# Appendix A

City of San Marcos Greenhouse Gas Emissions Inventory and Projections

# City of San Marcos Greenhouse Gas Emissions Inventory and Projections

**Draft**

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Prepared for the City of San Marcos

SAN MARCOS
DISCOVER LIFE'S POSSIBILITIES

Prepared by the Energy Policy Initiatives Center

EPIC
ENERGY POLICY INITIATIVES CENTER
UNIVERSITY OF SAN DIEGO SCHOOL OF LAW

## About EPIC

The Energy Policy Initiatives Center (EPIC) is a non-profit research center of the USD School of Law that studies energy policy issues affecting California and the San Diego region. EPIC's mission is to increase awareness and understanding of energy- and climate-related policy issues by conducting research and analysis to inform decision makers and educating law students.

For more information, please visit the EPIC website at www.sandiego.edu/epic.

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## Table of Contents

# 1 OVERVIEW

This document presents a summary of the greenhouse gas (GHG) emissions for the City of San Marcos (referred to as San Marcos or the City) from 2012 to 2014, and the business-as-usual (BAU) emissions projections for 2020, 2030 and 2035. This BAU projection demonstrates emissions growth in the absence of any new policies and programs and does not consider future impacts of adopted Federal and State policies. GHG reductions from these policies are considered later in the climate action planning process and are referred to as the "legislatively-adjusted BAU".

Section 2 describes the background sources and common assumptions used for the inventory and projections. Section 0 provides the results of the GHG emissions inventory for 2012 to 2014. The methods used to prepare each category of the inventory are provided in Section 4. Section 5 provides a summary of the emissions projections for 2020, 2030 and 2035, and the methods used to prepare each category of projections.

# 2 BACKGROUND

## 2.1 Greenhouse Gases

The primary GHGs included in the emissions estimates presented here are carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$). Each GHG has a different capacity to trap heat in the atmosphere, known as its global warming potential (GWP), which is normalized relative to $CO_2$ and expressed in carbon dioxide equivalents ($CO_2e$). In general, the 100-year GWPs reported by the Intergovernmental Panel on Climate Change (IPCC) are used to estimate GHG emissions. The GWPs used in this inventory are from the IPCC Fourth Assessment Report (AR4),[1] provided in Table 1.

**Table 1 Global Warming Potentials Used in San Marcos GHG Emission Inventory & Projections**

| Greenhouse Gas | Global Warming Potential |
|---|---|
| Carbon dioxide ($CO_2$) | 1 |
| Methane ($CH_4$) | 25 |
| Nitrous oxide ($N_2O$) | 298 |

## 2.2 Categories of Emissions

The U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (U.S. Community Protocol),[2] published by ICLEI USA, requires a minimum of five basic emissions-generating activities to be included in a Protocol-compliant community-scale GHG inventory. These categories are: electricity, natural gas, on-road transportation, water and wastewater, and solid waste. GHG emissions are calculated by multiplying activity data (e.g., kilowatt-hours of electricity, tons of solid waste) by an emission factor (e.g., pounds of $CO_2e$ per unit of electricity). For these five categories, methods used in this inventory were based on the U.S. Community Protocol standard methods and modified with regional- or City-specific data when available.

[1] IPCC Fourth Assessment Report: Climate Change 2007: Direct Global Warming Potentials (2013).
[2] ICLEI – Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.0 (2012).

Additionally, GHG emissions from off-road transportation were included in the inventory and projections, based on the methods and models used by California Air Resources Board (CARB) in the statewide GHG emission inventory.[3]

### 2.3 Demographics

The San Diego Association of Governments (SANDAG) estimates and forecasts population and employment for all jurisdictions in the San Diego region. The population and jobs estimate from 2012 to 2014 for San Marcos are provided in Table 2.[4]

**Table 2 Population and Jobs Estimates (San Marcos, 2012-2014)**

| Year | Population | Jobs |
|---|---|---|
| 2012 | 85,563 | 37,608 |
| 2013 | 87,591 | 38,630 |
| 2014 | 90,397 | 39,652 |

### 2.4 Rounding of Values in Tables and Figures

Rounding is used only for the final GHG value within the tables and figures throughout the document. Values are rounded to the nearest integer of a higher order of magnitude. Values are not rounded in the intermediary steps in the actual calculation. Because of rounding, some totals may not equal the exact values summed in any table or figure.

## 3 SUMMARY OF GHG EMISSIONS INVENTORY

The total GHG emissions from San Marcos in 2012 were estimated at 599,000 metric tons $CO_2e$ (MT $CO_2e$), distributed into categories as shown in Figure 1.

[3] CARB: California Greenhouse Gas Emission Inventory – 2017 Edition (June 2017).
[4] 2012–2014 Population are from SANDAG's Demographic & Socio-Economic Estimates (March 8, 2017 Version). Jobs in 2012 are from SANDAG's Series 13 Regional Growth Forecast (October 2013). Jobs in 2013 and 2014 are interpolated linearly based on 2012 and 2020 jobs estimates. The number of jobs is for civilian jobs only and does not include military jobs, SANDAG Data Surfer, accessed on November 2, 2017.

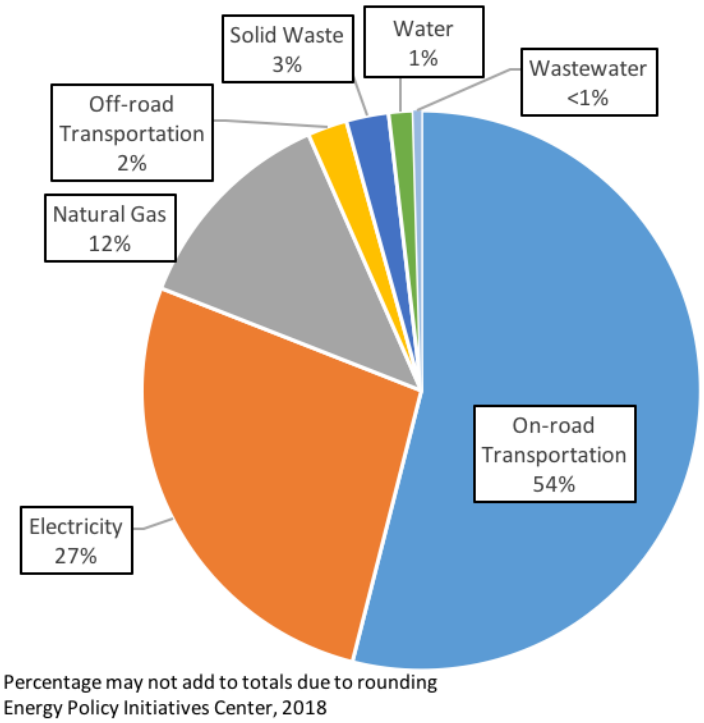



**Figure 1 Breakdown of GHG Emissions in San Marcos (2012)**

The total GHG emissions in the year 2012, 2013, and 2014 are provided in Table 3. The 2013 estimates were estimated at 595,000 MT $CO_2e$ and the total GHG emissions in 2014 were estimated at 566,000 MT $CO_2e$, 6% lower than the total emissions in 2012. Both the 2013 and 2014 GHG emissions have similar distributions among the emissions categories as the 2012 GHG emissions. The on-road transportation category contributed the most (54%) to the overall GHG emissions in 2012, while the wastewater category contributed the least (<1%). The totals and breakdown of emissions by category are presented in Table 3.

**Table 3 Total and Breakdown of GHG Emissions in San Marcos (2012–2014)**

| Emissions Category | 2012 GHG Emissions (MT $CO_2e$) | 2013 GHG Emissions (MT $CO_2e$) | 2014 GHG Emissions (MT $CO_2e$) |
|---|---|---|---|
| On-Road Transportation* | 322,000 | 323,000 | 323,000 |
| Electricity | 162,000 | 156,000 | 138,000 |
| Natural Gas | 75,000 | 77,000 | 66,000 |
| Solid Waste | 15,000 | 14,000 | 13,000 |
| Off-Road Transportation | 14,000 | 14,000 | 14,000 |
| Water | 9,000 | 9,000 | 9,000 |
| Wastewater | 3,000 | 3,000 | 3,000 |
| **Total** | 599,000 | 595,000 | 566,000 |

Sum may not add up to totals due to rounding.
GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.
* Based on SANDAG Series 13 vehicle miles traveled (VMT) estimates. 2012 is the Base Year.
Energy Policy Initiatives Center 2018

# 4 METHODS TO CALCULATE EMISSIONS INVENTORY

## 4.1 On-Road Transportation

The emissions associated with on-road transportation in San Marcos are calculated by multiplying the estimated vehicle miles traveled (VMT) and the average vehicle emission rate in the San Diego region in a given year. VMT data were provided by SANDAG based on its activity-based model and the Origin-Destination (O-D) method.[5] The O-D VMT method is the preferred method proposed by the U.S Community Protocol in 'TR.1 Emissions from Passenger Vehicles' and 'TR.2 Emissions from Freight and Service Trucks' that estimates miles traveled based on where a trip originates and where it ends to better attribute on-road emissions to cities and regions of miles traveled (Figure 2).[6]

[5] SANDAG (2015). San Diego Forward: The Regional Plan. Appendix T Travel Demand Model Documentation. SANDAG (2013). Vehicle Miles Traveled Calculation Using the SANDAG Regional Travel Demand Model. Technical White Paper.
[6] ICLEI – Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.0 (2012), Appendix D: Transportation and Other Mobile Emission Activities and Sources.

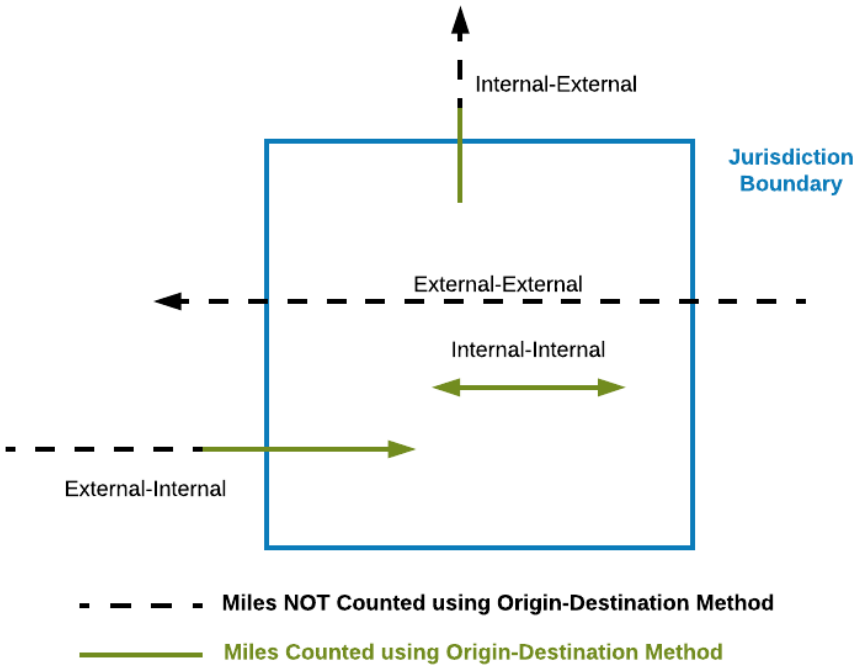



Figure 2 Components of O-D Method for VMT Calculation

O-D VMT data include all the miles traveled for trips that originate and end within a boundary (in this case, within San Marcos city limits, referred to as Internal-Internal), and half of the miles traveled of the trips that either begin within the boundary and end outside the boundary (referred to as Internal-External), or vice versa (referred to as External-Internal). In accordance with the methodology, VMT from trips that begin and end outside the boundary that only pass through San Marcos (referred to as External-External) are not included in the total City VMT.

The average weekday O-D VMT data for each trip type in 2012 and 2014 were provided by SANDAG, and 2013 VMT were interpolated linearly using 2012 and 2014 values (Table 4).[7]

Table 4 O-D VMT and Trip Types (San Marcos, 2012-2014)

| Year | Internal-Internal Trips (Miles/weekday) | External-Internal/Internal-External Trips (miles/weekday) | External-External Trips (Information only, excluded from City VMT)* (miles/weekday) |
|---|---|---|---|
| 2012 | 272,798 | 3,290,797 | 693,753 |
| 2013 | 280,453 | 3,351,690 | 705,949 |
| 2014 | 288,108 | 3,412,583 | 718,145 |

*Miles from External-External trips (pass-through trips) are the portion within the City boundary, not the entire trip.
Based on SANDAG Series 13 VMT estimates. 2012 is the Base Year. 2013 is linearly interpolated between 2012 and 2014.
SANDAG 2018, Energy Policy Initiatives Center 2018.

[7] Series 13 2012 (Base Year) and 2014 average weekday VMT estimates were provided by SANDAG to EPIC (September 29, 2017). 2013 VMT were interpolated linearly between 2012 and 2014 VMT. Original data tables provided by SANDAG are given in Appendix A.

All estimated and projected Internal-External and External-Internal miles associated with San Marcos are divided in half to allocate the miles between San Marcos and all other outside jurisdictions (see Appendix A for source data). The average weekday VMT is multiplied by 347 to adjust from average weekday VMT to average annual VMT, which includes weekends.[8]

The average annual vehicle emission rate expressed in grams of $CO_2e$ per mile driven (g $CO_2e$/mile) were derived from the statewide mobile source emissions model EMFAC2014, developed by the California Air Resources Board (CARB).[9] EMFAC2014 was used to generate average emission rates for the San Diego region for all vehicle classes, model years, speeds, and fuel types.[10] The average emission rates (g $CO_2e$/mile) were calculated based on the VMT distribution of each vehicle class and its emission rate. The average vehicle emission rate was adjusted from g $CO_2$/mile to g $CO_2e$/mile, to account for total GHG emissions, including $CO_2$, $CH_4$, and $N_2O$.[11]

The total VMT, average vehicle emission rates, and corresponding GHG emissions from the on-road transportation category from 2012 to 2014 are given in Table 5.

**Table 5 VMT, Emission Rate and GHG Emissions from the On-Road Transportation Category (San Marcos, 2012-2014)**

| Year | Average Vehicle Emission Rate (g $CO_2e$/mile) | Total VMT | | GHG Emissions (MT $CO_2e$) |
|---|---|---|---|---|
| | | Average Weekday Miles* | Average Annual Miles | |
| 2012 | 483 | 1,918,196 | 665,614,152 | 322,000 |
| 2013 | 476 | 1,956,298 | 678,835,404 | 323,000 |
| 2014 | 467 | 1,994,400 | 692,056,657 | 323,000 |

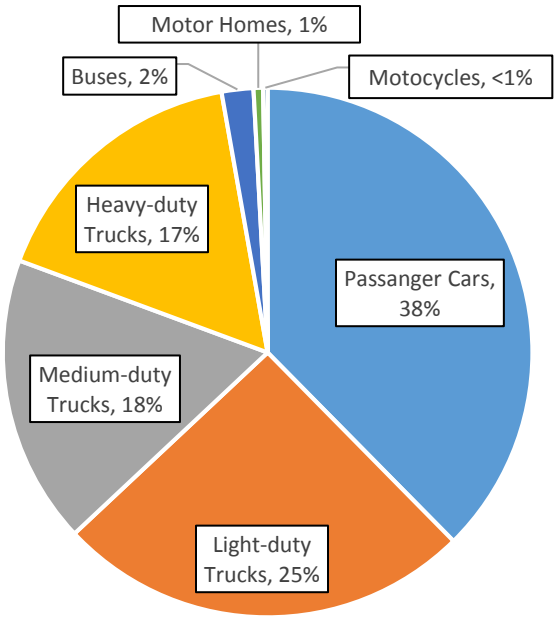
*Consistent with the methodology, this is the sum of internal-internal and half of external-internal and internal-external VMT from Table 4. Weekday miles are converted to annual average before conversion to GHG emissions. GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.
Based on SANDAG Series 13 VMT estimates. 2012 is the Base Year. 2013 is linearly interpolated between 2012 and 2014.
CARB 2015, SANDAG 2018, Energy Policy Initiatives Center 2018.

The decrease in the emission rate is likely due to the vehicle turnover rate in the San Diego region and the improved vehicle emission standards for new vehicles.

Figure 3 gives the breakdown of emissions by vehicle class in 2012, based on the EMFAC vehicle class distribution in the San Diego region. This report assumes San Marcos has the same distribution of

[8] The conversion factor 347 weekdays to 365 days per year as used by CARB.CARB: California's 2000-2014 Greenhouse Gas Emission Inventory Technical Support Document (2016 Edition). (September 2016) p. 41.
[9] CARB: EMission FACtors model, EMFAC2014 (2015).
[10] EMFAC2014 Web Database: Emission Rates for SANDAG, download date: January 22, 2016. The vehicle classes in EMFAC2014 are the same as the vehicle classes in the previous model EMFAC2011.
[11] The conversion factor, 1.01, was calculated based on the ratio of $CO_2$ emissions to total GHG emissions ($CO_2$, $CH_4$, and $N_2O$ expressed as $CO_2e$) using methods from EPA GHG Equivalencies Calculations and References. Emissions were from mobile fossil fuel combustion in the transportation end-use category in 2013 (the latest available data year), on-road emissions. EPA *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013* (2015), Table 3-12 to 3-14.

vehicle types as the region. Passenger cars contribute the most to the City's on-road transportation emissions with 37%, while motorcycles contribute the least with smaller than 1%.[12]




EMFAC2014. Energy Policy Intiatvies Center, 2017
Percentages may not add to totals due to rounding.
*EMFAC vehicle categorization is different from Enviromental Protect Agency (EPA) Emission Standards categorization.

**Figure 3 On-Road Transportation Emissions by Vehicle Class in the San Diego Region**

## 4.2 Electricity

Emissions from electricity use in San Marcos were estimated using the Built Environment (BE.2) method from the U.S Community Protocol.[13] Annual metered electricity sales by the local utility, San Diego Gas & Electric (SDG&E) to San Marcos customers[14] were adjusted by: 1) a loss factor[15] of 1.07[16] to account for transmission and distribution losses; and 2) subtracting electricity use associated with moving and treating water, which is allocated to the water category emissions.

Emissions are calculated by multiplying the adjusted net energy for load (electricity sales + losses) by the corresponding City-specific electricity emission factor, given in Table 6, expressed in pounds of $CO_2e$ per

[12] In California's EMFAC2014, passenger cars are all cars and fuel types designated as Light Duty Automobiles (LDAs). Light Duty Trucks (LDTs) are divided into LDT1 and LDT2, where LDT1 includes gas, diesel, and electric fuel vehicles, while LDT2 does not include electric vehicles. Medium-duty trucks included medium duty vehicles (MDV with Gross Vehicle Weight Rating (GVWR) 5751-8,500 lbs), and heavy-duty trucks (HDTs), with GVWR larger than 8,500 lbs. Under the EPA Emission Standard category vehicles with GVWR under 8,500 lbs are considered light-duty trucks/vehicles.

[13] ICLEI – Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.0 (2012), Appendix C: Built Environment Emission Activities and Sources.

[14] 2012–2016 metered electricity sales were provided by SDG&E to EPIC (July 12, 2017).

[15] The transmission and distribution loss factor is used to scale end-use demand or retail sales to produce net energy for load. L. Wong, *A Review of Transmission Losses In Planning Studies*, CEC Staff Paper (August 2011).

[16] California Energy Commission (CEC): *California Energy Demand 2015–2025 Final Forecast Mid-Case Final Baseline Demand Forecast Forms*, SDG&E Mid. The transmission and distribution loss factor is calculated based on the ratio of net energy for load (total sales + net losses) and total sales from SDG&E Form 1.2 Mid.

megawatt-hour (lbs $CO_2e$/MWh). For a given year, the City-specific electricity emission factor is estimated based on the specific power mix of bundled power[17] and Direct Access (DA) power[18], and their respective emission factors. The SDG&E bundled emission factors are calculated using Federal Energy Regulatory Commission (FERC) Form 1[19] data, the California Energy Commission (CEC) Power Source Disclosure Program[20] data on SDG&E-owned and purchased power, and U.S. EPA Emissions and Generating Resource Integrated Database (eGRID)[21] on specific power plant emissions. The DA emission factor is taken from the California Public Utilities Commission (CPUC) Decision D.14-12-037.[22]

The differences in the electricity emission factors from 2012 to 2014 reflect the change in the electricity power mix in the City and in SDG&E's service territory. The emission factor increased in 2012 due to the shutdown of the zero-emissions electricity supply from the San Onofre Nuclear Generation Station (SONGS) and replacement by other natural gas-fired power plant sources.[23] In the later years, more renewable resources were included in the power mix that resulted in a lower electricity emission factor. SDG&E had 32% renewable sources in the electricity supplied to its bundled customers in 2014, an increase from 19% in 2012.[24]

The net energy for San Marcos's load (electricity sales + losses), electricity emission factors, and corresponding GHG emissions from the electricity category for the years 2012-2014 are given in Table 6.

**Table 6 Net Energy for Load, Emission Factor and GHG Emissions from Electricity Category (San Marcos, 2012–2014)**

| Year | Net Energy for Load (electricity sales + losses) (MWh) | Emission Factor (lbs $CO_2e$/MWh) | GHG Emissions (MT $CO_2e$) |
|---|---|---|---|
| 2012 | 469,906 | 762 | 162,000 |
| 2013 | 462,214 | 744 | 156,000 |
| 2014 | 467,635 | 651 | 138,000 |
| GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.<br>SDG&E 2018, Energy Policy Initiatives Center 2018. | | | |

Electricity use fluctuated between 2012 and 2014 but GHG emissions from the electricity category decreased 15% from 2012 to 2014 which may be partly attributed to the increase of renewable content in the electricity supply as reflected in the decrease in electricity emission factor.

[17] SDG&E bundled power includes the electricity from SDG&E-owned power plants and the electricity from its net procurements.
[18] The SDG&E Direct Access Program includes electricity that customers purchased from non-SDG&E electric service providers (ESPs), but SDG&E still provides transmission and distribution services.
[19] Federal Energy Regulatory Commission (FERC): Form 1- Electricity Utility Annual Report, download date: July 20, 2015
[20] California Energy Commission (CEC) Power Source Disclosure Program under Senate Bill 1305. SDG&E annual power source disclosure report (2012-2014) were provided by CEC staff to EPIC.
[21] U.S. EPA. eGRID 2012 (2015) and eGRID 2014 v2 (2017).
[22] Decision 14-12-037, December 18, 2014 in Rulemaking 11-03-012 (Filed March 24, 2011). The recommended emission factor is 0.379 MT $CO_2e$/MWh (836 lbs $CO_2e$/MWh).
[23] SONGS is partially owned by SDG&E and historically accounted for approximately 15–20% of SDG&E power generation. SONGS was permanently closed in 2013 and the energy generation was replaced by other sources, including non-renewable sources, which increased the emission factor of SDG&E-generated electricity.
[24] California Energy Commission: Utility Annual Power Content Label.

The net energy for load does not include self-serve renewable supply such as customer-owned behind-the-meter photovoltaic (PV) systems or self-serve non-renewable supply. The behind-the-meter PV systems in San Marcos increased significantly from 2012 to 2014. The estimated cumulative PV capacity at the end of 2014 was 10.3 MW, with an estimated 17,585 MWh of self-serve solar generation. This is double the cumulative PV capacity at the end of 2012 (4.9 MW). The newly added PV systems in 2014 tripled when compared with 2012, as shown in Table 7.[25] Electricity generation from PV systems is considered as renewable, and, therefore, assumed to have no associated GHG emissions.

**Table 7 Behind-the-meter PV Systems and Electricity Generation (San Marcos, 2012–2014)**

| Year | New PV Systems | | Cumulative PV Systems since 2001 | | Estimated Behind-the-meter Solar Generation (MWh) |
|---|---|---|---|---|---|
| | Number of Systems | Capacity ($MW_{dc}$) | Number of Systems | Capacity ($MW_{dc}$) | |
| 2012 | 144 | 1.3 | 630 | 4.9 | 8,387 |
| 2013 | 345 | 1.8 | 975 | 6.7 | 11,402 |
| 2014 | 536 | 3.6 | 1,511 | 10.3 | 17,585 |

The emissions from the electricity category are separated further into residential, commercial and industrial customer classes. In 2012, 46% of emissions were attributed to commercial electricity use, 40% were attributed to residential electricity use, and 14% to industrial use as shown in Figure 4.

[25] NEM Interconnection Data Set (current as of May 31, 2017), download date: September 12, 2017. Based on date of NEM interconnection applications approved. Solar capacities are in direct current (DC).

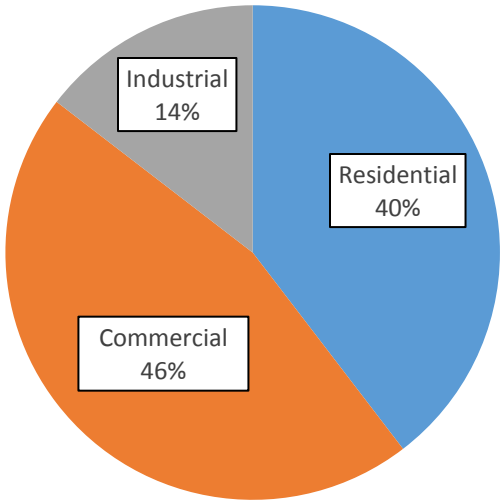



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Figure 4 Electricity Emissions by Customer Class (San Marcos, 2012)

## 4.3 Natural Gas

Emissions from natural gas end-use in San Marcos were estimated using method Built Environment (BE.1) from the U.S. Community Protocol.[26] Annual metered natural gas sales were provided by SDG&E.[27]

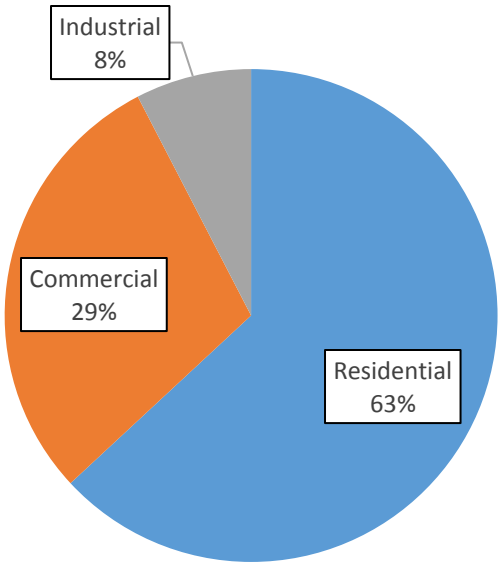
To estimate emissions from the combustion of natural gas, fuel use was multiplied by an emission factor for natural gas based on data from the CARB.[28] The total natural gas use and corresponding GHG emissions from the natural gas category for the years 2012-2014 are given in Table 8.

Table 8 Natural Gas Use and GHG Emissions from Natural Gas Category (San Marcos, 2012–2014)

| Year | Natural Gas Use (Million Therms) | GHG Emissions (MT $CO_2e$) |
|---|---|---|
| 2012 | 13.7 | 75,000 |
| 2013 | 14.0 | 77,000 |
| 2014 | 12.0 | 66,000 |
| GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.<br>SDG&E 2018, Energy Policy Initiatives Center 2018. | | |

Emissions from the natural gas category can be broken down further into residential, commercial and industrial customer classes. In 2012, 63% of emissions resulted from residential natural gas use, 29% resulted from commercial natural gas use, and 8% resulted from industrial natural gas use, as shown in Figure 5.

[26] ICLEI– Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.0 (2012), Appendix C: Built Environment Emission Activities and Sources.
[27] 2012–2016 metered natural gas sales were provided to EPIC by SDG&E (July 12, 2017).
[28] Emission factor for natural gas: 0.0554 million metric tons $CO_2e$/Million therms. CARB: Documentation of California's GHG Inventory – Index.




Energy Policy Initiatives Center, 2018

**Figure 5 Natural Gas Emissions by Customer Class (San Marcos, 2012)**

## 4.4 Off-road Transportation

The emissions from off-road transportation in San Marcos, such as gasoline and diesel fuel use for off-road vehicles and equipment, were estimated based on CARB off-road models. OFFROAD2007 is the main model for estimating off-road transportation emissions. [29] After the release of OFFROAD2007, CARB has been developing inventories and models for each sub-category based on specific regulatory requirements.[30] For example, the recreational equipment category in OFFROAD2007 was replaced by RV2013.[31] In this section, new inventories and models were used if available; otherwise, OFFROAD2007 was used.

Due to the lack of jurisdiction-specific data from CARB models, the emissions or fuel consumption from the CARB model outputs for the San Diego region were scaled to the City based on sub-category-specific scaling factors. The off-road activity sub-categories that are relevant to San Marcos and the scaling factors are given in Table 9. [32]

[29] CARB: Off-Road Motor Vehicles, OFFROAD 2007.
[30] CARB: Mobile Source Emissions inventory – Off-Road Diesel Vehicles.
[31] CARB: Off-Road Gasoline-Fueled Equipment. Recreational Vehicles, RV2013 (Inventory Model Database).
[32] The sub-categories listed in this table are not the comprehensive off-road mobile sources listed in CARB, as some of the sub-categories are not relevant to San Marcos, such as airport ground support, pleasure craft, commercial marine vessels, etc.

**Table 9 Sub-Categories included in the San Marcos Off-Road Transportation Categories**

| Sub-Category | Model Source | Common Equipment Type | Scaling Factor |
|---|---|---|---|
| Recreational Vehicles | CARB RV2013 | Terrain vehicles, golf carts, minibikes, off-road motorcycles | Population |
| Lawn and Garden Equipment | CARB OFFROAD2007 | Lawn mowers, trimmers, brush cutters, chainsaws, leaf blowers/ vacuums | Population |
| Light Commercial Equipment | CARB OFFROAD2007 | Generator set, pumps, welders | Commercial Jobs |
| Construction and Mining | CARB In-Use Off-Road Equipment 2011 Inventory | Excavators, off-highway tractors, loaders, paving equipment | Construction Jobs |
| Industrial | CARB In-Use Off-Road Equipment 2011 Inventory | Aerial lifts, forklifts, sweepers/scrubbers | Industrial Jobs |
| Diesel-Fueled Portable Equipment | CARB Portable Equipment 2017 | Compressors, generators, pumps | Jobs |

In the RV2013 model, the GHG emissions from recreational vehicles in the San Diego region were reported in tons per day and converted to annual emissions. In the Portable Equipment 2017 model and In-Use Off-Road Equipment 2011 Inventory, the fuel consumptions for the equipment in the San Diego region were reported in gallons per year and converted to annual GHG emissions. For other sub-categories, the OFFROAD2007 model outputs are annual emissions for the San Diego region. The scaling factors and the corresponding GHG emissions from the off-road transportation category in 2012 to 2014 are given in Table 10.[33]

[33] The population scaling factors were calculated based on San Marcos 2012–2014 populations compared to the regional population. The regional population is from the SANDAG Demographic & Socio-Economic Estimates (Updated in September 2015), download date: October 29, 2015. Regional commercial jobs in 2012 is from the SANDAG Series 13 Regional Growth Forecast (Updated in October 2013), download date: March 29, 2017, SANDAG Data Surfer. Commercial jobs include all employment types other than agriculture and mining, construction and manufacturing. Jobs estimate in 2013 is interpolated linearly based on 2012 and 2020 jobs estimates.

Table 10 GHG Emissions from Off-road Transportation Category (San Marcos, 2012–2014)

| Sub-Category | Scaling Factor | San Diego Region (Million MT $CO_2e$) | | | San Marcos (MT $CO_2e$) | | |
|---|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | 2012 | 2013 | 2014 |
| Recreational Vehicles | 3% | 0.004 | 0.004 | 0.004 | 103 | 101 | 104 |
| Lawn and Garden Equipment | 3% | 0.095 | 0.094 | 0.093 | 2,594 | 2,612 | 2,632 |
| Light Commercial Equipment | 3% | 0.103 | 0.102 | 0.102 | 2,680 | 2,698 | 2,714 |
| Construction and Mining | 3% | 0.184 | 0.185 | 0.186 | 5,927 | 5,961 | 5,972 |
| Industrial | 4% | 0.012 | 0.012 | 0.013 | 516 | 541 | 566 |
| Diesel-Fueled Potable Equipment | 3% | 0.070 | 0.064 | 0.065 | 1,961 | 1,812 | 1,847 |
| Total | | | | | 14,000 | 14,000 | 14,000 |

Only total GHG emissions are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.
CARB, 2007, 2011, 2013 and 2017; Energy Policy Initiatives Center, 2018.

## 4.5 Solid Waste

Emissions from solid waste disposed by San Marcos were estimated using method Solid Waste (SW.4) from the U.S. Community Protocol.[34] To estimate emissions, the amount of waste disposed by a city in a given year is multiplied by an emission factor for mixed solid waste. Solid waste disposal data were retrieved from the California Department of Resources Recycling and Recovery (CalRecycle) Disposal Reporting System (DRS).[35]

The emission factor of mixed solid waste depends on the percentage of each waste type within the waste stream disposed in a landfill. The City of San Diego's 2012–2013 Waste Characterization Study was used as a reasonable proxy for San Marcos's waste composition to determine the percentage of each waste type within the mixed solid waste and applied to 2012–2014 waste disposal for the emission calculation.[36] Only the $CH_4$ emissions from waste degradation is considered non-biogenic and included in this category in accordance with the methodology. The $CO_2$ emissions from waste degradation is considered biogenic and not included in this category.

The default capture rate of $CH_4$ emissions from landfills is 75% based on that in the U.S. Community Protocol and any $CH_4$ emissions above this are accounted for as emissions from the solid waste category. The total and per-capita solid waste disposal and the corresponding GHG emissions from the years 2012–2014 are given in Table 11.

[34] ICLEI – Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.0 (2012), Appendix E: Solid Waste Emission Activities and Sources.
[35] CalRecycle: Disposal Reporting System (DRS): Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility. 2012–2014 solid waste disposal data from CalRecycle were confirmed by City staff. Download date: October 2017.
[36] City of San Diego 2014, *Waste Characterization Study 2012–2013 Final Report*. Emission factor, 0.744 MT $CO_2e$/short ton calculated based on waste distribution and emission factor for each waste type in *Version 13 Waste Reduction Model (WARM)*.

**Table 11 Solid Waste Disposal and GHG Emissions from Solid Waste Category (San Marcos, 2012–2014)**

| Year | Solid Waste Disposal (MT/year) | Per Capita Solid Waste Disposal (kg/person/day) | GHG Emissions (MT $CO_2e$) |
|---|---|---|---|
| 2012 | 79,918 | 2.6 | 15,000 |
| 2013 | 74,251 | 2.3 | 14,000 |
| 2014 | 72,437 | 2.2 | 13,000 |
| GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the actual calculation.<br>CalRecycle 2017, Energy Policy Initiatives Center 2018. | | | |

## 4.6 Water

Vallecitos Water District (VWD), a San Diego County Water Authority (SDCWA) member agency, provides most of the City's potable water.[37] VWD purchases treated water from SDCWA.[38] Emissions from water use in San Marcos were estimated using method Wastewater and Water (WW.14) from the U.S. Community Protocol.[39] The method considers energy use in each segment of the water system (upstream supply and conveyance, water treatment, and local water distribution) individually, as described below.

Upstream Supply and Conveyance – This is defined as the energy used to supply and convey water from the raw sources to the local service area. The upstream supply and conveyance energy use for SDCWA treated water consists of conveyance of water from the State Water Project and Colorado River through Metropolitan Water District's (MWD's) service area to SDCWA's service area, as well as water treatment, before reaching the VWD service area.

Local Water Treatment – This is the energy used for water treatment plant operations. VWD imports treated water directly and does not own a water treatment plant. Therefore, there is no energy used for local water treatment.

Local Water Distribution – This is defined as the energy required to move treated water from water treatment plants to end-use customers. Distribution energy use includes energy use for water pump stations and/or pressure reduction stations, water tanks, etc.

The energy intensity per unit of water for each segment of the water-use cycle is given in Table 12.

[37] A small portion of the City is also supplied by Vista Irrigation District, however VWD supplies most of the City's water.
[38] Water is either treated at SDCWA's treatment plants or treated by Olivenhain Municipal Water District (OMWD). Water treated by OMWD comes from Olivenhain Reservoir, a SDCWA-owned reservoir. VWD (2016) Urban Water Management Plan 2015, Section 6: System Supplies.
[39] ICLEI – Local Governments for Sustainability USA: U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.0 (2012) Appendix F: Wastewater and Water Emission Activities and Sources.

**Table 12 Energy Intensity for Each Segment of Water-Use Cycle (San Marcos, 2012–2014)**

| Year | Upstream Supply and Conveyance - SDCWA Treated Water (kWh/Acre-Foot)[40] | Local Distribution Energy Intensity (kWh/Acre-Foot)[41] |
|---|---|---|
| 2012 | 1,816 | 58 |
| 2013 | | 64 |
| 2014 | | 55 |

For upstream supply and conveyance emissions, the amount of water use was multiplied by the upstream energy intensity to get the total electricity use from upstream supply. The electricity use was multiplied by the average California electricity emission factor to calculate the GHG emissions.[42] Because the electricity uses and GHG emissions associated with upstream supply and conveyance are outside the City boundary and would not be included in the electricity category, they are accounted for in the water category.

For water distribution emissions, the potable water amount was multiplied by the energy intensity for local water distribution and the SDG&E electricity emission factor. The electricity and GHG emissions associated with water distribution occur within the City boundary and have been subtracted from the electricity category, as they are accounted for in the water category.

In 2012, 96% of the GHG emissions in the water category were from upstream supply and conveyance. The breakdown of emissions for the water category is given Figure 6.

[40] Since climate action plans (CAPs) consider the jurisdiction as the unit of analysis, water-related GHG emissions associated with its water use begin at the jurisdiction's water supply agency or district. Anything upstream of the agency or district is part of upstream supply and conveyance. Therefore, the upstream supply and conveyance energy intensity for SDCWA treated water for VWD includes conveyance from the State Water Project and Colorado River water to MWD's distribution system, distribution from MWD to MWD's member agencies, SDCWA conveyance of raw water to its water treatment plants, treatment in SDCWA's plants, and distribution of treated water from SDCWA's treatment plant to SDCWA's member agency including VWD. SDCWA 2016, Urban Water Management Plan 2015. Metropolitan Water District of Southern California 2016. 2015 Urban Water Management Plan, accessed July 15, 2016

[41] Distribution electricity use or distribution energy intensity in VWD's service area was not available. The distribution energy intensity for the adjacent Vista Irrigation District's service area was used a proxy. VID's distribution electricity use from 2010 to 2015 was provided by the City of Vista (2017).

[42] The Western Electricity Coordinating Council (WECC) CAMX (eGRID sub-region) emission rate, 653 lbs $CO_2e$/MWh, was used as a proxy for the average California electricity emission rate for upstream electricity. U.S. EPA eGRID 2012 (2015) and eGRID 2014 v2 (2017).

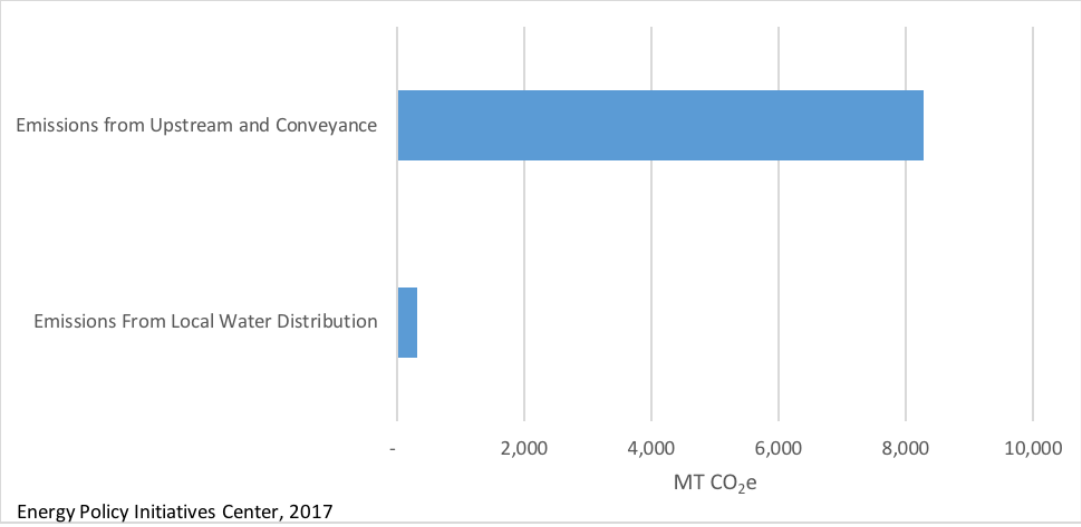



**Figure 6 Emissions from Water Category by Water System Segment (Upstream and Conveyance Includes Energy for Treatment, San Marcos, 2012)**

The total potable and recycled water supplied, as well as the corresponding GHG emissions from the water category for the years 2012–2014 are given in Table 13.[43]

**Table 13 Water Supplied and GHG Emissions from the Water Category (San Marcos, 2012–2014)**

| Year | Potable Water Supplied | | GHG Emissions (MT $CO_2e$) |
|---|---|---|---|
| | Annual Acre-Feet | Gallons per capita per day | |
| 2012 | 15,384 | 161 | 9,000 |
| 2013 | 15,748 | 161 | 9,000 |
| 2014 | 16,253 | 161 | 9,000 |
| GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the actual calculation.<br>Energy Policy Initiatives Center 2018. | | | |

Emissions associated with water end-use, such as water heating and cooling, are included in the electricity and natural gas category, and not in this water category, as data are not available to separate out those values

## 4.7 Wastewater

The emissions from wastewater generated by San Marcos were estimated by multiplying the total amount of wastewater generated in a given year with the emission factor of the wastewater treatment processes.

The wastewater in San Marcos is collected and delivered to the Encina Wastewater Authority for treatment at the Encina Water Pollution Control Facility (Encina WPCF) or at the VWD's Meadowlark Water Reclamation Facility (MRF). The wastewater treatment GHG emissions for the Encina WPCF were provided by the Encina Wastewater Authority. In 2013, the Encina WPCF treated an average of 22.8

[43] The 2014 potable water amount was provided by the City (originally from VWD). The 2012-2013 potable water amounts were estimated based on the 2014 per capita water use and the 2012-2013 City population.

million gallons per day (MGD) with annual $CO_2e$ emissions of 11,359 metric tons. This resulted in an emission factor of 1.37 MT $CO_2e$/million gallons treated, which consists of emissions from: 1) stationary combustion of anaerobic digester gas; 2) process emissions from wastewater treatment with nitrification and denitrification; and 3) direct anaerobic digester gas. The wastewater emission factor derived from the Encina WPCF was applied to all wastewater flow from the City of San Marcos.[44] As similar data were not available for the other years;, the emission factor was used as an estimate for all inventory years.

The total wastewater treated at the centralized wastewater treatment plant (WWTP), Encina WPCF and Meadowlark MRF, as well as the corresponding GHG emissions, are given Table 14.[45]

**Table 14 Wastewater Generated and Treated at Centralized Treatment Plant (San Marcos, 2012–2014)**

| Year | Total Wastewater Generated | | GHG Emissions (MT $CO_2e$) |
|---|---|---|---|
| | Annual Million Gallon | Gallons per Capita per Day | |
| 2012 | 1,825 | 58 | 2,500 |
| 2013 | 1,868 | 58 | 2,559 |
| 2014 | 1,928 | 58 | 2,641 |

In addition to wastewater collected and treated at the centralized WWTP, there are areas in the City that are not connected to any municipal wastewater system and using septic systems, a commonly used on-site wastewater treatment systems. The number of homes that are on septic systems was estimated at 750 homes (2,300 persons) within the City.[46] The GHG emissions were estimated based on Method WW.11 (Methane Emissions from Septic Systems) from the U.S. Community Protocol. Methane ($CH_4$) emissions were calculated based on the total population served by septic systems (2,300) and a septic system $CH_4$ emission factor (10.7 grams $CH_4$/person/day).[47]

The total GHG emissions from the wastewater category are provided in Table 15.

**Table 15 GHG Emissions from Wastewater Category (San Marcos, 2012–2014)**

| Year | GHG Emissions from Centralized Wastewater Treatment (MT $CO_2e$) | GHG Emissions from Septic Systems (MT $CO_2e$) | Total GHG Emissions (MT $CO_2e$) |
|---|---|---|---|
| 2012 | 2,500 | 212 | 3,000 |
| 2013 | 2,559 | 212 | 3,000 |
| 2014 | 2,641 | 212 | 3,000 |
| GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.<br>CARB 2017, City of San Diego 2017, Energy Policy Initiatives Center 2018. | | | |

[44] The treatment processes in Meadowlark MRF is similar to Encina's WPCF and can be used as a proxy.
[45] 2014 wastewater amount was provided by the City, October 2017 (originally from VWD). 2012-2013 wastewater amount was estimated based on the 2014 per capita wastewater generation and the 2012-2013 City population.
[46] The historic number of homes on septic systems is not available for San Marcos. The City provided an estimated number of septic systems, based on the ratios of homes on septic systems to total number of single-family homes in neighbor cities, Escondido and Vista. From 2011 to 2013, on average, San Marcos had 3.1 persons per household based on SANDAG's Demographic & Socio-Economic Estimates (March 2017 version).
[47] CARB: Documentation of California's Greenhouse Gas Inventory (10th Edition) Year 2015. IPCC:4D1-Domestic Wastewater Treatment and Discharge: Septic Systems.

# 5 BUSINESS-AS-USUAL GHG EMISSIONS PROJECTIONS

To inform the development of GHG reduction strategies within a jurisdiction's Climate Action Plan (CAP), GHG emissions are projected using the baseline year from the GHG inventory, as well as estimates for population, housing, and job growth. This is used to develop a BAU projection, which demonstrates emissions growth in the absence of any new policies and programs. The latest year with available data may be different for different inventory categories.

Next, emissions from federal and State policies and programs are applied in the future, creating a legislatively-adjusted BAU. Information about a city's anticipated growth and development in the absence of any new policies and programs or additional changes to policy after the latest year with available data (BAU projections). The latest year with available data may be different for different categories. This BAU projection **does not** include any new policies and programs or the additional impact in future years of currently adopted Federal and State policies that affect GHG emissions. The "legislatively-adjusted BAU projection" **does** include the future effects of Federal and State policies that are in place currently. Reductions from federal and State policies and programs are applied in the future, creating a legislatively-adjusted BAU.

Figure 7 illustrates provides an illustrative example of the difference between a BAU and a legislatively-adjusted BAU. Only the BAU projection is discussed in this document; GHG reductions from the policies and programs included in the legislatively-adjusted BAU are considered later in the climate action planning process.

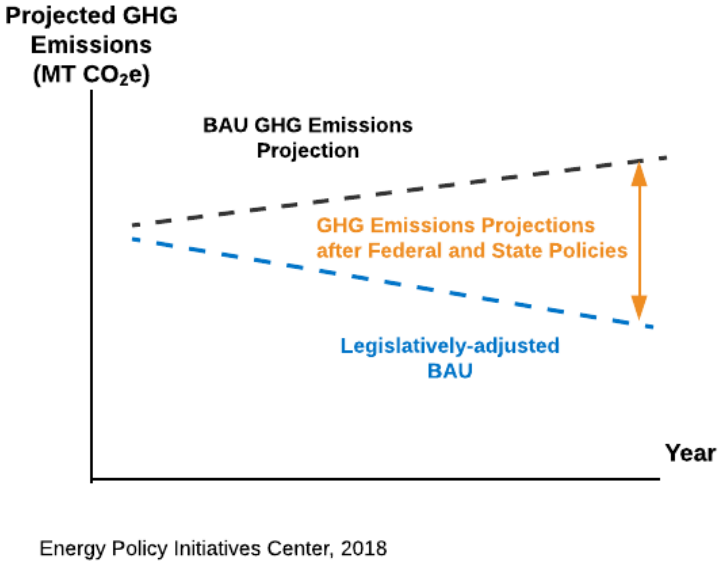



**Figure 7 Illustrative Example Only: BAU and Legislatively-adjusted BAU Emissions Projections**

Section 5.1 provides a summary of the BAU emissions projections for years 2020, 2030 and 2035, and Section 5.2 provides the projection methodologies used for each category.

## 5.1 Emissions Projections for 2020, 2030, and 2035

The total GHG emissions in 2020 are projected to be 549,000 MT $CO_2e$, 8% lower than the 2012 emissions level and 3% lower than the 2014 emissions level. The total GHG emissions in 2030 are projected to be 591,000 MT $CO_2e$ and the total GHG emissions in 2035 are projected to be 603,000 MT

$CO_2e$. Figure 8 below shows a comparison of the emissions breakdown by category for the inventory years (2012 and 2014) and projection years (2020, 2030 and 2035).

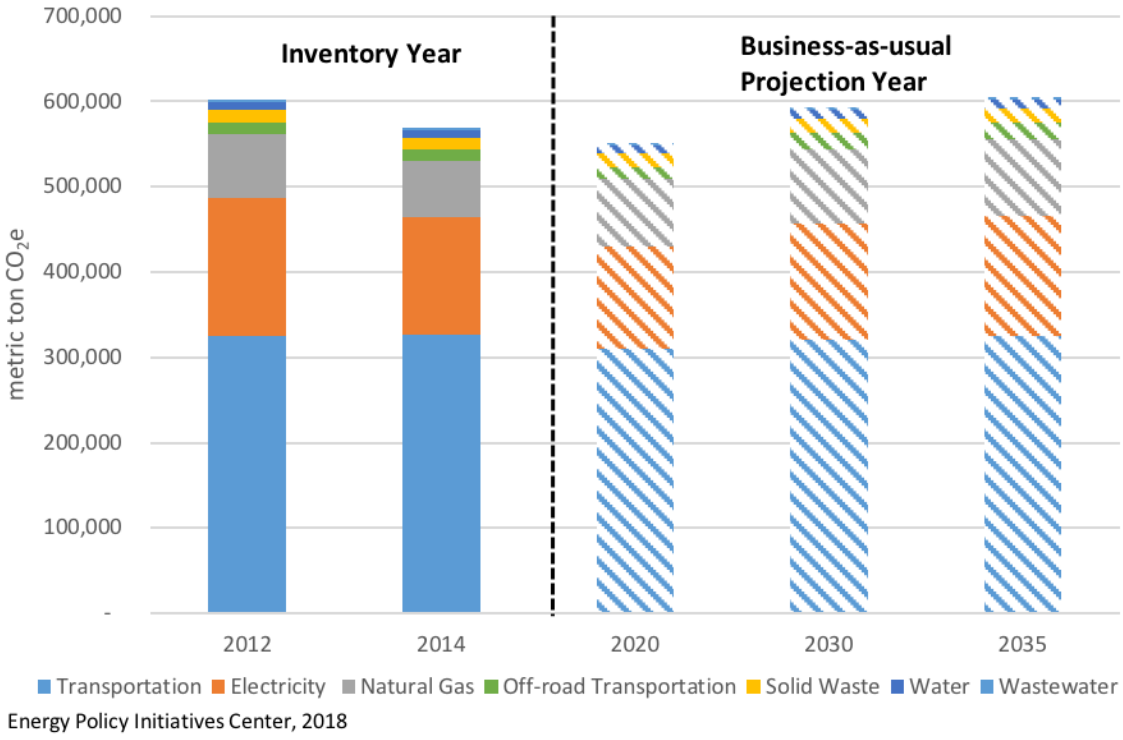



**Figure 8 BAU GHG Emissions Projections (San Marcos, 2020, 2030 and 2035)**

As shown in Figure 8, the on-road transportation category contributes the most to the overall emissions in each projection year. Emissions from on-road transportation are expected to decline through 2020 and then rise again but are not projected to be higher than the on-road transportation emissions in 2012 and 2014. One of the reasons for the decline of on-road transportation emissions is likely due to the decline of average vehicle emission rates, as newer, more efficient vehicles replace old vehicles in the region. The total and distribution of projected emissions by category are presented in Table 16.

Table 16 Projected Total and Category-GHG Emissions in San Marcos (2020, 2030 and 2035)

| Year | Projected GHG Emissions (MT $CO_2e$) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | On-Road Transportation | Electricity | Natural Gas | Solid Waste | Off-Road Transportation | Water | Wastewater | Total |
| 2020 | 307,000 | 121,000 | 79,000 | 15,000 | 14,000 | 10,000 | 3,000 | 549,000 |
| 2030 | 317,000 | 136,000 | 88,000 | 17,000 | 18,000 | 11,000 | 3,000 | 591,000 |
| 2035 | 322,000 | 140,000 | 90,000 | 17,000 | 20,000 | 11,000 | 3,000 | 603,000 |

Sum may not add up to totals due to rounding.
Projected GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.
Energy Policy Initiatives Center, 2018

## 5.2 Methods to Project GHG Emissions

The SANDAG Series 13 Regional Growth Forecast was used as the basis of population and job growth in San Marcos, as shown in Table 17.[48] The methods used to project future emissions are provided below for each emissions category.

Table 17 SANDAG Population and Job Growth Forecast (San Marcos, 2020, 2030 and 2035)

| Year | Population | Commercial Jobs | Industrial Jobs | Total Jobs |
|---|---|---|---|---|
| 2020 | 98,915 | 38,237 | 7,434 | 45,783 |
| 2030 | 108,824 | 44,486 | 7,755 | 52,348 |
| 2035 | 109,095 | 46,898 | 7,899 | 54,902 |

SANDAG 2013, Energy Policy Initiatives Center, 2018.

### 5.2.1 On-road Transportation

O-D VMT forecast for each trip type in 2020, 2030 and 2035 were provided by SANDAG based on its Series 13 activity-based model, as shown in Table 18 (See Appendix A for original data tables provided).[49]

Table 18 Projected O-D VMT and Trip Types (San Marcos, 2020, 2030 and 2035)

| Trip Type (miles/weekday) | 2020 | 2030 | 2035 |
|---|---|---|---|
| Internal-Internal | 326,340 | 384,112 | 390,560 |
| Internal-External/External-Internal | 3,632,353 | 4,060,658 | 4,144,827 |
| External-External (Information only, excluded from VMT and GHG calculations) * | 680,790 | 762,824 | 759,851 |

*Miles from External-External trips are the portion within the City boundary, not the entire trips.
SANDAG 2018.

[48] Population and jobs data are from the SANDAG Series 13 Regional Growth Forecast (Updated in October 2013). The number of jobs are for civilian jobs only and do not include military jobs. Industrial jobs include the job categories construction and manufacturing. Commercial jobs include all job categories except agriculture, construction and manufacturing. SANDAG Data Surfer, accessed on November 2, 2017.
[49] Series 13 2020, 2030 and 2035 VMT were provided by SANDAG (September 29, 2017).

To convert VMT of each type to total VMT, the method as discussed in Section 4.1 was used. The VMT was multiplied by the adjusted average vehicle emission rate derived from EMFAC2014 for each projection year. Two adjustments were made to the EMFAC2014 emission rates for the projections: 1) the electric vehicle penetration rate in 2016 was kept constant for all projection years[50]; and, 2) for all new vehicles entering the fleet after 2016, the emission rates are equal to the emission rates of new model year 2016 vehicles with the same vehicle class and fuel type.[51]

The projected total VMT, average vehicle emission rates, and corresponding GHG emissions from the on-road transportation category are given in Table 19.

**Table 19 Projected VMT, Average Vehicle Emission Rate and GHG Emissions from On-road Transportation Category (San Marcos, 2020, 2030 and 2035)**

| Year | Projected Total VMT | | Average Vehicle Emission Rate (g $CO_2e$/mile) | Projected GHG Emissions (MT $CO_2e$) |
|---|---|---|---|---|
| | Average Weekday Miles | Average Annual Miles | | |
| 2020 | 2,142,516 | 743,453,202 | 412 | 307,000 |
| 2030 | 2,414,441 | 837,811,001 | 379 | 317,000 |
| 2035 | 2,462,974 | 854,651,843 | 377 | 322,000 |
| Projected GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.<br>CARB 2015, SANDAG 2018, Energy Policy Initiatives Center 2018. | | | | |

As newer, more efficient vehicles replace old vehicles in the region, the average vehicle emission rate decreases.

### 5.2.2 Electricity

Electricity use in the City was projected separately for the residential, commercial and industrial customer classes. For the residential customer class, the per-capita electricity use (metered electricity sales) in 2016 (1,711 kWh/person/year), the latest year with available SDG&E data, was calculated by dividing the total electricity sales in the residential class by the population in 2016. The per-capita electricity use is held constant and used to project BAU total electricity use for a future year by multiplying by the SANDAG Series 13 population forecast for the future year. The projected total electricity use was multiplied by the City-specific electricity emission factor in 2016 (561 lbs $CO_2e$/MWh), held constant, for a projected total GHG emission. The City-specific electricity emission factor in 2016 is significantly lower than that of 2012 and 2014 because SDG&E has since reached 43% renewable energy in its power mix.[52]

[50] This uses a fixed 2016 electric vehicle penetration rate of about 2% of light duty vehicles instead of using the estimated impact of the state Zero Emission Vehicle (ZEV) program on BAU emissions. The 2016 electric vehicle penetration rate is based on EMFAC2014 Technical Documentation, Section 3.2.2.4.3. The ZEV program requires auto manufacturers to make and sell ZEVs that will increase VMTs driven by ZEVs.

[51] This uses a fixed actual emission rate of the new 2016 models instead of the effect of adopted federal and state vehicle efficiency standards 2017–2025 for light-duty and heavy-duty vehicles.

[52] 2016 renewable content in SDG&E bundled power is based on SDG&E's 2016 power source disclosure report submitted to the CEC. The 2016 report was provided by CEC staff to EPIC in July 2017. It is also reported under the California Energy Commission Power Source Disclosure Program.

The commercial and industrial electricity use was projected based on job growth and the per-job electricity consumption in 2016 (5,861 kWh/commercial job/year and 6,883 kWh/industrial job/year) for all future years. The total projected net energy for load (electricity sales + transmission and distribution losses) and corresponding GHG emissions from the electricity category are given in Table 20.[53]

**Table 20 Projected Net Energy for Load and GHG Emissions from the Electricity Category (San Marcos, 2020, 2030 and 2035)**

| Year | Projected Net Energy for Load (electricity sales + losses) (MWh) | Projected GHG Emissions (MT $CO_2e$) |
|---|---|---|
| 2020 | 474,796 | 121,000 |
| 2030 | 534,417 | 136,000 |
| 2035 | 551,111 | 140,000 |
| Projected GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.<br>Energy Policy Initiatives Center, 2018. | | |

### 5.2.3 Natural Gas

The projection method for the natural gas category is similar to that for the electricity category. The natural gas use in residential, commercial and industrial classes are calculated separately. The per-capita residential natural gas consumption (83 therms/person/year), and the per-job natural gas consumption (137 therms/job/year) in 2016 were held constant with Series 13 population and job growth for the BAU projection. The natural gas emission factor used in Section 4.3 was held constant for future years. The projected total natural gas use and corresponding GHG emissions from the natural gas category are given in Table 21.

**Table 21 Projected Natural Gas Use and GHG Emissions from Natural Gas Category (San Marcos, 2020, 2030 and 2035)**

| Year | Projected Total Natural Gas Use (Million Therms) | Projected GHG Emissions (MT $CO_2e$) |
|---|---|---|
| 2020 | 14.5 | 79,000 |
| 2030 | 16.1 | 88,000 |
| 2035 | 16.4 | 90,000 |
| Projected GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.<br>Energy Policy Initiatives Center 2018. | | |

### 5.2.4 Off-Road Transportation

In the off-road transportation category, the direct output of OFFROAD2007 (lawn and garden equipment and light commercial equipment), RV2013 model (recreational equipment), and diesel-fueled potable equipment for the San Diego region were used and scaled down to San Marcos based on the scaling factor as determined in Section 4.4. For the construction and industrial equipment sub-category, the In-Use Off-Road Equipment 2011 Inventory does not include emissions output after 2030. For the

[53] The net energy for load of each future year is adjusted using the method described in Section 4.2. The net energy for load does not include self-serve renewable supply, such as electricity generation from behind-the-meter PV systems.

projection years 2020 and 2030, the direct output for the San Diego region from the model was used and scaled down to San Marcos. For 2035, the emissions were estimated based on the commercial and industrial job growth. The projected total and sub-category off-road transportation emissions are given Table 22.

**Table 22 Projected GHG Emissions from Off-Road Transportation Category (San Marcos, 2020, 2030 and 2035)**

| Year | Projected GHG Emissions (MT $CO_2e$) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Recreational Equipment | Lawn and Garden Equipment | Light Commercial Equipment | Construction and Mining | Industrial | Diesel-Fueled Portable Equipment | Total |
| 2020 | 141 | 2,518 | 2,785 | 5,662 | 719 | 2,020 | 14,000 |
| 2030 | 175 | 2,981 | 3,239 | 8,430 | 867 | 2,653 | 18,000 |
| 2035 | 184 | 3,114 | 3,402 | 8,964 | 883 | 2,975 | 20,000 |

Projected GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.
CARB. Energy Policy Initiatives Center 2018.

### 5.2.5 Solid Waste

The BAU solid waste disposal by San Marcos was projected using the population growth and the per-capita solid waste disposed in 2016 (2.3 kg/person/day), held constant for future years, to be consistent with other categories. The projected emissions from the disposal were calculated by multiplying the disposal amount with the emission factor for mixed solid waste, provided in Section 4.5. The projected total waste disposal and corresponding GHG emissions from the solid waste category are given in Table 23.

**Table 23 Projected Solid Waste Disposal and GHG Emissions from Solid Waste Category (San Marcos, 2020, 2030 and 2035)**

| Year | Projected Solid Waste Disposal (MT) | Projected GHG Emissions (MT $CO_2e$) |
|---|---|---|
| 2020 | 83,284 | 15,000 |
| 2030 | 91,627 | 17,000 |
| 2035 | 91,855 | 17,000 |

Projected GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.
Energy Policy Initiatives Center 2018.

### 5.2.6 Water

The water use for all projection years was based on the per-capita water consumption and population growth forecast. The 2015 and 2016 potable water supplied to the City was not available; therefore, the total potable water supplied to the City and the water supply source (100% from imported SDCWA water) in 2014 were used. It is assumed that no recycled water source or new potable water source will be developed under the BAU projection.

The per-capita potable water used in 2014 was 161 gallons/person/day. The energy intensity for each element of the water cycle (Table 12) and the electricity emission factor were held constant for all

projection years. The projected total water supply and corresponding GHG emissions from the water category are given in Table 24.

**Table 24 Projected Potable Water and GHG Emissions from the Water Category (San Marcos, 2020, 2030 and 2035)**

| Year | Projected Potable Water Supply (Acre-feet) | Projected GHG Emissions (MT $CO_2e$) |
|---|---|---|
| 2020 | 17,784 | 10,000 |
| 2030 | 19,566 | 11,000 |
| 2035 | 19,615 | 11,000 |
| Projected GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.<br>Energy Policy Initiatives Center 2018. | | |

### 5.2.7 Wastewater

The total wastewater generation for all projection years was determined using the same method as the solid waste and water sections, based on per-capita wastewater generation and projected population growth. The 2016 or 2015 per-capita wastewater generated and treated were not available. Therefore, the per-capita wastewater generated in 2014 (56 gallons/person/day) was used as a proxy. The emission factor derived from data based on the Encina Wastewater Authority (Section 4.7) was held constant for all projection years. It is assumed the 750 homes that currently have on-site septic systems for wastewater treatment still use the systems and no new homes use septic systems in future years under the BAU projection.[54]

The projected total wastewater treated at the centralized WWTP and the GHG emissions from the wastewater category are given Table 25.

**Table 25 Projected Wastewater Generated and GHG Emissions from the Wastewater Category (San Marcos, 2020, 2030 and 2035)**

| Year | Projected Wastewater treated at Centralized WWTP (Million Gallons) | Projected GHG Emissions from Centralized Wastewater Treatment (MT $CO_2e$) | Projected GHG Emissions from Septic Systems (MT $CO_2e$) | Projected GHG Emissions (MT $CO_2e$) |
|---|---|---|---|---|
| 2020 | 2,110 | 2,890 | 212 | 3,000 |
| 2030 | 2,321 | 3,180 | 212 | 3,000 |
| 2035 | 2,327 | 3,188 | 212 | 3,000 |
| Projected GHG emissions for each category are rounded to the nearest thousands. Values are not rounded in the intermediary steps in the calculation.<br>Energy Policy Initiatives Center 2018. | | | | |

[54] Based on City staff, City's current plumbing code requires properties located within 150 feet of a sewer system to connect to the sewer system.

# Appendix A. SAN MARCOS VMT BY TRIP TYPE

Average weekday VMT data tables were provided by SANDAG (from SANDAG ABM Series 13, Release 13.3.0). Emphasis (red squares and text) was added by EPIC. Revenue Constrained refers to the transportation network scenario adopted in San Diego Forward: The 2015 Regional Plan.[55]

**2012 Base Year**

| JURISDICTION | TOTAL VMT | TOTAL City of San Marcos VMT | Two Trip End City of San Marcos VMT | One Trip End City of San Marcos VMT | NON-City of San Marcos VMT |
|---|---|---|---|---|---|
| | | I-I, I-E and E-I | I-I | I-E and E-I | E - E |
| CARLSBAD TOTAL | 3,112,142 | 263,651 | - | 263,651 | 2,848,491 |
| CHULA VISTA TOTAL | 3,516,776 | 4,330 | - | 4,330 | 3,512,446 |
| CORONADO TOTAL | 369,020 | 248 | - | 248 | 368,772 |
| DEL MAR TOTAL | 77,409 | 892 | - | 892 | 76,517 |
| EL CAJON TOTAL | 1,895,376 | 2,265 | - | 2,265 | 1,893,111 |
| ENCINITAS TOTAL | 1,798,588 | 61,142 | - | 61,142 | 1,737,446 |
| ESCONDIDO TOTAL | 2,644,337 | 411,708 | - | 411,708 | 2,232,629 |
| External TOTAL | 173,565 | 1,529 | - | 1,529 | 172,036 |
| IMPERIAL BEACH TOTAL | 92,294 | 25 | - | 25 | 92,269 |
| LA MESA TOTAL | 1,529,817 | 1,935 | - | 1,935 | 1,527,882 |
| LEMON GROVE TOTAL | 790,801 | 240 | - | 240 | 790,561 |
| NATIONAL CITY TOTAL | 1,545,818 | 3,095 | - | 3,095 | 1,542,723 |
| OCEANSIDE TOTAL | 2,675,295 | 130,632 | - | 130,632 | 2,544,663 |
| POWAY TOTAL | 868,013 | 10,942 | - | 10,942 | 857,071 |
| SAN DIEGO TOTAL | 36,928,734 | 503,222 | - | 503,222 | 36,425,512 |
| SAN MARCOS TOTAL | 1,838,273 | 1,144,520 | 272,798 | 871,722 | 693,753 |
| SANTEE TOTAL | 947,193 | 4,743 | - | 4,743 | 942,450 |
| SOLANA BEACH TOTAL | 603,982 | 9,133 | - | 9,133 | 594,849 |
| Unincorporated TOTAL | 16,372,819 | 678,075 | - | 678,075 | 15,694,744 |
| VISTA TOTAL | 1,610,600 | 331,268 | - | 331,268 | 1,279,332 |
| REGIONWIDE TOTAL | 79,390,852 | 3,563,595 | 272,798 | 3,290,797 | 75,827,257 |



Figure A-1 Estimated San Marcos 2012 VMT by Trip Type

**2014 Estimates**

| JURISDICTION | TOTAL VMT | TOTAL City of San Marcos VMT | Two Trip End City of San Marcos VMT | One Trip End City of San Marcos VMT | NON-City of San Marcos VMT |
|---|---|---|---|---|---|
| | | I-I, I-E and E-I | I-I | I-E and E-I | E - E |
| CARLSBAD TOTAL | 3,203,488 | 277,324 | - | 277,324 | 2,926,164 |
| CHULA VISTA TOTAL | 3,692,997 | 4,696 | - | 4,696 | 3,688,301 |
| CORONADO TOTAL | 376,307 | 307 | - | 307 | 376,000 |
| DEL MAR TOTAL | 78,343 | 971 | - | 971 | 77,372 |
| EL CAJON TOTAL | 1,995,802 | 2,690 | - | 2,690 | 1,993,112 |
| ENCINITAS TOTAL | 1,847,350 | 64,271 | - | 64,271 | 1,783,079 |
| ESCONDIDO TOTAL | 2,773,383 | 416,938 | - | 416,938 | 2,356,445 |
| External TOTAL | 207,246 | 1,954 | - | 1,954 | 205,292 |
| IMPERIAL BEACH TOTAL | 92,994 | 18 | - | 18 | 92,976 |
| LA MESA TOTAL | 1,574,973 | 1,868 | - | 1,868 | 1,573,105 |
| LEMON GROVE TOTAL | 826,374 | 270 | - | 270 | 826,104 |
| NATIONAL CITY TOTAL | 1,587,714 | 3,181 | - | 3,181 | 1,584,533 |
| OCEANSIDE TOTAL | 2,812,792 | 134,739 | - | 134,739 | 2,678,053 |
| POWAY TOTAL | 875,057 | 10,598 | - | 10,598 | 864,459 |
| SAN DIEGO TOTAL | 37,907,376 | 517,676 | - | 517,676 | 37,389,700 |
| SAN MARCOS TOTAL | 1,896,873 | 1,178,728 | 288,108 | 890,620 | 718,145 |
| SANTEE TOTAL | 973,959 | 5,344 | - | 5,344 | 968,615 |
| SOLANA BEACH TOTAL | 623,215 | 9,959 | - | 9,959 | 613,256 |
| Unincorporated TOTAL | 17,593,241 | 728,587 | - | 728,587 | 16,864,654 |
| VISTA TOTAL | 1,667,838 | 340,572 | - | 340,572 | 1,327,266 |
| REGIONWIDE TOTAL | 82,607,322 | 3,700,691 | 288,108 | 3,412,583 | 78,906,631 |



Figure A-2 Estimated San Marcos 2014 VMT by Trip Type

[55] San Diego Forward: The 2015 Regional Plan was adopted by the SANDAG Board of Directors on October 9, 2015.

**2020 Revenue Constrained**

| JURISDICTION | TOTAL VMT | TOTAL City of San Marcos VMT | Two Trip End City of San Marcos VMT | One Trip End City of San Marcos VMT | NON-City of San Marcos VMT |
|---|---|---|---|---|---|
| | | I-I, I-E and E-I | I-I | I-E and E-I | E-E |
| CARLSBAD TOTAL | 3,472,436 | 300,262 | - | 300,262 | 3,172,174 |
| CHULA VISTA TOTAL | 4,110,315 | 5,287 | - | 5,287 | 4,105,028 |
| CORONADO TOTAL | 376,776 | 305 | - | 305 | 376,471 |
| DEL MAR TOTAL | 75,193 | 925 | - | 925 | 74,268 |
| EL CAJON TOTAL | 1,999,957 | 2,645 | - | 2,645 | 1,997,312 |
| ENCINITAS TOTAL | 1,882,878 | 66,765 | - | 66,765 | 1,816,113 |
| ESCONDIDO TOTAL | 2,805,409 | 449,275 | - | 449,275 | 2,356,134 |
| External TOTAL | 194,117 | 1,792 | - | 1,792 | 192,325 |
| IMPERIAL BEACH TOTAL | 91,844 | 19 | - | 19 | 91,825 |
| LA MESA TOTAL | 1,600,130 | 2,074 | - | 2,074 | 1,598,056 |
| LEMON GROVE TOTAL | 822,920 | 282 | - | 282 | 822,638 |
| NATIONAL CITY TOTAL | 1,620,907 | 3,446 | - | 3,446 | 1,617,461 |
| OCEANSIDE TOTAL | 2,854,499 | 138,846 | - | 138,846 | 2,715,653 |
| POWAY TOTAL | 925,978 | 11,409 | - | 11,409 | 914,569 |
| SAN DIEGO TOTAL | 39,059,773 | 551,823 | - | 551,823 | 38,507,950 |
| SAN MARCOS TOTAL | 1,971,319 | 1,290,529 | 326,340 | 964,189 | 680,790 |
| SANTEE TOTAL | 1,028,034 | 5,772 | - | 5,772 | 1,022,262 |
| SOLANA BEACH TOTAL | 643,319 | 10,676 | - | 10,676 | 632,643 |
| Unincorporated TOTAL | 17,475,190 | 757,594 | - | 757,594 | 16,717,596 |
| VISTA TOTAL | 1,666,374 | 358,967 | - | 358,967 | 1,307,407 |
| REGIONWIDE TOTAL | 84,677,368 | 3,958,693 | 326,340 | 3,632,353 | 80,718,675 |

0% E-E VMT

100% I-I VMT

50% I-E/E-I VMT

Figure A-3 Projected San Marcos 2020 VMT by Trip Type

**2030 Revenue Constrained**

| JURISDICTION | TOTAL VMT | TOTAL City of San Marcos VMT | Two Trip End City of San Marcos VMT | One Trip End City of San Marcos VMT | NON-City of San Marcos VMT |
|---|---|---|---|---|---|
| | | I-I, I-E and E-I | I-I | I-E and E-I | E - E |
| CARLSBAD TOTAL | 3,612,570 | 322,789 | - | 322,789 | 3,289,781 |
| CHULA VISTA TOTAL | 4,707,744 | 7,210 | - | 7,210 | 4,700,534 |
| CORONADO TOTAL | 385,001 | 388 | - | 388 | 384,613 |
| DEL MAR TOTAL | 76,024 | 901 | - | 901 | 75,123 |
| EL CAJON TOTAL | 2,161,071 | 3,395 | - | 3,395 | 2,157,676 |
| ENCINITAS TOTAL | 1,924,311 | 68,973 | - | 68,973 | 1,855,338 |
| ESCONDIDO TOTAL | 2,972,037 | 485,012 | - | 485,012 | 2,487,025 |
| External TOTAL | 222,080 | 2,307 | - | 2,307 | 219,773 |
| IMPERIAL BEACH TOTAL | 95,173 | 19 | - | 19 | 95,154 |
| LA MESA TOTAL | 1,755,098 | 2,426 | - | 2,426 | 1,752,672 |
| LEMON GROVE TOTAL | 867,492 | 288 | - | 288 | 867,204 |
| NATIONAL CITY TOTAL | 1,777,970 | 4,295 | - | 4,295 | 1,773,675 |
| OCEANSIDE TOTAL | 3,048,450 | 160,372 | - | 160,372 | 2,888,078 |
| POWAY TOTAL | 966,183 | 12,099 | - | 12,099 | 954,084 |
| SAN DIEGO TOTAL | 41,736,317 | 610,543 | - | 610,543 | 41,125,774 |
| SAN MARCOS TOTAL | 2,215,053 | 1,452,229 | 384,112 | 1,068,117 | 762,824 |
| SANTEE TOTAL | 1,097,270 | 6,365 | - | 6,365 | 1,090,905 |
| SOLANA BEACH TOTAL | 667,905 | 11,020 | - | 11,020 | 656,885 |
| Unincorporated TOTAL | 19,108,723 | 893,692 | - | 893,692 | 18,215,031 |
| VISTA TOTAL | 1,829,321 | 400,447 | - | 400,447 | 1,428,874 |
| REGIONWIDE TOTAL | 91,225,793 | 4,444,770 | 384,112 | 4,060,658 | 86,781,023 |

0% E-E VMT

100% I-I VMT

50% I-E/E-I VMT

Figure A-4 Projected San Marcos 2030 VMT by Trip Type

**2035 Revenue Constrained**

| JURISDICTION | TOTAL VMT | TOTAL City of San Marcos VMT | Two Trip End City of San Marcos VMT | One Trip End City of San Marcos VMT | NON-City of San Marcos VMT |
|---|---|---|---|---|---|
| | | I-I, I-E and E-I | I-I | I-E and E-I | E-E |
| CARLSBAD TOTAL | 3,668,094 | 324,707 | - | 324,707 | 3,343,387 |
| CHULA VISTA TOTAL | 4,783,453 | 7,146 | - | 7,146 | 4,776,307 |
| CORONADO TOTAL | 379,321 | 276 | - | 276 | 379,045 |
| DEL MAR TOTAL | 74,771 | 846 | - | 846 | 73,925 |
| EL CAJON TOTAL | 2,198,458 | 3,434 | - | 3,434 | 2,195,024 |
| ENCINITAS TOTAL | 1,951,056 | 69,069 | - | 69,069 | 1,881,987 |
| ESCONDIDO TOTAL | 3,050,942 | 496,232 | - | 496,232 | 2,554,710 |
| External TOTAL | 234,505 | 2,472 | - | 2,472 | 232,033 |
| IMPERIAL BEACH TOTAL | 99,513 | 25 | - | 25 | 99,488 |
| LA MESA TOTAL | 1,785,371 | 2,436 | - | 2,436 | 1,782,935 |
| LEMON GROVE TOTAL | 864,461 | 290 | - | 290 | 864,171 |
| NATIONAL CITY TOTAL | 1,772,554 | 4,317 | - | 4,317 | 1,768,237 |
| OCEANSIDE TOTAL | 3,136,145 | 164,749 | - | 164,749 | 2,971,396 |
| POWAY TOTAL | 990,763 | 13,357 | - | 13,357 | 977,406 |
| SAN DIEGO TOTAL | 42,048,607 | 591,475 | - | 591,475 | 41,457,132 |
| SAN MARCOS TOTAL | 2,248,294 | 1,488,443 | 390,560 | 1,097,883 | 759,851 |
| SANTEE TOTAL | 1,108,219 | 6,299 | - | 6,299 | 1,101,920 |
| SOLANA BEACH TOTAL | 666,221 | 11,003 | - | 11,003 | 655,218 |
| Unincorporated TOTAL | 19,851,083 | 937,314 | - | 937,314 | 18,913,769 |
| VISTA TOTAL | 1,882,346 | 411,497 | - | 411,497 | 1,470,849 |
| REGIONWIDE TOTAL | 92,794,177 | 4,535,387 | 390,560 | 4,144,827 | 88,258,790 |

0% E-E VMT

100% I-I VMT

50% I-E/E-I VMT

Figure A-5 Projected San Marcos 2035 VMT by Trip Type

# Appendix B. SOURCE DATA FOR THE SOLID WASTE EMISSION FACTOR

| Waste Component | Waste Distribution (%)[1] | Landfill Gas Emissions | |
|---|---|---|---|
| | | $CH_4$ without LFG Recovery (MT $CO_2e$/short ton) | Source[2] |
| Paper | 16.8% | - | - |
| *Corrugated Containers/Cardboard* | *5.0%* | 2.36 | Exhibit 3-27, WARM v14 Containers /Packaging |
| *Newspaper* | *0.8%* | 0.95 | Exhibit 3-27, WARM v14 Containers /Packaging |
| *Magazine* | *0.6%* | 1.08 | Exhibit 3-27, WARM v14 containers /packaging |
| *Mixed Paper (general)* | *10.4%* | 2.14 | Exhibit 3-27, WARM v14 containers /packaging |
| Plastic | 8.9% | - | - |
| Glass | 1.7% | - | - |
| Metal | 3.5% | - | - |
| Organics | 38.9% | - | - |
| *Food* | *15%* | 1.57 | Exhibit 1-49, WARM V14 Organic Materials |
| *Tree* | *5.3%* | 0.77 | Exhibit 2-11 WARM V14 Organic Materials |
| *Leaves and Grass* | *6.8%* | 0.59 | Exhibit 2-11 WARM V14 Organic Materials |
| *Trimmings* | *3.5%* | 0.59 | Exhibit 2-11 WARM V14 Organic Materials |
| *Mixed Organics* | *8.3%* | 0.53 | Exhibit 2-11 WARM V14 Organic Materials |
| Electronics | 0.6% | - | - |
| C&D | 24.6% | - | - |
| Household Hazardous Waste | 0.2% | - | - |
| Special Waste | 3.1% | - | - |
| Mixed Residue | 1.6% | 0.53 | |
| **Mixed Waste Emission Factor** | | **0.744** | |

Source: 1) City of San Diego 2014. 2) EPA Waste Reduction Model (WARM) Version 14 (2016)

# Appendix B

## Methods for Estimating Greenhouse Gas Emissions Reductions in the San Marcos Climate Action Plan

# Methods for Estimating Greenhouse Gas Emissions Reductions in the San Marcos Climate Action Plan

**Draft**

May 2020

Prepared for the City of San Marcos

SAN MARCOS
DISCOVER LIFE'S POSSIBILITIES

Prepared by the Energy Policy Initiatives Center

EPIC
ENERGY POLICY INITIATIVES CENTER
UNIVERSITY OF SAN DIEGO SCHOOL OF LAW

## About EPIC

The Energy Policy Initiatives Center (EPIC) is a non-profit research center of the USD School of Law that studies energy policy issues affecting California and the San Diego region. EPIC's mission is to increase awareness and understanding of energy- and climate-related policy issues by conducting research and analysis to inform decision makers and educate law students.

For more information, please visit the EPIC website at www.sandiego.edu/epic.

*Prepared in partnership with the San Diego Association of Governments (SANDAG) and the Roadmap Program. This Program is partially funded by California utility customers and administered by San Diego Gas & Electric Company under the auspices of the California Public Utilities Commission.*

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# 1 OVERVIEW

This document provides a summary of the methods used to calculate the greenhouse gas (GHG) emissions reductions for the strategies and measures included in the City of San Marcos (referred to as "the City" or "San Marcos") Climate Action Plan (CAP).

Section 2 provides emission reduction targets for San Marcos in the years 2020 and 2030. Section 3 provides a summary of emissions reduction estimates in 2030 from federal and State (California) actions, as well as eight CAP strategies. Section 4 provides the common data sources and methods used throughout the document. The detailed methods used to estimate emissions reductions from each strategy and measure are presented in Sections 5 and 6.

Unless stated otherwise, all activity data and GHG emissions reported in this document are annual values for the calendar year, and all emission factors reported in this document are annual average values for the calendar year.

## 1.1 Rounding of Values in Tables and Figures

Rounding is used only for the final GHG values within the tables and figures throughout the document. Values are not rounded in the intermediary steps in the calculation. Because of rounding, some totals may not equal the values summed in any table or figure.

# 2 EMISSION REDUCTION TARGETS

California has a statewide target to reach the 1990 GHG emissions level by 2020, or 431 million metric tons of carbon dioxide equivalent (MMT $CO_2e$), and to reach 40% below the 1990 level by 2030, or 260 MMT $CO_2e$.[1] According to the California Air Resources Board's (CARB) statewide inventory, the statewide total GHG emissions level in 2012 was 450 MMT $CO_2e$.[2] At the State level, the emissions reduction target for 2020 is equivalent to 4% below 2012; for 2030, it is equivalent to 42% below 2012, as illustrated in Figure 1.

[1] AB 32 (Nunez) (Chapter 488, Statutes of 2006): California Global Warming Solutions Act of 2006. SB 32 (Pavley) (Chapter 249, Statutes of 2016): California Global Warming Solutions Act of 2006: emissions limit (2015-2016).
[2] California Air Resources Board: California Greenhouse Gas Inventory for 2000–2016 (June, 2018), accessed on December 13, 2018.

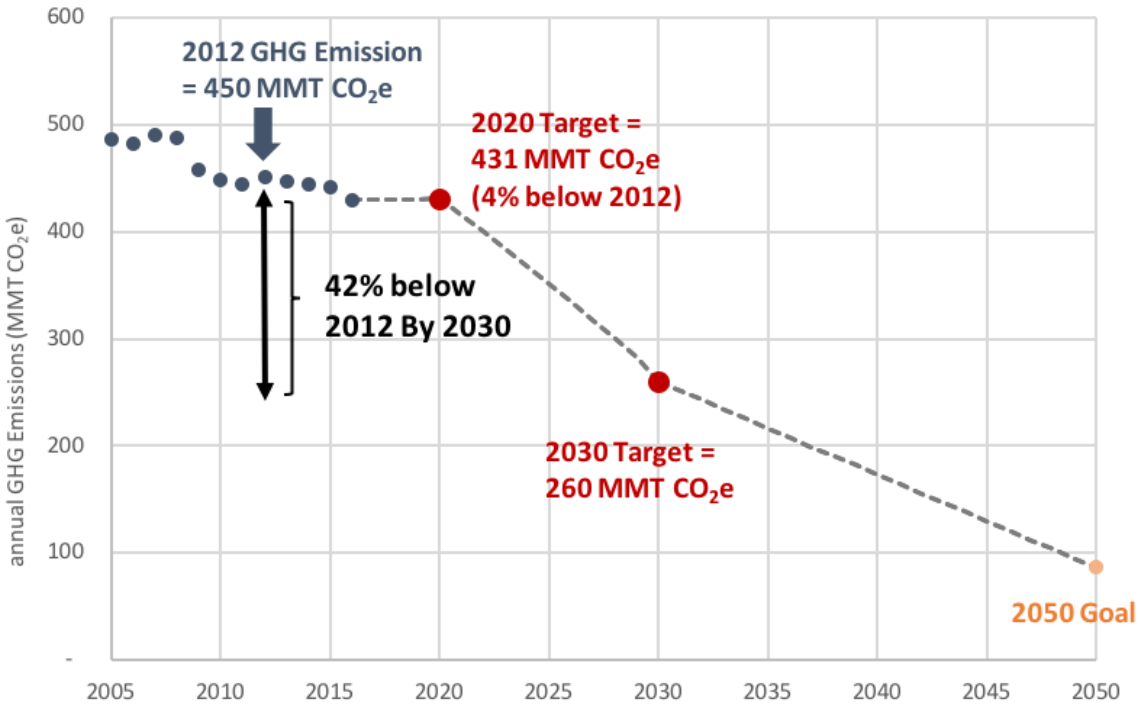



Figure adapted from California's 2017 Climate Change Scoping Plan Figure 6 that shows a linear, straight-line path to the 2030 target. The 2050 goal is 80% below 1990 level
Source: California Air Resources Board California Greenhouse Gas Emission Inventory - 2018 Edition (June 2018) 2017 Climate Change Scoping Plan.

**Figure 1 California Statewide GHG Inventory and Emissions Reduction Targets**

The San Marcos CAP has a baseline inventory year of 2012; 2012 was selected as the baseline year for the CAP because it was the year with the best available transportation activity data during development of the San Marcos GHG emissions inventory. Use of the best available transportation activity data is important because emissions from transportation account for the largest category of total city emissions and would be the main category affecting the overall emissions and projections.

The target emissions for San Marcos are set at 4% below the 2012 emissions level by 2020 and 42% below the 2012 emissions level by 2030. These mass reduction targets are consistent with the emissions reduction targets at the State level. Table 1 shows the business-as-usual (BAU) emissions projections, targets, and $CO_2e$ reductions needed in 2020 and 2030 to achieve the target levels.[3]

[3] The method to project emissions at 2020 and 2030 is provided in *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventories and Projections* (EPIC, 2018).

Table 1 Emissions Projections, Targets, and Emissions Reductions Needed

| Year | Business-as-usual Projection (MT $CO_2e$) | Target Emissions Level (% below baseline) | Target Emissions Level (MT $CO_2e$) | Emissions Reduction Needed to Meet Target (MT $CO_2e$) |
|---|---|---|---|---|
| 2012 | 599,000 | - | - | - |
| 2020 | 549,000 | 4% | 575,000 | none |
| 2030 | 591,000 | 42% | 347,000 | 244,000 |

Emissions projections and reductions are rounded.
Energy Policy Initiatives Center 2019.

No local actions are needed for San Marcos to reach its 2020 target. In 2030, a reduction of 244,000 MT $CO_2e$ is needed to meet San Marcos' target. This document focuses on the State and local measures needed to reach the 2030 target.

# 3 SUMMARY OF EMISSIONS REDUCTION ESTIMATES

This section summarizes the GHG emissions reductions from strategies and measures included in the San Marcos CAP. Table 2 below presents a summary of emissions reductions from eight local strategies in the San Marcos CAP, as well as the reductions from federal and State actions.

Table 2 Summary of 2030 GHG Emissions Reduction by Strategy in the San Marcos CAP

| Summary of Federal and State Actions and CAP Strategies | | 2030 Emissions Reduction (MT $CO_2e$) |
|---|---|---|
| CAP Strategies | Strategy 1: Increase Use of Zero-Emission or Alternative Fuel Vehicles (T) | 11,566 |
| | Strategy 2: Reduce Fossil Fuel Use (T) | 950 |
| | Strategy 3: Reduce Vehicle Miles Traveled (T) | 21,265 |
| | Strategy 4: Increase Building Energy Efficiency (E) | 1,275 |
| | Strategy 5: Increase Renewable and Zero-Carbon Energy (E) | 35,109 |
| | Strategy 6: Reduce Water Use (W) | 158 |
| | Strategy 7: Reduce and Recycle Solid Waste (S) | 11,585 |
| | Strategy 8: Increase Urban Tree Cover (C) | 245 |
| Federal and State Actions | | 161,988 |
| Total Emissions Reduction* | | 244,000 |

Transportation (T), Energy (E), Water (W), Waste (S) and Carbon Sequestration (C).
*Total emissions reduction value is rounded.
Energy Policy Initiatives Center 2020.

Each CAP strategy includes several measures. Table 3 presents a detailed summary of the emissions reductions from each CAP measure and from each federal and State action.

**Table 3 Summary of 2030 GHG Emissions Reductions from Measures in San Marcos CAP**

| CAP Strategies | Federal and State Regulations and CAP Measures | 2030 Emissions Reductions (MT $CO_2e$) |
|---|---|---|
| Strategy 1: Increase Use of Zero-Emission or Alternative Fuel Vehicles (T) | T-1: Transition to a More Fuel-Efficient Municipal Fleet | 32 |
| | T-2: Require Electric Vehicle Charging Stations in New Developments | 2,493 |
| | T-3: Install Electric Vehicle Charging Stations at Public Facilities | 759 |
| | T-4: Provide Grants for Residents and Business to Install Electric Vehicle Charging Stations | 8,282 |
| Strategy 2: Reduce Fossil Fuel Use (T) | T-5: Synchronize Traffic Signals | 263 |
| | T-6: Install Roundabouts | 687 |
| Strategy 3: Reduce Vehicle Miles Traveled (T) | T-7: Participate in the San Diego Association of Government iCommute Vanpool Program | 149 |
| | T-8: Develop Bicycle Infrastructure Identified in the City's General Plan Mobility Element | 692 |
| | T-9: Adopt Citywide Transportation Demand Management Ordinance | 262 |
| | T-10: Implement an Intra-City Shuttle System | 4,932 |
| | T-11: Increase Transit Ridership | 4,415 |
| | T-12: Reduce Parking Requirements for New Residential Development Near Transit | 2,017 |
| | T-13: Implement Transportation Demand Management Plans at Existing Employers | 8,786 |
| | T-14: Transition to an Online Building and Engineering Permit Submittal System | 13 |
| Strategy 4: Increase Building Energy Efficiency (E) | E-1: Require New Residential Developments to Install Alternatively-Fueled Water Heaters | 1,275 |
| Strategy 5: Increase Renewable and Zero-Carbon Energy (E) | E-2: Require Installation of PV Systems at New Non-Residential Developments | 773 |
| | E-3: Increase Grid-Supply Renewable and Zero-Carbon Electricity | 34,336 |
| Strategy 6: Reduce Water Use (W) | W-1: Reduce Outdoor Water Use for Landscaping | 91 |
| | W-2: Reduce Water Use in City Managed Landscaping Areas | 67 |
| Strategy 7: Reduce and Recycle Solid Waste (S) | S-1: Increase Citywide Waste Diversion | 11,585 |
| Strategy 8: Increase Urban Tree Cover (C) | C-1: Increase Tree Planting at City Parks and Public Rights-Of-Way | 148 |
| | C-2: Increase Tree Planting at New Developments | 97 |
| Federal and State Regulations | Federal and California Vehicle Efficiency Standards | 65,606 |
| | California Energy Efficiency Programs | 10,461 |
| | California Renewables Portfolio Standard | 60,681 |
| | California Solar Programs, Policies and 2019 Mandates | 25,239 |
| | Total Reduction from Federal and State Regulations | 161,988 |
| | Total Reduction from CAP Measures | 82,153 |
| | Total Reduction (Federal, State and CAP Measures)* | 244,000 |

Transportation (T), Energy (E), Water (W), Waste (S) and Carbon Sequestration (C).
*Total emissions reduction is rounded.
Energy Policy Initiatives Center 2020.

Figure 2 provides a visualization of the emissions trend for the CAP horizon year through 2030.

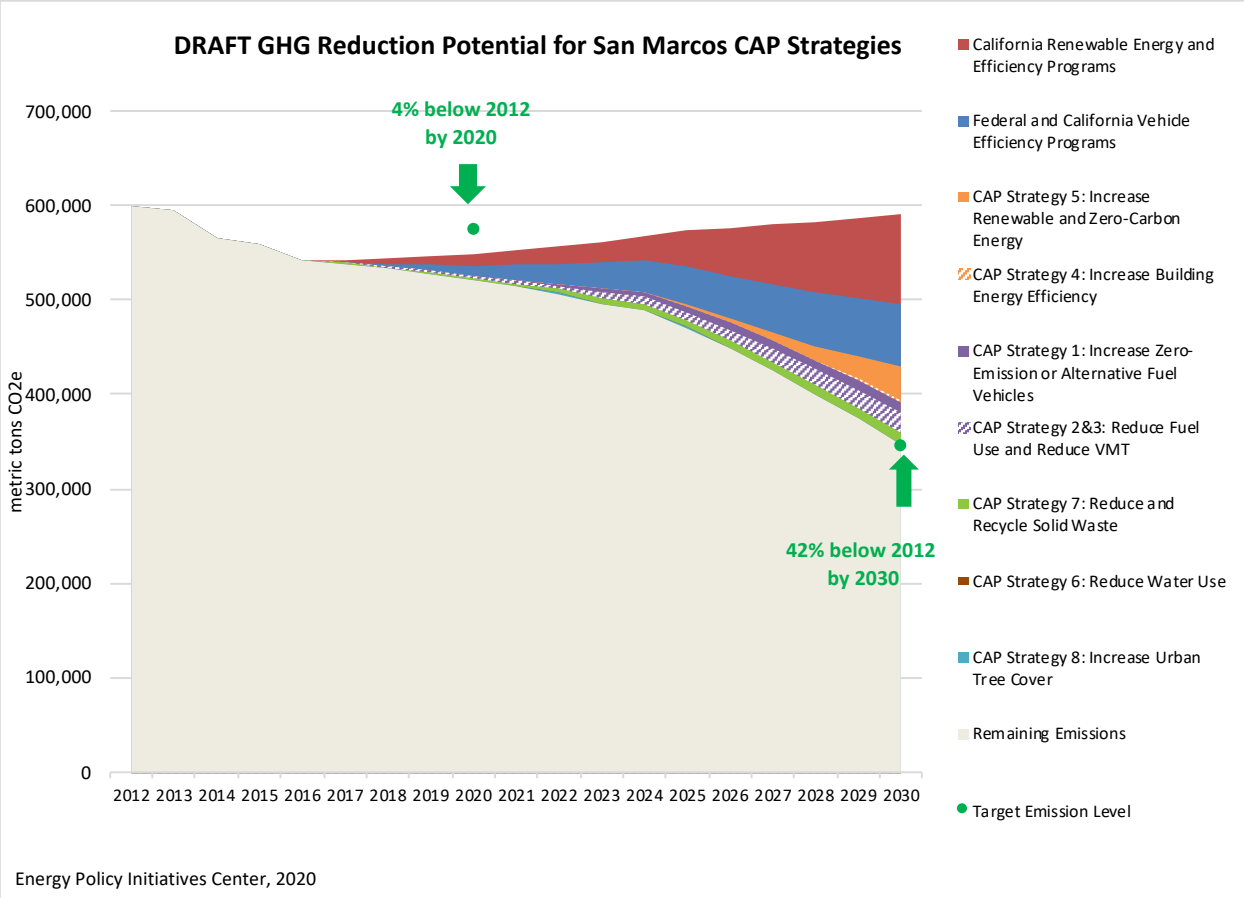



Figure 2 San Marcos GHG Emissions Trend (2012–2030)

In Figure 2, the BAU emissions projection is represented along the top of the graph. The green dots represent the target emissions levels in 2020 and 2030. In this case, the City meets both 2020 and 2030 targets with the federal and State actions, and local measures identified in the CAP. The colored wedges represent the reductions from CAP strategies and from federal and State actions. Each wedge represents the cumulative GHG reduction from each strategy, from when the strategy is initiated through 2030. Although implementation of *Strategy 5: Increase Renewable and Zero-Carbon Energy (E)* would be initiated later than some other strategies, it has the largest cumulative reduction potential and largest 2030 reduction potential among all CAP strategies. The grey area beneath the colored wedges represents the remaining emissions after all the actions have taken place.

# 4 BACKGROUND AND COMMON ASSUMPTIONS

A set of common assumptions and sources was used to calculate potential emissions reductions for many of the measures included in the CAP. The following section provides assumptions that are applied to measures related to electricity, natural gas, and on-road transportation. Measures related to other categories do not have common assumptions. The detailed methods and data for each measure are provided in Sections 5 and 6.

## 4.1 Common Background Data

Table 4 presents a summary of common data used to estimate overall GHG emissions levels and the reduction estimates across several CAP measures.

**Table 4 Common Data Used for the San Marcos CAP**

| Year | 2012 | 2030 |
|---|---|---|
| Population[4] | 85,563 | 108,824 |
| Labor Force[5] | 38,600 | 53,729 |
| Vehicle Miles Traveled (VMT) (annual miles)[6] | 665,614,152 | 837,811,001 |
| Electricity Gross Generation (GWh)[7] | 479 | 607 |
| VMT refers to 'Origin-Destination miles' associated with San Marcos. VMT projections are based on the SANDAG Series 13 forecast. 2012 is the Series 13 Base Year.<br>2012 VMT is historical and 2030 VMT is the latest available forecasted data.<br>Energy Policy Initiatives Center 2019. | | |

## 4.2 Common Assumptions and Methods for Calculating Electricity Emissions Reductions

The following overall assumptions and methods are used in the calculation of emissions reductions related to electricity, including from federal and State actions and local CAP measures. Details for the calculation of each action are provided in Sections 5 and 6.

### 4.2.1 GHG Emission Factor for Electricity

The GHG emission factor for electricity for a city, expressed in pounds of $CO_2e$ per megawatt-hour (lbs $CO_2e$/MWh) is specific to each city and depends on the types of supply to the city. Therefore, for the purpose of estimating overall GHG reductions from renewables in electricity supply, the GHG emission factor for electricity is used, which is the weighted average emission factor of gross generation from three sources of supply: the utility (San Diego Gas & Electric (SDG&E) and other electric retail supplier), a local renewables and zero-carbon program, and behind-the-meter photovoltaic (PV) systems.

The citywide emission factor is calculated based on the percentage of renewable and zero-carbon content in, and the percentage of, gross generation from each source of supply as described below. This method is applied to 2016, the starting year for emissions projections, as well as to each year included in

[4] The 2012 population is from SANDAG's Demographic & Socio-Economic Estimates (March 8, 2017 version). The population in 2030 is from SANDAG's Series 13 Regional Growth Forecast (Updated in October 2013). SANDAG Data Surfer, accessed on November 2, 2017. Series 13 has a base year of 2012. Projections from 2012 may differ from more recent estimates by the State, such as from the Department of Finance (DOF).
[5] The 2012 labor force is from the California Employment Development Department (EDD) Database, accessed January 25, 2019. The 2030 labor force is based on the SANDAG Series 13 forecast for civilian jobs estimates in 2030, and the ratio of the 2012 labor force and 2012 SANDAG Series 13 civilian jobs estimate (2012 is the forecast base year). SANDAG's Series 13 Regional Growth Forecast (Updated in October 2013). SANDAG Data Surfer, accessed November 2, 2017.
[6] Based on SANDAG Series 13 Origin-Destination weekday VMT, provided by SANDAG (September 29, 2017). Weekday VMT were converted to annual VMT using the methods described in *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventories and Projections* (EPIC, 2018).
[7] Gross generation is the sum of the forecasted utility electricity sales, electricity generated from behind-the-meter PV systems, additional load from electric vehicles and transmission and distribution losses.

the CAP horizon.[8] As the percentage of renewable and zero-carbon supply in the mix increases, the weighted average emission factor of electricity supply decreases.

This citywide emission factor, in contrast to using only the utility grid emission factor, is used to attribute the reductions according to the measure responsible for achieving the reductions. Therefore, the GHG reductions from increased renewable supply in the city can be attributed to the State RPS mandate for grid supply, to the local CAP measures that increase the grid-supply of renewable and zero-carbon electricity, and to the impact of adding behind-the-meter PV systems and increasing building energy efficiency.

#### 4.2.1.1 Renewables Content in Supply from SDG&E and Other Electric Retail Suppliers

SDG&E's power mix includes electricity generated from SDG&E's own power plants and electricity procured by SDG&E (both specified and unspecified sources), known as bundled power. As of 2016, SDG&E's bundled power mix is 43% renewable.[9] It is assumed that SDG&E and the electric retail suppliers of SDG&E's Direct Access customers will be at 60% renewable by 2030, as required by the Renewables Portfolio Standard (RPS) under SB 100 (de León) (Chapter 312, Statutes of 2016).[10] The RPS mandate is discussed in Section 5.1.

#### 4.2.1.2 Supply from Renewables and Zero-Carbon Program

Under CAP Measure E-3, the City would establish or join a program to increase grid-supply renewable and zero-carbon electricity. It is assumed that such a program would increase the renewable and zero-carbon electricity to 95% in 2030, or 35% beyond the current RPS mandate for 2030.

The renewable and zero-carbon content of the program would affect the citywide weighted average emission factor. California requires all electric retail suppliers to meet the RPS requirement, so that a portion of the emissions reduction from the program is attributed to RPS compliance as a State action. The remaining portion of reduction, beyond the 60% in 2030, is due only to the implementation of the local CAP measure E-3 and is therefore attributed that measure.

#### 4.2.1.3 Renewables Supply from behind-the-meter PV Systems

Electricity generation from behind-the-meter PV systems, including residential and non-residential PV systems, is considered part of the overall electricity supply. Electricity generation from PV is considered 100% zero-carbon (i.e., GHG-free). The State's solar policies and programs, the 2019 California Building Energy Efficiency Standards (Title 24, Part 6) residential PV mandates, and CAP Measure E-2 all increase behind-the-meter PV systems in the city; they are discussed in Section 5 and Section 6.

Considering behind-the-meter PV as a supply source that contributes to the citywide emission factor allows for calculating the effects of energy efficiency programs that may reduce behind-the-meter electricity use, or from additional electric vehicle (EV) charging load, which may come from behind-the-meter electricity sources and not just from grid supply.

[8] The method to project emissions in 2030 is provided in the *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventories and Projections* (EPIC, 2018).
[9] California Energy Commission: 2016 Power Content Label San Diego Gas & Electric.
[10] SB 100 (de León) California Renewables Portfolio Standard Program: emissions of greenhouse gases (2017–2018). The interim RPS targets are 44% by 2024 and 52% by 2027 from eligible renewable energy resources.

#### 4.2.1.4 Weighted Average GHG Emission Factor for Electricity

The weighted average GHG emission factor for electricity is based on the percentage of gross generation supplied by each of the previously referenced supplies, as well as the percentage of renewable or zero-carbon content in each supply.

Table 5 shows the contribution from each supply to gross generation and its renewable or zero-carbon content, as well as the overall citywide annual weighted average emission factors for 2016 and 2030.

**Table 5 2016 and Projected 2030 GHG Emission Factor for Electricity in San Marcos**

| Year | Renewables and Zero-Carbon Program | | Utility | | Behind-the-meter PV | | Overall City-wide | |
|---|---|---|---|---|---|---|---|---|
| | % of Gross Generation Supplied | Zero-Carbon Content in Supply | % of Gross Generation Supplied | Renewable Content in Supply | % of Gross Generation Supplied | Renewable Content in Supply | City-wide Renewable and Zero-Carbon Supply | Annual Electricity Emission Factor (lbs $CO_2e$/MWh) |
| 2016 | - | - | 92% | 43% | 8% | 100% | 47% | 484 |
| 2030 | 77% | 95% | 2% | 60% | 21% | 100% | 95% | 44 |

2016 is the most recent year of utility data. The city-wide 2016 electricity emission factor is used for BAU emissions projections in future years, including 2030.
2030 data are projections under the CAP based on CAP assumptions, current status, and future impact of current State policies and programs.
Sums may not add up to totals due to rounding.
Energy Policy Initiatives Center 2019.

In 2016, SDG&E supplied 92% of the gross generation with 43% eligible renewable sources; behind-the-meter PV systems supplied the remainder. SDG&E's 2016 bundled emission factor was 525 lbs $CO_2e$/MWh, resulting in an overall city-wide emission factor of 484 lbs $CO_2e$/MWh in 2016.[11]

In 2030, the projected electricity supply from behind-the-meter PV systems is estimated to be 21% of gross generation. To comply with the 2030 RPS target, the renewable content in SDG&E's supply will increase to 60%; this document assumes the utility's supply is fixed at the RPS mandate level to avoid overestimating the emissions reduction from the utility's renewable program. The renewables and zero-carbon program (CAP Measure E-3) is assumed to have 95% zero-carbon sources in 2030. Based on these supplies' contributions, the citywide annual weighted electricity emission factor in 2030 is projected to be 44 lbs $CO_2e$/MWh (95% renewable or zero-carbon).[12]

The annual weighted citywide electricity emission factor is used to calculate the GHG reductions from CAP measures that increase renewable and zero-carbon supply or reduce electricity use.

[11] The SDG&E bundled emission factor is calculated by EPIC and reported in the SANDAG Regional Climate Planning Framework (ReCAP) Technical Appendix I, Table 6 (2018). The 2016 citywide emission factor is 525 lbs $CO_2e$/MWh*92%.
[12] Starting with SDG&E's 2016 bundled emission factor 525 lbs $CO_2e$/MWh (43% renewable), the projected 2030 utility emission factor is 368 lbs $CO_2e$/MWh (60% renewable) and the projected 2030 local program emission factor is 46 lbs $CO_2e$/MWh (95% renewable or zero-carbon). The 2030 citywide emission factor of 44 lbs/MWh is then calculated as 46 lbs $CO_2e$/MWh*77% + 368 lbs $CO_2e$/MWh*2%.

### 4.2.2 Allocation of GHG Emissions Reductions from Actions that Increase Renewables in Electricity to State Actions and Local CAP Measures

The projected citywide electricity emission factor is used to estimate the GHG emissions reductions from any measures that increase the overall renewable and zero-carbon supply. The total reduction from State and local CAP actions to increase renewable and zero-carbon supply is given in Table 6; it is calculated using the projected gross generation in 2030, as well as the difference in the 2030 citywide emission factor and BAU emission factor.

**Table 6 Emissions Reductions from All Actions Increasing Renewable and Zero-Carbon Supply in San Marcos**

| Year | Gross Generation (GWh) | BAU Projections | | Projections with State and Local Actions Increasing Renewable and Zero-Carbon Supply | | Emissions Reduction from Increased Renewable and Zero-Carbon Supply (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| | | BAU Electricity Emission Factor (lbs $CO_2e$/MWh) | BAU Emissions from Electricity (MT $CO_2e$) | Projected Electricity Emission Factor (lbs $CO_2e$/MWh) | Projected Emissions from Electricity (MT $CO_2e$) | |
| 2030 | 607 | 484 | 133,225 | 44 | 12,196 | 121,029 |
| The projections with increasing renewable and zero-carbon supply are based on CAP assumptions and State policies and programs. Energy Policy Initiatives Center 2020. | | | | | | |

The BAU emission factor for 2016 (Table 5) is kept constant through the year 2030, as opposed to using the emission factor for the 2012 baseline year, because the additional renewable content in SDG&E's supply and behind-the-meter PV supply in 2016 is already included in the BAU emissions projection.[13]

The total emissions reduction from increasing renewable and zero-carbon supply as calculated above (Table 6) is attributed to each supply based on its renewable (or zero-carbon, if beyond the RPS mandate) contribution to the total citywide renewable content. This attribution of GHG reduction from each supply shown in Table 7.

[13] The method to project emissions in 2030 is provided in the *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventories and Projections* (EPIC, 2018).

**Table 7 Allocation of Emissions Reductions to Supplies that Increase Renewable (or Zero-Carbon) Supply in San Marcos**

| Year | Electricity Supply | Total | Local Renewables and Zero-Carbon Program | Utility | Behind-the-meter PV |
|---|---|---|---|---|---|
| 2030 | % of Gross Generation Supplied by Renewables and Zero-Carbon Sources | 95% | 73% | 1% | 21% |
| | Emissions Reduction from Increased Renewables and Zero-Carbon Supply (MT $CO_2e$) | 121,029 | 93,197 | 1,820 | 26,012 |
| 2030 data are the projections under the CAP, based on CAP assumptions and the future impact of current State policies and programs.<br>Energy Policy Initiatives Center 2020. | | | | | |

## 4.3 Common Assumptions and Methods for Calculating Natural Gas Emissions Reductions

The default emission factor of 0.0054 MT $CO_2e$ per therm is used for all years to estimate the emissions reductions for the CAP measures related to reducing natural gas use.[14]

## 4.4 Common Assumptions and Methods for Calculating On-Road Transportation Emissions Reductions

The following assumptions and methods are used to calculate emissions reductions for strategies related to on-road transportation, including federal and State actions, and local CAP measures.

### 4.4.1 GHG Emission Factor for On-Road Transportation

The GHG emission factor for on-road transportation, expressed in grams of $CO_2e$ per mile (g $CO_2e$/mile), is used in several ways throughout the document. It is used to estimate the effect of State actions to increase the vehicle fuel efficiency standard, the impact of reduced VMT, and the effect of State and local actions to increase the miles driven by EVs.

#### 4.4.1.1 Impact of Federal and State Actions on Average Vehicle Emission Rates

The default outputs of the CARB's Mobile Source Emissions Factor model (EMFAC2014) are used to determine the average vehicle emission rates for the San Diego region.[15] The average vehicle emission rate for the San Diego region do not account for the impact of the financial incentives provided by San Marcos to increase EV charging infrastructure (Measure T-4), therefore, they are adjusted to determine the San Marcos average vehicle emission rates.

The EMFAC2014 model outputs include effects of all key federal and State regulations related to tailpipe GHG emissions reductions that were adopted before the model release date in 2015. The regulations embedded in the outputs are:

[14] Emission factor for natural gas is from CARB, Documentation of California's GHG Inventory – Index.
[15] CARB: Mobile Source Emissions Inventory. EMFAC2014 was the latest model available at the beginning of the CAP development process (early 2017). The latest model is EMFAC2017, released in March 2018.

- For passenger cars and light-duty vehicles – Federal Corporate Average Fuel Economy (CAFE) standards and California Advanced Clean Car (ACC) Program[16]
- For heavy-duty vehicles (heavy-duty trucks, tractors, and buses) – U.S. Environmental Protection Agency's Phase-I GHG Regulation and CARB Tractor-Trailer GHG Regulation[17]

Using the EMFAC2014 default output, the average vehicle emission rates (g $CO_2$/mile) are calculated based on the distribution of VMT for each vehicle class and its emission rate. The results are adjusted to convert from g $CO_2$/mile to g $CO_2$e/mile to account for total GHG emissions, including $CO_2$, $CH_4$, and $N_2O$.[18] The average vehicle emission rates (Table 8) are used to estimate the GHG emissions reduction impact of policies that increase vehicle efficiency and increase the number of ZEVs on the road.[19]

**Table 8 Average Vehicle Emission Rate in the San Diego Region**

| Year | Average Vehicle Emission Rate - with the Impact of all Adopted State and Federal Policies as of 2015 (g $CO_2$e/mile) |
|---|---|
| 2016 | 446 |
| 2030 | 297 |
| Based on CARB EMFAC2014 Model. The model includes all key federal and State regulations related to tailpipe GHG emissions reductions that were adopted before the model release date in 2015.<br>CARB 2015, Energy Policy Initiatives Center 2019. | |

Because vehicle efficiency improves and the population of ZEVs increases over time, the average vehicle emission rate decreases.

#### 4.4.1.2 Impact of Local Financial Incentives for Electric Vehicle Charging Infrastructure on Average Vehicle Emission Rates

Through *Measure T-4: Provide Grants for Residents and Businesses to Install Electric Vehicle Charging Stations*, the City plans to provide grants for residents who purchase new plug-in hybrid electric vehicles (PHEVs) and businesses to install electric vehicle charging stations (EVCSs). This measure aims to increase the electric vehicle miles (e-VMT) and decrease gasoline vehicle miles (combustion-VMT, or c-VMT) of PHEVs in the City, by helping the PHEV fleet to reach its full all-electric range potential.

It is assumed that as a result of Measure T-4, additional 11,340 miles of c-VMT will be replaced by e-VMT every day after the measure takes into effect in 2021. Therefore, the average vehicle emission rate

[16] ACC program includes additional standards for vehicle model years 2017–2025, and the Zero-Emission Vehicle (ZEV) program requires manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles for 2017–2025 model year vehicles. CARB: EMFAC2014 Technical Documentation, Section 1.4 (v1.0.7 May 2015).
[17] EPA's Phase-I GHG regulation includes GHG emission standards for heavy-duty vehicle model years 2014–2018. CARB's Tractor-Trailer GHG Regulation includes the aerodynamic and tire improvements requirements to reduce GHG emissions from heavy-duty trucks. CARB: EMFAC2014 Technical Documentation, Section 1.4 (v1.0.7 May 2015).
[18] The calculation and adjustment method are described in Section 4.1 of the *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventories and Projections* (EPIC, 2018).
[19] EVs are ZEVs, however, ZEVs may include vehicles with other technologies such as fuel cell vehicles. EMFAC2014 only modeled the impact of EVs as ZEVs, therefore, in this document EVs and ZEVs are interchangeable.

in the San Diego region (Table 8) must be adjusted to derive a San Marcos specific average vehicle emission rate, as shown in Table 9.[20] Details of Measure T-4 assumptions are discussed in Section 6.1.4.

**Table 9 Average Vehicle Emission Rate in San Marcos**

| Year | Average Vehicle Emission Rate – San Marcos Specific ($g CO_2e$/mile) |
|---|---|
| 2016 | 446 |
| 2030 | 287* |
| *Adjusted from San Diego region average vehicle emission rate due to the impact of local financial incentives for electric vehicle charging infrastructure.<br>2030 emission rate is projected based on CAP assumptions and future impact of State policies and programs.<br>CARB 2015, Energy Policy Initiatives Center 2020. | |

The projected San Marcos-specific 2030 average vehicle emission rate in Table 8 is used to estimate the emissions reduction from CAP measures that reduce fossil fuel use (Section 6.2) and reduce VMT (Section 6.3). Because vehicle efficiency improves, the population of ZEVs increases, and e-VMT from PHEVs increase over time, the average vehicle emission rate decreases. Therefore, measures that reduce the same amounts of VMT would lead to decreasing amounts of GHG emissions throughout the CAP horizon.

### 4.4.2 GHG Emissions Reduction from Increasing Zero Emission Vehicles

CAP *Measure T-2: Require Electric Vehicle Charging Stations in New Development* and *Measure T-3: Install Electric Vehicle Charging Stations at Public Facilities* assists in the implementation of the State ZEV program that requires manufacturers to produce increasing numbers of ZEVs including battery electric vehicles (BEVs) and PHEVs.

The total effect of the ZEV program in future years is estimated by comparing the emissions rate in the BAU projection with no additional policy impacts after 2016 (fixed 2016 ZEV penetration rate for the CAP horizon) with the emissions rate including the impact of the ZEV program (EMFAC2014's default ZEV penetration rate), as shown in Table 10.[21] The BAU projection is based on 2016, not the 2012 baseline year, to be consistent with the projection methodology in the electricity category. The additional 2016 model year vehicle fuel efficiency and ZEVs are already taken into consideration in the BAU emissions projection.

[20] This assumes that the vehicle class distribution and VMT distribution by vehicle class in San Marcos are the same as those in the region. e-VMT only replaces the c-VMT of the same model year vehicle, therefore, only changes the VMT distribution within the same vehicle class. For example, the percentage of miles driven by light-duty vehicles (LDVs) to miles driven by all vehicles remains unchanged, while the percentage of e-VMT driven by LDVs to all miles driven by LDVs increases.
[21] The method to project emissions at 2020 and 2030 is provided in the *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventories and Projections* (EPIC, 2018).

Table 10 Emissions Reduction from Increasing Miles Driven by Zero Emission Vehicles

| Year | Projected VMT (annual million miles) | BAU Projection - With No Policy Impact after 2016 | | With Impact of Adopted ZEV Program | | Total Emissions Reduction from ZEVs (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| | | BAU Average Vehicle Emission Rate (g $CO_2e$/mile) | BAU Emissions from On-Road Transportation (MT $CO_2e$) | Average Vehicle Emission Rate (g $CO_2e$/mile) | Emissions from On-Road Transportation (MT $CO_2e$) | |
| 2030 | 838 | 379 | 317,379 | 361 | 302,158 | 15,220 |

The 2030 VMT projection is based on the SANDAG Series 13 Growth Forecast. The projected emission rates are the projections under the CAP, including future impact of State policies and programs used in the CARB EMFAC2014 model.
Energy Policy Initiatives Center 2019.

Portions of the total emissions reduction from ZEVs (15,220 MT $CO_2e$) are attributed to Measure T-2 and Measure T-3 in proportion to each measure's contribution to e-VMT. Table 11 provides the key assumptions and results of the attribution.

Table 11 Allocation of GHG Emissions Reduction from Increasing Zero Emission Vehicles

| Year | Projected e-VMT of Total VMT | Projected e-VMT Due to (annual million miles) | | | Emissions Reduction from e-VMT Due to (MT $CO_2e$) | | |
|---|---|---|---|---|---|---|---|
| | | With Impact of Adopted ZEV Program | Measure T-2 | Measure T-3 | With Impact of Adopted ZEV Program | Measure T-2 | Measure T-3 |
| 2030 | 7.6% | 63.8 | 10.4 | 3.2 | 15,220 | 2,493 | 759 |

Measure T-2: Require Electric Vehicle Charging Stations in New Development and Measure T-3: Install Electric Vehicle Charging Stations at Public Facilities

Projected e-VMT (electric vehicle miles) as a percent of total VMT are based on the assumptions in the CARB EMFAC2014 model for the San Diego Region.
The emissions reduction from e-VMT is the projection under the CAP, based on future impact of State policies and programs used in the CARB EMFAC2014 model and assumptions used for local CAP measures.
Energy Policy Initiatives Center 2019.

Based on the EMFAC2014 model assumptions, in 2030, 7.6% of all VMT in the San Diego region will be e-VMT, equivalent to 63.8 million miles in San Marcos. The EVCS added under *Measure T-3: Install Electric Vehicle Charging Stations at Public Facilities* would facilitate the vehicle charging needs of 3.2 million e-VMT in 2030. Therefore, 5% (the ratio of 3.2 to 63.8 million miles) of emissions reduction from the ZEV program is attributed to Measure T-3. The emissions reduction from *Measure T-2: Require Electric Vehicle Charging Stations in New Development* is allocated using the same method.

# 5 FEDERAL AND STATE ACTIONS

Federal and State actions are expected to reduce emissions significantly over the CAP horizon. This section provides a summary of the methods used to estimate the emissions reductions associated with the following federal and State actions to increase renewable electricity, building energy efficiency, and clean and efficient transportation. The federal and State actions included are:

- California Renewables Portfolio Standard
- California Solar Programs, Policies and 2019 Mandates

- California Energy Efficiency Program
- Federal and California Vehicle Efficiency Standards

With these federal and State actions, emissions in San Marcos are projected to decrease over time. The projected emissions in each category are shown in Table 12.[22]

**Table 12 Emissions Projections in San Marcos (2020 and 2030)**

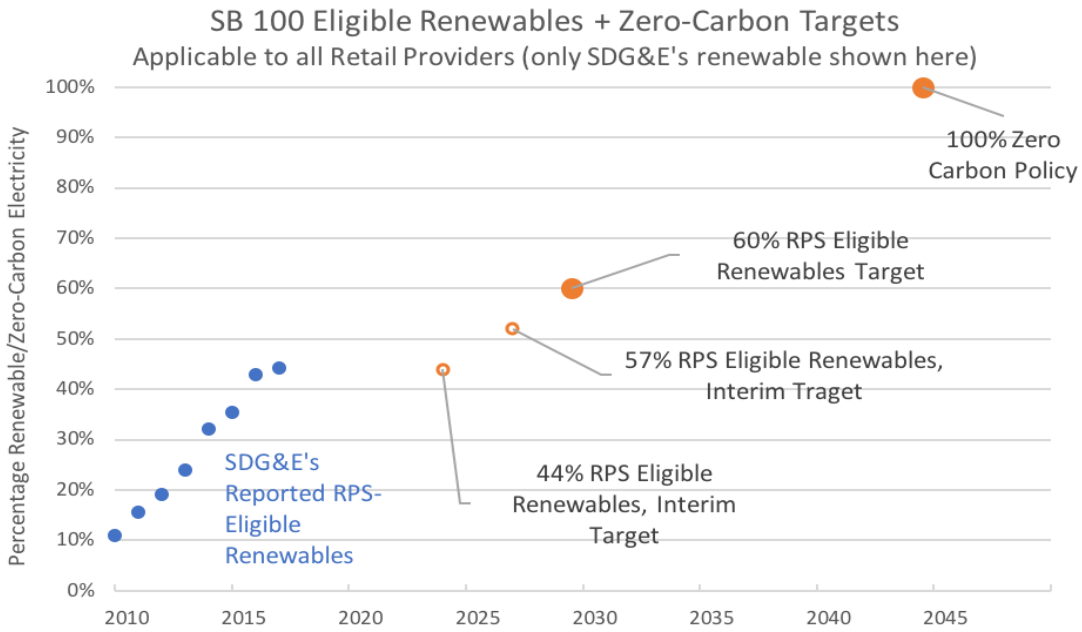
| Emissions Category | 2012 GHG Inventory | 2020 GHG Projections | | 2030 GHG Projections | |
|---|---|---|---|---|---|
| | | BAU | Legislatively-adjusted BAU | BAU | Legislatively-adjusted BAU |
| On-Road Transportation | 322,000 | 307,000 | 296,000 | 317,000 | 252,000 |
| Electricity | 162,000 | 121,000 | 110,000 | 136,000 | 49,000 |
| Natural Gas | 75,000 | 79,000 | 77,000 | 88,000 | 79,000 |
| Solid Waste | 15,000 | 15,000 | 15,000 | 17,000 | 17,000 |
| Off-Road Transportation | 14,000 | 14,000 | 14,000 | 18,000 | 18,000 |
| Water | 9,000 | 10,000 | 10,000 | 11,000 | 11,000 |
| Wastewater | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |
| Total (MT $CO_2e$) | 599,000 | 549,000 | 526,000 | 591,000 | 429,000 |

BAU = business as usual.
Legislatively-adjusted BAU projections account for the emissions reduction impact of California Renewable Portfolio Standard, California Solar Programs, Policies and 2019 Mandates, California Energy Efficiency Program, and Federal and California Vehicle Efficiency Standards.
Emissions projections and reductions are rounded.
Energy Policy Initiatives Center 2020.

## 5.1 California Renewables Portfolio Standard

SB 100, the 100 Percent Clean Energy Act of 2018, adopts a 60% RPS for all of California's electric retail suppliers by 2030; this increases the current RPS standard from 50% to 60%. The legislation also provides goals for intervening years before 2030 and establishes a State policy requiring that "zero-carbon" resources supply 100% of all retail electricity sales to end-user customers and all State agencies by December 31, 2045.[23] The SB 100 renewable and zero-carbon targets are shown in Figure 3 below.

[22] The method to calculate emissions in 2020 and project emissions at 2020 and 2030 is provided in the *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventories and Projections* (EPIC, 2018).
[23] SB 100 (de León): California Renewables Portfolio Standard Program: emissions of greenhouse gases (2017–2018). The interim RPS targets are 44% by 2024 and 52% by 2027 from eligible renewable energy resources.




Targets apply to all retail providers include electric service providers for Direct Access, Community Choice Aggregators and Investor Owned Utilities.
Energy Policy Initiatives Center 2018.

**Figure 3 SB 100 Renewables and Zero-Carbon Targets**

All electric retail suppliers are required to meet the State's RPS requirements, including SDG&E, electricity service suppliers for SDG&E's Direct Access customers, and any other suppliers of renewables and zero-carbon programs. In this document, a conservative approach is taken that assumes all providers for utility customers, including electricity sales to DA customers, will meet, but not exceed, the RPS requirements for 2030. Under this assumption, all emissions reduction from SDG&E and electric retail suppliers reaching 60% renewables in 2030 are credited to the State under the RPS requirements.

The impacts of any measure that goes beyond the RPS mandates results in GHG reductions that are attributed to the measure. The renewables and zero-carbon program considered under Measure E-3, has a target is to reach 95% zero-carbon in 2030. A portion of the emissions reduction from the program will be attributed to the State under RPS compliance, and the remaining reduction will be attributed to CAP Measure E-3, as described in Section 6.5.2. Table 13 shows results from RPS mandates only.

**Table 13 Electricity Suppliers and Projected 2030 GHG Emissions Reduction Attributed to the California Renewables Portfolio Standard**

| Year | (a) RPS-Related Emissions Reduction from the Utility* (MT $CO_2e$) | (b) RPS-Related Emissions Reduction from Renewables and Zero-Carbon Program Under Measure E-3 (MT $CO_2e$) | (a + b) All RPS-Related Emissions Reductions (MT $CO_2e$) |
|---|---|---|---|
| 2030 | 1,820 | 58,861 | 60,681 |
| *Includes utility and electricity suppliers of utility's Direct Access customers.<br>2030 data are projections under the CAP based on current status, future impact of State policies and programs, and CAP measures assumptions.<br>Energy Policy Initiatives Center 2020. | | | |

## 5.2 California Solar Programs, Policies and 2019 Mandates

### 5.2.1 Solar Policies and Programs

California has several policies and programs to encourage customer-owned, behind-the-meter PV systems, including the California Solar Initiatives, New Solar Home Partnership, Net Energy Metering, and electricity rate structures designed for solar customers.

The most recent California Energy Demand 2018–2030 Revised Forecast, developed by the California Energy Commission (CEC), has projections for behind-the-meter PV generation in the SDG&E planning area through 2030.[24] The demand forecast provides three scenarios: the high-demand case, mid-demand case and low-demand case. The PV projection from 2018–2030 in the SDG&E planning area mid-demand case forecast is used to project the PV generation in San Marcos.[25]

The California Distributed Generation (DG) Statistics database includes capacities of behind-the-meter PV systems interconnected in a jurisdiction in a given year for each of the three Investor Owned Utility (IOUs) planning areas, including SDG&E. This provides a historical record used to determine the capacity in GHG inventory years and can also help determine trends in PV installation.

A comparison of the estimated capacity and electricity generation from PV systems in San Marcos and in the SDG&E planning area are given in Table 14.[26] The SDG&E planning area estimates are used for PV projections for the city, as described below.

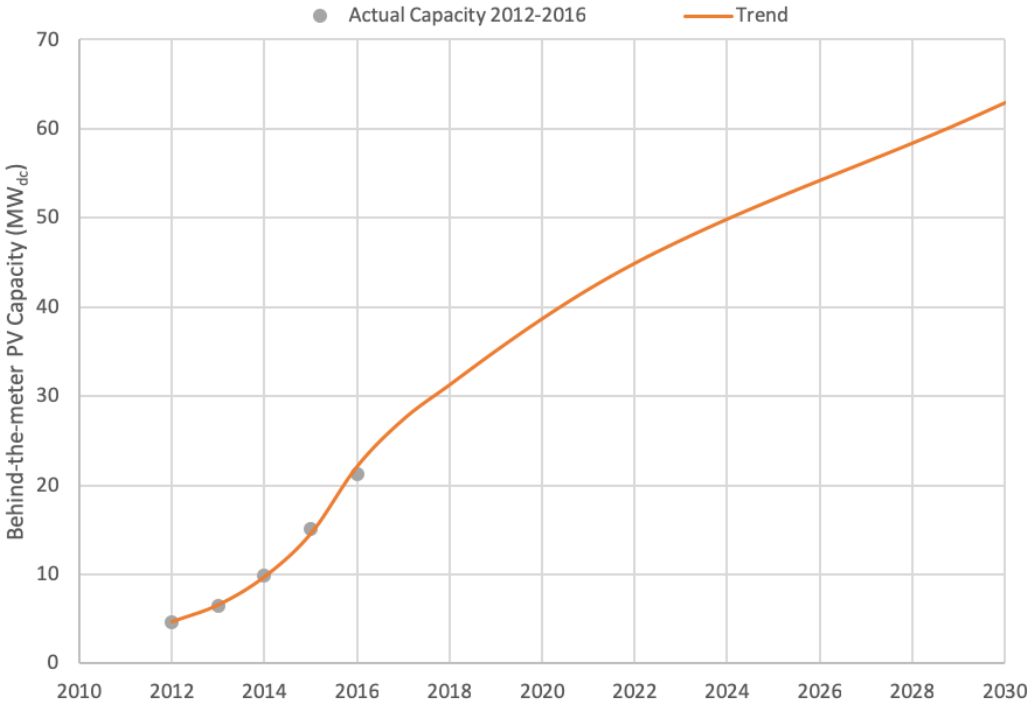
[24] Kavalec et al., 2018. California Energy Demand 2018 — 2030 Revised Forecast. CEC, Electricity Assessments Division. Publication Number: CEC-200-2018-002-CMF, accessed July 11, 2018. SDG&E planning area is larger than San Diego region. The 2018–2030 revised forecast was the most recent forecast at the development of San Marcos CAP measures. As of November 2019, CEC is in the process of developing 2019–2030 revised forecast with an anticipated adoption in January 2020.
[25] Kavalec et al., 2018. Mid Case Revised Demand Forecast (February 2018). CEC, Electricity Assessments Division. Publication Number: CEC-200-2018-002-CMF, accessed July 11, 2018.
[26] The capacity of all interconnected PV systems in San Marcos are from the California Distributed Generation Statistics NEM Currently Interconnected Data Set (current as of May 31, 2017), download date: September 12, 2017.

**Table 14 Behind-the-meter PV Capacity and Estimated Electricity Generation**

| Year | San Marcos* | | SDG&E Planning Area** | Historical Ratio of Electricity Generation from PV (San Marcos to SDG&E) |
|---|---|---|---|---|
| | PV Capacity (MW) | Estimated Electricity Generation (GWh) | Estimated Electricity Generation (GWh) | |
| 2012 | 4.7 | 8.2 | 238 | 3.5% |
| 2013 | 6.4 | 11.3 | 335 | 3.4% |
| 2014 | 9.9 | 17.4 | 496 | 3.5% |
| 2015 | 15.0 | 26.4 | 744 | 3.5% |
| 2016 | 21.2 | 37.1 | 1,129 | 3.3% |
| | | | Average | 3.4% |

*Estimated electricity generation based on PV capacity and 20% capacity factor.
**California Energy Demand 2018–2030 Revised Forecast mid-demand case (February 2018 version).
California Distributed Generation Statistics 2017, CEC 2018, Energy Policy Initiatives Center 2019.

For future years, the electricity generation and capacity of behind-the-meter PV systems in the City are estimated based on the PV generation in CEC's mid-demand forecast for SDG&E's planning area, and the average ratio of PV generation in the City to that of SDG&E's planning area from 2012–2016 (3.4%). Because of California's solar programs and policies, the estimated PV capacity in 2030 in San Marcos is projected to be 63 megawatts (MW), with 110 gigawatt hours (GWh) electricity generation. The trend of behind-the-meter PV in the City is shown in Figure 4.




Source of historical capacity: California Distributed Generation Statistics, 2017.
Source of capacity trend: California Energy Demand 2018-2030 Revised Forecast in San Diego planning area, mid-demand scenario (Feburary 2018 version).
The forecast does not include the additional PV installation due to 2019 Title 24 PV mandates or local CAP measures.
Energy Policy Initiatives Center 2018.

**Figure 4 Behind-the-meter PV Historical and Projected Trend in San Marcos (2012–2030)**

### 5.2.2 2019 Building Energy Efficiency Standards PV Mandates

The new California 2019 Building Energy Efficiency Standards, which go into effect on January 1, 2020, require all single-family homes, low-rise multi-family homes, and detached accessory dwelling units (ADUs) to have PV systems installed, unless the building receives an exception.[27]

The San Diego Association of Governments (SANDAG) Series 13 Forecast assumes that approximately 340 new single-family homes and 2,800 new multi-family homes will be added in San Marcos from 2020 to 2030.[28] In this document, it is assumed that all new single-family and low-rise multi-family homes are subject to the mandate.[29] For the PV system size requirement of each housing unit type, the minimum qualified size required by the 2019 Building Energy Efficiency Standards is calculated based on its average size, as shown in Table 15.[30]

[27] CEC: 2019 Building Energy Efficiency Standards – 2019 Residential Compliance Manual (December 2018). For the requirements on newly constructed single-family and low-rise multi-family homes, see Section 7.2 Prescriptive Requirements for Photovoltaic System. For the requirements on newly constructed and detached ADU, see Section 9.3.5 Accessory Dwelling Units (ADUs).
[28] SANDAG Series 13 Regional Growth Forecast (October 2013). SANDAG Data Surfer, accessed on November 2, 2017.
[29] Based on San Marcos multi-family zoning code, the height limits for multi-family developments are 45 feet or 3 stories, within the low-rise limit.
[30] The average size of single-family homes and the average unit size of apartments are based on City of San Marcos 2013–2021 Housing Element (June 2013). Table 8-34.

Table 15 Estimated PV Requirement for New Homes after 2020 in San Marcos

| Housing Unit Type | Average Size of Unit (sq. ft.)* | Minimum PV Required for the Unit Size ($kW_{dc}$)** |
|---|---|---|
| Single-family | 2,249 | 2.8 |
| Multi-family | 1,000 | 2.0 |

* Based on the sizes of prototype homes in San Marcos Housing Element.
** Calculated based on unit size (sq. ft.) and 2019 Building Energy Efficiency Standards Residential Compliance Manual Equation 7-1 and Table 7-1. San Marcos is in Climate Zone 10.
Energy Policy Initiatives Center 2019.

It is assumed that 20% of the new homes would be exempt for other reasons and consistent with the assumptions in the CEC's mid-case scenario for additional achievable PV forecast.[31] The Energy Demand 2018–2030 Revised Forecast already assumes that a certain percentage of new single-family homes will install PV systems regardless of the mandates; therefore, the result of the PV mandates is assumed to be the additional installation beyond the baseline assumption for single-family PV installation. The numbers of new homes with PV systems as a result of the PV mandate, as well as the estimated minimum system capacity, are given in Table 16. The numbers of new homes with PV systems and capacity are those added between 2020 and 2030.

Table 16 New Homes with PV Systems after 2020 in San Marcos

| Year | New Single-family Homes (SFHs) after 2020 with PV Systems due to State Mandates | | New Multi-family Homes (MFHs) after 2020 with PV Systems due to State Mandates | | All New Homes after 2020 with PV Systems due to State Mandates | |
|---|---|---|---|---|---|---|
| | Number of Additional Homes with PV Systems | Total PV System Capacity in SFHs (MW) | Number of Additional Homes with PV Systems | Total PV System Capacity in MFHs (MW) | PV System Capacity (MW) | Estimated Electricity Generation (MWh) |
| 2030 | 262 | 0.7 | 2,527 | 5.1 | 5.8 | 10,137 |

PV system capacity is the additional capacity in 2030 from all systems added to new homes after 2020 as a result of PV mandates. The capacity does not include existing PV, PV installation at new single-family homes already shown in the projection in Figure 4, or PV added on other new non-residential projects.
Energy Policy Initiatives Center 2019.

### 5.2.3 All Solar Policies, Programs and Mandates

The California Energy Demand 2018–2030 Revised Forecast, discussed in Section 5.2.1, does not include the additional impact of the 2019 PV mandates; therefore, the PV installation trend shown in Figure 4 does not include the additional 5.8 MW PV capacity from new homes after 2020.[32] The total estimated PV capacity in San Marcos resulting from California solar policies, programs, and the CAP PV mandates is projected to be 69 MW (the sum of 63 MW and 5.8 MW).

[31] This approach is consistent with the CEC's additional achievable PV forecast mid-case scenario for single-family homes. CEC's forecasts do not model the impact of PV mandates on low-rise multi-family homes. Personal communication with CEC staff, December 14, 2018.
[32] The 2018–2030 Revised Forecast assumes a percentage of new single-family homes will install PV systems without the mandates. The 2020–2030 percentages vary by year. However, it does not model the impact of PV mandates on low-rise multi-family homes. Personal communication with CEC staff, December 14, 2018.

CAP *Measure E-2: Require Installation of PV Systems at New Non-Residential Developments* is similar to the residential PV mandates but would not be captured in the Energy Demand Forecast, resulting in additional PV capacity. The estimated PV capacity as a result of Measure E-2 is 2.1 MW, discussed in detail in Section 6.5.1, which brings the projected total PV capacity in the City to be 71 MW in 2030.

The emissions reductions from all State and CAP measures that increase behind-the-meter renewable supply is 26,012 MT $CO_2e$ as shown in Table 7 (Allocation of Emissions Reductions to Supplies that Increase Renewable (or Zero-Carbon) Supply in San Marcos). The total reduction is attributed based on estimated capacity (MW) that would result from each action, as shown in Table 17. GHG emissions reductions are the projected reduction amounts in the year 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

**Table 17 Key Assumptions and Results for California Solar Policies, Programs and Mandates**

| Year | State or City Action | Total | Measure E-2: Require Installation of PV Systems at New Non-Residential Developments | California Solar Polices, Programs, and Mandates* |
|---|---|---|---|---|
| 2030 | Projected Behind-the-meter PV Capacity (MW) | 71 | 2.1 | 69 |
| | Projected Emissions Reduction (MT $CO_2e$) | 26,012 | 773 | **25,239** |
| *Solar policies, programs and mandates include the impact of the PV mandates from the 2019 Building Energy Efficiency Standard.<br>The capacity and emissions reductions are projections under the CAP, based on CAP assumptions, current status, and future impact of State policies and programs. Sum may not add up to totals due to rounding.<br>Energy Policy Initiatives Center 2020. | | | | |

In 2030, 97% (69 MW out of 71 MW) of the projected citywide PV capacity will be due to State polices, programs, and mandates; therefore, 97% of the total emissions reduction from increasing behind-the-meter PV (26,012 MT $CO_2e$) is attributed to this State action (25,239 MT $CO_2e$).

## 5.3 California Energy Efficiency Program

In September 2017, the California Public Utilities Commission (CPUC) adopted energy efficiency goals for ratepayer-funded energy efficiency programs, that went into effect in 2018 (Decision 17-09-025). The adopted energy saving goals for SDG&E's service territory are given in the Decision on an annual basis from 2018 to 2030.[33] The sources of the energy savings include, but are not limited to, rebated technologies, building retrofits, behavior-based initiatives, and codes and standards.[34]

To evaluate the impact of the energy efficiency program on San Marcos, the total energy savings in SDG&E's service territory by 2030 are allocated to the city using a ratio of the city's natural gas and electricity demand to those of SDG&E's service territory. In recent years, the ratios on average were

[33] CPUC: Decision 17-09-025, Adopting Energy Efficiency Goals for 2018–2030, accessed December 12, 2018. SDG&E's electricity service territory is larger than San Diego region.
[34] Navigant Consulting: Energy Efficiency Potential and Goals Study for 2018 and Beyond (August 2017), accessed December 12, 2018. Rebated technologies are the energy efficiency technologies from the utility's historic incentive programs, including equipment and retrofits.

2.2% for electricity and 2.8% for natural gas.[35] SDG&E's service territory electricity and natural gas savings were allocated accordingly to San Marcos, as shown in Table 18.[36]

**Table 18 Estimated Energy Savings from California Energy Efficiency Program**

| Year | Electricity Savings (GWh) | | Natural Gas Savings (Million Therms) | |
|---|---|---|---|---|
| | SDG&E Service Territory | Allocation of Savings to San Marcos | SDG&E Service Territory | Allocation of Savings to San Marcos |
| 2030 | 3,328 | 72 | 60 | 1.8 |
| SDG&E service territory savings are the cumulative savings after 2018 based on the 2018–2030 annual saving goals in CPUC Decision 17-09-025.<br>Energy Policy Initiatives Center 2020. | | | | |

Emissions reductions from electricity savings are calculated by multiplying the electricity savings by the citywide GHG emission factor for electricity, discussed in Section 4.2.1 (GHG Emission Factor for Electricity) and shown in Table 5 (2016 and Projected 2030 GHG Emission Factor for Electricity in San Marcos). As the renewable and zero-carbon content in electricity increases, the emissions reduction from the electricity portion of the energy efficiency program decreases. Emissions reductions from natural gas savings were calculated using the natural gas savings amount and natural gas emission factor. Table 19 summarizes the energy savings and GHG emissions reductions in year 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

**Table 19 Estimated Emission Reductions from California Energy Efficiency Programs**

| Year | Electricity Savings | | | Natural Gas Savings | | | Total Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|---|---|
| | Electricity Savings (GWh) | Emission Factor (lbs $CO_2e$/MWh) | GHG Reduction from Electricity Savings (MT $CO_2e$) | Natural Gas Savings (Million therms) | Emission Factor (MT $CO_2e$/therm) | GHG Reduction from Natural Gas Savings (MT $CO_2e$) | |
| 2030 | 72 | 44 | 1,455 | 1.8 | 0.0054 | 9,006 | 10,461 |
| The emissions reductions are projected based on CAP assumptions and future impact of State policies and programs.<br>Energy Policy Initiatives Center 2020. | | | | | | | |

## 5.4 Federal and California Vehicle Efficiency Standards

As discussed in Section 4.4 (Common Assumptions and Methods for Calculating On-Road Transportation Emissions Reductions), CARB's EMFAC2014 model includes all key federal and State regulations related to tailpipe GHG emissions reductions for both light-duty and heavy-duty vehicles that were in place before the model release date in 2015.

[35] SDG&E's service territory demand is from California Energy Demand 2018–2030 Revised Forecast, SDG&E's planning area load 2014–2016. 2016 is the latest year with historical data in the demand forecast. Electricity and natural gas demand in San Marcos were provided to EPIC by SDG&E for the GHG inventory. *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventory and Projection* (EPIC, 2018).

[36] CPUC: Decision 17-09-025, Adopting Energy Efficiency Goals for 2018–2030, accessed December 12, 2018. The 2018 and beyond goals are given on an annual basis for each year from 2018 to 2030, different from previous studies, in which the cumulative goals are given. The cumulative savings in 2030 from 2018 are the sum of the annual savings.

Table 20 shows a comparison of the average vehicle emission rate and emissions from on-road transportation under the BAU projection, as well as with the impact of policies that increase vehicle efficiency and ZEVs. As discussed in Section 4.4.2 (GHG Emissions Reduction from Increasing Zero Emission Vehicles), to avoid double-counting, the maximum emissions reductions related to all measures in the CAP that facilitating e-VMT are set at the amount expected from statewide programs and policies.

In order to attribute these reductions to San Marcos measures, the effect of *Measure T-2: Require Electric Vehicle Charging Stations in New Developments* and *Measure T-3: Install Electric Vehicle Charging Stations at Public Facilities* are subtracted from the maximum emissions reductions from State policies. Table 20 summarizes the key assumptions and results. The GHG emissions reduction is the projected reduction amount in the year 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

**Table 20 Key Assumptions and Results for Federal and California Vehicle Efficiency Standards**

| Year | Projected VMT (annual million miles) | BAU Projection - With No Policy Impact after 2016 | | With Impact of Adopted Statewide Policies | | Emissions Reduction ($MT CO_2e$) | | |
|---|---|---|---|---|---|---|---|---|
| | | Average Vehicle Emission Rate ($g CO_2e$/mile) | Emissions from On-Road Transportation ($MT CO_2e$) | Average Vehicle Emission Rate ($g CO_2e$/mile) | Emissions from On-Road Transportation ($MT CO_2e$) | With Impact of Adopted Statewide Policies | From CAP Measure T-2 and T-3 | Remaining State Reduction |
| 2030 | 838 | 379 | 317,379 | 297 | 248,520 | 68,858 | 3,252 | 65,606 |

Measure T-2: Require Electric Vehicle Charging Stations in New Development and Measure T-3: Install Electric Vehicle Charging Stations at Public Facilities
The 2030 VMT projections are based on SANDAG's Series 13 Growth Forecast. The emission rates and emissions reductions are projected based on CAP assumptions and future impact of State policies and programs used in the CARB EMFAC2014 model.
Energy Policy Initiatives Center 2019.

# 6 CAP STRATEGIES AND MEASURES

The following section describes the methods used to estimate the GHG reductions from CAP measures, which are organized into the following eight strategies:[37]

- Strategy 1: Increase Use of Zero-Emission or Alternative Fuel Vehicles (T)
- Strategy 2: Reduce Fossil Fuel Use (T)
- Strategy 3: Reduce Vehicle Miles Traveled (T)
- Strategy 4: Increase Building Energy Efficiency (E)
- Strategy 5: Increase Renewable and Zero-Carbon Energy (E)
- Strategy 6: Reduce Water Use (W)
- Strategy 7: Reduce and Recycle Solid Waste (S)
- Strategy 8: Increase Urban Tree Cover (C)

[37] Transportation (T), Energy (E), Water (W), Waste (S), and Carbon Sequestration (C).

## 6.1 Strategy 1: Increase Use of Zero-Emission or Alternative Fuel Vehicles (T)

The goal of this strategy is to reduce on-road transportation fossil fuel use by increasing the use of zero-emission or alternative fuel vehicles citywide through the following measures.

### 6.1.1 Measure T-1: Transition to a More Fuel-Efficient Municipal Fleet

At the time of City vehicle replacement, the City will convert purchased or leased passenger vehicles to EVs or other types of ZEVs.

According to City staff, the bulk of the City's leased vehicles are specialty utility vehicles which cannot yet be converted to BEVs or PHEVs. However, there are currently 16 passenger vehicles, including five hybrid vehicles, that could be covered to BEVs. The potential gasoline fuel savings are approximately 4,000 gallons a year from this vehicle conversion. The conversion would also require EVCS installations at three separate City sites where the vehicles are located.[38] The GHG emissions reduction in 2030 from this conversion is shown in Table 21.[39]

**Table 21 Key Assumptions and Results for Measure T-1: Transition to a More Fuel-Efficient Municipal Fleet**

| Year | Gasoline Reduction (gallons) | Gasoline Carbon Content* (lbs $CO_2$/gallon) | GHG Emission Reduction (MT $CO_2e$) |
|---|---|---|---|
| 2030 | 4,000 | 17.8 | 32 |
| *California gasoline blend is 10% ethanol.<br>The gasoline reduction and emissions reduction are the projected based on CAP assumptions.<br>Energy Policy Initiatives Center 2019. | | | |

### 6.1.2 Measure T-2: Require Electric Vehicle Charging Stations in New Development

To facilitate the increasing demand of EV infrastructure, the City will develop and implement an ordinance requiring new multi-family and commercial developments to install EVCSs at 5% of total parking spaces. The estimated effective year of the ordinance is 2021.

Based on recent development permitting data, an average of 130,000 square feet (sq. ft.) of new commercial developments that would have been subject to the requirement was added per year. Assuming this trend continues, approximately 130,000 sq. ft. of new commercial development per year will be subject to the requirement after 2021.[40] The San Marcos Zoning Ordinance off-street parking requirements have approximately one parking space required per 250 sq. ft. of gross floor area; therefore, 520 parking spaces will be added every year at these new commercial developments.[41]

[38] The number of vehicles and fuel savings were provided by City to EPIC (October 2018).
[39] The gasoline carbon content based on estimates from U.S. Energy Information Administration. Frequently Asked Questions, accessed on October 24, 2018.
[40] The average annual new commercial development sq. ft. is calculated based on the average of new sq. ft. added annually from 2016 to 2018 (50,000 sq. ft. in 2016, 85,000 sq. ft. in 2017, and 250,000 sq. ft. in 2018) based on the approved project details and project site plans provided by City (November 2018). The sq. ft. is new gross floor area added each year and does not specific plans, transit station plans nor the sq. ft. added for self-storage projects that are unlikely to be subject to the requirement.
[41] San Marcos Zoning Ordinance: Off-street Parking Requirement (Section 20.340.040), adopted November 13, 2012, accessed March 27, 2018. The minimum parking requirements are different for retail, offices, restaurants and hotels, the average is used here.

For the EVCSs, it is assumed that Level 2 or better chargers will be installed and the chargers will be available for use daily with approximately five hours of charging a day per charger.[42] The EV miles resulting from the EVCSs are estimated based on a Level 2 charging capacity, EV drive efficiency, and hours in use, as shown in Table 22.[43] On average, it is assumed that 70,628 EV miles per year are from charging at a commercial EVCS.

**Table 22 Electric Vehicle Charging Efficiency by Level 2 Charger Type**

| Type of Charging (Level 2) | Capacity (kW)* | Hours in Use per Day | EV load (kWh/day) | Vehicle Drive Efficiency (kWh/mile) ** | EV miles per Day of Charge | EV miles per Year per Commercial EVCS |
|---|---|---|---|---|---|---|
| Low | 3.3 | 5 | 20 | 0.25 | 79 | 16,830 |
| Medium | 6.6 | 5 | 40 | 0.25 | 158 | 33,660 |
| High | 9.6 | 5 | 58 | 0.25 | 230 | 48,960 |
| Highest | 19.2 | 5 | 115 | 0.25 | 461 | 97,920 |
| | | | | | Average | 70,628 |

*Based on Electric Vehicle Charging Station Installation Best Practice, Center for Sustainable Energy, 2016.
**Based on CEC Plug-in Electric Vehicle Infrastructure Projections: 2017–2025 vehicle driven efficiency assumptions.
Assume chargers are used daily (365 days per year).
Energy Policy Initiatives Center 2019.

The estimated number of new EVCSs and EV miles due to Measure T-2 are shown in Table 23.

**Table 23 Assumptions for Commercial New Electric Vehicle Charging Stations under Measure T-2: Require Electric Vehicle Charging Stations in New Development**

| Year | New Annual Commercial Development Space Added after 2021* (sq. ft. per year) | Total Number of New Parking Spaces at Commercial Developments after 2021 | % of Parking Spaces with EVCSs | Number of NEW EVCSs after 2021 | Annual EV Miles Charged at the EVCSs (miles per year) | Annual San Marcos EV Miles due to the EVCS** (miles per year) |
|---|---|---|---|---|---|---|
| 2030 | 130,000 | 5,200 | 5% | 234 | 16,526,835 | 8,924,491 |

* New gross floor area. Based on recent years' new development permitting data.
** The difference between the "Annual EV Miles Charged at the EVCSs" and the "Annual San Marcos EV Miles" is due to the allocation of miles to jurisdictions in the methodology. Not all the charging will result in miles driven only in San Marcos. 54% of all EV miles are allocated to San Marcos based on Origin-Destination VMT allocation methods, assuming trips driven by EVs will have at least one trip-end within San Marcos. The number of parking spaces is based on San Marcos off-street parking requirements and assumes 10% of new commercial development would qualify for exemption of the requirement. The miles are projected based on current status and CAP assumptions.
Energy Policy Initiatives Center 2019.

[42] Idaho National Laboratory: Plugged In: How Americans Charge Their Electric Vehicles. Based on the study, public Level 2 charging stations at parking lots and garages serving multiple venues have the potential to support 7 to 11 chargers per day. The estimated number of charging hours is based on this potential and the minimum vehicle dwell time of 30 minutes.

[43] The Level 2 charger capacity range comes from the Center for Sustainable Energy: Electric Vehicle Charging Station Installation Best Practice (June 2016). The vehicle drive efficiency assumption is based on Bedir et al., 2018. California Plug-In Electric Vehicle Infrastructure Projections: 2017–2025. CEC. Publication Number: CEC-600-2018-001.

For multi-family development in the city, SANDAG Series 13 projects that 2,800 new multi-family units will be added from 2021 to 2030.[44] The San Marcos Zoning Ordinance off-street parking requirements have approximately 1.75 parking spaces for each multi-family unit.[45] At new multi-family developments, the EVCSs will be used to charge the residents' personal EVs. Based on the EMFAC2014 model, approximately 35 miles per day are driven by EVs in the San Diego region.[46] The estimated number of new EVCSs and EV miles are shown in Table 24.

**Table 24 Assumptions for Multi-family New Electric Vehicle Charging Stations under Measure T-2: Require Electric Vehicle Charging Stations in New Development**

| Year | Number of New Multi-Family Units after 2021* | Number of New Parking Spaces at Multi-Family Developments after 2021 | % of Parking Spaces with EVCS | Number of New EVCSs after 2021 | Annual EV Miles Charged at the EVCSs (miles per year) | Annual San Marcos EV Miles due to the EVCS** (miles per year) |
|---|---|---|---|---|---|---|
| 2030 | 2,797 | 4,895 | 5% | 220 | 2,813,869 | 1,519,489 |

*Based on SANDAG Series 13 Regional Growth Forecast.
** The difference between the "Annual EV Miles Charged at the EVCSs" and the "Annual San Marcos EV Miles" is due to the allocation of miles to jurisdictions in the methodology. Not all the charging will result in a miles driven only in San Marcos. 54% of all EV miles are allocated to San Marcos based on Origin-Destination VMT allocation methods, assuming trips driven by EVs will have at least one trip-end within San Marcos.
The number of parking spaces is based on San Marcos off-street parking requirements and assumes 10% of new multi-family development would qualify for exemption of the requirement. The miles are projected based on current status and CAP assumptions.
Energy Policy Initiatives Center 2019.

The GHG emissions reduction from this measure is estimated based on the ratio of projected EV miles due to this measure to the total EV miles from EMFAC2014 model estimates, as discussed in Section 4.4.2 (GHG Emissions Reduction from Increasing Zero Emission Vehicles) and shown in Table 11 (Allocation of GHG Emissions Reduction from Increasing Zero Emission Vehicles). The total number of parking spaces with EVCSs, projected EV miles, and GHG emissions reductions are shown in Table 25. Commercial EVCSs provide greater EV miles due to more frequent use compared with multi-family homes. The GHG emissions reduction is the projected reduction amount in 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

[44] SANDAG Series 13 Regional Growth Forecast (October 2013). SANDAG Data Surfer, accessed November 2, 2017. The annual new multi-family units added are estimated using linear interpolation between 2020 and 2030.
[45] San Marcos Zoning Ordinance: Off-street Parking Requirement (Section 20.340.040), adopted November 13, 2012, accessed March 27, 2018. The minimum parking requirements are different for studio, 1-bedroom, 2-bedroom and 3+ bedroom, the average is used here.
[46] CARB: Mobile Source Emissions Inventory. EMFAC2014 San Diego County 2020–2030 estimates.

Table 25 Key Assumptions and Results for Measure T-2: Require Electric Vehicle Charging Stations in New Development

| New Development Type | Projected Number of EVCSs in 2030 | Annual San Marcos EV Miles due to the EVCSs in 2030 (miles per year) | 2030 Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|
| Multi-Family | 220 | 1,519,489 | 363 |
| Commercial | 234 | 8,924,491 | 2,130 |
| | | Total | 2,493 |
| The emissions reduction is projected based on CAP assumptions, current status, and future impact of State policies and programs used in the CARB EMFAC2014 model. Energy Policy Initiatives Center 2019. | | | |

### 6.1.3 Measure T-3: Install Electric Vehicle Charging Stations at Public Facilities

The City plans to add 45 publicly available EVCSs at City-owned public spaces for City staff or contractors to charge their vehicles, or for charging vehicles for business use within the city.

For the EVCSs, it is assumed that high capacity Level 2 or better chargers will be installed and the charging profile will be similar to the one described in Table 22. GHG emissions reduction is estimated based on the ratio of projected EV miles due to the measure to the total EV miles from EMFAC2014 model estimates, as discussed in Section 4.4.2 (GHG Emissions Reduction from Increasing Zero Emission Vehicles) and shown in Table 11 (Allocation of GHG Emissions Reduction from Increasing Zero Emission Vehicles). It is assumed that all EV miles driven by City employees and contractors are within the City. The number of EVCSs, projected EV miles, and GHG emissions reduction in 2030 are shown in Table 26.

Table 26 Key Assumptions and Results for Measure T-3: Install Electric Vehicle Charging Stations at Public Facilities

| Year | Number of Public EVCSs | EV Miles Charged at Public EVCSs | Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|
| 2030 | 45 | 3,178,238 | 759 |
| The emissions reduction is projected based on CAP assumptions and future impact of State policies and programs used in the CARB EMFAC2014 model. Energy Policy Initiatives Center 2019. | | | |

### 6.1.4 Measure T-4: Provide Grants for Residents and Businesses to Install Electric Vehicle Charging Stations

The City will develop and implement an EV charging station program that will provide a total of $240,000 per year for residents and businesses to offset costs related to EVCSs installation. The estimated effective year of the grant program is 2021.

San Marcos residents who purchase new PHEVs in that year will be eligible for the grant. For example, a resident who purchases a new 2021 PHEV will be eligible to apply for the grant in 2021. Because PHEVs have an option to operate in gasoline and electric mode, the goal of this measure is to maximize the electric-range of the PHEV and is not intended to capture BEVs. Due to the funding availability, a maximum of $900 is set per resident application, which covers approximately the cost of a Level 1 EVCS,

cost of installation and permit, and other software service fee.[47] The installation of EVCS at newly constructed homes is not eligible for the grant.

For San Marcos business owners, a similar grant opportunity will be available if the business owner does not receive other types of EVCS installation incentives from other State, regional, or local agencies.[48] Currently, the average all-electric range of the PHEV fleet in California is approximately 33 e-VMT per day per vehicle, while the actual electric usage is only 20 e-VMT per day per vehicle.[49] This measure aims to increase workplace or other types of commercial EVCSs, in order to help PHEV drivers to fully utilize the all-electric range of their PHEVs. A maximum of $1,800 is set per application, which covers approximately the cost of a Level 2 EVCS, cost of installation and permit, and other software service fee.[50]

Assuming half of the granted applications are from residents and half are from business owners, if the funding is fully utilized, the City would fund 90 residential EVCSs and 90 commercial EVCSs a year starting in 2021. For the residential EVCSs, it is assumed the EVCSs will be used to charge the residents' personal PHEV, at approximately 35 miles per day similar to other EVs in the San Diego region.[51] The estimated number of EVCSs funded and electric miles are shown in Table 27.

**Table 27 Assumptions for Residential Electric Vehicle Charging Stations under Measure T-4: Provide Grants for Residents and Businesses to Install Electric Vehicle Charging Stations**

| Year | Number of EVCSs Funded per year | Total EVCSs Funded after 2021 | Daily Electric Miles Charged per EVCS | Annual Electric Miles Charged at all EVCSs |
|---|---|---|---|---|
| 2030 | 90 | 900 | 35 | 11,497,500 |
| Assume all miles are within San Marcos. The projections are based on the current status and CAP assumptions.<br>Energy Policy Initiatives Center 2020. | | | | |

For commercial EVCSs, it is assumed the EVCS will help the PHEV to "top off" its battery during work hours or business hours, and on average one EVCS will support seven PHEVs per day, therefore, the average daily electric miles charged per EVCS is 91 miles per day.[52] The estimated number of EVCSs funded and electric miles are shown in Table 28.

[47] Cost of Level 1 EVCS is $200–$500 based on current market price. Cost of installation and other soft cost are based on Costs Associated with Non-Residential Electric Vehicle Supply Equipment (November 2015), accessed June 15, 2019.
[48] The impact of EV infrastructure incentives from the State are captured under the State program.
[49] CARB: Final Draft Sustainable Communities Strategy Program and Evaluation Guidelines Appendices (March 2019), accessed June 15, 2019. The method to quantify GHG reduction from electric vehicle charging infrastructure program is in Appendix E: Quantifying Greenhouse Gas Emission Reductions from Off-Model Strategies.
[50] Cost of Level 2 EVCS is $500-800 based on current market price. Cost of installation and other soft cost are based on Costs Associated with Non-Residential Electric Vehicle Supply Equipment (November 2015), accessed June 15, 2019.
[51] CARB: Mobile Source Emissions Inventory. EMFAC2014 San Diego County 2020–2030 estimates.
[52] Additional 13 miles per vehicle and 7 vehicles per charger. CARB: Final Draft Sustainable Communities Strategy Program and Evaluation Guidelines Appendices (March 2019), accessed June 15, 2019. The method to quantify GHG reduction from electric vehicle charging infrastructure program is in Appendix E: Quantifying Greenhouse Gas Emission Reductions from Off-Model Strategies.

**Table 28 Assumptions for Commercial Electric Vehicle Charging Stations under Measure T-4: Provide Grants for Residents and Businesses to Install Electric Vehicle Charging Stations**

| Year | Number of EVCSs Funded per year | Total EVCSs Funded after 2021 | Daily Electric Miles Charged per EVCS | Annual Electric Miles Charged at all EVCSs |
|---|---|---|---|---|
| 2030 | 90 | 900 | 91 | 29,893,500 |
| Assume all miles are within San Marcos. The projections are based on the current status and CAP assumptions.<br>Energy Policy Initiatives Center 2020. | | | | |

The GHG emissions reduction from this measure is estimated based on the projected electric miles due to this measure and the emissions avoided from each PHEV mile transferred from gasoline to electric options. The total number EVCSs, projected EV miles, and GHG emissions reductions are shown in Table 29.[53] The GHG emissions reduction is the projected reduction amount in 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

**Table 29 Key Assumptions and Results for Measure T-4: Provide Grants for Residents and Businesses to Install Electric Vehicle Charging Stations**

| EVCS Grant Application Type | Emissions Avoided from Gasoline to Electric mile* (g $CO_2e$/ mile) | Projected Number of EVCSs in 2030 | Annual San Marcos EV Miles due to the EVCSs Grant | 2030 Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|
| Residential | 200 | 740 | 11,497,500 | 2,301 |
| Commercial | | 740 | 29,893,500 | 5,982 |
| | | | Total | 8,282 |
| *EMFAC2014 assumption for model 2030 light-duty gasoline vehicle emission rate<br>The emissions reduction is projected based on CAP assumptions and future impact of State policies and programs used in the CARB EMFAC2014 model.<br>Energy Policy Initiatives Center 2020. | | | | |

## 6.2 Strategy 2: Reduce Fossil Fuel Use (T)

The goal of this strategy is to reduce the on-road transportation fossil fuel use by improving traffic flow. The strategy includes the following two measures.

### 6.2.1 Measure T-5: Synchronize Traffic Signals

The City has ongoing efforts to synchronize traffic lights; all main corridors in the City are under review. The City is also in the process of upgrading all traffic signal controllers to smart controllers that are capable of running adaptive traffic single control and communicating with vehicles and other infrastructure.

Recently, the City fine-tuned 13 signals out of 51 intersections that are coordinated. There are an additional 18 traffic signals that may be coordinated based on motorists' complaints and visuals.[54]

[53] CARB: Mobile Source Emissions Inventory. EMFAC2014. For a model year 2030 light-duty vehicle, the emission rate is 200 g $CO_2e$/mile.

[54] Information on signal synchronization provided by City (November 2018). The roundabouts at University District were constructed in 2019, the other ones were completed before October 2018.

Assuming half of the additional signals will be fine-tuned, the City aims to complete an additional 9 signal synchronizations by 2030.

The effect of traffic signal synchronization on fuel reduction depends on the traffic volume, number of intersections, and size of the intersections on the arterials. Based on the study of a project with similar size, the annual fuel savings per intersection is around 2,400 gallons.[55] However, as the vehicles become more efficient and the number of ZEVs increases, there would be less fuel savings per intersection in 2030. Assuming the 2,400 gallons of annual fuel savings per intersection could be realized in the 2012 CAP baseline year, the increase in vehicle fuel efficiency would reduce the fuel savings to approximately 1,400 gallons in 2030.[56] The GHG emissions reduction in 2030 from the traffic signal synchronization is shown in Table 30.[57]

**Table 30 Key Assumptions and Results for Measure T-5: Synchronize Traffic Signals**

| Year | Number of Intersections with Traffic Signal Synchronization* | Increase in Vehicle Fuel Efficiency Comparing with Baseline Year 2012 | Equivalent Fuel Saving per Intersection (gallon per year) | Fuel Saving from All Intersections (gallon/year) | GHG Emission for Fuel** (lbs $CO_2e$/gallon) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| 2030 | 22 | 41% | 1,425 | 31,352 | 18.5 | 263 |
| *13 of the 22 intersections are already fine-tuned **Emissions per gallon of fuel use for an average vehicle in San Marcos, regardless of fuel type, vehicle type, or fuel economy<br>Increase in vehicle fuel efficiency in 2030 compared with 2012 is based on the decrease in the average vehicle emission rate in San Marcos. The 2012 annual fuel saving per intersection is assumed to be about 2,400 gallons.<br>The emissions reduction is projected under the CAP, including future impact of State policies and programs used in CARB EMFAC2014 model and CAP assumptions.<br>Energy Policy Initiatives Center 2020. | | | | | | |

### 6.2.2 Measure T-6: Install Roundabouts

Since 2012, the City has installed two roundabouts on Rock Spring Road, three roundabouts at the Rancho Tesoro development, and two roundabouts at the University District.[58]

The effect of roundabouts on fuel reduction depends on the traffic volume and size of the intersections on the arterials. Based on the study of small roundabouts with similar sizes, the annual fuel savings per roundabout is around 19,000 gallons.[59] Similar to estimating the impact of traffic signal synchronization, as vehicles get more efficient and the number of ZEVs increases, the fuel savings per intersection in 2030 would be fewer than those in previous years. Assuming the gallons of annual fuel savings per

[55] Sunkari: The Benefits of Retiming Traffic Signals (2004). The Jacksonville traffic signal retiming project at a 25-intersection section resulted in estimated annual fuel savings of 65,000 gallons.
[56] The San Marcos specific average vehicle emission rate in 2030, 287 g $CO_2e$/mile, is 41% less than that in 2012, 483 g $CO_2e$/mile, as discussed in Section 4.4.
[57] Emissions per gallon of fuel use for an average vehicle in San Marcos, calculated based on 2030 $CO_2$ emissions from on-road transportation and total vehicle fuel use.
[58] Information on completed and planned roundabouts projects provided by City to EPIC (November 2018).
[59] Varhelyi: The Effects of Small Roundabouts on Emission and Fuel Consumption: A Case Study (2002). The study estimated the traffic volume of the intersection and the fuel consumption before and after the roundabout. The traffic volume is 23,500 vehicles per day and the fuel savings are approximately 144 kg per day after the roundabout installation.

roundabout could be realized in the 2012 CAP baseline year, the increase in vehicle fuel efficiency would reduce the fuel savings to approximately 12,000 gallons in 2030.[60]

The associated fuel and GHG emissions reduction in 2030 from the roundabouts is shown in Table 31.[61]

**Table 31 Key Assumptions and Results for Measure T-6: Install Roundabouts**

| Year | Number of New Roundabouts Since 2012* | Increase in Vehicle Fuel Efficiency Baseline Year 2012 | Equivalent Fuel Saving per Intersection (gallon per year) | Fuel Saving for All Intersections (gallon/year) | GHG Emission for Fuel** (lbs $CO_2e$/gallon) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| 2030 | 7 | 41% | 11,677 | 81,740 | 18.5 | 687 |

*All roundabouts are completed as of December 2019 **Emissions per gallon of fuel use for an average vehicle in San Marcos, regardless of fuel type, vehicle type, or fuel economy
Increase in vehicle fuel efficiency in 2030 compared with 2012 is based on the decrease of the average vehicle emission rate in San Marcos. It is assumed that the annual fuel savings per intersection is about 19,000 gallons in 2012.
The emissions reduction is projected under the CAP, including future impact of State policies and programs used in CARB EMFAC2014 model, as well as CAP assumptions.
Energy Policy Initiatives Center 2020.

## 6.3 Strategy 3: Reduce Vehicle Miles Traveled (T)

The goal of this strategy is to reduce the labor force commute VMT citywide by increasing alternative modes of transportation and avoiding single-occupancy vehicles (SOVs), and to reduce household VMT by a reduced parking requirement. The strategy includes the following eight measures.

### 6.3.1 Measure T-7: Participate in the San Diego Association of Government iCommute Vanpool Program

The SANDAG iCommute Vanpool Program provides a convenient way for groups of five or more people to get to work in and around the San Diego region. The Vanpool Program provides a subsidy of up to $400 per month to offset the vehicle lease cost and vanpool participants share the remaining vehicle lease and gas cost. The vanpools in general have a longer than the regional average commute distance.[62] The number of vanpools that are in operation vary by year. On average, from 2016 to 2018, 12 SANDAG vanpools were in operation annually that started or ended within San Marcos.[63] Through this measure, the City would promote the SANDAG Vanpool Program at businesses in San Marcos to encourage their participation. The goal is to maintain 12 SANDAG vanpools that start or end in San Marcos every year through 2030.

[60] The San Marcos specific average vehicle emission rate in 2030, 289 g $CO_2e$/mile, is 40% less than that in 2012, 483 g $CO_2e$/mile, as discussed in Section 4.4.
[61] Emissions per gallon of fuel use for an average vehicle in San Marcos, calculated based on 2030 $CO_2$ emissions from on-road transportation and total vehicle fuel use.
[62] SANDAG: iCommute Vanpool.
[63] SANDAG Vanpool Program: active vanpools as of November 16, 2018. 2006 to 2018 vanpool data were provided by SANDAG to EPIC (November 2018). If the vanpool has an origin or a business city identified as San Marcos, they are accounted for here.

The vanpools in the program have different commute distances, vanpool frequencies, and number of vanpool participants. The estimated average commute distance, commute VMT avoided due to vanpools, and the GHG emissions reduction are shown in Table 32.[64]

**Table 32 Projected SANDAG Vanpools in San Marcos and GHG Emissions Reduction from Avoiding Single-Occupancy Vehicle Trips**

| Year | Number of SANDAG Vanpools | Average Number of Passengers in the Vanpool | Average Vanpool Distance (miles per roundtrip per workday) | Annual VMT Avoided due to Vanpool (miles per year) | Annual San Marcos VMT Avoided due to Vanpool (miles per year)* | Average Vehicle Emission Rate (g $CO_2e$/mile) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|---|---|
| 2030 | 12 | 6 | 77 | 1,413,403 | 763,238 | 287 | 219 |

Average number of passengers and commute distance of the SANDAG vanpools in recent years. 255 workdays per year.
*54% of all avoided miles are allocated to San Marcos based on Origin-Destination VMT allocation methods.
The projections are based on the current status and CAP assumptions.
Energy Policy Initiatives Center 2020.

A portion of the emissions avoided from reducing single-occupancy vehicle trips is offset by the emissions from operating the vanpool vehicles. As the vehicle fleet becomes more efficient, the fuel economy of potential vanpool vehicles also improves. Assuming the average fuel economy (miles per gallon, or "MPG") of the vanpool vehicle is 20 MPG in 2019, it will improve to 28 MPG in 2030 that reduces fuel use and associated GHG emissions from operating the vanpool vehicles.[65] GHG emissions from the vanpool vehicles are shown in Table 33.

**Table 33 GHG Emissions from Projected SANDAG Vanpools in San Marcos**

| Year | Number of SANDAG Vanpools | Average Fuel Economy of Vanpool Vehicle (miles per gallon) | Average Fuel Use of Vanpool Vehicle (gallons per year) | GHG Emissions from Vanpool Gasoline* (lbs $CO_2e$/gallon) | GHG Emissions from Vanpools (MT $CO_2e$) |
|---|---|---|---|---|---|
| 2030 | 12 | 28 | 728 | 17.8 | 70 |

*California gasoline blend has 10% ethanol.
Vehicle fuel economy in 2030 is based on the decrease in the average vehicle emission rate in San Diego region and 2019 vanpool vehicle fuel economy. Annual fuel use is calculated based on commute distance of the SANDAG vanpools in recent years (77 mile per roundtrip per day) and 255 workdays per year.
The projections are based on the current status and CAP assumptions.
Energy Policy Initiatives Center 2019.

The net GHG emissions reduction in 2030 from avoiding single occupancy vehicle trips and emissions added from vanpool vehicles, is shown in Table 34.

[64] SANDAG Vanpool Program: active vanpools as of November 16, 2018. 2006 to 2018 vanpool data were provided by SANDAG to EPIC (November 2018). The average number of passengers are estimated based on van capacity and the 80% capacity requirement. All vanpools start or end in San Marcos run from Monday to Friday, therefore, the 255 workday to year conversion is used.

[65] Based on the SANDAG Vanpool Program data the most common vanpool vehicles are Ford Traverse, Dodge Grand Caravan, and Buick Enclave. The 2019 new vehicle fuel economy of these vehicle models are approximately 20 MPG. U.S. Department of Energy: Fuel Economy Estimates, accessed January 10, 2019. The San Diego regional average vehicle emission rate in 2030, 297 g $CO_2e$/mile, is 28% less than that in 2019, 410 g $CO_2e$/mile. EMFAC2014. The ratio of emission rates is used to estimate 2030 MPG.

Table 34 Results for Measure T-7: Participate in the San Diego Association of Government iCommute Vanpool Program

| Emissions Reduction from SANDAG Vanpool Program | GHG Emissions Reduction in 2030 (MT $CO_2e$) |
|---|---|
| Emissions Reduction from Avoiding Single Occupancy Vehicle Commute | 219 |
| Emissions Added from Operating Vanpool Vehicles | -70 |
| Net Emissions Reduction due to SANDAG Vanpool Program | 149 |
| The projections are based on the current status and CAP assumptions.<br>Energy Policy Initiatives Center 2020. | |

### 6.3.2 Measure T-8 Develop Bicycle Infrastructure Identified in the City's General Plan Mobility Element

San Marcos' General Plan Mobility Element identifies estimated miles of existing and planned bicycle facility improvements.[66]

Bicycle facilities are categorized as follows: 1) Class I bicycle paths, which have a completely separated right-of-way designed for the exclusive use of bicycles and pedestrians; 2) Class II separated bicycle lanes; 3) Class III bicycle routes, where bicyclists share streets with motor traffic; and, 4) Class IV cycle tracks, that provide a right-of-way designated exclusively for bicycle travel and physically protected from vehicular traffic. Bicycle lanes are used for both recreational and commuting purposes. For this measure, only the impact on avoiding commute VMT is quantified. While Class III may have some impact on increasing bicycle commuting, studies of the impact of bicycle facilities on increasing bicycle commuting focus on separated bicycle lanes, such as Class I, II or IV (Class II or better) bicycle lanes. The mileages and classifications of future bicycle lane projects in San Marcos are show in Table 35.[67]

Table 35 Planned New Bicycle Infrastructure in San Marcos to be completed by 2030

| Bicycle Facility Classification | Miles of Road Segment | Miles of Bicycle Lane* |
|---|---|---|
| Class I Bicycle Path or Class II Bicycle Lane | 18.4 | 36.8 |
| Class IV Cycle Track | 0.3 | 0.6 |
| Total | 18.7 | 37.5 |
| San Marcos Developed Area (square miles) | | 17 |
| Projected Additional Bicycle Lanes (miles per square mile) | | 2.2 |
| *Planned bicycle lanes are all in both directions.<br>Class IV cycle track has already been added.<br>City of San Marcos 2019, SANDAG 2013. | | |

The increase in percentage of bicycle commuters is assumed to be proportional to the increase in bicycle lane miles per square mile. The elasticity of adding each additional mile of Class II or better bicycle lane

[66] San Marcos 2012 General Plan: Mobility Element, accessed November 10, 2018.
[67] Classifications and length of current and future bicycle lane projects were provided by City (January 2019). The Class IV cycle track on Armorlite Drive between Bingham Road and Las Posas Road has already been completed.

per square mile is roughly one percent for commuters.[68] This means one additional mile of Class II or better bicycle lanes per square mile would lead to roughly one additional percent of commuters riding bicycles to work. San Marcos's developed area is approximately 17 square miles; therefore, the additional bicycle lane miles would lead to an additional 2.2 miles of bicycle lane per square mile.[69]

To calculate annual commute VMT avoided, the increase in percentage of commuters by bicycle was multiplied by an eight-mile commute distance avoided per day, assuming bicycle commuters are traveling within the City. The avoided VMT is converted to GHG emissions reductions using the average vehicle emission factor, discussed in Section 4.4.1 (GHG Emission Factor for On-Road Transportation). The GHG emissions reduction in 2030 is shown in Table 36.

**Table 36 Key Assumptions and Results for Measure T-8 Develop Bicycle Infrastructure Identified in the City's General Plan Mobility Element**

| Year | Labor Force | Additional Bicycle Lanes Added (bicycle lane miles per square mile) | % of Additional Labor Force Using Bicycle to Commute | Additional Labor Force Using Bicycles to Commute | Commute VMT Avoided (miles per year) | Average Vehicle Emission Rate (g $CO_2e$/mile) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|---|---|
| 2030 | 53,729 | 2.2 | 2.2% | 1,182 | 2,411,349 | 287 | 692 |
| Average VMT avoided by commuting by bicycle is assumed to be eight miles per workday, with 255 workdays per year.<br>The emissions reduction is projected based on CAP assumptions and future impact of State policies and programs used in the CARB EMFAC2014 model.<br>Energy Policy Initiatives Center 2020. | | | | | | | |

### 6.3.3 Measure T-9: Adopt Citywide Transportation Demand Management Ordinance

Through this action, the City will develop and implement an ordinance requiring new developments (excluding single-family developments) to develop a Transportation Demand Management (TDM) plan. The TDM plans would be required to include a list of TDM activities that leads to a 7% increase in alternative travel modes from commuting at the new developments.

Table 37 is a list of potential TDM activities that may lead to a 7% increase in alternative modes of transportation that are based on existing TDM plans from projects in the City.[70] However, other TDM activities may be recommended or required in the TDM ordinance.[71] The estimated effective year of the ordinance is 2021.

[68] Dill and Carr (2013): Bicycle Commuting and Facilities in Major U.S. Cities: If you build them, commuters will use them – another look

[69] Developed based on SANDAG's Series 13 Regional Growth Forecast (Updated in October 2013). SANDAG Data Surfer, accessed November 2, 2017.

[70] Examples of TDM plans are provided by the City (November 2018).

[71] TDM activities and their impacts are from California Air Pollution Control Officers Association's GHG mitigation measure and San Francisco's TDM Program Measures. CAPCOA: Quantifying Greenhouse Gas Mitigation Measures (2010). City of San Francisco: TDM Program Standards Appendix A: TDM Measures, updated June 7, 2018, access November 19, 2018.

**Table 37 Examples of TDM Activities and Effects on Increasing Alternative Modes**

| TDM Activity Number | Activity Details | Effect on Alternative Modes | Source |
|---|---|---|---|
| TDM-1 | Provide discounted monthly transit pass or provide at least 25% transit fare subsidy to employees (for employees using daily or multi-day NCTD transit pass) | 2% of new development labor force will use mass transit to work | CAPCOA - TRT-4<br>San Francisco TDM Ordinance HOV - 1 |
| TDM-2 | Provide designated car-share, carpool, vanpool and/or "Park and Ride" parking spaces | 2% of new development labor force will carpool to work | San Francisco TDM Ordinance CSHARE-1 |
| TDM-3 | Provide pedestrian access network that internally links all uses and connects to all existing or planned external streets around the project sites | 1% of new development labor force will walk to work | CAPCOA - SDT-1<br>San Francisco TDM Ordinance Active – 1 |
| TDM-4 | Provide "end-of-trip" facilities for bicycle riders including secure bicycle parking spaces or bicycle racks, showers and clothes lockers | 1% of new development labor force will bicycle to work | CAPCOA - SDT-6 and SDT-7<br><br>San Francisco TDM Ordinance Active - 2 and 3 |
| TDM-5 | Encourage tele-commutable employees to telecommute one day per work week or switch to compressed work week (4 day/40-hour work week schedule)<br>OR<br>Provide a telecommute "work" center with common office space and equipment for residents. | 2% of new development labor force participate in telecommute (1% of new development labor force VMT reduction) | CAPCOA - TRT-6<br>San Elijo Hills TDM Plan |
| CAPCOA – California Air Pollution Control Officers Association.<br>CAPCOA 2010, City of San Francisco 2018. | | | |

Though TDM activities may lead to additional VMT reductions (e.g., reduce business trip VMT), the reduction in employee commute VMT can be better monitored than non-commute VMT (e.g., through commuter surveys). Therefore, for this measure, only the impact on avoiding commute VMT is quantified.

Increasing each type of alternative transportation mode leads to different reductions in VMT. For example, the commute distance by bicycle riders and vanpoolers are different. The percentage of jobs eligible for each alternative transportation mode and the estimated VMT reduction as a result of the activities are shown in Table 38.[72]

[72] SANDAG: San Diego Regional Transportation Study Volume I: Technical Report (2017), Figure 1-10, accessed November 19, 2018. Percentage of tele-commutable jobs based on personal communications between EPIC and SANDAG transportation modeler.

Table 38 VMT Reduction from the Examples of TDM Activities

| Increase in Alternative Modes of Transportation | Goal (% Increase of Eligible Jobs) | % of Jobs that are Eligible | Miles Avoided per Workday** | Miles Avoided per Year*** |
|---|---|---|---|---|
| Commute by Walking | 1% Increase | 100% | 1.34 | 342 |
| Commute by Bicycle | 1% Increase | 100% | 8 | 2,040 |
| Commute by Mass Transit | 2% Increase | 100% | 16 | 2,203 |
| Commute by Carpool | 2% Increase | 100% | 16 | 2,203 |
| Telecommuting | 2% Increase | 35%* | 16 | 154 |

* SANDAG's current activity-based travel model assumption.
**Based on 2017 SANDAG Regional Transportation study, the average commute distance of San Diego North County East commuters is 16 miles per roundtrip. Miles are allocated to San Marcos based on Origin-Destination VMT allocation methods (54% miles are City miles) except the commute by walking and bicycling.
***51 days a year for telecommute (one day per work week) and 255 workdays a year for the remaining modes.
Energy Policy Initiatives Center 2019.

To calculate emissions avoided in 2030, miles avoided per year were multiplied by the total labor force added after 2021 (projected ordinance effective year), and converted to GHG emissions reductions using the average vehicle emission factor, discussed in Section 4.4.1 (GHG Emission Factor for On-Road Transportation). The GHG emissions reduction in 2030 is shown in Table 39.

Table 39 Key Assumptions and Results for Measure T-9: Adopt Citywide Transportation Demand Management Ordinance

| Year | Labor Force Added after 2021 | VMT Avoided from Increasing Alternative Modes (miles per year) | Average Vehicle Emission Rate (g $CO_2e$/mile) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|
| 2030 | 6,738 | 912,547 | 287 | 262 |

The emissions reduction is the projection under the CAP, including future impact of State policies and programs used in CARB EMFAC2014 model, and CAP assumptions.
Energy Policy Initiatives Center 2020.

### 6.3.4 Measure T-10: Implement the Intra-City Shuttle System

San Marcos' General Plan identifies a policy to establish an intra-city shuttle system that connects the central developing nodes in the City, including University District, Creek District, Palomar Station and California State University — San Marcos (CSU San Marcos).[73] The proposed shuttle routes includes three phases: Phase 1 — employee shuttle between University Office and Medical Park to CSU San Marcos Sprinter Station, Phase 2 — intra-city shuttle with two routes, and Phase 3 – expanded intra-city shuttle that includes Creek District.

Measure T-10 focuses on Phase 3 of the shuttle routes, with the intra-system shuttle operating in two partially overlapped routes (Route A and Route B) that both terminate at bus stations across Mission Road from Palomar Sprinter station. The City aims to run all electric shuttles and achieve high-frequencies with 10-minute headways during peak period (6 buses per service hour) and 15-minute headways during non-peak period (4 buses per service hour).

[73] San Marcos 2012 General Plan: Mobility Element, accessed November 10, 2018.

In order to avoid double-counting with measures that increase mass transit ridership, the miles avoided per passenger trip do not take into account the potential miles avoided by commuters using the intra-shuttle to connect mass transit (Sprinter or buses) to other city employment centers or from other cities. The miles avoided per passenger trip is assumed to be all internal city miles, that account for the miles the passengers would otherwise have to drive to city destinations. The passengers would instead take the shuttle or take the shuttle and use other modes of transportation (e.g., shuttle and bicycle, shuttle and bus within the city).

The estimated intra-city shuttle passenger avoided miles are estimated based on shuttle frequency and routes, as show in Table 40.[74]

**Table 40 Miles Avoided for Intra-City Shuttle Passengers**

| Bus Schedule | Peak | Non-peak |
|---|---|---|
| Number of bus per service hour | 6 | 4 |
| Service hour at weekday | 6 | 11 |
| Service hour at weekend | 0 | 16 |
| # of days in service per year | 250 | 354 |
| Bus Trip per year | 9,000 | 38,232 |
| Total Number of Bus trip per Route | | 47,232 |
| Number of Routes | | 2 |
| Number of Passengers per Bus* | | 30 |
| Average Miles Avoided per Passenger Trip** | | 6 |
| Total Passenger Miles Avoided | | 17,192,448 |
| *Mid-sized bus **Assume all miles are within the city<br>San Marcos University District, 2009 | | |

The avoided VMT is converted to GHG emissions reductions using the average vehicle emission factor, discussed in Section 4.4.1 (GHG Emission Factor for On-Road Transportation). The GHG emissions reduction in 2030 is shown in Table 41.

[74] San Marcos University District Parking & Transportation Demand Management Plan (2009), Recommendation 10: Establish an Intra-City Shuttle Service, accessed February 12, 2019.

Table 41 Key Assumptions and Results for Measure T-10: Implement the Intra-City Shuttle System

| Year | VMT Avoided from Intra-City Shuttle Passengers (miles per year) | Average Vehicle Emission Rate (g CO2e/mile) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|
| 2030 | 17,192,448 | 287 | 4,932 |
| The emissions reduction is the projection under the CAP, including future impact of State policies and programs used in CARB EMFAC2014 model, and CAP assumptions.<br>Energy Policy Initiatives Center 2020. | | | |

### 6.3.5 Measure T-11: Increase Transit Ridership

According to the American Community Survey (ACS), approximately 2% of San Marcos commuters took public transportation to work in 2017.[75] Through Measure T-11, City will work with neighboring cities, North County Transit District (NCTD), which provides public transportation in North San Diego County, and SANDAG to improve mass transit services and increase the number of commuters taking public transportation to work.

Working with neighboring cities, such as Vista, Escondido, Oceanside, and Carlsbad, is essential to increase commuting by mass transit because many San Marcos residents commute outside the City for work and many people come to work in San Marcos. Based on a SANDAG commute pattern report, 87% of the people who work in San Marcos live outside the jurisdiction and 88% of San Marcos residents work outside of the City, many of them commute from or to neighboring cities mentioned above.[76]

The goal of this measure is to increase the percentage of commuters taking public transportation to work from the current 2%, equivalent to around 1,000 commuters, to 15% in 2030, equivalent to around 7,000 additional commuters.

The avoided commute VMT is calculated based on the number of additional commuters taking public transportation and the average commute distance, and then converted to GHG emissions reductions using the average vehicle emission factor, discussed in Section 4.4.1 (GHG Emission Factor for On-Road Transportation). The GHG emissions reduction in 2030 is shown in Table 42.[77]

[75] American Community Survey: 2017 5-Year Estimates for City of San Marcos, accessed February 22, 2019. 2017 was the most recent data year as of February 2019.
[76] SANDAG: Commuting Patterns in the San Diego Region (2016), accessed June 11, 2019.
[77] SANDAG: San Diego Regional Transportation Study Volume I: Technical Report (2017), Figure 1-10, accessed November 19, 2018. The commute distance is also similar to the commute distance between San Marcos and neighboring cities mentioned above.

Table 42 Key Assumptions and Results for Measure T-11: Increase Transit Ridership

| Year | Labor Force (Commuters) | Percent of Commuters Taking Mass Transit to Work - Baseline (%) | Percent of Commuters Taking Mass Transit to Work - Target (%) | Additional Commuters Taking Mass Transit to Work | Commute VMT Avoided (miles per year)* | Average Vehicle Emission Rate (g $CO_2e$/mile) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|---|---|
| 2030 | 53,729 | 2% | 15% | 6,985 | 15,388,789 | 287 | 4,415 |

*Based on 2017 SANDAG Regional Transportation study, the average commute distance of San Diego North County East commuters is 16 miles per roundtrip for a workday. Miles are allocated to San Marcos based on Origin-Destination VMT allocation methods (54% miles are City miles) except the commute by walking and bicycling.
255 workdays a year
The emissions reduction is projected based on future impact of State policies and programs used in CARB EMFAC2014 model and CAP assumptions.
Energy Policy Initiatives Center 2020.

### 6.3.6 Measure T-12: Reduce Parking Requirements for New Residential Development near Transit

Reducing minimum parking requirements for the residential units near transit, especially in the higher density zoning areas, encourages the residents to use alternative modes of transportation. The City plans to reduce the minimum parking requirements of the residential units in the vacant parcels within a half mile radius of major transit stops. The light rail line Sprinter, operated by NCTD between Oceanside and Escondido, has four transit stops in San Marcos that are counted as major transit stops. In addition, the major transit stops include 30 bus stops with fixed bus services and 10-minute headways during peak hours.[78]

The current vacant parcels near transit cover different residential zoning areas and specific plan areas. The total number of potential units that could be built near transit is estimated at 3,756 units.[79]

The VMT reduction per household from parking reduction varies based on the size of projects and availability of alternative modes of transportation services nearby (e.g., transit services, bicycle infrastructure). Based on studies, the elasticity of VMT reduction to parking reduction is 50% (i.e., 20% parking reduction would lead to 10% VMT reduction).[80] The average VMT avoided per household is provided in Table 43.[81]

[78] According to City staff, the bus stops included are stops on high-quality bus corridors. High-quality bus corridors are the ones with fixed route bus service that have average service in each direction of no more than 10 minutes during three peak hours between 6–10a.m., and three peak hours between 3–7p.m, on Monday through Friday.
[79] Number of potential units provided by City (June 2019), assuming maximum density for the vacant parcels in residential zoning areas and 12 units per acre density for the vacant parcels in Specific Plan areas.
[80] CAPCOA: Quantifying Greenhouse Gas Mitigation Measures (2010). PDT-1 Parking Policy/Pricing, accessed on November 19, 2018.
[81] SANDAG: San Diego Forward: The Regional Plan Program Environmental Impact Report 4.15 Transportation (2015), accessed on November 29, 2018. 2012, 2020, and 2035 San Diego region VMT per capita is from the Regional Plan, all other years are linearly interpolated. Number of persons per households based on SANDAG Series 13 Regional Growth Forecast (October 2013). SANDAG Data Surfer, accessed on November 2, 2017.

Table 43 Average VMT Avoided from Households with Parking Reduction

| Year | % Parking Space Reduction | Conversion from Parking Reduction to VMT Reduction* | % VMT Reduction per Household | Average Household VMT** (miles/weekday) | VMT Reduction per Household (miles/year) | % of VMT within San Marcos | San Marcos VMT Reduction per Household (miles/year) |
|---|---|---|---|---|---|---|---|
| 2030 | 27% | 50% | 14% | 74 | 3,466 | 54% | 1,872 |

*CAPCOA Quantifying GHG Mitigation Measures PDT-1.
**Assumes 3.1 persons per household in San Marcos and 24-mile average weekday VMT per capita (SANDAG Series 13 projection for San Diego region).
347 average weekdays per year. 54% of all household VMT is allocated to San Marcos based on Origin-Destination VMT allocation methods, assuming trips will have at least one trip-end within San Marcos.
CAPCOA 2010, Energy Policy Initiatives Center 2019.

To calculate annual VMT avoided, the total number of potential units near transit is multiplied by the VMT avoided per household in Table 43 and converted to GHG emissions reductions using the average vehicle emission factor, discussed in Section 4.4.1 (GHG Emission Factor for On-Road Transportation). The GHG emissions reduction in 2030 is shown in Table 44.

Table 44 Key Assumptions and Results for Measure T-12: Reduce Parking Requirements for New Residential Development near Transit

| Year | Number of New Units with Reduced Parking | VMT Reduction per Household (miles/year)* | VMT Reduction from all New Units (miles/year) | Average Vehicle Emission Rate (g $CO_2e$/mile) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|
| 2030 | 3,756 | 3,466 | 7,029,688 | 287 | 2,017 |

*This is the VMT reduction for the homes projected to be built in 2030, which may differ from the VMT reduction from the homes built prior to 2030.
The emissions reduction is projected based on future impact of State policies and programs used in the CARB EMFAC2014 model and CAP assumptions.
Energy Policy Initiatives Center 2020.

### 6.3.7 Measure T-13: Implement Transportation Demand Management Plans at Existing Employers

Through Measure T-13, the City will work with existing major employers in San Marcos to implement TDM activities to reduce commute and work-related VMT. The TDM activities include, but are not limited to, employee shuttle bus services, vanpool programs, and parking cash-out programs.

To avoid double counting the GHG reductions with *Measure T-11: Increase Transit Ridership*, this effort is separate from working with neighboring cities and partners to improve public transportation services. Similarly, in order to avoid double counting the GHG reductions in *Measure T-9: Adopt Citywide Transportation Demand Management Ordinance,* the City would work with existing employers to develop TDM plans through this effort, not new employers.

Because specific TDM activities are not developed at the time of CAP development, the measure goal is set to reduce projected 2030 VMT by 3.7%, which is approximately 30 million vehicle miles. The avoided VMT is converted to GHG emissions reductions using the average vehicle emission factor, discussed in

Section 4.4.1 (GHG Emission Factor for On-Road Transportation). The GHG emissions reduction in 2030 is shown in Table 45.[82]

**Table 45 Key Assumptions and Results for Measure T-13: Implement Transportation Demand Management Plans at Existing Employers**

| Year | Projected 2030 VMT (million miles per year) | VMT Reduction (%) | VMT Reduction (million miles per year) | Average Vehicle Emission Rate (g $CO_2e$/mile) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|
| 2030 | 838 | 3.7% | 30.6 | 287 | 8,786 |
| The emissions reduction is the projection under the CAP, including future impact of State policies and programs used in the CARB EMFAC2014 model and CAP assumptions.<br>Energy Policy Initiatives Center 2019. | | | | | |

### 6.3.8 Measure T-14: Transition to an Online Building and Engineering Permit Submittal System

Currently, San Marcos residents, business owners, and developers submit buildings permits and other necessary documents at City Hall. The City plans to complete the transition to online building and engineering permit submittal by 2021 to both increase the permit and plan review efficiency and reduce the VMT associated with the permit submittal trips.

On average, the City receives 1,640 building or engineering permit applications that require only one trip to City Hall every year, and 661 permit applications that require multiple trips (on average three trips) to City Hall every year.[83] Assuming all the single trips are all within the City and half of the multiple trips are from outside the City, by switching to online permit submittal, the avoided VMT is calculated and converted to GHG emissions reductions using the average vehicle emission factor, discussed in Section 4.4.1 (GHG Emission Factor for On-Road Transportation). The GHG emissions reduction in 2030 is shown in Table 46.[84]

[82] SANDAG: San Diego Regional Transportation Study Volume I: Technical Report (2017), Figure 1-10, accessed November 19, 2018. The commute distance is also similar to the commute distance between San Marcos and neighboring cities mentioned above.
[83] Building and engineering permits issued in 2017 and 2018 by average number of trip per permits are provided by the City (June 2019).The average of 2017 and 2018 is used here.
[84] Assume single trips are all within San Marcos with average distance of 10 miles, and the average distance for multiple trips is 15 miles.

Table 46 Key Assumptions and Results for Measure T-14: Transition to an Online Building and Engineering Permit Submittal System

| Year | Trip Type | Annual Average Number of Building Permits Submitted | Average Trips per Permit Application | Average Distance per Trip (miles/trip) | Miles Avoided by Transition to Online Submission (miles/year) | Average Vehicle Emission Rate (g $CO_2e$/mile) | GHG Emissions Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|---|---|
| 2030 | Single | 1,640 | 1 | 10 | 16,395 | 287 | 13 |
| | Multiple | 661 | 3 | 15 | 29,723 | | |
| The emissions reduction is projected based on future impact of State policies and programs used in the CARB EMFAC2014 model and CAP assumptions. Energy Policy Initiatives Center 2020. | | | | | | | |

## 6.4 Strategy 4: Increase Building Energy Efficiency (E)

The goal of this strategy is to increase building energy efficiency through the following measure.

### 6.4.1 Measure E-1 Require New Residential Developments to Install Alternatively-Fueled Water Heaters

To reduce reliance on building natural gas end-use, the City will develop and implement an ordinance requiring new single-family and multi-family residential projects to install non-natural gas water heaters. The anticipated effective year of the ordinance is 2022.

The energy savings from installing a non-natural gas water heater is calculated based on the natural gas savings from replacing a gas storage water heater with an electric heat pump water heater (HPWH). The energy use of these two water heaters are show in Table 47.[85]

Table 47 Residential Water Heater Energy Use Comparison

| Residential Type | Natural Gas Use from a Gas Storage Water Heater | | Electricity Use from a Heat Pump Water Heater | |
|---|---|---|---|---|
| | (therms/year) | (MMBtu/year)* | (kWh/year) | (MMBtu/year)* |
| Single-Family 1 | 137 | 14 | 813 | 2.8 |
| Single-Family 2 | 146 | 15 | 925 | 3.2 |
| Multi-Family | 117 | 14 | 559 | 3.0 |
| **Average** | **133** | **12** | **766** | **1.0** |
| *99,976 Btu per therm and 3,312 Btu per kWh.<br>Residential types are based on prototype types developed by CEC for 2019 Building Energy Efficiency Standard. The two single-family prototypes have different floor areas (square footage) and number of stories, therefore different water heating energy use.<br>Energy use are modeled with CEC CBECC-Res tool, March 2018 version, for Climate Zone 10 where San Marcos is located.<br>Energy Policy Initiatives Center 2019. | | | | |

[85] CEC: CBECC-Res , version dated March 9, 2018, model run by EPIC.

HPWH is used as an example here, however, other types of non-natural gas water heater may be used as replacement water heater.[86] Based on recent permit data, on average, City issues 258 new water heater permits annually. Assuming the same number of permits will be subject to the requirement beginning in 2022, and 20% of the water heaters will be exempt from the requirement due to certain limitations, the emissions reduction from natural gas savings and emissions added from electricity use are show in Table 48 and Table 49.

**Table 48 Emissions Reduction from Natural Gas Savings for Measure E-1 Require New Residential Developments to Install Alternatively-Fueled Water Heaters**

| Year | New Residential Water Heaters Added Annually | Total New Alternatively-Fueled Water Heaters after 2022* | Natural Gas Savings Per Alternatively-Fueled Water Heater (Therms/year) | Total Natural Gas Savings (Therms/year) | Natural Gas Emission Factor (MT $CO_2e$/Therm) | Emissions Reductions from Natural Gas Savings (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| 2030 | 250 | 1,800 | 133 | 239,400 | 0.0054 | 1,303 |

*Assumes 20% of water heaters will be exempt from this requirement due to limitations.
The projected natural gas savings and emissions reduction are the projections under the CAP, based on current status, future impact of State policies and programs, and CAP assumptions.
Energy Policy Initiatives Center 2019.

**Table 49 Emissions from Electricity use for Measure E-1 Require New Residential Developments to Install Alternatively-Fueled Water Heaters**

| Year | New Residential Water Heaters Added Annually | Total New Alternatively-Fueled Water Heaters after 2022* | Electricity Added Per Alternatively-Fueled Water Heater** (kWh/year) | Total Electricity Use (kWh/year) | Electricity Emission Factor (lbs $CO_2e$/MWh) | Emissions from Additional Electricity Use (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| 2030 | 250 | 1,800 | 766 | 1,378,800 | 44 | 28 |

*Assumes 20% of water heaters will be exempt from this requirement due to limitations. **The alternatively-fueled water heater type used here is heat pump water heater.
The projected electricity use and emissions added are the projections under the CAP based on current status, future impact of State policies and programs, and CAP assumptions.
Energy Policy Initiatives Center 2019.

The net emissions reduction from Measure E-1 in 2030 is 1,275 MT $CO_2e$.

## 6.5 Strategy 5: Increase Renewable and Zero-Carbon Energy (E)

The goal of this strategy is to increase grid-supply and behind-the-meter renewable and zero-carbon electricity through the following measures.

### 6.5.1 Measure E-2: Require Installation of PV Systems at New Non-Residential Developments

The City will develop and implement an ordinance requiring all new non-residential developments to install PV systems with a minimum capacity of 2 watts (W) per sq. ft. of gross floor area ft. The anticipated effective year of the ordinance is 2022.

[86] Other options include, but are not limited to, instantaneous electric, electric tank solar water heater with HPWH back up, and solar water heater with electric tank back up.

The minimum PV requirement is developed based on the minimum requirement in the City of Santa Monica's Green Building Solar Ordinance requirement for high-rise residential, non-residential, hotels and motels.[87] The new development square footage assumption used under *Measure T-2: Require Electric Vehicle Charging Stations in New Development* is used here, therefore, 130,000 sq. ft. of new commercial development will be subject to the requirement beginning in 2022.[88]

It is assumed that 10% of the projects cannot install on-site PV systems due to building age or other limitations.[89] Based on the minimum PV requirement and square footage of new commercial developments anticipated to be added after 2022, the new PV capacity due to Measure E-2 is given in Table 50.

**Table 50 Assumptions for New Commercial PV Capacity due to Measure E-2: Require Installation of PV Systems at New Non-Residential Developments**

| Year | New Commercial Floor Area Added after 2022 (sq. ft.)* | PV Size Requirement (W per sq. ft.) | Total PV at New Commercial due to Measure E-3 (kW) | Total PV at New Commercial due to Measure E-3 (MW) |
|---|---|---|---|---|
| 2030 | 1,170,000 | 2 | 2,106 | 2.1 |
| *Assumes 10% new development will be exempt from this requirement due to other limitations.<br>The capacity is projected under the CAP assumptions.<br>Energy Policy Initiatives Center 2019. | | | | |

The emissions reductions from all State and CAP actions that increase behind-the-meter renewable supply are given in Table 7 Allocation of Emissions Reductions to Supplies that Increase Renewable (or Zero-Carbon) Supply in San Marcos). The total reduction is attributed based on estimated capacity, in MW, that would result from each measure. As shown in Table 51, GHG emissions reductions from Measure E-2 are the projected reduction amounts in the years 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

[87] City of Santa Monica: Green Building Solar Ordinance, as of May 1, 2017.
[88] The average annual new commercial development sq. ft. is calculated based on the average new sq. ft. added annually from 2016 to 2018 (50,000 sq. ft. in 2016, 85,000 sq. ft. in 2017, and 250,000 sq. ft. in 2018) approved project details and project site plans provided by the City (November 2018). The sq. ft. is new gross floor area added each year and does not include specific plans, transit station plans or the sq. ft. added for self-storage projects that are unlikely to be subject to the requirement. Only new commercial project data are available, however, other non-residential projects may also subject to the requirement.
[89] A conservative approach based on the assumptions on other similar local PV reach codes.

**Table 51 Key Assumptions and Results for Measure E-2: Require Installation of PV Systems at New Non-Residential Developments**

| Year | State or City Action | Total | Measure E-2: Require Installation of PV Systems at New Non-Residential Developments | California Solar Polices, Programs, and Mandates* |
|---|---|---|---|---|
| 2030 | Projected Behind-the-meter PV Capacity (MW) | 71 | 2.1 | 69 |
| | Projected Emissions Reduction (MT $CO_2e$) | 26,012 | **773** | 25,239 |

*Solar policies, programs and mandates include the impact of the PV mandates from the 2019 Building Energy Efficiency Standard.
The capacity and emissions reductions are projections under the CAP, based on CAP assumptions, current status, and future impact of State policies and programs. Sum may not add up to totals due to rounding.
Energy Policy Initiatives Center 2019.

### 6.5.2 Measure E-3: Increase Grid-Supply Renewable and Zero-Carbon Electricity

As discussed in Section 5.1, SB 100 (100 Percent Clean Energy Act of 2018) adopts a 60% RPS for all California's electricity retail suppliers by 2030. Through Measure E-3, the City would establish or join a program to further increase grid-supply renewable and zero-carbon electricity to 95% by 2030; 35% beyond the RPS mandate for that year. In addition, the City will ensure that at least 97% of the total electric load will be supplied by the local renewable program.

As previously explained in Section 5.1 and Table 7 Allocation of Emissions Reductions to Supplies that Increase Renewable (or Zero-Carbon) Supply in San Marcos), because the local renewables and zero-carbon program is required to comply with the State's RPS mandates, a portion of the total emissions reduction from Measure E-3 is credited to the State's RPS compliance. The remaining emissions reduction beyond RPS compliance is attributed to Measure E-3. The allocation of GHG emissions reduction in 2030 from this measure to the State and the City is shown in Table 52.

**Table 52 Key Assumptions and Results for Measure E-3: Increase Grid-Supply Renewable and Zero-Carbon Electricity**

| Year | State or City Action | Total for Local Renewables and Zero-Carbon Program | Local Renewables and Zero-Carbon program to Comply with RPS | Local Renewables and Zero-Carbon Program above RPS (E-3) |
|---|---|---|---|---|
| 2030 | Projected Renewables and Zero Carbon (%) | 95% | 60% | 35% |
| | Emissions Reduction (MT $CO_2e$) | 93,197* | 58,861 | 34,336 |

*Calculated in Table 7.
The emissions reduction is the projection under the CAP, based on CAP assumptions and future impact of State policies and programs.
Energy Policy Initiatives Center 2019.

## 6.6 Strategy 6: Reduce Water Use (W)

The goal of this strategy is to increase indoor and outdoor water efficiency through the following two measures.

### 6.6.1 Measure W-1: Reduce Outdoor Water Use for Landscaping

The City's current Water Efficient Landscape Ordinance (WELO) and the associated WELO Compliance Manual, updated in 2016, are consistent with the statewide 2015 Model Water Efficient Landscape Ordinance (MWELO) and its requirements. All new development projects with landscape area no less than 500 sq. ft. and rehabilitated projects with landscape area no less than 2,500 sq. ft. applying for building or landscape permits in San Marcos are subject to the WELO requirements. WELO also requires high efficiency sprinklers and weather-based controllers. [90]

After the WELO went into effect in 2016, the City had approximately 136,000 sq. ft. of landscape area in 2016 (87% residential and 13% non-residential) and approximately 1 million sq. ft. of landscape area in 2017 (47% residential and 53% non-residential) that were subject to the requirement.[91] Using the maximum applied water allowance (MAWA) calculation in the City's WELO, and assuming that low water use plants and high-efficient irrigation systems were used, the annual water uses from the 2016 and 2017 landscape projects are estimated at 2 million gallons and 16 million gallons, respectively.[92] Assuming this trend continues, approximately 295,000 sq. ft. of new residential landscape area and 280,000 sq. ft. new non-residential landscape area per year will be subject to the City's WELO.[93] Compared to the previous MAWA, the water savings with the current WELO are approximately 20% for

[90] San Marcos Landscape Plan Review and Water Efficient Landscape Ordinance Compliance Manual (September 2016), accessed December 11, 2018. City's WELO has additional design guidelines for certain projects (e.g., parking lots) compared with MWELO but the water efficiency requirements are the same as those in MWELO.
[91] Types and square footage of landscape areas subject to WELO in 2016 and 2017 are provided by the City (December 2018). 117,698 sq. ft. residential and 17,827 sq. ft. non-residential landscape area in 2016, and 471,426 sq. ft. residential and 541,927 sq. ft. non-residential landscape area in 2017, based on 2016 and 2017 WELO annual reports.
[92] San Marcos Landscape Plan Review and Water Efficient Landscape Ordinance Compliance Manual (September 2016), accessed December 11, 2018. The maximum applied water allowance (MAWA) in the City's WELO the same as the MAWA established by the State MWELO.
[93] Average of 2016 and 2017 landscape sq. ft.

residential landscape projects and 35% for non-residential landscape projects.[94] Therefore, the WELO would lead to 3.6 million gallons of water savings per year.

The water savings are converted to GHG reductions based on the water GHG intensities in 2030. The water GHG intensities are calculated based on projected water use and the GHG emissions from water, as assumed in the BAU emissions projection.[95] Table 53 summarizes the key assumptions and results. The GHG emissions reductions projected are the reduction amounts in the year 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

**Table 53 Key Assumptions and Results for Measure W-1: Reduce Outdoor Water Use for Landscaping**

| Year | Outdoor Water Use Reduction due to WELO* (Gallons) | Outdoor Water Use Reduction due to WELO (Acre-Feet) | Water-GHG Intensity** (MT $CO_2e$/Acre-Foot) | GHG Emission Reduction (MT $CO_2e$) |
|---|---|---|---|---|
| 2030 | 53,723,510 | 165 | 0.6 | 91 |

* Total water savings from all projects subject to WELO starting 2016. Historical data from 2016 and 2017 are included, savings starting 2018 are projections **Water-GHG intensity of imported treated water.
Energy Policy Initiatives Center 2019

### 6.6.2 Measure W-2: Reduce Water Use in City Managed Landscape Areas

Currently, the City tracks municipal building water use and City-managed landscaping (e.g., City parks) water use separately. The annual average water use of the current City-managed landscaping is 350,000 hundred cubic feet (HCF).[96] The City aims to reduce the current level landscaping water use 15% by 2030.

The water savings are converted to GHG reductions based on the water GHG intensities in 2030. The water GHG intensities are calculated based on projected water use and the GHG emissions from water, as assumed in the BAU emissions projection.[97] Table 54 summarizes the key assumptions and results. The GHG emissions reductions projected are the reduction amounts in the years 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

[94] Department of Water Resource: Model Water Efficiency Landscape Ordinance: 2015 Revision, updated July 31, 2015, accessed November 12, 2018. City's WELO has the same MAWA as the State MWELO.
[95] Emissions from water and projected water use are provided in *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventories and Projections* (EPIC, 2018).
[96] Estimated current water use for landscaping is provided by the City (December 2018). The water use is estimated based on 2013 to 2015 annual average landscape water use of 323,723 HCF and growth since then. 350,000 HCF is equivalent to 803 acre-feet.
[97] Emissions from water and projected water use are provided in *Appendix A: City of San Marcos Greenhouse Gas Emissions Inventories and Projections* (EPIC, 2018).

Table 54 Key Assumptions and Results for Measure W-2: Reduce Water Use in City Managed Landscape Areas

| Year | Current City Managed Landscaping Water Use* (Hundred Cubic Feet) | Water Reduction Target from Current Level (%) | Water Use Reduction (Hundred Cubic Feet) | Water Use Reduction (Acre-Feet) | Water-GHG Intensity (MT $CO_2e$/Acre-Foot)** | GHG Emission Reduction (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| 2030 | 350,000 | 15% | 52,500 | 121 | 0.6 | 67 |
| *Current as of 2017/2018 **Water-GHG intensity of imported treated water<br>City of Lemon Grove 2019, Energy Policy Initiatives Center 2019. | | | | | | |

## 6.7 Strategy 7: Reduce and Recycle Solid Waste (S)

The goal of the strategy is to reduce emissions from landfill waste through the following measure.

### 6.7.1 Measure S-1: Increase Citywide Waste Diversion

Through Measure S-1, the City will work with its waste hauler to achieve a citywide 85% waste diversion rate by 2030. The 85% waste diversion rate would result in 2.7 pounds per person per day (PPD) of waste disposed in landfills.

The City had 5.6 PPD waste disposal in the 2012 baseline year and 5.1 PPD waste disposal in 2016, corresponding to approximately 68% and 71% diversion rates, respectively. From 2012 to 2016, the diversion rates fluctuated between 68% and 73%.[98] The City has not conducted a waste characterization study recently; therefore, it is assumed that the waste composition for the CAP time horizon would not change compared with that in 2012.[99] Landfills in the San Diego region are in the process of upgrading landfill gas collection systems.[100] It is assumed the landfill gas capture rate in 2030 will be 85%, higher than the default 75% used in the BAU emissions projection. The emissions avoided from increasing the waste diversion rate is the difference between the emissions from the waste category in the BAU emissions projection and the emissions from the solid waste category using the target diversion rates and PPD. Table 55 summarizes the key assumptions and results. The GHG emissions reduction projected is the reduction amount in the year 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

[98] Method to convert PPD to estimated diversion rate is based on Calrecycle. Per Capita Disposal and Goal Measurement. Jurisdiction PPD from 2012–2016 were downloaded from CalRecycle Jurisdiction Diversion Summary.
[99] Recent State actions include organic waste recycling, which may reduce the mixed waste emission factor in future years.
[100] The main landfill, City of San Diego's Miramar Landfill, has added a landfill gas recovery improvement project to be completed late 2018.

Table 55 Key Assumptions and Results for Measure S-1: Increase Citywide Waste Diversion

| Projections | Waste Disposed at Landfills from San Marcos | | | Landfill Gas Capture Rate | Emissions from Waste Disposal (MT $CO_2e$) | GHG Emissions Reduction in 2030 (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| | lbs./person/ day | short tons/year | MT/year | | | |
| Business-as-usual | 5.1 | 101,002 | 67,648 | 75% | 16,912 | 11,585 |
| With Targeted Diversion Rate | 2.7 | 53,027 | 35,516 | 85% | 5,327 | |
| Emissions from waste are calculated based on the mixed waste emission factor (0.74 MT $CO_2e$/short ton), oxidation rate (10%), and the waste capture rates. The projected emissions reduction are based on the CAP assumptions.<br>Energy Policy Initiatives Center 2019. | | | | | | |

## 6.8 Strategy 8: Increase Urban Tree Cover (C)

The most recent urban tree canopy assessment in the San Diego region, based on high-resolution Light Detection and Ranging (LiDAR), shows that as of 2014 San Marcos had approximately 13% existing urban tree canopy.[101] The goal of this strategy is to increase carbon sequestration through increasing urban tree cover within San Marcos.

### 6.8.1 Measure C-1: Increase Tree Planting at City Parks and Public Rights-of-Way

Since 2012, the City has planted a total of 2,375 new trees, including new developments and areas where the City performs landscaping maintenance. Through Measure C-1, the City plans to plant an average of 150 new trees annually going forward, and will develop a program to track tree planting and maintenance at City managed landscaping areas and public rights-of-way.

The carbon sequestration potential from the new trees is based on the projected total number of trees planted and the $CO_2$ absorption rate per tree.[102] Table 56 summarizes the key assumptions and results. The GHG emissions reduction projected is the reduction amount in the year 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

[101] The assessment was done in 2014 for all urban areas in the San Diego County using method developed by University of Vermont and USDA Forest Service.

[102] On average, the $CO_2$ sequestration rate is 0.035 MT $CO_2$ per tree per year. The carbon sequestration rate depends on the tree species, climate zone, planting location, and tree age. A more accurate carbon sequestration rate will be evaluated once the parameters are decided in implementation of the measure. California Emissions Estimator Model (CALEEMOD). Appendix D Default Data Tables (October 2017).

**Table 56 Key Assumptions and Results for Measure C-1: Increase Tree Planting at City Parks and Public Rights-of-Way**

| Year | Annual Number of New Trees Added | Number of New Trees Added Since 2012 | CO2 Sequestered** (MT $CO_2$/tree/year) | Carbon Sequestration (MT $CO_2$) |
|---|---|---|---|---|
| 2030 | 150 | 4,175 | 0.0354 | 148 |

*Including the trees planted by the City since 2012
**Average of trees. An improved estimate of the carbon sequestration rate can be evaluated once the implementation parameters are decided.
The projected carbon sequestration rates are based on the CAP assumptions.
Energy Policy Initiatives Center 2019.

### 6.8.2 Measure C-2: Increase Tree Planting at New Development

The City's current landscape standards include the following requirements for tree planting: 1) a minimum of one tree for every five parking spaces for any required parking area of more than 10 spaces; and 2) a minimum of one tree per new single-family unit. The trees need to be selected from the City's approved planting list and a minimum of 24-inch box size.[103]

As discussed in Section 6.1.2 (Measure T-2: Require Electric Vehicle Charging Stations in New Development), it is anticipated that an average of 520 parking spaces will be added every year at new developments. However, based on the 2017 and 2018 new projects' design plans, on average approximately 83% of all parking spaces (430 parking spaces annually) are uncovered parking space (i.e., not in covered parking garages).[104] Assuming only uncovered parking spaces are subject to the requirement and the trend continues, on average 86 new trees will be planted annually due to parking area tree planting requirement.[105] The projected total number of new trees added by 2030 are shown in Table 57.

**Table 57 Number of New Trees Added At Parking Spaces due to Measure C-2: Increase Tree Planting at New Development**

| Year | Annual New Uncovered Parking Spaces (Number of Spaces) | Minimum Tree Requirement (parking spaces/tree) | Annual Number of New Trees Added | Number of New Trees Added Since 2017 |
|---|---|---|---|---|
| 2030 | 430 | 5 | 86 | 1,205 |

*Average of 2017 and 2018 number of uncovered parking spaces added at new development. **Includes parking lot trees added in 2017 and 2018 at new development due to the requirements.
Energy Policy Initiatives Center 2019.

[103] San Marcos Municipal Code: Section 20.33.040 - Landscape Standards, accessed December 12, 2018.
[104] 2017 and 2018 approved project details and project site plans provided by City (November 2018). 419 uncovered parking spaces from 2017 projects and 447 uncovered parking spaces from 2018 projects.
[105] The number of sq. ft. per parking space requirement is discussed in Section 6.1.3. Lemon Grove Municipal Code: Off-street Parking Requirement (Section 17.24.010), accessed on August 12, 2019. The minimum parking requirements for retail, office, vehicle service and manufacturing are all one space per 500 sq. ft. of floor area. The tree planting requirements are not limited to the commercial parking lots.

SANDAG Series 13 projects that 1,531 new single-family units will be added from 2012 to 2030.[106] Therefore, a minimum of 1,531 trees are anticipated to be planted by 2030.

Similar to Measure C-1, the carbon sequestration potential from the new trees is based on the projected total number of trees planted and the $CO_2$ absorption rate per tree.[107] Table 58 summarizes the key assumptions and results. The GHG emissions reductions are the projected reduction amounts in the years 2030 only, not the sum of the annual reductions from baseline year 2012 to 2030.

**Table 58 Key Assumptions and Results for Measure C-2: Increase Tree Planting at New Development**

| Year | Number of New Trees Added by Target Year* | CO2 Sequestered** (MT $CO_2$/tree/year) | Carbon Sequestration (MT $CO_2$) |
|---|---|---|---|
| 2030 | 2,736 | 0.0354 | 97 |
| *Sum of 1,531 trees at new single-family and 1,205 new trees at new parking lots.<br>**Average number of trees. An improved estimate of the carbon sequestration rate can be evaluated once the implementation parameters are decided.<br>The projected carbon sequestration rates are based on the CAP assumptions.<br>Energy Policy Initiatives Center 2019. | | | |

[106] SANDAG Series 13 Regional Growth Forecast (October 2013). SANDAG Data Surfer, accessed November 2, 2017.
[107] On average, the $CO_2$ sequestration rate is 0.035 MT $CO_2$ per tree per year. The carbon sequestration rate depends on the tree species, climate zone, planting location, and tree age. A more accurate carbon sequestration rate will be evaluated once the parameters are decided in implementation of the measure. California Emissions Estimator Model (CALEEMOD). Appendix D Default Data Tables (October 2017).

# Appendix C

## Climate Action Plan Outreach and Public Engagement Summary

DISCOVER LIFE'S POSSIBILITIES

# CLIMATE ACTION PLAN

## Outreach and Public Engagement Summary

June 2019

SAN MARCOS
DISCOVER LIFE'S POSSIBILITIES

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## ATTACHMENTS

In support of the Climate Action Plan (CAP) update process, the City of San Marcos (City) developed an outreach and engagement strategy to provide residents, stakeholders, interested parties, and other agencies the opportunity to participate in the climate action planning process. This strategy included hosting community workshops to educate the public and other organizations about the CAP, and administering surveys to solicit input from workshop attendees and the general public on potential greenhouse gas (GHG) reduction strategies. Feedback provided at the workshops and through the survey will guide the City in updating the CAP in alignment with the goals and values of the community.

## COMMUNITY WORKSHOPS

The City hosted three CAP community workshops in May 2019. These meetings were open to and attended by the general public, key stakeholders, City staff, and CAP consultants. Each workshop was designed to allow attendees to provide an opportunity to ask questions, learn more about the CAP update process, and provide input and feedback on its development, in particular on the development of strategies to reduce GHG emissions.

The three workshops included:

| | |
|---|---|
| **Workshop #1** | • May 9th (Thursday) at 6:00 PM<br>• San Marcos Senior Center |
| **Workshop #2** | • May 13th (Monday) at 6:00 PM<br>• San Marcos Community Center - Main Hall |
| **Workshop #3**<br>**(with Planning Commission)** | • May 20th (Monday) at 6:30 PM<br>• San Marcos Civic Center - Valley of Discovery Room |

### WORKSHOP ADVERTISING

The City provided promotional material through multiple mediums to inform residents, business owners, and stakeholders of the CAP workshops. This included press releases, flyers, e-blasts, and social media updates. The workshop advertising documentation is provided in ***Attachment A***. Additionally, the City maintained a webpage dedicated to the CAP update (accessed at https://www.san-marcos.net/departments/development-services/planning/climate-action-plan), which was updated to include information on the workshops and direct links to informational materials.

## WORKSHOP FORMAT

Each of the three workshops included four primary components: City staff and consultants' presentation of the CAP update process and proposed GHG reduction strategies; attendees review of the reduction strategy boards; attendees' completion of the CAP survey; and a summary presentation by City staff of survey responses received at the workshop.

### PRESENTATION

A presentation was given by City staff and consultants at the start of each workshop to provide background on the CAP update process and to describe the purpose of the workshop. This presentation included a description of the CAP update process, a summary of the City's baseline GHG emissions and CAP target reductions, and an overview of the proposed strategies identified by the City to potentially include in the CAP update to achieve the targeted Citywide GHG reductions. The PowerPoint presentation used at each workshop is included in ***Attachment B***.

### REDUCTION STRATEGY BOARDS

Following the presentation, workshop attendees had the opportunity to review the GHG reduction strategies preliminarily identified by City staff. These reduction strategies were presented on a series of boards, positioned throughout each workshop space, and included a list of all the reduction strategies preliminarily identified by City staff and the GHG reduction potential (ranging from low to very high) of each strategy. The GHG reduction potential represents a strategy's potential to result in emissions reduction in the year 2030 relative to the other strategies. In addition to the GHG reduction strategies boards, the City provided a GHG inventory board that included information about the City's baseline GHG inventory with a breakdown by emission sector. In total, six boards were provided at each workshop including the GHG inventory board and five GHG reduction strategies summary boards. Each GHG reduction strategy summary board was organized by emissions sector and included the two to six measures within the respective sector and a summary of how emissions in each sector are generated. The five GHG reduction strategies sectors include the following:

- Transportation – Fuel Use
- Transportation – Vehicle Miles Traveled
- Energy
- Waste and Water
- Carbon Sequestration

All six boards are included in ***Attachment C***.

### SURVEY

Workshop attendees had the opportunity to complete a survey following review of the GHG reduction strategies boards. The survey was administered primarily online, and attendees were encouraged to complete it on their mobile device (smart phone or tablet).

Paper copies of the survey and laptops linked directly to the online survey were also available at each workshop for attendees to provide responses if they preferred not to or were unable to use a mobile device.

Surveys completed using paper copies were input directly into the online survey by the City staff and consultant team at each workshop. English and Spanish versions of both the online (for mobile device and laptop users) and paper survey were available. The survey, which is described below, was broken into three parts and is included in ***Attachment D***.

### Introductory Questions

All participants were asked to answer introductory questions. The purpose of these questions was to provide the City with details about who was taking the survey, and allow users to become comfortable with the survey format prior to answering CAP specific questions. Responses to the introductory questions provided the City with the age-range, relationship to the City (i.e., resident, business owner, or worker), and how information about the workshop was received from each respondent.

### Top Five Strategies

The second part of the survey asked respondents to pick the top five reduction strategies they support the most. Each respondent was provided a list of all 23 reduction strategies, from which they could choose up to five measures they support the most.

### Open-Ended Questions

The final page of the survey provided respondents with the opportunity to provide open-ended responses related to the CAP. Respondents had the opportunity to provide information about ways to improve identified reduction strategies, identify additional reduction strategies that respondents felt should be included in the CAP update, and any other general comments on the CAP update process.

## SUMMARY OF RESULTS

Survey results were compiled in real-time at each workshop and a summary of the five most supported reduction strategies, as identified by workshop attendees, were presented at the end of each workshop. In addition to presenting the top five reduction strategies, each meeting concluded with a summary of future meetings, description of how survey results would be considered for the CAP update, and ways to stay involved with the CAP update process.

## ADDITIONAL COMMUNITY INPUT

In addition to the surveys administered at each workshop, comment cards were provided to workshop attendees to note additional comments or questions related to the CAP update. Outside of the workshops, interested parties and community members who were not in attendance at one of the three workshops were also provided the opportunity to submit comments and questions to the City and complete the workshop survey via the City's CAP web page.

All materials provided at the workshops were also published on the City's CAP webpage and available for all community members and the general public.

### COMMENT CARDS

Comment cards were made available at each workshop, allowing attendees the opportunity to provide additional input on the CAP update. These comment cards consisted of a blank page with no leader question, allowing for open-ended responses related to the CAP. Interested parties and community members were also provided the opportunity to submit comments outside of workshop attendance to City staff via email or letter.

### ONLINE SURVEY

A survey identical to the surveys administered at the workshops was made available for completion on the City's CAP webpage. This survey, referred to as the "online survey," was provided in the same format and included the same questions as the workshops survey described previously. The English version of the online survey was made available to the public starting on May 9, 2019, while the Spanish version was made available on May 13, 2019. Both English and Spanish versions of the online survey were closed on May 21, 2019.

## COMMUNITY INPUT SUMMARY

Community input on the CAP update and reduction strategies was provided through completion of the survey and comment cards. In total, the City received thirty-seven (37) responses to the survey and eight (8) completed comment cards. The 37 survey responses include surveys completed at the workshops and online.

### SURVEY RESPONSES

Nearly 75 percent of the surveys were received during the workshops, while the remainder of the surveys were received through the online survey available on the City's CAP webpage. In summary, the City received ten surveys during Workshop #1, seven during Workshop #2, ten during Workshop #3, and ten from online respondents. About three quarters of the responses were provided by residents of San Marcos (73 percent or 27 respondents), while about 40% (or 15 respondents) were either business owners or worked in the City. Only one business or property owner was not also a resident of San Marcos. Five survey responses were provided by individuals who did not live, work, or own a business/property in San Marcos.

Approximately two-thirds of the survey respondents (64 percent or 23 respondents) were 35 to 64 years in age; the largest cohort of respondents (25 percent or nine respondents) being between 45 and 54 years in age. Additionally, 14 percent of survey responses were from persons ages 18 to 24.

All but one of the survey respondents provided input on the top five potential reduction strategies. Six measures were identified as the most supported and are shown in the Table 1.

TABLE 1 MOST SUPPORTED POTENTIAL REDUCTION STRATEGIES FROM SURVEY RESPONSES

| POTENTIAL REDUCTION STRATEGY | VOTES | PERCENT |
|---|---|---|
| Reduce vehicle miles traveled by increasing density in target areas and applying mixed use zones. | 15 | 42% |
| Synchronize traffic signals along major corridors to reduce vehicle idling | 15 | 42% |
| Increase grid-supplied renewable or zero-carbon electricity to achieve 100% carbon-free electricity generated for the City. | 13 | 36% |
| Transition to a more fuel-efficient municipal vehicle fleet by replacing existing vehicles with electric vehicles or other types of zero- or low-emissions vehicles. | 12 | 33% |
| Implement the intra-city shuttle system, identified in the General Plan, with electric buses, to connect activity centers in the City. | 12 | 33% |
| Increase public transit commuter use. | 12 | 33% |

Open-ended questions provided opportunities for survey respondents to address additional concerns with the potential reduction strategies, suggest ways strategies could be improved, and provide additional strategies not currently identified that the City should consider. The survey received 17 responses identifying concerns or explaining how strategies could be improved, and 23 responses identifying additional measures the City should consider.

Concerns or strategy improvements were primarily focused on reductions to vehicle miles traveled. These responses indicated that additional opportunities to carpool or use transit were desired but concerns about the feasibility and cost of making these services available were expressed.

A range of additional strategies the City should consider were provided. The most commonly mentioned suggestions from survey respondents are provided below (in no particular order):

- Work with local schools to increase school bus use
- Implement and encourage composting to occur either at a citywide or individual household/business level
- Invest in or join an existing community choice aggregation program

A full summary of all survey responses is provided in ***Attachment E***.

## COMMENT CARDS

A total of eight comments were provided in addition to the survey and open-ended responses. These comments included seven comment cards completed by workshop attendees and submitted to staff during the workshop, and one comment submitted to City staff outside of the workshops via email. These comments were provided by workshop attendees and San Diego Gas & Electric and included suggestions for the CAP beyond the potential reduction measures. These suggestions included adding adaptation and social justice sections to the updated CAP, reviewing land-use policies to limit outward City growth and focus on infill development, as well as comments providing examples of existing climate change policies or programs implemented by other jurisdictions. All comment cards received are included in ***Attachment F***.

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# ATTACHMENT A

## Workshop Advertising Materials

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## DEVELOPMENT SERVICES DEPARTMENT

# UPCOMING WORKSHOPS FOR THE CLIMATE ACTION PLAN UPDATE

The City of San Marcos (City) is currently in the process of updating its Climate Action Plan (CAP). As part of the CAP update development process, the City is holding a series of workshops. City staff plans to incorporate feedback received and release the CAP for public review in Summer 2019, with final release of the CAP and public hearings occurring in Fall/Winter 2019.

## SAVE THE DATES

The City will be hosting three public workshops to engage City residents, businesses, and community leaders in the CAP update development process. These workshops will provide an opportunity to ask questions, learn more about the CAP update process, and to provide input and feedback on its development. Feedback will be gathered through real-time polling and survey responses at the workshops. The City will incorporate input from these workshops and an online survey into the CAP to create a plan that reflects the values and vision of the community.

Please join us at any one of our upcoming workshops:

**WORKSHOP #1: MAY 9TH (THURSDAY) AT 6:00 PM.**
***San Marcos Senior Center*** (111 Richmar Avenue, San Marcos, CA 92069)

**WORKSHOP #2: MAY 13TH (MONDAY) AT 6:00 PM.**
***San Marcos Community Center – Main Hall*** (3 Civic Center Drive, San Marcos, CA 92069)

**WORKSHOP #3 (PLANNING COMMISSION): MAY 20TH (MONDAY) AT 6:30 PM**
***San Marcos Civic Center – Valley of Discover Room*** (1 Civic Center Drive, San Marcos, CA 92069)

## WHAT IS A CLIMATE ACTION PLAN?

A CAP is a long-range plan that outlines strategies to reduce greenhouse gas (GHG) emissions. This City is in the process of updating its previous CAP, adopted in 2013, with support from the SANDAG Roadmap Program. The intent of the updated CAP is to reduce GHG emissions in the City to 40 percent below 1990 levels by 2030, consistent with State goals. In addition to reducing GHG emissions, the types of strategies considered in the CAP can also provide community benefits by reducing air pollution, improving traffic conditions, supporting local economic development, and improving public health and quality of life.

The City has completed a draft greenhouse gas emissions inventory and projections document, which summarizes emissions from 2012 to 2014 and the business-as-usual projections for 2020, 2030 and 2035. The updated CAP will use these projections to develop GHG reduction strategies to achieve the 2030 target.


201 Mata Way | San Marcos, CA 92069 | (760) 752-7550

## STAY INVOLVED IN THE PROCESS

Please head over to our webpage dedicated to the CAP update, which will be updated periodically to keep all stakeholders informed on the CAP update process. If you are not able to attend one of these workshops, you will still be able to provide your thoughts and ideas! An online survey will soon be launched on the website to gather input from members of the community who are unable to attend these workshops, or for those who wish to provide additional feedback following workshop attendance. Stay tuned for more information!

(https://www.san-marcos.net/departments/development-services/planning/climate-action-plan)

## HAVE OTHER QUESTIONS?

For questions, please contact Saima Qureshy, City of San Marcos Principal Planner.
Email: squreshy@san-marcos.net Phone: (760) 744-1050, ext. 3222


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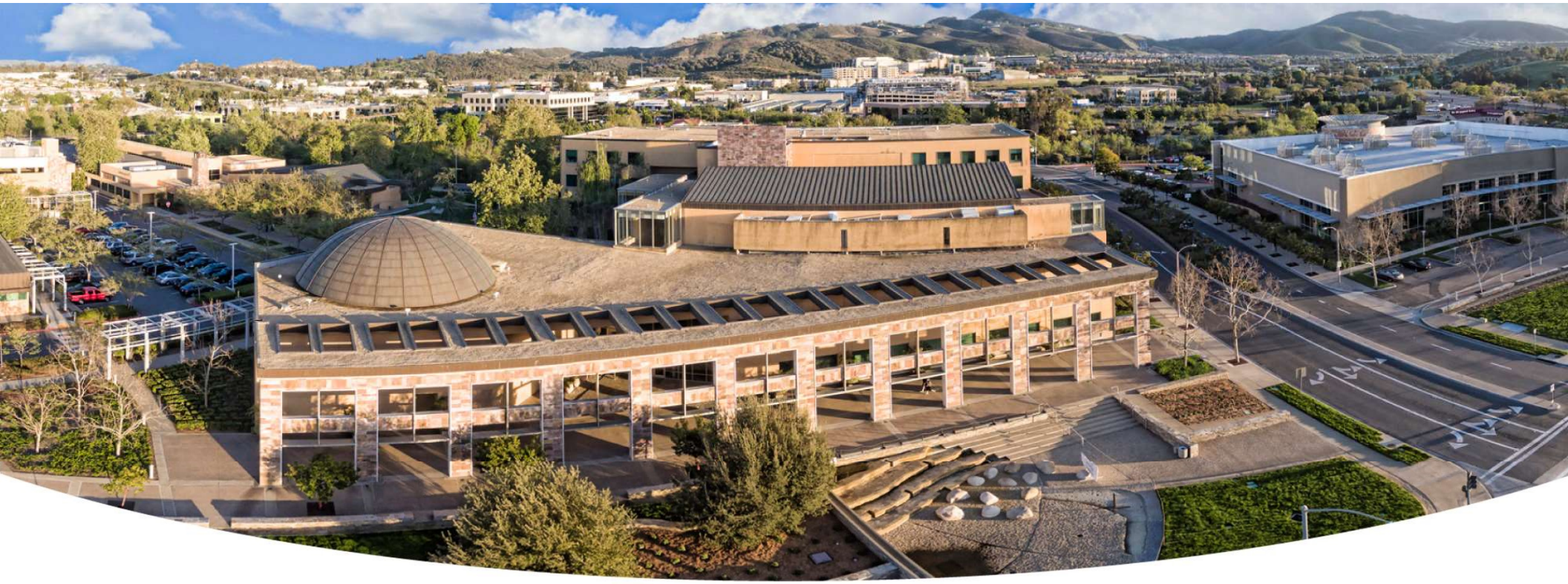
Save the Dates
CLIMATE ACTION PLAN WORKSHOPS
THURSDAY, MAY 9TH
AT 6:00 PM
San Marcos Senior Center
MONDAY, MAY 13TH
AT 6:00 PM
San Marcos Community Center , Main Hall
MONDAY, MAY 20TH
AT 6:30 PM
Planning Commission Workshop: San Marcos Civic Center, Valley of Discovery Room
www.san-marcos.net/departments/development-services/planning/climate-action-plan

# ATTACHMENT B

## CAP Workshop PowerPoint



# CLIMATE ACTION PLAN WORKSHOP

City of San Marcos | May 2019

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# TONIGHT'S PROGRAM

**6:15** Presentation

- Climate Action Plan (CAP) Introduction
- Citywide Greenhouse Gas (GHG) Inventory
- Proposed Reduction Strategies

**6:30** Reduction Strategy Board Review and Survey Completion

**7:30** Results of Survey

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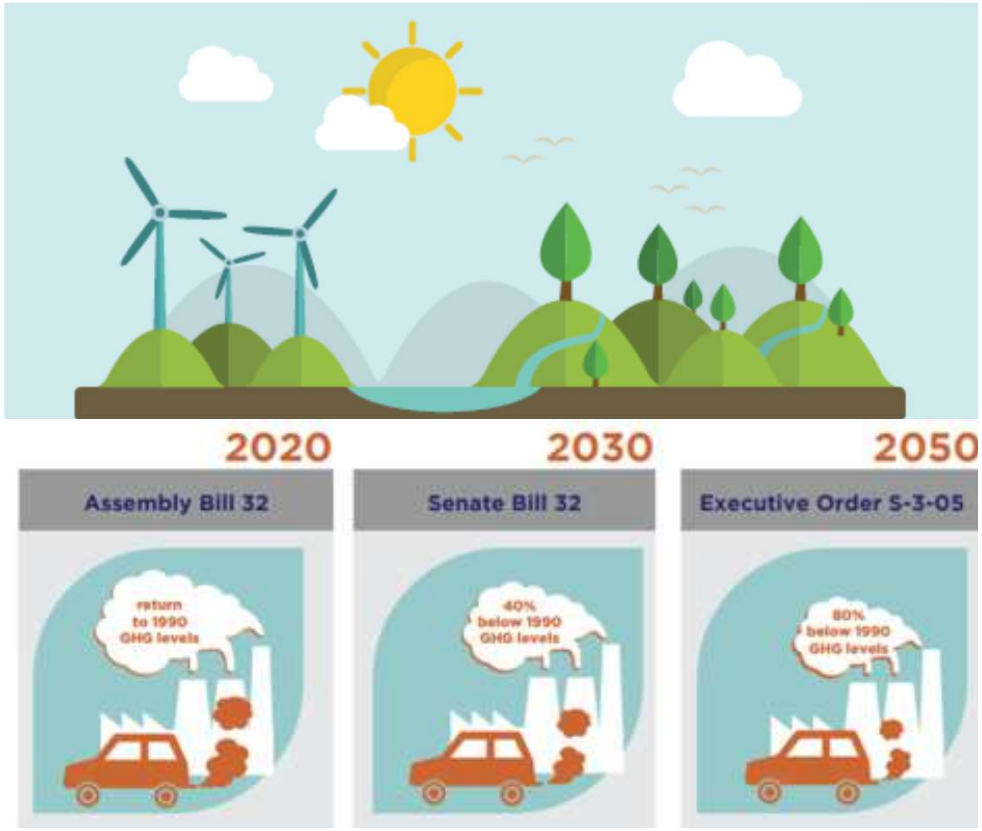
# CLIMATE ACTION PLAN (CAP) BASICS




Source: SANDAG 2018

A CAP is a comprehensive policy document that outlines specific activities a City will undertake to reduce greenhouse gas (GHG) emissions

This includes:

- Modeling current and future citywide GHG emissions and projections.
  - Setting future reduction targets consistent with State targets and goals
  - Identifies "emissions gap" needed to be met through City action
- Outlining actions the City will take to reduce GHG emissions.
  - Developing strategies and measure to achieve targets.
  - Establishing implementation and monitoring strategies

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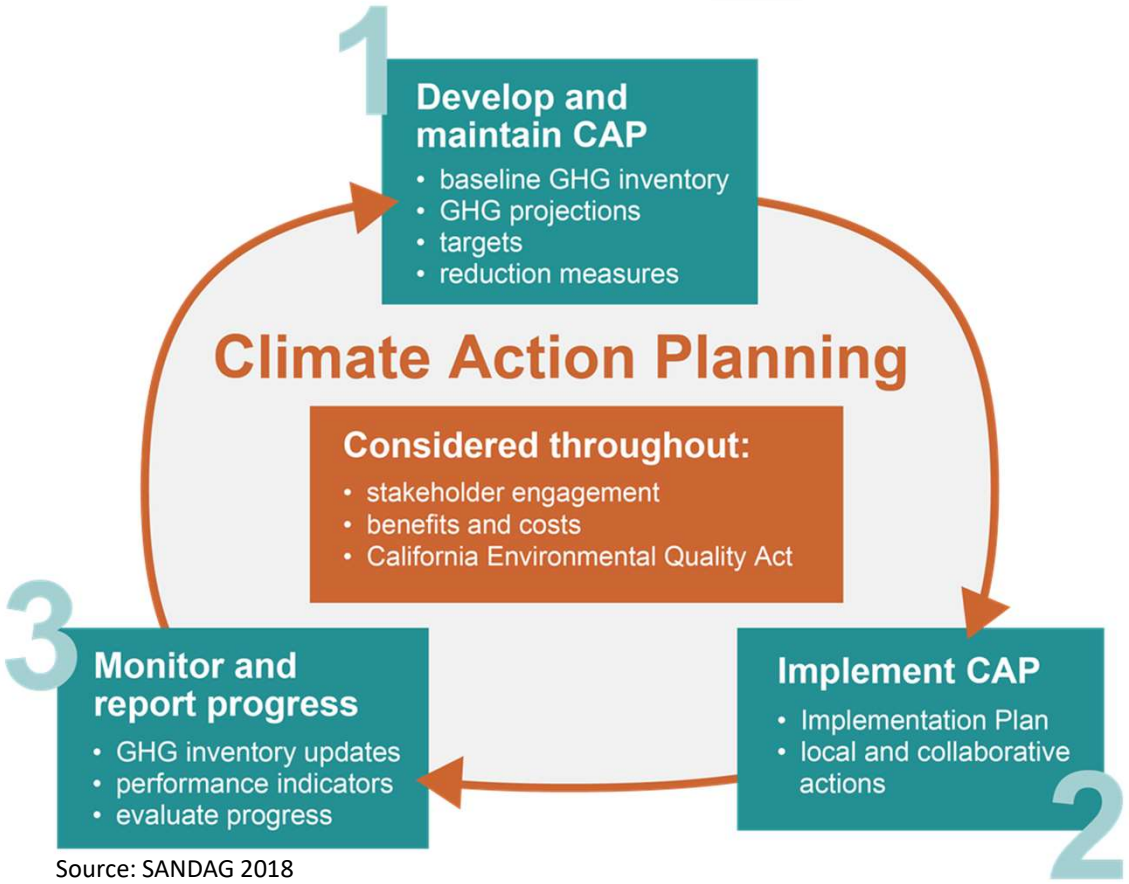
# THE CLIMATE ACTION PLANNING PROCESS




Source: SANDAG 2018

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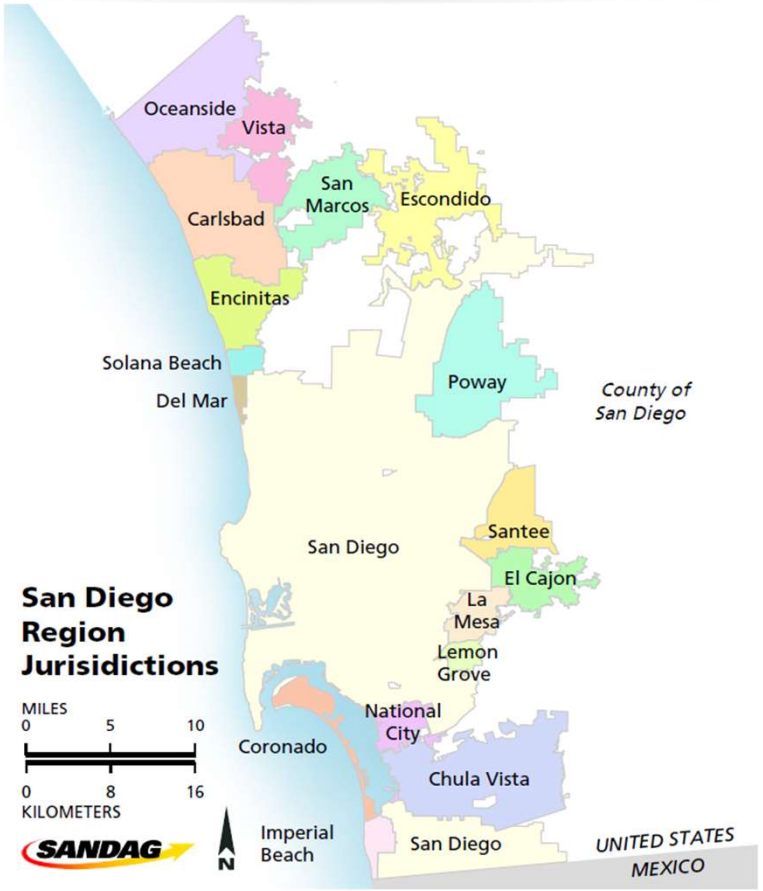
# LOCAL CLIMATE PLANNING EFFORTS

| Jurisdiction | Climate Action Plan | |
|---|---|---|
| | Adopted (year) | Developing |
| Carlsbad | 2015 | |
| Chula Vista | 2017 | |
| Coronado | | ✓ |
| County of San Diego | 2018 | |
| Del Mar | 2016 | |
| El Cajon | | ✓ |
| Encinitas | 2018 | |
| Escondido | 2012 | ✓* |
| Imperial Beach | | ✓ |
| La Mesa | 2018 | |
| Lemon Grove | | ✓ |
| National City | 2011 | |
| Oceanside | | ✓ |
| Poway | | |
| San Diego | 2015 | |
| San Marcos | 2013 | ✓* |
| Santee | | ✓ |
| Solana Beach | 2017 | |
| Vista | 2013 | ✓* |

*Escondido, San Marcos, and Vista are currently updating their CAPs.




Source: SANDAG 2018

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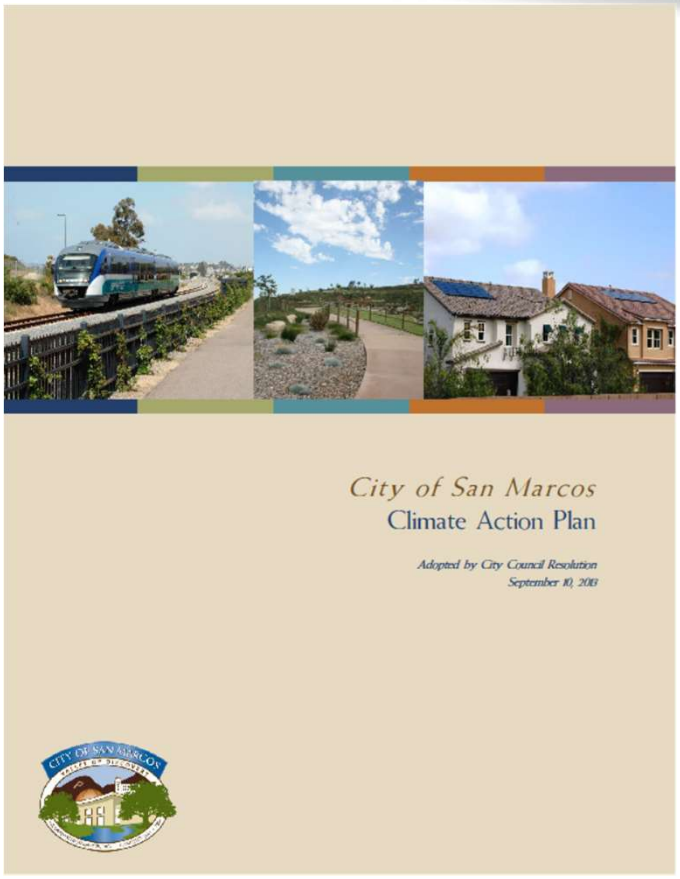
# UPDATING THE PREVIOUS 2013 CAP




Source: City of San Marcos 2013

## Original CAP: Adopted Sept. 2013

- Mitigation measure of the General Plan –EIR
  - Based on 2005 GHG inventory
  - GHG reduction measures to meet 2020 and 2030 targets
  - Allows tiering and streamlining in environmental review

## Since adoption there have been…

- Updates to statewide targets/SB32

## Updating the CAP allows for…

- Compliance with SB 32/State's target for 2030
- Updated Citywide GHG inventory
- Incorporation of updated GHG reduction measures based on new technologies

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# STATUS OF CAP UPDATE DEVELOPMENT

Source: SANDAG 2018

1. Update baseline GHG emissions inventory - Completed
2. Model business-as-usual (BAU) GHG emissions projections and establish GHG emissions reduction targets – Completed
3. Identify GHG Reduction Measures – In Progress
4. Conduct outreach – In Progress
5. Prepare Draft CAP- Next Step
6. Prepare Cost Analysis and conduct CEQA analysis – Next Step
7. Finalize and Adopt the CAP – Future Step
8. Monitor and Implement the CAP - Future Step

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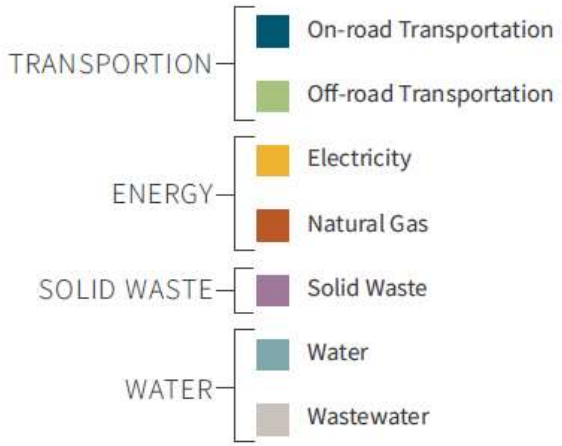
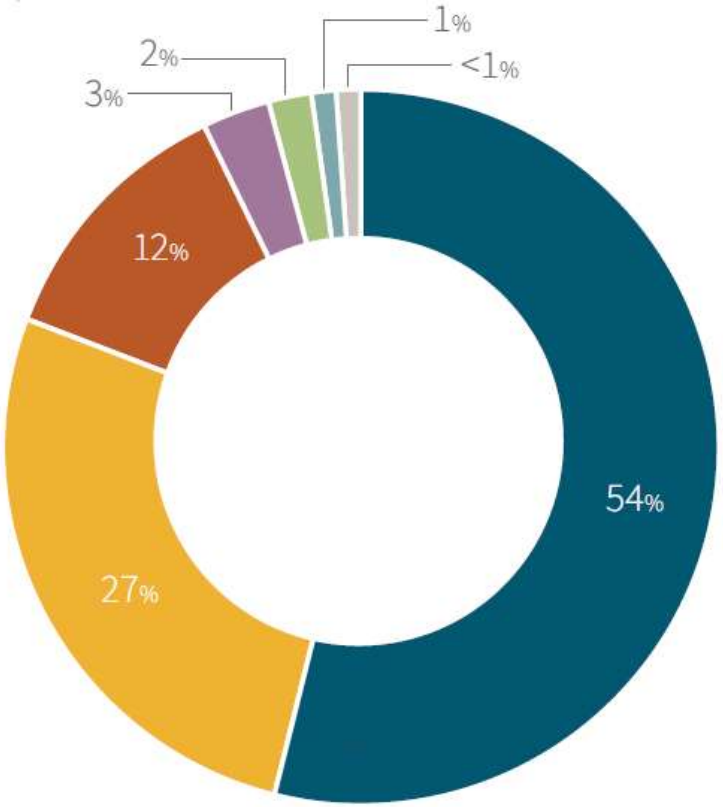
# BASELINE GHG EMISSIONS INVENTORY - 2012

Total emissions in 2012:

**600,000 MT $CO_2e$/yr**

*(metric tons of carbon dioxide equivalent per year)*




Source: Energy Policy Initiatives Center 2019

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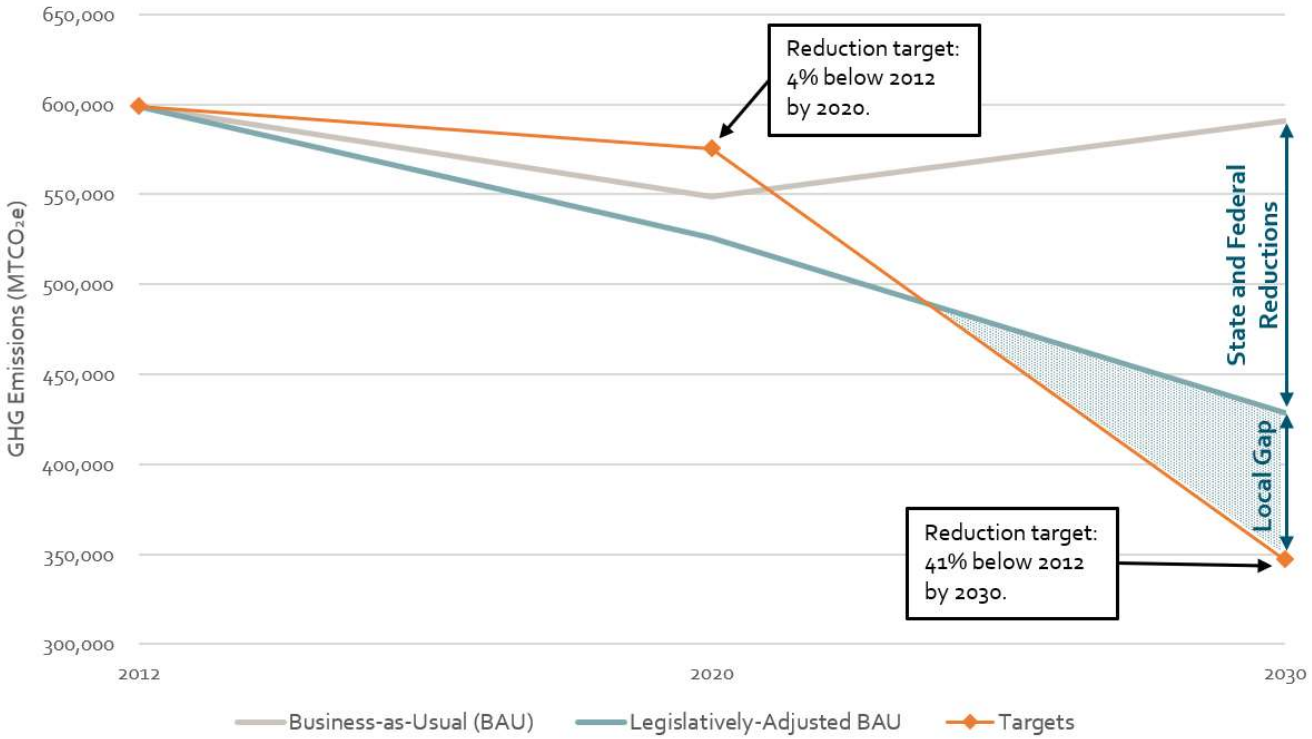
# GHG BASELINE, PROJECTIONS, & TARGETS




Source: Energy Policy Initiatives Center 2019

- Baseline inventory from citywide emissions in 2012
- State and Federal Programs to Reduce Emissions
  - Renewable Portfolio Standard
  - California Solar policies and Programs
  - California Energy Efficiency Programs
  - Federal and State Vehicle Standards
- San Marcos CAP Targets
  - 4% below 2012 levels by 2020
  - 41% below 2012 levels by 2030

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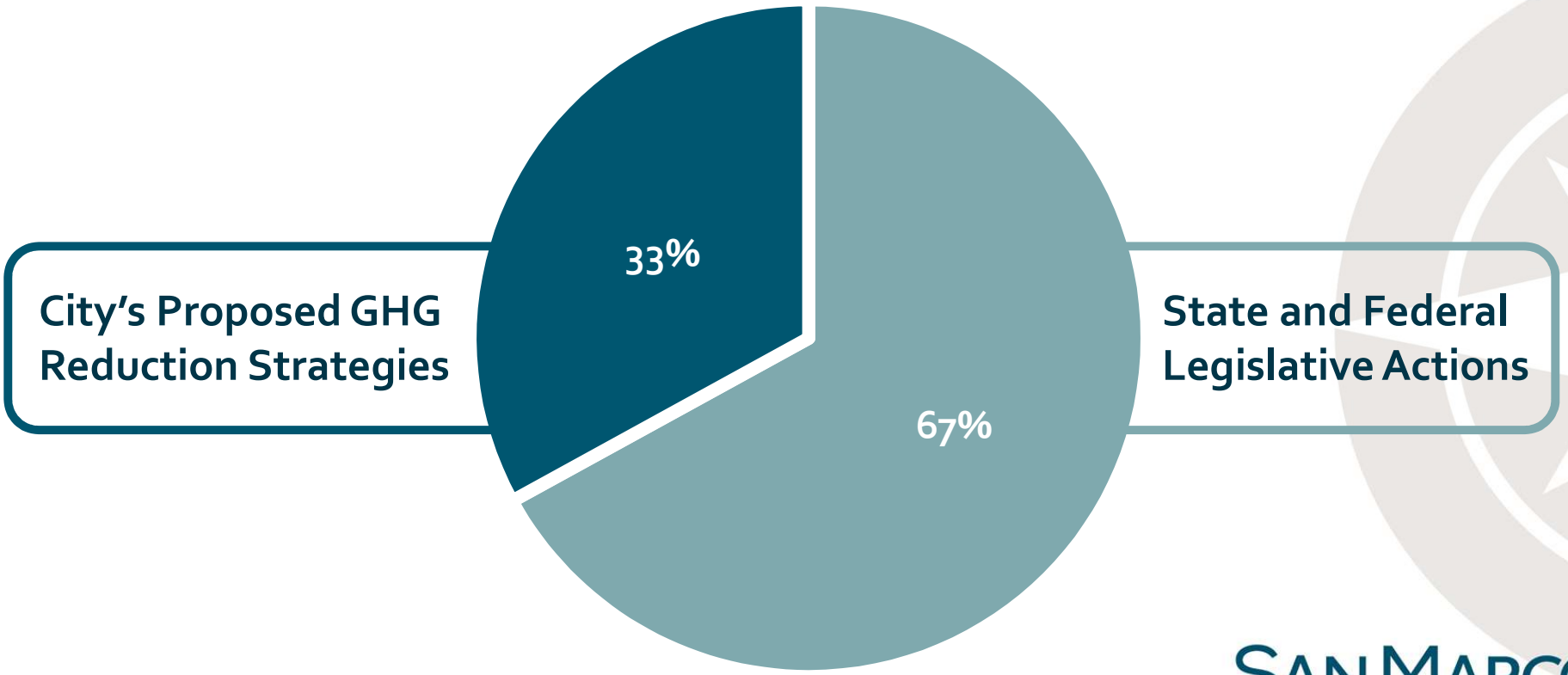
# GHG BASELINE, PROJECTIONS, & TARGETS

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# POTENTIAL REDUCTION STRATEGIES

- Transportation
  - Fuel Use
  - Vehicle Miles Traveled
- Energy
- Waste and Water
- Carbon Sequestration

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# TRANSPORTATION

- Emissions generated from…
  - Vehicle travel on City roads
  - Construction vehicle operation
- Reductions achieved by…
  - Increased bicycle and pedestrian travel
  - Increased use of public transit
  - Smart growth
  - Increased use of less carbon-intensive fuels

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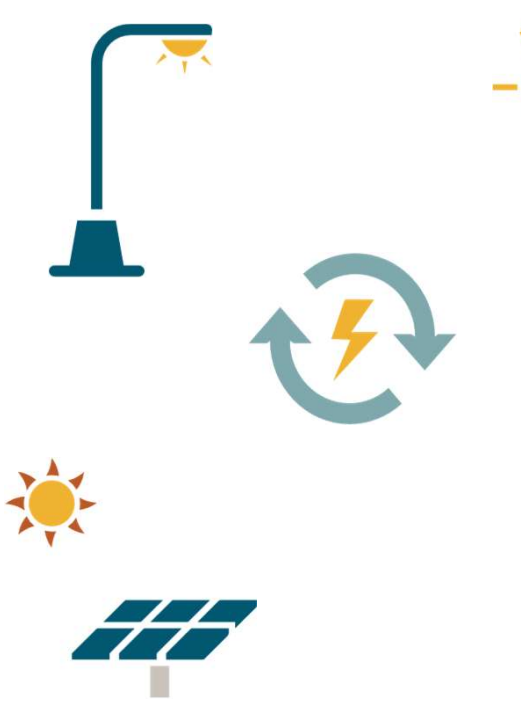
# ENERGY

- Emissions generated from…
  - Fuel used to generate electricity
  - Building lighting
  - Space and water heating
- Reductions achieved by…
  - Increasing building efficiency
  - Increasing supply of renewable energy



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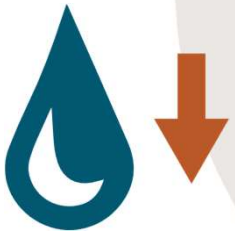
# WASTE AND WATER

- Emissions generated from…
  - Solid waste disposal at landfills
  - Fuel used to extract, treat, convey, and distribute water
- Reductions achieved by…
  - Reducing outdoor water use
  - Increasing solid waste diversion from landfills (e.g., recycling or composting)



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# CARBON SEQUESTRATION

- Offset GHG emissions generated by other sources
- Reductions achieved by…
  - Planting new trees
  - Increasing landscaped area

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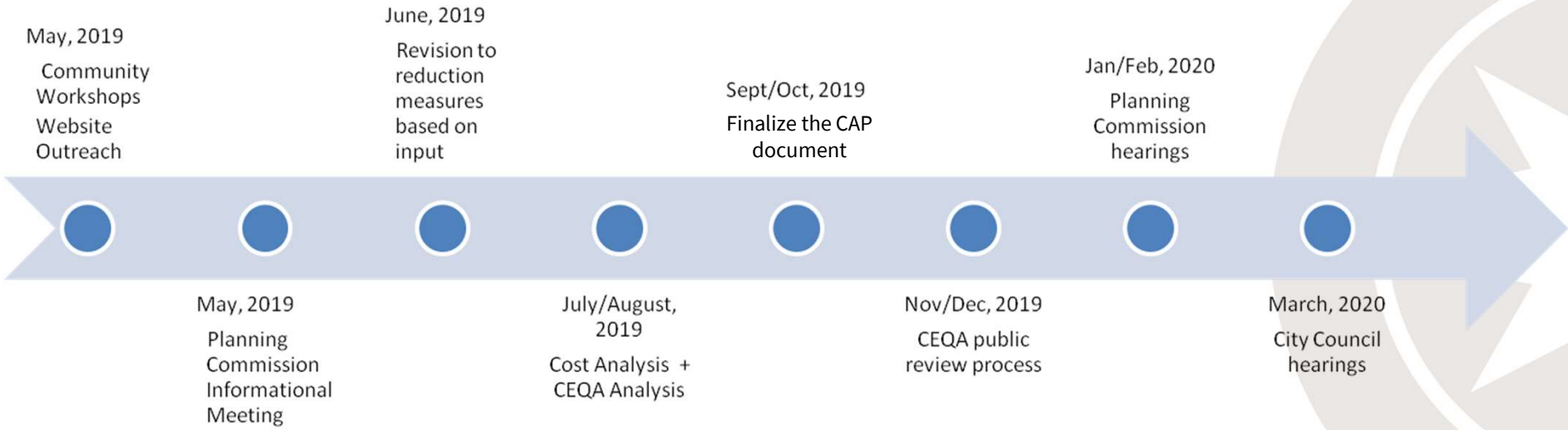
# WHAT'S NEXT?

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# SURVEY

- Taking the survey
  - Survey available online
    Click or type in the URL to your browser
  - Introduction and screener questions
    Information used for data sorting and compiling
  - Pick up to five measures you support the most
  - Additional feedback through three open-ended questions

https://www.surveymonkey.com/r/**SanMarcosCAPSurvey**

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# ATTACHMENT C

## Potential Reduction Strategies Workshop Boards

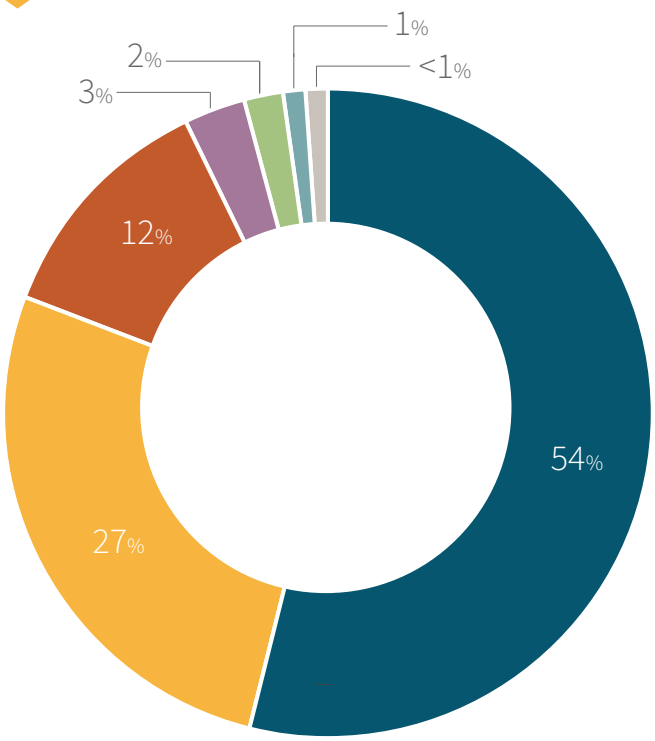
# GREENHOUSE GAS INVENTORY
# EMISSIONS

Total emissions in 2012:

**600,000 MT $CO_2e$/yr**

*(metric tons of carbon dioxide equivalent per year)*

- TRANSPORTION
  - On-road Transportation
  - Off-road Transportation
- ENERGY
  - Electricity
  - Natural Gas
- SOLID WASTE
  - Solid Waste
- WATER
  - Water
  - Wastewater




## 600,000 MT $CO_2e$ IS EQUIVALENT TO...

### GHG EMISSIONS GENERATED BY...

**655 million pounds**
of coal burned

*or*

**1.5 billion miles**
driven by a single car

*or*

Energy required to charge
**76.5 billion smartphones**

### GHG EMISSIONS AVOIDED BY...

**127 wind turbines**
running for a year

*or*

**26.2 million bags of trash**
recycled instead of landfilled

*or*

**10 million tree seedlings**
grown for ten years

*(source: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator)*

# GREENHOUSE GAS REDUCTION STRATEGY
# TRANSPORTATION - FUEL USE

Greenhouse gas (GHG) emissions in the transportation sector are generated through the burning of fuel in vehicles traveling to and from destinations in the City and are the largest source of emissions in the City. Transportation-related GHG emissions can be reduced by increasing the use of low or zero-emissions vehicles like plug-in electric vehicles (EVs), reducing the length or amount of vehicle trips (called vehicle miles traveled [VMT]) and improving the efficiency of vehicle travel. Potential strategies to reduce emissions from transportation fuel use include increasing the use of low- and zero-emission vehicles, installing EV charging stations, and making traffic control improvements such as synchronizing traffic signals to increase the efficiency of vehicle travel.

| | STRATEGY | GHG REDUCTION POTENTIAL |
|---|---|---|
|  | Transition to a more fuel-efficient municipal vehicle fleet by replacing existing vehicles with EVs or other types of zero- or low-emissions vehicles. | **LOW** |
|  | Require EV charging stations at new multi-family and non-residential developments. | **HIGH** |
| | Install EV charging stations at City-owned public spaces. | **MEDIUM** |
|  | Increase renewable or less carbon-intensive fuel use in construction vehicles and equipment. | **HIGH** |
|  | Synchronize traffic signals along major corridors to reduce vehicle idling. | **LOW** |
|  | Install roundabouts to improve efficiency of vehicle travel in the City. | **MEDIUM** |

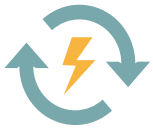
# GREENHOUSE GAS REDUCTION STRATEGY
# TRANSPORTATION-VEHICLE MILES TRAVELED

Greenhouse gas (GHG) emissions in the transportation sector are generated through the burning of fuel in vehicles traveling to and from destinations in the City and are the largest source of emissions in the City. Transportation-related GHG emissions can be reduced by increasing the use of low or zero-emissions vehicles like plug-in electric vehicles (EVs), reducing the length or amount of vehicle trips (called vehicle miles traveled [VMT]) and improving the efficiency of vehicle travel. Potential strategies to reduce VMT include providing new and upgraded bicycle facilities, new and improved public transit service, and planning for new development that promotes use of public transit, walking, biking, ridesharing and other options to driving alone.

| STRATEGY | | GHG REDUCTION POTENTIAL |
|---|---|---|
|  | Promote employer participation in San Diego Association of Government's (SANDAG's) iCommute vanpool program. | **LOW** |
|  | Install new bike lanes and upgrade existing ones in the City as stipulated in the General Plan | **MEDIUM** |
|  | Require Transportation Demand Management (TDM) measures at new developments (excluding single-family homes) that specify incentives or requirements for residents and employers to increase use of public transit, walking, biking, and ridesharing. | **LOW** |
|  | Implement the intra-city shuttle system, identified in the General Plan, with electric buses, to connect activity centers in the City. | **HIGH** |
| | Increase public transit commuter use (e.g., bus, Sprinter). | **HIGH** |
|  | Reduce vehicle miles traveled by increasing density in target areas and applying mixed use zones. | **HIGH** |

# GREENHOUSE GAS REDUCTION STRATEGY
# ENERGY

Greenhouse gas (GHG) emissions in the energy sector are generally a product of the fuel used to generate electricity, and the end use of electricity and natural gas in buildings for lighting, space and water heating, air conditioning, equipment, and appliances. Energy-related emissions can be reduced by increasing the amount of electricity generated from renewable or zero-emissions sources, and using electricity and natural gas more efficiently. Potential strategies to reduce emissions in this sector can include improving building energy efficiencies, transitioning from gas-fueled to electric-powered appliances and equipment, and increasing renewable energy use and supply.

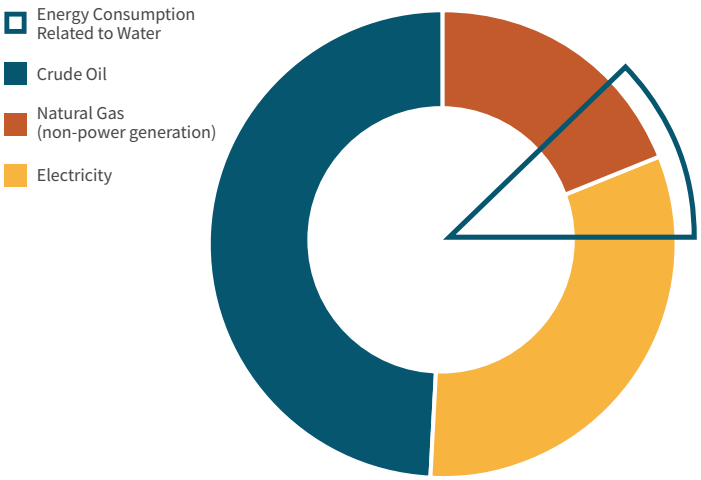
| STRATEGY | GHG REDUCTION POTENTIAL |
|---|---|
|  Implement municipal lighting retrofit projects. | **LOW** |
|  Require new residential projects to install alternative powered water heaters (e.g., electric heat pump water heaters, solar water heaters). | **HIGH** |
|  Implement lighting and other measures at municipal facilities to increase energy efficiency. | **LOW** |
|  Increase grid-supplied renewable or zero-carbon electricity to achieve 100% carbon-free electricity generated for the City. | **VERY HIGH** |
|  Require new non-residential developments to install photovoltaic (PV) energy generation systems. | **MEDIUM** |
|  Install PV systems at municipal sites. | **LOW** |

# GREENHOUSE GAS REDUCTION STRATEGY
# WASTE AND WATER

Greenhouse gas (GHG) emissions in the waste and water sectors are generated by solid waste disposal at landfills and fuel used to extract, treat, convey, and distribute water. Potential strategies to reduce emissions in these sectors can include diverting solid waste away from landfills and reducing water consumption.

| STRATEGY | | GHG REDUCTION POTENTIAL |
|---|---|---|
|  | Reduce outdoor landscape water use by enforcing new water budgets and the use of weather-based irrigation controllers | LOW |
|  | Reduce water use at City parks. | LOW |
|  | Increase citywide waste diversion by working with the City's franchise waste hauler | HIGH |

## Energy Consumption in California




**About 12% of California's total energy use is related to water.** Energy is used in multiple ways and at multiple steps in water delivery and treatment systems, as well as wastewater collection and treatment. The sources of energy used to power these water activities is directly tied to the volume of GHGs we emit into the atmosphere. Energy is required for the following water activities:

- Pumping water from underground aquifers
- Moving water from one location to another (water conveyance)
- Treating water to make it drinkable
- Heating and cooling water*

*(Source: California Department of Water Resources 2019)*

* The City's inventory identifies GHGs generated due to heating and cooling water in the Energy sector.

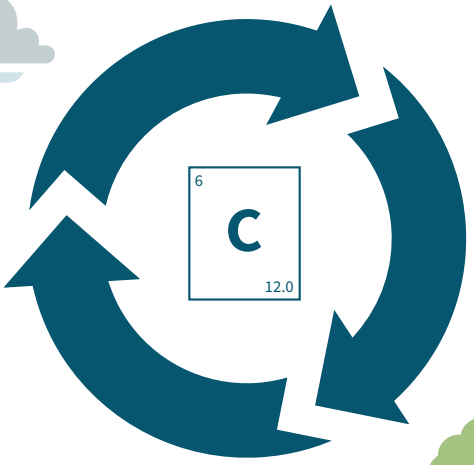
# GREENHOUSE GAS REDUCTION STRATEGY
# CARBON SEQUESTRATION

As part of photosynthesis and the natural carbon cycle, plants take carbon dioxide ($CO_2$) – an important greenhouse gas (GHG) – and convert it into oxygen and carbon-based plant matter, storing the carbon captured from the atmosphere. Due to their size and longevity, trees are an important source of carbon storage and sequestration. This strategy focuses on planting more trees in public spaces and private developments to offset GHG emissions generated by other sources.

| STRATEGY | GHG REDUCTION POTENTIAL |
|---|---|
|  Plant and maintain trees in City parks and public rights-of-way. | LOW |
| Require trees to be planted at private properties, per requirements in the parking code and for each new project. | LOW |

## Carbon Cycle and Storage

Cars and factories emit carbon into the atmosphere.




Carbon sequestered in trees is returned to the cycle when trees die and decompose, or are harvested and used as fuel.

New tree growth results in the intake and storing of carbon from the atmosphere

# ATTACHMENT D

## Workshop Survey

# *CLIMATE ACTION PLAN WORKSHOP SURVEY*

## INTRODUCTION

*The City of San Marcos (City) is currently in the process of updating its Climate Action Plan (CAP). As part of the CAP update process, the City is seeking input from City residents, businesses, and other interested parties.*

*City staff plans to incorporate feedback received from this survey into the CAP to create a plan that reflects the values and vision of the community. The CAP is expected to be released for public review in Fall 2019, with final release of the CAP and public hearings anticipated in early 2020.*

### INTRODUCTORY QUESTIONS (PLEASE CIRCLE YOUR ANSWERS)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| What is your age? | <18 | 18-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ |
| Are you a resident of San Marcos? | | Yes | | | | No | |
| Do you own a business or property in San Marcos? | | Yes | | | | No | |
| Do you work in San Marcos? | | Yes | | | | No | |
| How did you hear about this project? | City Website | | Press Release | | Social Media | | |
| | Email | | Other (please specify)_____ | | | | |

## PROPOSED GREENHOUSE GAS REDUCTION STRATEGIES

*The City is considering a variety of strategies to reduce greenhouse gas (GHG) emissions. These strategies have been organized into the following categories:*

- *Transportation*
- *Energy*
- *Waste and Water*
- *Carbon Sequestration*

*There are a total of 23 proposed strategies grouped into the categories listed above. On the following page you will be asked to choose up to five strategies you support the most.*

From the list of proposed strategies, below, please indicate ***up to five*** strategies that you support the most.

| ***Proposed Strategies*** | Category |
|---|---|
| ☐ Transition to a more fuel-efficient municipal fleet by replacing existing vehicles with electric vehicles (EVs) or other types of zero- or low-emissions vehicles | Transportation (Fuel Use) |
| ☐ Require EV charging stations at new multi-family and non-residential developments. | Transportation (Fuel Use) |
| ☐ Install EV charging stations at City-owned public spaces. | Transportation (Fuel Use) |
| ☐ Increase renewable or less carbon-intensive fuel use in construction vehicles and equipment. | Transportation (Fuel Use) |
| ☐ Synchronize traffic signals along major corridors to reduce vehicle idling. | Transportation (Fuel Use) |
| ☐ Install roundabouts to improve efficiency of vehicle travel in the City. | Transportation (Fuel Use) |
| ☐ Promote employer participation in San Diego Association of Government's (SANDAG's) iCommute vanpool program. | Transportation (VMT) |
| ☐ Install new bike lanes and upgrade existing ones in the City as stipulated in the General Plan. | Transportation (VMT) |
| ☐ Require Transportation Demand Management (TDM) measures at new developments (excluding single-family homes) that specify incentives or requirements for residents and employers to increase use of public transit, walking, biking, and ridesharing. | Transportation (VMT) |
| ☐ Implement the intra-city shuttle system, identified in the General Plan, with electric busses, to connect activity centers in the City. | Transportation (VMT) |
| ☐ Increase public transit commuter use. | Transportation (VMT) |
| ☐ Reduce vehicle miles traveled by increasing density in target areas and applying mixed use zoning. | Transportation (VMT) |
| ☐ Implement municipal lighting retrofit projects. | Energy |
| ☐ Require new residential projects to install alternative powered water heaters (e.g., electric heat pump water heaters, solar water heaters). | Energy |
| ☐ Implement lighting and other measures at municipal facilities to increase energy efficiency. | Energy |
| ☐ Increase grid-supplied renewable or zero-carbon electricity to achieve 100% carbon-free electricity generated for the City. | Energy |
| ☐ Require new non-residential developments to install photovoltaic (PV) energy generation systems. | Energy |
| ☐ Install PV systems at municipal sites. | Energy |
| ☐ Reduce outdoor landscape water use by enforcing new water budgets and the use of weather-based irrigation controllers. | Waste and Water |
| ☐ Reduce water use at City parks. | Waste and Water |
| ☐ Increase citywide waste diversion by working with the City's franchise waste hauler. | Waste and Water |
| ☐ Plant and maintain trees in City parks and public rights-of-way. | Carbon Sequestration |
| ☐ Require trees to be planted at private properties, per requirements in the parking code and for each new project. | Carbon Sequestration |
| ☐ None | |

## OPEN-RESPONSE QUESTIONS

*The following three questions are open-ended for you to provide further input on strategies and general comments on the CAP update process. Please print your responses within the space provided for each question. Please use the back of this page if you require additional space.*

***For any of the proposed strategies that you would not support, please identify your concerns or explain how you think they could be improved:***

***Are there any measures not currently identified by the City that you think should be considered? If yes, please briefly explain below:***

***Do you have any other questions or comments about the CAP, its process, and/or its development?***

Thank you for attending this workshop and providing your input!

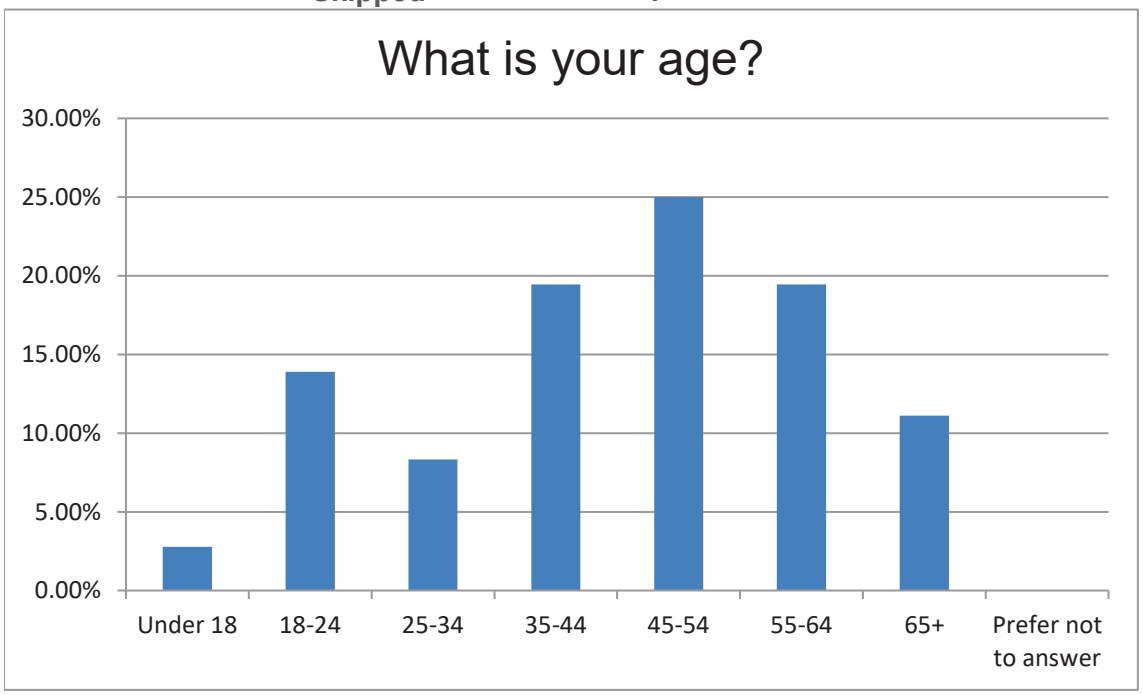
# ATTACHMENT E

## Workshop and Online Survey Responses

# San Marcos Climate Action Plan Workshop Survey

**What is your age?**

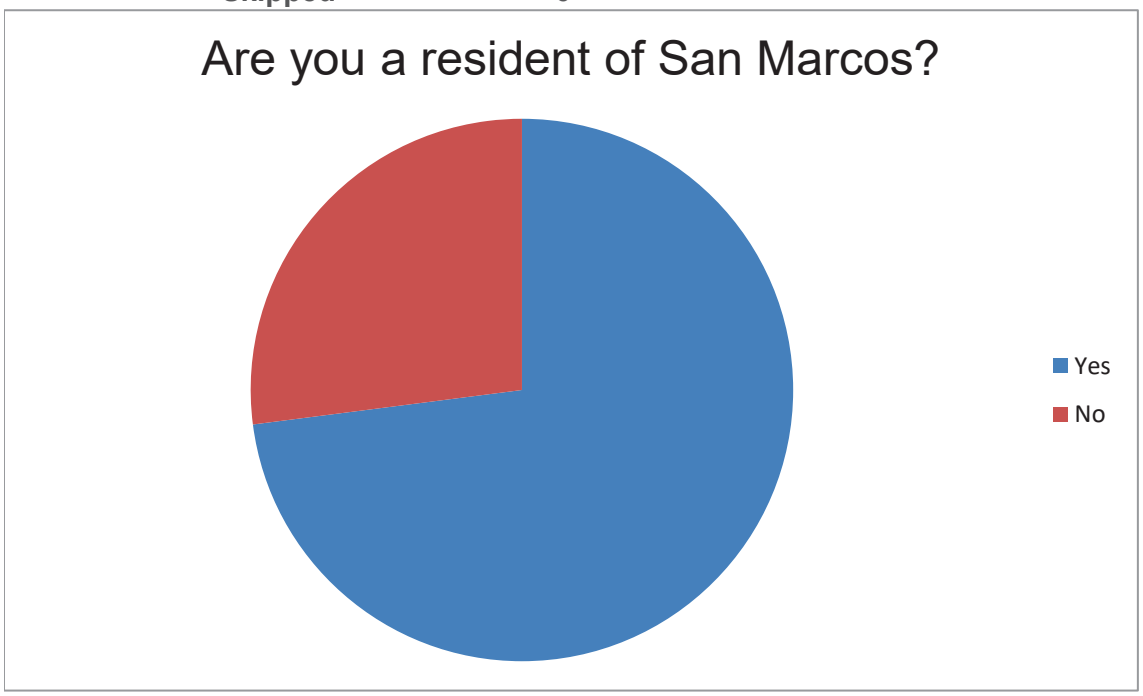
| Answer Choices | Responses | |
|---|---|---|
| Under 18 | 2.78% | 1 |
| 18-24 | 13.89% | 5 |
| 25-34 | 8.33% | 3 |
| 35-44 | 19.44% | 7 |
| 45-54 | 25.00% | 9 |
| 55-64 | 19.44% | 7 |
| 65+ | 11.11% | 4 |
| Prefer not to answer | 0.00% | 0 |
| | **Answered** | **36** |
| | **Skipped** | **1** |



San Marcos Climate Action Plan Workshop Survey

**Are you a resident of San Marcos?**

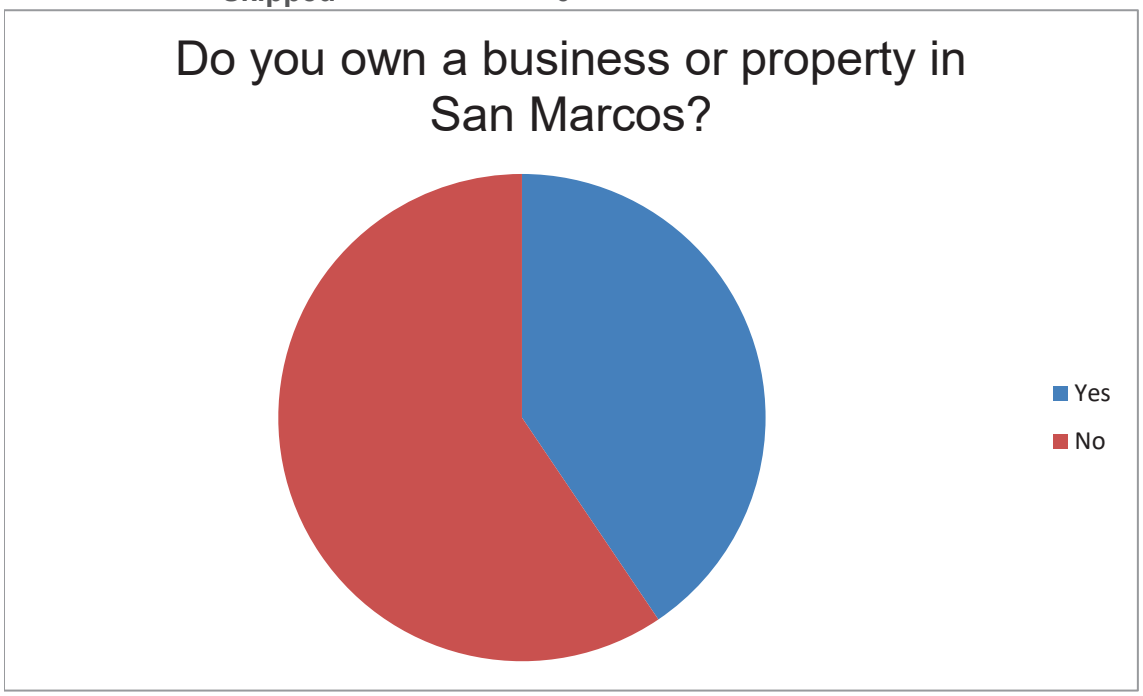
| Answer Choices | Responses | |
|---|---|---|
| Yes | 72.97% | 27 |
| No | 27.03% | 10 |
| | **Answered** | **37** |
| | **Skipped** | **0** |



San Marcos Climate Action Plan Workshop Survey

**Do you own a business or property in San Marcos?**

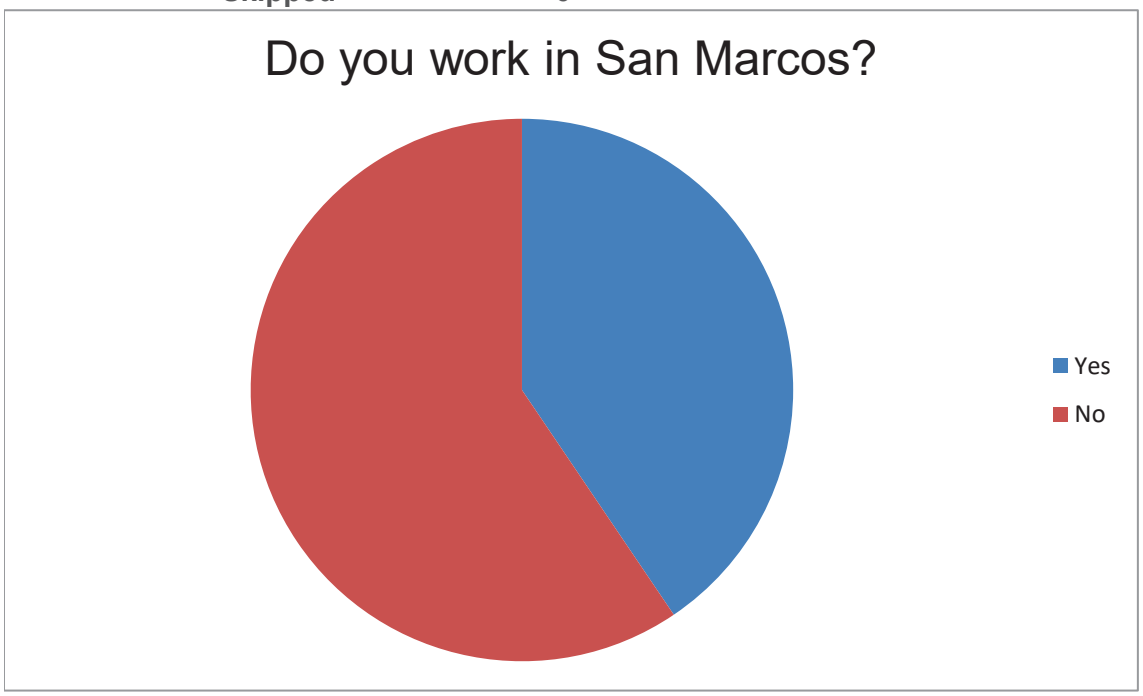
| Answer Choices | Responses | |
|---|---|---|
| Yes | 40.54% | 15 |
| No | 59.46% | 22 |
| | **Answered** | **37** |
| | **Skipped** | **0** |



San Marcos Climate Action Plan Workshop Survey

**Do you work in San Marcos?**

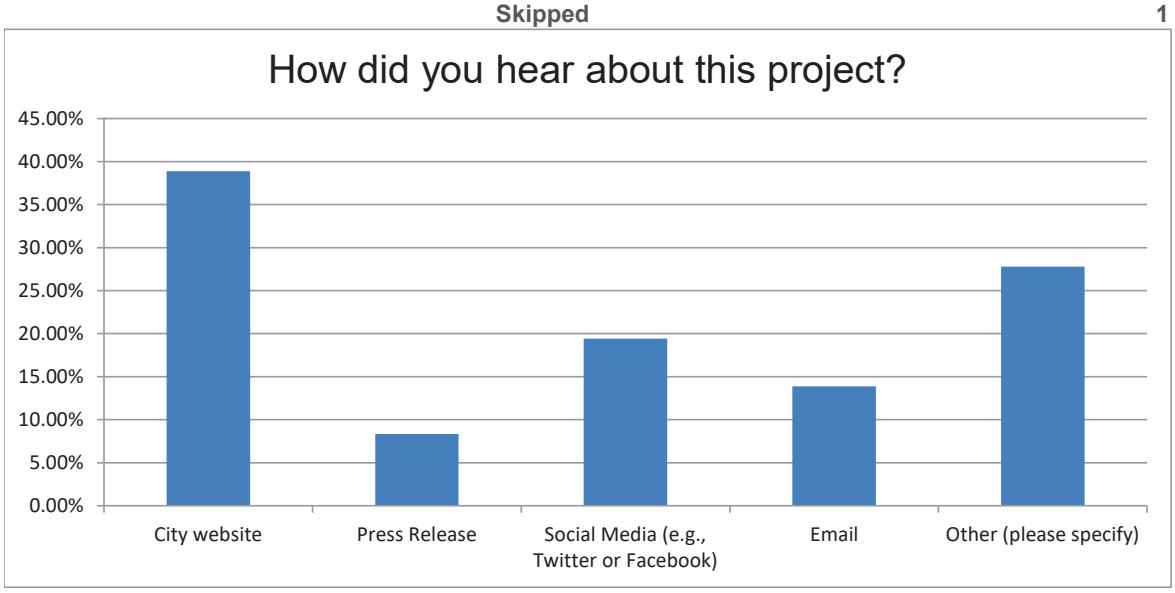
| Answer Choices | Responses | |
|---|---|---|
| Yes | 40.54% | 15 |
| No | 59.46% | 22 |
| | **Answered** | **37** |
| | **Skipped** | **0** |



# San Marcos Climate Action Plan Workshop Survey

**How did you hear about this project?**

| Answer Choices | | Responses |
|---|---|---|
| City website | 38.89% | 14 |
| Press Release | 8.33% | 3 |
| Social Media (e.g., Twitter or Facebook) | 19.44% | 7 |
| Email | 13.89% | 5 |
| Other (please specify) | 27.78% | 10 |
| | **Answered** | **36** |
| | **Skipped** | **1** |




| Respondents | Response Date | Other (please specify) | Tags |
|---|---|---|---|
| 1 | May 20 2019 07:16 PM | City planning committee | |
| 2 | May 20 2019 07:14 PM | Work | |
| 3 | May 20 2019 07:01 PM | Planning commissioner | |
| 4 | May 13 2019 06:44 PM | My husband who is on the planning commission for San Marcos | |
| 5 | May 13 2019 06:39 PM | O regularly attend city meetings | |
| 6 | May 13 2019 09:15 AM | other city CAPs reviewing | |
| 7 | May 09 2019 06:51 PM | In the city park and rec catalog | |
| 8 | May 09 2019 06:49 PM | From city staff | |
| 9 | May 09 2019 06:44 PM | Asked to attend by employer | |
| 10 | May 09 2019 06:41 PM | Asked to attend by employer | |

# San Marcos Climate Action Plan Workshop Survey

**Would you like to receive updates about CAP Progress? If yes, please provide us with your email:**

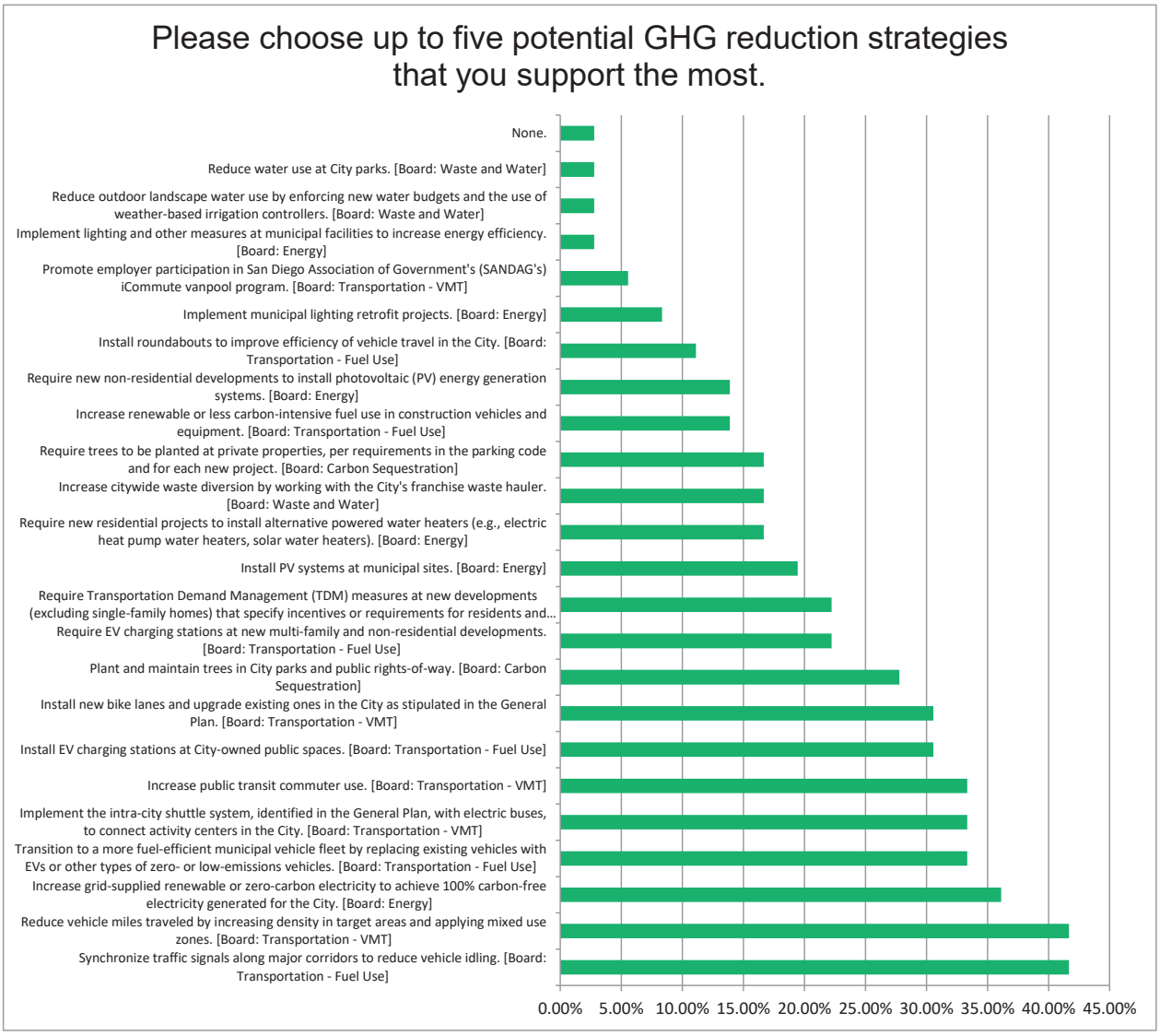
| | |
|---|---|
| **Answered** | **19** |
| **Skipped** | **18** |

| Respondents | Response Date | Responses | Tags |
|---|---|---|---|
| 1 | May 20 2019 07:16 PM | dave.nuttall4@me.com | |
| 2 | May 20 2019 07:14 PM | Maleeka@climateactioncampaign.org | |
| 3 | May 20 2019 07:07 PM | Silopez@csusm.edu | |
| 4 | May 20 2019 07:01 PM | Bobcrain@roadrunner.com | |
| 5 | May 20 2019 06:55 PM | sdelsolar@san-marcos.net | |
| 6 | May 20 2019 06:00 PM | klizardi@csusm.edu | |
| 7 | May 20 2019 03:21 PM | rayweagraff@gmail.com | |
| 8 | May 20 2019 11:15 AM | calidaee@gmail.com | |
| 9 | May 19 2019 04:05 PM | gary_lomayesva@yahoo.com | |
| 10 | May 13 2019 07:04 PM | seligloma@yahoo.com | |
| 11 | May 13 2019 06:56 PM | steel.kathleen@gmail.com | |
| 12 | May 13 2019 06:44 PM | Knorris@ucsd.edu | |
| 13 | May 13 2019 06:39 PM | m.borevitz@cox.net | |
| 14 | May 13 2019 06:39 PM | Jabildgaard69@gmail.com | |
| 15 | May 09 2019 06:51 PM | Jgmorris@csusm.edu | |
| 16 | May 09 2019 06:49 PM | Jason.greminger@cciconnect.com | |
| 17 | May 09 2019 06:44 PM | rfrasca@csusm.edu | |
| 18 | May 09 2019 06:41 PM | Rfrasca@csusm.edu | |
| 19 | May 09 2019 06:38 PM | atempajoseph@gmail.com | |

San Marcos Climate Action Plan Workshop Survey

**Please choose up to five potential GHG reduction strategies that you support the most.**

| Answer Choices | Responses | |
|---|---|---|
| Synchronize traffic signals along major corridors to reduce vehicle idling. [Board: Transportation - Fuel Use] | 41.67% | 15 |
| Reduce vehicle miles traveled by increasing density in target areas and applying mixed use zones. [Board: Transportation - VMT] | 41.67% | 15 |
| Increase grid-supplied renewable or zero-carbon electricity to achieve 100% carbon-free electricity generated for the City. [Board: Energy] | 36.11% | 13 |
| Transition to a more fuel-efficient municipal vehicle fleet by replacing existing vehicles with EVs or other types of zero- or low-emissions vehicles. [Board: Transportation - Fuel Use] | 33.33% | 12 |
| Implement the intra-city shuttle system, identified in the General Plan, with electric buses, to connect activity centers in the City. [Board: Transportation - VMT] | 33.33% | 12 |
| Increase public transit commuter use. [Board: Transportation - VMT] | 33.33% | 12 |
| Install EV charging stations at City-owned public spaces. [Board: Transportation - Fuel Use] | 30.56% | 11 |
| Install new bike lanes and upgrade existing ones in the City as stipulated in the General Plan. [Board: Transportation - VMT] | 30.56% | 11 |
| Plant and maintain trees in City parks and public rights-of-way. [Board: Carbon Sequestration] | 27.78% | 10 |
| Require EV charging stations at new multi-family and non-residential developments. [Board: Transportation - Fuel Use] | 22.22% | 8 |
| Require Transportation Demand Management (TDM) measures at new developments (excluding single-family homes) that specify incentives or requirements for residents and employers to increase use of public transit, walking, biking, and ridesharing. [Board: Transportation - VMT] | 22.22% | 8 |
| Install PV systems at municipal sites. [Board: Energy] | 19.44% | 7 |
| Require new residential projects to install alternative powered water heaters (e.g., electric heat pump water heaters, solar water heaters). [Board: Energy] | 16.67% | 6 |
| Increase citywide waste diversion by working with the City's franchise waste hauler. [Board: Waste and Water] | 16.67% | 6 |
| Require trees to be planted at private properties, per requirements in the parking code and for each new project. [Board: Carbon Sequestration] | 16.67% | 6 |
| Increase renewable or less carbon-intensive fuel use in construction vehicles and equipment. [Board: Transportation - Fuel Use] | 13.89% | 5 |
| Require new non-residential developments to install photovoltaic (PV) energy generation systems. [Board: Energy] | 13.89% | 5 |
| Install roundabouts to improve efficiency of vehicle travel in the City. [Board: Transportation - Fuel Use] | 11.11% | 4 |
| Implement municipal lighting retrofit projects. [Board: Energy] | 8.33% | 3 |
| Promote employer participation in San Diego Association of Government's (SANDAG's) iCommute vanpool program. [Board: Transportation - VMT] | 5.56% | 2 |
| Implement lighting and other measures at municipal facilities to increase energy efficiency. [Board: Energy] | 2.78% | 1 |
| Reduce outdoor landscape water use by enforcing new water budgets and the use of weather-based irrigation controllers. [Board: Waste and Water] | 2.78% | 1 |
| Reduce water use at City parks. [Board: Waste and Water] | 2.78% | 1 |
| None. | 2.78% | 1 |
| | **Answered** | **36** |
| | **Skipped** | **1** |


Please choose up to five potential GHG reduction strategies that you support the most.
None.
Reduce water use at City parks. [Board: Waste and Water]
Reduce outdoor landscape water use by enforcing new water budgets and the use of weather-based irrigation controllers. [Board: Waste and Water]
Implement lighting and other measures at municipal facilities to increase energy efficiency. [Board: Energy]
Promote employer participation in San Diego Association of Government's (SANDAG's) iCommute vanpool program. [Board: Transportation - VMT]
Implement municipal lighting retrofit projects. [Board: Energy]
Install roundabouts to improve efficiency of vehicle travel in the City. [Board: Transportation - Fuel Use]
Require new non-residential developments to install photovoltaic (PV) energy generation systems. [Board: Energy]
Increase renewable or less carbon-intensive fuel use in construction vehicles and equipment. [Board: Transportation - Fuel Use]
Require trees to be planted at private properties, per requirements in the parking code and for each new project. [Board: Carbon Sequestration]
Increase citywide waste diversion by working with the City's franchise waste hauler. [Board: Waste and Water]
Require new residential projects to install alternative powered water heaters (e.g., electric heat pump water heaters, solar water heaters). [Board: Energy]
Install PV systems at municipal sites. [Board: Energy]
Require Transportation Demand Management (TDM) measures at new developments (excluding single-family homes) that specify incentives or requirements for residents and...
Require EV charging stations at new multi-family and non-residential developments. [Board: Transportation - Fuel Use]
Plant and maintain trees in City parks and public rights-of-way. [Board: Carbon Sequestration]
Install new bike lanes and upgrade existing ones in the City as stipulated in the General Plan. [Board: Transportation - VMT]
Install EV charging stations at City-owned public spaces. [Board: Transportation - Fuel Use]
Increase public transit commuter use. [Board: Transportation - VMT]
Implement the intra-city shuttle system, identified in the General Plan, with electric buses, to connect activity centers in the City. [Board: Transportation - VMT]
Transition to a more fuel-efficient municipal vehicle fleet by replacing existing vehicles with EVs or other types of zero- or low-emissions vehicles. [Board: Transportation - Fuel Use]
Increase grid-supplied renewable or zero-carbon electricity to achieve 100% carbon-free electricity generated for the City. [Board: Energy]
Reduce vehicle miles traveled by increasing density in target areas and applying mixed use zones. [Board: Transportation - VMT]
Synchronize traffic signals along major corridors to reduce vehicle idling. [Board: Transportation - Fuel Use]
0.00% 5.00% 10.00% 15.00% 20.00% 25.00% 30.00% 35.00% 40.00% 45.00%

San Marcos Climate Action Plan Workshop Survey

**For any of the proposed strategies that you would not support, please identify your concerns or explain how you think they could be improved:**

**Answered** 17

**Skipped** 20

| Respondents | Response Date | Responses | Tags |
|---|---|---|---|
| 1 | May 20 2019 07:20 PM | None | |
| 2 | May 20 2019 07:18 PM | Two trees per unit, like county cap, makes project planning difficult (dense projects have difficulty fitting trees; more guidance needed if trees can be planted off site, etc) | |
| 3 | May 20 2019 07:13 PM | They | |
| 4 | May 20 2019 07:00 PM | The decreased use of cars! It is a good idea to use them less but in all actuality it will not happen. | |
| 5 | May 20 2019 11:24 AM | I support most of them, but did not choose some because they should automatically be done to improve efficiency, such as improving irrigation systems and replacing lighting systems, upgrading vehicles to EV when old vehicles need replacing, etc. | |
| 6 | May 20 2019 10:53 AM | Measures that "Require" private property owners to implement costly upgrades for the benefit of the larger community need to have local/state/federal incentives associated with them. | |
| 7 | May 13 2019 07:02 PM | Weekly exciting dynamic farmers market that becomes a center for community engagement including tasting and live music. See Davis California for example | |
| 8 | May 13 2019 06:54 PM | I support them all I could only select five, the ones I did select I believe have the biggest impact. | |
| 9 | May 13 2019 06:50 PM | I support more than the 5 I was allowed to check | |
| 10 | May 13 2019 06:48 PM | Update city buses to low or zero emissions busses<br>Also Implement more bus routes throughout San Marcos | |
| 11 | May 13 2019 09:17 AM | Please stop thinking business-as-usual; in that if we build density around a transit stop, it will address other problems. If we are going to address transit and traffic - then address it. | |
| 12 | May 09 2019 07:36 PM | I support all of them | |
| 13 | May 09 2019 07:15 PM | I think we need to really think critically about how to make public transport easy, accessible and goes throughout the city so people can jump on that and not their cars | |
| 14 | May 09 2019 07:09 PM | Promoting employer based car pool programs seems problematic considering the outreach efforts that may be required<br>If you improve signal timing to reduce idling, you'll increase VMT contradicting the other goals. | |
| 15 | May 09 2019 07:07 PM | Also, roundabouts aren't a panacea, they work in certain situations. | |
| 16 | May 09 2019 06:55 PM | Education needs to be implemented for residents before anything is fiscally imposed upon them. You need to make alternatives easy for residents to make sound choices. | |
| 17 | May 09 2019 02:48 PM | yudftujt | |

San Marcos Climate Action Plan Workshop Survey

**Are there any measures not currently identified by the City that you think should be considered? If yes, please briefly explain below:**

| | |
|---|---|
| **Answered** | **23** |
| **Skipped** | **14** |

| Respondents | Response Date | Responses | Tags |
|---|---|---|---|
| 1 | May 20 2019 07:25 PM | Work with the schools to get the school buses back<br>Community choice energy as the path to 100% clean energy. | |
| 2 | May 20 2019 07:22 PM | Would also like to see the CAP horizon extend to 2045 and a social equity section to the CAP. | |
| 3 | May 20 2019 07:20 PM | None | |
| 4 | May 20 2019 07:13 PM | Not just meeting required levels but exceeding | |
| 5 | May 20 2019 07:00 PM | No! | |
| 6 | May 20 2019 03:24 PM | Community Choice Energy to reach a 100% clean, renewable energy source as soon as possible | |
| 7 | May 20 2019 11:24 AM | If not already being done, planting all native plants in city landscaping/parks and requiring new housing or industrial developments to plant only native plants in their landscaping | |
| 8 | May 13 2019 07:18 PM | Community composting programs | |
| 9 | May 13 2019 07:05 PM | Require restaurants to recycle plastic products used instead of tossing in the garbage that goes to thelandfill. . | |
| 10 | May 13 2019 07:02 PM | Municipal household kitchen scrap composting | |
| 11 | May 13 2019 06:54 PM | City generated renewable energy. | |
| 12 | May 13 2019 06:53 PM | For the Transportation Engineers, have them measure the number of bike and pedestrian traffic exists and then have them set specific, measurable goals to increase these numbers. Look to create smart grid areas where you increase the available parking outside the area while reducing parking inside the area until you have a large, walkable area (restaurant row or the new area below CSUSM would both easily convert to these). | |
| 13 | May 13 2019 06:50 PM | I think schools should go back to using school buses to eliminate hundreds of vehicle trips & that if at all possible the busses should be electric or hybrid | |
| 14 | May 13 2019 06:48 PM | School bus system would greatly improve the car congestion issue and help reduce carbon and help 2 parent or one car households with getting kids to school effectively | |
| 15 | May 13 2019 09:17 AM | community choice energy | |
| 16 | May 09 2019 07:36 PM | The CAP Should include ADAPTATION to climate change, and mitigation of risk including: fires, creating green parks to reduce heat for people without air conditioning, CCE/CCA, composting, education of children and adults, change diet, vegetarian food | |
| 17 | May 09 2019 07:36 PM | Require school district to provide free bussing for students in electric or natural gas busses. There is limited bussing in the City and literally thousands of parents drive their students to and from schools plus idling time in the excessive traffic jams the | |
| 18 | May 09 2019 07:09 PM | Carbon credit programs should be considered within the air basin to allow for buying and selling of credits to meet climate action goals<br>Curb side composting like San Francisco.<br>New development mandate for rainwater harvesting. | |
| 19 | May 09 2019 07:07 PM | | |
| 20 | May 09 2019 07:06 PM | Weekly compost pickup alongside trash pickup. | |
| 21 | May 09 2019 06:55 PM | Uber in SM that is electric vehicles then there would be a discount to passenger and driver gets to retain more of the fare | |
| 22 | May 09 2019 06:44 PM | Some ideas can include planting more trees (even on private property) near roads so they absorb carbon. Also, get multi billion dollar companies like Walmart and Target to build solar panels on their parking lots just like San Marcos High School and Costco has done if they want to continue business in the city. And one more idea could be maybe a bottle for train ticket plan. You trade in bottles into a bottle machine similar to that next to an Albertsons and you get a sprinter ticket for one ride. Also, maybe a public campaign to change opinions on public transit so it's not thought as a "broke" way of traveling. | |
| 23 | May 09 2019 02:48 PM | frtry | |

San Marcos Climate Action Plan Workshop Survey

**Do you have any other questions or comments about the CAP, its process, and/or its development?**

| | |
|---|---|
| **Answered** | **11** |
| **Skipped** | **26** |

| Respondents | Response Date | Responses | Tags |
|---|---|---|---|
| 1 | May 20 2019 07:23 PM | It would be interesting to see partnerships with the local institutions | |
| 2 | May 20 2019 07:20 PM | Great presentation | |
| 3 | May 20 2019 07:00 PM | Nope! | |
| 4 | May 13 2019 07:05 PM | no | |
| 5 | May 13 2019 06:54 PM | Is there any thought of not just meeting required levels but going beyond the minimum? | |
| 6 | May 13 2019 06:48 PM | Improve infrastructure some subdivisions have only one way in or out which is a major issue when there is a natural disaster it leads to more people injured or killed due to not being able to get out of harms way and time | |
| 7 | May 09 2019 07:36 PM | The UN reports may be helpful. It is too late to stop climate change and we need to start to adapt to it. | |
| 8 | May 09 2019 07:36 PM | Going in the right direction. | |
| 9 | May 09 2019 07:09 PM | What are the CAP benefits for preservation of open space? How will the CAP work with the implementation of the general plan? Will the CAP be flexible enough to adapt to future technologies and conditions? What is the nexus between trees in parking lots and the energy provided from solar shade structures? Implement mandatory school bussing using natural gas and electric busses. | |
| 10 | May 09 2019 06:55 PM | Ensure that there is a partnership with CSUSM | |
| 11 | May 09 2019 02:48 PM | ryry | |

# ATTACHMENT F

## Workshop and Online Comments

**City of San Marcos**
**Climate Action Plan Workshop**

# COMMENT SHEET

**Please provide your comments in the space below. When finished, please provide to a staff person, place on the appropriate table at the workshop, or email your comments to Saima Quresy at SQureshy@san-marcos.net.**

Name: Joseph Atempa

E-mail: atempajoseph@gmail.com

**Comments:**

Some ideas to eliminate GHG and gain new ways of green energy could be:

- A bottle for sprinter travel plan. A bottle processing machine could be set up and if someone ~~gue~~ trades enough bottles they get a sprinter ticket. This would be unique and may promote its use + it's a great way to recycle.
- Plant more trees + native plants near roads + train tracks even if it's private property.
- Have multi billion dollar companies like walmart and Target to implement solar panels on their parking lots similar to those of San Marcos and Costco if they want to continue business in the city. They should be helping the community ~~mon~~ rather than hurting (mass production pollution + killing small businesses)
- Have a public campaign to get people to change their ideas on public transit. So
- Get college clubs involved (CSUSM and Palomar) to involved such as M.E.Ch.A

***Please use reverse side for additional space to provide comments***

- Implement new pollution soaking technology for roads. It would be expensive but it can gradually be implemented. It could start small in public parking lots.

**City of San Marcos**
**Climate Action Plan Workshop**

# COMMENT SHEET

**Please provide your comments in the space below. When finished, please provide to a staff person, place on the appropriate table at the workshop, or email your comments to Saima Quresy at SQureshy@san-marcos.net.**

Name: Georgina Vájera.

E-mail:

**Comments:**

(1)— El agua más regulacion en los quimicos de agricultura, industrias, porque los quimicos también contaminan la tierra y esto se evapora y sube a la admosfera, más árboles.

- transporte, más autobuses escolares es un buen punto para desminuir el trafico, sensitivar a los residentes poniendo paradas de buses con bancos con un techo para sombra y unas árboles y tambien poner más árboles y no cortarlos porque son viviendas de las aves, ellas son parte del balance del medio ambiente. tambien es una forma de tomarlos en cuenta porque son seres vivientes son parte de nuestra vida.

los aves todo tipo de animales tienen el derecho de que sean tomados en cuenta y ser respetados.

***Please use reverse side for additional space to provide comments***

-la luz - tambien es muy importante los paneles solares para todas las viviendas y muchos árboles

D.t. regular más seguido el agua que no este contamida.

— y arboles frutales para las aves para que no coman basura. que dejamos en el suelo.

— paneles solares por ~~el~~ la luz tambien contamina.

— queremos muchos árboles para que limpien el aire.

— regresen autobuses esolares para disminuir la contaminación.

COMMENT SHEET

Name: Georgina Najera

Comments:

- There should be more water regulation on the chemicals used in agriculture and industry, as chemicals also contaminate the earth, it evaporates into the atmosphere.

- Using school buses for transportation is another point to diminish traffic. To incentivize residents to use public transportation, bus stops should have shade whether it's by putting roofs or planting trees. More trees need to be planted and not cut down because they are home to many birds and they are part of the balance in our environment. We should take them into account because they are living beings that are part of our life. Birds and all other animals have the right to be taken into account and be respected.

- Solar Panels are also very important and should be put on all housing.

- Regulate the water more frequently so that it's not contaminated.

- Plant fruit trees for the birds, so that they don't eat trash left on the floor.

- Have solar panels as electricity also contaminates.

- We want a lot of trees, so that they can clean the air.

- Bring back school buses to diminish contamination.

(Wksp 1)

**City of San Marcos**
**Climate Action Plan Workshop**

Extend the CAP horizon to at least 2045 to align with executive order B-55-18 to achieve Carbon neutrality by 2045

## COMMENT SHEET

**Please provide your comments in the space below. When finished, please provide to a staff person, place on the appropriate table at the workshop, or email your comments to Saima Quresy at SQureshy@san-marcos.net.**

Name: Matthew Vasilakis – Climate Action Campaign

E-mail: matthew@climateactioncampaign.org

**Comments:**

Thank ya for this opportunity to contribute:

- Include a 100% clean energy by 2030/35 goal/target
- Identify Community Choice Energy as the option to achieve that 100% target
- Participte in a CCE feasibility study with the Vista and Escondido to save on costs
- Set mode share targets for biking, walking and transit — tied to mode share data tracking and specific strategies to achieve those targets
- set a zero waste target
- electrify building to reduce reliance on natural gas
- set urban tree canopy targets
- define strategies to ensure that the communities most vulnerable and impacted by the climat crisis are first to benefit from implementation

Thank you, we will continue to participate and excited to see San Marcos adopt a robust CAP.

***Please use reverse side for additional space to provide comments***

(2)

**City of San Marcos**
**Climate Action Plan Workshop**

## COMMENT SHEET

**Please provide your comments in the space below. When finished, please provide to a staff person, place on the appropriate table at the workshop, or email your comments to Saima Quresy at SQureshy@san-marcos.net.**

Name: Jazrene Abildgaard
E-mail: Jabildgaard69@Gmail.com

**Comments:**

- Expand and update Public transit through out San Marcos
- School bus Systum - Getting Kids to and From school is Such a hardsip & For 2 Parent working home impossible at times
- Improve infertructure - Some subdivisions have only one way in or out which is a major issue when there is a Natural disater. It leads to more people injured or killed due to not being able to get out of harms way.
- Incentivize homes so that going solor is easyier on there financhal packets
- Stop Developing on Natural habits! leave Natrual Space open and Undevloped. Wild life is coming in contact more with residents due to more of there land being devloped over.
- Water recycling - reclaim rain and waste water
- New Construction must requier green desgin
- More low income Green affordable housing

***Please use reverse side for additional space to provide comments***

(2)

**City of San Marcos**
**Climate Action Plan Workshop**

## COMMENT SHEET

**Please provide your comments in the space below. When finished, please provide to a staff person, place on the appropriate table at the workshop, or email your comments to Saima Quresy at SQureshy@san-marcos.net.**

Name: Kathy Steel
E-mail: steel.kathleen@gmail.com

**Comments:**

- recycle plastic ware & cups used in restaurants. (goes in landfill now)
- stop overbuilding in SM, especially without proper infrastructure in place: It increases traffic and makes for congestion during fire evacuation.
- Solar panels and Smart energy requirements on new builds
- Require all stores, not just food stores to stop using plastic bags.
- It was difficult to make just 5 choices in the survey! If the city of San Marcos could implement most of these changes the rewards in terms of GHG emissions would be far greater.

***Please use reverse side for additional space to provide comments***

(2)

**City of San Marcos**
**Climate Action Plan Workshop**

## COMMENT SHEET

**Please provide your comments in the space below. When finished, please provide to a staff person, place on the appropriate table at the workshop, or email your comments to Saima Quresy at SQureshy@san-marcos.net.**

Name: Mary Borevitz
E-mail: m.borevitz

**Comments:**

We need to do ALL items mentioned in survey. Time is short. We need to hurry + do Everything we can to save our planet as we know it.

Other things we could do:

have City self define as city of the future:

1) all electricity to come from renewables
2) develop household food waste recycling program
3) " public relations campaign to educate citizens as to why we need to use public transportation, buy electric cars, recycle + composting
4) San Marcos incentivize solar panel installations
5) " " walk the walk: NO one use plastic, plates, cups, etc.

Define ourselves as the city of the future.

***Please use reverse side for additional space to provide comments***

SDGE

A Sempra Energy utility®

May 20, 2019

Saima Qureshy
Principal Planner
City of San Marcos
1 Civic Center Drive
San Marcos, CA 92069

Re: City of San Marcos Climate Action Plan Update

Dear Ms. Qureshy:

San Diego Gas & Electric Company (SDG&E) appreciates the opportunity to provide input on the update of the City of San Marcos's forward-thinking Climate Action Plan (CAP). We share the City's ambitions for achieving reductions in greenhouse gas (GHG) emissions and are committed to helping you achieve the long-term goals outlined in the plan. The purpose of this letter is to submit our comments as you work to update of the City's 2013 CAP.

Your CAP aligns well with our mission of building the cleanest, safest, and most reliable energy infrastructure company in America. SDG&E has among the cleanest energy portfolios in the nation. Currently, we are delivering around 45 percent renewable energy to all of our customers, including the residents, business and governmental customers located within the City of San Marcos. This compares to the national average of about 10 percent. Due to our forward-looking planning for the procurement of renewable energy, SDG&E is well-positioned to meet the 60 percent Renewable Portfolio Standard (RPS) by 2030 as outlined in Senate Bill 100. At SDG&E, we recognize and embrace the important role that we have in helping the City achieve its GHG reduction goals. While we are proud of our work to date to reduce our carbon footprint, we want you to know that we look forward to continuing our long partnership with the City in its ongoing work to achieve its climate goals.

We understand many customers want more clean energy solutions. For these customers, SDG&E designed the EcoChoice program, which supports all our customers (residential, commercial, agricultural, businesses, or municipalities) who have additional environmental preferences and goals for their energy use. EcoChoice offers an immediate and cost-effective way to reduce carbon emissions through the purchase of up to 100 percent clean renewable energy directly from SDG&E. Municipal customers, like the City, can designate eligible individuals and city facilities (i.e., City Hall, parks, libraries, etc.) to receive between 50 and 100 percent of the energy they use from renewable sources. We procure renewable energy with steel-in-the-ground new-build projects for EcoChoice customers.

Additionally, given the regional reliance on natural gas as a clean-burning fuel, SDG&E filed a request asking state regulators at the California Public Utilities Commission (CPUC) to allow the utility to offer its customers the option to buy their natural gas from renewable sources. Similar to EcoChoice, if approved by the CPUC, the program would allow SDG&E customers to further reduce their carbon footprint by purchasing a portion of their gas from renewable sources. Renewable natural gas is a fuel produced from waste and agriculture that can be used to fuel heating systems and water heaters in homes and businesses, for cooking, in trucks and buses, and to generate electricity. The fuel is carbon-neutral or carbon-negative, meaning that it takes more carbon emissions out of the air than it emits as an energy source.

Because nearly half of the GHG emissions in the City of San Marcos come from transportation, focusing on driving clean is critical to any measurable impact on GHG reductions. There are numerous areas which SDG&E can be a critical advisor/partner in helping in the transition to transportation electrification – some of which we are already working on together. SDG&E has installed electric vehicle charging stations at various businesses and multi-family residences in the City through our Power Your Drive program. Twenty-three public electric vehicle chargers have also been installed in the

City. There are currently nearly 1,000 electric vehicles in the City. SDG&E looks forward to our ongoing partnership with the City to continue to install the infrastructure needed to expand its clean transportation goals.

Additionally, we are proud of the fact that we have over 4,600 residential Net Energy Metering customers in the City. We are enabling our customers to go green directly by offering an online application that makes the private solar rooftop interconnection process fast and convenient for new solar adopters – it is the fastest approval time in the state. SDG&E employees also invented a Renewable Meter Adapter device which helps customers bypass electric panel upgrades often needed to install private solar systems. This innovation, combined with our fast track process, has helped nearly 149,000 customers in the region to install private solar.

As San Marcos's 2013 CAP indicates, reaching the City's GHG goals will require a host of thoughtful and complementary efforts. SDG&E has a tailored suite of complementary tools to support the City's agenda. We strongly believe that GHG-reducing actions, such as those in energy efficiency and electric vehicle promotion, should remain a central focus for the City of San Marcos. SDG&E plans to continue to support the City in a comprehensive manner to meet our mutual objective of improving the lives of those in our communities through a cleaner energy future. We have a long-standing commitment to our community and we have the skills, expertise, and track record required to foster achievement of San Marcos's climate vision.

A few of our additional shared accomplishments through SDG&E programs are highlighted below:

- Energy efficiency programs in the SDG&E service territory in 2016 eliminated significant energy waste, roughly the equivalent of removing 38,000 cars from Southern California roads or enough electricity to serve about 33,500 homes for one year.
- Since 2013, the City of San Marcos has saved over 3,500,000 kilowatt-hours (kWh) of electricity through energy efficiency measures – the equivalent of 1,498 metric tons of avoided carbon dioxide emissions.
- SDG&E's energy efficiency programs have helped reduce the City's electric and gas bills by nearly $650,000 and provided over $23,000 in interest-free financing through SDG&E's On-Bill Financing program.

We appreciate the opportunity to provide input on the update of San Marcos's Climate Action Plan. SDG&E is committed to continuing our partnership with the City and would be pleased to work with you to develop a specific concrete plan that meets the needs of the City in support of its CAP objectives.

I will also drop off a copy of SDG&E's Clean Energy Plan, tailored for the City of San Marcos; which does a deep dive on our programs designed to help the City meet its GHG reduction goals.

Sincerely,

Joe Britton
Public Affairs Manager
San Diego Gas & Electric Company

CC: Honorable Mayor Rebecca Jones
Honorable Mayor Pro Tem Sharon Jenkins
Honorable Councilmember Randy Walton
Honorable Councilmember María Nuñez
Honorable Councilmember Jay Petrek
City Manager Jack Griffin

# Appendix D

Guidance to Demonstrating Consistency with the City of San Marcos Climate Action Plan for Discretionary Projects Subject to CEQA and City of San Marcos Climate Action Plan Consistency Review Checklist

# Memo

1230 Columbia Street, Suite 440
San Diego, CA 92101
619.219.8000

| | |
|---|---|
| Date: | July 15, 2020 |
| To: | Saima Qureshy, City of San Marcos |
| From: | Ricky Williams, Poonam Boparai, Alyssa Way, and Brenda Hom |
| Subject: | **Guidance to Demonstrating Consistency with the City of San Marcos Climate Action Plan: For Discretionary Projects Subject to CEQA** |
| Attachments: | Attachment A – Screening Level Threshold Calculation Worksheets<br>Attachment B – Numerical Threshold Calculation Worksheet |

The City of San Marcos (City) adopted an updated Climate Action Plan (CAP) on December 8, 2020. The CAP outlines strategies and measures that the City will undertake to achieve its proportional share of State greenhouse gas (GHG) emissions reduction targets. The CAP is a plan for the reduction of GHG emissions in accordance with California Environmental Quality Act (CEQA) Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of the CAP.

The City has also developed a CAP Consistency Checklist (Checklist), in conjunction with the CAP, to provide a streamlined review process for proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to CEQA. This memorandum summarizes the methodology and application of a GHG screening threshold (set at 500 metric tons carbon dioxide equivalent [$MTCO_2e$] per year) for new development projects in order to determine if a project would need to demonstrate consistency with the CAP through the Checklist. The memorandum also describes a numerical GHG threshold (set at 2.1 $MTCO_2e$ per service population per year) for use as an alternative method for demonstrating consistency for projects that cannot use the Checklist due to unique land uses or circumstances but are otherwise consistent with CAP projections.

## 1 CLIMATE ACTION PLAN SUMMARY

The City's CAP contains a baseline inventory of GHG emissions for 2012, business-as-usual (BAU) projections of emissions to 2020 and 2030, a calculation of the City's targets based on a reduction from the 2012 baseline, and emission reductions with implementation of the CAP.

The City emitted approximately 599,000 $MTCO_2e$ in 2012. Accounting for future population and economic growth, the City projects GHG emissions of 549,000 $MTCO_2e$ in 2020 and 591,000 $MTCO_2e$ in 2030. The CAP sets

targets to achieve a four percent reduction from the 2012 baseline levels by 2020, and a 42 percent reduction from the 2012 baseline by 2030. The City's GHG reduction targets are consistent with the California Air Resources Board's (CARB's) recommendations for community-wide targets. Therefore, the City must implement strategies and measures that reduce emissions to 575,000 $MTCO_2e$ in 2020 and 347,000 $MTCO_2e$ in 2030. The projections demonstrate that the City is anticipated to meet its 2020 target under BAU conditions.

The CAP accounts for GHG emission reductions that would be achieved through State and federal actions. This "Legislatively-Adjusted" BAU projection estimates that the City would generate 429,000 $MTCO_2e$ in 2030 when accounting for federal and State actions. The City would need to implement additional actions to meet the 2030 emissions target. The CAP includes GHG reduction strategies and measures to achieve the City's 2030 target.

By meeting the 2020 and 2030 targets, the City will meet the 2030 State goal identified in Senate Bill 32 and maintain a trajectory to meet its proportional share of the 2050 State target identified in Executive Order S-3-05. Future actions anticipated by the State and possible federal initiatives would reduce the need for local measures and help ensure broader participation in emission reduction efforts.

The City's ability to grow its population and economy while meeting the GHG reduction targets will require broad-based participation from the entire community. Everyone who lives, works, shops, or recreates in the City contributes to the community's GHG emissions and will need to be part of the solution. This includes new development that is anticipated in the City through 2030. The CAP is intended to achieve reductions from existing and new sources. This is emphasized by the fact that the City's reduction targets are a reduction below baseline emissions. Therefore, GHG emissions in the City need to be reduced below existing levels while additional emissions are generated by growth through 2030. As such, new development can contribute its fair-share of GHG reductions by complying with CAP strategies and measures that were determined to be applicable through the Checklist development process. The following sections provide additional information about the steps for new development projects to demonstrate consistency with the CAP.

# 2 CEQA STREAMLINING PROVISIONS OF THE CLIMATE ACTION PLAN

This memorandum describes a GHG screening threshold and associated size-based criteria to determine if a project would be subject to the provisions of the CAP. Projects that exceed the GHG screening threshold are required to show consistency with the CAP through the Checklist. No additional screening or GHG studies are required, except in cases involving land use designation changes or when other unique circumstances warrant it, as determined by the Planning Division Manager through the CEQA process.

In most cases, compliance with the Checklist would provide the CEQA streamlining path to allow project-specific environmental documents, if eligible, to tier from and/or incorporate by reference the CAP's programmatic review of GHG impacts. Projects that are consistent with the General Plan and implement CAP GHG reduction measures may incorporate by reference the CAP's cumulative GHG analysis. The City's CAP meets the requirements under Section 15183.5 of the CEQA Guidelines as a qualified plan for the reduction of GHG emissions for use in cumulative impact analysis pertaining to development projects. The Checklist provides a streamlined review process for the GHG emissions analysis of proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to CEQA.

# 3 PROJECT SCREENING THRESHOLDS

A GHG screening threshold of 500 $MTCO_2e$/year is established for new development projects in order to determine if a project would need to demonstrate consistency with the CAP through the Checklist. Projects that are projected to emit fewer than 500 $MTCO_2e$ annually would not make a considerable contribution to the cumulative impact of climate change and would not need to provide additional analysis to demonstrate consistency with the CAP. **Table 1** lists types and sizes of projects that correspond to the 500 $MTCO_2e$ GHG screening threshold. For project types not listed in this table, the need for GHG analysis and mitigation will be made on a project-specific basis, considering the 500 $MTCO_2e$ per year screening threshold. Projects that are projected to emit more than 500 $MTCO_2e$ of GHGs annually would need to comply with applicable CAP strategies and measures. Compliance will be evaluated through completion of the CAP Consistency Checklist.

**Table 1 Project Review Thresholds**

| Project/Plan Type [1] | Screening Threshold [2] | SFE Factor |
|---|---|---|
| Single-Family Housing | 36 dwelling units | 1.0 |
| Multi-Family Housing | 55 dwelling units | 0.7 |
| Office | 43 ksf | 0.8 |
| Commercial Space | 20 ksf | 1.8 |
| Regional Shopping Center | 18 ksf | 2.0 |
| Hotel | 37 rooms | 1.0 |
| Restaurant (Sit-Down) | 6.5 ksf | 5.5 |
| Restaurant (Drive-Thru, High Turnover) | 2.4 ksf | 15.0 |
| General Light Industrial | 58 ksf | 0.6 |
| University | 263 students | 0.1 |
| Mixed-Use | *See Footnote 3* | -- |

Notes: ksf = thousand square feet; SFE = single-family equivalency

[1] For project types not listed in this table, the need for GHG analysis and mitigation will be made on a project-specific basis, considering the 500 $MTCO_2e$ per year screening level.

[2] The screening threshold represents the maximum project size at which a project is estimated to emit less than 500 $MTCO_2e$ per year without the application of additional mitigation measures or project design features. Projects proposing greater unit, square footage, rooms, or student amounts than the above screening thresholds would be required to complete the CAP Consistency Checklist.

[3] Mixed-Use projects can provide a comparison to the screening thresholds using a single-family equivalent (SFE) factor. All projects that demonstrate they would propose development equal to or less than 36 SFE units are considered below the screening threshold. For example, a mixed-use development proposing 20 multi-family dwelling units and 10 ksf of commercial space would have an SFE value of 32 [*equation: (20 x 0.7) + (10 x 1.8) = 32]*, and would be below the screening threshold.

Source: Analysis conducted by Ascent Environmental in 2020

It should be noted that the 500 $MTCO_2e$/year level must be strictly applied as a screening threshold and is not intended to be a threshold of significance. Projects that exceed this emissions level may not propose mitigation measures to reduce emissions below 500 $MTCO_2e$. Projects that exceed the screening level would be required to complete the next step of the CAP Consistency Checklist as described below.

This 500 $MTCO_2e$ per year screening threshold is the first step in analyzing a project's GHG emissions. The screening threshold would apply to all discretionary projects. Based on review of project applications processed by the City from 2016 to 2018 (described below in Section 3.1, *Screening Threshold Development Methodology*, it was determined just over 10 percent of the emissions generated by projects processed by the City would be attributable to projects emitting fewer than 500 $MTCO_2e$ annually. Thus, nearly 90 percent of the estimated emissions from projects processed by the City (assuming these development trends would continue into the future) would be subject to CAP reduction measures applied through the Checklist. Based on historical emissions from projects processed by the City, the total emissions from development projects that would fall below the 500 $MTCO_2e$ threshold is approximately 3,000 $MTCO_2e$ annually. These emissions would account for less than one percent of the City's baseline GHG inventory and would be considered nominal at the citywide level. Thus, emissions from projects processed by the City and below the screening threshold would not be anticipated to result in cumulative GHG impacts and conflict with the City's ability to achieve its GHG reduction targets. The City's screening level and Checklist would capture a large proportion of emissions and require application of GHG reduction measures. In addition, the analysis in the CAP demonstrates that the City would achieve its GHG reduction targets through a combination of reduction measures applicable to new development and City-led actions that would also yield reductions from existing uses (e.g., increase in grid supply renewables). Ultimately, when processing projects the Planning Division Manager would maintain discretion to require projects to implement applicable CAP measures identified within this Checklist if unique circumstances exist for projects that are otherwise below the screening level.

For proposed projects at or above the screening threshold of 500 $MTCO_2e$, applicants are required to complete the CAP Consistency Checklist, which is meant to provide a streamlined review process for proposed new development projects that are subject to discretionary review and require environmental review pursuant to CEQA. A properly completed Checklist documents how a proposed project complies with the CAP, and in so doing, demonstrates that the project's contribution to climate change impacts is not cumulatively considerable. Additionally, a project requiring a land use designation change that is more GHG-intensive than the land use assumed under the CAP must prepare a project-specific GHG analysis in accordance with the applicable CEQA Guidelines.

## 3.1 SCREENING THRESHOLD DEVELOPMENT METHODOLOGY

This section describes the methodology used to develop the screening threshold based on CAP data, historical projects processed by the City, and anticipated growth projections. The steps used to develop the screening threshold are outlined below and detailed calculation worksheets are provided in Attachment A.

1) A list of project applications processed by the City in the last three years was obtained to assess historical GHG emissions associated with new projects. Project data obtained included project name, land use or project type (e.g., residential, commercial), project size metrics (e.g., dwelling units, square feet, acres), and annual unmitigated GHG emissions (if available from the project environmental document). Project data were categorized by CEQA document, i.e., exemptions, negative declarations or mitigated negative declarations (NDs/MNDs), and Environmental Impact Reports (EIRs). The goal of this exercise was to gather sufficient data to match each project with an equivalent California Emissions Estimator Model (CalEEMod) land use type.
2) For projects that did not report estimated GHG emissions in their environmental documents, annual operational GHG emissions were estimated using CalEEMod. Emissions were approximated by assigning an equivalent CalEEMod land use type and size based on data obtained in Step 1.
3) Estimated reductions from CAP GHG reduction measures were allocated to new development based on their application to new uses (i.e., development between the CAP's baseline year of 2012 and forecast year of 2030). Estimated BAU emissions in 2030 were also allocated to new development using the same methodology. The proportion of new development's GHG emissions anticipated to be reduced through CAP measures was estimated using the reductions attributable to new development, compared with total BAU emissions.
4) The proportional reduction in emissions from new development estimated in Step 3 was applied to unmitigated project emissions in the City's list obtained under Step 1, to calculate anticipated reductions from application of CAP measures to projects in the City.
5) The average reductions that may be anticipated from an average annual set of projects from the City were calculated and compared to the reductions that would occur from an average annual set of new development under the CAP. This approach is used because the project list from the City represents development in recent years while new development analyzed in the CAP's forecast year would include decades' worth of new development. Thus, an "amortization" approach for new development is needed to compare projects across varying timelines.
6) A screening level input is set such that the percent of projects captured, and percent of emissions captured by the set level can be calculated.
7) The screening level was adjusted in an iterative manner to achieve an appropriate emissions capture rate and align with anticipated reductions from the CAP on an amortized basis. The goal of this exercise was to achieve the maximum emissions capture rate while getting the total estimated reductions from projects based on the screening level to align with total estimated reductions from new development under the CAP, on an amortized basis.

Based on the above analysis, the mass emissions level that achieves the goals outlined in Step 7 is **500 $MTCO_2e$ per year**. This level would capture 88 percent of emissions from new projects and would achieve enough reductions from captured emissions to meet the CAP's goals for new development. Thus, 88 percent of emissions from new projects would be subject to CAP reduction measures through the Checklist and would achieve reductions consistent with the analysis in the CAP through application of these measures. Projects that fall below this level would be considered less than significant and would not interfere with the City's ability to meet its CAP targets.

# 4 DEMONSTRATING CONSISTENCY WITH THE CLIMATE ACTION PLAN

The CAP Consistency Checklist provides direction about GHG reduction measures to be incorporated in individual projects, which will be used during the normal development review and building permit processes. Projects in the City may need to apply an additional analysis method (i.e., numerical GHG threshold) to demonstrate consistency with the CAP in certain circumstances. This method will supplement the CAP Consistency Checklist in cases when a project proposes unique land uses that require a quantitative analysis or other circumstances exist for a General Plan consistent project that warrant the use of the alternative method, as determined by the Planning Division Manager through the CEQA process. Utilizing the Checklist alone or in combination with the numerical GHG threshold, identified project features that help a project meet the provisions of the CAP shall then become part of project conditions of approval.

## 4.1 LAND USE CONSISTENCY

As noted previously, the first step in determining a project's consistency with the CAP is to compare the project size to the screening level criteria identified in Table 1. Projects that would generate less than 500 $MTCO_2e$ per year would not require further analysis. Based on the analysis described previously to determine the screening level threshold, these projects are considered to be of minimal intensity, would generate nominal emissions at the citywide level, and would typically achieve reduced GHG emissions through compliance with State regulations.

If a project would exceed the screening threshold, the next step in the CAP Consistency Checklist assesses a project's consistency with the growth projections and land use assumptions made in the CAP. If a project is consistent with the projections in the CAP, its associated growth in terms of GHG emissions was accounted for in the CAP's BAU projection and is within the scope of the CAP's analysis and program of measures that contribute towards reducing overall City GHG emissions below identified GHG targets.

If a project is consistent with the existing General Plan land use designation(s), it can be determined to be consistent with the CAP projections and can move forward to Step 2 of the Checklist.

Not all projects that are proposing development that is not consistent with the existing General Plan land use designations would be in conflict with the CAP's projections. For example, if a project includes a General Plan land use amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations, it would still be within the projections assumed in the CAP. In addition to providing evidence to support the conclusion that the project would generate fewer emissions than existing designations, these projects would demonstrate consistency with the CAP through completion of Step 2 of the Checklist.

If a land use designation amendment results in a more GHG-intensive project, the project is required to prepare a quantitative GHG analysis based on applicable sections of the CEQA Guidelines and is not eligible for GHG analysis streamlining using the CAP Checklist.

## 4.2 CLIMATE ACTION PLAN REDUCTION MEASURES CONSISTENCY

The CAP identifies specific goals supporting each GHG reduction measure. Actions to implement the measures include a combination of ordinances, programs, incentives, outreach, and educational activities. As CAP implementation occurs, each action will be assessed and monitored.

As described in the CAP, there is an existing framework of federal, State, regional, and local policies and regulations that contribute to reducing GHG emissions. The CAP shows that reductions from existing regulations, in combination with additional General Plan policies and actions, would not be adequate to meet established targets. Local actions that reduce emissions from both the built environment and new development would be necessary. The CAP includes targets that relate to a percent reduction in GHG emissions below baseline levels. While the City will achieve reductions outlined in the CAP through capital programming, incentives, awareness and education, and planning processes and ordinances, new development can do its fair share in helping the City achieve its targets by incorporating measures consistent with the CAP. This also provides new development with the benefit of using CEQA streamlining provisions for addressing its GHG impacts.

### *CAP Consistency Checklist*

Based on the foregoing, the intent of the CAP Consistency Checklist is to demonstrate compliance with applicable CAP strategies and measures. The Checklist will be updated by the City as needed to incorporate new GHG reduction techniques or to comply with later amendments to the CAP, local ordinances, or State or federal law. If the CAP monitoring process (see CAP **Chapter 4**, "Implementation and Monitoring") reveals the need for further reductions to stay on track to meet reduction targets, the Checklist may be updated to include additional applicable measures for new development.

The CAP is the City's adopted policy document to reduce GHG emissions. Reduction strategies and measures in the CAP were evaluated through the CAP development process and represent the most relevant and effective pathway to achieving established targets, as determined by the City. As such, the City requires project applicants to use the Checklist to show consistency with the CAP and avail themselves of its streamlining benefits. The Checklist approach would not require quantification of GHG emissions and reductions from each measure because the City's CAP has performed the analysis at a programmatic level. However, project applicants would still need to quantify design parameters to demonstrate compliance with CAP measures referenced in the Checklist (e.g., number of electric vehicle [EV] charging spaces).

## 4.3 ADDITIONAL METHOD TO DEMONSTRATE CONSISTENCY

Proposed projects that are not consistent with the City's General Plan land use designation, and that intensify GHG emissions beyond current designations are required to provide a project-specific quantitative GHG analysis. The analysis must be prepared based on State CEQA Guidelines and identify substantiated thresholds of significance to determine project impacts. However, projects that are consistent with the General Plan but have unique land uses or circumstances for which no measures in the Checklist would apply, could demonstrate consistency with the CAP through comparison to a numerical GHG threshold.

Project-specific mitigation measures, which would be in addition to all Checklist items and all feasible on-site project design features, must include specific, enforceable actions to reduce project emissions, and an analysis is required to show the emission reductions achieved from each measure. Each mitigation measure should include references or a logical, fact-based explanation as to why a specific mitigation measure would achieve the stated reductions. Mitigation measures and/or design features must be supported with substantial evidence showing impacts have been reduced. With the implementation of CAP strategies and

measures, the City expects most projects will achieve CAP consistency through the Checklist alone. The additional analysis option is to be used only when unique circumstances warrant it, as determined by the Planning Division Manager through the CEQA process. In such cases, an applicant would need to provide a project-specific quantitative GHG analysis demonstrating consistency with the method described below. Project applicants would still need to complete the entire Checklist (i.e., Steps 1 and 2) and comply with all other applicable CAP measures to the extent feasible.

## *Numerical Greenhouse Gas Threshold*

Projects that are consistent with the City's General Plan may apply the City's recommended numerical GHG threshold of **2.1 MTCO$_2$e per service population per year**. Service population is defined as the sum of number of residents and jobs anticipated to be generated by the project. This threshold was established based on the CAP GHG reduction target in 2030 and demographics projections (i.e., population and employment) for the same year. A detailed worksheet used to determine this numerical threshold is included as Appendix B.

The numerical GHG threshold approach requires applicants to quantify their GHG emissions in 2030, consistent with the CAP horizon year, and estimate reductions from the applicable Checklist measure(s), in addition to supplemental mitigation measures necessary to achieve the numerical GHG threshold. The type, character, and level of mitigation would depend on the project type, size, location, context, and other factors. The availability of mitigation measures can change over time as well, with new technologies, building materials, building design practices, and other changes. Therefore, in developing project-specific reduction measures, the City recommends that a project applicant refer to current guidance from the California Air Pollution Control Officers Association (CAPCOA), CARB, the Governor's Office of Planning and Research (OPR), the California Attorney General, and the San Diego Association of Governments (SANDAG) to determine applicable mitigation measures and estimate their effectiveness.

# Attachment A

## Screening Level Threshold Calculation Worksheets

| Measure Number | Measure Description | How to scale to New Development/Growth Only | GHG Reductions in 2030 applicable to New Development (MTCO2e/year) |
|---|---|---|---|
| **T-2** | Require EV Charging Stations in New Developments | New Construction | 2,493 |
| **T-4** | Provide Grants for Residents and Businesses to Install EV Charging Stations | Grant from City | 8,282 |
| **T-8** | Develop Bicycle Infrastructure in the City's General Plan Mobility Element | City Action, potentially supported by individual projects. | 692 |
| **T-9** | Adopt Citywide Transportation Demand Management Ordinance | New Construction | 262 |
| **T-12** | Reduce Parking Requirements for New Residential Developments Near Transit | New Construction near transit | 2,017 |
| **E-1** | Require New Residential Developments to Install Alternatively-Fueled Water Heaters | New residential | 1,275 |
| **E-2** | Require installation of PV systems at New Non-Residential Developments | New Non-res | 773 |
| **W-1** | Reduce Outdoor Water Use for Landscaping | All projects | 91 |
| **C-2** | Increase Tree Planting in New Departments | All projects | 97 |
| | Total Reduction from New Development Operating between 2012 and 2030. | | 15,982 |
| | Total Reduction from New Development Operating between 2012 and 2030 per average year of annual set of new development | | 888 |
| | Percent reduction from new development BAU emissions | | 6% |

**Emissions Projections and Reductions (from EPIC's Technical Document)**

| Year | Business-as-usual Projection ($MT CO_2e$) | Target Emissions Level (% below baseline) | Target Emissions Level ($MT CO_2e$) | Emissions Reduction Needed to Meet Target ($MT CO_2e$) |
|---|---|---|---|---|
| 2012 | 599,000 | - | - | - |
| 2020 | 549,000 | 4% | 527,040 | none |
| 2030 | 591,000 | 42% | 342,780 | 248,220 |

Emissions projections and reductions are rounded.
Energy Policy Initiatives Center 2019.

**Approved Project Details in San Marcos**
**2016 - 2018**

| | |
|---|---|
| Screening Level | 500 |
| Percent of Projects Exceeding Screening Level | 36% |
| Percent of Emissions Captured | 88% |

| Project Approval Year | Project Name | CalEEMod Land Use Type | Size (Acres) | Proposed Land Uses | | | CEQA Document | 2018 Unmitigated GHG Emissions (Annual Operational) (MTCO2e/year) (using 2030 EFs) | Percent of total emissions | Mitigated GHG Emissions (applied to projects above screening level) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Residential (# of du) | Non-Residential (square feet) | Other (Parks, Public etc.) | | | | |
| 2018 | Fenton Discovery Village South | Single Family Homes | 39 ac. | 230 | N/A | N/A | MND | 3745.2 | 13.38% | 241 |
| 2016 | San Marcos Highlands (Farouk Kubba) | Single Family Homes | 262 | 189 | N/A | N/A | EIR | 2591.6 | 9.26% | 167 |
| 2017 | Block 3 Extended Learning Building | University | | N/A | 229,310 | N/A | EIR | 2371.0 | 8.47% | 153 |
| 2018 | MU-4 Brookfield | Apartment Low Rise | 23.2 | 220 | N/A | N/A | MND | 2071.4 | 7.40% | 133 |
| 2017 | RAF Pacifica | Industrial Park | 15.7 | N/A | 212,233 | N/A | MND | 2029.5 | 7.25% | 131 |
| 2016 | PIMA Medical Institute | Medical Office Building | | N/A | 61,876 | N/A | EIR | 1662.8 | 5.94% | 107 |
| 2018 | JR Legacy/Global Carte | Hotel | 1.66 | N/A | 71,000 | N/A | MND | 1540.0 | 5.50% | 99 |
| 2017 | Phase 2 Corner @ 2 Oaks | Condos | 6.8 ac | 118 | N/A | N/A | MND | 1048.5 | 3.74% | 68 |
| 2018 | Block 3, Lot 11 | Retail | | N/A | 14,237 | N/A | EIR | 999.0 | 3.57% | 64 |
| | | University | | N/A | 118,496 | N/A | | | | |
| 2018 | Murai Specific Plan | Single Family Homes | 91.6 ac | 89 | N/A | 1 acre park | EIR | 793.9 | 3% | 51 |
| 2016 | Pacific Industrial | Regional Shopping Center | 1.49 | N/A | 29,236 | N/A | MND | 790.4 | 2.82% | 51 |
| 2016 | Planning Area T | Single Family Homes | | 55 | N/A | N/A | EIR | 754.2 | 2.69% | 49 |
| 2016 | Costco Fuel Island Expansion | Gas Station | | N/A | N/A | N/A | exempt, small structure | 700.8 | 2.50% | 45 |
| 2017 | Phase 1 Corner @ 2 Oaks | Strip Mall | 4.66 ac | N/A | 13,499 | N/A | MND | 677.3 | 2.42% | 44 |
| | | Quality Restaurant | | N/A | 6,500 | N/A | | | | |
| 2017 | San Elijo Town Center | Regional Shopping Center | | 12 | 23,232 | N/A | Previous EIR | 628.1 | 2.24% | 40 |
| 2016 | Lot 5, Block K | Condos | | 68 | N/A | N/A | Previous EIR | 604.2 | 2.16% | 39 |
| 2016 | Block K Condo Units | Condos | | 68 | N/A | N/A | Previous EIR | 604.2 | 2.16% | 39 |
| 2016 | San Elijo Area O | Single Family Homes | | 44 | N/A | N/A | Previous EIR | 603.3 | 2.15% | 39 |
| 2018 | West Health Adult Care/Service Facility | Medical Office Building | | N/A | 20,156 | N/A | Exempt | 541.7 | 1.93% | 35 |
| 2018 | Phase 2 San Elijo Hills Town Center | Apartment Low Rise + Regional Shopping Center | 2.18 | 12 | 11,711 | | Previous EIR | 429.6 | 1.53% | 0 |
| 2018 | Fenton Discovery Village North | City Park | 41 ac. | N/A | N/A | Public park | Previous EIR | 301.1 | 1.08% | 0 |
| 2018 | 1039 E. Mission Outdoor Storage | Unrefrigerated Warehouse - No Rail | 2.96 | N/A | N/A | N/A | Exempt | 276.0 | 0.99% | 0 |
| 2016 | KRC Rock | General Light Industry | | N/A | 31,000 | N/A | Exempt | 264.3 | 0.94% | 0 |
| 2017 | Palomar College M&O Building | General Light Industry | | N/A | 28,157 | N/A | FEIR | 240.0 | 0.86% | 0 |
| 2017 | Crown Point San Elijo Area O | Single Family Homes | | 16 | N/A | N/A | Previous EIR | 219.4 | 0.78% | 0 |
| 2017 | Pacifica San Marcos | Apartment Mid Rise + Strip Mall | 1.12 | 31 | 4,530 | N/A | Exempt | 210.1 | 0.75% | 0 |
| 2017 | Palomar Station SP-Admin Amendment | | 14.32 ac | 16 | N/A | N/A | EIR | 187.4 | 0.67% | 0 |
| 2016 | North County Shooting Center | Raquet Club | | N/A | 12,258 | N/A | MND | 172.1 | 0.61% | 0 |
| 2016 | SJ Asset Management | Apartment Low Rise + pool | 3.38 | 50 | N/A | N/A | MND | 165.8 | 0.59% | 0 |
| 2017 | Crown Point San Elijo Area T | Single Family Homes | | 11 | N/A | N/A | Previous EIR | 150.8 | 0.54% | 0 |
| 2018 | ERS Fitness | Gym | | N/A | 5,474 | N/A | Exempt | 123.2 | 0.44% | 0 |
| 2017 | Montiel Rd Partners | Single Family Homes | 2.7 | 9 | N/A | N/A | MND | 109.7 | 0.39% | 0 |
| 2018 | Klauss Schmidt | Parking Lot + Auto Care Care Center | 31,243 square feet | N/A | 1,200 | N/A | Exempt | 99.0 | 0.35% | 0 |
| 2017 | MAAC Preschool Expansion | Day Care | 0.64 ac | N/A | 2,661 | N/A | MND | 65.0 | 0.23% | 0 |
| 2017 | National Community Renaissance | Apartment Mid Rise | 4.06 | 148 | N/A | N/A | MND | 39.0 | 0.14% | 0 |
| 2016 | Enstrom Mold | Manufacturing | 0.37 | N/A | 9,358 | N/A | Exempt | 34.7 | 0.12% | 0 |
| 2017 | 650 Bennett | Single Family Homes | 1.21 | 3 | N/A | N/A | Exempt | 27.4 | 0.10% | 0 |
| 2017 | Chiu Parcel Map | Single Family Homes | 0.71 | 2 | N/A | N/A | Exempt | 27.4 | 0.10% | 0 |
| 2018 | El Chino Tires | Automobile Care Center | | N/A | 2,080 | N/A | Exempt | 25.6 | 0.09% | 0 |
| 2016 | Richmar Park | City Park | 2.86 ac | N/A | N/A | N/A | MND | 21.0 | 0.08% | 0 |
| 2018 | Nimaax Auto Repair | Automobile Care Center | | N/A | 1,200 | N/A | Exempt | 14.8 | 0.05% | 0 |
| 2016 | Broemmelsiek Lot Split | Single Family Homes | 0.57 | 2 | N/A | N/A | Exempt | 13.7 | 0.05% | 0 |
| 2017 | Twin Oaks Valley Winery | Manufacturing | | N/A | 3,528 | N/A | Exempt | 13.1 | 0.05% | 0 |
| 2016 | MAAC at 165 Vallecitos de Oro | General Office Building | | N/A | 2,020 | N/A | Exempt | 10.1 | 0.04% | 0 |
| 2018 | Verizon Twin Marcos (110 Richmar) | | | N/A | N/A | N/A | Exempt | 0.0009 | 0.00% | 0 |
| 2018 | Verizon Palomar College (Borden) | | | N/A | N/A | N/A | Exempt | 0.0009 | 0.00% | 0 |
| 2017 | Verizon Sunset Park (La Mirada) | | | N/A | N/A | N/A | Exempt | 0.0009 | 0.00% | 0 |
| 2016 | Verizon Smilax (S Santa Fe Rd) | | | N/A | N/A | N/A | Exempt | 0.0009 | 0.00% | 0 |
| 2016 | Verizon Nordahl Market Pl (Nordahl) | | | N/A | N/A | N/A | Exempt | 0.0009 | 0.00% | 0 |
| 2016 | Verizon Borden Oaks (TOV) | | | N/A | N/A | N/A | Exempt | 0.0009 | 0.00% | 0 |
| 2016 | Verizon Hollandia Daity (Mission Hills) | | | N/A | N/A | N/A | Exempt | 0.0009 | 0.00% | 0 |
| 2016 | Verizon Jacks Pond (La Moree) | | | N/A | N/A | N/A | Exempt | 0.0009 | 0.00% | 0 |
| 2017 | Kaiser Mobile MRI | | | N/A | N/A | N/A | Exempt | 0.0000 | 0.00% | 0 |

| | |
|---|---|
| Total Reduction | 1594 |
| Yearly Average | 797 |
| Difference from CAP Reductions | -91 |

| | |
|---|---|
| 2018 - 2030 scaling factor | 1.10 |
| 2030 (60% renewable) SDGE Electricity Emission Factor (lb CO2e/MWh) | 418.2390 |
| 2030 (60% renewable) SDGE Electricity Emission Factor (MT CO2e/MWh) | 0.1897 |

| Climate Zone | 13 |
|---|---|

| Land Use | Unit | CalEEMod 2016.3.2 Results (MTCO2e/year) | Emissions per unit (MTCO2e/unit) |
|---|---|---|---|
| Apartment Low Rise | 100 DU | 941.56 | 9.416 |
| Apartment Mid Rise | 100 DU | 325.27 | 3.253 |
| Automobile Care Center | 1,000 sf | 12.32 | 0.012 |
| City Park | 1 acre | 7.34 | 7.345 |
| Condos | 100 DU | 888.52 | 8.885 |
| Day Care | 1,000 sf | 24.41 | 0.024 |
| Gas station | 10 Pumps | 389.32 | 38.932 |
| General Light Industry | 10,000 sf | 85.25 | 0.009 |
| General Office Building | 1,000 sf | 5.01 | 0.005 |
| Gym | 1,000 sf | 22.51 | 0.023 |
| Industrial Park | 100,000 sf | 956.26 | 0.010 |
| Manufacturing | 10,000 sf | 37.07 | 0.004 |
| Medical Office Building | 1,000 sf | 26.87 | 0.027 |
| Quality Restaurant | 1,000 sf | 54.13 | 0.054 |
| Raquet Club | 1,000 sf | 14.04 | 0.014 |
| Recreational Swimming Pool | 1,000 sf | 3.17 | 0.003 |
| Regional Shopping Center | 10,000 sf | 270.34 | 0.027 |
| Single Family Homes | 100 DU | 1371.23 | 13.712 |
| Strip mall | 1,000 sf | 24.11 | 0.024 |
| University | 229,379 sf | 2371.67 | 0.010 |
| Unrefrigerated Warehouse - No Rail | 100,000 sf | 214.08 | 0.002 |

# Attachment B

## Numerical Threshold Calculation Worksheet

| Year | Population | Jobs |
|---|---|---|
| 2012 | 85,563 | 37,608 |
| 2013 | 87,591 | 38,630 |
| 2014 | 90,397 | 39,652 |

| Year | Population | Commercial Jobs | Industrial Jobs | Total Jobs |
|---|---|---|---|---|
| 2020 | 98,915 | 38,237 | 7,434 | 45,783 |
| 2030 | 108,824 | 44,486 | 7,755 | 52,348 |
| 2035 | 109,095 | 46,898 | 7,899 | 54,902 |
| Source: SANDAG 2013; EPIC 2018. | | | | |

| Year | Business-as-usual Projection ($MTCO_2e$) | Target Emissions Level (% below baseline) | Target Emissions Level ($MTCO_2e$) | Emissions Reduction Needed to Meet Target ($MTCO_2e$) |
|---|---|---|---|---|
| 2012 | 599,000 | - | - | - |
| 2020 | 549,000 | 4% | 575,000 | none |
| 2030 | 591,000 | 42% | 347,000 | 244,000 |

Notes:
Emissions projections and reductions are rounded.

Source: EPIC 2018

| Numerical GHG Threshold for Target Year Calculation | | |
|---|---|---|
| $\frac{Emissions\ Target_X}{(Population_X + Total\ Jobs_X)}$<br>Where "X" = Target Year | Target Year | Numerical Threshold |
| | 2030 | 2.1 |

# CLIMATE ACTION PLAN CONSISTENCY REVIEW CHECKLIST

## INTRODUCTION

The City of San Marcos (City) adopted an updated Climate Action Plan (CAP) in [Insert Date of CAP Adoption]. The CAP outlines strategies and measures that the City will undertake to achieve its proportional share of State greenhouse gas (GHG) emissions reduction targets. The purpose of the CAP Consistency Checklist (Checklist), in conjunction with the CAP, is to provide a streamlined review process for all proposed development projects that are subject to discretionary review and/or trigger environmental review pursuant to the California Environmental Quality Act (CEQA).

Analysis of GHG emissions and potential climate change impacts from new development is required under CEQA. The City's CAP is a qualified greenhouse gas (GHG) emissions reduction plan in accordance with State CEQA Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of a CAP.

The purpose of this Checklist is to implement GHG reduction measures from the CAP that apply to new discretionary development projects. New development would demonstrate consistency with relevant CAP strategies and would not conflict with the City's ability to achieve the identified GHG reduction targets through implementation of applicable measures. Projects that are consistent with the CAP, as determined through the use of this Checklist, may rely on the CAP for the cumulative impact analysis of GHG emissions. Projects that are not consistent with the CAP must prepare a comprehensive project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and incorporation of the measures in this Checklist to the extent feasible. Cumulative GHG impacts would be significant for any project that is not consistent with the CAP.

This Checklist may be updated periodically to incorporate new GHG reduction techniques or to comply with later amendments to the CAP or local, State, or federal law. Comprehensive updates to this Checklist will be coordinated with each CAP update. Administrative updates to the Checklist may occur regularly, as necessary for the purpose of keeping the Checklist up-to-date and implementable. Updates to the CAP Checklist associated with an update to the City's CAP would also require City Council approval and shall comply with CEQA.

## APPLICABILITY AND PROCEDURES

This Checklist is required only for discretionary projects[1] that are subject to and not exempt from CEQA. Projects that are exempt from CEQA are deemed to be consistent with the City's CAP, and no further review is necessary, with the exception of a Class 32 "In-Fill Development Projects" categorical exemption (State CEQA Guidelines Section 15332), for which projects are required to demonstrate consistency with the CAP through this Checklist.

General procedures for Checklist compliance and review are described below. Specific guidance is also provided under each of the questions under Steps 1 and 2 of the Checklist.

- The City's Development Services - Planning Division reviews development applications and makes determinations regarding environmental review requirements under CEQA.
- The specific applicable requirements outlined in the Checklist shall be required as conditions of project approval.
- The project must provide written documentation and supporting evidence that demonstrate how the proposed project would implement each applicable Checklist requirement described herein to the satisfaction of the Planning Division.
- If a question in the Checklist is deemed not applicable (N/A) to a project, written documentation and evidence supporting that conclusion shall be provided to the satisfaction of the Planning Division. Each Checklist question provides the scenario(s) where checking N/A may be acceptable. If a measure is deemed not applicable for reasons other than those outlined in each question, supporting evidence will need to be provided and would be subject to Planning Division approval. A project may be determined to be inconsistent with the CAP if the N/A response is deemed to be not supported by credible evidence.
- Development projects requiring discretionary review that cannot demonstrate consistency with the CAP using this Checklist shall prepare a separate, project-level GHG analysis as part of the CEQA document prepared for the project.

[1] In this context, a project is any action that meets the definition of a "Project" in Section 15378 of the State CEQA Guidelines.

## Application Information

### Contact Information

Project No. and Name: _____

Property Address and APN: _____

Applicant Name and Co.: _____

Contact Phone: _____ Contact Email: _____

Was a consultant retained to complete this checklist? ☐ Yes ☐ No
If Yes, complete the following:

Consultant Name: _____ Contact Phone: _____

Company Name: _____ Contact Email: _____

### Project Information

1. What is the size of the project site (acres)? _____

2. Identify all applicable proposed land uses:
   - ☐ Residential (indicate # of single-family dwelling units): _____
   - ☐ Residential (indicate # of multi-family dwelling units): _____
   - ☐ Commercial (indicate total square footage): _____
   - ☐ Industrial (indicate total square footage): _____
   - ☐ Other (describe): _____

3. Provide a description of the project proposed. This description should match the basic project description used for the CEQA document. The description may be attached to the Checklist if there are space constraints.

_____

_____

_____

_____

_____

_____

_____

## STEP 1: LAND USE CONSISTENCY

The first step in this section evaluates a project's GHG emissions consistent with the City's *Guidance to Demonstrating Consistency with the City of San Marcos Climate Action Plan: For Discretionary Projects Subject to CEQA* (Guidance Document). New discretionary development projects subject to CEQA review that emit fewer than 500 metric tons of carbon dioxide equivalent ($MTCO_2e$) annually would not contribute considerably to cumulative climate change impacts as stated in the City's Guidance Document, and therefore, would be considered consistent with the CAP and associated emissions projections.

For projects that are subject to CAP consistency review, the next step in determining consistency is to assess the project's consistency with the growth projections used in the development of the CAP. This section allows the city to determine a project's consistency with the land use assumptions used in the CAP.

## Step 1: Land Use Consistency

| | **Checklist Item**<br>(Check the appropriate box and provide an explanation and supporting documentation for your answer) | **Yes** | **No** |
|---|---|---|---|
| 1. | The size and type of projects listed below would emit fewer than 500 $MTCO_2e$ per year. Based on this threshold, does the proposed project exceed these characteristics?<br>▪ Single Family Housing: 36 dwelling units<br>▪ Multi-Family Housing: 55 dwelling units<br>▪ Office: 43,000 square feet<br>▪ Commercial Space: 20,000 square feet<br>▪ Regional Shopping Center: 18,000 square feet<br>▪ Hotel: 37 rooms<br>▪ Restaurant (Sit-Down): 6,500 square feet<br>▪ Restaurant (Drive-Thru, High Turnover): 2,400 square feet<br>▪ General Light Industrial: 58,000 square feet<br>▪ University: 263 students<br>▪ Mixed-Use: See *Guidance to Demonstrating Consistency* memorandum for methods to estimate mixed-use development thresholds<br>▪ Other: For project types not listed in this section the need for GHG analysis and mitigation will be made on a project-specific basis, considering the 500 $MTCO_2e$ per year screening threshold.<br><br>If **"Yes",** proceed to Question 2 of Step 1.<br>If **"No",** in accordance with the City's CAP screening criteria, the project's GHG impact is less than significant and is not subject to the measures of the CAP. | ☐ | ☐ |
| 2. | Is the proposed project consistent with the City's existing General Plan land use designation?<br><br>If **"Yes"**, proceed to Step 2.<br>If **"No"**, proceed to Question 3 of Step 1 | ☐ | ☐ |
| 3. | For projects not consistent with the existing General Plan land use designation, does the project include a General Plan Amendment that would generate GHG emissions equal to or less than estimated emissions generated under the existing designation?<br><br>If **"Yes"**, proceed to Step 2 and provide estimated project emissions under both existing and proposed designation(s) for comparison.<br>If **"No"**, the project's GHG impact is potentially significant, and a GHG analysis must be prepared in accordance with the City's Guidance Document and applicable CEQA guidelines. The project must incorporate each of the measures identified in Step 2 to mitigate cumulative GHG emissions impacts, along with other mitigation measures as necessary based on a project specific GHG analysis.. Proceed and complete a project specific GHG analysis, and Step 2 of the Checklist. | ☐ | ☐ |

## STEP 2: CAP MEASURES CONSISTENCY

The second step of CAP consistency review is to evaluate a project's consistency with the applicable strategies and measures of the CAP. Each Checklist item is associated with a specific GHG reduction measure in the City's CAP. "N/A" should only be checked based on the direction provided in each Checklist Item question. All projects for which the measure is applicable must demonstrate that they would implement measures consistent with the Checklist Item, or fully substantiate how the item would be infeasible for project implementation. "N/A" responses are subject to Planning Division review and approval. If "No" is provided as a response to a question, the project would be determined to be inconsistent with the CAP and result in a significant GHG impact.

| Step 2: CAP Measures Consistency | | | |
|---|---|---|---|
| **Checklist Item**<br>(Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary) | **Yes** | **No** | **N/A** |
| **Project Design** | | | |
| **1. Electric Vehicle Charging Stations (Measure T-2)**<br><br>Multi-Family Residential and Non-Residential: Will the project install electric vehicle charging stations (Level 2 or better) in at least five percent of the total parking spaces provided on-site?<br><br>Check "N/A" if the project is a single-family residential project or would not provide any parking. | ☐ | ☐ | ☐ |
| Please substantiate how the project satisfies question 1:<br>_____<br>_____<br>_____<br>_____ | | | |
| **2. Bicycle Infrastructure (Measure T-8)**<br><br>Residential and Non-Residential Projects: If the following conditions are met, would the project pay its fair-share contribution to bicycle infrastructure improvements?<br>☐ Intersection or roadway segment improvements are proposed as part of the project and,<br>☐ The City's General Plan Mobility Element identifies bicycle infrastructure improvements at any intersection(s) or roadway segment(s) that would be improved as part of the project.<br><br>Check "N/A" if the conditions above would not be met. | ☐ | ☐ | ☐ |
| Please substantiate how the project satisfies question 2:<br>_____<br>_____<br>_____<br>_____ | | | |

| Step 2: CAP Measures Consistency | | | |
|---|---|---|---|
| **Checklist Item**<br>(Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary) | **Yes** | **No** | **N/A** |
| **3. Transportation Demand Management (Measure T-9)**<br><br>Multi-Family Residential and Non-Residential: Will the project develop and implement a TDM plan that includes, at a minimum, all of the TDM strategies listed below?<br>☐ Provide discounted monthly transit pass or provide at least 25 percent transit fare subsidy to residents/employees.<br>☐ Provide designated car-share, carpool, vanpool, and/or park-and-ride parking spaces.[2]<br>☐ Provide pedestrian connections between all internal uses and to all existing or planned external streets around the project site(s).<br>☐ Provide secure bicycle parking spaces or bicycle racks, showers, and clothes lockers.<br>☐ Encourage telecommuting for employees (allow one telecommute day per week or compressed work weeks) or provide a telecommute work center with common office space and equipment available to residents.<br><br>*-or-*<br><br>Would the project implement and monitor for four (4) years a TDM program that demonstrates an alternative transportation (i.e. carpool, public transit, bicycle, walk, telecommute) mode share of at least 29 percent [3] for all residents?<br><br>Check "N/A" if the project is a single-family residential project or is not subject to the City's TDM Ordinance. | ☐ | ☐ | ☐ |
| Please state which measure option the project for which the project would comply and substantiate how the project satisfies question 3:<br>_____<br>_____<br>_____<br>_____<br>_____ | | | |

[2] The designated number of car-share, carpool, vanpool, and/or park-and-ride parking spaces provided at a rate equal to or greater than CALGreen minimum requirements.

[3] Measure T-10 requires projects to increase alternative mode share by seven percent. The baseline mode share for alternative transportation (i.e. carpool, public transit, bicycle, walk, and telecommute) is 22 percent based on 2010 Census Data.

| Step 2: CAP Measures Consistency | | | |
|---|---|---|---|
| **Checklist Item**<br>(Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary) | **Yes** | **No** | **N/A** |
| **4. Reduce Parking Near Transit (Measure T-12)**<br><br>Multi-Family Residential: If located within a half-mile of a major transit stop[4], would the project provide at least 27 percent fewer parking spaces than required for the same use based on the City's municipal code parking requirements?<br><br>Check "N/A" if the project is a single-family residential or non-residential project. | ☐ | ☐ | ☐ |
| Please substantiate how the project satisfies question 4:<br>_____<br>_____<br>_____<br>_____<br>_____<br>_____ | | | |
| **5. Water Heaters (Measure E-1)**<br><br>Residential: Will the project install one of, or a combination of, the following water heater types in place of natural gas water heaters?<br>☐ Electric heat pump water heater<br>☐ Instantaneous electric water heater<br>☐ Electric tank<br>☐ Solar water heater with heat pump water heater backup<br>☐ Solar water heater with electric tank backup<br><br>Check "N/A" if the project is a non-residential project. | ☐ | ☐ | ☐ |
| Please substantiate how the project satisfies question 5:<br>_____<br>_____<br>_____<br>_____<br>_____<br>_____ | | | |

[4] Major transit stop is defined as a bus or light-rail station with fixed service and 10-minute minimum headways during peak hours. Project applicants should confirm with City staff if the project site would fall within this proximity tot a major transit stop.

| Step 2: CAP Measures Consistency | | | |
|---|---|---|---|
| **Checklist Item**<br>(Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary) | **Yes** | **No** | **N/A** |
| **6. Photovoltaic Installation (Measure E-2)**<br><br>Non-Residential: Will the project install photovoltaic systems with a minimum capacity of two watts per square foot of gross floor area?<br><br>Check "N/A" if the project is a residential project or if installation of on-site photovoltaic would be infeasible. | ☐ | ☐ | ☐ |
| Please substantiate how the project satisfies question 6:<br>_____<br>_____<br>_____<br>_____<br>_____ | | | |
| **7. Landscaping Water Use (Measure W-1)**<br><br>Residential and Non-Residential: Will the project comply with the City's Water Efficient Landscape Ordinance?[5]<br><br>Check "N/A" if the project is not proposing any landscaping or is not subject to the City's Water Efficient Landscape Ordinance. | ☐ | ☐ | ☐ |
| Please substantiate how the project satisfies question 7:<br>_____<br>_____<br>_____<br>_____<br>_____<br>_____ | | | |

[5] City of San Marcos Landscape Manual: https://www.san-marcos.net/home/showdocument?id=13984

| Step 2: CAP Measures Consistency | | | |
|---|---|---|---|
| **Checklist Item**<br>(Check the appropriate box and provide an explanation for your answer. Please use additional sheets if necessary) | **Yes** | **No** | **N/A** |
| **8. Urban Tree Canopy (Measure C-2)**<br><br>Single-Family Residential: Will the project plant a minimum of one tree per single-family residential unit?<br>*-or-*<br>Multi-Family Residential and Non-Residential: If the project is providing more than 10 parking spaces, will the project plant at least one tree per five parking spaces provided?<br><br>Check "N/A" if planting the required number of trees on-site would be infeasible. | ☐ | ☐ | ☐ |

Please substantiate how the project satisfies question 8:

_____
_____
_____
_____
_____
_____

# Appendix E

City of San Marcos Climate Action Plan Implementation Cost Analysis

# Climate Action Plan Implementation Cost Analysis

A Preliminary Estimate of the City of San Marcos Budget Impact and Staffing Needs to Implement CAP Activities

July 2020

Prepared for the City of San Marcos

Prepared by the Energy Policy Initiatives Center

ENERGY POLICY INITIATIVES CENTER
UNIVERSITY OF SAN DIEGO SCHOOL OF LAW

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# 1 EXECUTIVE SUMMARY

This report summarizes the findings of the City of San Marcos (San Marcos) Climate Action Plan (CAP) Implementation Cost Analysis conducted by the Energy Policy Initiatives Center (EPIC) at the University of San Diego. The analysis estimates costs and staffing impacts to implement the activities needed to achieve the GHG emission reduction targets as identified in the CAP. The goals of this analysis are to estimate the following over the first five fiscal years of CAP implementation (FY 2021–22 to FY 2024–25):

- Total cost to San Marcos to implement GHG reduction measures included in CAP over the first five fiscal years;
- Full-time equivalent (FTE) staffing impacts to implement CAP measures; and,
- Incremental costs that would not have occurred without CAP adoption.

While the analysis in this report evaluated costs for the first five fiscal years, CAP measures could have associated costs beyond the time frame presented here since the CAP identifies activities to reduce GHG emissions until year 2030. Cost and staffing impact estimates in this report represent those anticipated to be incurred by San Marcos to implement CAP measures, including costs to develop and execute projects and programs, develop and adopt ordinances, and conduct education and outreach activities. Costs associated with CAP coordination and reporting, including costs to assess the performance of CAP measures annually, complete regular GHG inventory updates, coordinate implementation and performance-tracking activities among departments, and prepare CAP updates are also included here.

It should be noted that this Cost Analysis is conducted to present estimated staffing and cost impacts to the City and does not include a Benefit Cost Analysis or present any cost and GHG reductions achieved over time due to implementation of CAP measures. This document also does not serve as a mechanism for funding allocation. All funds needed to implement the CAP will be allocated through the City's regular budgeting process. This report, however, can serve as a resource when allocating future funding. This report also does not include costs and benefits borne by San Marcos residents and businesses.

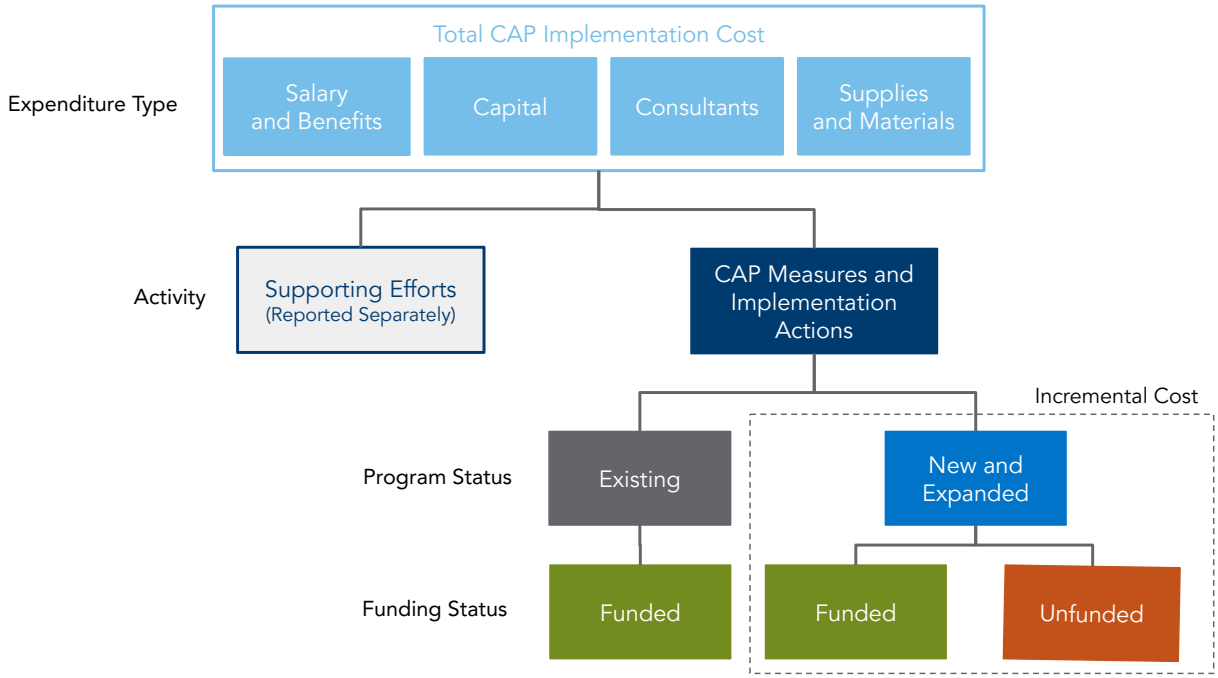
To capture uncertainty of the cost estimates, a 10% contingency is applied to total overall cost estimates, excluding capital costs as regular capital cost estimates include contingencies of 25% or higher.

## 1.1 Cost Analysis Framework

Total implementation costs comprise several expenditure types: salary and benefits, capital, consultants, and supplies and materials. For this analysis, implementation activities directly related to CAP measures and implementation actions were separated from supporting efforts, which are included in the CAP to support identified Strategies. Since the support efforts do not necessarily directly result in GHG reductions and may not occur, they are separated from other costs and reported separately in this report.

Activities that directly implement CAP measures can be divided into existing and new and expanded programs. Based on the analysis conducted for this report, all existing programs have identified funding status (i.e., funded) but new and expanded programs can have funded or unfunded activities. Costs associated with new and expanded activities represent the incremental costs to implement CAP measures. These represent additional costs to San Marcos that would result from CAP adoption. Figure 1 illustrates this cost analysis framework.

Figure 1 Framework for Evaluating CAP Implementation Costs




## 1.2 Key Findings

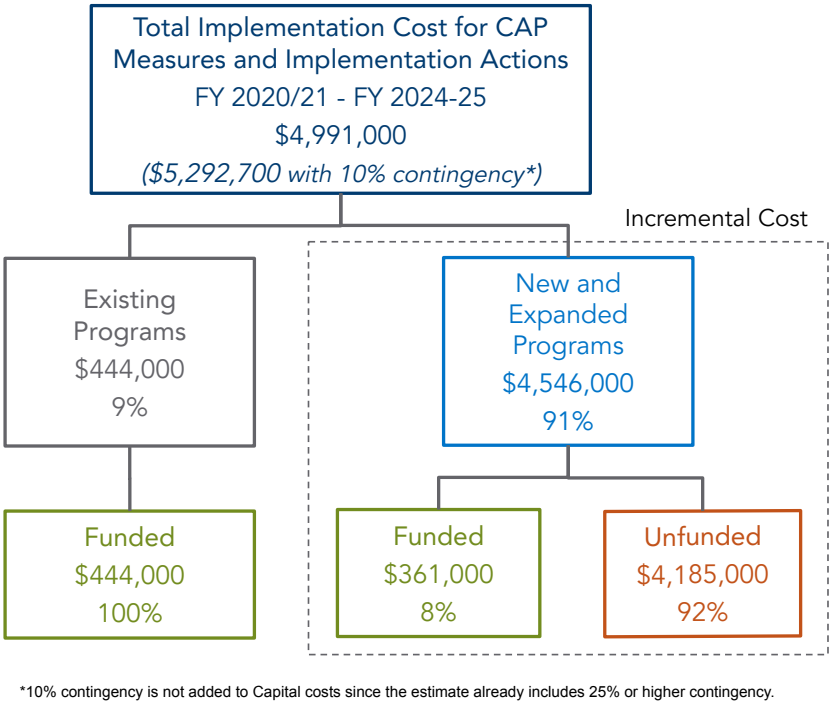
Key findings of the CAP Implementation Cost Analysis are presented below.

### Incremental, Unfunded Costs to Implement CAP Activities through FY 24–25 would be About $4.2 million

The total estimated cost to implement CAP measures over the first five-year period (FY 2020–21 – FY 2024–25)—not including supporting efforts—is about $5 million (Figure 2). Assuming an additional 10% contingency to account for uncertainty, the total would be about $5.3 million.[1] The vast majority of these costs, about $4.5 million (91%), are associated with new and expanded programs and represent incremental costs that would not have occurred without CAP adoption. Of this subset of costs, about $4.2 million, or 92% of new and expanded program costs, are unfunded.

[1] The 10% contingency is not added to Capital costs since the estimate already includes 25% or higher contingency.

Figure 2 Total CAP Implementation Costs Summary Diagram (FY21–FY25)[2]




*10% contingency is not added to Capital costs since the estimate already includes 25% or higher contingency.

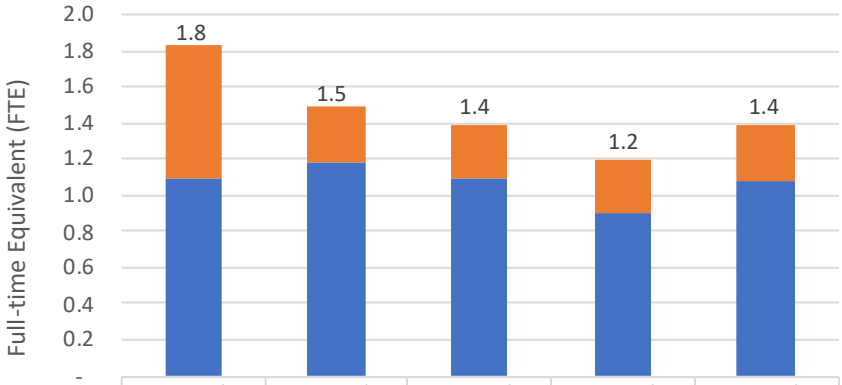
## Existing Staffing Capacity Should be Sufficient to Implement CAP Measures

Given the estimated staffing impacts, San Marcos staff should be able to absorb additional CAP implementation activities without adding new staff. Accommodating new CAP-related activities will require reassignment and reprioritization of assigned tasks. Successful CAP implementation will require a position to be devoted to CAP implementation efforts on 0.3–0.5 FTE basis. Additional staff will not be hired, instead the CAP implementation duties will be absorbed through re-prioritization of staff position assigned to the CAP update and implementation efforts and to devote roughly 0.5 FTE on CAP related matters. The responsible position will act as clearinghouse for all CAP related implementation efforts and will continue attendance and representation on Climate related matters at regional and state level. The City should also consider establishing an inter-departmental CAP team of key positions that will be tasked with implementation efforts.

Total staffing needs to implement CAP measures is 1.8 FTE in year one and then declines to between 1.2 FTE and 1.5 FTE over the remaining four fiscal years (Figure 3). This pattern reflects start up activity in year one and then a leveling off as CAP implementation continues. New and expanded programs account for a majority of increased staffing needs.

[2] Note that the 10% contingency does not apply to capital cost estimates. These already include a contingency.

Figure 3 Annual Direct Staffing Impact (FTE) by Program Status




| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Existing Programs | 0.7 | 0.3 | 0.3 | 0.3 | 0.3 |
| New and Expanded Programs | 1.1 | 1.2 | 1.1 | 0.9 | 1.1 |
| Total | 1.8 | 1.5 | 1.4 | 1.2 | 1.4 |

## Three CAP Measures Account for Most Implementation Costs

Three CAP measures account for about two-thirds of CAP implementation costs (Table 1). T-3 (Install Public Electric Vehicle Charging Stations) would have a total cost of about $1.3 million (26% of total) and annual costs of about $300,000 in years two through five.[3] T-4 (Provide Grants for Residents and Businesses to Install Electric Vehicle Charging Stations) would have a similar implementation cost of about $240,000 annually ($1.3 million total over five years) for grants. These two electric vehicle related measures would account for about half of all CAP implementation costs. Measure E-3 (Increase Grid-Supply Renewable and Zero-Carbon Electricity) would have the next highest cost at about 580,000 (12% of total).

Table 1 CAP Measures with a Total Implementation Cost Greater than $1 Million

| CAP Measure | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 | Total | % of Total |
|---|---|---|---|---|---|---|---|
| T-3 | $0 | $301,000 | $308,000 | $303,000 | $374,000 | $1,286,000 | 26% |
| T-4 | $262,000 | $254,000 | $253,000 | $254,000 | $254,000 | $1,277,000 | 26% |
| E-3 | $77,000 | $400,000 | $40,000 | $33,000 | $34,000 | $584,000 | 12% |

## Public Works Would Have the Highest Implementation Costs and Staffing Impacts

Public Works Department would have the highest level of CAP implementation cost during the first five years with between about $200,000 and $570,000 annually and a total of $2.4 million. These costs include about $774,000 for capital purchases, $794,000 in consultant fees, and $614,000 in personnel costs.

[3] The City is working with SDG&E to pursue AB1083 funding which could result in partial funding for this measure.

Development Services Department would have the second highest costs with about $2 million over five years. Two measures that Development Services will lead account for more than 80% of these costs: T-4 (Provide Grants for Residents and Businesses to Install Electric Vehicle Charging Stations), which would cost about $1.2 million over five years; and E-3 (Increase Grid-Supply Renewable and Zero-Carbon Electricity), which would cost about $455,000 over five years.

## 1.3 Next Steps and Recommendations

The San Marcos CAP Implementation Cost Analysis is a comprehensive analysis to evaluate the costs and staffing impacts to implement the CAP. It estimates the capital, personnel, consultant, and other costs to implement 22 CAP measures and the associated implementation actions over the first five year period of the CAP's implementation. As noted earlier, additional analysis can further complement this report to provide a more comprehensive estimate of not just the upfront costs but also benefits that could be achieved over time from CAP's implementation.

- Consider Estimating the Cost and Benefit Impacts to San Marcos Residents and Businesses – The analysis presented in this report focuses on the City's costs and staffing impacts but does not consider the potential financial implications to homes and businesses located in the City. Conducting a benefit-cost analysis provides information on how cost-effectively each CAP measure can reduce GHG emissions and provides estimates on the financial impacts to those who participate in the programs or policies. Benefit-cost analysis considers the costs (e.g., upfront costs and operations and maintenance) and benefits (e.g., utility cost savings) over the life of the project as well as the total GHG reduction over this same period. The results of this analysis could include the net cost of reducing a metric ton of GHG emissions, net present value, return on investment, internal rate of return, payback period, and benefit-cost ratio.

# 2 INTRODUCTION

This report summarizes the findings of the City of San Marcos (San Marcos) Climate Action Plan (CAP) Implementation Cost Analysis conducted by the Energy Policy Initiatives Center (EPIC) at the University of San Diego. The analysis estimates costs and staffing impacts to implement the activities needed to achieve the GHG emission reduction targets included in the CAP. The goals of this analysis are to estimate the:

- Total cost to San Marcos to implement GHG reduction measures included in CAP over the first five fiscal years;
- Full-time equivalent (FTE) staffing impact to implement CAP measures; and
- Incremental costs that would not have occurred without CAP adoption.

While the analysis for this report evaluated costs for the first five fiscal years, CAP measures will have associated costs beyond the timeframe presented here. Cost and staffing impact estimates in this report represent those anticipated to be incurred by San Marcos to implement the CAP measures including costs to develop and execute project and programs, develop and adopt ordinances, and conduct education and outreach activities. Costs associated with CAP coordination and reporting, including costs to assess the performance of CAP measures annually, complete regular GHG inventory updates, coordinate implementation and performance-tracking activities among departments, and prepare CAP updates are also included here. This report does not include a benefit-cost analysis to consider the costs and benefits to the City and to San Marcos residents and businesses that could be achieved over time due to implementation of CAP.

## 2.1 Organization of Report

The overall process used to estimate Implementation Costs is presented in Section 3. Section 4 summarizes the results of the CAP Implementation Cost Analysis. Section 5 summarizes the staffing impacts from implementing CAP measures. Section 6 summarizes the cost and staffing impact results for implementing supporting measures. Section 7 briefly discusses the limitations of the analysis.

# 3 CAP IMPLEMENTATION COST ANALYSIS OVERVIEW

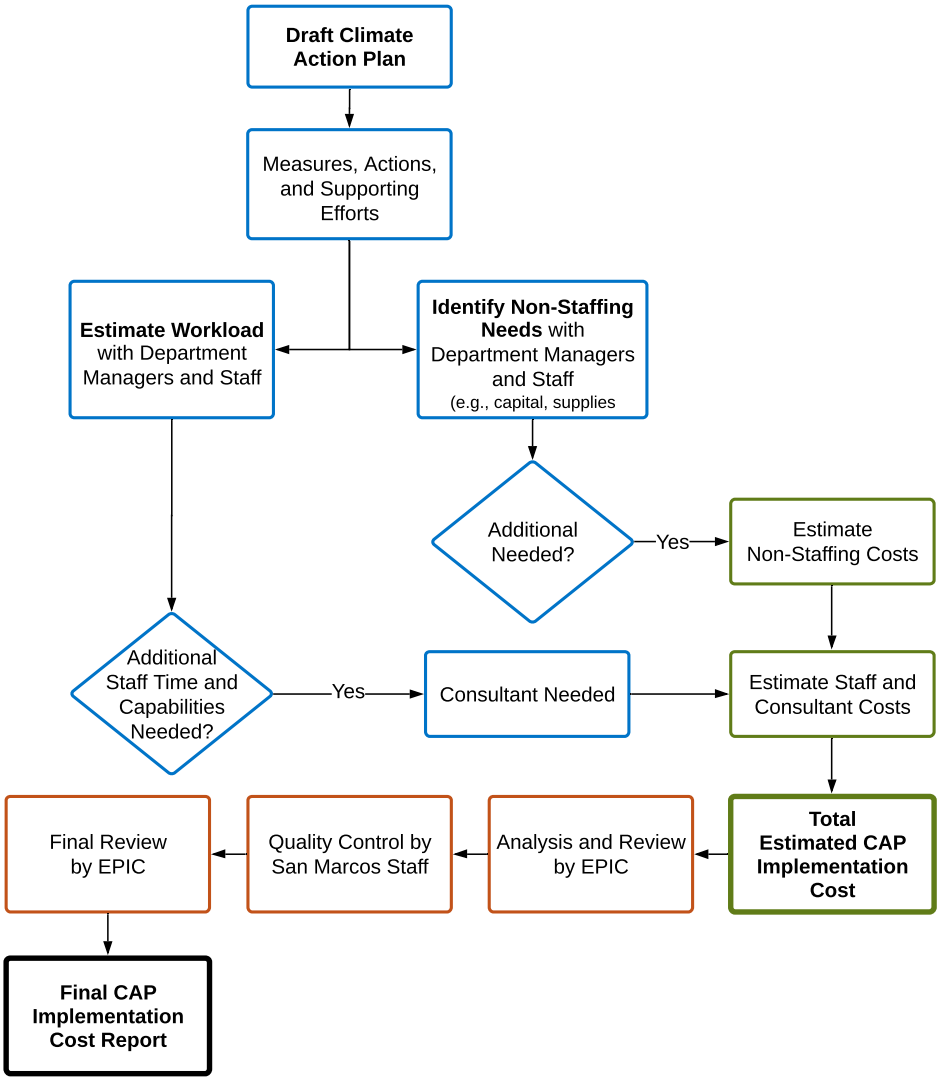
This report estimates staffing and other implementation costs anticipated during the first five fiscal years of CAP implementation. The costs and staffing impacts presented are estimates based on input and discussions with San Marcos staff that would participate in anticipated implementation actions included in the CAP. Over time as the City launches in the CAP Implementation phase, this preliminary estimate would need to be adjusted to account for changes in City's priorities and staff's workload. To account for changes in CAP implementation activities, cost, and staffing impacts, the estimates included here can be updated in the future in concert with regular CAP monitoring and updating efforts. This would provide sufficient time to better understand how implementation activities may actually occur and allow for synchronization with the San Marcos budget process.

The following sections summarize the process used to estimate CAP implementation costs and the overall framework used to identify and evaluate costs.

## 3.1 Process to Estimate CAP Implementation Costs

The general steps in the process to estimate CAP implementations costs were to: (1) determine the tasks required to implement CAP actions; (2) define workload associated with these tasks; and, (3) estimate staffing levels and associated costs. Figure 4 illustrates the general process used to identify resource gaps (blue boxes), estimate the cost of those resources (green boxes), compile results, conduct a review, and confirm analysis results with appropriate San Marcos staff (orange boxes).

Figure 4 Process to Develop CAP Implementation Staffing Cost Estimate



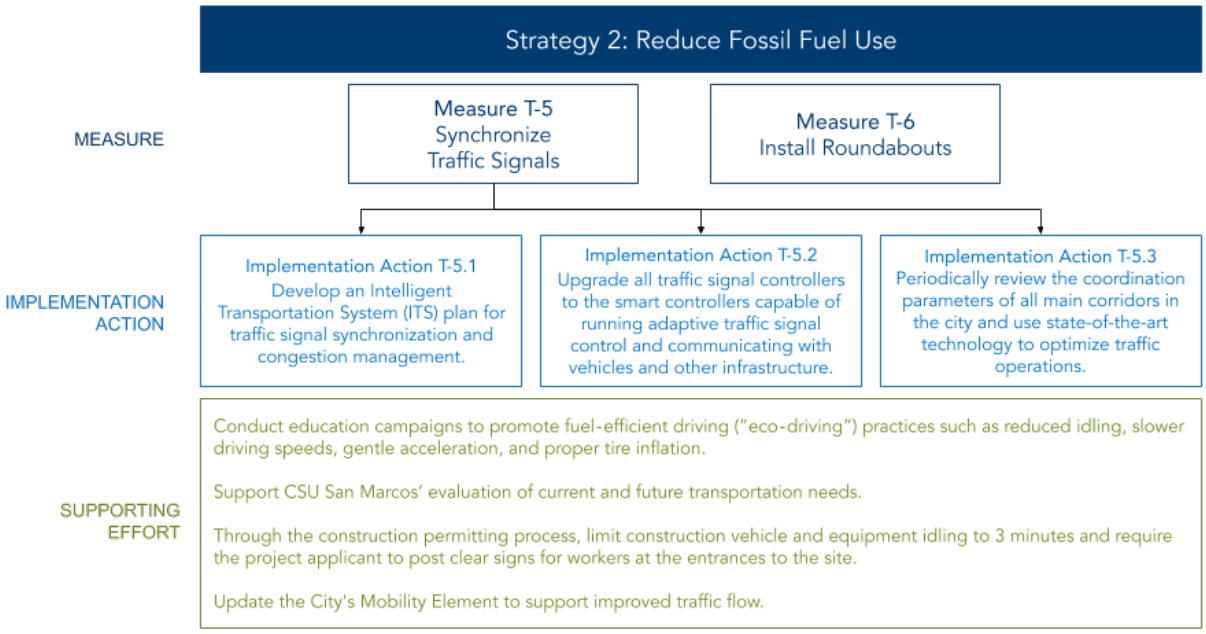

### 3.1.1 Identify Implementation Actions

San Marcos staff identified implementation actions that represent the expected workload to implement CAP activities. The CAP comprises measures that include specific programs, policy actions, and associated actions that will be implemented to reduce GHG emissions. To better understand the potential workload and more accurately estimate associated costs, San Marcos staff, assisted by EPIC, identified preliminary implementation actions for each measure. Figure 5 illustrates the relationship between the CAP measures, actions, and supporting efforts. The San Marcos CAP includes 8 strategies, 22 measures, and implementation actions.

Preliminary cost estimates in this report represent the cost to implement activities directly related to CAP measures; that is, those related to completing implementation actions. The cost and staffing

impacts to implement supporting efforts, which support multiple measures within a strategy and may not directly lead to GHG reductions, are reported separately in Section 6.

Figure 5 Structure of CAP Strategies, Measures, Action, and Supporting Efforts




### 3.1.2 Establish Preliminary Cost Estimates

Once the implementation actions were developed, San Marcos staff estimated staffing effort (in hours) and the cost of non-staffing costs like capital, consultants, and materials and supplies that would be required to implement CAP actions. To facilitate and standardize the collection of implementation cost data provided by San Marcos staff across several departments, EPIC created a data collection template. San Marcos staff conducted meetings with department managers and staff representatives to further discuss cost estimates and cost data collection.

The cost and staffing impacts estimates presented in this study reflect the staffing costs to implement the activities in the CAP. They are based on assumptions of the work effort needed to implement the CAP actions. If the CAP measures change over time, implementation costs could be different from those reported here and would need to be adjusted.

### 3.1.3 Quality Assurance and Quality Control (QA/QC)

Quality control and data validation occurred at several stages. Primary validation occurred after total estimated costs and staffing impact were collected. EPIC and San Marcos staff performed an internal quality control check, updated key managers, and reviewed costs with Department/Division managers and staff. Based on this initial review, some cost components were updated to create consistency across all departments and to create a complete data set. San Marcos staff also conducted a detailed consistency check to ensure internal cost reporting consistency. EPIC conducted a final review of all costs prior to inclusion in this report.

## 3.2 Costs Evaluated

CAP implementation cost estimates presented here include those incurred to implement programs and activities related to specific CAP measures (including education and outreach, and ordinance development, etc.), and those related to overall CAP coordination and reporting (including updating the GHG inventory, the monitoring and reporting progress, and updating the CAP). While the CAP coordination and reporting activities are not specifically included in the CAP as measures, they will require staff time and other costs; therefore, they are included in the estimates presented in this report. As noted above, cost and staffing impacts for supporting measures are reported separately in Section 6.

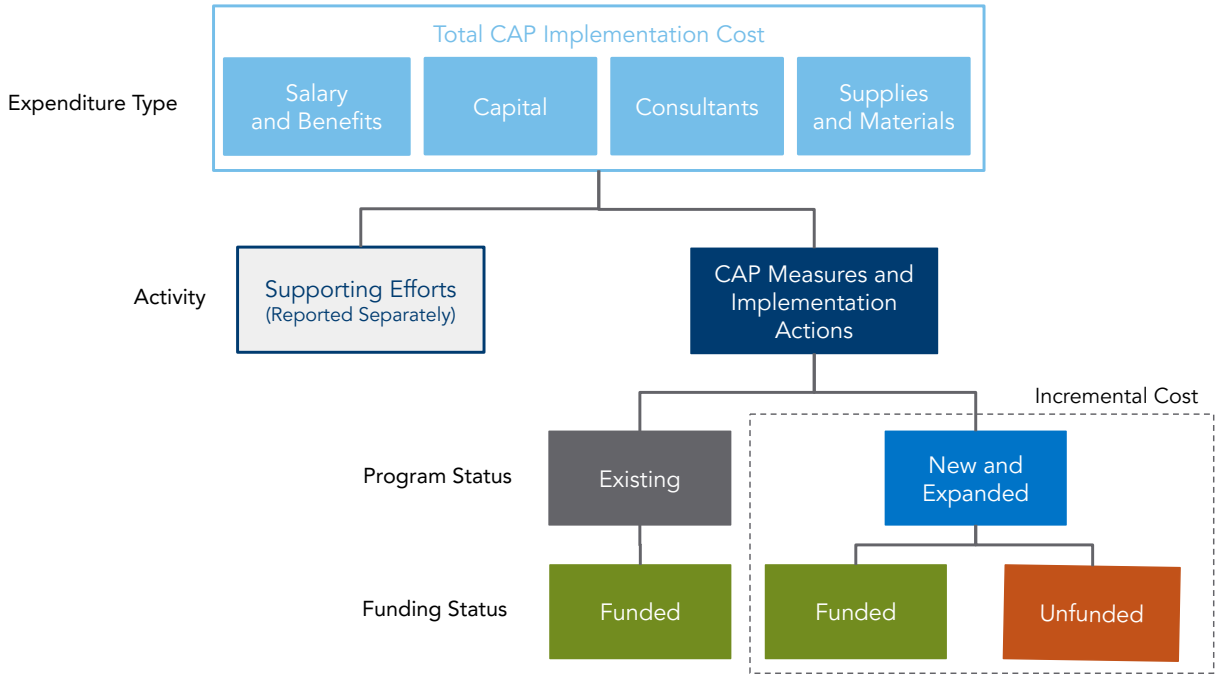
### 3.2.1 Framework for Evaluating CAP Costs

The goals of the CAP Implementation Cost analysis are to develop a preliminary estimate of the total cost to implement GHG reductions measures over the first five fiscal years, evaluate costs based on Program Status (e.g., existing versus new and expanded programs) to determine the estimated incremental costs associated with new and expanded programs that would not have occurred without the CAP, and evaluate costs based on funding status (e.g., funded versus unfunded) to determine which activities require additional financial resources to implement.

Figure 6 illustrates this cost analysis framework. Total implementation costs comprise salary and benefits, capital, consultants, and supplies and materials. For this analysis, implementation activities directly related to CAP measures and implementation actions were separated from those related to supporting efforts. As noted above, supporting efforts are grouped by CAP strategy and include more than one measure. Because these efforts do not necessarily directly result in GHG reductions and may or may not occur, they were separated from other costs and reported separately in Section 6.

Activities that directly implement CAP measures can be divided into existing and new and expanded programs. For purposes of this analysis, existing programs are those that are already being implemented, or are planned through other ongoing programs, and would have occurred regardless of CAPs requirements. New and expanded programs are those that currently do not exist or the expanded portion of existing programs that would not have occurred without CAP adoption. Based on the analysis conducted for this report, all existing programs have identified funding sources (i.e., funded) but new and expanded programs can have funded or unfunded activities. Costs associated with new and expanded activities represent the incremental costs to implement CAP measures. The unfunded portion represents additional costs to San Marcos that directly result from the CAP.

Figure 6 Framework for Evaluating CAP Implementation Costs




### 3.2.2 Contingency

A contingency of 10% is applied to total preliminary cost estimates to account for uncertainty. Since capital cost estimates already include a contingency of 25% or higher, the 10% is not applied to those costs. As a consequence, the values for total cost plus contingency do not equal the total cost multiplied by 10%.

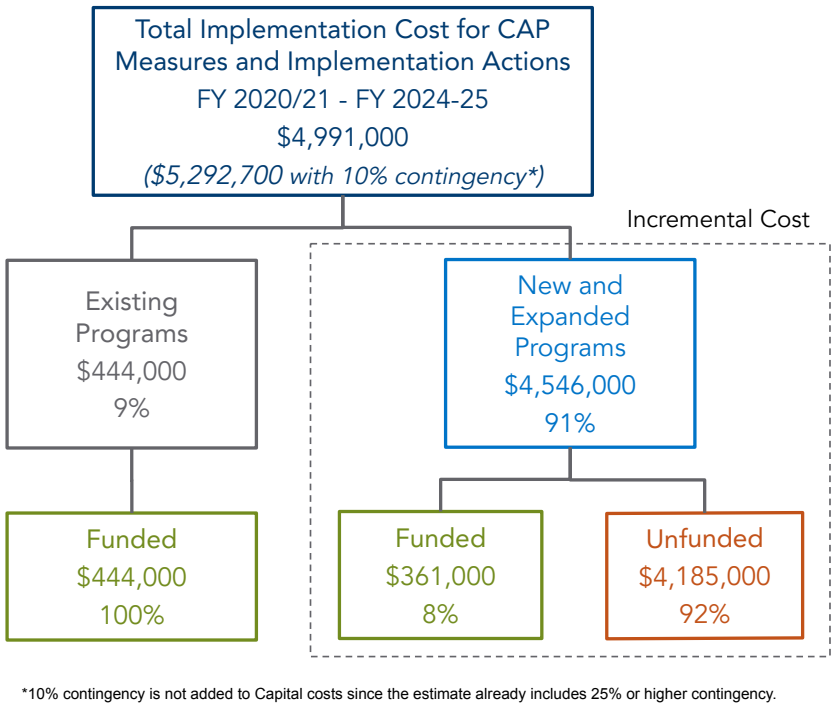
# 4 RESULTS – CAP IMPLEMENTATION COSTS

This section presents the results of the San Marcos CAP Implementation Cost Analysis and answers the question: **What are the costs and staffing impacts to San Marcos to implement the CAP activities over the first five fiscal years?** It presents an overall summary of results for the first five fiscal years and summarizes results by San Marcos department, staff position, CAP measure, and CAP strategy. Results for supporting efforts are reported separately in Section 6 of this report.

## 4.1 Total CAP Implementation Costs

The total estimated direct implementation cost—not including supporting efforts—over the first five fiscal years (FY 2020–21–FY 2024–25) is about $5 million (Figure 7). With a 10% contingency applied to all anticipated costs other than capital expenditures, the total cost would be nearly $5.3 million. The vast majority of these costs, about $4.5 million (91%), are associated with new and expanded programs and represent incremental costs that result from the CAP. Of this total, about $4.2 million, or 92% of new and expanded program costs, are unfunded. This amount represents the estimated new costs to San Marcos to implement CAP activities over the first five fiscal years.

Figure 7 Total CAP Implementation Costs Summary Diagram (FY21–FY25)

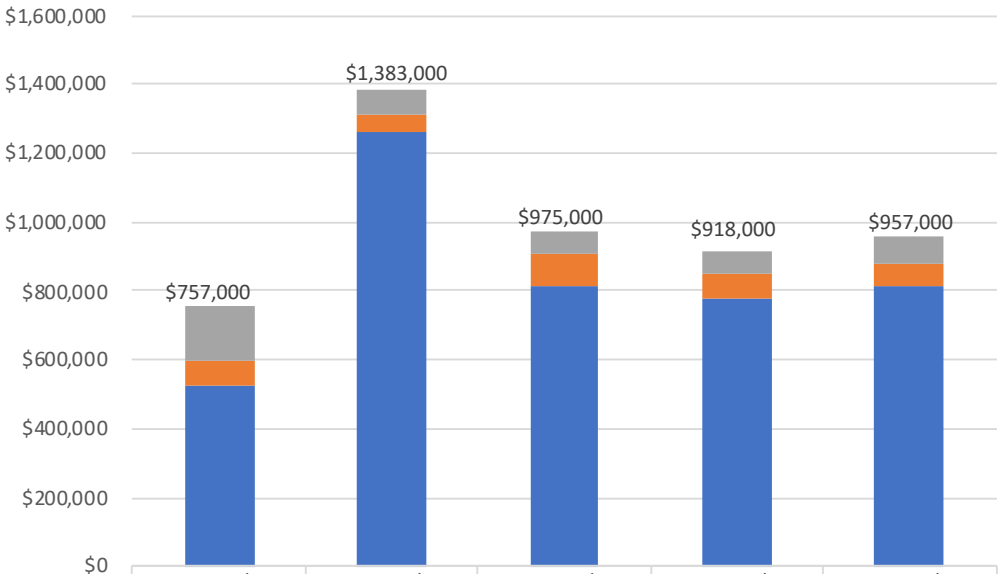



*10% contingency is not added to Capital costs since the estimate already includes 25% or higher contingency.

Estimated annual total CAP implementation costs are $760,000 in in the first year, increase to about $1.4 million in year two, and then level off at between $918,000 and $975,000 for the remaining three years. (Figure 8). The vast majority of costs, about $600,000 to $1.3 million, are associated with new and expanded programs (blue plus orange bars) and represent the annual incremental costs to implement CAP activities. Over 90% of these costs are unfunded (blue bars). Annual costs

of existing programs (gray bars) are highest in year one with a total of about $157,000 and then remains steady at about $70,000 over the remaining four years.

Figure 8 Annual Direct CAP Implementation Costs by Program Status (FY21-FY25)




| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Existing-Funded | $157,000 | $70,000 | $70,000 | $71,000 | $77,000 |
| New and Expanded - Funded | $73,000 | $53,000 | $94,000 | $71,000 | $70,000 |
| New and Expanded - Unfunded | $527,000 | $1,261,000 | $811,000 | $776,000 | $810,000 |
| Total | $757,000 | $1,383,000 | $975,000 | $918,000 | $957,000 |

## 4.2 Costs by Measure

This section summarizes the total estimated costs to implement CAP activities associated with each GHG reduction measure included in the CAP. As noted in Section 3, the CAP has 8 main strategies, which comprise 22 measures and 79 implementation actions. In addition, this report also includes staffing and cost impacts related to CAP coordination and reporting activities. Table 2 provides a list of CAP strategies and measures for which costs are provided in this Section.

Table 2 San Marcos Draft CAP Measures

| | |
|---|---|
| **Strategy 1: Increase Use of Zero-Emission or Alternative Fuel Vehicles** | |
| T-1 | Transition to a Clean and More Fuel Efficient Municipal Vehicle Fleet |
| T-2 | Require Electric Vehicle Charging Stations at New Developments |
| T-3 | Install Public Electric Vehicle Charging Stations |
| T-4 | Provide Grants for Residents and Businesses to Install EV Charging Stations |
| **Strategy 2: Reduce Fossil Fuel Use** | |
| T-5 | Synchronize Traffic Lights |
| T-6 | Install Roundabouts |
| **Strategy 3: Reduce Vehicle Miles Traveled** | |
| T-7 | Participate in the San Diego Association of Government's iCommute Vanpool Program |
| T-8 | Implement Bicycle Network as identified in the General Plan-Mobility Element |
| T-9 | Adopt Citywide Transportation Demand Management (TDM) Ordinance |
| T-10 | Implement the Intra-City Shuttle System |
| T-11 | Increase Transit Ridership |
| T-12 | Reduce Parking Requirements for New Residential Development near Transit |
| T-13 | Work with Existing Employers to Implement Transportation Demand Management Plans |
| T-14 | Transition to an Online Building and Engineering Permit Submittal System |
| **Strategy 4: Increase Building Energy Efficiency** | |
| E-1 | Require New Residential Developments to Install Alternatively-Fueled Water Heater |
| **Strategy 5: Increase Renewable and Zero-Carbon Energy** | |
| E-2 | Require Installation of PV Systems at New Non-Residential Developments |
| E-3 | Increase Grid-Supply Renewable and Zero-Carbon Electricity |
| **Strategy 6: Reduce Water Use** | |
| W-1 | Reduce Outdoor Landscape Water Use |
| W-2 | Reduce Current City Managed Landscaping Water Use |
| **Strategy 7: Reduce and Recycle Solid Waste** | |
| S-1 | Increase Citywide Waste Diversion |
| **Strategy 8: Increase Urban Tree Cover** | |
| CS-1 | Increase Tree Planting at City Parks and Public Rights-of-Way |
| CS-2 | Increase Tree Planting at New Development |

Table 3 shows annual costs by CAP Measure sorted from highest to lowest. Note that the colors in the table show the range of costs. Higher costs are in red, lower costs are in green, and those in the middle are in yellow/orange.

Measures T-3 (Install Electric Vehicle Charging Stations at Public Facilities) and T-4 (Provide Grants for Residents and Business to Install Electric Vehicle Charging Stations) would have the highest implementation cost over the first five years, together representing over 50% of total implementation costs. Each would cost about $1.3 million over this period, about 26% of total implementation costs.

For Measures T-3 (Install Electric Vehicle Charging Stations at Public Facilities), these costs are mainly for capital expenditures for electric vehicle charging equipment (about $190,000 annually for the first four years) and consultant costs to support project design and construction (about $95,000 annually over the same period). For T-4 (Provide Grants for Residents and Business to Install Electric Vehicle Charging Stations), nearly all costs ($1.2 million or $240,000 annually over five years) are associated with funding for grants.

Another notable cost would be the $400,000 expenditure in year two for measure E-3 (Increase Grid-Supply Renewable and Zero-Carbon Electricity). This is mostly for a consultant to support exploration and potential establishment of a Community Choice Energy program.

Table 3 Annual Direct CAP Implementation Costs by Measure and Supporting Efforts (FY21-FY25)[4]

| CAP Measure | FY 2020/21 | FY 2021/22 | Y 2022/23 | Y 2023/24 | Y 2024/25 | Total | % of Total |
|---|---|---|---|---|---|---|---|
| T-3 | $0 | $301,000 | $308,000 | $303,000 | $374,000 | $1,286,000 | 26% |
| T-4 | $262,000 | $254,000 | $253,000 | $254,000 | $254,000 | $1,277,000 | 26% |
| E-3 | $77,000 | $400,000 | $40,000 | $33,000 | $34,000 | $584,000 | 12% |
| T-14 | $135,000 | $51,000 | $50,000 | $52,000 | $54,000 | $342,000 | 7% |
| W-2 | $69,000 | $51,000 | $78,000 | $61,000 | $66,000 | $324,000 | 6% |
| T-5 | $68,000 | $46,000 | $29,000 | $30,000 | $31,000 | $204,000 | 4% |
| T-9 | $0 | $69,000 | $47,000 | $38,000 | $14,000 | $168,000 | 3% |
| T-13 | $0 | $39,000 | $40,000 | $39,000 | $39,000 | $157,000 | 3% |
| C-1 | $31,000 | $30,000 | $31,000 | $32,000 | $33,000 | $156,000 | 3% |
| T-8 | $15,000 | $49,000 | $34,000 | $24,000 | $3,000 | $125,000 | 3% |
| W-1 | $19,000 | $11,000 | $8,000 | $9,000 | $9,000 | $56,000 | 1% |
| CCR | $9,000 | $12,000 | $8,000 | $12,000 | $10,000 | $52,000 | 1% |
| T-1 | $9,000 | $8,000 | $10,000 | $9,000 | $15,000 | $51,000 | 1% |
| T-2 | $25,000 | $18,000 | $2,000 | $0 | $0 | $46,000 | 1% |
| E-1 | $0 | $37,000 | $4,000 | $1,000 | $1,000 | $43,000 | 1% |
| E-2 | $31,000 | $3,000 | $3,000 | $3,000 | $3,000 | $43,000 | 1% |
| T-12 | $0 | $0 | $15,000 | $9,000 | $4,000 | $29,000 | 1% |
| T-7 | $0 | $0 | $10,000 | $7,000 | $8,000 | $25,000 | 1% |
| T-10 | $2,000 | $2,000 | $2,000 | $2,000 | $2,000 | $11,000 | 0% |
| T-6 | $2,000 | $2,000 | $2,000 | $2,000 | $2,000 | $10,000 | 0% |
| C-2 | $2,000 | $0 | $0 | $0 | $0 | $3,000 | 0% |
| S-1 | N/C | N/C | N/C | N/C | N/C | N/C | N/C |
| T-11 | N/C | N/C | N/C | N/C | N/C | N/C | N/C |
| **Total** | **$757,000** | **$1,383,000** | **$975,000** | **$918,000** | **$957,000** | **$4,991,000** | **100%** |
| *Total with 10% Contingency** | *$809,700* | *$1,478,100* | *$1,029,300* | *$966,400* | *$1,009,200* | *$5,292,700* | |

*10% contingency is not added to Capital costs since the estimate already includes 25% or higher contingency.

N/C - Not Calculated. Measures are expected to be implemented in years 6-10.

## 4.3 Costs by Department

The Public Works Department would have the highest level of CAP implementation cost during the first five years of between $195,000 and $570,000 annually and a total of $2.4 million. These costs, which represent nearly 50% of total costs, comprise capital expenditures of $774,000, consultant costs of $794,000, and personnel costs of $615,000.

The Development Services Department would have the second highest estimated costs with about $2 million over five years, 41% of total costs. Two measures that Development Services will lead account for more than 80% of these costs: T-4 (Provide Grants for Residents and Businesses to

[4] Measures S-1 and T-11 would not have any activity in the first five years of implementation.

Install Electric Vehicle Charging Stations) with $1.2 million over five years, and E-3 (Increase Grid-Supply Renewable and Zero-Carbon Electricity) with $455,000 over five years.

Figure 9 and Table 4 summarize annual CAP implementation costs by City Department.

Figure 9 Annual Direct CAP Implementation Costs by Department (FY21–FY25)

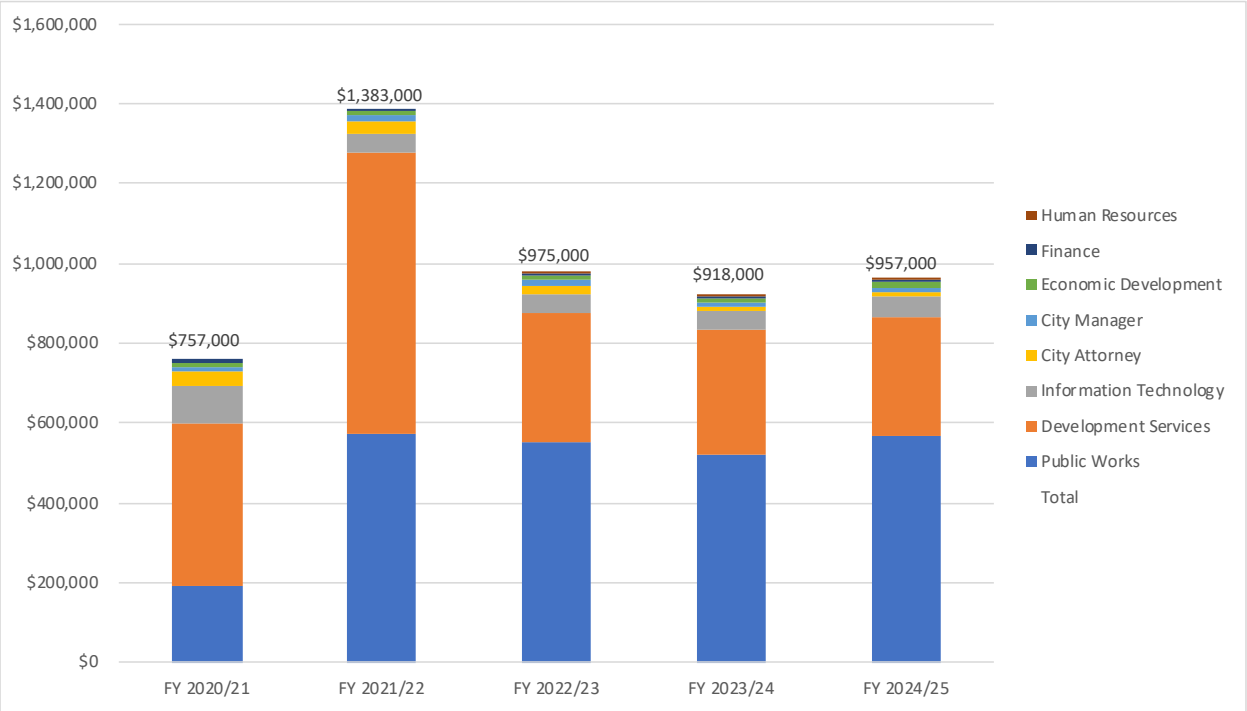



Table 4 Annual Direct CAP Implementation Costs by Department (FY21-FY25)

| Department | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 | Total | % of Total |
|---|---|---|---|---|---|---|---|
| Public Works | $194,000 | $571,000 | $554,000 | $520,000 | $570,000 | $2,409,000 | 48% |
| Development Services | $407,000 | $707,000 | $321,000 | $311,000 | $297,000 | $2,043,000 | 41% |
| Information Technology | $89,000 | $46,000 | $48,000 | $50,000 | $52,000 | $284,000 | 6% |
| City Attorney | $37,000 | $29,000 | $21,000 | $8,000 | $8,000 | $102,000 | 2% |
| City Manager | $15,000 | $16,000 | $13,000 | $13,000 | $13,000 | $69,000 | 1% |
| Economic Development | $9,000 | $11,000 | $11,000 | $11,000 | $11,000 | $53,000 | 1% |
| Finance | $7,000 | $5,000 | $5,000 | $5,000 | $5,000 | $27,000 | 1% |
| Human Resources | $0 | $0 | $3,000 | $1,000 | $1,000 | $5,000 | 0% |
| **Total** | **$757,000** | **$1,383,000** | **$975,000** | **$918,000** | **$957,000** | **$4,991,000** | **100%** |
| *Total with 10% Contingency** | *$809,700* | *$1,478,100* | *$1,029,300* | *$966,400* | *$1,009,200* | *$5,292,700* | |

*10% contingency is not added to Capital costs since the estimate already includes 25% or higher contingency.

### 4.3.1 Costs by Division

The two Divisions that would have highest estimated implementation costs—Admin Division within Development Services and the CIP Division within Public Works—account for over 50% of total costs over the first five years. Each Division would have costs of about $1.3 million (26% of total) (Table 5). The Planning Division within Development Services would have next highest implementation costs, with just over $700,000 respectively over the analysis period (14% of total). Two other divisions in Public Works (Traffic, and Parks & Landscape) account for about 20% of total costs.

Table 5 Annual Direct CAP Implementation Costs by Division

| Departments/Divisions | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 | Total | % of Total |
|---|---|---|---|---|---|---|---|
| Development Services - Admin | $277,000 | $257,000 | $251,000 | $250,000 | $250,000 | $1,285,000 | 26% |
| Public Works - CIP | $12,000 | $298,000 | $297,000 | $298,000 | $374,000 | $1,279,000 | 26% |
| Development Services - Planning | $111,000 | $438,000 | $64,000 | $56,000 | $44,000 | $713,000 | 14% |
| Public Works - Traffic | $68,000 | $176,000 | $131,000 | $113,000 | $74,000 | $562,000 | 11% |
| Public Works - Parks | $101,000 | $82,000 | $109,000 | $93,000 | $99,000 | $485,000 | 10% |
| Information Technology | $89,000 | $46,000 | $48,000 | $50,000 | $52,000 | $284,000 | 6% |
| City Attorney | $37,000 | $29,000 | $21,000 | $8,000 | $8,000 | $102,000 | 2% |
| Public Works - Admin | $12,000 | $14,000 | $17,000 | $16,000 | $23,000 | $83,000 | 2% |
| City Manager | $15,000 | $16,000 | $13,000 | $13,000 | $13,000 | $69,000 | 1% |
| Economic Development | $9,000 | $11,000 | $11,000 | $11,000 | $11,000 | $53,000 | 1% |
| Development Services - Building | $17,000 | $8,000 | $1,000 | $1,000 | $1,000 | $28,000 | 1% |
| Finance | $7,000 | $5,000 | $5,000 | $5,000 | $5,000 | $27,000 | 1% |
| Development Services - Land Development | $3,000 | $3,000 | $4,000 | $4,000 | $1,000 | $17,000 | 0% |
| Human Resources | $0 | $0 | $3,000 | $1,000 | $1,000 | $5,000 | 0% |
| **Total** | **$757,000** | **$1,383,000** | **$975,000** | **$918,000** | **$957,000** | **$4,991,000** | **100%** |
| *Total with 10% Contingency** | *$809,700* | *$1,478,100* | *$1,029,300* | *$966,400* | *$1,009,200* | *$5,292,700* | |

*10% contingency is not added to Capital costs since the estimate already includes 25% or higher contingency.

## 4.4 Costs by Expenditure Category

Expenditure categories in this analysis include capital, personnel (salary and benefits), consultant costs, and materials and supplies. Figure 10 summarizes the breakdown of CAP implementation costs by expenditure category.

- Capital – Capital expenditures is the largest category of CAP Implementation Costs representing about 40% of total costs over the analysis period. Examples of capital expenditures associated with CAP implementation could include purchase of electric vehicle chargers, and trees.
- Salary and Benefits – Personnel represents the salary and benefits costs associated with CAP implementation. This category would account for about 32% of total costs over the five years. Salary and benefit costs include current base salary, benefits like health insurance and retirement. Hourly rates are specific to each department and include an annual increase of 4% over the five year period.

- Consultants – If existing San Marcos personnel either do not have capacity or expertise to complete an activity related to CAP implementation, consultant support and services can be used. About 23% of estimated CAP implementation costs are for consultant support. This can include project design and development, feasibility studies, and plan development.
- Materials and Supplies – Materials and supplies, which accounts for 5% of costs, comprises purchases (e.g., education and outreach materials) needed to implement CAP measures.

Figure 10 Breakdown of CAP Implementation Costs by Expenditure Category

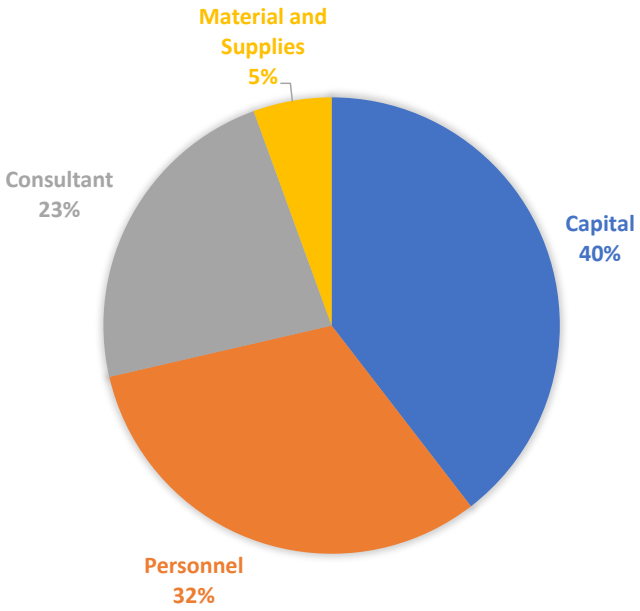
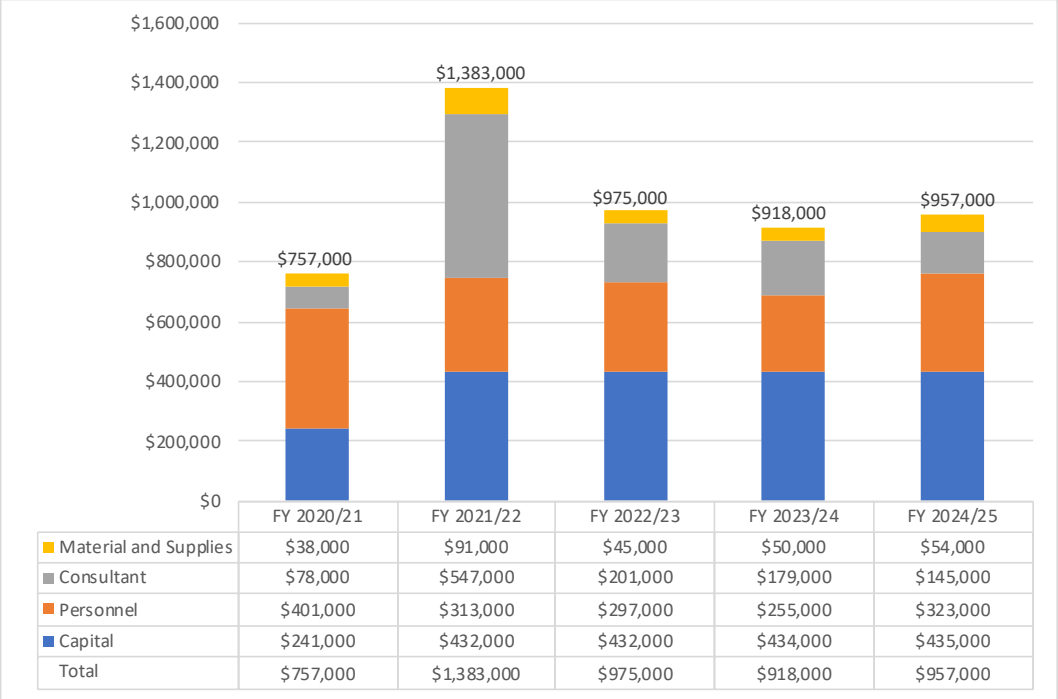



Figure 11 shows estimated annual CAP implementation costs by expenditure category. Annual capital costs would be $241,000 in year one and increase to about $435,000 in the remaining four years. Personnel costs would vary between $250,000 and $400,000 over the five years. Consultant costs are significantly higher in year two due in part to analysis related to Community Choice Energy programs. Materials and supplies costs are comparatively low over the period of analysis.

Figure 11 Annual Direct CAP Implementation Costs by Expenditure Category




| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Material and Supplies | $38,000 | $91,000 | $45,000 | $50,000 | $54,000 |
| Consultant | $78,000 | $547,000 | $201,000 | $179,000 | $145,000 |
| Personnel | $401,000 | $313,000 | $297,000 | $255,000 | $323,000 |
| Capital | $241,000 | $432,000 | $432,000 | $434,000 | $435,000 |
| Total | $757,000 | $1,383,000 | $975,000 | $918,000 | $957,000 |

### 4.4.1 Breakdown by Department and Division

Table 6 shows estimated CAP implementation costs by department and expenditure category. Costs associated with Development Services account for about 60% of capital expenditures. Public Works would account for 70% of estimated costs in consultant, and 80% of materials and supply, and 50% of personnel costs. Development Services accounts for the balance of total costs for capital, consulting, and materials and supplies, and 27% of estimated personnel costs.

Table 6 CAP Direct Implementation Cost by Department and Expenditure Category

| Department | Capital | Consultant | Material and Supplies | Personnel | Total | % of Total |
|---|---|---|---|---|---|---|
| Public Works | $774,000 | $794,000 | $227,000 | $614,000 | $2,409,000 | 48% |
| Development Services | $1,200,000 | $357,000 | $50,000 | $436,000 | $2,043,000 | 41% |
| Information Technology | $0 | $0 | $0 | $284,000 | $284,000 | 6% |
| City Attorney | $0 | $0 | $0 | $102,000 | $102,000 | 2% |
| City Manager | $0 | $0 | $0 | $69,000 | $69,000 | 1% |
| Economic Development | $0 | $0 | $0 | $53,000 | $53,000 | 1% |
| Finance | $0 | $0 | $0 | $27,000 | $27,000 | 1% |
| Human Resources | $0 | $0 | $0 | $5,000 | $5,000 | 0% |
| **Total** | **$1,974,000** | **$1,151,000** | **$277,000** | **$1,589,000** | **$4,991,000** | **100%** |
| *Total with 10% Contingency** | *$1,974,000* | *$1,266,000* | *$305,000* | *$1,748,000* | *$5,293,000* | |

*10% contingency is not added to Capital costs since the estimate already includes 25% or higher contingency.

Table 7 shows estimated CAP implementation costs by City Division and expenditure category. The Development Services Admin Division and Public Works CIP Division each accounts for about $1.3 million over the first five years, about 26% of total CAP implementation costs. About 60% of all capital expenditures would be associated with the Development Services Admin Division. These expenditures would be for grants for electric vehicle charging equipment. The Planning Division of Development Services would account for $713,000, or 14% of total implementation costs over the analysis period.

Table 7 Direct CAP Implementation Costs by Division and Expenditure Category

| Department / Division | Capital | Consultant | Material and Supplies | Personnel | Total | % of Total |
|---|---|---|---|---|---|---|
| Development Services - Admin | $1,200,000 | $0 | $0 | $85,000 | $1,285,000 | 26% |
| Public Works - CIP | $744,000 | $425,000 | $0 | $110,000 | $1,279,000 | 26% |
| Development Services - Planning | $0 | $357,000 | $50,000 | $306,000 | $713,000 | 14% |
| Public Works - Traffic | $0 | $369,000 | $0 | $193,000 | $562,000 | 11% |
| Public Works - Parks | $0 | $0 | $227,000 | $258,000 | $485,000 | 10% |
| Information Technology | $0 | $0 | $0 | $284,000 | $284,000 | 6% |
| City Attorney | $0 | $0 | $0 | $102,000 | $102,000 | 2% |
| Public Works - Admin | $30,000 | $0 | $0 | $53,000 | $83,000 | 2% |
| City Manager | $0 | $0 | $0 | $69,000 | $69,000 | 1% |
| Economic Development | $0 | $0 | $0 | $53,000 | $53,000 | 1% |
| Development Services - Building | $0 | $0 | $0 | $28,000 | $28,000 | 1% |
| Finance | $0 | $0 | $0 | $27,000 | $27,000 | 1% |
| Development Services - Land Development | $0 | $0 | $0 | $17,000 | $17,000 | 0% |
| Human Resources | $0 | $0 | $0 | $5,000 | $5,000 | 0% |
| **Total** | **$1,974,000** | **$1,151,000** | **$277,000** | **$1,589,000** | **$4,991,000** | **100%** |
| *Total with 10% Contingency** | *$1,974,000* | *$1,266,100* | *$304,700* | *$1,747,900* | *$5,292,700* | |

*10% contingency is not added to Capital costs since the estimate already includes 25% or higher contingency.

### 4.4.2 Breakdown by Measure

Table 8 provides a breakdown of costs by expenditure type for measures with a total cost greater than $100,000. Remaining measures below $100,000 would have mostly personnel costs. Two measures related to electric vehicles would account for over 50% of all estimated CAP implementation costs, including nearly all capital costs and about 40% of consultant costs. T-3 (Install Public Electric Vehicle Charging Stations) would require about $744,000 in capital costs and $435,000 in consulting support. T-4 (Provide Grants for Residents and Businesses to Install Electric Vehicle Charging Stations) would require $1.2 million in capital costs to offset the cost of electric vehicle charging stations.

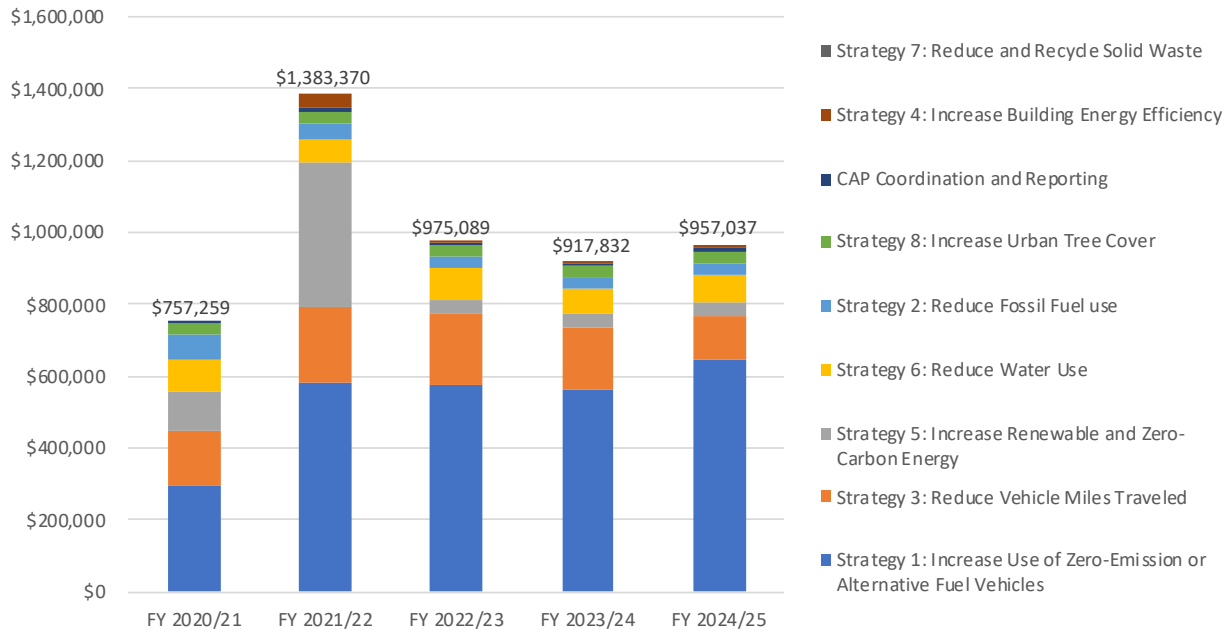
Table 8 Breakdown of Direct CAP Implementation Costs by Expenditure Category (Measures >$100,000)

| CAP Measures | Capital | Consultant | Material and Supplies | Personnel | Total | % of Total |
|---|---|---|---|---|---|---|
| T-3 | $744,000 | $435,000 | $0 | $107,000 | $1,286,000 | 26% |
| T-4 | $1,200,000 | $0 | $0 | $77,000 | $1,277,000 | 26% |
| E-3 | $0 | $315,000 | $50,000 | $219,000 | $584,000 | 12% |
| T-14 | $0 | $0 | $0 | $342,000 | $342,000 | 7% |
| W-2 | $0 | $0 | $221,000 | $103,000 | $324,000 | 6% |
| T-5 | $0 | $113,000 | $0 | $91,000 | $204,000 | 4% |
| T-9 | $0 | $95,000 | $0 | $73,000 | $168,000 | 3% |
| T-13 | $0 | $96,000 | $0 | $61,000 | $157,000 | 3% |
| C-1 | $0 | $0 | $3,000 | $154,000 | $156,000 | 3% |
| T-8 | $0 | $65,000 | $0 | $60,000 | $125,000 | 3% |

## 4.5 Costs by CAP Strategy

Three strategies would account for about 80% of total estimated CAP implementation costs over five years. Strategy 1 (Increase Use of Zero-Emission or Alternative Fuel Vehicles) would account for about $2.6 million in costs, about 53% of total costs. Strategy 3 (Reduce Vehicle Miles Traveled) would cost $855,000 (17%) and Strategy 5 (Increase Renewable and Zero-Carbon Energy) would require about $625,000 (13%). This would be expected since transportation and energy account for the majority of GHG emissions in the San Marcos. Figure 12 and Table 9 show annual CAP implementation cost by CAP Strategy. While CAP Coordination and Reporting is not a CAP strategy, it is included in Figure 12 and Table 9 for comparison.

## Figure 12 Annual CAP Implementation Costs by CAP Strategy




## Table 9 Annual CAP Implementation Costs by CAP Strategy

| CAP Strategy | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 | Total | % of Total |
|---|---|---|---|---|---|---|---|
| Strategy 1: Increase Use of Zero-Emission or Alternative Fuel Vehicles | $296,380 | $581,787 | $573,303 | $565,394 | $643,921 | $2,660,785 | 53% |
| Strategy 3: Reduce Vehicle Miles Traveled | $151,885 | $210,824 | $198,173 | $170,658 | $123,677 | $855,217 | 17% |
| Strategy 5: Increase Renewable and Zero-Carbon Energy | $108,311 | $402,285 | $42,938 | $35,823 | $37,256 | $626,615 | 13% |
| Strategy 6: Reduce Water Use | $88,121 | $62,004 | $85,881 | $69,446 | $75,109 | $380,561 | 8% |
| Strategy 2: Reduce Fossil Fuel use | $69,757 | $47,955 | $31,369 | $32,024 | $32,705 | $213,811 | 4% |
| Strategy 8: Increase Urban Tree Cover | $33,548 | $30,117 | $30,890 | $31,891 | $33,147 | $159,593 | 3% |
| CAP Coordination and Reporting | $9,256 | $11,606 | $8,285 | $11,879 | $10,478 | $51,503 | 1% |
| Strategy 4: Increase Building Energy Efficiency | $0 | $36,791 | $4,251 | $716 | $745 | $42,502 | 1% |
| Strategy 7: Reduce and Recycle Solid Waste | $0 | $0 | $0 | $0 | $0 | $0 | 0% |
| **Total** | **$757,259** | **$1,383,370** | **$975,089** | **$917,832** | **$957,037** | **$4,990,587** | **100%** |
| Total with Contingency (10%)* | $809,700 | $1,478,100 | $1,029,300 | $966,400 | $1,009,200 | $5,292,700 | |

*10% contingency is not added to Capital costs since the estimate already includes 25% or higher contingency.

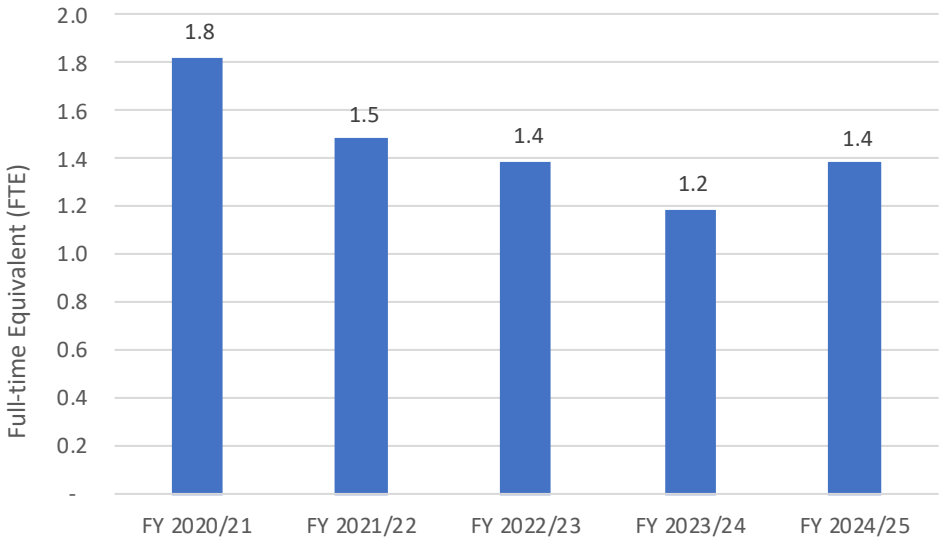
# 5 RESULTS – STAFFING IMPACTS (FTE)

This section presents the results of the San Marcos CAP Implementation Cost Analysis and answers the question: **What are the staffing impacts (FTE) to San Marcos to implement the CAP over the first five fiscal years?** It presents an overall summary of staffing costs for the first five fiscal years and summarizes results by San Marcos department, staff position, CAP measure, and CAP strategy. Staffing impacts for supporting measures are reported separately in Section 6.

## 5.1 Overall Staff Impacts

Total annual staffing needs to implement CAP measures is 1.8 FTE in year one and then declines to between 1.2 FTE and 1.5 FTE over the remaining four fiscal years of CAP implementation (Figure 13). This pattern reflects start up activity in year one and then a leveling off over the final four years, and represents a conservative scenario of staff time required to implement CAP measures. The final years could represent a pattern that could continue beyond the timeframe of this report.

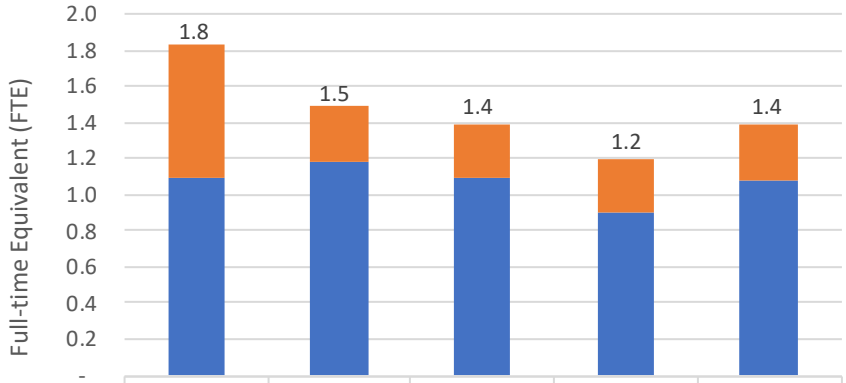
Figure 13 Annual Direct Staffing Impact (FTE)




Given the estimated staffing impacts, San Marcos staff should be able to implement CAP implementation activities without adding new staff. However, accommodating new CAP-related activities likely will require reassignment and reprioritization of current responsibilities of affected staff. Also, based on preliminary cost analysis and observations from other cities that have implemented CAP activities, it may be necessary to reallocate a portion of an existing position to be devoted to CAP implementation efforts. It is reasonable to expect that this could require about 0.3 FTE to 0.5 FTE. Because the City has determined that additional staff will not be hired for CAP implementation, these CAP coordination and implementation duties could be absorbed through re-prioritization of an existing staff position.

As with overall CAP implementation costs, the majority of staffing impacts would be associated with new and expanded programs (Figure 14). The portion of staff effort associated with new and expanded programs ranges from 0.9 FTE to 1.2 FTE over the first five years.

Figure 14 Annual Direct Staffing Impact (FTE) by Program Status

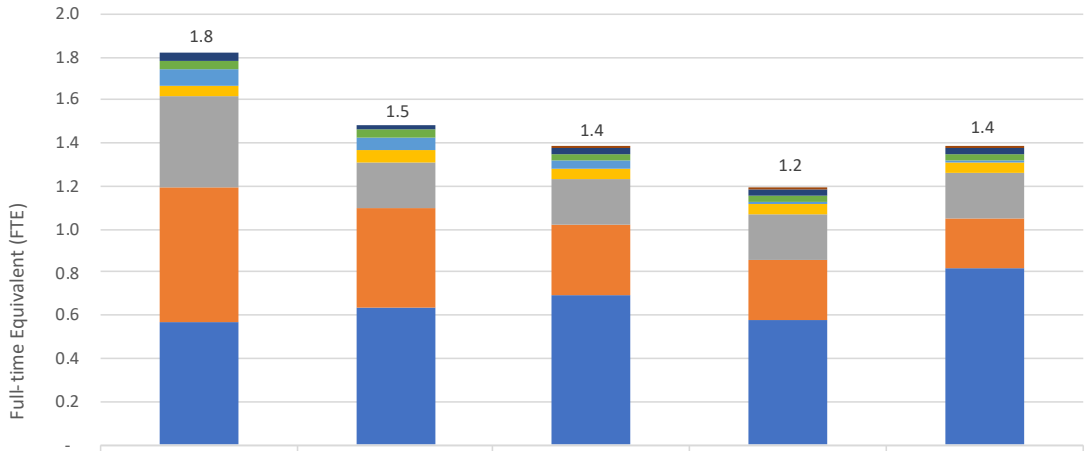



| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Existing Programs | 0.7 | 0.3 | 0.3 | 0.3 | 0.3 |
| New and Expanded Programs | 1.1 | 1.2 | 1.1 | 0.9 | 1.1 |
| Total | 1.8 | 1.5 | 1.4 | 1.2 | 1.4 |

## 5.2 Staffing Impact by Department

The San Marcos CAP Implementation Cost Analysis estimated staffing impacts for each department that will participate in CAP implementation to illustrate how workload would be distributed across the San Marcos organizational structure. Public Works would have the highest level of staffing impact with a range of about 0.6 FTE to 0.8 FTE during the first five years. The staffing impact for capital projects is estimated with a conservative approach when Capital projects are required to be completed in year five, the last year of the analysis. Actual staffing allocation depends on available funding and grants received. Development Services would have the next highest staffing impacts with 0.6 FTE in year one declining to 0.2 FTE in year five, which likely reflects the start-up nature of many of the CAP measures. Figure 15 and Table 10 show annual staffing impact by City department.

## Figure 15 Annual Direct Staff Impact (FTE) by Department




| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Human Resources | - | - | 0.0 | 0.0 | 0.0 |
| Finance | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| City Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| City Attorney | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| Economic Development | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| Information Technology | 0.4 | 0.2 | 0.2 | 0.2 | 0.2 |
| Development Services | 0.6 | 0.5 | 0.3 | 0.3 | 0.2 |
| Public Works | 0.6 | 0.6 | 0.7 | 0.6 | 0.8 |
| Total | 1.8 | 1.5 | 1.4 | 1.2 | 1.4 |

## Table 10 Annual Direct Staff Impact (FTE) by Department[5]

| Department | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Public Works | 0.6 | 0.6 | 0.7 | 0.6 | 0.8 |
| Development Services | 0.6 | 0.5 | 0.3 | 0.3 | 0.2 |
| Information Technology | 0.4 | 0.2 | 0.2 | 0.2 | 0.2 |
| Economic Development | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| City Attorney | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| City Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Finance | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Human Resources | - | - | 0.0 | 0.0 | 0.0 |
| **Total** | **1.8** | **1.5** | **1.4** | **1.2** | **1.4** |

[5] A value of 0.0 means that the FTE is less than 0.1 but is not zero. A "-" means there is no associated effort.

### 5.2.1 Staffing Impact by Division

Public Works – Traffic would have the highest level of staff impact. With relatively low impact (0.1 FTE) in year one and then an increase to between 0.3 FTE and 0.4 FTE over the remaining four years (Table 11). Development Services – Planning would have a similar estimated staffing impact of between 0.4 FTE in year one with a steady decline to 0.2 in the final two years. Information Technology would have the next highest with 0.4 FTE in year one and 0.2 FTE in the remaining four years.

Table 11 Annual Direct Staffing Impact (FTE) by Division[6]

| Division | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Public Works - Traffic | 0.1 | 0.4 | 0.3 | 0.3 | 0.3 |
| Development Services - Planning | 0.4 | 0.4 | 0.3 | 0.2 | 0.2 |
| Information Technology | 0.4 | 0.2 | 0.2 | 0.2 | 0.2 |
| Public Works - Parks | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 |
| Public Works - CIP | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 |
| Development Services - Admin | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 |
| Economic Development | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 |
| Public Works - Admin | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 |
| City Attorney | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| City Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Finance | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Development Services - Building | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Development Services - Land Development | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Human Resources | - | - | 0.0 | 0.0 | 0.0 |
| **Total** | **1.8** | **1.5** | **1.4** | **1.2** | **1.4** |

## 5.3 Staffing Impact by Position

The staffing impact to implement CAP activities is concentrated in a handful of positions, though no single position would require greater than 0.4 FTE in a single year. The IT Manager would require 0.4 FTE in the first year, then 0.2 FTE in remaining four years because of Measure T-14 (Transition to online Building and Engineering Permit Submittal System). This position would have the highest single year impact (0.4 FTE). Work on this measure is already in progress and is managed through distributing work to other IT staff. The Principal Planner in the Development Services Planning Division, which is expected to support many CAP measures would require between 0.2 FTE and 0.3 FTE over the first five years of CAP implementation. This position is currently supporting the update to the CAP and is expected to continue to devote between 0.3 FTE and 0.5 FTE to CAP related

[6] A value of 0.0 means that the FTE is less than 0.1 but is not zero. A "-" means there is no associated effort.

activities over the first five years of implementation. The Parks Manager in Public Works would have similar requirements to the Principal Planner Position with between 0.2 FTE and 0.3 FTE over the five-year period of this analysis. As can be seen in Table 12, many staff positions that are expected to support CAP implementation would have little to no increase in workload.

Table 12 Annual Staffing Impact (FTE) by Position[7,8]

| Position | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| IT Manager | 0.4 | 0.2 | 0.2 | 0.2 | 0.2 |
| DS Planning-Principal Planner | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 |
| PW Parks-PW Parks Manager | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 |
| PW TE-Principal Traffic Engineer | 0.0 | 0.2 | 0.2 | 0.2 | 0.2 |
| PW TE-Senior Traffic Engineer | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 |
| PW CIP - Principal CIP Engineer | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| DS Planning-Planning Manager | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| City Attorney | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| DS Admin - DS Director | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| City Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| PW Admin - Fleet Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| DS Admin- DS Admin Manager | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| DS Building- Building Official | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| ED Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ED Communic. Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Finance Senior Office Specialist | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| PW Admin - PW Director | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| DS Land Development – Principal Engineer | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| PW CIP- Deputy City Engineer | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Finance Contracts, Grants & Procurement Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Finance Director | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| HR Manager | - | - | 0.0 | 0.0 | 0.0 |
| Fiannce Fiscal Budget Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| HR Director | - | - | - | - | - |
| Admin-PW Admin Manager | - | - | - | - | - |
| PW Facilities - Facilities Manager | - | - | - | - | - |
| **Total** | **1.8** | **1.5** | **1.4** | **1.2** | **1.4** |

## 5.4 Staffing Impact by Measure

T-14 (Transition to an Online Building and Engineering Permit Submittal System) would have the highest staffing impact of any CAP measure (Table 13). It would require about 0.6 FTE in year one and then level off at about 0.2 FTE for the remaining years. C-1 (Increase Tree Planting at City Parks

[7] A value of 0.0 means that the FTE is less than 0.1 but is not zero. A "-" means there is no associated effort.
[8] Measures S-1 and T-11 would not have any activity in the first five years of implementation.

and Public Rights-of-Way) would have the second highest estimated staffing needs with 0.1 FTE per year.

Table 13 Annual Staffing Impact (FTE) by CAP Measure[9]

| CAP Measure | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| T-14 | 0.6 | 0.2 | 0.2 | 0.2 | 0.2 |
| C-1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| E-3 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 |
| T-9 | - | 0.2 | 0.1 | 0.1 | 0.1 |
| T-5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| W-2 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 |
| T-3 | - | 0.0 | 0.0 | 0.0 | 0.3 |
| T-13 | - | 0.1 | 0.1 | 0.1 | 0.1 |
| T-4 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| T-8 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 |
| CCR | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |
| W-1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| E-2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| T-2 | 0.1 | 0.1 | 0.0 | - | - |
| E-1 | - | 0.1 | 0.0 | 0.0 | 0.0 |
| T-7 | - | - | 0.1 | 0.0 | 0.0 |
| T-1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| T-12 | - | - | 0.1 | 0.0 | 0.0 |
| T-6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| T-10 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| C-2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| S-1 | N/C | N/C | N/C | N/C | N/C |
| T-11 | N/C | N/C | N/C | N/C | N/C |
| **Total** | **1.8** | **1.5** | **1.4** | **1.2** | **1.4** |

N/C - Not Calculated. Measures are expected to be implemented in years 6-10.

## 5.5 Staffing Impact by CAP Strategy

Strategy 3 (Reduce Vehicle Miles Traveled) would require the most staff effort with between 0.5 FTE and 0.7 FTE over the five year analysis period (Table 14). This strategy comprises eight measures

[9] A value of 0.0 means that the FTE is less than 0.1 but is not zero. A "-" means there is no associated effort.

and 29 implementation actions. Strategy 5 (Increase Renewable and Zero-Carbon Energy) would require the next highest level of staff effort with between 0.3 FTE and 1.1 FTE. This is the only strategy to require a combined staffing effort greater than 1.0 FTE in a single year (1.1 FTE in year five). This is due in part to the staff time required to investigate, establish, and launch a Community Choice Energy program.

Table 14 Annual Direct Staff Impact (FTE) by CAP Strategy[10]

| Strategy | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Strategy 3: Reduce Vehicle Miles Traveled | 0.7 | 0.6 | 0.7 | 0.6 | 0.5 |
| Strategy 5: Increase Renewable and Zero-Carbon Energy | 0.3 | 0.2 | 0.1 | 0.1 | 1.1 |
| Strategy 1: Increase Use of Zero-Emission or Alternative Fuel Vehicles | 0.2 | 0.2 | 0.1 | 0.1 | 0.4 |
| Strategy 4: Increase Building Energy Efficiency | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 |
| Strategy 2: Reduce Fossil Fuel use | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 |
| Strategy 6: Reduce Water Use | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 |
| Strategy 8: Increase Urban Tree Cover | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 |
| CAP Coordination and Reporting | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 |
| Strategy 7: Reduce and Recycle Solid Waste | - | - | - | - | - |
| **Total** | **2.0** | **1.7** | **1.6** | **1.4** | **2.6** |

[10] A value of 0.0 means that the FTE is less than 0.1 but is not zero. A "-" means there is no associated effort.

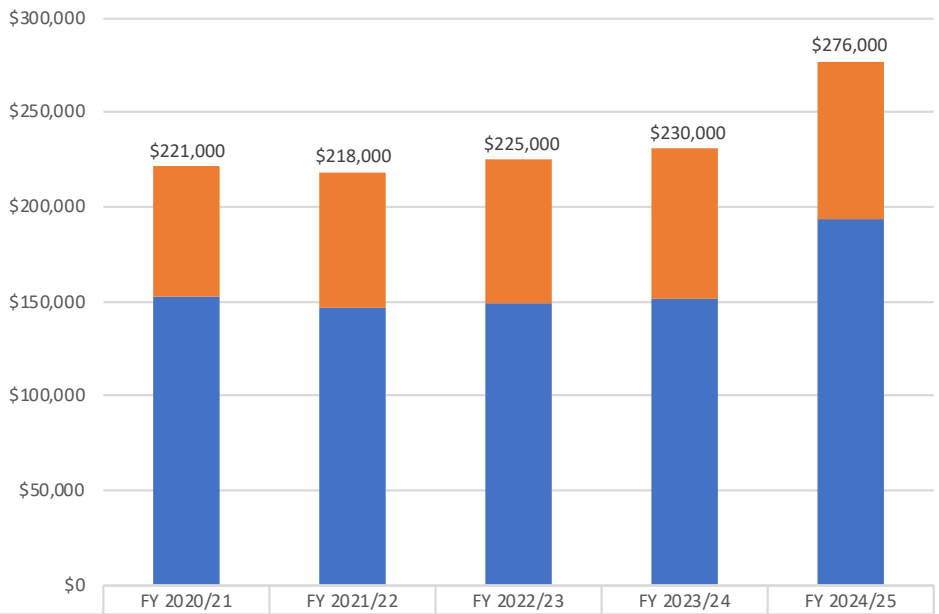
# 6 SUPPORTING EFFORTS

Previous sections of this report summarized results of the San Marcos CAP Implementation Cost Analysis for activities that directly implement CAP measures. The costs and staffing impacts of supporting efforts, which support multiple CAP measures, may not lead directly to GHG emissions reductions, and may not be implemented, were excluded from these results. This section provides a summary of the estimated costs and staffing impacts associated with the supporting efforts included in the CAP.

## 6.1 Costs for Supporting Efforts

The total estimated costs over the first five years to implement supporting efforts would be nearly $1.2 million. Annual costs would remain relatively steady between $221,000 to $230,00 during the first four years and rise to $276,000 in year five (Figure 16). About 70% of these costs are associated with new and expanded programs that would not have occurred without CAP adoption.

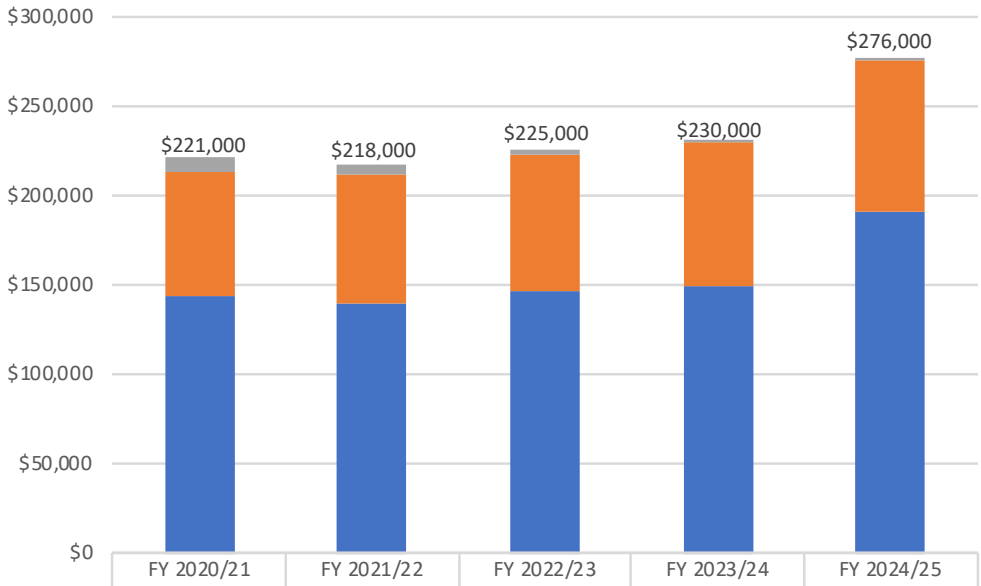
Figure 16 Annual Cost of Supporting Efforts by Program Type




| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Existing Programs | $69,000 | $72,000 | $76,000 | $80,000 | $84,000 |
| New and Expanded Programs | $152,000 | $146,000 | $149,000 | $151,000 | $193,000 |
| Total | $221,000 | $218,000 | $225,000 | $230,000 | $276,000 |

Similarly, about 65% of estimated costs to implement supporting efforts are unfunded (Figure 17).

Figure 17 Annual Cost of Supporting Efforts by Program and Funding Type




| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| New and Expanded - Funded | $8,000 | $6,000 | $3,000 | $2,000 | $2,000 |
| Existing-Funded | $69,000 | $72,000 | $76,000 | $80,000 | $84,000 |
| New and Expanded - Unfunded | $144,000 | $139,000 | $146,000 | $149,000 | $191,000 |
| Total | $221,000 | $218,000 | $225,000 | $230,000 | $276,000 |

Supporting efforts can support multiple measures within a CAP strategy. Figure 18 summarizes costs for supporting efforts by strategy. Strategy 8 (Increase Urban Tree Cover) would have the highest estimated costs over five years with $678,000, or nearly 60% of all costs for supporting efforts. These costs supporting efforts:

- Launch a community forestry program with an annual budget of at least $2 per capita and observe an official Arbor Day on yearly basis.
- Continue turf management practices which specify the top-dressing of compost to increase carbon sequestration at City parks.

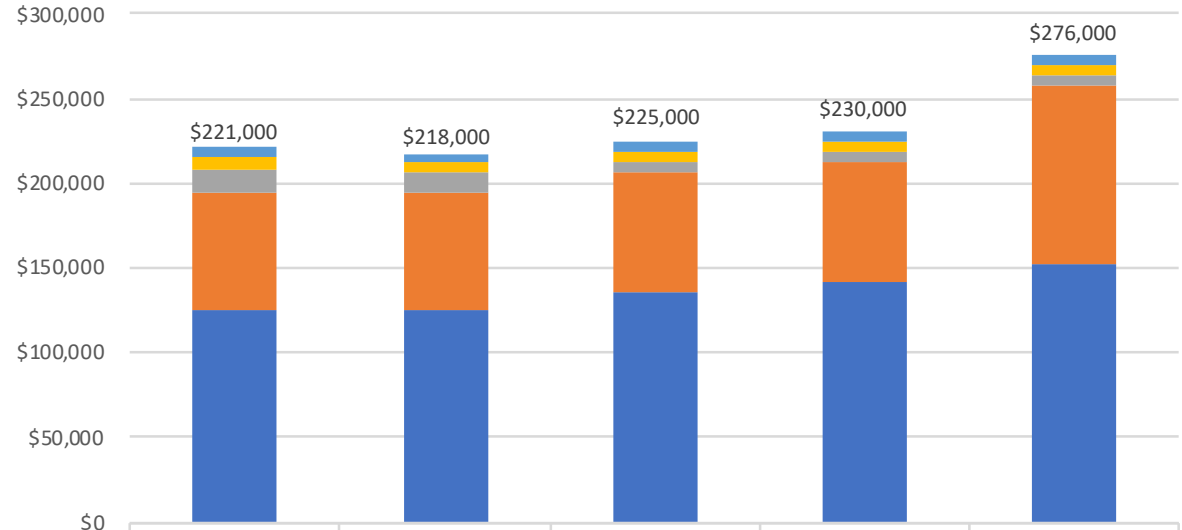
Costs to implement these two supporting efforts would be mostly for materials and supplies. Neither activity contributed to estimated GHG reductions in the draft CAP.

Supporting efforts for Strategy 3 (Reduce Vehicle Miles Traveled) would have estimated costs of $386,000, or about 33% of total supporting efforts. These costs would comprise mostly consultant support and personnel. Three supporting measures account for a significant amount of consulting support:

- Consider development of a neighborhood electric vehicle (NEV) master plan to encourage use of no emission vehicles on appropriate facilities.
- Continue to pursue public and private funding to expand and link the City's bicycle and pedestrian network in accordance with the General Plan-Mobility Element ,and Trails Master Plan.

- Incorporate multi-modal improvements into pavement resurfacing, restriping, and signalization operations where the safety and convenience of users can be improved within the scope of work.

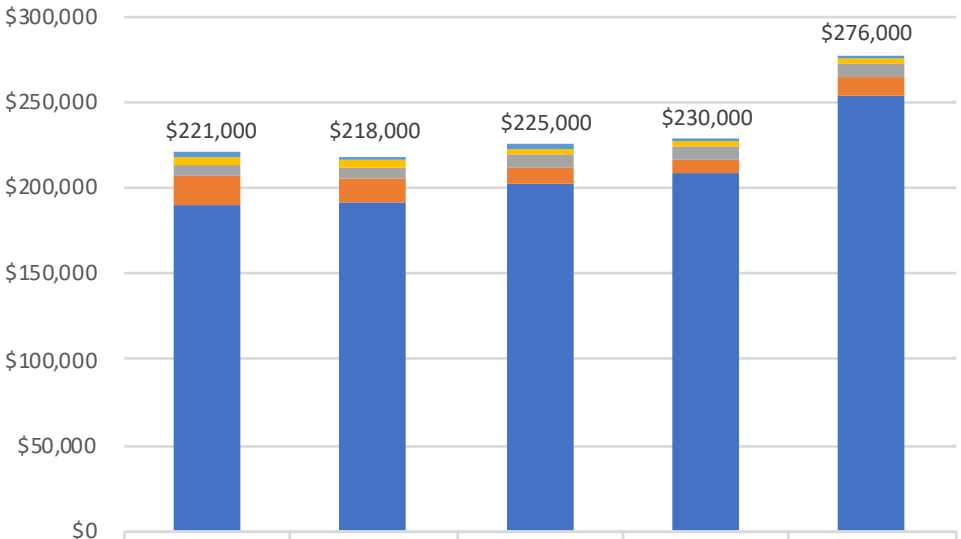
Figure 18 Cost of Supporting Efforts by Strategy




| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Strategy 1 | $6,000 | $5,000 | $5,000 | $6,000 | $6,000 |
| Strategy 7 | $8,000 | $6,000 | $6,000 | $6,000 | $6,000 |
| Strategy 2 | $13,000 | $11,000 | $7,000 | $7,000 | $7,000 |
| Strategy 3 | $70,000 | $70,000 | $70,000 | $71,000 | $105,000 |
| Strategy 8 | $125,000 | $125,000 | $136,000 | $141,000 | $152,000 |
| Total | $221,000 | $218,000 | $225,000 | $230,000 | $276,000 |

Consistent with other direct CAP implementation costs, Public Works would have the highest supporting effort costs with just over $1 million over five years (Figure 19). The activities associated with Strategy 8 contribute to this total.

Figure 19 Cost for Supporting Efforts by Department




| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Finance | $3,000 | $2,000 | $2,000 | $2,000 | $1,000 |
| City Manager | $5,000 | $4,000 | $4,000 | $3,000 | $3,000 |
| Economic Development | $6,000 | $7,000 | $7,000 | $7,000 | $8,000 |
| Development Services | $17,000 | $13,000 | $9,000 | $9,000 | $10,000 |
| Public Works | $190,000 | $192,000 | $203,000 | $208,000 | $254,000 |
| Total | $221,000 | $218,000 | $225,000 | $230,000 | $276,000 |

Materials and supplies would account for about 45% of supporting effort costs, followed by personnel (33%), and consultants (22%). No capital expenditures would be required for supporting efforts. Annual costs by expenditure type would remain relatively steady over the first five years of CAP implementation. Figure 20 and Figure 21 present these findings.

Figure 20 Total Costs for Supporting Efforts Broken Down by Expenditure Category

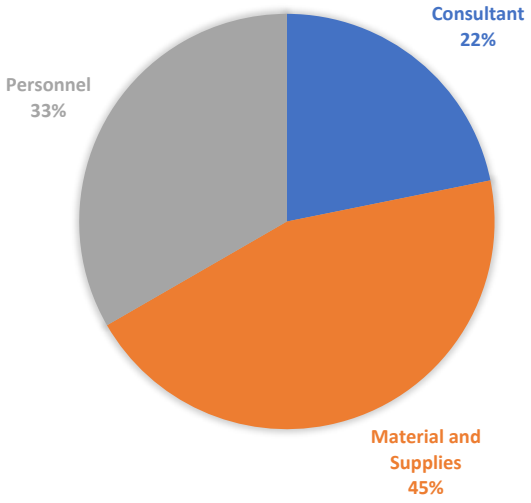
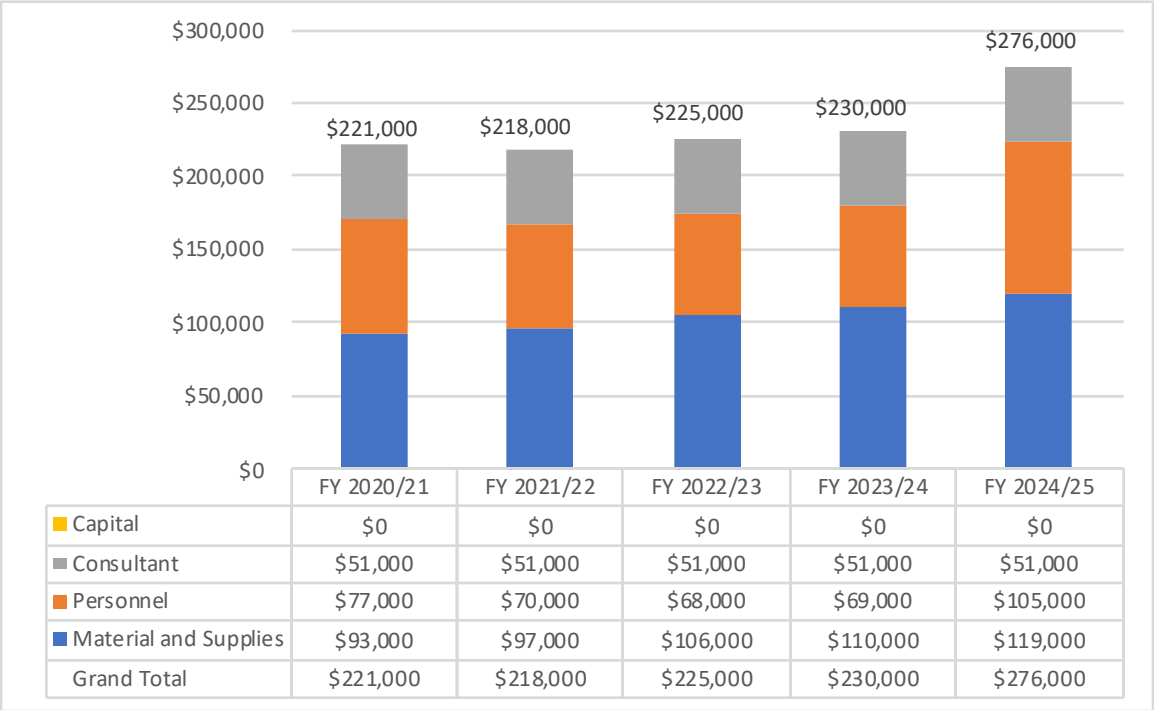


Figure 21 Annual Supporting Effort Costs by Expenditure Category

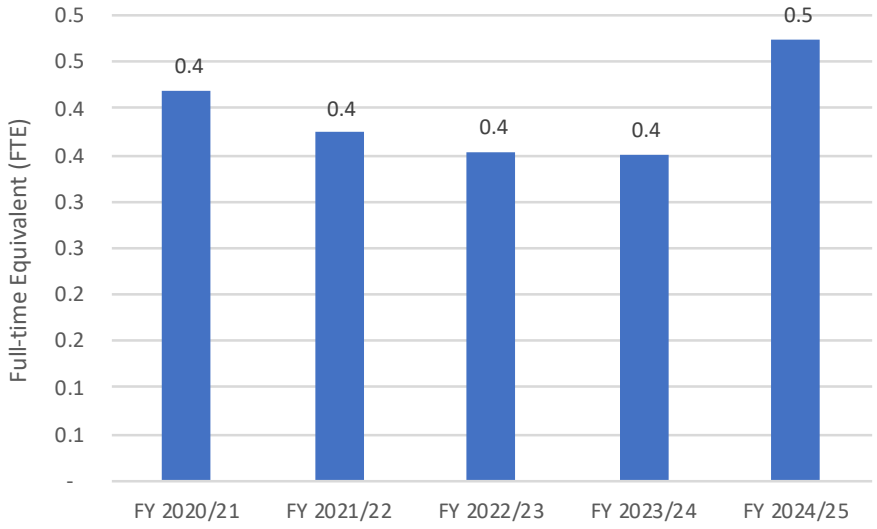



| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Capital | $0 | $0 | $0 | $0 | $0 |
| Consultant | $51,000 | $51,000 | $51,000 | $51,000 | $51,000 |
| Personnel | $77,000 | $70,000 | $68,000 | $69,000 | $105,000 |
| Material and Supplies | $93,000 | $97,000 | $106,000 | $110,000 | $119,000 |
| Grand Total | $221,000 | $218,000 | $225,000 | $230,000 | $276,000 |

## 6.2 Staffing Impact for Supporting Efforts

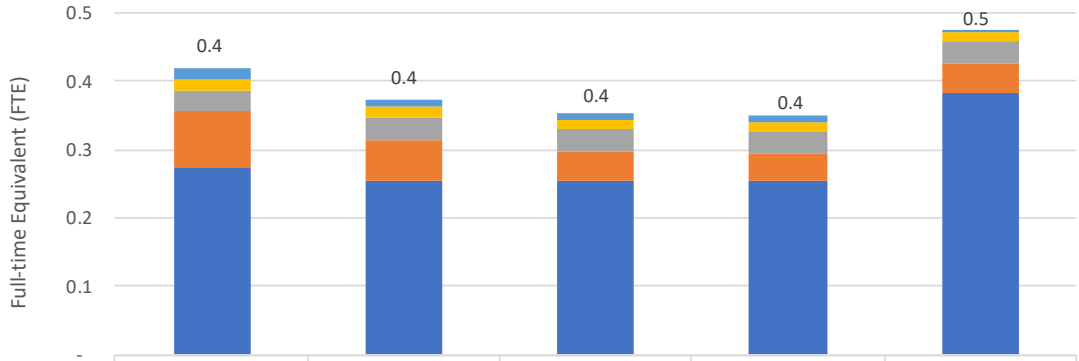
As noted above, about 33% of supporting effort costs would be associated with personnel. Staffing impacts for supporting efforts over the five-year period, measured in FTE, represent between 25% and 35% of total FTE to implement all CAP activities. Related staffing effort ranges between 0.4 FTE and 0.5 FTE over the five years (Figure 22).

Figure 22 Annual Staffing Impact (FTE) to Implement Supporting Measures




Public Works would require the most staff effort to implement CAP supporting measures, ranging from 0.3 FTE in the first four years to 0.4 in the final year of the analysis period (Figure 23).

Figure 23 Annual Staffing Impact (FTE) to Implement Supporting Measures by Department[11]




| | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Finance | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| City Manager | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Economic Development | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Development Services | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| Public Works | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 |
| Total | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 |

Supporting efforts related to Strategies 3 and 8 would have the highest staffing impact, with about 0.1 FTE over the first five years (Table 15). Strategy 3 supporting efforts would require about 0.2 FTE in the final year of the initial timeline.

[11] A value of 0.0 means that the FTE is less than 0.1 but is not zero.

## Table 15 Annual Staffing Impact (FTE) to Implement Supporting Measure by Strategy

| Strategy | FY 2020/21 | FY 2021/22 | FY 2022/23 | FY 2023/24 | FY 2024/25 |
|---|---|---|---|---|---|
| Strategy 3: Reduce Vehicle Miles Traveled | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 |
| Strategy 8: Increase Urban Tree Cover | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Strategy 2: Reduce Fossil Fuel use | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| Strategy 1: Increase Use of Zero-Emission or Alternative Fuel Vehicles | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Strategy 7: Reduce and Recycle Solid Waste | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Total** | **0.4** | **0.4** | **0.4** | **0.4** | **0.5** |

# 7 LIMITATIONS

There are inherent limitations with any data analysis that result in a degree of uncertainty. This implementation cost and staffing impact analysis uses the best information, data, and methods available at the time. Nonetheless, the following limitations should be considered.

## 7.1 Preliminary Estimate

The cost and staffing impact results presented are preliminary estimates. Because there is limited information about the specific tasks that would be required to implement the CAP measures, the estimates included are based on assumptions about the work to be performed. Over time, the specific tasks required to implement final CAP measures will become clearer and considerations for how to coordinate and sequence activities can be made, which may also affect the ultimate cost and staffing required to implement the final CAP.

## 7.2 CAP Time Horizon

This analysis evaluated San Marcos' cost and staffing impact (FTE) for the first five years of CAP implementation through FY 24–25. While the CAP has an implementation horizon of 2030 this report does not estimate costs between FY 25–26 and 2030. It would be too speculative to determine specific tasks and staffing needs for implementation activities beyond year five. It should be noted that certain CAP measures will be implemented and will have costs beyond the scope of this initial cost analysis. To account for future costs, the City can conduct cost analysis as part of the CAP monitoring and update process.

## 7.3 Cost Savings not Considered

This report estimates costs that will be incurred by the City of San Marcos to implement the measures included in the CAP. It does not consider any potential benefits/cost savings that might result from those measures. For example, rooftop solar and energy efficiency retrofits have an upfront cost but could result in a net savings over the project lifetime. A benefit-cost analysis would be required to estimate the net savings or costs that would accrue to San Marcos for municipal projects, and residents, and businesses located within the City.

## 7.4 GHG Emissions

This report does not consider the GHG emissions associated with CAP measures. It is common for cost analyses to normalize cost across GHG emission reductions in a CAP; this means dividing costs by GHG emissions to derive a cost per ton of carbon-dioxide equivalent ($CO_2e$) reduced. It is not possible to derive such values from the cost information included in this report, because there is no way to correlate the amount of GHG reductions that would occur due to the specific staffing expenditures estimated for this effort. For example, it would not be accurate to divide costs for the first five fiscal years by the total GHG reduction for 2030, as there could be additional costs associated with achieving those reductions.

# APPENDIX A FUNDING OPPORTUNITIES

Below is a preliminary list of possible funding opportunities to assist with CAP implementation organized by GHG emissions category and by responsible agency or organization.

## A.1. On-Road Transportation

### A.1.1. California Air Resources Board

#### Advanced Technology Demonstration and Pilot Projects

Grants for pre-commercial demonstrations of advanced vehicles, engines, equipment, and transportation systems. (Website)

#### Air Quality Improvement Program (AQIP)

The Air Quality Improvement Program (AQIP) provide mobile source incentives to reduce greenhouse gas, criteria pollutant, and toxic air contaminant emissions through the deployment of advanced technology and clean transportation in the light-duty and heavy-duty sectors. The Air Quality Improvement Program (AQIP) was established by the California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007 (AB 118, Statutes of 2007, Chapter 750). Each year, the legislature appropriates funding to CARB for these incentives to reduce emissions and support advanced technology demonstrations and deployments. The AQIP Guidelines and annual Funding Plans guide CARB's implementation of these investments. For more information on clean transportation projects, incentives, and financing, please visit Moving California. (Website)

#### Carl Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) provides grant funding for cleaner-than-required engines, equipment, and other sources of air pollution. The Carl Moyer Program is implemented as a partnership between CARB and California's 35 local air districts. CARB works collaboratively with the air districts and other stakeholders to set Guidelines and ensure the Program reduces pollution and provides cleaner air for Californians.

Public and private entities can apply for Moyer funding. In order to receive funds projects must not be required by any regulation, memorandum of understanding, or other legal mandate but must be "early or extra." Under Moyer Program Guidelines, fund recipients sign a contract and submit basic project status information on a regular basis. Small businesses with vehicles or equipment that are exempt from or not yet subject to air quality rules are particularly encouraged to apply. (Website)

#### Clean Truck and Bus Vouchers

This program provides vouchers for the purchase of zero-emission, hybrid, and low-emissions trucks and buses. (Website)

#### Clean Vehicle Rebate Project (CVRP)

The Clean Vehicle Rebate Project (CVRP) provides up to $7,000 to purchase or lease a new plug-in hybrid electric vehicle (PHEV), battery electric vehicle (BEV), or a fuel cell electric vehicle (FCEV). CVRP offers vehicle rebates on a first-come, first-served basis and helps get the cleanest vehicles on

the road in California by providing consumer rebates to reduce the initial cost of advanced technologies. Rebates are available to California residents that meet income requirements and purchase or lease an eligible vehicle. (Website)

### Community Air Protection

The Community Air Protection program provided funding for projects focused on the communities most burdened by air pollution. Funds cleaner vehicles, equipment, charging infrastructure for heavy vehicles, projects that reduce air toxics from smaller stationary sources, and projects from AB 617. This program is administered by local Air Districts. (Website)

### Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project

The California Air Resources Board (CARB), in partnership with CALSTART, launched the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) to accelerate the adoption of cleaner, more-efficient trucks and buses. HVIP works directly with dealers to apply the voucher incentive at the time of purchase. (Website)

### Low Carbon Transportation Investments Program

Low Carbon Transportation Investments provides mobile source incentives to reduce greenhouse gas, criteria pollutant, and toxic air contaminant emissions through the deployment of advanced technology and clean transportation in the light-duty and heavy-duty sectors. Low Carbon Transportation Investments are supported by Cap-and-Trade auction proceeds. Each year, the legislature appropriates funding to CARB for these incentives to reduce emissions and support advanced technology demonstrations and deployments. (Website)

### Lower-Emission School Bus Program

The Lower-Emission School Bus Program (LESBP) provides public funds to California public school districts to replace old, diesel school buses with cleaner buses. (Website)

### Sustainable Transportation Equity Project (STEP)

The Program makes $2 million available for planning and capacity building grants. Funding is intended to help low-income and disadvantaged communities identify residents' transportation needs and prepare to implement clean transportation and land use projects. The Program makes $20 million available for one to three implementation block grants to fund clean transportation and land use projects in disadvantaged communities. Funded projects will work together to increase community residents' access to key destinations so they can get where they need to go without the use of a personal vehicle. (Website)

### Truck Loan Assistance Program

The Truck Loan Assistance Program helps small-business fleet owners affected by CARB's In-Use Truck and Bus regulation to secure financing for upgrading their fleets with newer trucks. (Website)

## A.1.2. California Energy Commission

### Clean Transportation Program - Biofuels: Biomethane, Diesel Substitutes, Gasoline Substitutes

The California Energy Commission supports California's transition to biofuels such as biomethane, diesel substitutes, and gasoline substitutes through investments in biofuel production and demonstration. The Energy Commission also supports development of technologies to produce these fuels from a variety of raw materials, called feedstocks, as well as the fueling infrastructure for these alternative fuels. (Website)

### Clean Transportation Program - Electric Vehicles & Charging Infrastructure

The California Energy Commission is investing in the charging infrastructure and technologies that are helping to drive the transition to clean, zero-emission electric vehicles throughout the state. The Energy Commission is also supporting strategic regional planning to support adoption of these vehicles. (Website)

### Clean Transportation Program - Hydrogen Vehicles & Refueling Infrastructure

The California Energy Commission is supporting the adoption of zero-emission hydrogen fuel cell electric cars by expanding California's network of hydrogen refueling stations throughout the state. The Energy Commission is investing in an initial network of 100 public hydrogen stations across California to support the fuel cell electric cars that are on the road now, and to encourage more consumers to consider these zero-emission vehicles. (Website)

### Clean Transportation Program - Medium and Heavy-Duty Vehicles

The California Energy Commission is investing in projects throughout California that accelerate advancement and adoption of medium- and heavy-duty vehicle technologies that produce zero or near-zero emissions. The program also invests in fueling stations for public and fleet vehicles that support the accelerated deployment of these vehicles. (Website)

### Clean Transportation Program - Natural Gas Vehicles & Refueling Infrastructure

The Energy Commission supports projects that demonstrate in-state production of renewable natural gas or biomethane, which can be substituted for conventional natural gas in natural gas vehicles. When powered by biomethane, low-NOx engines can reduce criteria pollutant and greenhouse gas emissions. (Website)

### Clean Transportation Program - Workforce Development

To meet the need for a skilled workforce in the state's growing clean transportation and fuels market, the California Energy Commission supports manufacturing and workforce training and development, working with a variety of public and private partners. (Website)

### School Bus Replacement

The School Bus Replacement Program offers funds to replace old diesel school buses in disadvantaged and low-income communities throughout California. The California Energy Commission is helping schools embrace next-generation zero-emission vehicles and improve children's health by reducing their exposure to transportation-related air pollution. (Website)

## A.1.3. California Department of Housing and Community Development (HCD)

### Infill Infrastructure Grant Program

The Infill Infrastructure Grant Program (IIG) provides grant assistance as gap funding to infrastructure improvements required for specific residential or mixed-use infill development. Funds will be allocated through a competitive process for Large Jurisdictions, based on the merits of the individual infill projects and areas. Application selection criteria includes housing density, project readiness, access to transit, proximity to amenities, and housing affordability. (Website)

## A.1.4. California Department of Transportation (CALTRANS)

### Active Transportation Program - SB99

Annual program providing state funds for city and county projects that improve safety and convenience for bicycle commuters, including, but not limited to, any of the following: New bikeways serving major transportation corridors; New bikeways removing travel barriers to potential bicycle commuters; Secure bicycle parking at employment centers, park-and-ride lots, rail and transit terminals, and ferry docks and landings; Bicycle-carrying facilities on public transit vehicles; Installation of traffic control devices to improve the safety and efficiency of bicycle travel; Elimination of hazardous conditions on existing bikeways; Planning; Improvement and maintenance of bikeways; Project planning; Preliminary engineering; Final design; Right of way acquisition; Construction engineering; and Construction and/or rehabilitation. (Website)

### Local Assistance Program

Caltrans' Local Assistance Program oversees more than one billion dollars annually available to over 600 cities, counties and regional agencies for the purpose of improving their transportation infrastructure or providing transportation services. This funding comes from various Federal and State programs specifically designed to assist the transportation needs of local agencies. Annually, over 1,200 new projects are authorized through the Local Assistance Program of which approximately 700 are construction projects. (Website)

### Low Carbon Transit Operations Program (LCTOP)

The LCTOP was created to provide operating and capital assistance for transit agencies to reduce greenhouse gas emission and improve mobility, with a priority on serving disadvantaged communities. Approved projects in LCTOP will support new or expanded bus or rail services, expand intermodal transit facilities, and may include equipment acquisition, fueling, maintenance and other costs to operate those services or facilities, with each project reducing greenhouse gas emissions. For agencies whose service area includes disadvantaged communities, at least 50 percent of the total moneys received shall be expended on projects that will benefit disadvantaged communities. Senate Bill 862 continuously appropriates five percent of the annual auction proceeds in the Greenhouse Gas Reduction Fund (Fund) for LCTOP, beginning in 2015-16.

This program will be administered by the California Department of Transportation (Caltrans) in coordination with Air Resource Board (ARB) and the State Controller's Office (SCO). Caltrans is responsible to ensure that the statutory requirements of the program are met in terms of project eligibility, greenhouse reduction, disadvantaged community benefit, and other requirements of the law. (Website)

### State Highway Operations and Protection Program (SHOPP)

The Office of SHOPP Management is responsible for planning, developing, managing and reporting the four-year SHOPP portfolio of projects. The Program is the State Highway System's "fix it first" program that funds repairs and preservation, emergency repairs, safety improvements, and some highway operational improvements on the State Highway System. (Website)

### Strategic Partnership Grants

This program includes $4.5 million to identify and address statewide, interregional, or regional transportation deficiencies on the State highway system in partnership with Caltrans. A sub-category funds transit-focused planning projects that address multimodal transportation deficiencies. (Website)

### Sustainable Communities Planning Grants

The program includes $29.5 million to encourage local and regional planning that furthers state goals, including, but not limited to, the goals and best practices cited in the Regional Transportation Plan Guidelines adopted by the California Transportation Commission. (Website)

### Transit and Intercity Rail Capital Program (TIRCP)

The TIRCP provides grants from the Greenhouse Gas Reduction Fund (GGRF) to fund transformative capital improvements that will modernize California's intercity, commuter, and urban rail systems, and bus and ferry transit systems, to significantly reduce emissions of greenhouse gases, vehicle miles traveled, and congestion. (Website)

## A.1.5. California Transportation Commission

### Local Partnership Program (LPP)

The primary objective of this program is to provide funding to counties, cities, districts, and regional transportation agencies in which voters have approved fees or taxes dedicated solely to transportation improvements or that have imposed fees, including uniform developer fees, dedicated solely to transportation improvements. Funding includes $200M/year to improve aging Infrastructure, Road Conditions, Active Transportation, Transit and rail, Health and Safety Benefits. (Website)

### Local Streets and Roads (LSR) Program

The purpose of the program is to provide approximately $1.5 billion per year to cities and counties for basic road maintenance, rehabilitation, and critical safety projects on the local streets and roads system. (Website)

### Solutions for Congested Corridors

The purpose of the program is to provide funding to achieve a balanced set of transportation, environmental, and community access improvements to reduce congestion throughout the state. This statewide, competitive program makes $250 million available annually for projects that implement specific transportation performance improvements and are part of a comprehensive

corridor plan by providing more transportation choices while preserving the character of local communities and creating opportunities for neighborhood enhancement. (Website)

#### State Transportation Improvement Program (STIP)

The STIP is the biennial five-year plan adopted by the Commission for future allocations of certain state transportation funds for state highway improvements, intercity rail, and regional highway and transit improvements. Local agencies should work through their Regional Transportation Planning Agency (RTPA), County Transportation Commission, or Metropolitan Planning Organization (MPO), as appropriate, to nominate projects for inclusion in the STIP. (Website)

### A.1.6. Federal Transportation Administration

#### Access and Mobility Partnership Grants

Access and Mobility Partnership Grants seek to improve access to public transportation by building partnerships among health, transportation and other service providers. This program provides competitive funding to support innovative projects for the transportation disadvantaged that will improve the coordination of transportation services and non-emergency medical transportation services. In 2018, there are two funding opportunities under the initiative: the Innovative Coordinated Access and Mobility (ICAM) Pilot Program and Human Services Coordination Research (HSCR) grants. (Website)

#### Better Utilizing Investments to Leverage Development (BUILD) Transportation Grants Program (formerly TIGER)

U.S. DOT's Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants program funds investments in transportation infrastructure, including transit. BUILD Transportation grants replace the Transportation Investment Generating Economic Recovery (TIGER) grant program. (Website)

#### Helping Obtain Prosperity for Everyone Program

Helping Obtain Prosperity for Everyone (HOPE) Program supports projects that will address the transportation challenges faced by areas of persistent poverty. HOPE supports planning, engineering and technical studies or financial planning to improve transit services in areas experiencing long-term economic distress. It will also support coordinated human service transportation planning to improve transit service or provide new services such as rides to opioid abuse recovery and treatment. (Website)

#### Integrated Mobility Innovation

FTA's Integrated Mobility Innovation (IMI) Program funds projects that demonstrate innovative and effective practices, partnerships and technologies to enhance public transportation effectiveness, increase efficiency, expand quality, promote safety and improve the traveler experience. (Website)

### Low or No Emission Vehicle Program - 5339(c)

The Low or No Emission competitive program provides funding to state and local governmental authorities for the purchase or lease of zero-emission and low-emission transit buses as well as acquisition, construction, and leasing of required supporting facilities. (Website)

### Mobility for All Pilot Program Grants

This funding opportunity seeks to improve mobility options through employing innovative coordination of transportation strategies and building partnerships to enhance mobility and access to vital community services for older adults, individuals with disabilities, and people of low income. (Website)

### Mobility on Demand (MOD) Sandbox Demonstration Program - 5312

Funds projects that promote innovative business models to deliver high quality, seamless and equitable mobility options for all travelers. (Website)

### Pilot Program for Transit-Oriented Development Planning – Section 20005(b)

The Pilot Program for TOD Planning helps support FTA's mission of improving public transportation for America's communities by providing funding to local communities to integrate land use and transportation planning with a new fixed guideway or core capacity transit capital investment. Comprehensive planning funded through the program must examine ways to improve economic development and ridership, foster multimodal connectivity and accessibility, improve transit access for pedestrian and bicycle traffic, engage the private sector, identify infrastructure needs, and enable mixed-use development near transit stations. (Website)

## A.1.7. California Office of Traffic Safety

### Office of Traffic Safety Grant Program

The Program provides annual funds to prevent serious injury and death resulting from motor vehicle crashes so that all roadway users arrive at their destination safely. Funds can be used for bicycle and pedestrian safety. (Website)

## A.1.8. San Diego Association of Governments (SANDAG)

### Active Transportation Grant Program

The goal of the ATGP is to encourage local jurisdictions to plan and build facilities that promote multiple travel choices and increase connectivity to transit, schools, retail centers, parks, work, and other community gathering places. The grant program also encourages local jurisdictions to provide bike parking, education, encouragement, and awareness programs that support pedestrian and bike infrastructure. SANDAG makes available the grant applications of projects funded through the ATGP. (Website)

### Environmental Mitigation Program

The TransNet Extension Ordinance and Expenditure Plan, approved countywide by voters in November 2004, includes an Environmental Mitigation Program (EMP) which is a funding allocation

category for the costs to mitigate habitat impacts for regional transportation projects. The EMP is a unique component of the TransNet Extension in that it goes beyond traditional mitigation for transportation projects by including a funding allocation for habitat acquisition, management, and monitoring activities as needed to help implement the Multiple Species Conservation Program and the Multiple Habitat Conservation Program. (Website)

#### Smart Growth Incentive Program

The SGIP provides funding for transportation-related infrastructure improvements and planning efforts that support smart growth development in Smart Growth Opportunity Areas as shown on the Smart Growth Concept Map (updated May 2016). The goal is to fund comprehensive public infrastructure projects and planning activities that facilitate compact, mixed-use, transit-oriented development and increase housing and transportation choices. SANDAG makes available the grant applications of projects funded through the SGIP. (Website)

#### Specialized Transportation Grant Program

The SANDAG Specialized Transportation Grant Program (STGP) funds projects and programs that expand mobility options for seniors and individuals with disabilities. (Website)

### A.1.9. San Diego Gas & Electric (SDG&E)

#### Medium/Heavy-Duty Electric Vehicle Charging Infrastructure Program (MD/HD)

Make-ready Electric Vehicle charging infrastructure program to support class 2 - 8 on/off-road electric vehicles. 3,000 vehicles/300 sites over 5 years through 2024. Includes a Vehicle to Grid school bus pilot. Charging station rebates available for qualified customers. Projects must procure at least 2 EVs; operate & maintain charging equipment for at least 10 years; provide charging data for at least 5 years; Provide an easement; Agree to program terms & conditions; Procure EV charging station from approved vendor list. (Website)

### A.1.10. Strategic Growth Council (and partners)

#### Transformative Climate Communities (TCC) Program

The Program funds community-led development and infrastructure projects that achieve major environmental, health, and economic benefits in California's most disadvantaged communities. (Website)

#### Affordable Housing and Sustainable Communities (AHSC)

The Program funds land-use, housing, transportation, and land preservation projects to support infill and compact development that reduce greenhouse gas emissions. (Website)

### A.1.11. Other

#### Community Grant

The PeopleForBikes Community Grant Program supports bicycle infrastructure projects and targeted advocacy initiatives that make it easier and safer for people of all ages and abilities to ride. Eligible projects include: Bike paths, lanes, trails, and bridges; Mountain bike facilities; Bike parks

and pump tracks; BMX facilities, End-of-trip facilities such as bike racks, bike parking, bike repair stations and bike storage. (Website)

## A.2. Energy

### A.2.1. California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA)

#### Qualified Energy Conservation Bonds

These bonds are designed to provide low-interest financing to promote the use of alternative energy and energy efficiency in State, Local, and Tribal Government facilities. Up to 30% of each state's allocation may be used for eligible projects that are privately owned or operated. The term is likely to be at least 10 years long based on similar programs with the borrower making one principal plus interest payment annually. (Website)

### A.2.2. California Conservation Corps

#### Energy Corps

The Energy Corps helps schools and public agencies save energy. Trained Corpsmembers conduct energy surveys and lighting and control retrofits in public buildings. Funding from the Greenhouse Gas Reduction Fund enables the Energy Corps to offer these services at an economical rate. With locations in Norwalk, Fresno, Vista, and Sacramento, the Energy Corps accepts requests for service on a rolling basis. (Website)

### A.2.3. California Department of Community Services & Development (CSD)

#### Low-Income Home Energy Assistance Program (LIHEAP)

The Low-Income Home Energy Assistance Program (LIHEAP) provides assistance to eligible low-income households with the goal of managing and meeting their immediate home heating and/or cooling needs. (Website)

#### Low-Income Weatherization Program (LIWP)

CSD's energy efficiency and weatherization programs provide home energy efficiency upgrades and health and safety improvements to qualifying low-income households. To learn more about eligibility requirements and inquire about available services in your area, please contact your local low-income energy services provider. (Website)

#### Multi-Family Energy Efficiency and Renewables

Incentives for energy-efficiency measures and solar photovoltaics in low-income multifamily dwellings, especially in disadvantaged communities. (Website)

### A.2.4. California Energy Commission

### Bright Schools Program

The Bright Schools Program offers services to help identify the most cost-effective energy saving opportunities for schools. The California Energy Commission is helping implement measures that help schools save money. (Website)

### Energy Conservation Assistance Act – Low-Interest Loans

The California Energy Commission's Energy Conservation Assistance Act (ECAA) program provides 1 percent interest loans to cities, counties, special districts, public colleges and universities, public care institutions, and public hospitals. Loans finance energy efficiency and energy generation projects. The maximum loan is $3 million. (Website)

### Energy Conservation Assistance Act – Zero-Interest Loans for Schools

The California Energy Commission's Energy Conservation Assistance Act – Education (ECAA-Ed) program provides competitive zero-interest rate loans to public school districts, charter schools, county offices of education, and state special schools. Loans finance energy efficiency and energy generation projects. The maximum loan is $3 million. (Website)

### Energy Conservation Assistance Act Low-Interest Loans

The California Energy Commission's Energy Conservation Assistance Act (ECAA) program provides 1 percent interest loans to cities, counties, special districts, public colleges and universities, public care institutions, and public hospitals. Loans finance energy efficiency and energy generation projects. The maximum loan is $3 million. (Website)

### Energy Efficiency Financing for Public Sector Projects

Cities, counties, public care institutions, public hospitals, public schools and colleges, and special districts in California can apply for low-interest loans from the California Energy Commission for energy efficiency projects in their buildings and facilities. Residential and commercial projects and non-profit institutions are not eligible for these funds. Entities eligible for 0% loans include: School districts, Charter schools, County offices of education, State special schools, Community college districts. Entities eligible for 1% loans include: Cities, Counties, and Special Districts. (Website)

### Energy Partnership Program

The California Energy Commission's Energy Partnership Program offers services to help identify the most cost-effective, energy-saving opportunities for buildings and new construction. Cost-saving measures are needed with shrinking budgets and increasing operating costs. Reducing energy costs is one way to save money. (Website)

### Local Government Challenge Program

The Local Government Challenge is a partnership between the California Energy Commission (CEC) and local governments to develop innovative solutions that will improve energy performance in California's communities. The CEC has awarded more than $10 million in two competitive grant programs. (Website)

## A.2.5. California Infrastructure and Economic Development Bank (Ibank)

#### California Lending for Energy and Environmental Needs (CLEEN) Center through IBank

The CLEEN Center provides direct public financing to Municipalities, Universities, Schools and Hospitals (MUSH) to help meet the State's goals for greenhouse gas emissions reduction, water conservation and environmental conservation. Financing can be funded via a combination of a direct loan from IBank or public market tax-exempt bonds in amounts from $50 thousand to $30 million (or higher with board approval). (Website)

### A.2.6. California Public Utilities Commission (CPUC)

#### California Solar Initiative - Thermal Program (CSI-Thermal)

The California Solar Initiative (CSI) is the solar rebate program for California consumers that are customers of the investor-owned utilities - Pacific Gas and Electric (PG&E), Southern California Edison (SCE), San Diego Gas & Electric (SDG&E). Together with the rebate program for New Solar Homes and rebate programs offered through the dozens of publicly owned utilities in the state - the CSI program is a key component of the Go Solar California campaign for California. (Website)

#### California Solar Initiative: Single-Family Affordable Solar Housing (SASH) Program

The SASH program, which provides solar incentives to single-family low-income housing, is administered through GRID Alternatives. (Website)

#### Electric Program Investment Challenge (EPIC) Program

The California Energy Commission's Electric Program Investment Charge (EPIC) program invests in scientific and technological research, development, and demonstration to accelerate the transformation of the electricity sector to meet the state's energy and climate goals. (Website)

#### Self-Generation Incentive Program

The CPUC's Self-Generation Incentive Program (SGIP) provides incentives to support existing, new, and emerging distributed energy resources. SGIP provides rebates for qualifying distributed energy systems installed on the customer's side of the utility meter. Qualifying technologies include wind turbines, waste heat to power technologies, pressure reduction turbines, internal combustion engines, microturbines, gas turbines, fuel cells, and advanced energy storage systems. (Website)

#### California Solar Initiative: Multi-Family Affordable Solar Housing (MASH) Program

The MASH Program provided solar incentives on qualifying affordable housing multifamily dwellings. MASH is the low-income, multifamily component within the California Solar Initiative program. (Website)

#### California Solar Initiative: Thermal Program

The CSI-Thermal program provides rebates to utility customers who install solar thermal systems to replace water-heating systems powered by electricity or natural gas. (Website)

#### California Solar Initiative: Thermal Low-income Program

The CSI-Thermal Low-Income Program provides rebates to qualifying utility customers who install solar water heating (SWH) systems that displace natural gas usage. (Website)

### A.2.7. San Diego Gas & Electric (SDG&E)

#### Non-Residential On-Bill Financing Program

The SDG&E On-Bill Financing (OBF) program offers qualified business customers 0% financing from $5,000 to $100,000 per meter for qualifying equipment. All institutional customers may receive from $5,000 to $250,000 per meter. On-Bill Financing is available to any commercial or government-funded customer participating in an energy efficiency rebate or incentive program. The program is open to all non-residential customers, including owners of multi-family units who do not live on premises. Participants must have had an active account for the past two years and good credit standing as determined by the Utility. The funds may be used for a wide variety of efficiency improvement projects, and the monthly loan payments will be added directly to the customer's bill. (Website)

### A.2.8. U.S. Department of Energy

#### Educational Materials for Professional Organizations Working on Efficiency and Renewable Energy Developments (EMPOWERED)

The Educational Materials for Professional Organizations Working on Efficiency and Renewable Energy Developments (EMPOWERED) funding program is a collaborative effort across EERE's Solar Energy Technologies Office (SETO), Vehicle Technologies Office (VTO), and Building Technologies Office (BTO), to provide professionals with educational materials and training resources in fields newly interacting with distributed energy resources (DER). In this program, DER includes distributed solar, like on homes and businesses, as well as efficient building technologies and sustainable transportation technologies, such as electric vehicles. (Website)

## A.3. Solid Waste

### A.3.1. California Department of Resources and Recycling (CalRecycle)

#### Beverage Container Recycling City/County Payment Program

The Department of Resources Recycling and Recovery (CalRecycle) administers a program to provide opportunities for beverage container recycling. The goal of this program is to reach and maintain an 80 percent recycling rate for all California refund value beverage containers--aluminum, glass, plastic and bi-metal. Projects implemented by cities and counties will assist in reaching and maintaining this goal. (Website)

#### Beverage Container Recycling Grant and Payment Programs

Public Resources Code, Division 12.1, Chapter 7, Section 14581(a)(4) authorizes the Department of Resources Recycling and Recovery (CalRecycle) to issue up to $1,500,000 annually in the form of grants for beverage container recycling programs. The availability of grant funding for communities will provide opportunities for CalRecycle to address recycling challenges, aid in increasing beverage container collection, and reduce beverage container litter in the waste stream. Eligible applicants for this grant program include California cities, counties, other local government entities, joint powers authorities, special districts, public colleges and universities, public K-12 school districts, nonprofit organizations and qualifying Indian tribes. (Website)

### Beverage Container Redemption Pilot Project Grant Program

The Department of Resources Recycling and Recovery (CalRecycle) received an appropriation from the California Beverage Container Recycling Fund to administer the California Beverage Container Recycling and Litter Reduction Act (Assembly Bill 2020, Margolin, Statutes of 1986, Chapter 1290) (Public Resources Code [PRC] section 14571.9). SB 458 (Wiener Chapter 648 Statutes of 2017) authorized CalRecycle to approve up to five pilot projects proposed by cities and/or counties working in combination with private businesses to provide convenient beverage container redemption opportunities in both urban and rural areas.

AB 54 (Ting, Chapter 793, Statutes of 2019) amends PRC 14581 to allow for the expenditure of up to $5,000,000 to support the pilot projects. AB 54 also extends the deadline for CalRecycle to approve pilot project applications until January 1, 2022. (Website)

### Community Composting for Green Spaces Grant

The Department of Resources Recycling and Recovery (CalRecycle) offers the Community Composting for Green Spaces Grant Program pursuant to Public Resources Code section 42999. The purpose of this competitive grant program is to increase the number of community groups operating small-scale composting programs in green spaces within disadvantaged and low-income communities, and to increase the capacity of those composting programs. Green spaces include, but are not limited to, community gardens, urban farms, and other public spaces where small-scale composting is appropriate. (Website)

### GHG Reduction Grant and Loan Programs

The Greenhouse Gas Reduction Fund (GGRF) receives Cap-and-Trade auction proceeds appropriated by the Legislature and Governor for projects that support the goals of AB 32. Eligible investments identified in Statute include reducing greenhouse gas emissions through increased in-state diversion of municipal solid waste from disposal through waste reduction, diversion, and reuse. (Website)

### Greenhouse Gas (GHG) Reduction Loan Program

The purpose of this loan program is to lower overall greenhouse gas emissions by expanding existing capacity or establishing new facilities in California to reduce the amount of California-generated green materials, food materials, and/or alternative daily cover being sent to landfills. Eligible applicants include government entities, regional or local sanitation agencies, waste agencies, and joint power authorities; private, for-profit entities; and nonprofit organizations (except private schools). Eligible Projects - Construction, renovation, or expansion of facilities to increase in-state infrastructure for: 1. The digestion or composting of organics into compost, soil amendments, biofuels, or bioenergy; or 2. The manufacturing of value-added finished products using California derived recycled content fiber, plastic, or glass. (Website)

### Local Conservation Corps Grant Program

California Public Resources Code (PRC) section 14581.1 authorizes funding from the California Beverage Container Recycling Fund, the Electronic Waste Recovery and Recycling Account, the California Tire Recycling Management Fund, and the California Used Oil Recycling Fund for grants

to the Local Conservation Corps (LCC). CalRecycle's grant program will help LCCs implement: beverage container recycling and litter abatement programs; programs relating to the collection and recovery of used oil and electronic waste; and the clean-up and abatement of waste tires. (Website)

#### Recycling Market Development Zones (RMDZ)-Revolving Loan Program

The Department of Resources Recycling and Recovery (CalRecycle) administers a Recycling Market Development Zone Loan Program to encourage California-based recycling businesses located within California to site new manufacturing facilities and expand existing operations. This program provides low-interest loans for the purchase of equipment and other relevant business costs. The intent of the Recycling Market Development Zone Loan Program is to help California manufacturers increase their processing capabilities and create additional markets for recycled-content products. (Website)

### A.3.2. U.S. Environmental Protection Agency (EPA)

#### Supporting Anaerobic Digestion in Communities

US EPA has announced a competitive grant funding opportunity with an estimated $3 million available to increase anaerobic digester (AD) capacity in the United States. US EPA anticipates awarding 10 to 40 projects, with each individual project eligible to receive between $50,000-$300,000. Applications must achieve one or more of the following objectives: Support state, tribal, and/or local government programs that seek to use AD to increase their organic waste diversion rates; Demonstrate solutions and/or approaches for increasing AD utilization that can be replicated by other communities, governments, or other entities; and/or Establish new or expand existing partnerships that result in the development of AD capacity. (Website)

## A.4. Water

### A.4.1. California Department of Food and Agriculture (CDFA)

#### Water Efficiency and Enhancement Program

The State Water Efficiency and Enhancement Program (SWEEP) provides financial assistance in the form of grants to implement irrigation systems that reduce greenhouse gases and save water on California agricultural operations. Eligible system components include (among others) soil moisture monitoring, drip systems, switching to low pressure irrigation systems, pump retrofits, variable frequency drives and installation of renewable energy to reduce on-farm water use and energy. (Website)

### A.4.2. California State Water Resources Control Board (WRCB)

#### Drinking Water State Revolving Fund

The Drinking Water State Revolving Fund (DWRSF) program assists public water systems in financing the cost of drinking water infrastructure projects needed to achieve or maintain compliance with Safe Drinking Water Act (SDWA) requirements. Established by an amendment to the federal Safe Drinking Water Act in 1996, the DWSRF provides low-interest loans, additional subsidy (principal forgiveness), and technical assistance to public water systems for infrastructure

improvements to correct system deficiencies and improve drinking water quality for the health, safety, and welfare of all Californians. (Website)

#### Clean Water State Revolving Fund (CWSRF)

The Clean Water State Revolving Fund (CWSRF) program offers low cost financing for a wide variety of water quality projects. The program has significant financial assets, and is capable of financing projects from <$1 million to >$100 million. (Website)

#### Federal Clean Water Act 319(h)

Annual nonpoint source pollution control program that is focused on controlling activities that impair beneficial uses and on limiting pollutant effects caused by those activities. States must establish priority rankings for waters on lists of impaired waters and develop action plans, known as Total Maximum Daily Loads (TMDLs), to improve water quality. Project proposals that address TMDL implementation and those that address problems in impaired waters are favored in the selection process. There is also a focus on implementing management activities that lead to reduction and/or prevention of pollutants that threaten or impair surface and ground waters. (Website)

#### Interim Emergency Drinking Water

On March 27, 2015, Governor Brown approved a $1 billion emergency drought relief package to take effect immediately. As a result of the Governor's action, the State Water Resources Control Board (State Water Board) approved $19 million in funding from the Cleanup and Abatement Account to meet interim emergency drinking water needs for those communities with a contaminated water supply or that suffer drought related water outages or threatened emergencies. (Website)

## A.5. Carbon Sequestration

### A.5.1. California Coastal Conservancy

#### Climate Ready Program - Carbon Sequestration

Climate change has been driven by greenhouse gas (GHG) emissions into the atmosphere and the Conservancy is working to protect natural and working lands that remove and capture these gases in photosynthesis. Projects include acquisitions of coastal forests, wetland restoration, carbon banking, and carbon farming. (Website)

#### Climate Ready Program - Rangeland and Agricultural Adaptation

The Conservancy is helping rangeland and agricultural lands adapt to changing climates including grazing operations, grassland restoration, and water and soil conservation projects such as water catchments and storage design. (Website)

#### Climate Ready Program - Urban Greening

Global warming, drought, and runoff from extreme storms threaten the well-being of millions of urban residents. Conservancy funding is supporting inner-city projects that are creating shady

retreats for residents, conserving rainwater, capturing stormwater pollution, and reducing air temperatures. (Website)

### A.5.2. California Conservation Corps

#### Forest Health

The California Conservation Corps collaborates with public agencies and non-profit partners to improve forest health and conserve natural resources. Trained Corpsmembers conduct fuel reduction, reforestation, wetland restoration, urban forestry, and urban greening projects. Funding from the Greenhouse Gas Reduction Fund enables the California Conservation Corps to offer these services at an economical rate. With 19 locations statewide, the California Conservation Corps accepts requests for service on a rolling basis. (Website)

### A.5.3. California Department of Fish and Wildlife

#### Wetlands Restoration

Grants for the restoration of wetland ecosystems for carbon storage and additional benefits. (Website)

### A.5.4. California Department of Food and Agriculture (CDFA)

#### Healthy Soils Program Incentives Program

The HSP Incentives Program provides financial incentives to California growers and ranchers to implement conservation management practices that sequester carbon, reduce atmospheric greenhouse gases (GHGs), and improve soil health. GHGs benefits are estimated using quantification methodology and tools developed by California Air Resources Board (CARB), USDA-NRCS and CDFA and soil health improvement will be assessed by measuring soil organic matter content. (Website)

### A.5.5. California Department of Forestry and Fire Protection (Cal FIRE)

#### Urban and Community Forestry Grant Program

The CAL FIRE Urban & Community Forestry Program works to optimize the benefits of trees and related vegetation through multiple objective projects as specified in the California Urban Forestry Act of 1978 (Public Resources Code 4799.06-4799.12). (Website)

#### Community Fire Planning and Preparedness

The California Department of Forestry and Fire Protection (CAL FIRE) will partner with the Governor's Office of Planning and Research, University of California, Cooperative Extension, and county governments in the wildland-urban interface to create a new fire outreach and extension program, provide funds and training for local planning, and support community fire prevention and preparedness, including the maintenance of evacuation routes. (Website)

### A.5.6. California Natural Resources Agency (CNRA)

### Environmental Enhancement and Mitigation Program (EEM)

The Environmental Enhancement and Mitigation Program (EEM) was established by the Legislature in 1989 to fund environmental enhancement and mitigation projects directly or indirectly related to transportation projects. EEM Program projects must fall within one of three categories: highway landscape and urban forestry; resource lands; or roadside recreation. Projects funded under this program must provide environmental enhancement and mitigation over and above that otherwise called for under the California Environmental Quality Act (CEQA). (Website)

### Urban Greening Grant Program

The Urban Greening Program, funded by the GGRF, continues the legacy of these programs but with a specific focus of achieving greenhouse gas reductions. Consistent with AB 32, the Urban Greening Program will fund projects that reduce greenhouse gases by sequestering carbon, decreasing energy consumption and reducing vehicle miles traveled, while also transforming the built environment into places that are more sustainable, enjoyable, and effective in creating healthy and vibrant communities. These projects will establish and enhance parks and open space, using natural solutions to improving air and water quality and reducing energy consumption, and creating more walkable and bike-able trails. (Website)

#### A.5.7. California State Coastal Conservancy (SCC)

### Proposition 1 Grants

Proposition 1 grants fund multi-benefit ecosystem and watershed protection and restoration projects. The Conservancy adopted its Proposition 1 Grant Program Guidelines in September 2016. Priority project types include: water sustainability improvements, anadromous fish habitat enhancement, wetland restoration and urban greening. For more details on the Coastal Conservancy's priorities, please review our Strategic Plan. (Website)

## A.6. Other

### CARB Clean Off-Road Equipment Voucher Incentive Project (CORE)

Analogous to the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)5, CORE provides a first-come, first-served voucher process for fleets ready to purchase cleaner off-road equipment to receive funding to offset the higher cost of such equipment. Pursuant to AB 134 and the FY 2017-18 Funding Plan, CORE is currently only applicable to freight equipment powered exclusively by zero-emission technology. (Website)

### CARB Funding Agricultural Replacement Measures for Emission Reductions (FARMER)

Local air districts offer incentives to replace old, high-polluting agricultural vehicles and equipment with cleaner options. (Website)

### HCD Community Development Block Grant (CDBG)

CDBG Partners with rural cities and counties to improve the lives of their low- and moderate-income residents through the creation and expansion of community and economic development opportunities in support of livable communities. Eligible activities include housing, public

improvements, community facilities, public services, planning and technical assistance, and improvements in Native American communities. (Website)

### HCD Local Early Action Planning Grants Program (LEAP)

The Local Early Action Planning Grant Program (LEAP) provides one-time grant funding to cities and counties to update their planning documents and implement process improvements that will facilitate the acceleration of housing production and help local jurisdictions. prepare for their 6th cycle RHNA much like the SB2 Planning Grants. (Website)

### DRP National Recreational Trails Program

The Recreational Trails Program (RTP) provides funds annually for recreational trails and trails-related projects. The RTP is administered at the federal level by the Federal Highway Administration (FHWA). It is administered at the state level by the California Department of Parks and Recreation (DPR) and the Department of Transportation (Caltrans) Active Transportation Program (ATP). Non-motorized DPR projects are administered by the Office of Grants and Local Services and motorized projects are administered by DPR's Off-Highway Motor Vehicle Recreation Division. (Website)

### IBank Infrastructure State Revolving Fund (ISRF) Program

The Infrastructure State Revolving Fund (ISRF) Program provides financing to public agencies and non-profit corporations, sponsored by public agencies, for a wide variety of infrastructure and economic development projects (excluding housing). ISRF Program funding is available in amounts ranging from $50,000 to $25 million with loan terms for the useful life of the project up to a maximum of 30 years. (Website)

### CNRA Youth Community Access Grant Program

The Youth Community Access Program will fund small capital projects, program projects, or a combination or capital and program projects that increase youth access to natural and cultural resources. (Website)

### CSCDA California Lease Finance Program (CaLease)

The CSCDA California Lease Finance Program (CaLease) allows local agencies to finance equipment and real estate. The program has been established using a Master Lease Agreement with each respective local agency to provide for efficient subsequent purchases in the future. CaLease provides local agencies with access to multiple funding institutions who competitively bid on their project. This comprehensive lease management program allows local government the ability to bid and manage leases without dedicating significant staff time to the process. (Website)

### SGC Proposition 84 Wildfire Resiliency and Recovery Planning Grants

The California Strategic Growth Council (SGC), the Governor's Office of Planning and Research (OPR), and the California Department of Conservation (DOC)are pleased to open the application period for Proposition 84 Wildfire Resiliency and Recovery Planning Grants. A total of approximately $720,000 is available for up to 3-5 grants between $150,000 and $250,000. Eligible applicants for the Wildfire Resiliency and Recovery Planning Grants include local and regional

governments (cities, counties, tribes, and metropolitan planning organizations) representing California areas affected by wildfires between 2017-2019. (Website)

### WCB Climate Adaptation and Resiliency Program

The intent of this grant program is to fund projects that provide climate adaptation and resilience on California's natural and working lands. These projects must be consistent with the State's climate adaptation strategy (Safeguarding California Plan), contribute to the goals of AB 32, support California Wildlife Conservation Board's (WCB) Strategic Plan, and help fulfil WCB's Mission. In addition, projects will be consistent with other statewide plans and priorities, including the California Water Action Plan (CWAP) and California State Wildlife Action Plan 2015 Update (SWAP). Program funding is directed toward projects that: Protect and restore ecosystems on natural and working lands to provide climate change adaptation and resilience for wildlife; Assist natural and working lands managers in implementing practices that provide climate adaptation and resilience; Facilitate the reduction of GHG emissions; and Increase carbon sequestration in natural and working lands, and provide additional social, economic, and environmental benefits, or "co-benefits". (Website)

### Habitat for Humanity Critical Home Repair Program

Since 2011, The Home Depot Foundation has generously funded critical repairs on the homes of veterans through Habitat for Humanity's Repair Corps program. This program is open to all military veterans, provided they have received an honorable or general discharge, and is not restricted to any specific veteran groups. While the primary focus of the program is on critical home repairs for veterans, the foundation has expressed their readiness to fund standard repairs on the homes of qualified veterans provided homes with critical needs take precedence. (Website)

### Local Government Commission (LGC) CivicSpark Program

CivicSpark is a Governor's Initiative AmeriCorps program that is dedicated to building capacity for local governments to address emerging environmental and social equity resilience challenges such as climate change, water resource management, affordable housing, and mobility. CivicSpark is administered by the Local Government Commission in partnership with the Governor's Office of Planning and Research. (Website)

### The Funders' Network for Smart Growth and Livable Communities Partners for Places Grant Program

Partners for Places aims to enhance local capacity to build equitable and sustainable communities in the United States and Canada. The fund does this by requiring local government and local foundation partnerships, and by pairing national and local philanthropic funding sources. These one-to-one matching awards support the planning and implementing of urban sustainability and green stormwater infrastructure projects. (Website)

### The San Diego Foundation (TSDF) Climate Program Grants

Through the support of our donors and other local, regional and national funding partners, the Climate Program works to: Catalyze greater regional action to reduce polluting emissions, Facilitate

and strengthen collaborative efforts to prepare for climate change, and Build public awareness and engage regional leaders around local solutions to climate change. (Website)

### U.S. Economic Development Administration (EDA) Economic Development Administration Disaster Grants

The U.S. Economic Development Administration (EDA) is awarding $587 million in grants to eligible entities to address economic challenges in disaster-impacted areas. These grants will support disaster recovery activities in areas receiving a major disaster designation as a result of Hurricanes Harvey, Irma, Maria, and wildfires and other 2017 natural disasters. EDA disaster grants will be made by regional offices under the Economic Adjustment Assistance (EAA) program, which can support a wide range of construction and non-construction activities. Through this program, EDA can support disaster recovery planning strategies as well as the implementation of disaster recovery projects. Projects, among other things, must have a nexus to applicable disaster recovery and resilience efforts and be consistent with at least one of the DOC Disaster Recovery Investment Priorities. EDA plans to accept proposals on a rolling basis until all funds are obligated. (Website)

### Ford Foundation Grants

The Ford Foundation makes grants that support the three I's: Institutions, Ideas, and Individuals. Having recently done away with their siloed grants program, the Ford Foundation accepts grant proposals that start in seven program areas, or entry points, as they say. The seven program areas: Civic Engagement and Government; Creativity and Free Expression; Future of Work(ers); Gender, Racial, and Ethnic Justice; Just Cities and Regions; Natural Resources and Climate Change; and Technology and Society. (Website)