areas.

SOLID WASTE

SW 1: Composting program

- Provide educational outreach materials to multifamily residents about urging HOA/property managers to support composting programs.
- Work with Recology San Mateo County to include information about adding composting services in monthly garbage and recycling bills to existing BizSMART customers.
- Work with food service facilities to understand barriers to utilizing existing composting programs. Use this clearer perception of roadblocks to mitigate concerns and target incentives more specifically at high food-waste facilities.
- Work with multifamily and commercial property owners to minimize any potential health or cleanliness impacts associated with compost collection bins.
- Explore alternative off-site collection or sorting methods to capture compostable materials from multifamily units.
- Provide a diversion discount to participating commercial and multifamily users to incentivize properly and fully utilize compost services.

SW 2: Expanded recycling service

- Expand recycling programs to accommodate additional material types as economic conditions allow.
- Improve educational efforts around proper waste sorting.
- Work with local businesses to promote “take back” programs for materials that cannot currently be recycled in curbside bins.

SW 3: Waste awareness and source reduction

- Work with partners to establish a source reduction program.
- Work with partners to establish a materials reuse program.
- Explore a ban on specific types of single-use or disposable plastics.
- Work with waste haulers to minimize recycling contamination.

WATER AND WASTEWATER

WW 1: Water efficiency retrofits for existing buildings

- Provide educational materials and outreach to encourage indoor water conservation.
- Work with Cal Water and Bay Area Water Supply & Conservation Agency (BAWSCA) to promote rebate offerings on high efficiency toilets, washing machines, rain barrels, and other water-conserving appliances.
- Work with Cal Water to offer low-cost or free water audits to businesses and homeowners.
- Explore ways to encourage installation of greywater systems in existing buildings, especially as part of significant retrofits.

WW 2: Water-efficient landscaping

- Provide educational materials to the community about drought-tolerant and native landscaping.
- Host educational workshops on drought-tolerant and native landscaping.
- Partner with Cal Water and BAWSCA to host a trade-in program for inefficient sprinklers for more efficient drip irrigation systems.
- Retrofit City-owned landscapes to increase the amount of drought-tolerant and native landscaping.

WW 3: Water efficiency in new construction

- Adopt a reach code to require new developments to meet the voluntary indoor and outdoor water efficiency standards in the California Green Building Standards Code.
- Encourage developers to install greywater systems in new buildings at time of construction.

OFF-ROAD EQUIPMENT

OR 1: Clean fuel lawn and garden equipment

- Buy hybrid and alternative fuel models when purchasing new City-owned landscaping equipment, as feasible.
- Conduct education campaigns and outreach events to property owners and landscaping companies about the availability of hybrid and alternative fuel landscaping equipment, including electric equipment, and available incentives such as the BAAQMD Lawn Mower Exchange.

ATTACHMENT B: SAN MATEO GHG REDUCTION MEASURES: DRAFT RESULTS

Table 1: Progress to GHG Reduction Targets

	2020	**2030**	**2050**
Baseline emissions	660,600	660,600	660,600
Target – Absolute Community-wide GHG Emissions	561,510	336,910	112,300
Community-wide GHG Emissions with new and updated CAP measures	501,830	363,750	182,230
Gap to target	-59,680	26,840	69,930
Target - % change	15% below baseline	40% below 2020 target	80% below 2020 target
Community-wide GHG Emissions - Percent below with new and updated CAP measures	-24.03%	-35.22%	-67.55%
Gap to target	-9.03%	4.78%	12.45%
Target - Per-capita GHG Emissions	-	6.00	2.00
Per-capita emissions with new and updated CAP measures	4.58	2.95	1.27
Gap to target	-	-3.05	-0.73

Table 2: GHG Reductions and Performance Indicators by Measure

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
BE-1	All-electric new construction	Cumulative % of residential construction influenced by energy design rating (EDR) reach code:	35%	35%	40%	Number of all-electric new construction residential housing units	480 new construction residential housing units built all-electric.	2,730 new construction residential housing units built all-electric.	5,520 new construction residential housing units built all-electric.	kWh	-441,650	-2,395,080	-3,915,720	880	4,650	7,440
		Cumulative % of office commercial construction influenced by energy design rating (EDR) reach code:	35%	35%	35%											
		Cumulative % of non-office commercial construction influenced by energy design rating (EDR) reach code:	0%	20%	35%	Square feet of all-electric new construction non-residential buildings	24,560 square feet of new construction non-residential buildings built all-electric.	548,730 square feet of new construction non-residential buildings built all-electric.	2,508,810 square feet of new construction non-residential buildings built all-electric.	Therms	167,970	876,630	1,399,060			
		Cumulative % new non-residential buildings that are office space:	40%	40%	40%											
BE-2	All-electric existing buildings	Cumulative % commercial buildings that are office space:	40%	40%	40%	Existing residential gas to electric HVAC conversions	130	2,860	16,100	kWh	-444,130	-9,897,890	-61,334,800	620	13,950	85,960
						Existing residential gas to electric water heating conversions	190	4,280	24,150							
		Cumulative % of residential gas equipment	5%	10%	20%	Existing residential gas to electric clothes drying conversions	190	4,280	24,150							

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
		reaching end of life replaced with electric due to panel incentive:				Existing residential gas to electric cooking conversions	160	3,430	19,320							
		Cumulative % of residential electrical panel upgrades resulting in EV purchase:	15%	20%	25%	Existing residential electrical panel upgrades	340	7,430	41,860	Therms	63,350	1,393,740	7,855,640			
						Square feet of existing offices receiving gas to electric HVAC conversions	32,560	716,370	4,037,710							
		Cumulative % of office gas equipment reaching end of life replaced with electric due to panel incentive:	5%	10%	20%	Square feet of existing offices receiving gas to electric water heating conversions	48,840	1,074,550	6,056,560							
						Square feet of existing offices receiving gas to electric cooking conversions	39,070	859,640	4,845,250	VMT (Gasoline)	875,850	24,326,560	172,471,320			
		Cumulative % of office electrical panel upgrades resulting in EV charging installation:	10%	10%	15%	Square feet of existing offices receiving electrical panel upgrades	60,240	1,325,280	7,469,760							
						Number of electric vehicles purchased/leased to replace ICE vehicles	60	1,720	12,450							
		Cumulative % of EV purchases replacing gasoline vehicle:	99%	98%	96%	Existing office parking spaces with EV charging:	10	270	2,240	VMT (Diesel)	8,850	496,460	7,186,300			
		Cumulative % of EV purchases replacing diesel vehicle:	1%	2%	4%	Existing residential parking spaces with EV charging:	50	1,490	10,460							

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
RE-1	Peninsula Clean Energy	Percent of residents enrolling in PCE	98%	99%	100%	PCE opt-out rate	2.0%	1.0%	0.5%					380	1,060	0
		Percent of businesses enrolling in PCE	98%	99%	100%											
		Percent of residents enrolling in ECO 100	1%	3%	5%	kWh supplied by ECO 100	15,009,960	28,976,980	53,073,310							
		Percent of businesses enrolling in ECO 100	5%	8%	15%											
		Percent of direct access customers switching to PCE	0%	2%	5%											
RE-2	Renewable energy systems for new and existing residences	Percent of existing homes installing solar energy systems	4%	15%	30%	Number of homes built before 2018 with solar panels	420	4,700	10,540					50	100	0

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
RE-3	Renewable energy systems for new and existing nonresidential buildings	Percent of existing businesses installing solar energy systems	2%	6%	15%	Number of businesses built before 2018 with solar panels	10	200	580					<10	20	0
EE-1	Residential energy efficiency retrofits	Percent of existing homes conducting standard retrofits (not including fuel-switched homes)	2%	25%	60%	Number of homes retrofitted	400 single family homes and 340 multifamily homes undergoing standard retrofits, and <10 single family homes and 0 multifamily homes being upgraded to current Title 24 standards	4,720 single family homes and 4,040 multifamily homes undergoing standard retrofits, and 940 single family homes and 810 multifamily homes being upgraded to current Title 24 standards	10,060 single family homes and 8620 multifamily homes undergoing standard retrofits, and 3,350 single family homes and 2,870 multifamily homes being upgraded to current Title 24 standards	kWh	935,040	22,303,130	63,551,960	410	6,030	17,860
		Percent of existing homes retrofitting to current Title 24 standards (not including fuel-switched homes)	0%	5%	20%					Therms	73,040	1,120,590	3,358,020			
EE-2	Nonresidential energy efficiency retrofits	Percent of existing businesses conducting standard retrofits (not including fuel-switched businesses)	3%	40%	75%	Number of businesses retrofitted	120 businesses undergoing standard retrofits, and 0 businesses upgraded to current Title 24 standards.	1,600 businesses undergoing standard retrofits, and 200 businesses upgraded to current Title 24 standards.	2,870 businesses undergoing standard retrofits, and 770 businesses upgraded to current Title 24 standards.	kWh	3,488,130	46,736,170	119,125,610	840	9,930	17,040
		Percent of existing businesses retrofitting to current Title 24 standards (not including fuel-switched businesses)	0%	5%	20%					Therms	121,600	1,629,220	3,203,760			

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
EE-3	Residential tree planting	Percent of households with shade trees	2%	10%	35%	Number of households with shade trees	860	4,820	18,770	kWh	174,760	874,610	3,064,110	<10	<10	0
ME-1	Energy efficiency for new municipal buildings	This measure requires additional information about new municipal construction before it can be quantified														
ME-2	Energy efficiency at existing municipal buildings	Percent of existing municipal square footage retrofitted	2%	10%	35%	Square footage of retrofitted municipal buildings	3,970	19,830	69,390	kWh	21,240	106,200	371,700	<10	20	70
										Therms	740	3,700	12,960			
ME-3	All-electric municipal buildings and facilities	Cumulative building area of existing municipal building/s electrified (square feet):	0	40,000	80,000	Square feet of existing municipal building/s electrified:	0 square feet of existing municipal buildings retrofitted to all-electric.	40,000 square feet of existing municipal buildings retrofitted to all-electric.	80,000 square feet of existing municipal buildings retrofitted to all-electric.	kWh	0	-157,380	-314,760	0	110	210
		Cumulative number of police stations & fire stations electrified:	0	0	1	Number of police stations & fire stations electrified:	0 existing police stations or fire stations retrofitted to all-electric.	0 existing police stations or fire stations retrofitted to all-electric.	1 existing police station or fire station retrofitted to all-electric.	Therms	0	19,760	39,520			
		Cumulative building area of new municipal building/s electrified (square feet):	0	40,000	80,000	Square feet of new municipal building/s electrified:	0 square feet of new municipal buildings built all-electric.	40,000 square feet of new municipal buildings built all-electric.	80,000 square feet of new municipal buildings built all-electric.							
CF-1	Electric vehicle charging infrastructure	Cumulative average square feet of new commercial building space per parking spot:	300	300	300	New non-residential parking spaces with EV charging	150 EV charging ports installed at new non-residential buildings.	2,700 EV charging ports installed at new non-residential buildings.	10,810 EV charging ports installed at new non-residential buildings.	kWh	-2,557,760	-27,826,150	-64,649,830	2,650	29,630	71,150

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
		Cumulative target % of new workplace parking to have EV charger installed:	10%	13%	17%	New multi-unit dwelling residential parking spaces with EV charging	80 EV charging ports installed at new multifamily residential buildings.	1,060 EV charging ports installed at new multifamily residential buildings.	2,320 EV charging ports installed at new multifamily residential buildings.							
		Cumulative target % of new multi-unit dwelling residents with EV charger access:	8%	16%	22%	New single-family residential parking spaces with EV charger outlet	0 EV charging outlets installed at new single family residential buildings.	1,310 EV charging outlets installed at new single-family residential buildings.	2,910 EV charging outlets installed at new single-family residential buildings.							
		Cumulative target % of new single family homes to have EV charger outlet installed:	0%	50%	70%	Existing non-residential parking spaces with EV charging	170 EV charging ports installed at existing non-residential buildings.	2,040 EV charging ports installed at existing non-residential buildings.	4,350 EV charging ports installed at existing non-residential buildings.							
		Cumulative % commercial buildings that are office space with parking:	40%	40%	40%	Existing multi-unit dwelling residential parking spaces with EV charging	210 EV charging ports installed at existing multifamily residential buildings.	2,380 EV charging ports installed at existing multifamily residential buildings.	3,980 EV charging ports installed at existing multifamily residential buildings.							
		Cumulative average square feet of existing commercial building space per parking spot:	600	600	600	Existing additional public parking spaces with EV charging	2 EV charging ports installed at existing public locations.	30 EV charging ports installed at existing public locations.	60 EV charging ports installed at existing public locations.							

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
		Cumulative target % of existing workplace parking to have EV charger installed:	1%	10%	15%	Number of electric vehicles purchased/leased to replace ICE vehicles	570 electric vehicles purchased or leased by residents or commuters to replace internal combustion engine vehicles.	7,800 electric vehicles purchased or leased by residents or commuters to replace internal combustion engine vehicles.	20,040 electric vehicles purchased or leased by residents or commuters to replace internal combustion engine vehicles.							
		Cumulative target % of existing multi-unit dwelling residents with access to EV charging:	1%	10%	15%											
		Cumulative target additional public parking spaces with EV charging:	2	30	60											
		Cumulative percent of EV purchases replacing gasoline vehicle:	99%	98%	96%											
		Cumulative percent of EV purchases replacing diesel vehicle:	1%	2%	4%											

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
CF-2	Electric vehicle education and outreach	Target % of total community TNC VMT from electric:	2%	60%	100%	Annual additional VMT travelled by EV TNCs	0 vehicle miles travelled by internal combustion engine transportation network companies' vehicles replaced with electric vehicles.	44,451,470 vehicle miles travelled by internal combustion engine transportation network companies' vehicles replaced with electric vehicles.	83,559,236 vehicle miles travelled by internal combustion engine transportation network companies' vehicles replaced with electric vehicles.	kWh	-921,380	-17,783,020	-24,767,890	1,020	18,910	26,000
		Target % total community VMT from electric vehicles:	5%	30%	74%	Number of electric vehicles purchased/leased to replace ICE vehicles due to education/outreach/incentives	210 electric vehicles purchased or leased by residents or commuters to replace internal combustion engine vehicles.	1900 electric vehicles purchased or leased by residents or commuters to replace internal combustion engine vehicles.	1,890 electric vehicles purchased or leased by residents or commuters to replace internal combustion engine vehicles.							
CF-3	Clean city fleet	Percent of City vehicles replaced with EVs	3%	25%	60%	Fleet EV VMT	69,210	643,920	1,715,120	kWh	-11,640	-135,510	-353,720	10	150	390
CF-4	Clean fuel	Target % total community VMT from hydrogen vehicles:	0%	2%	4%	Number of hydrogen vehicles purchased/leased to replace ICE vehicles due to education/outreach/incentives	5 hydrogen fuel cell vehicles purchased or leased by residents or commuters to replace internal combustion engine vehicles.	800 hydrogen fuel cell vehicles purchased or leased by residents or commuters to replace internal combustion engine vehicles.	1,960 hydrogen fuel cell vehicles purchased or leased by residents or commuters to replace internal combustion engine vehicles.	kWh	-53,540	-6,526,710	-14,424,060	20	3,130	7,010

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
ST-1	Bicycle mode share	Additional miles of bike lanes	1.3	10	30	Total miles of bike lanes	58	67	87	VMT	106,930	874,290	2,742,520	40	240	670
ST-2	Pedestrian mode share	Percent of development in infill locations	100%	100%	100%					VMT	1,159,460	2,853,720	4,650,540	390	760	1,110
ST-3	Shared mobility	This measure cannot currently be quantified. We were unable to identify an appropriate method for quantification that would not be redundant with other measures.														
ST-4	Public transit service	Bus commute share	3%	5%	10%	Bus commute share	3%	5%	10%	kWh	-89,880	-3,987,160	-13,663,690	120	2,170	7,020
		Caltrain commute share	5%	8%	15%	Annual Caltrain daily ridership	3,130	5,320	10,430	VMT	335,270	7,915,410	28,741,550			
ST-5	Commuter programs	Percent of existing employers (pre-2006) participating in TDM	0%	5%	30%	Existing (pre-2018) businesses participating in TDM efforts	0	210	1,250	VMT	0	466,240	13,987,130	0	130	3,420
		Average trip reduction from voluntary TDM participation	0%	8%	40%											
ST-6	Transportation Demand Management	Percent of new developments subject to TDM rules	90%	95%	95%	Service population in new development (2018 and later) subject to the TDM ordinance	2,910	20,410	43,870	VMT	167,920	8,500,890	34,636,730	60	2,330	8,460

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
		Average trip reduction from new development subject to TDM rules	6%	10%	40%											
ST-7	Transit-oriented development	Percent of new units in areas supporting transit-oriented development	90%	95%	95%	New development in TOD zones	3,680 households and 0 employees	8,770 households and 2,980 employees	13,940 households and 5,710 employees	VMT	464,110	3,605,900	9,695,490	160	990	2,370
		Percent of new nonresidential square footage in areas supporting transit-oriented development	85%	90%	90%											
SW-1	Composting program	Residential composting participation rate	55%	90%	95%	Composting participation levels	23,670 households and 410 businesses	43,360 households and 3,510 businesses	50,940 households and 4,120 businesses	Tonnage	2,190	28,910	33,910	950	12,650	14,850
		Nonresidential composting participation rate	10%	80%	90%											
SW-2	Expanded recycling service	Target diversion rate	75%	85%	90%	Community diversion rate	75%	85%	90%	Tonnage	1,320	8,710	13,860	810	5,360	8,530

Measure code	Measure name	Assumptions				Performance standards				Activity reduction				GHG reduction ($MTCO_2e$)		
			2020	2030	2050		2020	2030	2050		2020	2030	2050	2020	2030	2050
SW-3	Waste awareness and source reduction	Decrease in non-organic and non-recyclable waste tonnage	5%	20%	50%					Tonnage	2,250	10,200	29,510	420	1,910	5,510
WW-1	Water efficiency retrofits for existing buildings	Percent of existing homes retrofitting water fixtures	10%	50%	95%	Number of water efficiency retrofits	3,890 existing homes and 210 existing businesses with water efficiency retrofits.	19,470 existing homes and 1670 existing businesses with water efficiency retrofits.	37,000 existing homes and 3960 existing businesses with water efficiency retrofits.	kWh	38,690	345,160	877,710	20	100	230
		Percent of existing businesses retrofitting water fixtures	5%	40%	95%											
		Percent of existing homes with greywater systems	0%	5%	20%	Number of greywater system installations	0 homes and 0 businesses with greywater systems installed.	1,950 homes and 120 businesses with greywater systems installed.	7,790 homes and 620 businesses with greywater systems installed.	Water MG	20	130	300			
		Percent of existing businesses with greywater systems	0%	3%	15%											
WW-2	Water-efficient landscaping	Reduction in total outdoor water use	3%	10%	25%					kWh	85,940	315,520	886,220	<10	<10	0
										Water MG	60	220	610			
WW-3	Water efficiency in new construction	Percent of new homes installing greywater systems	0%	8%	25%	Number of new homes with greywater systems	0	740	3,670	kWh	0	5,990	30,050	0	<10	10
		Percent of new businesses installing greywater systems	0%	5%	20%	Number of new businesses with greywater systems	0	10	80	Water MG	0	<10	20			
OR-1	Alternative fuel lawn and garden equipment	Percent of construction projects using alternative-fuel equipment	0%	8%	40%									0	370	1,270