# Sustainable Santee Plan

## The City's Roadmap to Greenhouse Gas Reductions

**Final – December 2019**

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Cover photo by Terry Rodgers

# Sustainable Santee Plan: The City's Roadmap to Greenhouse Gas Reductions

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# Acronyms and Abbreviations

| | |
|---|---|
| AB | Assembly Bill |
| ABAU | Adjusted Business-As-Usual |
| CARB | California Air Resources Board |
| BAU | Business-As-Usual |
| ° C | degrees Celsius |
| Cal/EPA | California Environmental Protection Agency |
| CALGreen | California's Green Building Standard Code |
| CalRecycle | California Department of Resources Recycling and Recovery |
| CCA/E | Community Choice Aggregation/Energy |
| CCR | California Code of Regulations |
| CEC | California Energy Commission |
| CEQA | California Environmental Quality Act |
| $CH_4$ | methane |
| CIP | Capital Improvement Program |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalent |
| EE | energy efficiency |
| EEM | Energy Efficient Mortgages |
| EIR | Environmental Impact Report |
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| EV | Electric Vehicles |
| ºF | degrees Fahrenheit |
| GHG | greenhouse gas |
| GWP | global warming potential |
| HERO | Home Energy Renovation Opportunity |
| HEV | Hybrid Electric Vehicles |
| HFC | Hydrofluorocarbons |
| HOA | Home-Owner Association |
| HVAC | Heating, venting, and air conditioning |
| IFT | Emissions Inventory, Forecasting, and Targets |
| IPCC | Intergovernmental Panel on Climate Change |

| | |
|---|---|
| kWh | kilowatt-hours |
| lb(s) | pound(s) |
| LCFS | Low Carbon Fuel Standard |
| LED | light-emitting diode |
| LEED | Leadership in Energy and Environmental Design |
| MT | metric tons |
| MWh | megawatt-hours |
| $N_2O$ | nitrous oxide |
| OBF | on-Bill Financing |
| PACE | Property Assessed Clean Energy |
| PFC | Perfluorocarbons |
| PITT | plan implementation tracker tool |
| Plan | Sustainable Santee Action Plan |
| ppb | parts per billion |
| ppm | parts per million |
| RTP | Regional Transportation Plan |
| SANDAG | San Diego Associated Governments |
| SB | Senate Bill |
| SDG&E | San Diego Gas & Electric |
| $SF_6$ | sulfur hexafluoride |
| SCS | Sustainable Communities Strategy |
| SEEC | Statewide Energy Efficiency Collaborative |
| SP | service population |
| SWRCB | State Water Resources Control Board |
| USEPA | United States Environmental Protection Agency |
| VOC | volatile organic compound |
| VMT | vehicle miles traveled |

# Executive Summary

The City of Santee (City) is committed to providing a more livable, equitable, and economically vibrant community through the incorporation of energy efficiency features and reduction of greenhouse gas (GHG) emissions. By using energy more efficiently, the City will keep dollars in the local economy, create jobs, and improve the community's quality of life. The efforts toward reducing City-wide greenhouse gas emissions described in this report would be done in coordination with the City's other planning land use decisions. Through the Sustainable Santee Action Plan, the City has established goals and policies that incorporate environmental responsibility into its daily management of its community and municipal operations.

## INVENTORIES (CHAPTER 2)

The first step in completing the Plan was to update the City's GHG emissions inventory. In 2015, the City completed the 2005, 2008, 2012 and 2013 emissions inventories for community-wide sectors. The results of the 2005 and 2013 inventories are shown in FIGURE ES-1. Sector-level emissions for 2013 are also shown in TABLE ES-1.

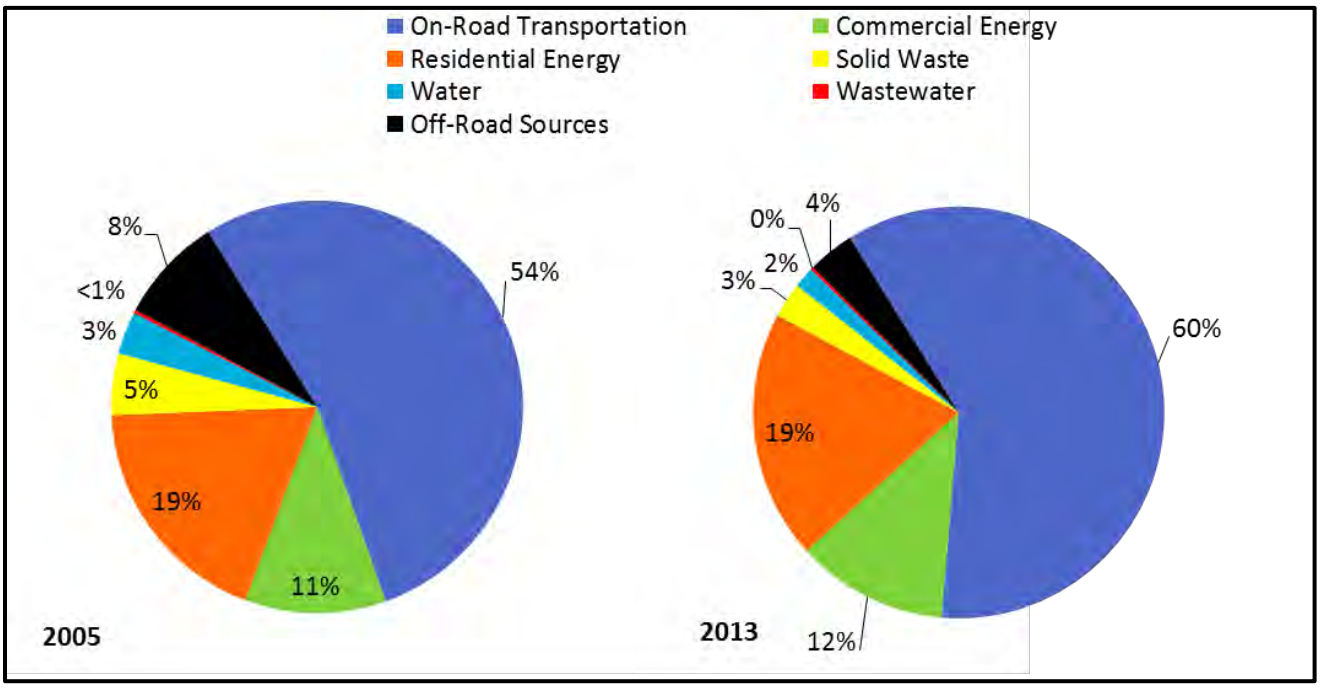


FIGURE ES-1 **Community GHG Emissions by Sector for 2005 and 2013**

TABLE ES-1 **Community-Wide GHG Emissions by Sector for 2005 and 2013**

| Sector | 2005 (MT $CO_2e$) | 2013 (MT $CO_2e$) | % Change 2005–2013 |
|---|---|---|---|
| On-Road Transportation | 181,812 | 242,499 | 33.4% |
| Residential Energy | 63,544 | 78,651 | 23.8% |
| Commercial Energy | 37,697 | 48,025 | 27.4% |
| Solid Waste | 16,376 | 11,151 | -31.9% |
| Water | 11,354 | 6,578 | -42.1% |
| Off-Road Sources | 28,230 | 14,699 | -47.9% |
| Wastewater | 959 | 971 | 1.3% |
| **Total** | **339,972** | **402,574** | **18.4%** |

Similarly, the City's municipal operations were inventoried for 2005 and 2013. FIGURE ES-2 shows the municipal emissions. Municipal emissions are a subset of community emissions and account for less than 1 percent of community emissions. Sector-level details for 2005 and 2013 are shown in TABLE ES-2.

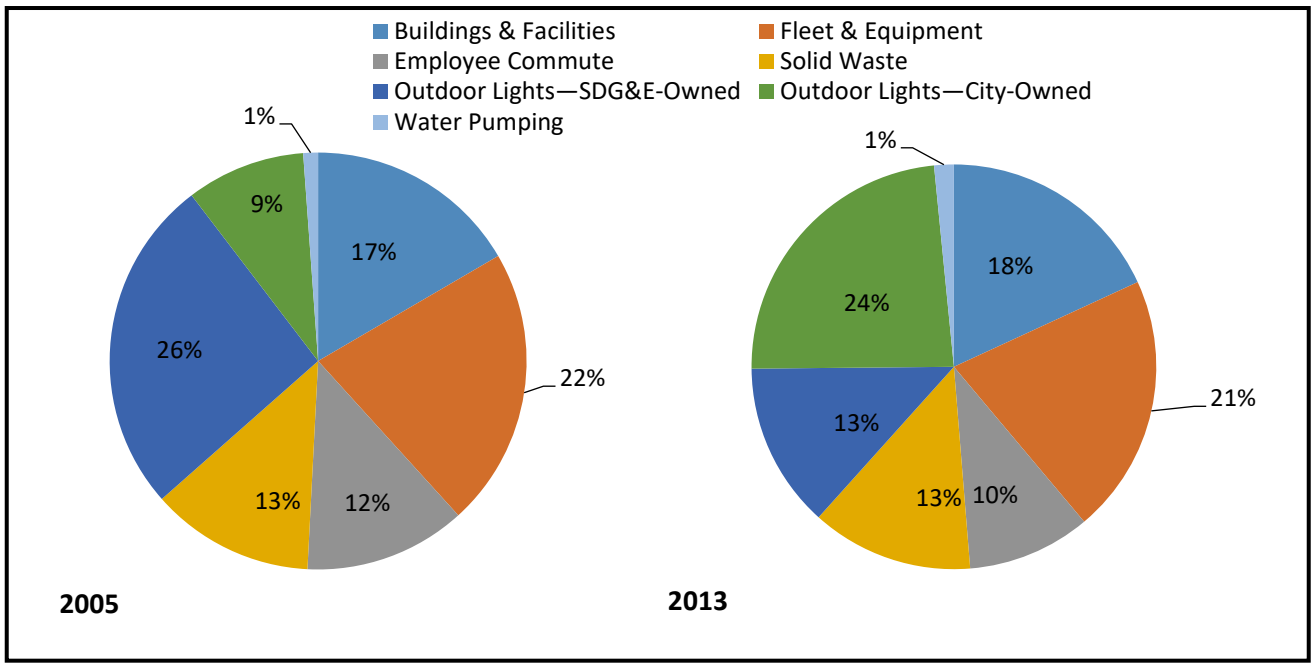


FIGURE ES-2 **Municipal GHG Emissions by Sector for 2005 and 2013**

TABLE ES-2 **Municipal GHG Emissions by Sector for 2005 and 2013**

| Sector | 2005 (MT $CO_2e$) | % of Total | 2013 (MT $CO_2e$) | % of Total | % Change 2005–2013 |
|---|---|---|---|---|---|
| Outdoor Lights–SDG&E-Owned | 433 | 26% | 252 | 13% | -42% |
| Fleet & Equipment | 359 | 22% | 396 | 21% | 10% |
| Buildings & Facilities | 275 | 17% | 346 | 18% | 10% |
| Solid Waste | 210 | 13% | 247 | 13% | 18% |
| Employee Commute | 208 | 13% | 188 | 10% | -10% |
| Outdoor Lights–City-Owned | 153 | 9% | 450 | 24% | 194% |
| Water Pumping | 19.0 | 1% | 30.0 | 2% | 58% |
| **Total** | **1,657** | | **1,909** | | **15%** |

## FORECASTS AND TARGET SETTING (CHAPTER 2)

The next step in the process was to estimate future emissions in the City and establish GHG reduction targets.

The City's future emissions were estimated using demographic indicators such as population and jobs growth. Emissions for the City's municipal operations were estimated using the number of staff anticipated in future years. Growth indicators used are shown by sector in TABLE ES-3.

TABLE ES-3 **Growth Indicators for 2013, 2020, and 2035**

| Sector | Demographic Indicator | 2013 | 2020 | 2035 |
|---|---|---|---|---|
| Solid Waste, Water, Wastewater, Off-Road Sources | Service Population (Population + Jobs) | 71,663 | 76,437 | 84,200 |
| Population[1] | Population | 55,033 | 59,488 | 63,518 |
| Residential Energy | Households | 19,725 | 20,995 | 24,165 |
| Commercial/Industrial Energy | Jobs | 16,630 | 16,949 | 20,682 |
| Transportation[2] | VMT – Gas | 458,785,827 | 493,494,150 | 576,966,520 |
| | VMT – Diesel | 27,822,637 | 32,536,348 | 45,500,895 |
| Municipal Jobs (FTE) | Municipal Emissions[3] | 112.8 | 115 | 120 |

SOURCE: SANDAG

FTE = Full-time equivalent employees

1 Population data are shown for informational purposes but are not used for forecasting any sector.

2 2020 VMT is derived from the compound annual growth rate between 2013 and 2035.

3 The number of jobs in the City is used as an indicator for all municipal operation emissions.

The 2017 Scoping Plan Update provides the State's roadmap in achieving a statewide reduction of 40 percent below 1990 levels of emissions by 2030. Future emissions estimates within the City of Santee also included reductions that would happen with implementation of the 2017 Scoping Plan Update at the State level. That is, some level of emission reduction is anticipated within the City as a result of the 2017 Scoping Plan Update policies and legislation implemented at the State level, including:

- Low Carbon Fuel Standard
- Assembly Bill (AB) 1493 and Advanced Clean Cars
- California Building Code Title 24
- Renewable Portfolio Standard
- Senate Bill X7-7

The resulting projected emissions are considered an "adjusted" business-as-usual (Adjusted BAU) forecast. Historic emissions and Adjusted BAU forecasts are shown in FIGURE ES-3 (community) and FIGURE ES-4 (municipal).

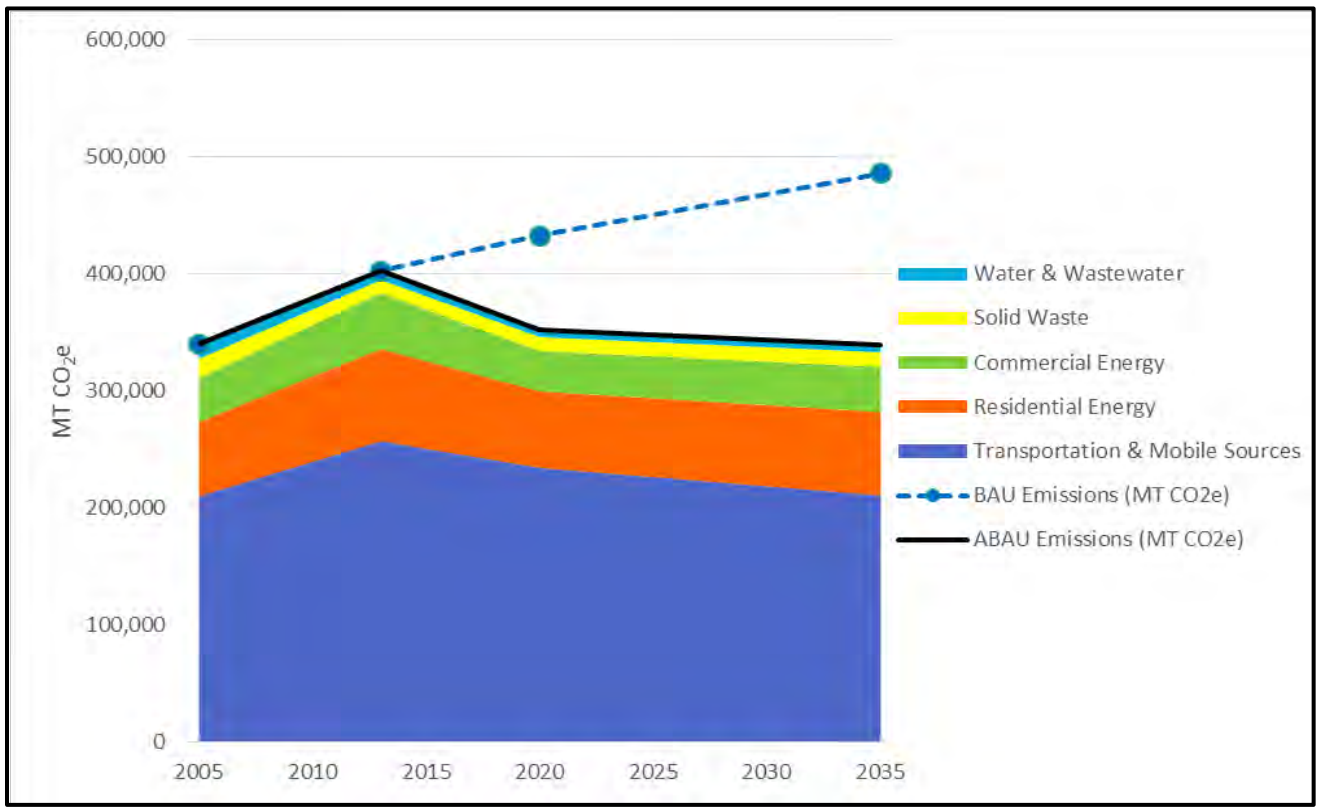


FIGURE ES-3 **Community BAU and ABAU Emissions Forecast**

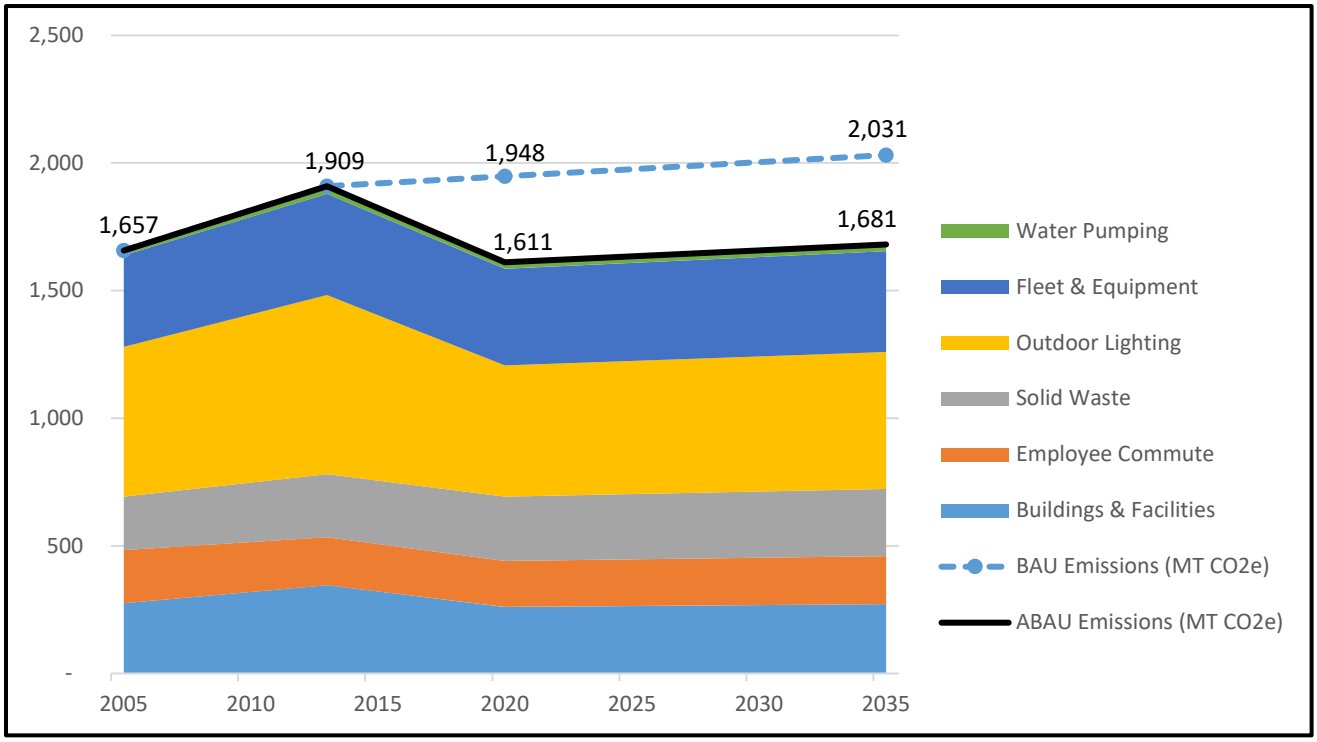


FIGURE ES-4 **Municipal BAU and ABAU Emissions Forecast**

## REDUCTION TARGETS (CHAPTER 2)

Both mass emissions (performance target) and per capita emissions (efficiency target) GHG reductions targets were identified for 2020, 2030, and 2035. The City has established the following reduction targets that are consistent with current regulation.

### Mass Emissions Targets

Consistent with the State's adopted AB 32 GHG reduction target, the City has set a goal to reduce emissions to 1990 levels by the year 2020. This target was calculated as a 15 percent decrease from 2005 levels, as recommended in the AB 32 Scoping Plan. The City developed an interim goal for 2030, which was to reduce emissions to 40 percent below 2005 levels. The City also developed a longer-term goal for 2035, which is to reduce emissions to 49 percent below 2005 levels. The interim and longer-term goals would put the City on a path consistent with the State's long-term goal to achieve Statewide carbon neutrality (zero net emissions) by 2045 (TABLE ES-4).

TABLE ES-4 **Mass GHG Reduction Targets for Community Emissions**

| | Community Target |
|---|---|
| 2030 Target | 40% below 2005 levels |
| 2030 Emissions Goal (MT $CO_2e$) | 249,596 |
| 2035 Target | 49% below 2005 levels |
| 2035 Emissions Goal (MT $CO_2e$) | 173,386 |

Notes and Acronyms:
MT $CO_2e$ = Metric tons of carbon dioxide equivalent

FIGURE ES-5 shows how the mass GHG reduction targets for community emissions align with the Statewide goals of reducing GHG emissions.

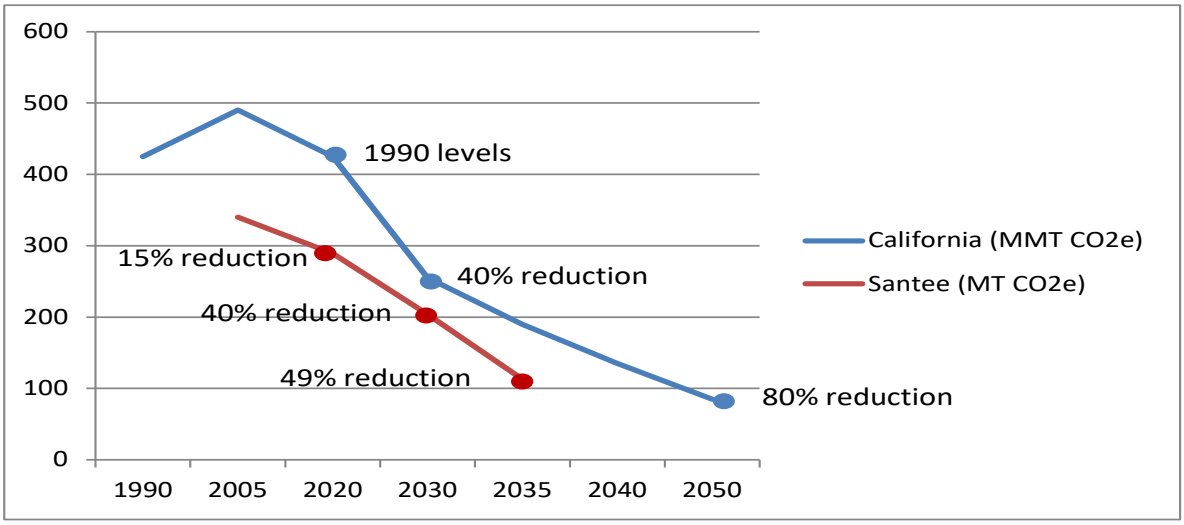


FIGURE ES-5 **Comparison of State Reduction Targets with Community Emission Reduction Targets**

## Per Capita Emissions Targets

The 2017 Scoping Plan Update recommends local plan level GHG emissions reduction goals of no more than 6 metric tons $CO_2e$ per capita by 2030 and no more than 2 metric tons carbon dioxide equivalent ($CO_2e$) per capita by 2050. These goals consider all Statewide emission sources; however, some of the emission sources are not included in the City's GHG inventories, such as industrial and aviation, and the City has no control over these emissions. By comparing the statewide most recent year (2015) GHG inventory and the City's 2013 inventory, it was determined that the City had control over 63 percent of total statewide emission sources. Therefore, the State-aligned emissions goals were proportioned to 3.8 MT $CO_2e$ per capita by 2030, and 1.27 MT $CO_2e$ per capita by 2050. The 2035 goal was interpolated from the 2030 and 2050 goals, assuming same rate of reduction of the emission goals each year (TABLE ES-5).

TABLE ES-5 **Per Capita GHG Reduction Targets for Community Emissions**

| | Community Target |
|---|---|
| 2030 State Target (MT $CO_2e$/SP) | 6 |
| 2030 Emissions Goal (MT $CO_2e$/SP) | 3.80 |
| 2035 State Target (MT $CO_2e$/SP) | 5 |
| 2035 Emissions Goal (MT $CO_2e$/SP) | 3.16 |

Notes and Acronyms:

MT $CO_2e$ = Metric tons of carbon dioxide equivalent

SP = Service Population (combined number of residents and people working in the City)

## REDUCTION MEASURES (CHAPTER 3)

The City has already demonstrated its commitment to conserve energy and reduce emissions through a variety of programs and policies. Programs to reduce emissions include implementing water efficient landscape ordinance and participation in multiple home financing programs that will allow home and business owners to obtain low-interest loans for implementing energy efficiency in their buildings. In order to reach the reduction target, the City would also implement the additional local reduction measures described in this report. These measures encourage energy efficiency, water conservation and alternative transportation. TABLE ES-6 and TABLE ES-7 summarize the reductions from measures that would be implemented to meet the community and municipal GHG reduction goals, respectively, for 2020, 2030 and 2035.

TABLE ES6 **Summary of Community GHG Reduction Strategies and Emission Reductions**

| Goals and Measures | 2030 Emission Reductions (MT $CO_2e$) | 2035 Emission Reductions (MT $CO_2e$) |
|---|---|---|
| **Goal 1: Increase Energy Efficiency in Existing Residential Units** | | |
| 1.1: Energy Audits in the Existing Residential Sector | | |

| Goals and Measures | 2030 Emission Reductions (MT $CO_2e$) | 2035 Emission Reductions (MT $CO_2e$) |
|---|---|---|
| Permits for Minor Modifications | 45 | 45 |
| Permits for Major Modifications | 7,811 | 7,811 |
| **Goal 2: Increase Energy Efficiency in New Residential Units** | | |
| 2.1: Exceed Energy Efficiency Standards | 13,524 | 17,750 |
| **Goal 3: Increase Energy Efficiency in Existing Commercial Units** | | |
| 3.1: Energy Audis in the Existing Commercial Sector | | |
| Permits for Minor Modifications | 660 | 660 |
| Permits for Major Modifications | 8,010 | 8,010 |
| **Goal 4: Increase Energy Efficiency in New Commercial Units** | | |
| 4.1: Exceed Energy Efficiency Standards | 8,705 | 12,337 |
| **Goal 5: Decrease Energy Demand through Reducing Urban Heat Island Effect** | | |
| 5.1: Tree Planting for Shading and Energy Efficiency | 47 | 22 |
| 5.2: Light-reflecting Surfaces for Energy Efficiency | 1 | 1 |
| **Goal 6: Decrease Greenhouse Gas Emissions through Reducing Vehicle Miles Traveled** | | |
| 6.1: Non-Motorized Transportation Options | 315 | 263 |
| 6.2: Implement Bicycle Master Plan to Expand Bike Routes in the City | 311 | 259 |
| **Goal 7: Increase Use of Electric Vehicles** | | |
| 7.1: Electric Vehicle Charger Program | 21,723 | 47,414 |
| **Goal 8: Improve Traffic Flow** | | |
| 8.1: Traffic Flow Improvement Program | 2,430 | 2,130 |
| **Goal 9: Decrease Greenhouse Gas Emissions through Reducing Solid Waste Generation** | | |
| 9.1: Reduce Waste to Landfills | 7,233 | 8,238 |
| **Goal 10: Decrease Greenhouse Gas Emissions through Increasing Clean Energy Use** | | |
| 10.1: Increase Distributed Renewable Energy within Santee | 1,800 | 2,783 |
| 10.2: Community Choice Aggregation Program[1] | 46,322 | 56,932 |
| **Total Community Measures** | | |
| Total of All Measures Excluding CCA | 72,615 | 107,723 |
| Total of All Measures Including CCA | 118,937 | 164,655 |

[1] CCA is separated from total of other reduction measures.

BAU = Business as Usual

CCA = Community Choice Aggregation

MT $CO_2e$ = metric tons of carbon dioxide equivalent

SB = Senate Bill

TABLE ES-7 summarizes the reductions from measures that would be implemented to meet the municipal GHG reduction goals, respectively, for 2020, 2030 and 2035.

TABLE ES-7 **Municipal GHG Reduction Strategies and Emission Reductions**

| Goal and Measure | 2030 Emission Reductions (MT $CO_2e$) | 2035 Emission Reductions (MT $CO_2e$) |
|---|---|---|
| **Goal M-1: Increase Energy Efficiency in Municipal Buildings** | | |
| M-1.1: Procurement Policy for Energy Efficient Equipment | 19 | 19 |
| M-1.2: Install Cool Roofs | 4 | 4 |
| M-1.3: Retrofit HVAC and Water Pump Equipment | 12 | 12 |
| **Goal M-3: Increase Energy Efficiency in Community Buildings and Infrastructure** | | |
| M-2.1: Traffic Signal and Outdoor Lighting Retrofits | 212 | 421 |
| **Goal M-3: On-Road Energy Efficiency Enhancements; Employee Commute and Vehicle Fleet** | | |
| M-3.1: Encourage or Incentivize Employee Carpools | 6 | 14 |
| M-3.2: Purchase of Hybrid or Electric Vehicles | 5 | 11 |
| M-3.3: Replace and/or Supplement Vehicle Fleet with Hybrid/Electric Vehicles | 7 | 16 |
| M-3.4: Install E-Vehicle Chargers | Supporting Measure | |
| **Goal M-4: Reduce Energy Consumption in the Long Term** | | |
| M-4.1: Ongoing City Facility Retrofits and LED light Conversions | - | 558 |
| **Total Municipal Measures** | | |
| Total of all Measures listed above | 264 | 1,054 |

Notes and Acronyms:
BAU = Business as Usual
MT $CO_2e$ = metric tons of carbon dioxide equivalent

## ADAPTATION (CHAPTER 4)

The City recognizes that planning sustainably is more than reducing GHG emissions; it also requires being prepared for changes that would affect the community's quality of life, its use of resources, and its economy. Preparedness, or adaptation, efforts seek to reduce vulnerability and increase the local capacity to adapt to changes. The City may expect increased temperatures, variable precipitation, and increased extreme weather events. The City has developed adaptation strategies to reduce potential impacts or to build resiliency to impacts. The strategies focus on public health and safety, electrical demand, water availability, infrastructure damage, wildfire, and social equity.

## IMPLEMENTATION (CHAPTER 5)

Finally, the Sustainable Santee Action Plan in itself is not enough to meet the reduction goals without a commitment to implementation. The Implementation Chapter of the Sustainable Santee Action Plan identifies the process for implementing and monitoring the strategies described. The six step process is summarized in FIGURE ES-6.


FIGURE ES-6 **Process of Implementing the Sustainable Santee Action Plan**

The City has added a Sustainable Program Manager to administer and staff implementation of the Sustainable Santee Action Plan. The City is also developing financing of the reduction measures through various grant applications and including funds within the annual budget allocated to the Sustainable Santee Action Plan. The strategy for implementation includes prioritization of the measures and ongoing public participation through workshops and educational programs. Monitoring of the Sustainable Santee Action Plan includes an emission-tracking tool and annual reports on progress. Finally, the Sustainable Santee Action Plan is not a static document and the City will continue with monitoring, inventory updates, and continued refinement of target setting to complement State goals and actions. To that end, while this current document has a horizon date of 2035, the City also recognizes the long-term State goal found in Executive Order B-55-18 of carbon neutrality by 2045 and is committed to updating the Sustainable Santee Plan at regular interviews.

Through successful implementation of this Sustainable Santee Action Plan, the City will demonstrate the potential economic, social, and environmental benefits of reducing GHG emissions and providing environmental stewardship within the community.

# CHAPTER 1 Introduction

The City of Santee (City) is committed to planning sustainably for the future while ensuring a livable, equitable, and economically vibrant community. Planning sustainably includes acknowledging the local role in climate change and how the City can mitigate their emissions and prepare for (i.e., adapt to) anticipated climate-related changes. By using energy more efficiently, harnessing renewable energy to power buildings, recycling waste, enhancing access to sustainable transportation modes, and optimizing land use planning, the City can keep dollars in its local economy, create new green jobs, and improve the community's health, safety, and welfare in addition to addressing climate change. To that end, the City has implemented a number of sustainability and conservation efforts and seeks to continue those efforts through local planning and partnerships. The Sustainable Santee Action Plan integrates the City's past and current efforts with future efforts to grow and thrive sustainably.

**PURPOSE**

The Sustainable Santee Plan has four primary purposes or goals:

1. Present the City's plan for achieving sustainability by utilizing resources efficiently, reducing greenhouse gas emissions, and preparing for potential climate-related impacts.
2. Identify how the City will effectively implement this Sustainable Santee Plan by obtaining funding for program implementation and tracking and monitoring the progress of the Plan implementation over time.
3. Allow streamlined CEQA compliance for new development by preparing an Environmental Impact Report for the Plan and developing tools that provide clear guidance to developers and other project proponents.
4. Maintain economic competitiveness within the region

## Climate Change Devastation and Urgency to Act

California Executive Order B-55-18 (September 12, 2018) finds that climate change is causing historic drought, devastating wildfires, torrential storms, extreme heat, the death of millions of trees, billions of dollars in property damage, and threats to human health and food supplies, and it sets a target to achieve carbon neutrality statewide as soon as possible and no later than 2045 while maintaining net negative emissions thereafter.[1] Scientists agree that that worldwide carbon must start trending downward by 2020, and carbon neutrality-the point at which the removal of carbon pollution from the atmosphere meets or exceeds emissions-must be achieved by midcentury at the latest. To have a 50 percent chance of limiting global temperature rise to 1.5 °C, we must meet carbon neutrality globally by 2050, and to have a 67 percent chance, the target year is 2040.[2] Significant devastating impacts will continue if warming is limited to 1.5°C, however, the benefits of limiting warming to 1.5°C, compared with 2°C, are enormous and incalculable.[3] [4]

To achieve carbon neutrality, massive reductions in carbon pollution and removal of carbon dioxide from the atmosphere will be required. As of October 2018, the remaining global carbon budget to have a 67 percent chance of limiting warming to 1.5°C was 420 gigatonnes of carbon dioxide (Gt $CO_2$), and to have a 50 percent chance, the budget was 580 Gt $CO_2$.[5] In 2018, global emissions reached approximately 40.8 Gt $CO_2$. The United Nations Intergovernmental Panel on Climate Change (IPCC) explains that manmade global emissions must quickly drop to 20 to 30 Gt $CO_2$ annually and then drop sharply toward zero in order to stay within budget. Failure to achieve global targets will result in accelerating feedback loops with irreparable devastation to civilization and advanced life forms on the planet.[6] Feedback loops that adversely impact the probability of limiting warming to specified targets have already been triggered and are not accounted for in the carbon budget models.[7] Furthermore, Global greenhouse gas (GHG) emissions with significant latent

[1] California Governor's Office. September 12, 2018. Cal. Exec. Order No. B-55-18. https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf
[2] United Nations Intergovernmental Panel on Climate Change. October 2018. *Global Warming of 1.5°C*. https://www.ipcc.ch/sr15/
[3] Columbia University, Earth Institute. September 2019. The missing economic risks in assessments of climate change impacts. https://blogs.ei.columbia.edu/2019/09/20/economists-are-excluding-or-downplaying-many-major-climate-risks-says-report/
[4] United Nations Intergovernmental Panel on Climate Change. June 2018. Final Government Draft Summary for Policymakers 1.5°C Report. https://climatenexus.org/international/ipcc/ipcc-1-5c-report-planet-nearing-tipping-point/
[5] United Nations Intergovernmental Panel on Climate Change. October 2018. *Global Warming of 1.5°C*. https://www.ipcc.ch/sr15/
[6] Columbia University, Earth Institute. September 2019. The missing economic risks in assessments of climate change impacts", http://www.lse.ac.uk/GranthamInstitute/publication/the-missing-economic-risks-in-assessments-of-climate-change-impacts/
[7] Association for the Tree of Life. December 2014. No Carbon Budget: Zero U.S> Carbon Within a Decade is a Must! https://www.tree-of-life.works/carbon_budget.

negative impacts to the earth's energy imbalance are still trending upward compounding the urgency to act aggressively.[8] [9] [10] [11]

The Sustainable Santee Plan is part of a larger State and global effort to address the urgency of climate change impacts. California continues to set national and international standards to protect public health and the environment. Recent efforts by the State-including the 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target, aggressive renewable energy targets, increases in energy use efficiency, waste diversion and reuse, water conservation, improvements to natural and working lands, and cleaner transportation-build upon the state's progress and further integrate efforts to reduce both GHGs and air pollution. Aggressive ongoing efforts are needed to further lower GHG emissions on a trajectory to avoid the worst impacts of climate change, support a clean energy economy, and provide a more equitable future with good jobs and less pollution for all communities.

"Enabling climate resilience and sustainable development depends critically on urgent and ambitious emissions reductions coupled with coordinated sustained and increasingly ambitious adaptation actions (*very high confidence*)." [12]

Natural systems are the most cost effective means of removing carbon from the atmosphere while providing aesthetic value.[13] Innovative technologies play a key role in meeting State GHG reduction targets and should be accessible to all residents and businesses. All Californians need access to clean transportation options that enable healthy communities to develop and thrive, including walking, cycling, transit, and clean vehicle options. No individual, community, city, state, or country can sufficiently address the urgency of climate change alone, but each plays a vital role. The Sustainable Santee Plan is the vehicle by which the City of Santee will do its part.

## CLIMATE CHANGE SCIENCE

Climate change is a term used to describe large-scale shifts in historically observed patterns in earth's climate system. Although the climate has historically responded to natural drivers, recent climate change has been unequivocally linked to increasing concentrations of greenhouse gases (GHGs) in earth's atmosphere.

[8] United Nations Development Program. September 2019. National Determined Contributions (NDC) Global Outlook Report 2019. https://www.un.org/en/climatechange/reports.shtml
[9] National Aeronautics and Space Administration. 2019.Global Climate Change Vital Signs of the Planet, https://climate.nasa.gov/faq/16/is-it-too-late-to-prevent-climate-change/
[10] Climate News Network. December 2018. 2018 Will Show Record Carbon Emissions. https://climatenewsnetwork.net/2018-will-show-record-carbon-emissions/
[11] David. G. Victor, Veerabhadran Ramanathan, & YangYang Xu. International Science Journal Nature. December 2018. Article: Global Warming Will Happen Faster Than We Think. https://www.nature.com/articles/d41586-018-07586-5
[12] United Nations Intergovernmental Panel on Climate Change. September 2019, Special Report on the Ocean and Cryosphere in a Changing Climate. https://report.ipcc.ch/srocc/pdf/SROCC_FinalDraft_FullReport.pdf
[13] American Association for the Advancement of Science, Journal Science Advances. November 2018.Natural Climate Solutions for the United States. https://advances.sciencemag.org/content/4/11/eaat1869

Gases that trap heat in the atmosphere are called greenhouse gases because they transform the light of the sun into heat, similar to the glass walls of a greenhouse. Human-generated GHG emissions significantly contribute to the changes in the global climate, which have a number of physical and environmental effects. Effects associated with global climate change include sea level rise, increase in frequency and intensity of droughts, and increased temperature. Increased GHG emissions are largely the result of increasing energy consumption, particularly through the combustion of fossil fuels.

The Intergovernmental Panel on Climate Change (IPCC) assesses scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC identifies six key GHG compounds: carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), perfluorocarbons (PFC), sulfur hexafluoride ($SF_6$), and hydrofluorocarbons (HFC). Each GHG has a different capacity to trap heat and therefore GHG emissions are generally reported in metric tons (MT) of carbon dioxide equivalents ($CO_2e$). Non-$CO_2$ emissions are converted to a $CO_2e$ using each GHG's Global Warming Potential (GWP). IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of carbon dioxide equivalents ($CO_2e$), which compares the gas in question to that of the same mass of $CO_2$ ($CO_2$ has a GWP of 1 by definition). Common greenhouse gases included in the Plan are $CO_2$, $CH_4$, and $N_2O$ which are the GHGs that most commonly result from human activities, and are detailed below.

**Carbon Dioxide** is the most important anthropogenic GHG and accounts for more than 75 percent of all GHG emissions caused by humans. Its atmospheric lifetime of 50–200 years ensures that atmospheric concentrations of $CO_2$ will remain elevated for decades, even after mitigation efforts to reduce GHG concentrations are implemented. The primary sources of anthropogenic $CO_2$ in the atmosphere include the burning of fossil fuels (including motor vehicles), gas flaring, cement production, and land use changes (e.g., deforestation, oxidation of elemental carbon). $CO_2$ can be removed from the atmosphere by photosynthetic organisms (e.g., plants and certain bacteria). Atmospheric $CO_2$ has increased from a preindustrial concentration of 280 parts per million (ppm) to 408 ppm in 2018.[14]

**Methane ($CH_4$)**, the main component of natural gas, is the second most abundant GHG and has a GWP of 25. Sources of anthropogenic emissions of $CH_4$ include using natural gas, burning fossil fuels, landfill outgassing, certain agricultural practices, and mining coal. Certain land uses also function as a both a source and sink for $CH_4$. For example, the primary terrestrial source of $CH_4$ are wetlands, whereas undisturbed, aerobic soils act as a $CH_4$ sink (i.e., they remove $CH_4$ from the atmosphere). Atmospheric $CH_4$ has increased from a pre-industrial concentration of 715 parts per billion (ppb) to 1,860 ppb in 2018.[15]

[14] NOAA, Annual Greenhouse Gas Index (AGGI), http://www.esrl.noaa.gov/gmd/aggi/aggi.fig2.png(accessed July 11, 2019).
[15] NOAA, Annual Greenhouse Gas Index (AGGI), http://www.esrl.noaa.gov/gmd/aggi/aggi.fig2.png (accessed July 11, 2019).

**Nitrous Oxide ($N_2O$)** is a powerful GHG, with a GWP of 298. Anthropogenic sources of $N_2O$ include combustion of fossil fuels, agricultural processes (e.g., fertilizer application), and nylon production. In the United States more than 70 percent of $N_2O$ emissions are related to agricultural soil management practices, particularly fertilizer application. $N_2O$ concentrations in the atmosphere have increased over 22 percent, from pre-industrial levels of 270 ppb to 330 ppb in 2018.[16]

In October 2018, IPCC published a report on the impacts of global warming of 1.5°C above pre-industrial levels. The report states that global warming, at its current rate, will result in a global temperature increase of 1.5°C, sometime between 2030 and 2052. The report also states that in order to keep global warming below 1.5°C, global net anthropogenic $CO_2$ emissions should decline by about 45 percent from 2010 levels by 2030, and reach net zero around 2050.

## BENEFITS OF THE PLAN

This Plan, while addressing climate change, also benefits the City in many direct ways.

- **Local Control**—This Plan allows the City to identify strategies to reduce resource consumption, costs, and GHG emissions in all economic sectors in a way that maintains local control over the issues and fits the character of the community. It also may position the City for funding to implement programs tied to climate goals.
- **Energy and Resource Efficiency**—This Plan identifies opportunities for the City to increase energy efficiency and lower GHG emissions in a manner that is most feasible in the community. Reducing energy consumption through increasing the efficiency of energy technologies, reducing energy use, and using alternative sustainable sources of energy are effective ways to reduce GHG emissions. Energy efficiency also provides opportunities for cost-savings.
- **Increased Public Health**—Many of the GHG reduction strategies identified in this Plan also have local public health benefits. Benefits include local air quality improvements; creating a more active community through implementing sustainable living practices; and reducing health risks, such as heat stroke, elevated by climate change impacts such as increased extreme heat days.
- **Demonstrating Consistency with State GHG Reduction Goals**—A GHG reduction plan may be used as GHG mitigation in a General Plan to demonstrate that the City is aligned with state goals for reducing GHG emissions to a level considered less than cumulatively considerable.
- **Meeting California Environmental Quality Act Requirements**—California Environmental Quality Act (CEQA) requires impacts from GHG emissions to be reviewed. A qualified GHG reduction plan may be used in future development projects as the GHG analysis for their CEQA document, resulting in greater certainty for developers and cost-effectiveness for developers and City staff.

[16] Ibid.

# REGULATORY SETTING

In an effort to stabilize GHG emissions and reduce impacts associated with climate change, international agreements, as well as federal and state actions were implemented beginning as early as 1988. The government agencies discussed below work jointly, as well as individually, to address GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

## Federal

### *Clean Air Act*

In 2007, through Massachusetts v. Environmental Protection Agency, 549 U.S. 497 (2007), the United States Supreme Court held that the United States Environmental Protection Agency (USEPA) has authority to regulate GHGs from new motor vehicles as pollutants under Section 202(a)(1) of the federal Clean Air Act in the event that it forms a judgment that such emissions contribute to climate change. EPA can avoid taking regulatory action only if it determines that greenhouse gases do not contribute to climate change, or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.

## State

### *California Air Resources Board Standards and Programs*

The California Air Resources Board (CARB), a part of the California EPA (Cal/EPA) is responsible for the coordination and administration of both federal and state air pollution control and climate change programs within California. In this capacity, CARB conducts research, sets state ambient air quality standards (California Ambient Air Quality Standards), compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products, and various types of commercial equipment. The California Health and Safety Code, Section 38561(h) requires CARB to update the State's scoping plan for achieving the maximum technologically feasible and cost effective reductions of GHG emission at least once every 5 years.

### *Executive Order S-3-05*

On June 1, 2005, California Governor Arnold Schwarzenegger announced through Executive Order S-3-05, the following GHG emissions targets:

- By 2010, California shall reduce GHG emissions to 2000 levels
- By 2020, California shall reduce GHG emissions to 1990 levels
- By 2050, California shall reduce GHG emissions to 80 percent below 1990 levels

The EO S-3-05 also laid out responsibilities among the state agencies for implementation and for reporting on progress toward the targets.

## *Executive Order B-30-15*

On April 29, 2015, California Governor Jerry Brown announced through Executive Order B-30-15, the following GHG emissions target:

- By 2030, California shall reduce GHG emissions to 40 percent below 1990 levels

The emission reduction target of 40 percent below 1990 levels by 2030 is an interim-year goal to make it possible to reach the ultimate goal of reducing emissions 80 percent under 1990 levels by 2050. The order directs the California Air Resources Board to provide a plan with specific regulations to reduce statewide sources of GHG emissions. The Executive Order does not include a specific guideline for local governments.

## *Executive Order B-55-18 to Achieve Carbon Nuetrality*

On September 12, 2018, California Governor Jerry Brown announced through Executive Order B-55-18, the following GHG emissions target:

- By 2045, California will be carbon neutral.

This executive order is more ambitious and replaces the 2050 goal found in Executive Order S-3-05. The order directs the California Air Resources Board to provide a plan with specific regulations to reduce statewide sources of GHG emissions. The Executive Order does not include a specific guideline for local governments.

## *Assembly Bill 1493, Clean Car Standards*

Known as "Pavley I," Assembly Bill (AB) 1493 standards were the nation's first GHG standards for automobiles. AB 1493 requires CARB to adopt vehicle standards that will lower GHG emissions from new light-duty autos to the maximum extent feasible. In January 2012, the CARB adopted the Advanced Clean Cars Program to achieve additional GHG emission reductions for passenger vehicles for model years 2017–2025. The Program includes low-emission vehicle (LEV) regulations and zero-emission vehicle regulations. Together, the two standards are expected to increase average fuel economy to roughly 43 miles per gallon by 2020 (and more for years beyond 2020).

## *Assembly Bill 32, the California Global Warming Solutions Act of 2006*

AB 32 requires CARB to reduce statewide GHG emissions to 1990 level by 2020. As part of this legislation, CARB was required to prepare a "Scoping Plan" that demonstrates how the State will achieve this goal. The Scoping Plan was adopted in 2011 and in it, local governments were described as "essential partners" in meeting the statewide goal, recommending a GHG reduction level 15 percent below 2005—2008 levels, depending on when a full emissions inventory is available, by 2020.

CARB released the 2017 Scoping Plan Update on January 20, 2017. The 2017 Scoping Plan Update provides strategies for achieving the 2030 target established by Executive Order B-30-15 and codified in Senate Bill (SB) 32 (40 percent below 1990 levels by 2030). The 2017 Scoping Plan

Update recommends local plan level GHG emissions reduction goals. CARB recommends that local governments aim to achieve emissions of no more than 6 metric tons (MT) of $CO_2e$ per capita by 2030 and no more than 2 $MTCO_2e$ per capita by 2050.

### *Assembly Bill 341 (Commercial Recycling)*

AB 341 sets a statewide goal of 75 percent recycling, composting, or source reduction of solid waste by the year 2020. As required by AB 341, the California Department of Resources Recycling and Recovery (CalRecycle) adopted the Mandatory Commercial Recycling Regulation on January 17, 2012. The regulation was approved by the Office of Administrative Law on May 7, 2012. It became effective immediately and clarifies the responsibilities in implementing mandatory commercial recycling. The Mandatory Commercial Recycling Regulation focuses on increased commercial waste diversion as a method to reduce GHG emissions. The regulation is designed to achieve a reduction in GHG emissions of 5 million MT of carbon dioxide, which equates to roughly an additional 2 to 3 MT of currently disposed commercial solid waste being recycled by 2020 and thereafter.

### *Senate Bill 97*

SB 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. The legislation directed the California Office of Planning and Research to develop draft CEQA Guidelines "for the mitigation of GHG emissions or the effects of GHG emissions" and directed the Resources Agency to certify and adopt the State CEQA Guidelines. CEQA Guidelines Section 15183.5, Tiering and Streamlining the Analysis of GHG Emissions, was added as part of the CEQA Guideline amendments that became effective in 2010 and describes the criteria needed in a GHG reduction plan that would allow for the tiering and streamlining of CEQA analysis for development projects.

### *Executive Order S-1-07, Low Carbon Fuel Standard*

California Executive Order S-01-07 mandates (1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020, and (2) that a low carbon fuel standard (LCFS) for transportation fuels be established in California. CARB developed the LCFS regulation pursuant to the authority under AB 32 and adopted it in 2009.

### *Executive Order S-13-08, The Climate Adaptation and Sea Level Rise Planning Directive*

Executive Order S-13-08 provides clear direction for how the state should plan for future climate impacts. Executive Order S-13-08 calls for the implementation of four key actions to reduce the vulnerability of California to climate change:

- Initiate California's first statewide Climate Adaptation Strategy that will assess the state's expected climate change impacts, identify where California is most vulnerable, and recommend climate adaptation policies.

- Request that the National Academy of Sciences establish an expert panel to report on sea level rise impacts in California in order to inform state planning and development efforts.
- Issue interim guidance to state agencies for how to plan for sea level rise in designated coastal and floodplain areas for new and existing projects.
- Initiate studies on critical infrastructure and land-use policies vulnerable to sea level rise.

## *California Code of Regulations Title 24, Part 6*

California Code of Regulations (CCR) Title 24, Part 6 (California's Energy Efficiency Standards for Residential and Nonresidential Buildings) (Title 24), was established in 1978 to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels and natural gas use result in GHG emissions and energy efficient buildings require less electricity and natural gas. Therefore, increased energy efficiency results in decreased GHG emissions.

The California Energy Commission (CEC) adopted 2008 Standards on April 23, 2008, in response to AB 32. The Standards were adopted to provide California with an adequate, reasonably priced, and environmentally sound supply of energy; to pursue California energy policy, which states that energy efficiency is the resource of first choice for meeting California's energy needs; to meet the West Coast Governors' Global Warming Initiative commitment to include aggressive energy efficiency measures into updates of state building codes every three years; and to meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards. The latest update of CCR Title 24, Part 6 went into effect January 1, 2017, which significantly increases the energy efficiency of new residential buildings. The 2019 Title 24 standards, which will become effective on January 1, 2020, are estimated to result in new buildings that use 7 percent less energy for lighting, heating, cooling, ventilation, and water heating than the previous 2016 Standards. The 2019 updates to Title 24 are focused on moving closer to zero net energy (ZNE) homes by increasing energy efficiency and requiring solar photovoltaic (PV) systems for new homes. The 2019 Title 24 standards also encourage demand responsive technologies including battery storage and heat pump water heaters and improve the building's thermal envelope through high performance attics, walls and windows to improve comfort and energy savings.

## *Senate Bill 375, Sustainable Communities Strategy*

SB 375 provides for a new planning process that coordinates land use planning, regional transportation plans, and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans, developed by metropolitan planning organizations to incorporate a sustainable communities strategy (SCS) in their regional transportation plans (RTPs). The goal of the SCS is to reduce regional vehicle miles traveled (VMT) through land use planning and consequent transportation patterns. SB 375 also includes provisions for streamlined CEQA review for some infill projects such as transit-oriented development.

### *CALGreen Building Code*

CCR Title 24, Part 11 (California's Green Building Standard Code [CALGreen]), was adopted in 2010 and went into effect January 1, 2011. CALGreen is the first statewide mandatory green building code and significantly raises the minimum environmental standards for construction of new buildings in California. The mandatory provisions in CALGreen will reduce the use of volatile organic compounds (VOC) emitting materials, strengthen water conservation, and require construction waste recycling. The most recent version of CalGreen became effective January 1, 2017.

### *SB x7-7*

SB x7-7 requires water suppliers to reduce urban per capita water consumption 20 percent from a baseline level by 2020.

### *Renewable Portfolio Standard*

The Renewable Portfolio Standard requires energy providers to derive 33 percent of their electricity from qualified renewable sources by 2020, 60 percent by 2030, and 100 percent by 2045. This is anticipated to lower emission factors (i.e., fewer GHG emissions per kilowatt-hour used) from utilities across the state, including San Diego Gas & Electric (SDG&E).

## CITY SETTING

The City is located in eastern San Diego County, at the eastern end of the San Clemente Canyon Freeway (State Route 52), bordering Mission Trails Regional Park and Marine Corps Air Station (MCAS) Miramar to the west, the unincorporated community of Lakeside to the north and east, and the unincorporated community of Bostonia and the City of El Cajon to the south. Approximately half of the City's land is undeveloped, with opportunity for growth. The City's extensive open space and proximity to nearby lakes offers a diverse environment of both urban and country qualities compared to many of San Diego County's larger, more developed cities.

The City of Santee is a community of approximately 55,000 residents. The City's population is diverse in age. The City's ethnicity is approximately 74 percent White, 16 percent Latino, 7 percent other ethnicities, and 7 percent two or more races. The City has nearly 20,000 households, with half being single-family detached units, a quarter as multifamily units, and the remaining as single-family multiunit, mobile home, and other units.

## PLAN STRUCTURE

The remainder of this Plan includes four additional chapters:

- **Chapter 2** summarizes the City's historic and future GHG emissions and the reduction targets the City has established.

- **Chapter 3** details the reduction strategies that will be implemented to meet the reduction targets identified in Chapter 2. Measures also include the potential energy savings and local co-benefits of the measures.
- **Chapter 4** discusses how the City may be impacted by climate change and how the City can adapt and become more resilient to climate change effects.
- **Chapter 5** includes the implementation of the measures, potential funding sources, and how the Plan will be monitored and updated over time. It also summarizes the outreach and CEQA review process conducted as part of this Plan.

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# CHAPTER 2 Energy and GHG Emissions Inventory, Forecast, and Targets

## GHG EMISSIONS INVENTORY

GHG emissions inventories are the foundation of planning for future reductions. Establishing an inventory of emissions helps to identify and categorize the major sources of emissions produced over a single calendar year. Jurisdictions often prepare emissions inventories for the community and municipal operations. A community inventory includes GHG emissions that result from the activities by residents and businesses in the City and a municipal inventory includes GHG emissions that result from the activities performed as part of the government operations in the City and are a subset of the community inventory. The inventories identify the major sources of GHGs emissions caused by activities in sectors that are specific to community or municipal activities.

The City prepared community inventories for the years 2005, 2008, 2012, and 2013, and municipal inventories for the years 2005 and 2013. The 2005 inventory (for both community and municipal operations) is considered the baseline year. A baseline year is established as a starting point against which other inventories may be compared and targets may be set, and is generally the earliest year with a full emissions inventory. The year of 2005 was considered the baseline year because it was the earliest year with a full emissions inventory for the City, and it met the need of setting emissions reduction targets based on 2005 to 2008 emission levels according to the Scoping Plan. The most

recent inventory has the most relevant data for planning purposes, while interim years provide context and may help identify trends or anomalies in the community emissions. The sectors evaluated in each inventory are provided in TABLE 1. The City prepared a detailed GHG Inventories, Long-Term Forecasts, and Target-Setting (IFT) Report, included as Appendix A, which contains detailed methodology of the information summarized in this chapter. Data were calculated and managed to best fit the GHG inventory and planning software tool used for this project, called ClearPath. ClearPath was developed by the Statewide Energy Efficiency Collaborative, which is a partnership among several statewide agencies, utilities, and non-profits to assist cities and counties in climate mitigation planning. The ClearPath Tool is an all-in-one suite of online tools to help local agencies complete government operations and community-wide GHG inventories, forecasts, and climate action plans. Appendix B contains input and output data from the ClearPath Tool for the City's GHG emissions inventory and forecasts.

TABLE 1 **Community and Municipal Sectors Evaluated in the Inventories**

| Community Sectors | Municipal Sectors |
|---|---|
| ■ Residential Energy<br>■ Commercial/Industrial Energy<br>■ On-road Transportation<br>■ Solid Waste<br>■ Water<br>■ Wastewater<br>■ Off-road Sources | ■ Building and Facilities Energy<br>■ Outdoor Lights and Streetlights<br>■ Water Pumping and Delivery<br>■ Fleet and Equipment<br>■ Employee Commute<br>■ Solid Waste |

## 2005–2013 Community Emissions Summary

Emissions increased 18 percent from 2005 to 2013, from 339,972 MT $CO_2e$ to 402,574 MT $CO_2e$, with On-Road Transportation emissions showing the greatest overall increase. As shown in FIGURE 1 and TABLE 2, the Transportation sector, including on-road and off-road emissions, was the largest contributor to emissions in all four inventory years.

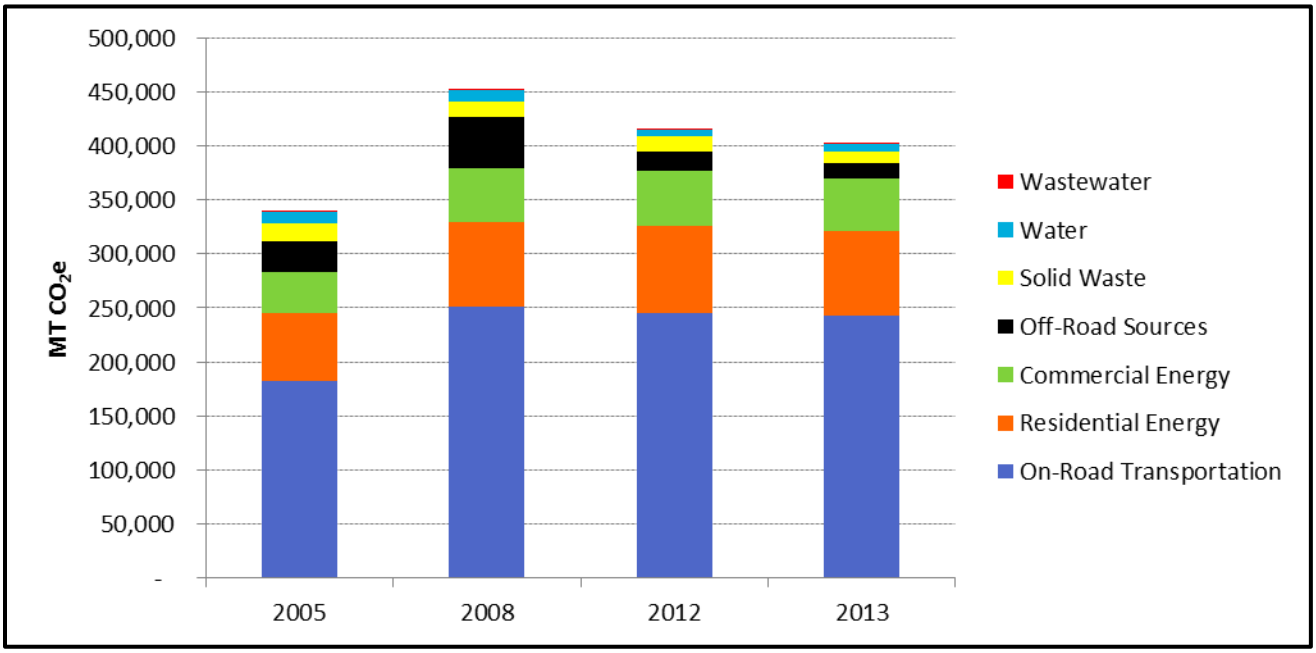



FIGURE 1 **Community GHG Emissions by Sector for 2005, 2008, 2012, and 2013**

TABLE 2 **Communitywide GHG Emissions by Sector for 2005 and 2013**

| Sector | 2005 (MT $CO_2e$) | 2013 (MT $CO_2e$) | % Change 2005–2013 |
|---|---|---|---|
| On-Road Transportation | 181,812 | 242,499 | 33.4% |
| Residential Energy | 63,544 | 78,651 | 23.8% |
| Commercial Energy | 37,697 | 48,025 | 27.4% |
| Solid Waste | 16,376 | 11,151 | -31.9% |
| Water | 11,354 | 6,578 | -42.1% |
| Off-Road Sources | 28,230 | 14,699 | -47.9% |
| Wastewater | 959 | 971 | 1.3% |
| **Total** | **339,972** | **402,574** | **18.4%** |

Note: [1] Vehicle Miles Traveled was modeled with SANDAG Series 12 (2008 Baseline Year) model. On-Road Transportation Emission Factors were derived from EMFAC2014.

## *Community Emissions by Energy*

Energy is an area over which local agencies often have the greatest opportunities for affecting change. In Santee, energy use has largely declined, although emissions have increased, reflecting the increase in emissions to produce a kilowatt-hour (kWh) of electricity in SDG&E territory.[17]

[17] As described in the IFT Report, emissions from electricity generation are variable, depending on the source of generation. SDG&E's energy portfolio for electricity increased from 550 pounds (lbs) $CO_2e$ per megawatt hour (MWH) in

Therefore, electricity and natural gas use remains a key area for reduction opportunities. Emissions from energy use account for 31 percent of total community emissions in 2013. FIGURE 2 shows the trend in electricity and natural gas emissions from 2005 to 2013 for the Commercial and Residential sectors. TABLE 3 includes the activity data and GHG emissions for 2005 and 2013.

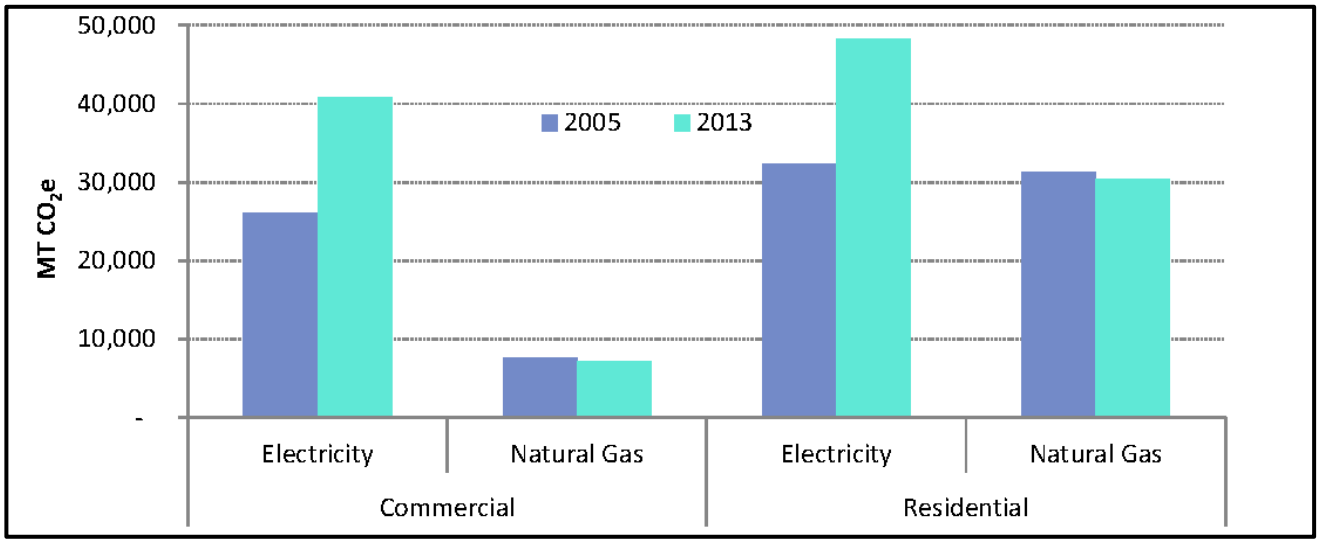



FIGURE 2 **GHG Emissions for Community Electricity and Natural Gas, by Sector**

TABLE 3 **Community Activity Data and GHG Emissions for Energy in 2005 and 2013**

| Sector | 2005 | | 2013 | | Percent Change in Activity 2005–2013 | Percent Change in Emissions 2005–2013 |
|---|---|---|---|---|---|---|
| | Activity (kWh or therms) | Emissions (MT $CO_2e$) | Activity (kWh or therms) | Emissions (MT $CO_2e$) | | |
| **Commercial/Industrial** | | | | | | |
| Electricity | 120,725,233 | 26,127 | 115,339,581 | 40,860 | -4.5% | 56.4% |
| Natural Gas | 1,419,790 | 7,550 | 1,347,484 | 7,165 | -5.1% | -5.1% |
| **Residential** | | | | | | |
| Electricity | 129,290,439 | 32,286 | 136,108,148 | 48,218 | 5.3% | 49.3% |
| Natural Gas | 5,878,287 | 31,258 | 5,723,205 | 30,433 | -2.6% | -2.6% |
| **Total (MT CO2e)** | | **97,221** | | **126,676** | | **30.3%** |

2005 to 781 lbs $CO_2e$ per MWh in 2013. Therefore, a decrease in electricity use can still result in an increase in emissions, as occurred in the City.

## 2005–2013 Municipal Emissions Summary

Emissions from municipal activities increased 15 percent from 2005 to 2013, from 1,657 MT $CO_2e$ to 1,909 MT $CO_2e$. Emissions from City-owned outdoor lights increased the most (297 MT $CO_2e$ between 2005 and 2013), followed by Buildings and Facilities, which increased emissions by 71 MT $CO_2e$ (FIGURE 3 and TABLE 4). Emissions decreased in two sectors, SDG&E-owned outdoor lights and employee commute. The decrease in employee commute emissions could be due to a decrease in staff.

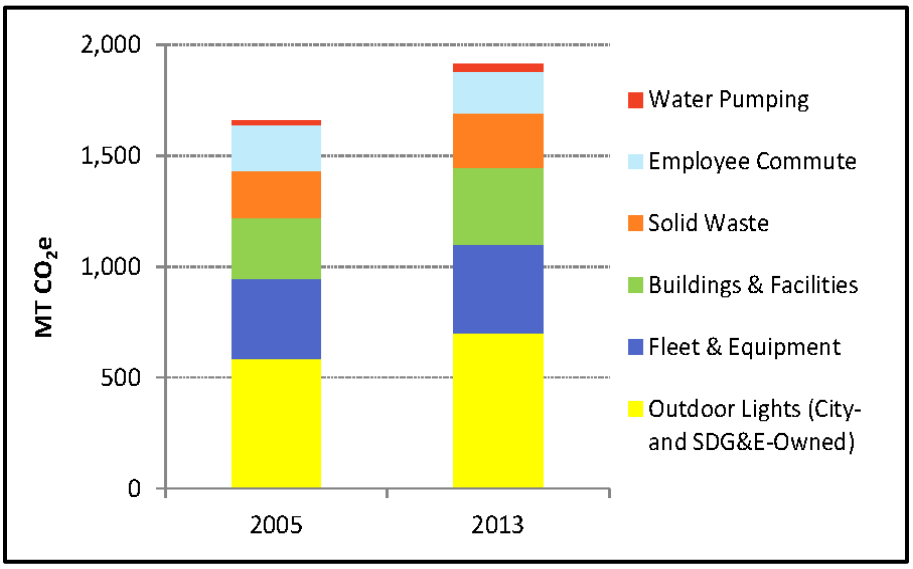



FIGURE 3 **Municipal GHG Emissions by Sector for 2005 & 2013**

**Municipal Emissions**

Municipal emissions account for 1% of total community emissions. However, municipal emissions are more directly controllable by the City and can be used to showcase sustainability efforts in the community.

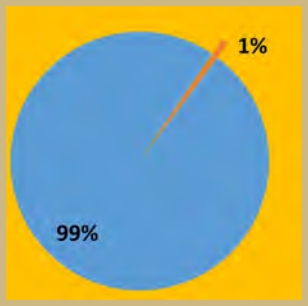
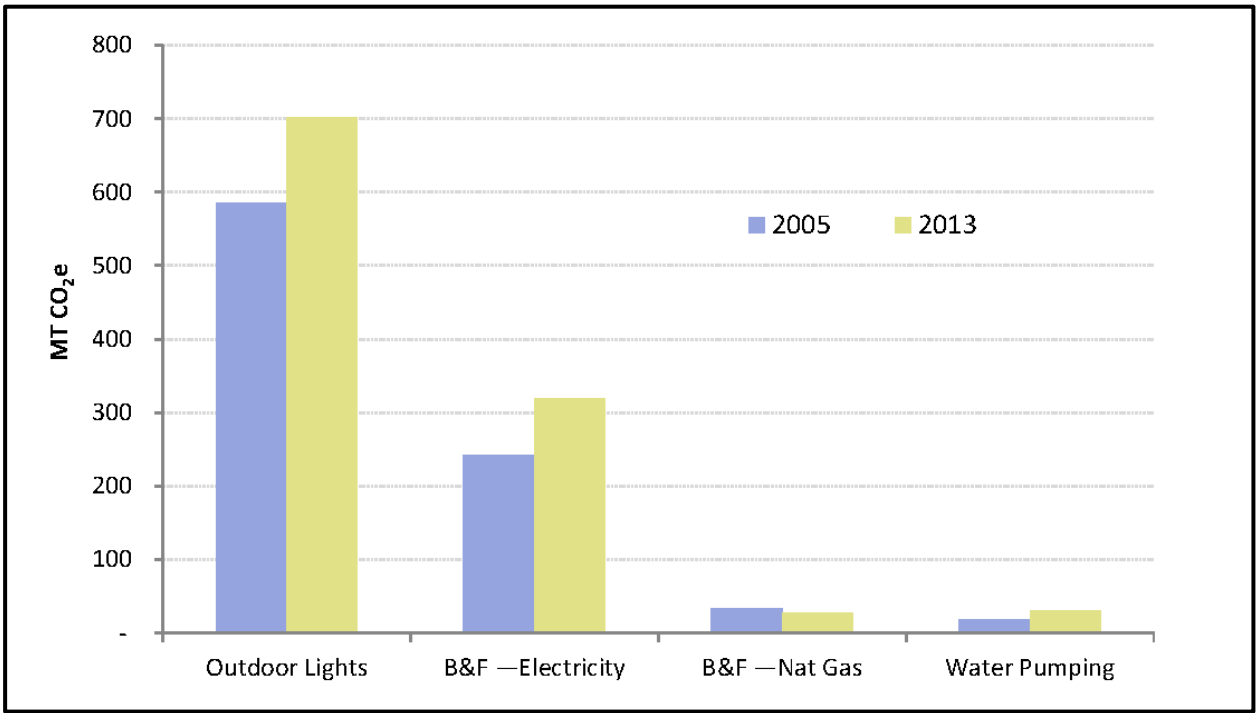



TABLE 4 **Municipal GHG Emissions by Sector for 2005 & 2013**

| Sector | 2005 (MT $CO_2e$) | 2013 (MT $CO_2e$) | % Change 2005 – 2013 |
|---|---|---|---|
| Outdoor Lights — SDG&E-Owned | 433 | 252 | -42% |
| Fleet and Equipment | 359 | 396 | 10% |
| Buildings and Facilities | 275 | 346 | 26% |
| Solid Waste | 210 | 247 | 18% |
| Employee Commute | 208 | 188 | -10% |
| Outdoor Lights—City-Owned | 153 | 450 | 194% |
| Water Pumping | 19.0 | 30.0 | 58% |
| **Total** | **1,657** | **1,909** | **15%** |

### *Municipal Emissions by Energy*

As with the community energy, municipal energy use decreased, but due to the emission factors for electricity, the GHG emissions increased from 2005 to 2013. Municipal energy use includes buildings and facilities (electricity and natural gas), outdoor lights, and water pumping. FIGURE 4 shows the trend in electricity and natural gas emissions from 2005 to 2013 for the municipal energy sectors.




NOTE: B&F = Buildings and Facilities

FIGURE 4 **GHG Emissions for Municipal Electricity and Natural Gas by Sector**

## INVENTORY FORECAST

Forecasting future GHG emissions allows the City to understand how emissions are expected to increase or decrease in the future. Major changes in growth or land uses may affect how to best plan to reduce emissions in the future. GHG emissions are forecast using two scenarios: a Business-as-Usual (BAU) and an Adjusted BAU scenario. The BAU scenario describes emissions based on projected growth in population and employment and does not consider policies that will reduce emissions in the future (that is, the policies and related efficiency levels in place in 2013 are assumed to remain constant through 2035). Projected growth is estimated using data from regional planning scenarios developed by the San Diego Association of Governments (SANDAG) and the City. To facilitate the Plan's long-term applicability, the forecast for households in 2035 includes a 2,000

household buffer above the build out accommodated by the City's currently adopted General Plan. Growth calculation and methods are detailed in the IFT Report located in Appendix A. In general, the City is expecting modest growth to 2020 and 2035 as population, housing, and jobs are all expected to increase. The City expects its municipal services to increase slightly over time. TABLE 5 shows the growth projections used to develop the emissions forecasts.

TABLE 5 **Growth Indicators for 2013, 2020, and 2035**

| Sector | Demographic Indicator | 2013 | 2020 | 2035 |
|---|---|---|---|---|
| Solid Waste, Water, Wastewater, Off-Road Sources | Service Population (Population + Jobs) | 71,663 | 76,437 | 84,200 |
| Population [a] | Population | 55,033 | 59,488 | 63,518 |
| Residential Energy | Households | 19,725 | 20,995 | 24,165 |
| Commercial/Industrial Energy | Jobs | 16,630 | 16,949 | 20,682 |
| Transportation [b] | VMT – Gas | 458,785,827 | 493,494,150 | 576,966,520 |
| | VMT – Diesel | 27,822,637 | 32,536,348 | 45,500,895 |
| Municipal Jobs (FTE) | Municipal Emissions [c] | 112.8 | 115 | 120 |

SOURCE: SANDAG

FTE = Full-time equivalent employees

a. Population data are shown for informational purposes but are not used for forecasting any sector.

b. 2020 VMT is derived from the compound annual growth rate between 2013 and 2035.

c. The number of jobs in the City is used as an indicator for all municipal operation emissions.

The Adjusted BAU scenario describes emissions based on projected growth *and* considers policies that will achieve GHG reductions in the future. Policies, described in the Regulatory Setting section of Chapter 1, include State-adopted or approved legislation that will affect future emissions. By evaluating the two scenarios, the City can see the effect that existing policies may have on future emissions and be better able to determine how local measures can provide additional reductions.

Three future years are forecasted for each scenario: 2020, 2030 and 2035. The 2020 forecast year is consistent with the goals identified in AB 32, which identifies a statewide GHG reduction target by 2020. The 2030 forecast year is consistent with the goals identified in 2017 Scoping Plan Update, which recommends a per capita GHG reduction target by 2030. The 2035 forecast year was chosen to be consistent with the horizon year of the Santee General Plan Mobility Element and will allow the City to develop long-term strategies to continue GHG reductions beyond 2030 towards the 2045 State target of Carbon Neutrality.

## Business-as-Usual Forecasts

### *Community Business-as-Usual Forecast*

The City's BAU emissions in 2020 are estimated to be 432,982 MT $CO_2e$, or a 27 percent increase from baseline (2005) emissions. The 2030 BAU emissions are estimated to be 486,170 MT $CO_2e$, or a

43 percent increase from 2005 level. By 2035, emissions are estimated to increase 51.6 percent from the baseline level to 515,462 MT $CO_2e$ (FIGURE **5**).

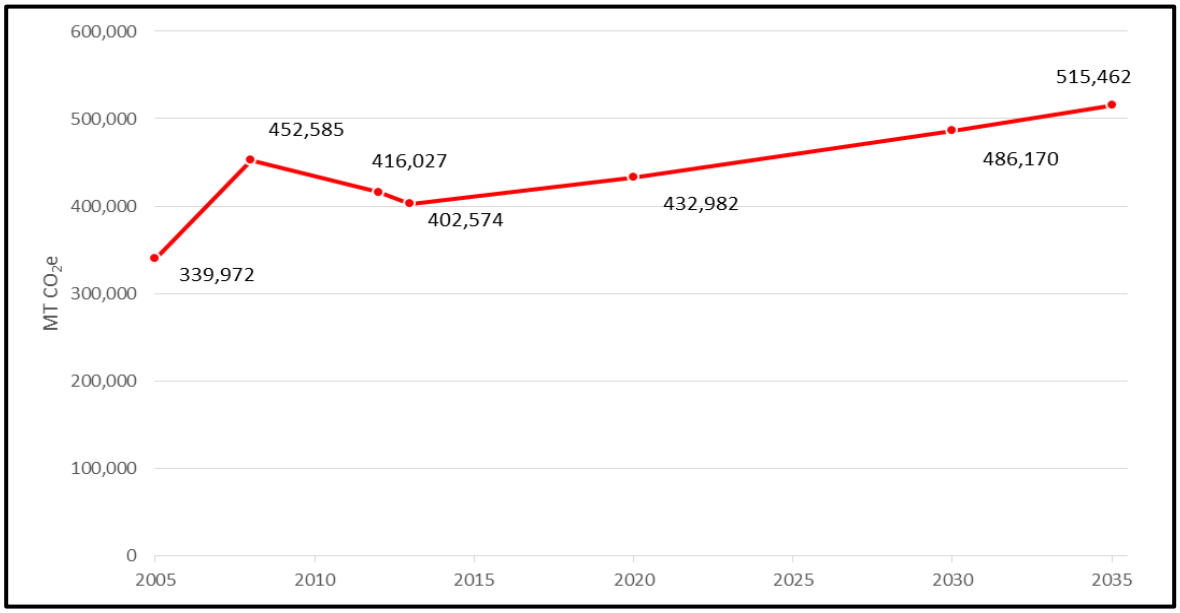



FIGURE 5 **Community BAU Forecast**

## *Municipal Business-as-Usual Forecast*

The City anticipates approximately 2 percent growth in emissions from City services by 2020, 5 percent by 2030, and 6 percent by 2035, relative to 2013 levels. However, emission levels are expected to be 18 percent, 21 percent, and 23 percent higher, respectively, due to the higher electricity emission factor assumed under a BAU forecast compared to the 2005 factor as described in FIGURE 6.

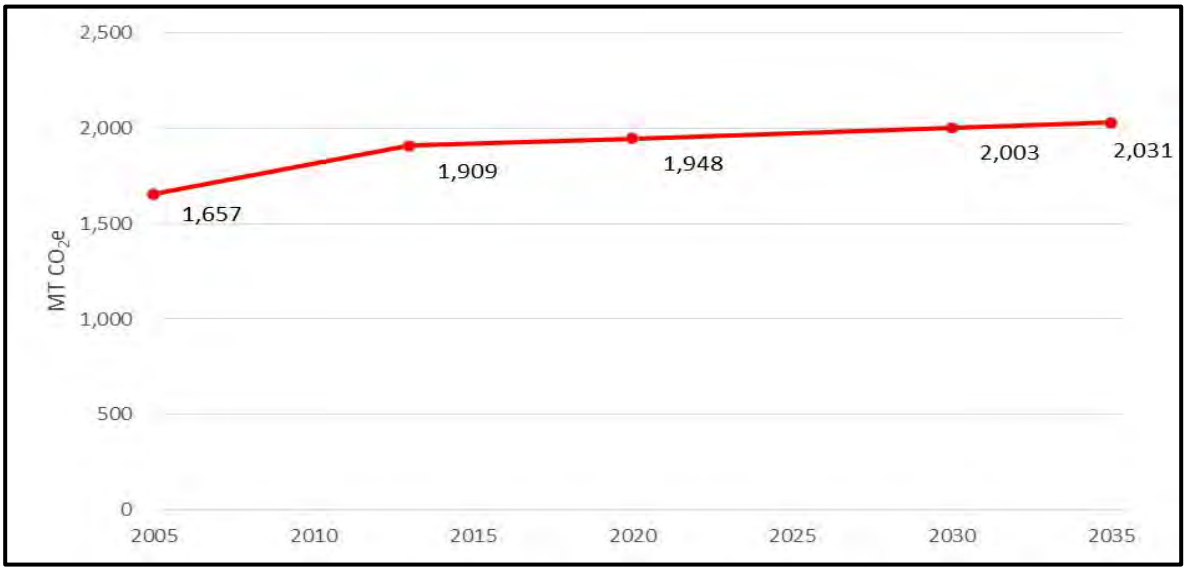



FIGURE 6 **Municipal BAU Forecast**

## Adjusted Business-as-Usual Forecasts

### *Community Adjusted Business-as-Usual Forecast*

The City's Adjusted BAU emissions are estimated to be 352,106 MT $CO_2e$ in 2020, 339,514 MT $CO_2e$ in 2030, and 336,543 MT $CO_2e$ in 2035 (Figure 7). This change represents a 3.6 percent increase from 2005 by 2020, 0.1 percent reduction by 2030, and 1.0 percent reduction by 2035.

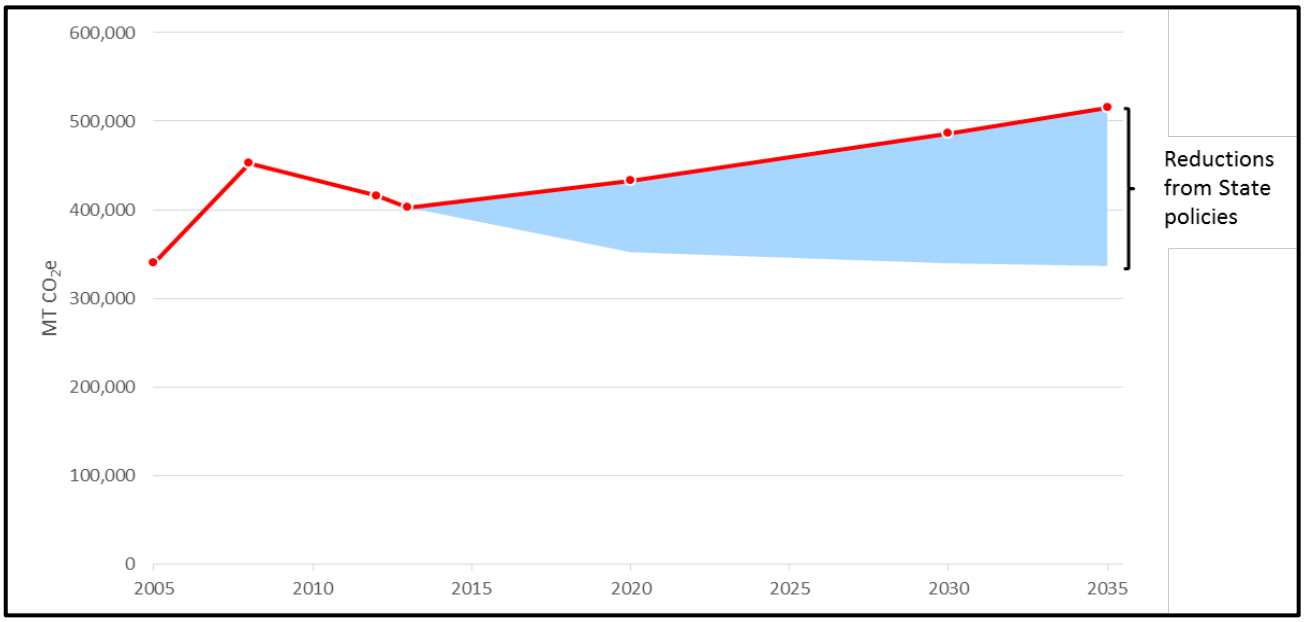



FIGURE 7 **Community Adjusted BAU Emissions**

### *Municipal Adjusted Business-as-Usual Forecast*

The City's Municipal Adjusted BAU emissions in 2020 are estimated to be 1,611 MT $CO_2e$, which is 3 percent lower than the 2005 baseline level (FIGURE 8). In 2030, emissions are expected to be 1,657 MT $CO_2e$, which is equivalent to 2005 levels. In 2035, emissions are expected to be 1 percent higher than in 2005 (1,681 MT $CO_2e$).

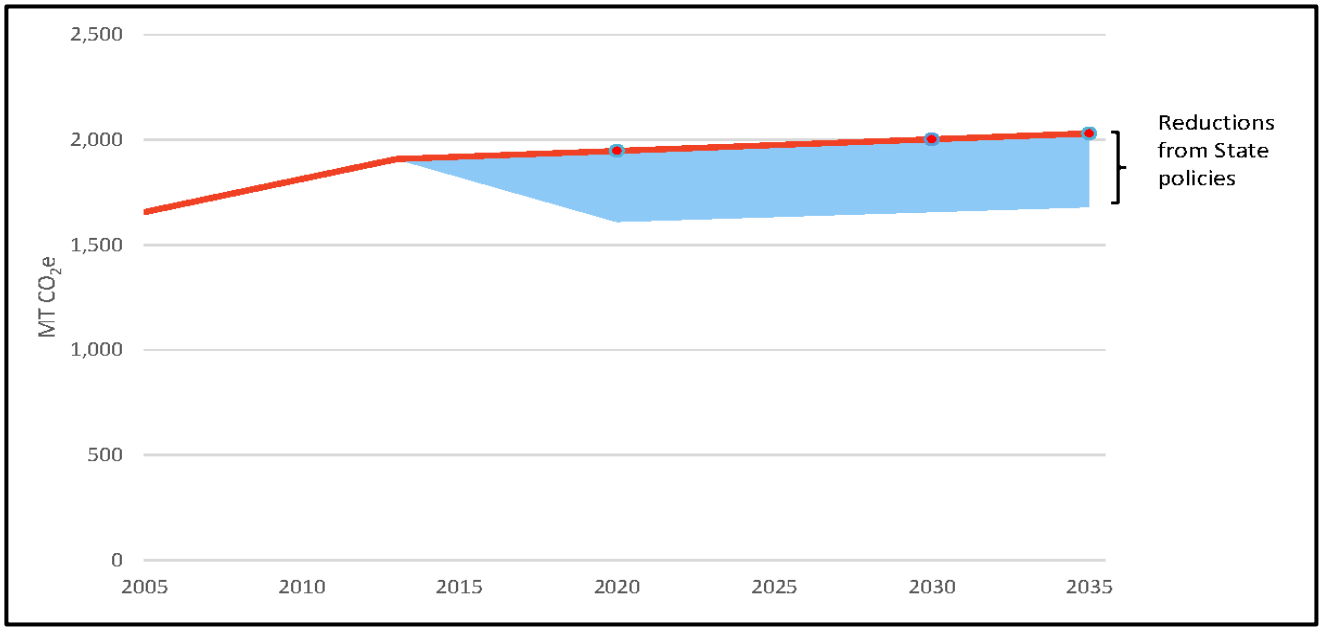



FIGURE 8 **Municipal Adjusted BAU Emissions**

## REDUCTION TARGETS

The State has set goals for reducing GHG emissions by 2020 and 2050 through AB 32 and Executive Order (EO) S-3-05, respectively. The State has also provided guidance to local jurisdictions as "essential partners" in achieving the State's goals by identifying a 2020 recommended reduction goal. That goal, stated in the AB 32 Scoping Plan, was for local governments to achieve a 15 percent reduction below 2005 levels by 2020, which aligns with the State's goal of not exceeding 1990 emissions levels by 2020.[18] Beyond 2020, AB 32 states that the emissions level in 2020 should be maintained post-2020 and Executive Order S-03-05 states that emissions should decline to 80 percent below 1990 levels by 2050.

The 2017 Scoping Plan Update released by ARB in January 2017 provides strategies for achieving the 2030 target established by Executive Order B-30-15 and codified in SB 32 (40 percent below 1990 levels by 2030). The 2017 Scoping Plan Update recommends local plan level GHG emissions reduction goals. ARB recommends that local governments aim to achieve community-wide goal to achieve emissions of no more than 6 MT $CO_2e$ per capita by 2030 and no more than 2 MT $CO_2e$ per capita by 2050.

Both mass emissions (performance target) and per capita emissions (efficiency target) GHG reductions targets were identified for 2020, 2030, and 2035. The City has established the following reduction targets that are consistent with current regulation.

[18] The State concluded that a 15 percent reduction in emissions from 2005 levels by 2020 would be equivalent to achieving 1990 emissions levels.

# Community Targets

## *Mass Emissions Targets*

The City has set an interim goal for 2030, which is to reduce emissions to 40 percent below 2005 levels consistent with the State's adopted SB 32 GHG reduction target. The City's longer-term goal for 2035is to reduce emissions to 49 percent below 2005 levels. The 2030 interim and 2035 longer-term goals would put the City on a downward emissions path consistent with the State's long-term goal of carbon neutrality by 2045 (TABLE 6).

### TABLE 6 Mass GHG Reduction Targets for Community Emissions

| | Community Target |
|---|---|
| 2030 Target | 40% below 2005 levels |
| 2030 Emissions Goal (MT $CO_2e$) | 249,596 |
| 2035 Target | 49% below 2005 levels |
| 2035 Emissions Goal (MT $CO_2e$) | 173,386 |

Notes and Acronyms:
MT $CO_2e$ = Metric tons of carbon dioxide equivalent

## *Per Capita Emission Targets*

The 2017 Scoping Plan Update recommends local plan level GHG emissions reduction goals of no more than 6 MT $CO_2e$ per capita by 2030 and no more than 2 MT $CO_2e$ per capita by 2050. These goals consider all Statewide emission sources; however, some of the emission sources are not included in the City's GHG inventories, such as industrial and aviation, and the City has no control over these emissions. By comparing the Statewide most recent year (2015) GHG inventory (ARB 2017) and the City's 2013 inventory, it was determined that the City had control over 63 percent of total Statewide emission sources. Therefore, the State-aligned emissions goals were proportioned to 3.8 MT $CO_2e$ per capita by 2030, and 1.27 MT $CO_2e$ per capita by 2050. The 2020 and 2035 goals were interpolated from the 2030 and 2050 goals assuming same rate of reduction of the emission goals each year (TABLE 7).

### TABLE 7 Per Capita GHG Reduction Targets for Community Emissions

| | Community Target |
|---|---|
| 2030 State Target (MT $CO_2e$/SP) | 6.00 |
| 2030 Emissions Goal (MT $CO_2e$/SP) | 3.80 |
| 2035 State Target (MT $CO_2e$/SP) | 5.00 |
| 2035 Emissions Goal (MT $CO_2e$/SP) | 3.16 |

Notes and Acronyms:
MT $CO_2e$ = Metric tons of carbon dioxide equivalent

SP = service population (population + jobs)

As shown in FIGURE 9, FIGURE 10 and TABLE 8, in 2020 the City would meet the State Aligned efficiency GHG reduction targets under the ABAU scenario, but would need to reduce 63,130 MT $CO_2e$ to meet the performance target. In 2030, under the ABAU scenario, the City would need to reduce 29,816 MT $CO_2e$ to meet the State Aligned efficiency target, and would need to reduce 108,531 MT $CO_2e$ to meet the performance target. In 2035, under the ABAU scenario, the City would need to reduce 70,471 MT $CO_2e$ to meet the State Aligned efficiency target, and would need to reduce 163,157 MT $CO_2e$ to meet the performance target.

TABLE 8 **State-Aligned GHG Reduction Targets for Community Emissions**

| Sector | 2005 | 2013 | 2020 | 2030 | 2035 |
|---|---|---|---|---|---|
| BAU Emissions (MT $CO_2e$) | 339,972 | 402,574 | 432,982 | 486,170 | 515,462 |
| Adjusted BAU Mass Emissions (MT $CO_2e$) | 339,972 | 402,574 | 352,106 | 339,514 | 336,543 |
| Service Population (Population + Jobs) | 70,152 | 71,663 | 76,437 | 81,499 | 84,200 |
| Adjusted BAU Per Capita Emissions (MT $CO_2e$/SP) | | | | 4.17 | 4.00 |
| State-Aligned Performance Target (% change from 2005) | | | | -40% | -49% |
| State-Aligned Performance Target (MT $CO_2e$) | | | | 249,596 | 173,386 |
| Reductions from Adjusted BAU needed to meet the Performance Target (MT $CO_2e$) | | | | 109,918 | 163,157 |
| State-Aligned Efficiency Target (MT $CO_2e$/SP) | | | | 3.80 | 3.16 |
| Reductions from Adjusted BAU needed to meet the Efficiency Target (MT $CO_2e$/SP) | | | | 30,155 | 70,471 |

Notes and Acronyms:
MT $CO_2e$ = Metric tons of carbon dioxide equivalent
SP = service population = population + jobs

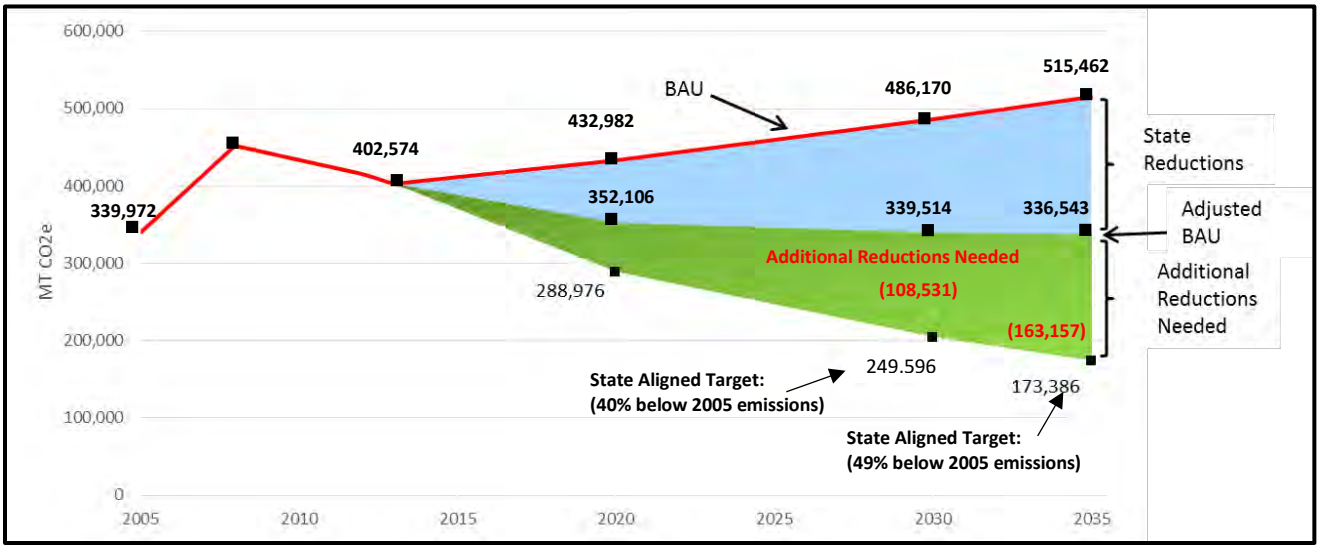



FIGURE 9 **Community Emissions Inventories, Projections, and Performance Targets**

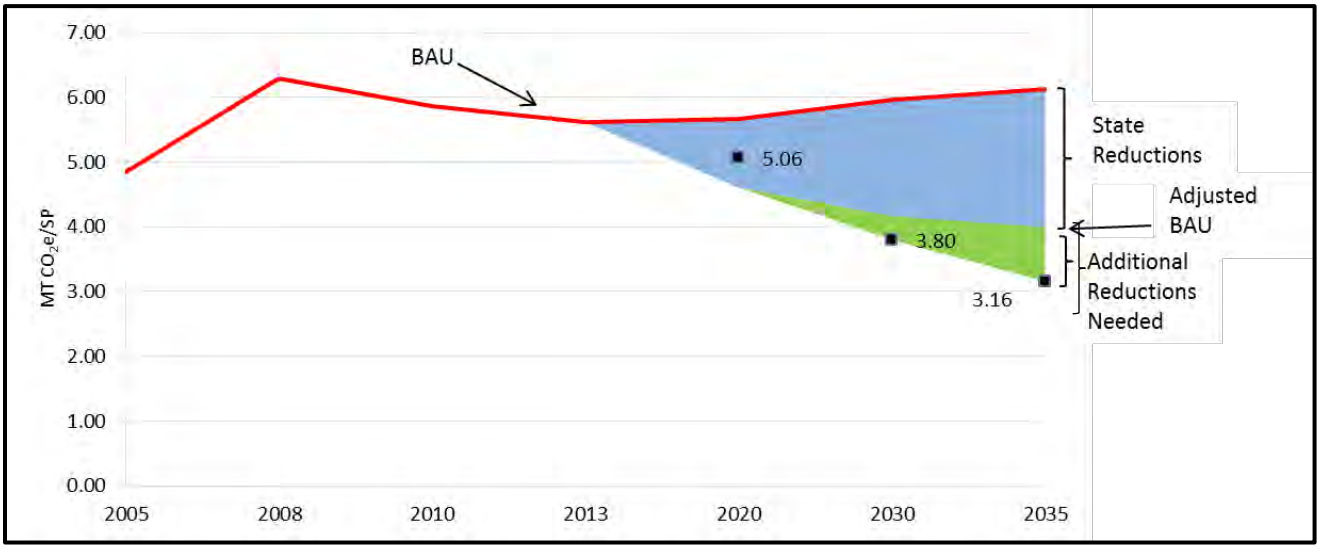



FIGURE 10 **Community Emissions Inventories, Projections, and Efficiency Targets**

## Municipal Targets

To be aligned with the community goals, the City would need to reduce its emissions by 203 MT $CO_2e$ from the 2020 Adjusted BAU forecast. The City will also need to implement measures to continue to achieve GHG reductions beyond 2020. By 2030, the City will need to reduce municipal operation emissions by 994 MT $CO_2e$ from an Adjusted BAU forecast to meet a 40-percent reduction goal below 2005 levels. By 2035, the City will need to reduce municipal operation emissions by 836 MT $CO_2e$ from an Adjusted BAU forecast to meet a 49-percent reduction goal below 2005 levels (TABLE 9 and FIGURE 11).

TABLE 9 **State-Aligned GHG Reduction Targets for Municipal Emissions**

| Sector | 2005 | 2013 | 2020 | 2030 | 2035 |
|---|---|---|---|---|---|
| BAU Emissions (MT $CO_2e$) | 1,657 | 1,909 | 1,948 | 2,003 | 2,031 |
| Adjusted BAU Emissions (MT $CO_2e$) | 1,657 | 1,909 | 1,611 | 1,657 | 1,681 |
| State-Aligned Target (% change from 2005) | | | | -40% | -49% |
| State-Aligned Target (% change from 2013) | | | | -46% | -56% |
| State-Aligned Emissions Goal (MT $CO_2e$) | | | | 994 | 845 |
| Reductions from Adjusted BAU needed to meet the Target (MT $CO_2e$) | | | | 663 | 836 |

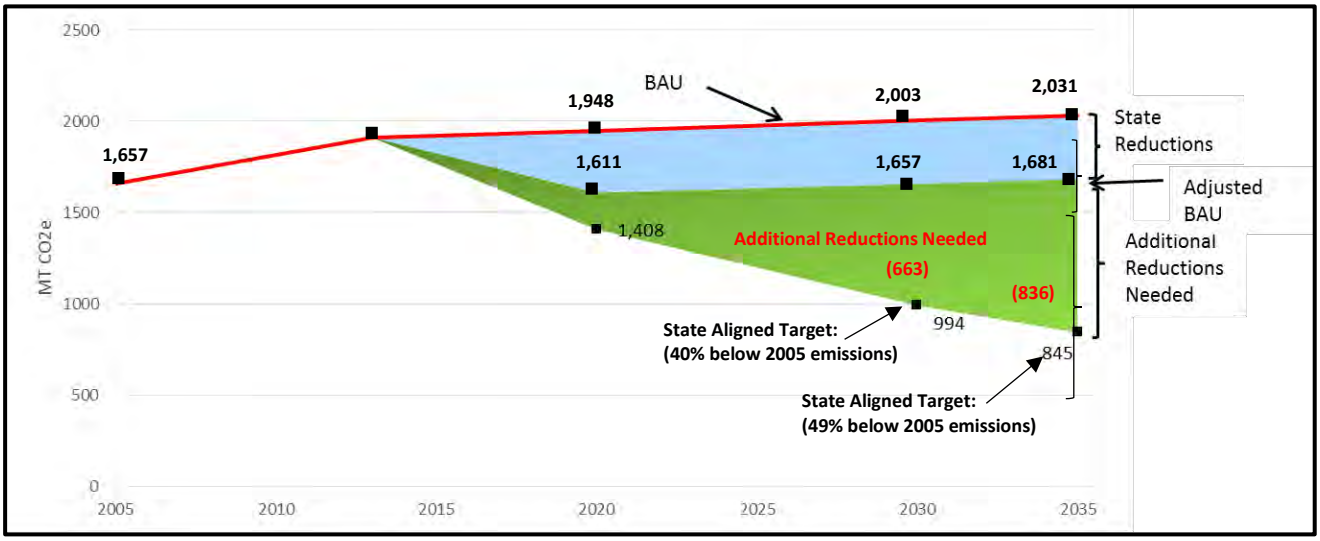



FIGURE 11 **Municipal Emissions Inventories, Projections, and Targets**

# CHAPTER 3 GHG Reduction Measures

This chapter details how the City will meet its GHG reduction targets by using goals, measures, and actions at the community and municipal levels. This commitment begins with existing regional and local programs and policies the City is currently implementing that will reduce GHG emissions, followed by community and municipal reduction actions that are the focus of the Sustainable Santee Action Plan.

## EXISTING REGIONAL AND LOCAL GHG REDUCTION MEASURES

Existing regional and local GHG reductions include the San Diego Association of Governments (SANDAG) Sustainable Communities Strategy (SCS) found in the SANDAG Regional Transportation Plan and the City of Santee Mobility Element within the Santee General Plan. These documents qualitatively describe on-road transportation strategies that will reduce GHG emissions within the Santee community. However, SANDAG did not quantify GHG emission reductions within the City of Santee specific to the SCS. The City of Santee Mobility Element implements the SANDAG SCS within the City of Santee but did not quantify the reductions in GHG emissions. The following briefly summarizes the goals, objectives and policies within the City of Santee Mobility Element that implement the SANDAG SCS relate to GHG reductions.

Mobility Element Goal: A balanced, interconnected multimodal transportation network that allows for the efficient and safe movement of all people and goods, and that supports the current and

future needs of Santee community members and travel generated by planned land uses. The following Mobility Element objectives and policies reduce GHG emissions.

Objective 1.0: Complete Streets.

Policy 1.1: The City shall provide integrated transportation and land use decisions that enhance smart growth development served by complete streets, which facilitate multimodal transportation opportunities.

Policy 1.2: The City should design streets in a manner that is sensitive to the local context and recognizes that needs vary between mixed use, urban, suburban, and rural settings.

Policy 1.3: The City shall ensure that the entire right-of-way is designed to accommodate appropriate modes of transportation.

Policy 1.4: The City should create a vibrant town center by developing a connected system of multi-modal corridors that encourage walking, biking, and riding transit. A mobility hub should be considered at the existing Santee Trolley Square providing features such as bike-share, bike parking, car-share, neighborhood electric vehicles, real time traveler information, demand-based shuttle services, wayfinding signage, bicycle and pedestrian improvements, urban design enhancements, etc.

Objective 2.0: Multi-modal Transportation Network of local roads, collectors, arterials, freeways and transit services. This multi-modal transportation network will be developed in a manner that promotes the health and mobility of Santee residents and that meets future circulation needs, provides access to all sectors of the City, and supports established and planned land uses. The following policies reduce GHG emissions and will implement Objective 2.0.

Policy 2.1: The City shall encourage an automobile Level of Service “D” on street segments and at intersections throughout the circulation network while also maintaining or improving the effectiveness of the non-automotive components of the circulation system (i.e. pedestrians, bicyclists, and public transit), especially in the Town Center area.

Policy 2.2: The City should ensure adequate accessibility for all modes to the northern undeveloped area of the City by designating a functional network of public streets for future dedication either prior to, or concurrent with anticipated need.

Policy 2.6: The City should encourage traffic circulation improvements such as, but not limited to, enhanced roadway markings, synchronized traffic signals, and Intelligent Transportation System (ITS) network management.

Policy 2.9: The City should work with the region to develop traffic and congestion management programs to improve commute times and improve air quality.

Objective 5.0: Allow parking reductions around transit and affordable housing.

Policy 5.1: The City should consider reducing parking requirements in the town center area and at transit stations as transit ridership increases over time due to increased development intensities and a broader mix of land uses.

Policy 5.2: The City should maximize shared parking opportunities for uses with varied peak parking periods.

Policy 5.3: The City should exercise flexibility in the application of parking standards to support transit-oriented development.

Objective 6.0: Increase the use of public transit systems.

Policy 6.1: The City should coordinate with SANDAG and MTS to maintain and enhance transit services in the City so that they are efficient, cost-effective, and responsive to growth and redevelopment.

Policy 6.2: The City should coordinate with SANDAG and MTS to improve bus stop and shelter facilities to increase the comfort of users.

Policy 6.3: The City should coordinate with SANDAG and MTS to provide multi-modal support facilities and adequate access near and to/from transit stops for bicyclists and pedestrians, including children and youth, seniors, and persons with disabilities.

Policy 6.4: The City should coordinate with SANDAG and MTS to post route maps and pick-up/drop-off times at each stop.

Policy 6.5: The City should coordinate with MTS to encourage establishing transit stops in areas of concentrated activity such as near senior housing projects, medical facilities, major employment centers, and mixed use areas.

Policy 6.6: The City should coordinate with MTS to accommodate transit centers and major stops with adequate bicycle and pedestrian access and secure bicycle storage where appropriate. Include facilities that are well designed, provide appropriate lighting and are safe, comfortable, and attractive.

Policy 6.7: The City should provide incentives for transit-oriented development, such as a parking reduction consistent with regional standards, for more intense development and higher density residential uses along major transportation corridors or in areas accessible to transit use.

Objective 7.0: Develop, maintain, and support a safe, comprehensive and integrated bikeway system that encourages bicycling, as documented in the City's Bicycle Master Plan (BMP).

Policy 7.1: The City shall continue to implement and maintain a comprehensive bicycle route system, and to designate appropriate bikeways through the regular update of the City's Bicycle Master Plan.

Policy 7.2: The City should strive to achieve objectives and policies identified in the Bicycle Master Plan including those related to bicycle safety awareness, bicycle promotion, maintenance and monitoring.

Policy 7.3: The City should promote the development of hiking and bicycle trails along the San Diego River in conjunction with the San Diego River Plan.

Policy 7.4: The City should require new development and redevelopment to provide connections to existing and proposed bicycle routes, where appropriate.

Policy 7.5: The City should keep abreast of bicycle facility innovations in other cities and regions, and seek to incorporate these into the bicycle network.

Objective 8.0: Develop and maintain an accessible, safe, complete and convenient pedestrian system that encourages walking.

Policy 8.1: The City should require the incorporation of pedestrian-friendly design concepts where feasible including separated sidewalks and bikeways, landscaped parkways, traffic calming measures, safe intersection designs and access to transit facilities and services into both public and private developments.

Policy 8.2: The City should provide for the connectivity of wide, well-lit sidewalks and environments with safety buffers between pedestrians and vehicular traffic, where feasible.

Policy 8.3: The City should pursue the elimination of physical barriers around public facilities and commercial centers to improve access and mobility of the elderly and disabled in a manner consistent with the Title 24 of the California Code of Regulations and the federal Americans with Disabilities Act (ADA).

Policy 8.4: The City shall require non-contiguous sidewalks on all streets with a residential collector classification or higher, as appropriate.

Policy 8.5: The City should identify and implement pedestrian improvements with special emphasis on providing safe access to schools, parks, community and recreation centers, and shopping districts.

Policy 8.6: The City should promote walking and improve the pedestrian experience by requiring pedestrian facilities along all classified streets designated on the Circulation Plan; by implementing streetscape improvements along pedestrian routes that incorporate such elements as shade trees, street furniture, and lighting; by orienting development toward the street; by employing traffic calming measures; and by enforcing vehicle speeds on both residential and arterial streets.

Policy 8.7: The City should promote walking as the primary travel mode for the school trip through implementing the citywide Safe Route to School Plan.

Policy 8.8: The City should improve pedestrian safety at intersections and mid-block crossings, where appropriate.

Policy 8.9: On all primary pedestrian corridors, the City shall ensure adequate green time, based on established standards, at all crosswalks that allow the elderly and disabled to cross City streets on a single green light.

Policy 8.10: The City should provide connected network of safe pedestrian crossings throughout the City.

Policy 8.11: The City should enhance pedestrian visibility by enforcing parking restrictions at intersection approaches, improving street lighting, and minimizing obstructions.

Objective 9.0: Increased use of alternative modes of travel to reduce peak hour vehicular trips, save energy, and improve air quality.

Policy 9.1: The City shall encourage and provide for Ride Sharing, Park 'n Ride, and other similar commuter programs that eliminate vehicles from freeways and arterials.

Policy 9.2: The City should encourage businesses to provide flexible work schedules for employees.

Policy 9.3: The City should encourage employers to offer shared commute programs and/or incentives for employees to use transit.

Policy 9.4: The City should encourage the use of alternative transportation modes, such as walking, cycling and public transit. The City should maintain and implement the policies and recommendations of the Bicycle Master Plan and Safe Routes to School Plan to improve safe bicycle and pedestrian access to major destinations.

Policy 9.5: The City should improve safety of walking and biking environment around schools to reduce school-related vehicle trips.

Objective 10.0: The City shall remain actively involved in regional issues.

Policy 10.1: The City should promote and support the continued expansion of the San Diego Trolley system which benefits residents of Santee, especially in higher density areas.

The community measures related to on-road transportation implement these Mobility Element Policies.

## GHG REDUCTION STRATEGY FRAMEWORK

The GHG reduction strategy framework includes reduction goals. The goals describes the overarching objective related to increasing energy efficiency or decreasing energy consumption, such as increasing energy efficiency in residential building units, as well as reducing VMT and solid waste generation. Within each goal, one or more measures are presented indicating the City's commitment toward meeting the goal. Within each measure, one or more actions are presented that indicate the steps the City will take in achieving the measure. Each measure includes the GHG reduction potential in 2030 and 2035. Actions are designed to include the steps needed to implement the measure. Actions may be added, removed, or modified during a Sustainable Santee Plan

Update that is approved with a public hearing and by presenting substantial evidence that the measures and actions are consistent with the State's GHG reduction targets. Actions include a performance indicator, implementation timeframe, department or agency responsible for implementation, and cost information, where applicable. In addition, this Plan will result in local benefits while reducing GHG emissions, called co-benefits. Co-benefits range from providing improved air quality and mobility to increased awareness about sustainability. Co-benefits are identified with each measure by an icon.

| Local Cobenefits | | |
|---|---|---|
| Increased energy efficiency/reduced demand | Water conservation | Improved public health |
| Improved air quality | Increased renewable energy | Increased non-motorized transportation |
| Sustainability education and awareness | Enhanced land use/ community design | Increased resiliency |

## COMMUNITY MEASURES

This section summarizes the proposed community-wide reduction measures to be implemented by the City to reduce its community GHG emissions. The reduction strategies are organized by emission categories; the land uses affected, goals, measures, target year, performance metric, GHG reduction potential, actions and supporting measures, which are defined below:

**Emissions Category**

Source of GHG emissions by category. Emissions categories include residential energy (electricity and natural gas), commercial/industrial energy (electricity and natural gas), on-road transportation, solid waste, and clean energy (renewable energy sources). There are also reduction goals under a category called advanced goals and measures that include the reduction of the heat island effect, and carbon sequestration. These are considered advanced because methodologies recently came out to allow quantification.

**Land Use Effected**

This is broadly categorized into two components, residential land uses which include single-family and multi-family dwelling units, and commercial land uses which include retail commercial and industrial uses.

| | |
|---|---|
| **Goals** | The general objective that the City will strive to achieve to address the defined emissions category and land uses effected. |
| **Target Year** | Year corresponding to the emissions reduction targets set by the City that are in line with State laws and guidelines, and the recommendations in the San Diego Associated Governments (SANDAG) Regional Climate Action Planning Framework (ReCAP). For the Sustainable Santee Action Plan, the proposed target years include 2020, 2030, and 2035. |
| **Performance Metric** | Quantitative metric by which achievement of the specified goal will be measured. Each goal will have two performance metrics corresponding to target years 2030 and 2035. |
| **GHG Reduction Potential** | Estimated reduction in local GHG emissions if the performance metric is met. The reduction is presented in metric ton of carbon dioxide equivalents (MT $CO_2e$). |
| **City Actions** | Programs, policies, ordinances, or projects the City will implement that will cause a direct and measureable reduction in GHG emissions. |
| **Supporting Measures** | Programs, policies, or projects the City will implement that could not be quantified, but will have an indirect effect on GHG emission reductions. |

To help meet the designated reduction targets, the Sustainable Santee Action Plan proposes 22 measures (13 measures focused on community emissions and nine municipal measures), numerous actions and supporting measures organized under 14 goals (10 community and 4 municipal), and 5 emission categories. The following sub-sections detail the GHG reduction goals under each emissions category and land uses effected. A description of each measure is followed by tables describing the goal of the measure, City actions, target year, performance metric, GHG reduction potential, and any supporting measures.

## Energy Efficiency

### *Residential Land Uses*

Residential Energy includes electricity and natural gas consumption within households in the City. There are many opportunities to save energy from existing and future development, described in the goals and measures below.

## *Goal 1: Increase Energy Efficiency in Existing Residential Units*

Opportunities for residents to improve energy efficiency in their homes include modifications or improvements they can make to their homes.


**Goal 1 Increase Energy Efficiency in Existing Residential Units**

**Co-Benefits**

| Goal 1: Increase Energy Efficiency in Existing Residential Units | | |
|---|---|---|
| **Measure 1.1: Energy Audits in the Existing Residential Sector** | | |
| **City Action: Require Energy Audits of Existing Residential Units Requesting Permits for Minor Modifications.** | | |
| On or before December 2020 require all existing residential units that seek building permits for minor modifications (less than 30 percent of the dwelling unit size), alterations, and additions that do not include bathrooms or kitchens must perform energy audits. In addition, the modification must include energy efficiency retrofit recommendations resulting from the energy audits. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Reduce energy use by an average of 14% in residential units that complete the energy audits and implement recommended energy retrofits. Estimated 65 units implement energy retrofits (reduce 66,890 kWh[19] and 3,943 therms[20]). | 45 |
| 2035 | Reduce energy use by an average of 14% in residential units that complete the energy audits and implement recommended energy retrofits. Estimated 65 units implement energy retrofits (reduce 66,890 kWh and 3,943 therms). | 45 |

[19] kWh savings based on historical participation rates in the SDG&E energy efficiency incentives programs.
[20] Therms savings based on historical participation rates in the SDG&E energy efficiency incentives programs.

| **City Action: Require Energy Audits of Existing Residential Units Requesting Permits for Major Modifications.** | | |
|---|---|---|
| On or before December 2020 require all existing residential unites that seek building permits for modifications, alterations, and additions representing 30 percent or more of the square footage of the dwelling unit size or that include bathrooms or kitchens must perform energy audits and energy efficiency retrofits to meet California Green Building Standards Tier 1 Voluntary Measures which shall include Energy Star electric water heaters or solar water heaters. Heating, ventilation, and air conditioning (HVAC) equipment shall be evaluated in the energy audit and recommendations made on energy efficiency improvements or replacement of the HVAC system. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Reduce energy use by an average of 25% in residential units that complete the energy audits and implement recommended energy retrofits. Estimated 800 units implement energy retrofits (reduce 15,065,193 kWh[21]468,554 therms[22] | 7,811 |
| 2035 | Reduce energy use by an average of 25% in residential units that complete the energy audits and implement recommended energy retrofits. Estimated 800 units implement energy retrofits (reduce 15,065,193 kWh and 468,554 therms | 7,811 |

## *Goal 2: Increase Energy Efficiency in New Residential Units*

This policy will develop City staff to become resources in implementing energy efficiency building measures beyond those required in current Title 24 standards. This policy will also ensure that as Title 24 standards are updated, City staff are well informed and can implement updates quickly and effectively.

| **Goal 2.: Exceed Energy Efficiency Standards** | |
|---|---|
| **Co-Benefits** | |

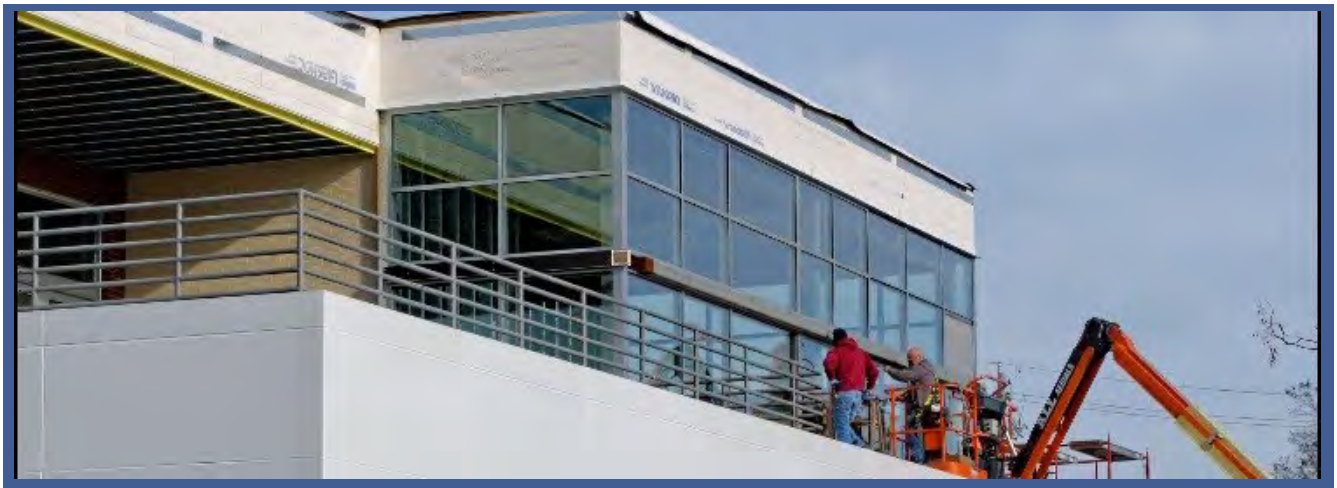
[21] kWH savings based upon historical participation rates in the HERO energy efficiency financing program.
[22] Therms savings based upon historical participation rates in the HERO energy efficiency financing program.

| Goal 2: Increase Energy Efficiency in New Residential Units | | |
|---|---|---|
| **Measure 2.1: Energy Efficiency Improvements of Residential Sector** | | |
| **City Action: Require all New Residential Construction to be Built to California Green Building Standards Tier 2** | | |
| On or before December 2020 require all new residential units including accessory residential units meet or exceed California Green Building Standards Tier 2 Voluntary Measures. New residential can use Green Building Ratings such as Leadership in Energy and Environmental Design (LEED), Build it Green, or Energy Star certified buildings certification in scoring development. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Reduce energy use by 12% beyond Title 24 energy efficiency in residential units that complete the energy audits and implement recommended energy retrofits. Estimated 1,500 units. | 13,524 |
| 2035 | Reduce energy use by 14% in residential units that complete the energy audits and implement recommended energy retrofits. Estimated 2,000 units. | 17,750 |

## *Commercial Land Uses*

Commercial Energy includes electricity and natural gas consumption for businesses in the City. Opportunities to save energy from existing and future development are described below.

## *Goal 3: Increase Energy Efficiency in Existing Commercial Units*



**Goal: Increase Energy Efficiency in Existing Commercial Units**

**Co-Benefits**

| Goal 3: Increase Energy Efficiency in Existing Commercial Units | | |
|---|---|---|
| **Measure 3.1: Energy Audits in the Existing Commercial Sector** | | |
| **City Action: Require Energy Audits of Existing Commercial Units Requesting Permits for Minor Modifications.** | | |
| On or before December 2020 require all existing commercial buildings of 10,000 sq. ft. or more that seek building permits for minor modifications alterations, and additions (< 30 percent of total), must perform energy audits and recommendations. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Reduce energy use by an average of 14% in existing commercial space that complete the energy audits and implement energy retrofits. Estimated 44 businesses will implement energy retrofits (reduce 1,651,021 kWh[23] and 14,551 therms[24][25]). | 660 |
| 2035 | Reduce energy use by an average of 14% in existing commercial space that complete the energy audits and implement recommended retrofits. Estimated 44 businesses will implement energy retrofits (reduce 1,651,021 kWh and 14,551 therms). | 660 |
| **City Action: Require Energy Audits of Existing Commercial Units requesting permits for Major Modifications.** | | |
| On or before December 2020 require all existing commercial buildings of 10,000 square feet or more that seek building permits for modifications, alterations, and additions representing 30 percent or more of the square footage must perform energy audits and energy efficiency retrofits to meet California Green Building Standards Tier 1 Voluntary Measures. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Reduce energy use by an average of 25% in n existing commercial space that complete the energy audits and implement recommended energy retrofits. Estimated 300 businesses will implement energy retrofits (reduce 20,148,154 kWh and 168,436 therms). | 8,010 |
| 2035 | Reduce energy use by an average of 25% in existing commercial space that complete the energy audits and implement recommended retrofits. Estimated 300 businesses will implement energy retrofits (reduce 20,148,154 kWh and 168,436 therms). | 8,010 |

## *Goal 4: Increase Energy Efficiency in New Commercial Units*

This policy will develop City staff to be resources in implementing energy efficiency beyond that required by current Title 24 standards. This will also ensure that as Title 24 standards are updated, City staff are well informed and can implement updates quickly and effectively.

[23] kWH savings based upon historical participation rates in SDG&E energy efficiency incentives programs.
[24] Therm savings based upon historical participation rates in SDG&E energy efficiency incentives program.
[25] Therms savings based on historical participation rates in the SDG&E energy efficiency incentives programs.

**Goal 4: Exceed Energy Efficiency Standards**

**Co-Benefits**

| Goal 4: Increase Energy Efficiency in New Commercial Units | | |
|---|---|---|
| **Measure 4.1: Meet or Exceed Tier 2 Voluntary Measures Energy Efficiency Standards** | | |
| **City Action: Require all New Commercial Construction to be Built to California Green Building Standards Tier 2** | | |
| On or before December 2020 require all new commercial units meet or exceed California Green Building Standards Tier 2 Voluntary Measures. New commercial development can use Green Building Ratings such as Leadership in Energy and Environmental Design (LEED), Build it Green, or Energy Star certified buildings certification in scoring development. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | An estimated 70 new businesses will reduce energy use by 14% in new commercial space | 8,705 |
| 2035 | An estimated 165 new businesses will reduce energy use by 14% in new commercial space | 12,337 |

## Advanced Goals and Measures

### *Goal 5: Decrease Energy Demand through Reducing Urban Heat Island Effect*

Trees and vegetation lower surface and air temperatures by providing shade and through evapotranspiration, making vegetation a simple and effective way to reduce urban heat islands. Shaded surfaces may be 20–45 degrees Fahrenheit ([°F] 11–25 degrees Celsius [°C]) cooler than the peak temperatures of un-shaded materials. In addition, evapotranspiration, alone or in combination with shading, can help reduce peak summer temperatures by 2–9 °F (1–5 °C). Trees and vegetation that directly shade buildings can reduce energy use by decreasing demand for air conditioning.

Replacing surface areas with light-reflecting materials can decrease heat absorption and lower outside air temperature. Both roofs and pavements are ideal surfaces for taking advantage of this advanced technology.

Cool roof is built from materials with high thermal emittance and high solar reflectance—or albedo—to help reflect sunlight (and the associated energy) away from a building. These properties help roofs to absorb less heat and stay up to 50–60 °F (28–33 °C) cooler than conventional materials during peak summer weather. Cool roofs may be installed on low-slope roofs (such as the flat or gently sloping roofs typically found on commercial, industrial, and office buildings) or the steep-sloped roofs used in many residences and retail buildings.

## Goal 5: Decrease Energy Demand Through Reducing Urban Heat Island Effect

**Co-Benefits**

| Goal 5: Decrease Energy Demand through Reducing Urban Heat Island Effect | | |
|---|---|---|
| **Measure 5.1: Tree Planting for Shade and Energy Efficiency** | | |
| **City Action: Require Tree Planting in all Parking Lots and Streetscapes.** | | |
| On or before December 2020 require trees along all streets, sidewalks and parking lots. Starting in 2020 City will begin tree planting along existing streets with the goal of having tree shade on 14% of pavement during the summer months by 2030 and 23% by 2035. City will require new development include trees within parking lots and street scrapes. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Reduce energy use by 1,334,745 kWh[26] | 47 |
| 2035 | Reduce energy use by 1,534,958 kWh | 22 |

[26] kWh savings based upon an assumed 2.5 percent reduction in cooling load for buildings resulting from reduced urban heat island effect. United States Environmental Protection Agency (EPA) Using Trees and Vegetation to Reduce Heat Islands. https://www.epa.gov/heat-islands/using-trees-and-vegetation-reduce-heat-islands. Accessed August 2018.

| Measure 5.2: Light Reflecting Surfaces for Energy Efficiency | | |
|---|---|---|
| **City Action: Require Cool Roofs.** | | |
| On or before December 2020 present to City Council for consideration an ordinance requiring enhanced cool roofs on commercial and municipal buildings. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | 80,000 square feet of commercial and municipal roofs using enhanced cool roofs saving 22,686 kWh. | 1 |
| 2035 | 120,000 square feet of commercial and municipal roofs using enhanced cool roofs saving 34,029 kWh. | 1 |

## Transportation

### *Goal 6: Decrease GHG Emissions through Reducing Vehicle Miles Traveled*

The City of Santee Mobility Element was updated in October 2017, and includes a goal of "a balanced, interconnected multimodal transportation network that allows for the efficient and safe movement of all people and goods, and that supports the current and future needs of Santee community members and travel generated by planned land uses." The objectives included in the updated element will support the Climate Action Plan's measure of encouraging mode shift in the City. Such objectives include implementation of AB 1358, the Complete Streets Act, which supports a balanced, multimodal transportation network. Additionally, the element includes objectives to increase the use of public transit, to develop and maintain accessible and safe pedestrian systems that encourage walking, and to remain active in regional transportation coordination, such as the expansion of the San Diego Trolley system.

| Goal 7: Reduce GHG Emissions Through Reducing VMT | |
|---|---|
| **Co-Benefits** | |

| Goal 6: Decrease GHG Emissions Through a Reduction in VMT | | |
|---|---|---|
| **Measure 6.1: Non-Motorized Transportation Options** | | |
| **City Action: Create Active Transportation Routes Between Santee Light Rail Station and Reduce Parking Near Transit** | | |
| Starting in 2020 with completion by 2030 the City will construct a total of 25 miles of active transportation routes (sidewalks and pedestrian paths) from Santee Light Rail Transit station to surrounding residential areas. The City will amend its zoning ordinances to require commercial centers within ¼ mile of the Santee Light Rail Transit station to reduce parking spaces by 10 percent from current zoning requirements. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Reduce 233,940 VMT by 2030 | 315 |
| 2035 | Reduce 233,940 VMT by 2035 | 263 |
| **Measure 6.2: Implement Bicycle Master Plan** | | |
| **City Action: Construct Bike Paths** | | |
| Starting in 2020 with completion by 2030 the City will expand bike routes to improve bike transit by increasing Class 1 Bike Path from 2.0 miles to 15.5 miles, Class 2 Bike Lane from 14.5 miles to 34.3 miles, and Class 3 Bike Route from 9.3 miles to 21.7 miles, which would implement City of Santee Bicycle Master Plan | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Reduce 230,387 VMT by 2030 | 311 |
| 2035 | Reduce 230,387 0 VMT by 2035 | 259 |

## *Goal 7: Increase Use of Electric Vehicles*

Electric vehicles (EVs) produce lower emissions than conventional vehicles. However, more than 95 percent of people still drive conventional gasoline or diesel vehicles. With the statewide EV ownership goal, EV ownership would reach 13 percent by 2035.


## Goal 7: Increase Use of Electric Vehicles

**Co-Benefits**

| Goal 7 Increase Use of Electric Vehicles | | |
|---|---|---|
| **Measure 7.1 Electric Vehicle Charger Program** | | |
| **City Action: Require Electric Vehicle Chargers** | | |
| On or before December2020 require all new residential and commercial development to install e-chargers. For new Single Family Residential Install complete 40 Amp electrical service and one e-charger, for new Multi-family Residential install e-chargers for 13 percent of total parking, for new Office Space, Regional Shopping Centers, and Movie Theaters, install e-chargers for 5 percent of total parking spaces, and for new Industrial and other Land Uses employing 200 or more employees install e-charges for 5 percent of total parking spaces. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Install 3,000 e-chargers | 21,723 |
| 2035 | Install 4,500 e-chargers | 47,414 |

## *Goal 8: Improve Traffic Flow*

Improving traffic flow reduces idling time and increases the fuel efficiency of vehicles on the road, which will reduce GHG emissions.

**Goal 8: Improve Traffic Flow**

**Co-Benefits**

| Goal 8 Improve Traffic Flow | | |
|---|---|---|
| **Measure 8.1 Traffic Flow Improvement Program** | | |
| **City Action: Improve Traffic Flow** | | |
| Starting in 2020 begin replacing 10 traffic signals with Smart Signals, retime 40 traffic signals, and install one round about. By 2035,retime a total of 60 traffic signals. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Retime 40 traffic signals, replace 10 existing traffic signals with Smart Signals, and install 1 roundabout. | 2,430 |
| 2035 | Retime a total of 60 traffic signals. | 2,130 |

## Solid Waste

### *Goal 9: Decrease GHG Emissions through Reducing Solid Waste Generation*

According to 2008 Statewide Waste Characterization data, the commercial sector generates nearly 75 percent of the solid waste in California. Furthermore, much of the commercial sector waste disposed in landfills is readily recyclable. Increasing the recovery of recyclable materials will directly reduce GHG emissions. In particular, recycled materials can reduce the GHG emissions from multiple phases of product production, including extraction of raw materials, preprocessing, and manufacturing. As described under the Regulatory Setting in Chapter 1, the Mandatory Commercial Recycling Measure was adopted in 2012 and is designed to achieve a reduction in GHG emissions of 5 million MT $CO_2e$. To achieve the measure's objective, an additional 11 percent of solid waste will need to be recycled from the commercial sector by 2020 and beyond. The City has also created a 90-percent diversion goal by 2035. The actions below are necessary to help the City achieve both its 2020 and 2035 goals. These goals will continue to progress the City towards zero waste. CalRecyle defines zero waste as "a process and a philosophy that involves a redesign of products and consumption, so that all material goods can be reused or recycled—or not needed at all."[27]


**Goal 9: Decrease GHG Emissions through Reducing Solid Waste Generation**

**Co-Benefits**

[27] CalRecycle. 2017. "Zero Waste." December 11, 2017. Website: http://www.calrecycle.ca.gov/ZeroWaste/ (accessed December 18, 2017).

| Goal 9 Decrease GHG Emissions through Reducing Solid Waste Generation | | |
|---|---|---|
| **Measure 9.1 Reduce Waste at Landfills** | | |
| **City Action: Divert at Least 80 Percent of Waste** | | |
| Require solid waste collector to provide recycling containers for all customers in compliance with State law and facilitate waste diversion requirements mandated on all solid waste facilities. Starting in 2020, require all development during construction and demolition activities to recycle construction and demolition waste. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Divert 70 percent total solid waste generated in the City. | 7,233 |
| 2035 | Divert 80 percent total solid waste generated in the City | 8,238 |

## Clean Energy

### *Goal 10: Decrease GHG Emissions through Increasing Clean Energy Use*

Renewable energy sources especially those that have zero or near zero emissions such as photovoltaic (PV) solar and wind generation are clean energy. Distributed renewable energy generation such as rooftop PV solar provides locally important environmental and economic benefits because the clean energy is being generated within the City of Santee

Besides distributed renewable energy generation, the City is also actively seeking opportunities to join the Community Choice Aggregation (CCA) program, which would allow the City's energy users to choose an alternative option to SDG&E and use more renewable energy. Nationally, the current CCA programs have renewable energy percentages between 20 and 100, and the national opt-out rates for the program range from 3 percent to 5 percent. Because electricity accounts for 31 percent of the City's baseline emission inventory, participation in a CCA district could provide an important source of future emission reductions.

Assembly Bill 117, which was signed into law in 2002, allows California cities and counties to either individually or collectively supply electricity to customers within their borders through the establishment of a CCA. The advantages of regional CCAs that include participation from multiple local jurisdictions would be the creation of efficiencies. The City will seek opportunities for collaboration with other local jurisdictions to develop and implement a CCA that would produce mutually beneficial results. Developing a CCA would require a detailed analysis of energy demand, efficiency opportunities, and available clean electricity sources for purchase.

On October 8, 2019, City Council voted unanimously to move forward with a CCA Program. The City is actively evaluating opportunities for local jurisdiction partners within SDG&E's territory to develop and implement a CCA that would product mutually beneficial results. To estimate the associated emissions reductions, LSA assumed that City Council would approve a CCA and launch the program sometime in 2022 with the goal of achieving 100 percent renewable energy by 2035.

The forthcoming CCA is expected to result in 46,322 MT $CO_2e$ reduced by 2030, and 56,932 MT $CO_2e$ reduced by 2035. However, due to the fact that implementation of a CCA program would require preparation time for carrying out studies, forming governing bodies, and carrying out other administrative tasks, to provide a conservative estimate, energy savings and GHG reductions from CCA are listed separately from the total quantification of other local reduction measures.

## Goal 10: Decrease GHG Emissions through Increasing Clean Energy Use

**Co-Benefits** 

| Goal 10 Decrease GHG Emissions through Increased Clean Energy Use | | |
|---|---|---|
| **Measure 10.1 Increase Distributed Renewable Energy Generation within the City of Santee** | | |
| **City Action: Require all New Development to Install Photovoltaic Solar Systems** | | |
| Starting in 2020 require New single-family homes to install at least 2kW per home; Multi-family residential to install at least 1kW per unit of PV solar systems, unless the installation is infeasible due to poor solar resources established in a solar feasibility study prepared by a qualified solar consultant submitted with an applicant's formal project submittal to City. On commercial buildings install at least 1.5 W per square feet of building area (e.g., 2,000 sq.ft. = 3 kW) unless the installation is infeasible due to poor solar resources. | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | Install a total of 3.1 Megawatts (MW) of PV solar within the City of Santee | 1,800 |
| 2035 | Install a total of 4.7 MW of PV solar within the City of Santee | 2,783 |
| **Measure 10.2: Community Choice Aggregation Program** | | |
| **City Action: Initiate a Community Choice Aggregation Program in the City of Santee** | | |
| Present to City Council for consideration a Community Choice Aggregation program that aims to provide 100 percent renewable energy by 2035[28][29] | | |
| **Target Year** | **Performance Metric** | **GHG Reduction Potential ($MTCO_2e$)** |
| 2030 | CCA Program to include a 100 percent renewable energy goal and achieve at least 75 percent zero emissions renewable energy with 95 percent public participation. | 46,322[30] |
| 2035 | CCA Program to include a 100 percent renewable energy goal and achieve at least 85 percent zero emissions renewable energy with 95 percent public participation. | 56,932 |

[28] Rather than assuming attainment of 100% clean energy, the City used the historical average of 70% clean energy for CCAs with similar goals. The actual percentage for the reduction measure could vary and may exceed this conservative assumption.

[29] The City used a conservative "opt out" rate of 5% which is at the upper range discussed above.

[30] GHG reductions calculated using historical data on CCAs in California accessed at LeanEnergy.org. Website: http://leanenergyus.org/cca-by-state/california/. Accessed on January 14, 2019.

# MUNICIPAL MEASURES

City operations make up a small percentage of the total communitywide GHG emissions, and therefore, the majority of the GHG reductions would result from the measures that are applied to the communitywide energy usage. Nevertheless, the City can set an example for its residents by improving the energy efficiency and reducing GHG emissions at its own facilities. This section summarizes the proposed reduction measures to be implemented by the City to further reduce its GHG emissions associated with energy consumption, water use, and transportation.

## *Goal M-1: Increase Energy Efficiency in Municipal Buildings*

### MEASURE M-1.1: PROCUREMENT POLICY FOR ENERGY-EFFICIENT EQUIPMENT

Energy efficient procurement policies can reduce government facility energy costs by about 5 to 10 percent.[31] As municipal appliances wear out, the City would replace them with Energy Star or energy efficient equipment. Energy Star offers an appliance calculator to estimate money and energy saved by purchasing its products.

| M-1.1: Procurement Policy for Energy Efficient Equipment | |
|---|---|
| **GHG Reduction Potential (2030)** | 19 MT $CO_2e$[32] |
| **GHG Reduction Potential (2035)** | 19 MT $CO_2e$ |
| **kWh Savings (2020)** | 48,450 kWh |
| **Co-Benefits** |  |

[31] Lawrence Berkeley National Laboratory, *Potential Energy, Cost, and $CO_2$ Saving from Energy-Efficient Government Purchasing*, 2002.

[32] GHG reductions calculated using CAPCOA Quantifying GHG Mitigation Measures (CAPCOA 2010), Section 2.1, Building Energy Use.

## MEASURE M-1.2: INSTALL COOL ROOFS

Surfaces with low albedo, or solar reflectance, amplify the urban heat island effect. Many surfaces in an urban environment consist of buildings' roofs. Roofs affect not only the temperature of the surrounding urban environment, but also the building's interior temperature. Upgrading roofs to materials with high albedo can reduce outdoor and indoor temperatures, thereby also reducing energy demand for air conditioning. Replacing a 1,000-square-foot dark roof with a white roof can offset approximately 10 MT $CO_2e$.

| M-1.2: Install Cool Roofs | |
|---|---|
| **Rate of GHG Reduction Potential 2030** | 10 MT $CO_2e$ per 1,000 sq. ft.[33] |
| **Rate of Estimated Energy Savings in 2030** | 28,319 kWh per 1,000 sq. ft. |
| **Co-Benefits** | |

[33] GHG reductions calculated using CAPCOA Quantifying GHG Mitigation Measures (CAPCOA 2010), Section 10.1, General Plans.

## MEASURE M-1.3: RETROFIT HVAC AND WATER PUMPING EQUIPMENT

The City could upgrade its heating, ventilation, and air conditioning (HVAC) systems to save energy. HVAC units, especially air conditioners, are large energy consumers. Applicable retrofits include converting central forced air conditioners into smart multi-zone systems and replacing inefficient HVAC equipment. The City has upgraded its HVAC system at City Hall, and will extend upgrades to other government buildings.

**M-1.3: Retrofit HVAC and Water Pumping Equipment**

| | |
|---|---|
| **GHG Reduction Potential (2030)** | 12 MT $CO_2e$[34] |
| **GHG Reduction Potential (2035)** | 12 MT $CO_2e$ |
| **kWh Savings (2020)** | 33,734 kWh |
| **Co-Benefits** | |

[34] GHG reductions calculated using CAPCOA Quantifying GHG Mitigation Measures (CAPCOA 2010), Section 2.1, Building Energy Use.

## *Goal M-2: Increase Energy Efficiency in Community Buildings and Infrastructure*

### MEASURE M-2.1: TRAFFIC SIGNAL AND OUTDOOR LIGHTING RETROFITS

Up to 2011, the City has replaced almost 1,000 City-owned streetlights with more energy-efficient lighting. An upgrade of all 1,986 City-owned streetlights is ongoing. Other outdoor lights (e.g. traffic signals, park lighting, etc.) can or will also be retrofitted.


| M-2.1: Traffic Signal and Outdoor Lighting Retrofits | |
|---|---|
| **GHG Reduction Potential (2030)** | 212 MT $CO_2e$[35] |
| **GHG Reduction Potential (2035)** | 421 MT $CO_2e$ |
| **kWh Savings (2020)** | 600,000 kWh |
| **Co-Benefits** | |

[35] GHG reductions calculated using CAPCOA Quantifying GHG Mitigation Measures (CAPCOA 2010), Section 2.2, Lighting.

## *Goal M-3: On-Road Energy Efficiency Enhancements; Employee Commute and Vehicle Fleet*

### MEASURE M-3.1: ENCOURAGE OR INCENTIVIZE EMPLOYEE CARPOOLS

The carpooling rate is as low as 3 percent for government employees of the City, and most people drive alone for work every day. Higher carpooling rates mean fewer VMT and GHG emissions, so encouraging carpooling by providing incentive programs such as cash incentives and necessary facilities such as preferred parking can be helpful.

| M-3.1: Encourage or Incentivize Employee Carpools | |
|---|---|
| **GHG Reduction Potential (2030)** | 6 MT $CO_2e$[36] |
| **GHG Reduction Potential (2035)** | 14 MT $CO_2e$ |
| **VMT Savings (2020)** | 16,544 miles |
| **Co-Benefits** | |

[36] GHG reductions calculated using CAPCOA Quantifying GHG Mitigation Measures (CAPCOA 2010), Section 3.4, Commute Trip Reduction Programs.

## MEASURE M-3.2: ENCOURAGE OR INCENTIVIZE PURCHASE OF HYBRID OR ELECTRIC VEHICLES

According to the employee commute survey, over 95 percent of government employees drive conventional gasoline or diesel vehicles, and only 1.5 percent of them plan to purchase an alternative fuel vehicle in the next year. Encouraging those employees to switch to any type of electrified vehicle would help reduce GHG by at least nearly 40 percent compared to conventional vehicles. The City will encourage employees to participate in the SDG&E and California Electric Vehicle (EV) incentive programs that provide rebates for the purchase of EVs.


| M-3.2: Encourage or Incentivize Purchase of Hybrid or Electric Vehicles | |
|---|---|
| **GHG Reduction Potential (2030)** | 5 MT $CO_2e$[37] |
| **GHG Reduction Potential (2035)** | 11 MT $CO_2e$ |
| **VMT Equivalent[38] Savings (2030)** | 13,188 miles |
| **Co-Benefits** | |

[37] GHG reductions calculated using CAPCOA Quantifying GHG Mitigation Measures (CAPCOA 2010), Section 3.7, Vehicles.

[38] Hybrid vehicles are expected to reduce fuel usage by 50 percent, which is equal to reducing VMT by 50 percent.

## MEASURE M-3.3: REPLACE OR SUPPLEMENT VEHICLE FLEET WITH HYBRID/ELECTRIC VEHICLES

The City's vehicle fleet results in more than 20 percent of total municipal GHG emissions. As hybrid or electric vehicles emit far less GHG than conventional cars, encouraging the replacement of the conventional vehicle fleet can help reduce the City's municipal GHG emissions greatly.

### ACTION

☐ Within one year of the plan adoption, staff will present for City Council consideration a resolution committing to the phased replacement of all non-emergency, non-construction, and non-all-terrain vehicles with electric vehicles.

| M-3.3: Replace or Supplement Vehicle Fleet with Hybrid/Electric Vehicles | |
|---|---|
| **GHG Reduction Potential (2030)** | 7 MT $CO_2e$[39] |
| **GHG Reduction Potential (2035)** | 16 MT $CO_2e$ |
| **VMT Equivalent[40] Savings (2030)** | 19,268 miles |
| **Co-Benefits** | |

[39] GHG reductions calculated using CAPCOA Quantifying GHG Mitigation Measures (CAPCOA 2010), Section 3.7. Vehicles.

[40] Hybrid vehicles are expected to reduce fuel usage by 50 percent, which is equal to reducing VMT by 50 percent.

## MEASURE M-3.4: INSTALL E-VEHICLE CHARGERS

More e-vehicle chargers become an incentive for employees to purchase an alternative fuel vehicle and to replace the conventional vehicle fleet with e-vehicles. The City can reduce GHG emissions indirectly through this measure.

### ACTION

☐ Install a minimum of one EV charging Station within the public parking at City Hall within Fiscal year 2020-2021


| M-3.4: Install E-Vehicle Chargers | |
|---|---|
| **GHG Reduction Potential (2035)** | Reductions calculated in M-3.2 |
| **)** | |
| **Co-Benefits** | |

### *Goal M-4: Reduce Energy Consumption in the Long Term*

MEASURE M-4.1: ONGOING ACTIONS AND PROJECTED REDUCTIONS

Based on completed and planned GHG reduction projects between 2013 and 2020 that are listed and quantified above, the City expects to reduce GHG emissions by approximately 34 MT $CO_2e$ annually. Assuming the City continues to achieve these annual reductions by continuing to implement committed measures and programs, it is projected that that the City could reduce energy related emissions by an additional 558 MT $CO_2e$ below the baseline level by 2035.

| M-5.1: Ongoing Actions and Projected Reductions | |
|---|---|
| **GHG Reduction Potential (2035)** | 558 MT $CO_2e$ |
| **Co-Benefits** | |

## SUPPORTING MEASURES

In addition to the mandatory community-wide reduction measures described above, which are necessary to meet the reduction targets in the Sustainable Santee Action Plan, the City will implement the following voluntary programs, policies, and projects to further reduce community and municipal GHG emissions. The supporting measures are anticipated to decrease GHG emissions but cannot yet be quantified or measured with the level of certainty necessary to constitute mandatory reduction measures.

- ☐ Designate a Sustainable Program Manager to oversee implementation of the Sustainable Santee Plan.
- ☐ Within six months of adoption of the Sustainable Santee Plan, establish a City webpage dedicated to the Sustainable Santee Plan that provides information to residents, businesses, and project applicants related to the plan, including but not limited to:
    - Financial incentives for reducing energy use, such as home upgrades through the HERO program, the California Solar Initiative, the Property-Assessed Clean Energy (PACE) program, and rainwater harvesting rebates;
    - Process for obtaining Tier 1 and Tier 2 Green Building Ratings such as LEED, Build It Green/Green Point Rating System, or Energy Star® certified buildings;
    - Programs and incentives to facilitate the installation of EV-chargers;
    - Updates to Title 24;
    - Measures and opportunities to reduce, reuse, and recycle waste;
    - Available ridesharing programs and school bus services and the benefits of both;
    - Programs and events in Santee promoting energy efficiency and sustainability;
    - Options for obtaining an energy audit for residences and businesses, such as through Energy Upgrade California;
    - Training opportunities offered by City, SDG&E and other entities on reducing energy and fuel use; and
    - Application of the Sustainable Santee Consistency Checklist for new development.
- ☐ Within six months of adoption of the Sustainable Santee Plan, establish an email recipient list for Santee residences, business, and interested persons to provide periodic email updates on the Sustainable Santee Plan and information on ways to facilitate its goals.
- ☐ On or before December 2020:
    - Establish online permitting to facilitate upgrades to residences and businesses;
    - Update the City's official street tree list to include more water-efficient varieties;
    - Update the Zoning Ordinance to add clarity on desired recreational amenities in multifamily complexes to replace the previously desired pool and water features;
    - Conduct a municipal energy audit, and continue to do so every two years, to inform City staff on municipal energy use and opportunities for improvement;
    - Conduct a study to evaluate the feasibility of installing EV charging stations on City property;
    - Upgrade or incorporate water-conserving landscape at City facilities, to the extent feasible; and
    - Plant trees in City-owned spaces to reduce urban heat island effect and building energy use and increase carbon sequestration, to the extent feasible.
- ☐ Track energy efficiency retrofits of existing residential and commercial land uses within the City through the permit application process.

☐ Track LEED and Energy Star participation of new construction within the City through the permit application process.

## SUMMARY OF REDUCTIONS

By implementing the statewide and local reduction measures described above, the City would reduce its community-wide GHG emissions by 40 percent compared to the 2020 BAU emissions. Statewide measures reduce the City's GHG emissions by 19 percent and the local measures reduce it an additional 21 percent. TABLE 10 and TABLE 11 summarize the strategies and the potential GHG reductions for community and municipal operations, respectively.

TABLE 10 **Summary of Community GHG Reduction Strategies and Emission Reductions**

| Goals and Measures | 2030 Emission Reductions (MT $CO_2e$) | 2035 Emission Reductions (MT $CO_2e$) |
|---|---|---|
| **Goal 1: Increase Energy Efficiency in Existing Residential Units** | | |
| 1.1: Energy Audits in the Existing Residential Sector | | |
| Permits for Minor Modifications | 45 | 45 |
| Permits for Major Modifications | 7,811 | 7,811 |
| **Goal 2: Increase Energy Efficiency in New Residential Units** | | |
| 2.1: Exceed Energy Efficiency Standards | 13,524 | 17,750 |
| **Goal 3: Increase Energy Efficiency in Existing Commercial Units** | | |
| 3.1: Energy Audis in the Existing Commercial Sector | | |
| Permits for Minor Modifications | 660 | 660 |
| Permits for Major Modifications | 8,010 | 8,010 |
| **Goal 4: Increase Energy Efficiency in New Commercial Units** | | |
| 4.1: Exceed Energy Efficiency Standards | 8,705 | 12,337 |
| **Goal 5: Decrease Energy Demand through Reducing Urban Heat Island Effect** | | |
| 5.1: Tree Planting for Shading and Energy Efficiency | 47 | 22 |
| 5.2: Light-reflecting Surfaces for Energy Efficiency | 1 | 1 |
| **Goal 6: Decrease Greenhouse Gas Emissions through Reducing Vehicle Miles Traveled** | | |
| 6.1: Non-Motorized Transportation Options | 315 | 263 |
| 6.2: Implement Bicycle Master Plan to Expand Bike Routes in the City | 311 | 259 |
| **Goal 7: Increase Use of Electric Vehicles** | | |
| 7.1: Electric Vehicle Charger Program | 21,723 | 47,414 |

TABLE 10 (Continued) Summary of Community GHG Reduction Strategies and Emission

| Goals and Measures | 2030 Emission Reductions (MT $CO_2e$) | 2035 Emission Reductions (MT $CO_2e$) |
|---|---|---|
| **Goal 8: Improve Traffic Flow** | | |
| 8.1: Traffic Flow Improvement Program | 2,430 | 2,130 |
| **Goal 9: Decrease Greenhouse Gas Emissions through Reducing Solid Waste Generation** | | |
| 9.1: Reduce Waste to Landfills | 7,233 | 8,238 |
| **Goal 10: Decrease Greenhouse Gas Emissions through Increasing Clean Energy Use** | | |
| 10.1: Increase Distributed Renewable Energy Generation within Santee | 1,800 | 2,783 |
| 10.2: Community Choice Aggregation Program[1] | 46,322 | 56,932 |
| **Total Community Measures** | | |
| Total of All Measures Excluding CCA | 72,615 | 107,723 |
| Total of All Measures Including CCA | 118,937 | 164,655 |

[1] CCA is separated from total of other reduction measures.

BAU = Business as Usual

CCA = Community Choice Aggregation

MT $CO_2e$ = metric tons of carbon dioxide equivalent

SB = Senate Bill

TABLE 11 **Summary of Municipal GHG Reduction Strategies and Emission Reductions**

| Goal and Measure | 2030 Emission Reductions (MT $CO_2e$) | 2035 Emission Reductions (MT $CO_2e$) |
|---|---|---|
| **Goal M-1: Increase Energy Efficiency in Municipal Buildings** | | |
| M-1.1: Procurement Policy for Energy Efficient Equipment | 19 | 19 |
| M-1.2: Install Cool Roofs | 4 | 4 |
| M-1.3: Retrofit HVAC and Water Pump Equipment | 12 | 12 |
| **Goal M-2: Increase Energy Efficiency in Community Buildings and Infrastructure** | | |
| M-2.1: Traffic Signal and Outdoor Lighting Retrofits | 212 | 421 |
| **Goal M-3: On-Road Energy Efficiency Enhancements; Employee Commute and Vehicle Fleet** | | |
| M-3.1: Encourage or Incentivize Employee Carpools | 6 | 14 |
| M-3.2: Purchase of Hybrid or Electric Vehicles | 5 | 11 |
| M-3.3: Replace or Supplement Vehicle Fleet with Hybrid/Electric Vehicles | 7 | 16 |
| M-3.4: Install E-Vehicle Chargers | Supporting Measure | |
| **Goal M-4: Reduce Energy Consumption in the Long Term** | | |
| M-4.1: Ongoing Actions and Projected Reductions | - | 558 |
| **Total Municipal Measures** | | |
| Total of all Measures listed above | 264 | 1,054 |

BAU = Business as Usual
MT $CO_2e$ = metric tons of carbon dioxide equivalent
SDG&E = San Diego Gas & Electric

## COMPARISON OF REDUCTIONS TO TARGETS

TABLE 12, TABLE 13, FIGURE 12, and Figure 13 summarize the baseline 2005 community and municipal emissions, the projected 2020, 3030, and 2035 emission inventory, as well as the reduced 2020, 2030, and 2035 inventories after implementation of the reduction measures for community and municipal operations, respectively.

In 2030, without the CCA, implementation of Statewide and local measures together would reduce emissions from the 2030 BAU level to 266,219MT $CO_2e$, which does not meet the 40 percent below 2005 levels reduction target of 249,596 MT $CO_2e$ for 2030. Implementation of the CCA would provide an additional 46,322 MT $CO_2e$ in reductions and result in the City meeting the 2030 reduction target. In 2035, without the CCA, implementation of statewide and local measures together would reduce emissions from the 2035 BAU level to 228,820 MT $CO_2e$, which would not meet the 49 percent below 2005 levels reduction target of 173,386 MT $CO_2e$ for 2035. Implementation of the CCA would provide an additional 56,932in MT $CO_2e$ reductions and result in the City meeting the target.

TABLE 12 **Community Emissions and Targets Comparison**

| | 2030 MT $CO_2e$ | 2035 MT $CO_2e$ |
|---|---|---|
| BAU Emissions | 486,170 | 515,462 |
| Reduction Target | 249,596 | 173,386 |
| State and Federal Reductions | 146,656 | 178,919 |
| Local Measures Reductions Excluding CCA | 72,615 | 107,723 |
| Total Adjusted Emissions Without CCA | 266,899 | 228,820 |
| Additional Reductions Needed | 17,303 | 55,434 |
| CCA Reductions | 46,322 | 56,932 |
| Total Adjusted Emissions With CCA | 220,577 | 171,888 |
| Additional Reductions Needed | Target Met | Target Met |

Notes and Acronyms:
BAU = Business as Usual
CCA = Community Choice Aggregation
MT $CO_2e$ = metric tons of carbon dioxide equivalent

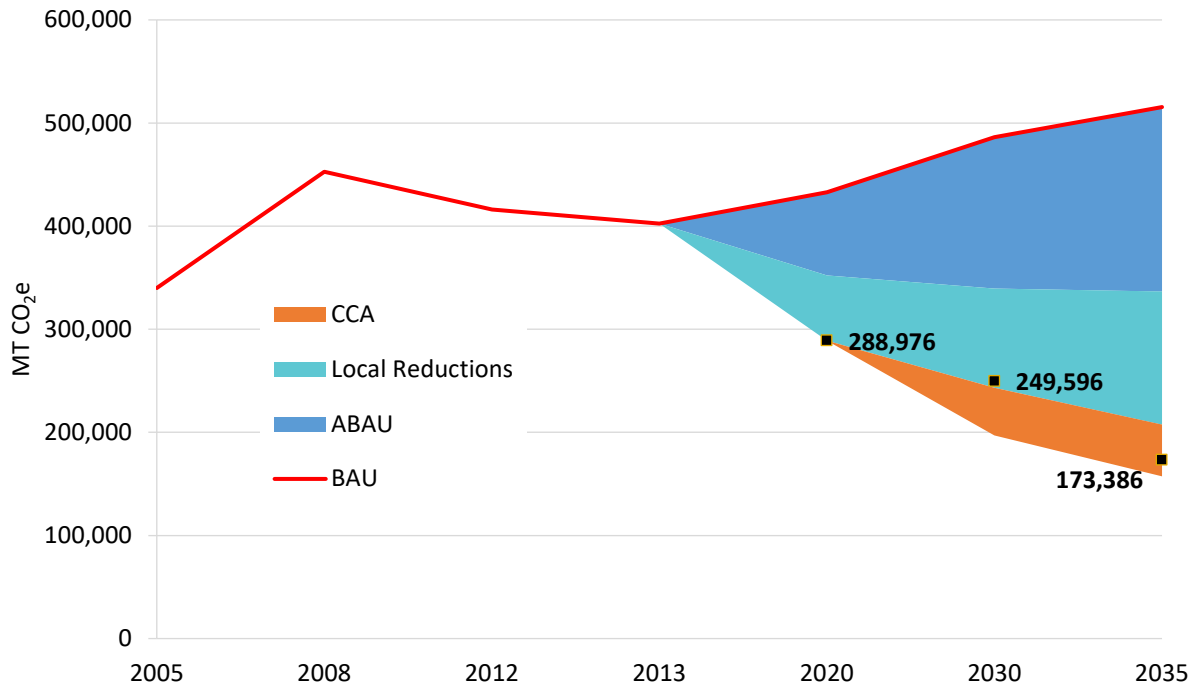



FIGURE 12 **State and Local Reductions Comparison with Targets for Community**

By 2020, the Statewide and local measures together would reduce the City's municipal GHG emissions from the 2020 BAU condition by 31 percent, or 597 MT $CO_2e$. The total adjusted

emissions would be 1,351 MT $CO_2e$, which would exceed the 15 percent below 2005 levels reduction target of 1,408 MT $CO_2e$ for 2020. Implementation of additional measures beyond 2020 would result in a 69 percent or 1,400 MT $CO_2e$ reduction below 2035 BAU. That would result in 631 MT $CO_2e$ of emissions and would exceed its municipal operation 49 percent below 2005 levels target of 845 MT $CO_2e$ by 2035.

TABLE 13 **Municipal Emissions and Targets Comparison**

| | 2005 | 2020 | 2030 | 2035 |
|---|---|---|---|---|
| | MT $CO_2e$ | MT $CO_2e$ | **MT $CO_2e$** | **MT $CO_2e$** |
| BAU Emissions | 1,657 | 1,948 | 2,003 | 2,031 |
| Reduction Target | -- | -- | 994 | 845 |
| State and Federal Reductions | -- | 337 | 346 | 350 |
| Local Energy Efficiency Reductions | -- | -- | 264 | 1,054 |
| Total Adjusted Emissions | -- | 1,611 | 399 | 627 |
| Additional Reductions Needed | -- | -- | Target Met | Target Met |

Notes and Acronyms:
BAU = Business as Usual MT $CO_2e$ = metric tons of carbon dioxide equivalent

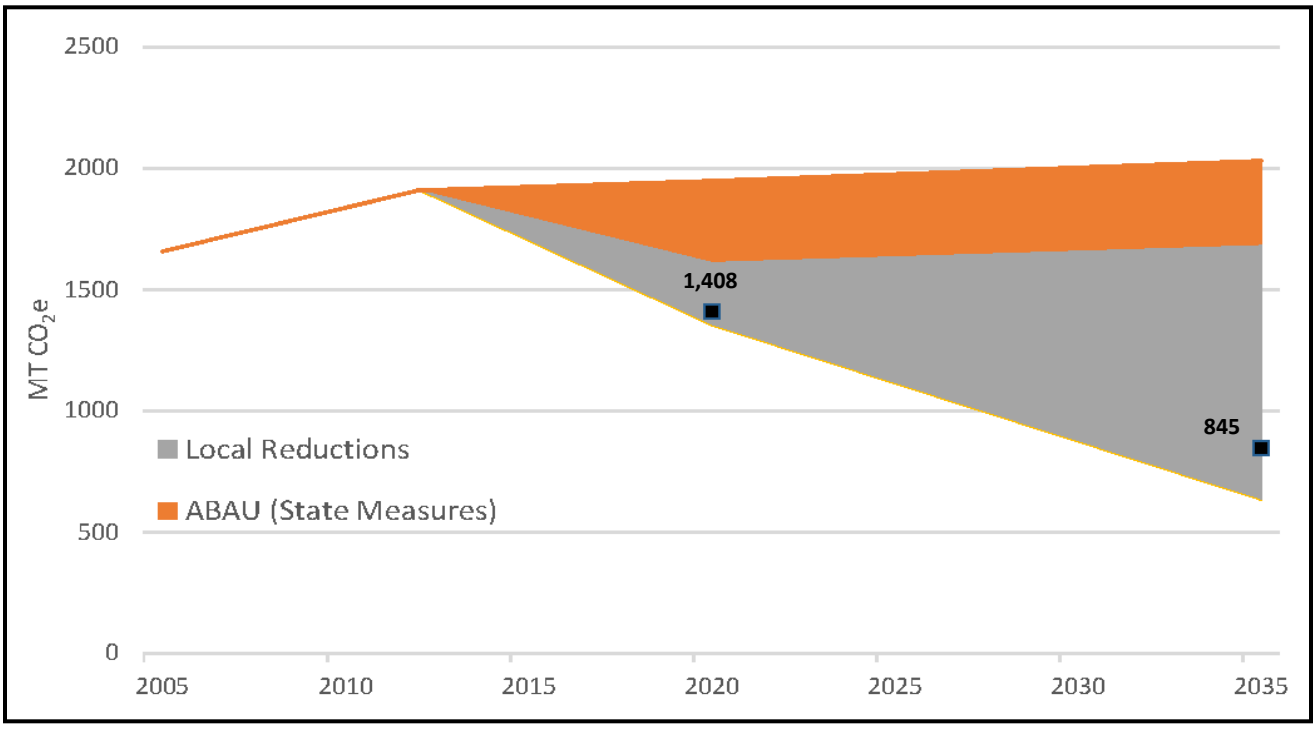



FIGURE 13 **State and Local Reductions Comparison with Targets for Municipal Emissions**

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# CHAPTER 4 Adaptation

The City recognizes that planning sustainably is more than reducing GHG emissions; it also requires being prepared for changes that would impact the community's quality of life, use of resources, and economy. Preparedness, or adaptation, efforts seek to reduce vulnerability and increase the local capacity to adapt to changes. Therefore, this Plan summarizes changes in average and extreme weather that may occur in the next several decades and identifies actions to build resilience and adapt to those changes.

## PROJECTIONS OF FUTURE CLIMATE

Studies show that California will experience warmer temperatures, increased drought, and more extreme weather events.[41] The impacts to the city will be similar.

The City may expect:

- **Increased temperatures**—By the end of this century, the average United States temperatures are predicted to increase by 3 °F to 12 °F, depending upon the amount of

[41] California Natural Resources Agency and California Energy Commission, *Our Changing Climate 2012: Vulnerability & Adaptation to the Increasing Risks from Climate Change in California.* CEC-500-2012-007. July 2012.

future emissions and how the earth responds to those emissions.[42] For California, the average annual temperature is expected to rise by 2.7 °F by 2050 and 4.1 to 8.6 °F by the end of the century.[43] For the city, average temperatures are expected to increase between about 5 °F and 10 °F by the end of the century, depending on the emission scenario.[44]

- **Variable precipitation**— Globally, future precipitation is highly variable, and California is no exception. Annual precipitation in California is expected to increase by more than 12 percent through the end of the 21st century. Most of this increase is expected in Northern and Central California; precipitation in Southern California is expected to decrease by 3.3 percent. All regions of California are expected experience wetter winters, with Southern California rain increasing by 11 percent during the rainy months of December, January, and February.[45]
- **Increase in extreme weather events**—The historical number of extreme heat days (days over 99.9 °F) has been about four in Santee. By 2050, the number of extreme heat days in the city could increase to more than 12 per year, and by the end of the century, the number of extreme heat days could exceed 40 per year (FIGURE 14).[46] In addition, the length of extremely hot days will increase. Historically, the maximum duration of heat waves in the city has been four, but may increase to 10 by mid-century and 20 to 45 by the end of the century.

[42] U.S. Global Change Research Program. 2014. Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment*.
[43] California Natural Resources Agency and California Energy Commission. 2012. *Our Changing Climate 2012: Vulnerability & Adaptation to the Increasing Risks from Climate Change in California.* CEC-500-2012-007. July.
[44] Scripps Institution of Oceanography. 2017. Projected Temperatures Data Set (2017). Website: http://cal-adapt.org/tools/annual-averages/#climatevar=tasmax&scenario=rcp85&lat=32.84375&lng=-.
[45] Allen, Robert J., and Rainer Luptowitz. 2017. "El Niño-like Teleconnection Increases California Precipitation in Response to Warming." Nature Communications 8 (July): 16055. doi:10.1038/ncomms16055.
[46] Scripps Institution of Oceanography. 2017 Projected Daily Temperature Data Set (2017), Website: http://cal-adapt.org/tools/extreme-heat/#climatevar=tasmax&scenario=rcp85&lat=32.84375&lng=-116.96875&boundary=locagrid&units=fahrenheit.

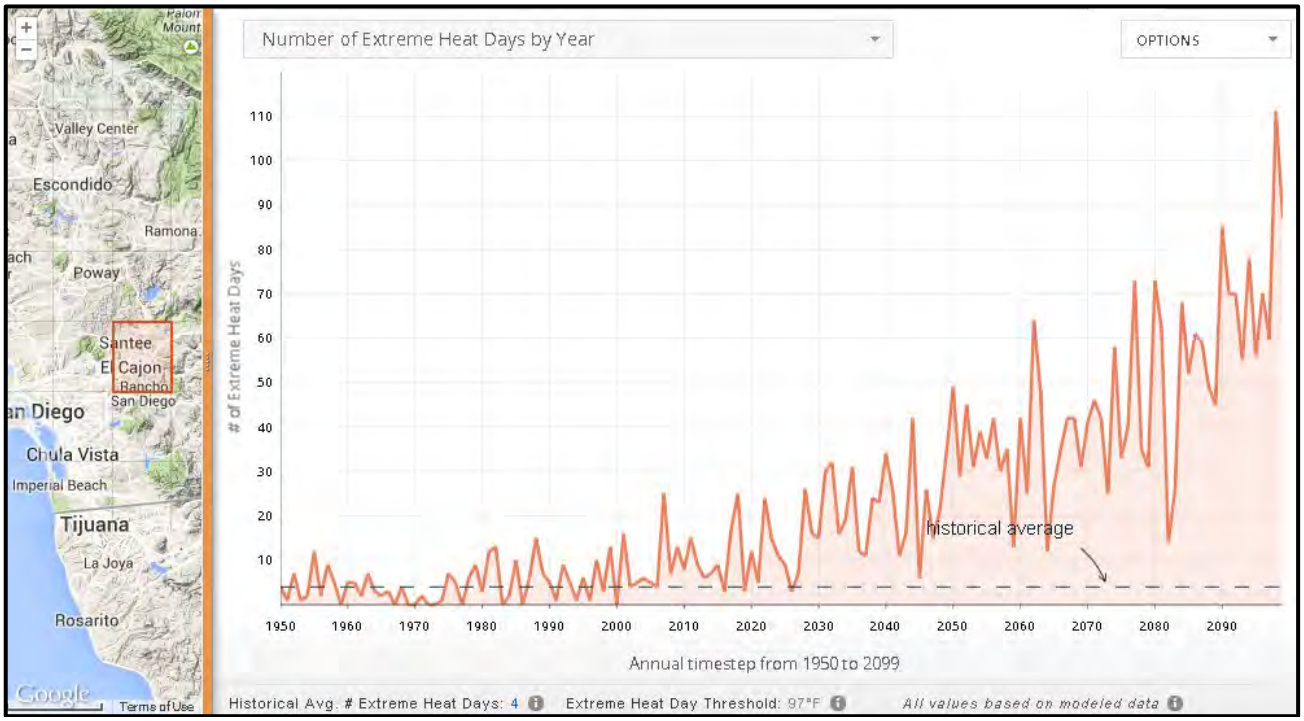



FIGURE 14 **Number of Extreme Heat Days per Year**

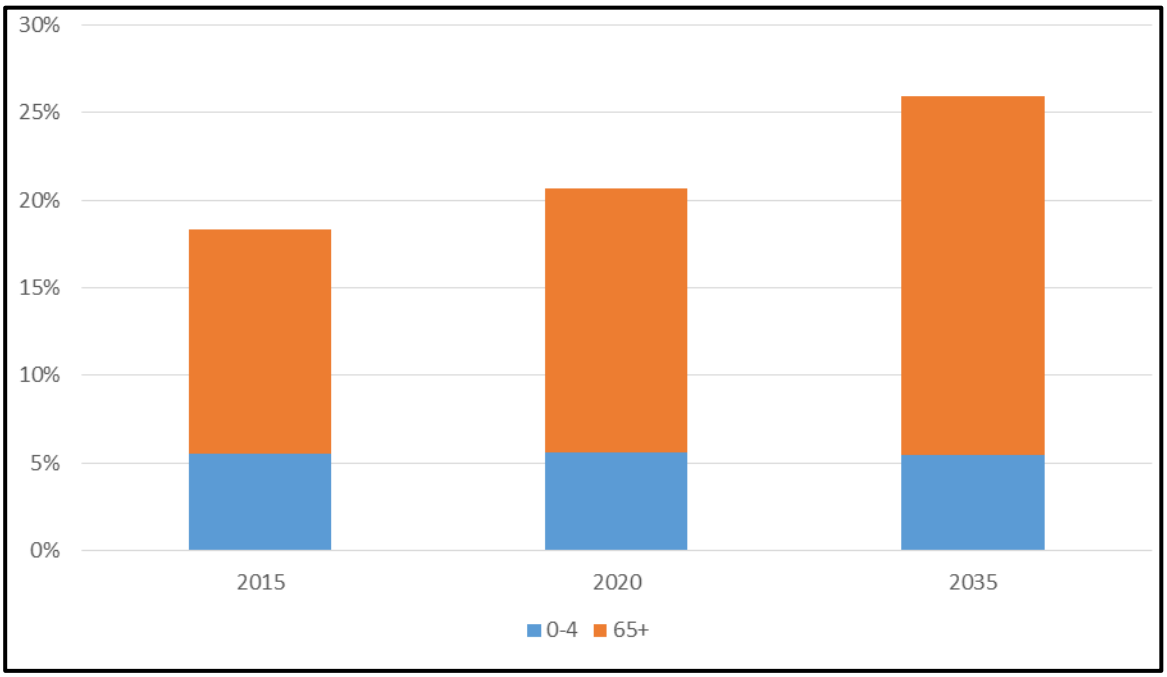
## IMPACTS OF CLIMATE CHANGE AND ADAPTATION STRATEGIES

Increasing awareness and concern regarding potential climate change impacts has led to some policy responses and programs aimed at reducing GHG emissions at the City, including Executive Order S-13-08 discussed in Chapter 1. Impacts of climate change are already being seen and other more serious consequences are likely to occur in the future. The exact nature of the impacts is unknown and also depends on near-term emissions, but the most likely impacts to the State and to the City over the next century are discussed below along with strategies to reduce potential impacts or to build resiliency to impacts. To this end, the City of Santee is part of the regional *Multi-Jurisdictional, Multi-Hazard Mitigation Plan.*

### Public Health & Safety

Periods of increased high temperatures or extended high temperatures can lead to increased heat-related, cardiovascular-related, and respiratory illnesses and diseases, and other health impacts. Emergency medical services and hospital visits also increase during heat waves. Changes in temperature are also expected to worsen air quality by increasing ozone and particulate matter concentrations, which can cause or exacerbate respiratory symptoms such as asthma attacks. The City recognizes that climate change will not impact all populations equally. Especially sensitive populations include the young (under 5 years of age) and the elderly (over 65), which constitute 19 percent of the 2015 population and will increase to more than 35 percent of the population by 2035 (FIGURE 15). Other populations that could be affected by extreme temperatures include outdoor

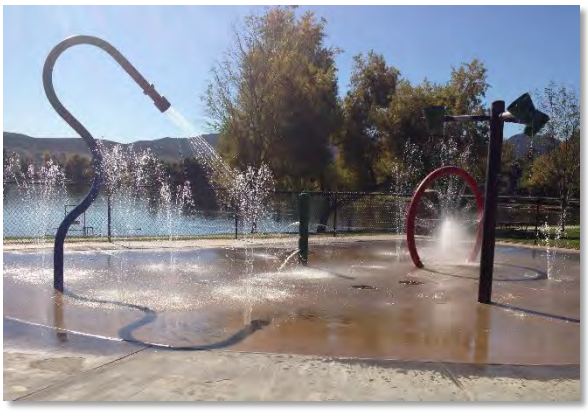
workers such as construction and maintenance employees. This places limits on work hours and may require additional training for workers to expand their understanding of heat-related illnesses.




SOURCE: SANDAG Data Warehouse

FIGURE 15 **Percentage of Santee's Population Considered Sensitive**

## *Strategies*



- Map neighborhoods that could be more vulnerable to the effects of climate change, such as flooding, fire, and the urban heat island effect is important in identifying high risk areas of the City.
- Create cooling centers at public spaces, such as libraries, for populations without air conditioning.
- Implement cooling technologies such as cool roofs and cool pavements.
- Strategically place shade trees near buildings, in parking lots, and along bike and pedestrian pathways.
- Use reverse 911 call to notify residents of serious heat events or natural disasters, and encourage residents to register into the "AlertSanDiego" system

## Electrical Demand

In addition to the health and public safety risks, the City may face challenges to its energy supply due to warmer temperatures. Peak demand for electricity may increase due to the increased use of air conditioners in the City and other regions of SDG&E territory, which may cause brownouts or blackouts. Additionally, efficiencies of electricity generation and transmission decrease as air temperatures increase, which further inhibit the ability of electric providers to meet increased demand.

### *Strategies*

- ☐ Educate the public to become more energy efficient and reduce demand.
- ☐ Solar-based or other renewable energy sources to supplement the grid and to reduce peak demand on the grid.
- ☐ Improve building envelopes by adding insulation and placing trees to provide shade
- ☐ Encourage cooling technologies.
- ☐ Increase the use of smart-meter devices to allow appliances to run on off-peak hours.

## Water Availability

Water availability is and has been a vital economic, natural resource, and public health issue in California. Governor Jerry Brown declared a drought State of Emergency in January 2015 and the State Water Resources Control Board (SWRCB) announced in March 2015 water suppliers were encouraged to go beyond the minimum requirements to safeguard remaining water supplies. In April 2015, the Governor issued Executive Order B-29-15 that directs the SWRCB to implement mandatory water reductions to reduce water usage by 25 percent. Multiyear droughts decrease water supplies, while population growth exacerbates the problem by increasing demand. Supply limitations will only intensify as climate change causes reduced rainfall and increased temperatures. The San Diego County Water Authority, the wholesale supplier to San Diego County, expects demand to increase 22 percent between 2009 and 2035.[47] The water agency serving the City, Padre Dam Municipal Water District, also sets water demands goals through 2035 consistent with SB X7-7 in the Urban Water Management Plan. SDCWA provided potential actions that may be taken in a drought situation in the Water Shortage and Drought Response Plan.

[47] San Diego County Water Authority. 2014. *San Diego County Water Authority Climate Action Plan*. p. 28. March.

### *Strategies*

- ☐ Educate the public about water conservation.
- ☐ Encourage low-impact development.
- ☐ Expand water recycling and grey-water systems.
- ☐ Promote sub-metering in multifamily housing units.
- ☐ Promote conversion of turf grass to xeriscaping.


## Infrastructure Damage

Cities, including Santee, rely on infrastructure for commuting, working, and other basic services. Roadways and buildings are built for long-term use; however, infrastructure is also susceptible to the impacts of climate change as it is generally built to meet historic climate conditions. Therefore, infrastructure is also vulnerable to climate change impacts. Much of the roadways and railways are dark or metal-based, conducting heat and raising temperatures well beyond the observed air temperature. Increased temperatures can cause pavement to soften and to expand, causing potholes. Railways can buckle under extreme heat, requiring trains to go slower to navigate the buckle or stop service for repairs. Flooding can also shorten the life of roadway infrastructure, require more maintenance, and cause traffic delays. Building infrastructure likewise may have shortened lifetimes due to flooding.

### *Strategies*

- ☐ Evaluate infrastructure vulnerability based on current degradation and expected climate-related impacts.
- ☐ Prioritize and plan for infrastructure improvements that increase fire safety and reduce energy, especially in vulnerable neighborhoods.
- ☐ Identify alternative routes where infrastructure damage may occur.

## Wildfire

Because California is expected to experience increased temperatures and reduced precipitation, there will likely be more frequent and intense wildfires and longer fire seasons. About one-third of the City of Santee is covered by open space, which is the type of land most vulnerable to wildfire. Effects from wildfire can include eye and respiratory illness, worsening asthma, allergies, chronic obstructive pulmonary disease, and other cardiovascular and respiratory diseases.

Homes and buildings near open space areas could also be threatened by future wildfires. All new buildings within a State Responsibility Area, Local Agency Very-High Fire Hazard Severity Zone, or Wildland-Urban Interface Fire Area designated by the enforcing agency must comply with all sections of the Wildland-Urban Interface Fire Area Building Standards. These standards provide a

reasonable level of exterior wildfire exposure protection for buildings within these hazard areas and establish minimum standards for materials and material assemblies to lessen the vulnerability of a building to resist the intrusion of flames and burning embers projected during a conflagration or wildfire.[48] Additional resources may be needed to combat additional wildfires in the region, including already-scarce water.

### *Strategies*

- ☐ Educate the public on the importance of fire safety.
- ☐ Buffer zones between vegetation and structures and infrastructure.
- ☐ Identify fire-prone habitats, evaluate and plan for increased risk of larger and more frequent wildfires.


## Social Equity

The City recognizes that some disadvantage populations (e.g., youth, elderly, low-income) may need special assistance in adapting to future climate changes. Disadvantage populations are more likely to be without air conditioning and may need assistance in accessing cooling locations, especially if they do not have cars or cannot drive. Disadvantaged populations may also face increased financial hardships with increased energy use. While the City may not be able to change the underlying factors of disadvantaged populations (e.g., age, health status, socio-economic) it can provide information and access to resources to help these populations adapt to future climate changes.

### *Strategies*

- ☐ Increase public outreach and educational programs to inform the public of health and safety resources.
- ☐ Assist in facilitating access to cooling centers for the public.
- ☐ Provide information about available low-income weatherization programs and identify other outreach methods to increase visibility and familiarity with these programs.
- ☐ Educate the public on the benefits of improved occupant comfort and reduced utility bills.

[48] Department of Forestry and Fire Protection, Office of the State Fire Marshal. 2007. *Wildland-Urban Interface Building Standards Information Bulletin*. Website: http://www.fire.ca.gov/fire_prevention/downloads/IB_LRA_Effective_Date.pdf (accessed December 5, 2017).

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# CHAPTER 5 Plan Implementation

This chapter describes implementation steps for the Plan to support achievement of the energy efficiency and GHG reduction goals for the community at large. Success in meeting the City's energy efficiency and GHG emission reduction goals will depend on cooperation, innovation, and participation by the City and residents, businesses, and local government entities. This section outlines key steps that the City would follow for the implementation of this Plan.

Successful implementation of the Plan will require the following components. These are described in more detail the sections below.

- Administration and/or staffing
- Financing and budgeting
- Timelines for measure implementation
- Community outreach and education
- Monitoring, reporting, and adaptive management

## ADMINISTRATION AND STAFFING

The Plan's success will require coordination with other regional agencies. The City will work with these agencies and will designate staff to oversee the successful implementation and the tracking of all selected GHG reduction strategies. The City will primarily be responsible for coordinating with contacts across departments to gather data, to report on progress, to track completed projects, and to ensure that scheduling and funding of upcoming projects is discussed at key City meetings. The City may identify one or more staff to act as the Plan Implementation Administrator(s) to guide monitoring, reporting, and dissemination of information to the public. Where possible, the City may use assistants from programs such as CivicSpark, an AmeriCorps program designed to build capacity for local governments to address climate change.

The Administrator could have the following responsibilities:

- Secure long-term financing for the energy efficiency and GHG reduction measures (i.e., grant application primary contact)
- Coordinate Plan implementation-related meetings
- Serve as the external communication hub to local and regional climate action organizations, including SANDAG
- Conduct public outreach to inform the community of the City's reduction planning efforts
- Investigate methods to use existing resources and harness community support to better streamline implementation of the Plan
- Monitor implementation of reduction measures and success of the Plan
- Develop a protocol for monitoring the effectiveness of emission-reduction programs
- Establish guidelines for reporting and documenting emission-reduction progress.
- Submit annual reports to the City Council
- Develop a protocol for using the real-time information collected through the verification process to modify and revise existing reduction programs
- Track State and federal legislation and its applicability to the City

In general, the goal in implementing the Plan is not to create new administrative tasks or new staff positions necessarily, but rather to leverage existing programs and staff to the maximum extent feasible. The City would seek to fold GHG planning and long-term reduction into its existing procedures, institutional organization, reporting, and long-term planning.

## FINANCING AND BUDGETING

Implementation of the local GHG reduction measures may require investment for the capital improvements and other investments, and increased operations and maintenance costs. However, in some cases operating costs are anticipated to decrease, resulting in offset savings. This section presents a summary of funding and financing options (**TABLE 14**) available at the writing of this

document. Some funding sources are not necessarily directed towards a City, but to a larger regional agency such as SANDAG, or a waste services provider serving multiple jurisdictions. The City would monitor private and public funding sources for new grant and rebate opportunities and to better understand how larger agencies are accessing funds that can be used for GHG reductions in their area. Leveraging financing sources is one of the most important roles the City can play in helping the community to implement many of the GHG reduction measures.

TABLE 14 **Potential Funding Sources to Support GHG Reduction Measures**

| Funding Source | Description |
|---|---|
| **State and Federal Funds** | |
| Federal Tax Credits for Energy Efficiency | ■ Tax credits for energy efficiency can be promoted to residents. |
| Energy Efficient Mortgages (EEM) | ■ An EEM is a mortgage that credits a home's energy efficiency in the mortgage itself.<br>■ Residents can finance energy-saving measures as part of a single mortgage.<br>■ To verify a home's energy efficiency, an EEM typically requires a home energy rating of the house by a home energy rater before financing is approved.<br>■ EEMs are typically used to purchase a new home that is already energy efficient, such as an ENERGY STAR®-qualified home. |
| California Department of Resources Recycling and Recovery (CalRecycle) | ■ CalRecycle grant programs allow jurisdictions to assist public and private entities in management of waste streams.<br>■ Incorporated cities and counties in California are eligible for funds.<br>■ Program funds are intended to:<br>○ Reduce, reuse, and recycle all waste<br>○ Encourage development of recycled-content products and markets<br>○ Protect public health and safety and foster environmental sustainability |
| California Energy Commission (CEC) | ■ CEC has energy efficiency financing options for projects with proven energy savings. These options include 0% interest rate loans for K–12 school districts, county offices of education, State special schools, community colleges, and 1% interest rate loans for cities, counties, special districts, public colleges or universities, public care institutions/public hospitals, University of California campuses, and California State University campuses.<br>■ Projects eligible for the CEC energy efficiency financing low interest loans include:<br>○ Lighting system upgrades<br>○ Pumps and motors<br>○ Streetlights and light-emitting diode (LED) traffic signals<br>○ Building insulation<br>○ Heating, ventilation and air conditioning equipment<br>○ Water and waste water treatment equipment |
| California Air Resources Board (CARB) | ■ CARB offers several grants, incentives, and credits programs to reduce on-road and off-road transportation emissions. Residents, businesses, and fleet operators can receive funds or incentives depending on the program.<br>■ The following programs can be utilized to fund local measures:<br>○ Air Quality Improvement Program (Assembly Bill 118)<br>○ Carl Moyer Program – Voucher Incentive Program |

TABLE 14 **Potential Funding Sources to Support GHG Reduction Measures**

| Funding Source | Description |
|---|---|
| | ○ Goods Movement Emission Reduction Program (Proposition 1B Incentives)<br>○ Loan Incentives Program<br>○ Lower-Emission School Bus Program/School Bus Retrofit and Replacement Account (Proposition 1B and United States Environmental Protection Agency Incentives) |
| Existing Capital Improvement Program | ■ State and federal funds would most likely continue to local governments, builders, and homeowners in the following forms:<br>○ Grants<br>○ Transportation and transit funding<br>○ Tax credit and rebate programs<br>○ The Capital Improvement Program can be utilized for measures relating to traffic or transit. |
| State Funding for Infrastructure | ■ The state's Infill Infrastructure Grant Program may potentially be used to help fund measures that promote infill housing development.<br>■ Grants can be used for gap funding for infrastructure improvements necessary for specific residential or mixed-use infill development projects. |
| Transportation-Related Federal and State Funding | ■ For funding measures related to transit, bicycle, or pedestrian improvements, the following funding sources from SANDAG may be used.<br>○ Smart Growth Incentive Program<br>○ Active Transportation Grant Program<br>○ Job Access and Reverse Commute and New Freedom Programs |
| Utility Rebates | ■ SDG&E is one of the utilities participating in the Go Solar initiative.<br>■ A variety of rebates are available for existing and new homes.<br>■ Photovoltaics, thermal technologies, and solar hot water projects are eligible.<br>■ Single-family homes, commercial development, and affordable housing are eligible. |
| Energy Upgrade California | ■ The program is intended for home energy upgrades.<br>■ Funding comes from the American Recovery and Reinvestment Act, California utility ratepayers, and private contributions.<br>■ Utilities administer the program, offering homeowners the choice of one of two upgrade packages—basic or advanced.<br>■ Homeowners are connected to home energy professionals.<br>■ Rebates, incentives, and financing are available.<br>■ Homeowners can receive up to $4,000 back on an upgrade through the local utility. |
| **Private Funding** | |
| Private Funding | ■ Private equity can be used to finance energy improvements, with returns realized as future cost savings.<br>■ Rent increases can fund retrofits in commercial buildings.<br>■ Net energy cost savings can fund retrofits in households.<br>■ Power Purchase Agreements involve a private company that purchases, installs, and maintains a renewable energy technology through a contract that typically lasts 15 years. After 15 years, the company would uninstall the technology or sign a new contract. |

TABLE 14 **Potential Funding Sources to Support GHG Reduction Measures**

| Funding Source | Description |
|---|---|
| | ■ On-Bill Financing (OBF) can be promoted to businesses for energy-efficiency retrofits. OBF funding is a no-interest loan that is paid back through monthly utility bills. Lighting, refrigeration, HVAC, and LED streetlights are all eligible projects. |
| **Other Funding Mechanisms for Implementation** | |
| Other Funding | ■ Increased operating costs can be supported by grants from the Strategic Growth Council or the State Department of Conservation to fund sustainable community planning, natural resource conservation and development, and adoption. |
| **Future Funding Options: Funding Mechanisms for Capital and/or Implementation Costs** | |
| New Development Impact Fees | ■ These types of fees may have some potential to provide funding, but such fees are best implemented when the real estate market and overall regional economic conditions are strong. |
| General Obligation Bond | ■ A general obligation bond is a form of long-term borrowing and could be used to fund municipal improvements. |
| AB 811 Districts Property-Assessed Clean Energy (PACE) | ■ Assembly Bill 811 is intended to help municipalities accomplish the goals outlined in Assembly Bill 32.<br>■ The PACE finance program is intended to finance energy and water improvements within a home or business through a land-secured loan, and funds are repaid through property assessments.<br>■ Municipalities are authorized to designate areas where property owners can enter into contractual assessments to receive long-term, low-interest loans for energy and water efficiency improvements, and renewable energy installation on their property.<br>■ Financing is repaid through property tax bills.<br>■ AB 811 and the PACE program are currently on hold for residential properties due to potential violation of standard Federal Housing Finance Agency (FHFA) federally guaranteed (Fannie Mae/Freddie Mac) residential mortgage contracts.<br>■ SANDAG has implemented the Home Energy Renovation Opportunity (HERO; a PACE program) in the County to assist residents in financing residential energy efficiency and solar retrofits. |

In addition to pursuing the funding options above and monitoring the availability of others, the City will take the following steps in order to best inform decisions related to the cost of GHG reduction measures:

- **Perform and refine cost estimates**—Cost estimates for local reduction measures should be performed to identify the cost-effectiveness of each measure to inform and guide the implementation process. This analysis will likely be based on a variety of participation, per-unit, and other assumptions. As programs are developed, cost estimates should be refined and updated over time with more precise implementation-level data.
- **Integrate GHG reduction into existing City budget and Capital Improvements Program**—Certain capital improvements may need to be added to the City's Capital Improvements Program CIP and facility master plan programs, as well as those of the City utility enterprises

and other public agencies that have control for project implementation. For CIPs completely under the City's control, new projects would need to be assessed for consistency with the Plan.

- **Adopt or update ordinances and/or codes**—Some local reduction measures may require new or revised ordinances. Staff would need to coordinate these efforts in conjunction with other departments, other agencies, and the City Council.
- **Pursue outside funding sources**—A range of funding from State and federal agencies has been identified. The City would need to pursue these (and other emerging) funding sources as a part of implementation efforts.
- **Implement and direct preferred City funding sources**—While City funding sources are limited, the City, when financially able, as a part of its budget process, could appropriate funding from general sources or make changes in its fee schedules, utility rates, and other sources as needed to support funding the implementation of the GHG reduction measures.
- **Create monitoring/tracking processes**—Local reduction measures would require program development, tracking, and/or monitoring.
- **Identify economic indicators to consider future funding options**—Economic recovery may occur rapidly or slowly. Whatever the timeframe, the City would need to determine the point at which certain additional funding sources may become feasible and/or favorable. Identification and monitoring of economic indicators and trends, such as home prices, energy prices cost per kWh on solar installations, unemployment rates, or real wage increases, can help the City decide when to further explore the potential for funding local reduction measures through different financing mechanisms.

## TIMELINE FOR MEASURE IMPLEMENTATION

After taking into account the reductions in energy and water usage and the GHG emissions resulting from statewide measures, the City would need to implement the local reduction measures to reach its reduction targets.

The City has developed an implementation schedule for the local reduction measures. Prioritization was based on the following factors:

- Cost effectiveness
- GHG reduction efficiency
- Availability of funding
- Level of City Control
- Ease of implementation
- Time to implement

To encourage implementation of all reduction measures, City staff would develop a Plan Implementation Timeline. Measure prioritization could be based on the following factors.

- **Cost/Funding**—How much does the measure cost? Is funding already in place for the measure?
- **Greenhouse Gas Reductions**—How effective is the measure at reducing greenhouse gases?
- **Other Benefits**—For example, does the measure improve water quality or conserve resources? Would it create jobs or enhance community well-being?
- **Consistency with Existing Programs**—Does the measure complement or extend existing programs?
- **Impact on the Community**—What are the advantages and disadvantages of the measure to the community as a whole?
- **Speed of Implementation**—How quickly can the measure be implemented and when would the City begin to see benefits?
- **Implementation Effort**—How difficult will it be to develop and implement the program?

A qualitative appraisal of implementation effort for the City is also provided. Measures can be categorized based on the convention of low, medium, or high, with low-level measures requiring the least level of effort by the City and being the most likely to be pursued immediately (i.e., the low-hanging fruit). Sample criteria are shown in TABLE 15.

TABLE 15 **Implementation Matrix**

| Implementation Effort Level | Sample Criteria |
|---|---|
| Low | ■ Requires limited staff resources to develop.<br>■ Existing programs in place to support implementation.<br>■ Required internal and external coordination is limited.<br>■ Required revisions to policy or code are limited. |
| Medium | ■ Requires staff resources beyond the typical daily level.<br>■ Policy or code revisions become necessary.<br>■ Internal and external coordination (e.g., with stakeholders, other cities or agencies, or general public) is necessary. |
| High | ■ Requires extensive staff time and resources.<br>■ Requires the development of completely new policies or programs and potential changes to the general plan.<br>■ Requires a robust outreach program to alert residents and businesses of program requirements and eligibility.<br>■ Requires regional cooperation and securing long-term funding. |

## COMMUNITY OUTREACH AND EDUCATION

The citizens and businesses in the City are integral to the success of the Plan and to overall GHG reduction for the region. Their involvement is essential, considering that several measures depend on the voluntary commitment, creativity, and participation of the community.

The City would educate stakeholders, such as businesses, business groups, residents, developers, and property owners, about the GHG reduction measures that require their participation, encourage participation in these programs, and alert them to program requirements, incentives and/or rebate availability, depending on the measure. City staff would schedule periodic meetings to facilitate formal community involvement in Plan implementation and adaptation over time. This could include focused meetings for a specific measure or program such as the PACE program and/or agenda items at City Council or other public meetings. These meetings would be targeted to particular stakeholder groups and provide information on Plan implementation progress as well as the implementation of a specific program or new policy. Alternatively, periodic written updates could be provided in City newsletters, SANDAG's newsletter, on City websites, or through other media communications with the general public, such as press releases and public service announcements. Stakeholders would be provided an opportunity to comment on potential improvements or changes to the Plan. The City would also sponsor periodic outreach events to directly inform and solicit the input, suggestions, and participation of the community at large.

## MONITORING, REPORTING, AND ADAPTIVE MANAGEMENT

Regular monitoring is important to ensure programs function as they were originally intended. Early identification of effective strategies and potential issues would enable the City to make informed decisions on future priorities, funding, and scheduling. Moreover, monitoring provides concrete data to document the City's progress in reducing GHG emissions. The City would be responsible for developing a protocol for monitoring the effectiveness of emission reduction programs as well as for undertaking emission inventory updates:

- **Update GHG Inventory**—Starting in 2021, the City would update the inventory of emissions ~~prior to 2020~~ and continue updates every three years ~~after 2020~~ to ensure they are on track to meet their GHG reduction goals. This includes regular data collection in each of the primary inventory sectors (utility, regional VMT, waste, wastewater, and water), and comparing the inventory to the City's baseline GHG emissions in 2005. The City would consolidate information in a database or spreadsheet that can be used to evaluate the effectiveness of individual reduction measures.
- **Track State Progress**—The Plan will rely heavily on State-level measures. The City would be responsible for tracking the state's progress on implementing state-level programs. Close monitoring of the real gains being achieved by state programs would allow the City to adjust its Plan, if needed.
- **Track Completion of GHG Reduction Measures**—The City would keep track of measures implemented as scheduled in the Plan, including progress reports on each measure, funding,

and savings. This will allow at least a rough attribution of gains when combined with regular GHG inventory updates.

- **Regular Progress Reports**—The City would report annually (or semi-annually or at other assigned intervals) to the City Council on Plan implementation progress. If annual reports, periodic inventories, or other information indicates that the GHG reduction measures are not as effective as originally anticipated, the Plan may need to be adjusted, amended, or supplemented.

# TRACKING TOOLS

## ~~Screening Tables~~

~~The purpose of the screening tables is to provide a measureable way of determining if a development project is implementing the GHG Performance Standard and is able to quantify the reduction of emissions attributable to certain design and construction measures incorporated into development projects. The screening table assigns points for each option incorporated into a project as mitigation or a project design feature (collectively referred to as "feature"). The point values correspond to the minimum emission reduction expected from each feature. The menu of features allows maximum flexibility and options for how development projects can implement the GHG Performance Standard. Projects that earn enough points would be consistent with the reductions anticipated in the City's Plan. The Screening tables are attached as Appendix B.~~

~~The City would use a screening tables tracker tool, which is a Microsoft Excel-based spreadsheet program that can be used to track implementation of the various menu options within the screening tables. This spreadsheet would allow the City to track cumulative points garnered by projects and to predict emission reductions. These values of reductions can then be input into the GHG Performance Standard within the Plan Implementation Tracker Tool (PITT) described in more detail below.~~

## Plan Implementation Tracker Tool

The City's ~~PITT~~ CAP Consistency Checklist is a Microsoft Excel-based tool that would help the City track GHG reductions achieved through implementation of the GHG reduction measures by new development within the Plan, to monitor the plan's implementation progress, and to share findings with stakeholders, partners, and the community.

The City will assess annual GHG reductions achieved by State, county, and local reduction measures to track progress toward meeting the City's GHG reduction targets. This is achieved by inventorying GHG emissions, estimating reductions, monitoring trends over time, and revising actions based on

results to achieve the reduction targets.

Tracking annual reductions should be done annually in order to demonstrate climate action planning leadership and initiative, to assist the State and the Region in meeting the reduction

targets outlined under AB 32, to demonstrate Plan progress, to show and communicate results, and to adaptively manage the Plan's implementation to ensure achievement of the reduction target.

## Progress Reports

The Plan would be tracked with Progress Reports which would be designed to outline the current status of each measure identified in the City's Plan. Metrics would be established for all measures to more specifically track implementation progress. Sector summaries would be provided in the report to identify each measure, the tracking metric, and emission reductions achieved to date. The Plan's Progress Reports would conclude with a summary of actions that need to be taken during the next tracking year to adaptively manage the Plan and encourage additional emission reduction.

Progress Reports would be designed to be used in conjunction with the CAP Consistency Checklist ~~PITT; (e.g., the PITT tables and graphs as outputs can easily be pasted into the Plan's Progress Report)~~.

The City should use the Progress Reports to produce annual reports on the Plan's progress toward the reduction targets and to highlight any adaptive management of the reduction strategies needed to achieve the targets.

## NEXT STEPS

The Sustainable Santee Action Plan is not a static document and will continue with monitoring, inventory updates, and continued refinement of target setting to complement State goals and actions. To that end, while this current document has a horizon date of 2035, the City also recognizes the long term State goal found in Executive Order B-55-18 of carbon neutrality by 2045 and is committed to updating the Sustainable Santee Plan at regular intervals to continue reducing emissions that will complement State actions and provide the City's contribution toward the State's long term goal.

Towards this end, the City commits to:

1. City staff will monitor CARB's development of a methodology and accounting procedure needed to progress towards the carbon neutrality goals on Executive Order B-55-18.

2. Within two (2) years of the final CARB rulemaking regarding carbon neutrality, staff will bring for City Council consideration an Amendment to the Sustainable Santee Plan that includes revised Measures/Actions designed to achieve this goal, including but not limited to further incentives for electrification of existing buildings within Santee through San Diego Gas & Electric and/or any CCA program in which the City participates.

3. Within three years of approval of the Sustainable Santee Plan, City Staff will develop a plan to install solar PV systems to the maximum extent possible at all City facilities. This plan shall be incorporated into the City's Capital Improvement Program ("CIP").

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# Appendix A

# City of Santee
# GHG Inventory, Forecasting, Target-Setting Report

## Revised December 2019

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# List of Acronyms and Abbreviations

| | |
|---|---|
| AB | Assembly Bill |
| ADC | Alternative Daily Cover |
| ARB | California Air Resources Board |
| BAU | Business-as-Usual |
| CAFE | Corporate Average Fuel Economy |
| CAP | Climate Action Plan |
| $CH_4$ | Methane |
| CARB | California Air Resources Board |
| $CO_2$ | Carbon Dioxide |
| $CO_2e$ | Carbon Dioxide Equivalents |
| EO | Executive Order |
| E-Grid | Emissions and Generation Resource Integrated Database |
| EMFAC2014 | On-road emission factors model version 2014 |
| EPA | Environmental Protection Agency |
| EPIC | Energy Policy Initiatives Center |
| GHG | Greenhouse Gas |
| GWP | Global Warming Potential |
| IFT | Inventories, Long-Term Forecasts, and Target-Setting |
| IPCC | Intergovernmental Panel on Climate Change |
| kWh | Kilowatt-hour |
| LCFS | Low Carbon Fuel Standard |
| LGOP | Local Government Operations Protocol |
| MT | Metric Tons |
| NDN | Nitrification/denitrification |
| $N_2O$ | Nitrous Oxide |
| RPS | Renewable Portfolio Standard |
| RTP | Regional Transportation Plan |
| SANDAG | San Diego Association of Governments |
| SDG&E | San Diego Gas & Electric |
| SEEC | Statewide Energy Efficiency Collaborative |
| VMT | Vehicle Miles Traveled |

# Key Findings

## Community

- The City of Santee increased total greenhouse gas (GHG) emissions 18.4% from 2005 to 2013, from 339,972 metric tons of carbon dioxide equivalent (MT $CO_2e$) to 402,574 MT $CO_2e$.
- Solid waste, water, and off-road sources sector emissions decreased while on-road transportation, commercial energy, residential energy, and wastewater sectors increased emissions from 2005 to 2013.
- On-road transportation emissions account for about 54% of the total community emissions in 2005 and 60% in 2013.
- Energy-related emissions account for about 30% of the total community emissions in 2005 and 31% in 2013.
- Under the Adjusted Business-as-Usual (BAU) forecast, emissions will be 352,106 MT $CO_2e$ in 2020, 339,514 MT $CO_2e$ in 2030 and 336,543 MT $CO_2e$ in 2035. These emissions levels are 3.6%, increase from 2005 by 2020 and a 0.1% and 1.0% lower than 2005 by 2030 and 2035 respectively.
- The State recommends a 15% reduction below 2005 levels by 2020, which the City will have met the target under an Adjusted BAU forecast by 2020.

## Municipal

- Emissions from City government services (municipal emissions) are a subset of communitywide emissions and represent less than 1% of community emissions.
- Municipal emissions have increased 15% from 2005 to 2013, from 1,657 MT $CO_2e$ to 1,909 MT $CO_2e$.
- Emissions in the buildings and facilities, fleet and equipment, solid waste, city-owned outdoor lights, and water pumping sectors increased between 2005 and 2013, and the employee commute, and SDG&E-owned outdoor lights sectors decreased.
- Municipal energy use accounted for 53% of total municipal emissions in 2005 and 57% in 2013.
- Under the Adjusted BAU forecast, emissions will be 1,611 MT $CO_2e$ in 2020, which is 3% lower than in 2005. In 2030, emissions will be equivalent to 2005. By 2035, emissions will grow to 1,681, which is 1% higher than in 2005. The changes reflect anticipated growth in the City's municipal operations and reductions from State-mandated policies.

# Introduction

This Greenhouse Gas (GHG) Inventories, Long-Term Forecasts, and Target-Setting (IFT) Report contains the first steps toward the City of Santee (City) identifying energy-efficiency and GHG reduction measures in a Climate Action Plan or Sustainable Santee Plan. The inventories describe historic energy use and GHG emissions and the forecasts describe projected future emissions in the City. The target-setting section describes GHG reduction approaches that are consistent with State goals and may assist the City in establishing local GHG reduction targets. This IFT Report will help the City identify energy efficiency and GHG reduction measures to meet their local reduction targets.

Specifically, the IFT Report includes (words and phrases in bold are described in Table 1):

- Historic GHG emissions in **community inventories** for 2005, 2008, 2012, and 2013 and **municipal inventories** for 2005 and 2013;
- Future GHG emissions for 2020, 2030 and 2035 under a **business-as-usual** forecast scenario and **adjusted business-as-usual** forecast scenario; and
- GHG **reduction targets** for 2020, 2030 and 2035 that are aligned with State goals.

**Table 1. Key Terms in the Report**[1]

| Term | Definition |
|---|---|
| Adjusted business-as-usual | A GHG forecast scenario that accounts for known policies and regulations that will affect future emissions. Generally, these are state and federal initiatives that will reduce emissions from the business-as-usual scenario. |
| Baseline year | The inventory year used for setting targets and comparing future inventories against. |
| Business-as-usual | A GHG forecast scenario that assumes no change in policy affecting emissions since the most recent inventory. Changes in emissions are driven primarily through changes in demographics. |
| Community, City-Wide or Community-wide Inventory or Emissions | GHG emissions that result from the activities by residents and businesses in the city. An inventory reports emissions that occur over a single calendar year. |
| Emission factors | The GHG-intensity of an activity. |
| Municipal Inventory or Emissions | GHG emissions that result from the activities performed as part of the government operations in the city and are a subset of the community inventory. An inventory reports emissions that occur over a single calendar year. |
| Reduction targets | Goals of GHG emissions levels not to be exceeded by a specific date. Local reduction targets are often informed by state recommendations and different targets may be established for different years. |
| Sector | A subset of the emissions inventory classified by a logical grouping such as economic or municipal-specific category. |

[1] A glossary of terms is also included as Attachment A.

# GHG Emission Inventories

GHG emissions inventories are the foundation of planning for future reductions. Establishing an existing inventory of emissions helps to identify and categorize the major sources of emissions currently being produced. In this report, four years of historic inventories are presented to show not only the major sources of emissions in the city, but also how those sources vary over time. For the community, the years 2005, 2008, 2012, and 2013 are presented, and for the municipal inventories the years 2005 and 2013 are presented. The 2005 inventory (for both community and municipal operations) is considered the **baseline year**. A baseline year is established as a starting point against which other inventories may be compared and targets may be set, and is generally the earliest year with a full emissions inventory. The most recent inventory (2013) has the most relevant data for planning purposes, while the interim years (2008 and 2012) provide context and may help identify trends or anomalies in the community emissions. Appendix B of the Sustainable Santee Plan provides the general methodology used to calculate the inventories.

The following explains why 2013 was considered the most recent inventory, how the City's community inventories were calculated, and why this information is still considered valid for use within the Sustainable Santee Plan. The 2013 inventory of emissions was considered the most recent inventory because the inventory process began in September of 2014. At that time, the most current modeling was used to translate activity data into GHG emissions. Activity data for the 2013 inventory and forecasts associated with on-road transportation was provided using the San Diego Association of Governments (SANDAG) Series 12 Transportation Model which became available in October 2013. The on-road transportation activity data from the Series 12 transportation model is provided in Attachment C. GHG emissions associated with the on-road activity data was calculated using the California Air Resources Board (ARB) on-road emissions factor model 2014 (EMFAC2014) which became available in April 2014.

Emission factors (EFs) for natural gas and electricity use within the community were provide by the University of San Diego School of Law Energy Policy Initiatives Center (EPIC) and shown in Attachment D. Electricity consumption for the 2005 and 2008 inventories used the 2010 EF provided by EPIC which originated from the Environmental Protection Agency (EPA) Emissions and Generation Resource Integrated Database (E-Grid) for San Diego Gas and Electric (SDG&E). The EFs for electrify consumption for the 2012 and 2013 inventories as well as the forecast years 2020, 2030, and 2035 used the 2012 E-Grid for SDG&E provided by EPIC.

The latest versions of these models as of January 2019 include SANDAG Series 13 Transportation Model, EMFAC2017, and E-Grid 2018 values for SDG&E. In evaluating the difference between the SANDAG Series 12 and Series 13 Transportation Models, the primary difference is in forecasted growth rates. The SANDAG Series 12 Transportation Model included very aggressive growth rates for future years which resulted in higher levels of transportation related travel in 2020, 2030 and 2035 than what the SANDAG Series 13 Transportation Model would have provided. Additionally, the EMFAC2014 emission factors for on-road transportation emissions did not include the low carbon fuel standard in calculating emissions. Because of this on-road transportation emissions for future years 2020, 2030, and 2035 shown in this report are higher than what would have been calculated using the most recent models.

The 2012 EFs from E-Grid used to calculate emissions from the use of electricity in 2020, 2030, and 2035 are higher than the 2018 EFs from E-Grid. The primary reason that the 2012 EFs are higher is due to the fact that in 2012 SDG&E was compensating for the loss of zero emissions electricity generation provided by San Onofre Nuclear Generating Station by generating more electricity with natural gas fired generation stations, which resulted in higher emissions. In 2018, the increased use of renewable electric generation in compliance with the required Renewable Portfolio Standard (RPS) resulted in lower GHG emissions compared with 2012. Because of this, future years 2020, 2030 and 2035 forecasts show higher energy related GHG emissions in this report than what would have been calculated using the 2018 E-Grid values.

The higher forecasted emission levels for 2020, 2030, and 2035, required more local reduction measures to reduce emissions down to the reduction targets.

Updating the 2020, 2030, and 2035 forecasts is considered unnecessary because doing so would only result in the local reduction measures reducing emissions even further below the reduction targets. The following describes how the inventories and forecasts were calculated.

## Emission Reporting

The primary GHGs from the community and municipal operations are from carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$) since they are most relevant to human activities[1]. Because each of these gases has a different capacity for trapping heat in the atmosphere, known as its global warming potential (GWP), a method of reporting is needed to be able to compare gases in the same terms. As a result, emissions are reported in carbon dioxide equivalents, or $CO_2e$, with each GHG normalized and calculated relative to $CO_2$ using its GWP. Table 2 describes the GHGs analyzed in this report, their symbol, GWP, and primary community sources of emissions. While $N_2O$ has the highest GWP and may be considered the most dangerous on a per-molecule basis, $CO_2$ is by far the most prevalent pollutant, accounting for 88% of total statewide GHG emissions in 2005 (CARB 2011).

**Table 2. GHGs Analyzed in the Inventories**

| Greenhouse Gas | Symbol | Global Warming Potential | Primary Community Sources |
|---|---|---|---|
| Carbon Dioxide | $CO_2$ | 1 | Fossil fuel combustion |
| Methane | $CH_4$ | 25 | Fossil fuel combustion, landfills, wastewater treatment |
| Nitrous Oxide | $N_2O$ | 298 | Fossil fuel combustion, wastewater treatment |

Source: IPCC Fourth Assessment Report, 2007.

### Emission Sectors

The inventories identify the major sources of GHGs emissions caused by activities in sectors that are specific to community or municipal activities. A **sector** is a subset of the economy, society, or municipal operations whose components share similar characteristics. An emissions sector can also contain

[1] Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report. 2007.

subsectors that provide more specificity about the source of emissions (e.g., natural gas and electricity are subsectors of the energy sector).

Inventories were completed for the community and municipal operations. Because the majority of municipal activities occur within the boundaries of the city and therefore contribute to the overall emissions of the community, both inventories are interconnected, with the municipal inventory considered a subset of the community inventory. As a result, municipal emissions are included in numbers reported for the community. The municipal inventory is separated to highlight areas of emissions that the city has more direct control over and to identify where they can begin to set examples for the community on how reduction strategies can be implemented.

The following subsections describe the sectors used in the community and municipal inventories. It is important to note that both inventories capture similar types of information but may be categorized differently. For example, energy is reported in both the community and municipal inventory, but community level energy emissions are reported as "Residential" and "Commercial/Industrial", whereas municipal energy emissions are more logically reported as "Buildings & Facilities" and "Streetlights".[2]

**Community Sectors**

The community inventory is categorized by sectors based on the sector's ability to be affected through regional and local programs, incentives, zoning, and other policies. The City's community inventories were divided into the following sectors:

- **Energy** in the Community Inventory is further broken down into two sectors:
  - **Commercial/Industrial Energy** includes emissions from electricity and natural gas consumption in non-residential buildings and facilities (including outdoor lighting) in the city.
  - **Residential Energy** includes emissions from electricity and natural gas consumption in residential buildings in the city.
- **On-Road Transportation** includes emissions from vehicle fuel use in trips wholly within the city (in-boundary) and trips that either originate or end in the city (cross-boundary). Emissions from in-boundary trips are fully accounted for in the inventory, whereas only half of the emissions from cross-boundary trips are accounted for. Trips that pass-through the city, (such as on SR-125 and SR-67) are not accounted for in the inventory because the City no control of these emissions. As a result, this methodology reflects only trips or parts of trips within city borders that the City has the ability to affect. To calculate emissions associated with in-boundary and cross-boundary vehicle trips for the City of Santee, vehicle miles traveled (VMT) must be used. The source of the VMT data used in this report was calculated by the San Diego Association of Governments (SANDAG) and provided as an Excel Spreadsheet. SANDAG calculated the VMT using their Series 12 Transportation Model. The SANDAG VMT calculations are provided as Attachment C to this Report.

[2] Streetlights are further categorized as SDG&E-owned or City-owned as described later.

As part of a public outreach / public workshop campaign conducted in 2018, the City reported GHG emissions from on-road transportation were lower than some of the public expected. The Climate Action Campaign questioned the source of these numbers. Staff and the consultant researched the issue. A review determined that the consultant used the SANDAG VMT data labeled "SANTEE TOTAL" which resulted in lower number for VMT and GHG. During conference calls and a meeting with SANDAG staff it was discovered that the SANDAG VMT data titled "REGIONAL TOTAL" should have been used. This has been corrected and the VMT and resulting GHG numbers have been adjusted. The revised levels in the Sustainable Santee Plan appear consistent with levels reported by other jurisdictions.

- **Solid Waste** includes emissions from waste that is generated in the community and sent to landfills.
- **Water** includes emissions from the electricity used to source, treat, and deliver imported water in the community that is not accounted for in the community utility data.
- **Wastewater** includes emissions from treating wastewater generated in the community.
- **Off-Road Sources** include emissions from operating equipment for construction, commercial, light industrial and agricultural activities; lawn and garden equipment; and recreational vehicles such as all-terrain vehicles.

**Municipal Sectors**

Sources of municipal emissions are divided into the following sectors:

- **Energy** in the municipal inventory is further broken down into four sectors:
  - **Buildings and Facilities** includes energy use by the government, including electricity and natural gas.
  - **SDG&E-owned Streetlights** includes energy for streetlights on fixtures owned by SDG&E.
  - **City-owned Outdoor Lighting** includes energy for streetlights on fixtures owned by the City, traffic control signals, and outdoor lighting.
  - **Water Pumping** includes energy for water pumping and irrigation.
- **Fleet & Equipment** includes emissions from vehicles owned or operated by the government or contracted by the City for services such as street cleaning. It also includes equipment, such as emergency generators.
- **Employee Commute** includes emissions from fuel use in vehicle trips by municipal employees commuting to and from work in the city.
- **Solid waste** includes emissions from waste generated by municipal employees or at municipally-owned facilities.

### Calculation Methodology

GHG emissions were calculated using activity data available (e.g., kilowatt-hours of electricity, therms of natural gas, vehicle miles traveled) for each sector and protocols for converting activity data to emissions output using relevant **emission factors**. Emission factors relate the activity to GHG emissions and may vary by year (e.g., for electricity) and often are not affected by local actions or behavior, unlike activity data. The U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (ICLEI 2012), The California Supplement to the U.S. Community Protocol (AEP 2013), and the Local Government Operations Protocol for the Quantification and Reporting of GHG Emissions Inventories (LGOP) (CARB 2010) were the primary protocols used for developing the community and municipal inventories, respectively. Activity data are reported in the community and municipal emissions subsections below, and emission factors are detailed in Attachment B.

## Community Emissions

The community inventory includes the GHG emissions that result from activities within city boundaries. This section presents the findings of the community inventory for four years: 2005 (baseline year), 2008, 2012, and 2013. It also provides more specific detail and findings on the energy sectors, which will form the basis of the reduction targets and reduction measures the City identifies in the CAP.

### 2005—2013 Emissions Summary

Overall, emissions increased 18 percent from 2005 to 2013, from 339,972 MT $CO_2e$ to 402,574 MT $CO_2e$, with On-Road Transportation emissions showing the greatest overall increase. As shown in Figure 1 and Table 3, the Transportation sector was the largest contributor to emissions in 2005, contributing 54% of total emission. By 2013, Transportation emissions increased to 60% of total emissions.

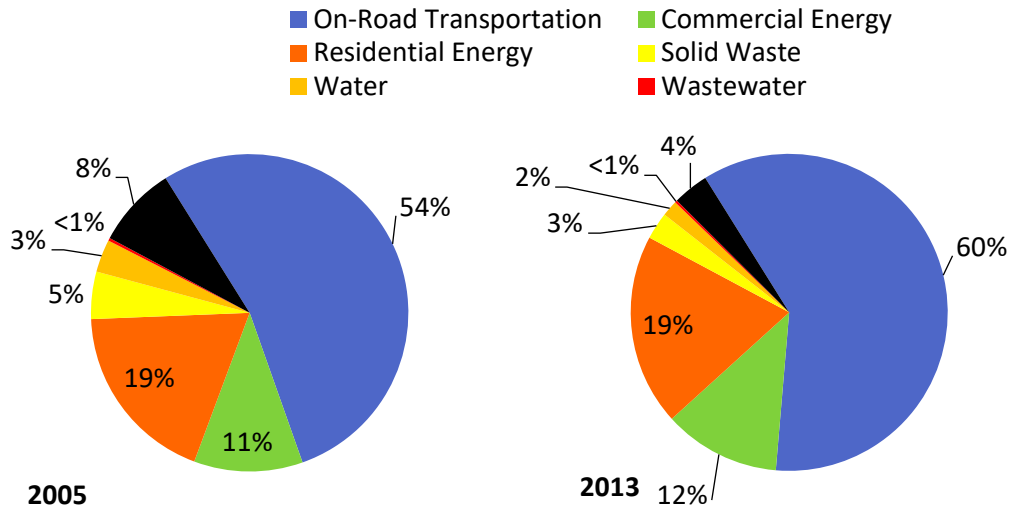


**Figure 1. Community GHG Emissions by Sector for 2005 and 2013**

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**ommunity-Wide GHG Emissions by Sector for 2005 and 2013**

| Sector | 2005 (MT $CO_2e$) | 2013 (MT $CO_2e$) | % Change 2005–2013 |
|---|---|---|---|
| On-Road Transportation | 181,812 | 242,499 | 33.4% |
| Residential Energy | 63,544 | 78,651 | 23.8% |
| Commercial Energy | 37,697 | 48,025 | 27.4% |
| Solid Waste | 16,376 | 11,151 | -31.9% |
| Water | 11,354 | 6,578 | -42.1% |
| Off-Road Sources | 28,230 | 14,699 | -47.9% |
| Wastewater | 959 | 971 | 1.3% |
| **Total** | 339,972 | 402,574 | 18.4% |

## 2005, 2008, 2012, and 2013 Inventories

While the total emissions from 2005 to 2013 decreased, there has been variation in the City's emissions by sector over time. Figure 2 and Table 4 show the GHG emissions by sector for four inventory years. Emissions are variable among the inventory years, and may reflect changes in the economy, weather, and programs implemented to reduce emissions. The table also lists the percentage of each sector relative to total emissions and shows how the proportion of each sector changed over the years. Of note are the relatively large variations in Commercial/Industrial Energy (varying from 15 to 21% of total emissions) and Off-Road Sources (which varied from 6 to 17% of total emissions), which were primarily due to changes in construction-related emissions.

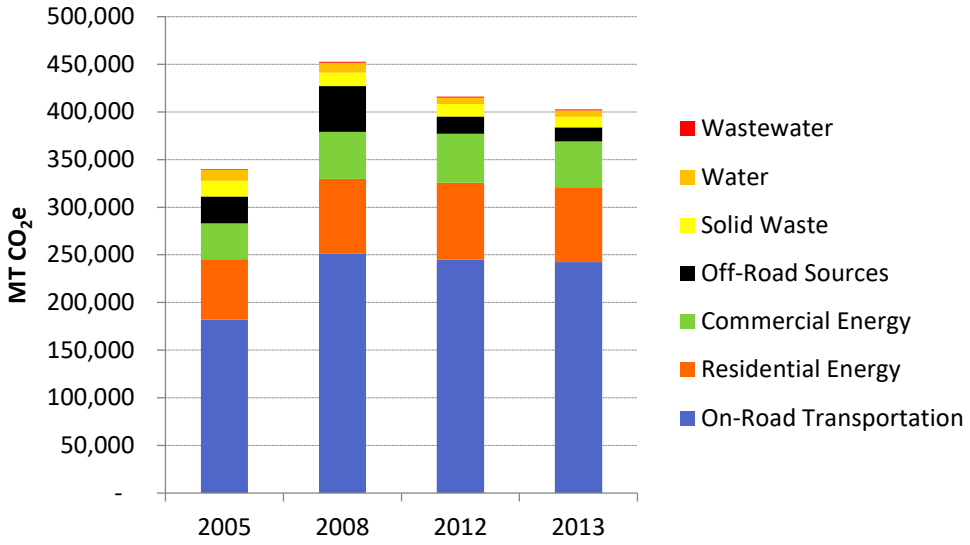


**Figure 1. Community GHG Emissions for 2005, 2008, 2012, and 2013**



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## Table 4. Community GHG Emissions for 2005, 2008, 2012, and 2013

| Sector | 2005 ($MT CO_2e$) | % of Total | 2008 ($MT CO_2e$) | % of Total | 2012 ($MT CO_2e$) | % of Total | 2013 ($MT CO_2e$) | % of Total |
|---|---|---|---|---|---|---|---|---|
| On-Road Transportation | 181,812 | 53% | 251,184 | 55% | 245,171 | 59% | 242,499 | 60% |
| Residential Energy | 63,544 | 19% | 78,477 | 17% | 80,673 | 19% | 78,651 | 20% |
| Commercial/ Industrial Energy | 37,697 | 11% | 49,580 | 11% | 51,148 | 12% | 48,025 | 12% |
| Solid Waste | 16,376 | 5% | 14,295 | 3% | 13,163 | 3% | 11,151 | 3% |
| Water | 11,354 | 3% | 10,235 | 2% | 6,722 | 2% | 6,578 | 2% |
| Wastewater | 959 | <1% | 985 | <1% | 964 | <1% | 971 | <1% |
| Off-Road Sources | 28,230 | 8% | 47,829 | 11% | 18,186 | 4% | 14,699 | 4% |
| **Total** | **339,972** | | **452,585** | | **416,027** | | **402,574** | |
| **% Change from 2005** | **—** | | **33.1%** | | **22.4%** | | **18.4%** | |

Activity data can provide more insight into behavioral changes in the community, as these data are not affected by emission factors. Table 5 summarizes activity data for each sector and subsector. The activity data show that while emissions from the Residential and Commercial/Industrial sectors increased, activity (kWh and therms) generally decreased (except for Residential electricity). The next section, Energy, discusses this apparent anomaly, which is related to the applicable emissions factors. Also notable, while On-road Transportation emissions increased 33.3% between 2005 and 2013, vehicle miles traveled increased by nearly 38%. The difference reflects that for each vehicle mile traveled, fewer emissions are generated due to improvements in the fuel efficiency of vehicles.

## Table 5. Activity Data Used in 2005, 2008, 2012, and 2013 Community Inventories

| Sector | 2005 | 2008 | 2012 | 2013 | % Change 2005–2013 |
|---|---|---|---|---|---|
| **On-Road Transportation** | | | | | |
| Total Vehicle Miles Traveled | 352,711,238 | 479,229,830 | 485,123,704 | 486,608,464 | 38.0% |
| **Residential Energy** | | | | | |
| Electricity (kWh) | 129,290,439 | 149,427,819 | 141,649,936 | 136,108,148 | 5.3% |
| Natural Gas (therms) | 5,878,287 | 5,797,758 | 5,734,216 | 5,723,205 | -2.6% |
| **Commercial/Industrial Energy** | | | | | |
| Electricity (kWh) | 120,725,233 | 108,987,978 | 102,850,529 | 115,339,581 | -4.5% |
| Natural Gas (therms) | 1,419,790 | 1,494,426 | 1,568,104 | 1,347,484 | -5.1% |
| **Solid Waste** | | | | | |
| Landfilled (tons) | 60,825 | 52,184 | 46,644 | 38,742 | -36.3% |
| ADC (tons)[a] | 8,136 | 7,362 | 8,531 | 8,185 | 0.6% |
| **Water and Wastewater** | | | | | |
| Water (MG) | 2,197 | 2,044 | 1,863 | 1,822 | -17.1% |
| Recycled Water (MG) | 232.4 | 253.4 | 284.4 | 292.7 | 25.9% |
| Wastewater (City portion of countywide residents) | 1.548% | 1.547% | 1.517% | 1.523% | -1.57% |
| **Off-Road sources[b] (% of San Diego County emissions attributed to the City)** | | | | | |
| Lawn & Garden (% Households) | 1.75% | 1.69% | 1.78% | 1.78% | 1.8% |
| Construction (% Building permits) | 3.46% | 6.22% | 1.65% | 1.14% | -67.2% |
| Industrial (% Manufacturing jobs) | 2.22% | 2.22% | 2.22% | 2.22% | -0.1% |
| Light Commercial (% Other jobs) | 0.97% | 0.97% | 0.97% | 0.97% | -0.01% |
| Recreation (Population weighted by income) | 2.42% | 2.30% | 1.95% | 1.87% | -22.6% |
| Agriculture (% Ag. Jobs) | 0.68% | 0.68% | 0.68% | 0.68% | 0.0% |

a. ADC is Alternative Daily Cover, which is green waste (grass, leaves, and branches) that is used to cover landfill emissions. They are reported separately by CalRecycle and therefore shown separately here.

b. Off-road emissions are available at the county level through CARB's OFFROAD model. Emissions attributable to the City were derived using indicator data related to the off-road source. For example, the percentage of households in the City compared to the county was used to attribute the same percentage of lawn & garden equipment emissions to the City. See Attachment B for more methodology details.

Demographic data also help provide perspective to changes in emissions over time. Table 6 shows the number of households, jobs, population, and service population (jobs + population) for each inventory year.

**Table 6. Demographic Data for 2005, 2008, 2012, and 2013**

| | 2005 | 2008 | 2012 | 2013 | % Change 2005–2013 |
|---|---|---|---|---|---|
| Service Population (Population + Jobs) | 70,152 | 71,859 | 70,959 | 71,663 | 1.0% |
| Population | 54,370 | 55,850 | 54,643 | 55,033 | 1.2% |
| Households | 18,563 | 19,080 | 19,725[1] | 19,725 | 6.3% |
| Jobs | 15,782 | 16,009 | 16,316 | 16,630 | 5.4% |

[1] 2012 households data is the proxy from 2013 since 2012 data is not available through SANDAG.

## Energy

Energy is an area over which local agencies often have the greatest opportunities for affecting change. In Santee, energy use has largely declined, although emissions have increased. Electricity and natural gas use remains a key area for reduction opportunities. Emissions from energy use account for 40% and 54% of total community emissions in 2005 and 2013, respectively. Commercial electricity use decreased 4.5% between 2005 and 2013; and emissions increased by 56%. Residential electricity use increased by about 5% but emissions increased by about 49%. The difference between the change in activity data and emissions data are due to the emission factor used for electricity for 2005 and 2013. Emission factors convert activity data into GHG emissions and electricity emission factors vary annually based on how electricity is generated by the electricity provider (i.e., the amount of renewables, natural gas, coal, etc.). In 2005, San Diego Gas & Electric (SDG&E) generated electricity that resulted in an emission factor of 550.488 pounds (lbs) $CO_2e$ per megawatt hour (MWh). In 2013, SDG&E's electricity generation resulted in an emission factor of 781.062 lbs $CO_2e$ per MWh. Therefore, a kilowatt-hour of electricity used in 2013 emitted more GHGs than a kilowatt-hour of electricity used in 2005. Future emissions could increase or decrease based on changes to SDG&E's emission factors, which the City cannot directly affect, or through changes in usage, which can be affected by changes in local policy, outreach, or incentive programs. Unlike electricity, the emission factor for natural gas is estimated on a national basis and remains fairly constant over time. Therefore, the natural gas GHG emissions follow the same trend as usage. In Santee, Commercial/ Industrial natural gas consumption (therms) decreased by 5% from 2005 to 2013; therefore the emissions also decreased 5%. Residential

### Electricity-Related Emissions

All emissions are comprised of activity data and the emission factor, or GHG-intensity, of that activity. For electricity, the activity data are the kilowatt-hours (kWh) used by the city's residents and businesses and the energy intensity is based on the sources of power that San Diego Gas & Electric uses to generate electricity. Changes to either component can affect the GHG emissions from electricity in the city.

natural gas therms used and GHG emissions declined nearly 3% from 2005 to 2013. Figure 3 shows the trend in electricity and natural gas emissions from 2005 to 2013 for the Commercial/Industrial and Residential sectors. Figure 3 shows the GHG emissions from 2005 to 2013 and Table 7 includes the activity data and GHG emissions for 2005 and 2013.

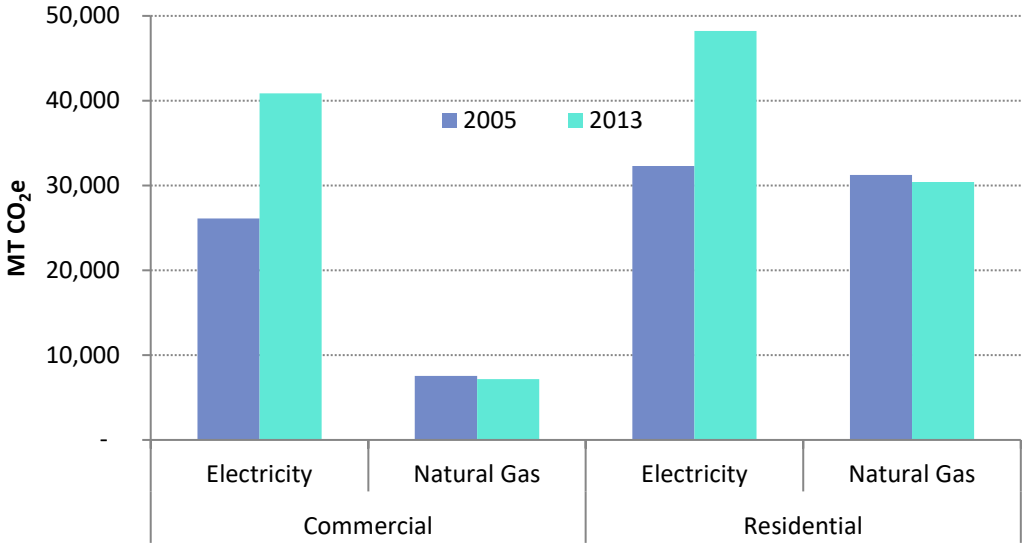



**Figure 2. GHG Emissions for Community Electricity and Natural Gas, by Sector**

**Table 7. Activity Data and GHG Emissions of Energy in 2005 and 2013**

| Sector | 2005 | | 2013 | | % Change in Activity 2005–2013 | % Change in Emissions 2005–2013 |
|---|---|---|---|---|---|---|
| | Activity (kWh or therms) | Emissions (MT $CO_2e$) | Activity (kWh or therms) | Emissions (MT $CO_2e$) | | |
| **Commercial/Industrial** | | | | | | |
| Electricity | 120,725,233 | 26,127 | 115,339,581 | 40,860 | -4.5% | 56.4% |
| Natural Gas | 1,419,790 | 7,550 | 1,347,484 | 7,165 | -5.1% | -5.1% |
| **Residential** | | | | | | |
| Electricity | 129,290,439 | 32,286 | 136,108,148 | 48,218 | 5.3% | 49.3% |
| Natural Gas | 5,878,287 | 31,258 | 5,723,205 | 30,433 | -2.6% | -2.6% |
| **Total (MT $CO_2e$)** | | **97,221** | | **126,676** | | **30.3%** |

## Municipal Emissions

As described earlier, a municipal GHG emissions inventory is a subset of the community inventory. The community inventory, as reported, includes the municipal emissions inventory. The municipal inventory includes emissions from activities conducted as part of government operations in the City. While emissions from government operations are normally a fraction of the overall community emissions, the City has the most direct control over municipal emissions and the City can demonstrate leadership in the

community by adopting and implementing energy and GHG reduction strategies. This section presents the findings of the municipal inventory for 2005 (the baseline year) and 2013. Interim data were not available for municipal operations.

## 2005—2013 Emissions Summary

Emissions from municipal activities increased 15% from 2005 to 2013, from 1,657 MT $CO_2e$ to 1,909 MT $CO_2e$. As shown in Figure 4 and Table 8, the most significant change was from City-Owned Outdoor Lighting, whose emissions tripled over the period. All sectors of municipal emissions increased except SDG&E-Owned Streetlights (decreasing emissions by 42%) and Employee Commute (decreasing emissions by 10%). The decline in commute emissions is most likely due to a decline in the number of employees (7%). The distribution of emissions by sector remained relatively constant except for City- versus SDG&E-owned Outdoor Lights, as shown in Figure 4 and Table 8. Total emissions increased by 252 MT $CO_2e$ and overall, municipal emissions account for less than 1% of the total community emissions.

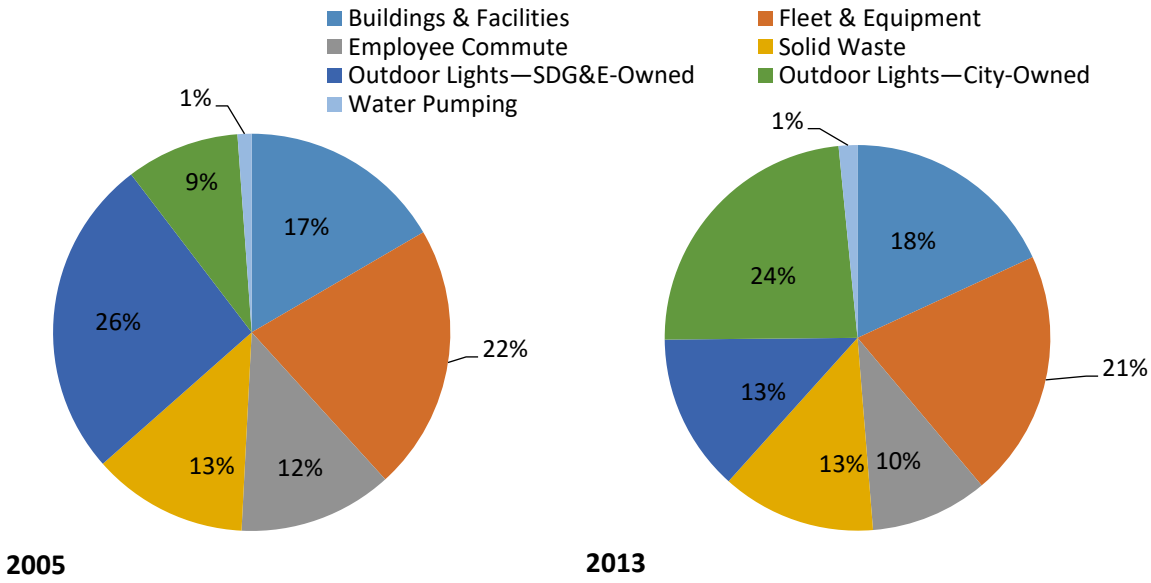



**Figure 3. Municipal GHG Emissions by Sector for 2005 and 2013**

## Table 8. Municipal GHG Emissions by Sector for 2005 and 2013

| Sector | 2005 (MT $CO_2e$) | % of Total | 2013 (MT $CO_2e$) | % of Total | % Change 2005–2013 |
|---|---|---|---|---|---|
| Outdoor Lights–SDG&E-Owned | 433 | 17% | 252 | 18% | -42% |
| Fleet & Equipment | 359 | 22% | 396 | 21% | 10% |
| Buildings & Facilities | 275 | 13% | 346 | 10% | 26% |
| Solid Waste | 210 | 13% | 247 | 13% | 18% |
| Employee Commute | 208 | 26% | 188 | 13% | -10% |
| Outdoor Lights–City-Owned | 153 | 9% | 450 | 24% | 194% |
| Water Pumping | 19.0 | 1% | 30.0 | 2% | 58% |
| **Total** | **1,657** | | **1,909** | | **15%** |

Table 9 summarizes activity data for each sector and subsector.

## Table 9. Activity Data used in 2005 and 2013 Municipal Inventories

| Sector | 2005 | 2013 | % Change 2005–2013 |
|---|---|---|---|
| **Buildings & Facilities** | | | |
| Electricity (kWh) | 968,991 | 900,602 | -7% |
| Natural Gas (therms) | 6,136 | 5,013 | -18% |
| **Streetlights & Outdoor Lighting** | | | |
| City-Owned Electricity (kWh) | 613,342 | 1,271,181 | 107% |
| SDG&E-Owned (kWh) | 1,735,514 | 712,155 | -59% |
| **Fleet & Equipment** | | | |
| Gasoline Regular (gallons) | 13,996 | 12,573 | -10% |
| Gasoline Hybrid (gallons) | 0 | 369 | - |
| Diesel (gallons) | 22,842 | 27,392 | 20% |
| **Employee Commute** | | | |
| Gasoline (vehicle miles traveled) | 516,765 | 479,549 | -7% |
| Diesel (vehicle miles traveled) | 0 | 0 | |
| # Full-Time Equivalent Employees | 122 | 113 | -7% |
| **Solid Waste** | | | |
| Generated Waste (tons) | 864 | 1,006 | 16% |
| **Water Pumping** | | | |
| Electricity (kWh) | 77,535 | 83,990 | 8% |

## Energy

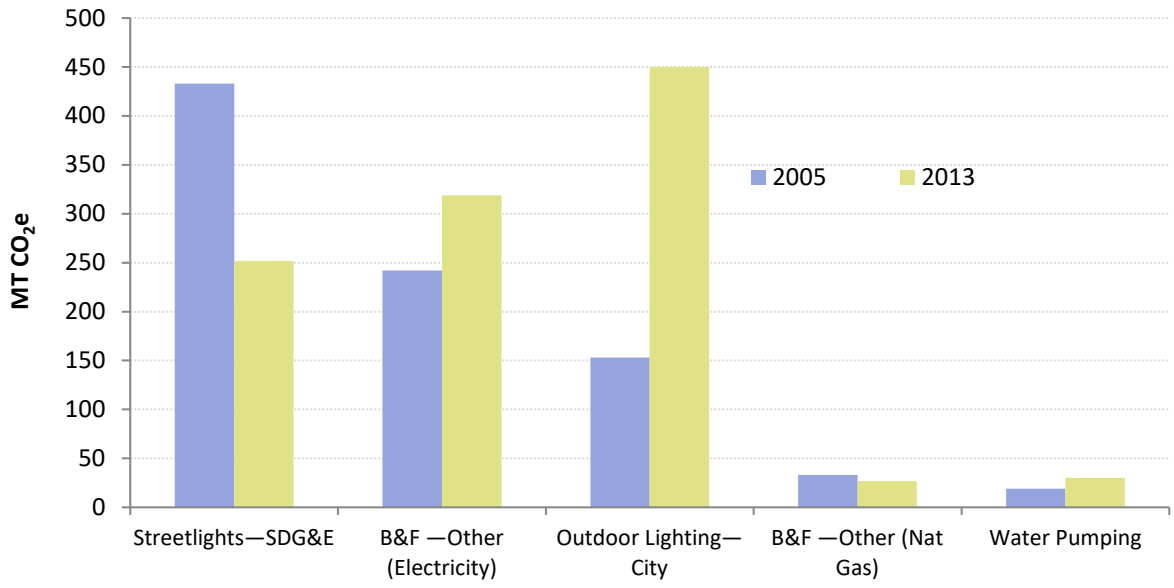
As with the community energy, municipal energy use decreased but GHG emissions increased from 2005 to 2013 due to the emission factors for electricity. Municipal energy use includes Buildings & Facilities, SDG&E-owned Streetlights, City-owned Outdoor Lighting, and Water Pumping. Energy accounted for 53% of total emissions in 2005 and 57% in 2013. While both electricity and natural gas are used for Building & Facilities, Streetlights and Water Pumping only use electricity. Emissions from energy increased 23% from 2005 to 2013 (Table 10). Electricity emissions increased for each sector except SDG&E-owned Streetlights. As with community energy, municipal emissions use variable electricity emission factors and constant natural gas emission factors.

**Table 10. Activity Data and GHG Emissions of Energy in 2005 and 2013**

| Sector | 2005 | | 2013 | | % Change in Activity 2005–2013 | % Change in Emissions 2005–2013 |
|---|---|---|---|---|---|---|
| | Activity (kWh or therms) | Emissions (MT $CO_2e$) | Activity (kWh or therms) | Emissions (MT $CO_2e$) | | |
| Buildings & Facilities | | | | | | |
| Electricity | 968,991 | 242 | 900,602 | 319 | -7% | 32% |
| Natural Gas | 6,136 | 33 | 5,013 | 27 | -18% | -18% |
| **Streetlights—SDG&E-owned** | | | | | | |
| Electricity | 1,735,514 | 433 | 712,155 | 252 | -59% | -42% |
| **Streetlights & Traffic Signals—City-owned** | | | | | | |
| Electricity | 613,342 | 153 | 1,271,181 | 450 | 107% | 194% |
| **Water Pumping** | | | | | | |
| Electricity | 77,535 | 19 | 83,990 | 30.00 | 8% | 58% |
| **Total (MT$CO_2e$)** | **3,401,518** | **880** | **2,972,941** | **1,078** | **-13%** | **23%** |

Electricity activity data are reported in kWh; Natural Gas activity data are reported in therms.

Figure 5 shows the trend in electricity and natural gas emissions from 2005 to 2013 for the municipal energy sectors.




Note: B&F is Buildings and Facilities

**Figure 4. GHG Emissions for Municipal Electricity and Natural Gas, by Sector**

# Inventory Forecasts

GHG emissions are forecast using two scenarios: a Business-as-Usual (BAU) and an Adjusted BAU scenario. The BAU scenario describes emissions based on projected growth in population, households and employment. In addition to the anticipated growth and land use forecasts within the General Plan, the City of Santee has approximately 2000 residential dwelling unit applications that were at different stages of approval at the time the BAU scenarios were being developed for the Sustainable Santee Action Plan (Table 11). The approved and pending residential development applications were added into the Sustainable Santee Action Plan growth assumptions as a land use buffer to ensure that the growth assumptions within the Sustainable Santee Action Plan were accurately depicting growth through the 2035 horizon year. The BAU scenario projections consider this residential land use buffer in the future growth projections. The BAU Scenario does not consider policies that will reduce emissions in the future (that is, the policies and related efficiency levels in place in 2013 are assumed to remain constant through 2035). The Adjusted BAU scenario describes emissions based on projected growth (including the residential land use buffer assumed under BAU scenario) *and* considers policies that will achieve GHG reductions in the future. Policies, described in detail below, include State-adopted or approved legislation that will affect future emissions. By evaluating the two scenarios, the City can see the effect that existing policies may have on future emissions and be better able to determine how local measures can provide additional reductions. Three future years are forecasted for each scenario: 2020, 2030, and 2035. The 2020 forecast year is consistent with the goals identified in Assembly Bill (AB) 32, which identifies a statewide GHG reduction target by 2020. The 2030 and 2035 forecast years will allow the City to develop long-term strategies to continue GHG reductions beyond 2020.

**Table 11. City of Santee Approved and Pending General Plan Amendments Residential Dwelling Units (DUs)**

**Approved and Pending Residential DUs**

| Development Name/Applicant | Number of DUs |
|---|---|
| **Approved/Under Construction** | |
| Mission George Multi-family | 113 |
| Infill Development Company | 154 |
| D'Lazio | 20 |
| Woodside Terrace | 4 |
| **Approved-Not Built** | |
| Meng Subdivision | 24 |
| Santee View Estates | 27 |
| Village Run Homes, LLC | 40 |
| GA Development LLC | 6 |
| **Pending Entitlement** | |
| Fanita Ranch Specific Plan | 1,612* |
| **Total** | **2,000** |

SOURCE: City of Santee, October 2019

* DUs above the General Plan allocation for the Fanita Ranch Specific Plan

Both the BAU and ABAU included the residential land use buffer when forecasting GHG emissions associated with energy (electricity and natural gas consumption), water, and solid waste.

In forecasting GHG emissions associated with on-road transportation the SANDAG Series 12 Transportation Model and the California Air Resources Board (CARB) EMFAC2014 were used. The SANDAG Series 12 Transportation Model included very aggressive growth rates for future years which resulted in higher levels of transportation related travel in 2020, 2030 and 2035. The growth rates were in excess of the Santee General Plan plus the land use buffer described above. Therefore the SANDAG Series 12 Transportation Model was used in forecasting vehicle miles traveled (VMT). The forecasted VMT was then used in the CARB EMFAC2014 to forecast on-road transportation related GHG emissions.

## Business-as-Usual Forecasts

The BAU forecasts estimate future emissions using current (2013) consumption patterns and emission factors with the anticipated growth in the City. Anticipated growth is estimated using data from regional planning scenarios developed by the SANDAG, the City, and other relevant sources (Table 11). The most relevant growth factors are used to project emissions by sector. For example, future Residential Energy emissions were developed using current energy use per household (from the 2013 inventory) and the anticipated number of households in the future. Actual energy use is a function of several variables, not only the number of households; however, this approach is supported by current protocols and best practices within the State and provides a consistent approach to forecasting. Compound annual growth rates were developed using the growth projections from 2013 to 2020 and from 2021 to 2035, as shown Table 11.

In general, the City is expecting modest growth to 2020 and 2035 as population, housing, jobs, and VMT are all expected to increase. At this time, the City expects its services to remain fairly constant over time. Please note the differences in growth rates used in the forecasts using the SANDAG Series 12 Transportation Model, EMFAC2014, and the energy related 2012 E-Grid values in these forecasts as discussed on page 2.

**Table 12. Growth Factors for 2013, 2020, and 2035**

| Sector | Demographic Indicator | 2013 | 2020 | 2035 | 2013–2020 CAGR[a] | 2020–2035 CAGR[a] |
|---|---|---|---|---|---|---|
| Solid Waste, Water, Wastewater, Off-Road Sources | Service Population (Population + Jobs) | 71,663 | 76,437 | 84,200 | 0.93% | 0.65% |
| Population [b] | Population | 55,033 | 59,488 | 63,518 | 1.12% | 0.44% |
| Residential Energy | Households | 19,725 | 20,995 | 24,165 | 0.90% | 0.94% |
| Commercial/Industrial Energy | Jobs | 16,630 | 16,949 | 20,682 | 0.27% | 1.34% |
| Transportation [c] | VMT – Gas | 458,785,827 | 493,494,150 | 576,966,520 | 25.76% | 16.91% |
| | VMT – Diesel | 27,822,637 | 32,536,348 | 45,500,895 | 16.94% | 39.85% |
| Municipal Jobs | Municipal Emissions[d] | 112.8 | 115 | 120 | 0.28% | 0.28% |

SOURCE: SANDAG
FTE: Full-time equivalent employees
a. Compound annual growth rate.
b. Population data are shown for informational purposes but are not used for forecasting any sector.
c. CAGR is calculated using 2013 and 2035 VMT data, and 2020 VMT is derived from the CAGR between 2013 and 2035.
d. The number of jobs in the City is used as an indicator for all municipal operation emissions.

## Community Business-as-Usual Forecast

- **BAU community emissions are expected to increase 3% from baseline levels by 2020, 16% by 2030, and 23% by 2035.**

The City's BAU emissions in 2020 are estimated to be 432,982 MT $CO_2e$, or a 27.4% increase from baseline (2005) emissions. By 2030, emissions are estimated to increase 43.0% from the baseline level to 486,170 MT $CO_2e$. By 2035, emissions are estimated to increase 51.6% from the baseline level to 515,462 MT $CO_2e$ (Table 12).

**Table 13. Community BAU Forecast**

| Sector | 2005 (MT $CO_2e$) | 2013 (MT $CO_2e$) | 2020 (MT $CO_2e$) | % Change 2013–2020 | 2030 (MT $CO_2e$) | %Change 2013–2030 | 2035 (MT $CO_2e$) | %Change 2013–2035 |
|---|---|---|---|---|---|---|---|---|
| On-Road Transportation | 181,812 | 242,499 | 264,162 | 8.9% | 298,992 | 23.3% | 318,334 | 31.3% |
| Residential Energy | 63,544 | 78,651 | 83,753 | 6.5% | 91,986 | 17.0% | 96,401 | 22.6% |
| Commercial Energy | 37,697 | 48,025 | 49,467 | 3.0% | 56,486 | 17.6% | 60,362 | 25.7% |
| Solid Waste | 16,376 | 11,151 | 11,861 | 6.4% | 12,651 | 13.5% | 13,066 | 17.2% |
| Water & Wastewater | 11,354 | 6,578 | 8,029 | 6.4% | 8,565 | 13.5% | 8,845 | 17.2% |
| Off-Road Sources | 28,230 | 14,699 | 15,710 | 6.9% | 17,490 | 19.0% | 18,454 | 25.5% |
| **Total** | **339,972** | **402,574** | **432,982** | **7.6%** | **486,170** | **20.8%** | **515,462** | **28.0%** |
| **% Change from 2005** | | **18.4%** | **27.4%** | | **43.0%** | | **51.6%** | |

## Municipal Business-as-Usual Forecast

- **BAU municipal emissions are expected to be 18% above baseline levels in 2020, 21% above baseline levels in 2030, and 23% above baseline levels by 2035.**

The City is anticipating approximately 2% growth in city utility use by 2020, 5% by 2030 and 6% by 2035, relative to 2013 levels. However, emission levels are expected to be 18, 21, and 23% higher, respectively, due to the higher electricity emission factor assumed under a BAU forecast compared to the 2005 factor as described above (Table 13 and Figure 6).

**Table 14. Municipal BAU Forecast**

| | 2005 (MT $CO_2e$) | 2013 (MT $CO_2e$) | 2020 (MT $CO_2e$) | % Change 2013–2020 | 2030 (MT $CO_2e$) | % Change 2013–2030 | 2035 (MT $CO_2e$) | % Change 2013–2035 |
|---|---|---|---|---|---|---|---|---|
| Outdoor Lighting | 586 | 702 | 716 | 2% | 737 | 5% | 747 | 6% |
| Vehicle Fleet | 359 | 396 | 404 | 2% | 416 | 5% | 421 | 6% |
| Buildings & Facilities | 275 | 346 | 353 | 2% | 363 | 5% | 368 | 6% |
| Solid Waste | 210 | 247 | 252 | 2% | 259 | 5% | 263 | 6% |
| Employee Commute | 208 | 188 | 192 | 2% | 197 | 5% | 200 | 6% |
| Water Pumping | 19 | 30 | 31 | 3% | 31 | 3% | 32 | 7% |
| **Total** | **1,657** | **1,909** | **1,948** | **2%** | **2,003** | **5%** | **2,031** | **6%** |
| **% Change from 2005** | | | **15%** | **18%** | **21%** | | | **23%** |

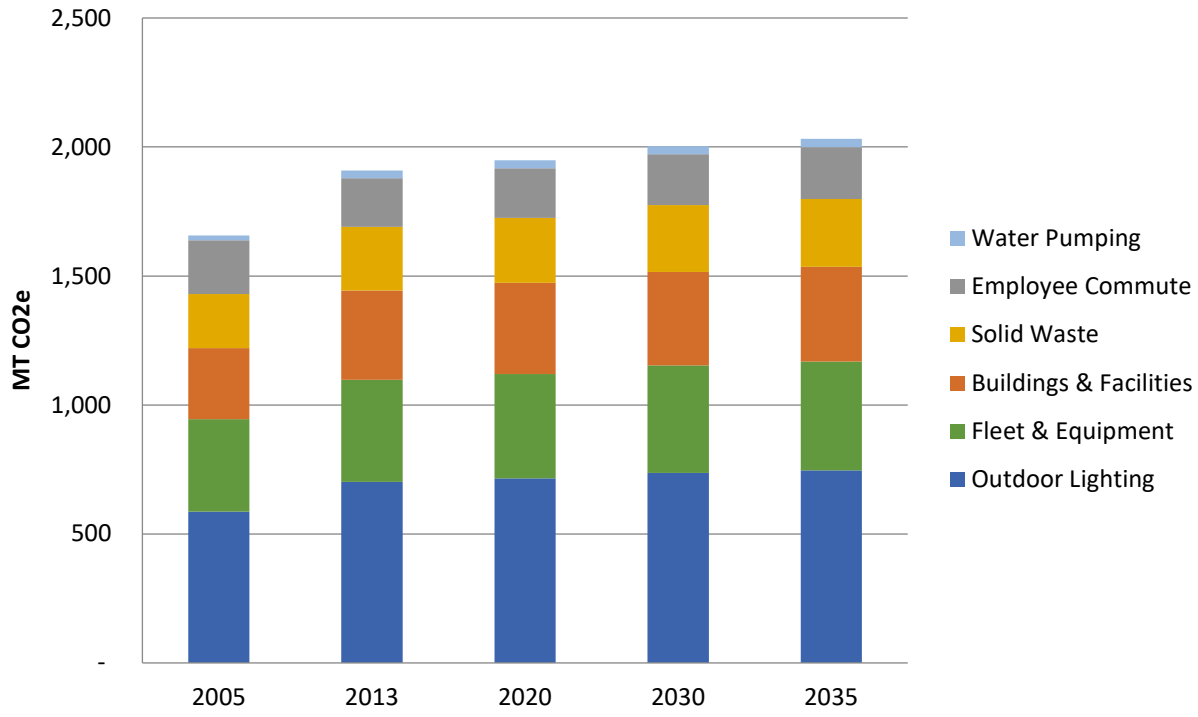



**Figure 5. Municipal BAU Forecast**

## Adjusted Business-as-Usual Forecasts

State legislation has been approved and/or adopted that will reduce GHG emissions in the City. These policies do not require additional local action, but should be accounted for in the City's emissions forecasts to provide a more accurate picture of future emissions and the level of local action needed to reduce emissions to levels consistent with State recommendations. This forecast is called the Adjusted BAU forecast. The measures are described briefly below.

**Low Carbon Fuel Standard.** The Low Carbon Fuel Standard (LCFS) was developed as a result of Executive Order S-1-07, which mandates that the carbon intensity of transportation fuels in California are lowered 10% by 2020. The State is currently implementing this standard, which is being phased in and will achieve full implementation in 2020.

**Assembly Bill (AB) 1493 and Advanced Clean Cars.** AB 1493 directed California Air Resources Board to adopt GHG standards for motor vehicles through model year 2015 that would result in reductions in GHG emissions by up to 25% in 2030. In addition, the State's Advanced Clean Cars program includes additional components that will further reduce GHG emissions statewide, including more stringent fuel efficiency standards for model years 2017—2025 and support infrastructure for the commercialization of zero-emission vehicles. CARB anticipates additional GHG reductions of 3% by 2020, 27% by 2035, and 33% by 2050.[3] CARB recently released a 2014 version of EMFAC, the standard mobile source emissions inventory tool, which includes current assumptions about how these regulations will increase fuel efficiency. Factors from EMFAC were applied to account for changes in mobile source emissions.

**California Building Code Title 24.** California's building efficiency standards are updated regularly to incorporate new energy efficiency technologies. The code was most recently updated in 2013 and went into effect for new development in 2014. For projects implemented after January 1, 2014, the California Energy Commission estimates that the 2013 Title 24 energy efficiency standards will reduce consumption by an estimated 25% for residential buildings and 30% for commercial buildings, relative to the 2008 standards. These percentage savings relate to heating, cooling, lighting, and water heating only; therefore, these percentage savings were applied to the estimated percentage of energy use by Title 24.

**Renewable Portfolio Standard.** The Renewable Portfolio Standard (RPS) requires energy providers to derive 33 percent of their electricity from qualified renewable sources by 2020 and 60 percent by 2030. This is anticipated to lower emission factors (i.e., fewer GHG emissions per kilowatt-hour used) from utilities across the state, including SDG&E. Reductions anticipated were modeled by the SEEC ClearPath software and are detailed in Attachment B.

**Senate Bill X7-7.** California's Senate Bill (SB) X7-7 requires water suppliers to reduce urban per capita water consumption 20% from a baseline level by 2020. Reductions in GHG emissions from SB X7-7 were calculated by applying the reduction goals established by Padre Dam to the City's population in 2020 and 2035.

[3] CARB Advanced Clean Cars Summary Sheet, http://www.arb.ca.gov/msprog/clean_cars/acc%20summary-final.pdf

## Community Adjusted Business-as-Usual Forecast

- **Emissions are expected to decrease under the Adjusted BAU forecast and will be 16.9% lower in 2020 than 2005, 14.8% lower in 2030 than 2005, and 13.2% lower than 2005 levels by 2035.**

The City's Adjusted BAU emissions are estimated to be 352,106 MT $CO_2e$ in 2020, 339,514 MT $CO_2e$ in 2030, and 336,543 MT $CO_2e$ in 2035 (Table 14). This change represents 3.6% increase from 2005 by 2020, a very small reduction (0.001%) by 2030, and a 0.01% reduction by 2035. Due to the stringent State vehicle standards, while VMT is going up the emissions from the Transportation sector are expected to decrease over time. The RPS will also result in reductions in the electricity sector compared to BAU but emissions from energy are still anticipated to grow by 2035. Emissions from Solid Waste is expected to increase over time but account for less than 10% of total emissions.

### Table 15. Community Adjusted BAU Emissions

| Sector | 2005 (MT $CO_2e$) | 2013 (MT $CO_2e$) | 2020 (MT $CO_2e$) | 2020 % of Total | 2030 (MT $CO_2e$) | 2030 % of Total | 2035 (MT $CO_2e$) | 2035 % of Total |
|---|---|---|---|---|---|---|---|---|
| Transportation & Mobile Sources | 181,812 | 242,499 | 234,283 | 67% | 210,692 | 62% | 201,729 | 60% |
| Residential Energy | 63,544 | 78,651 | 65,424 | 19% | 71,292 | 21% | 74,483 | 22% |
| Commercial Energy | 37,697 | 48,025 | 34,597 | 10% | 38,543 | 11% | 40,721 | 12% |
| Solid Waste | 16,376 | 11,151 | 11,861 | 3% | 12,651 | 4% | 13,066 | 4% |
| Water & Wastewater | 12,313 | 7,549 | 5,941 | 1% | 6,336 | 2% | 6,544 | 2% |
| **Total** | **339,972** | **402,574** | **352,106** | **100%** | **339,514** | **100%** | **336,543** | **100%** |
| **% Change from 2005** | | **18.4%** | **3.6%** | | **-0.001%** | | **-0.01%** | |

## Municipal Adjusted Business-as-Usual Forecast

- **Under an Adjusted BAU forecast, the City's municipal emissions are projected to be 3% below 2005 levels in 2020. In 2030, emissions are projected to be equivalent to 2005 levels. In 2035, emissions are anticipated to be 1% higher than 2005 levels under an Adjusted BAU forecast.**

The City's Municipal Adjusted BAU emissions in 2020 are estimated to be 1,611 MT $CO_2e$, which is 3% lower than the 2005 baseline level (Table 15 and Figure 7). In 2030, emissions are projected to be equivalent to 2005 levels. In 2035, emissions are expected to be 1% higher than in 2005 (1,681 MT $CO_2e$). The Adjusted BAU emissions are lower than the BAU emissions due to the Low Carbon Fuel Standard and RPS policies described earlier. The Low Carbon Fuel Standard would lower the carbon intensity of fuels used in both the City's Fleet & Equipment and Employee Commute sectors and RPS would lower electricity-related emissions.

**Table 16. Municipal Adjusted BAU Emissions**

| Sector | 2005 (MT $CO_2e$) | 2013 (MT $CO_2e$) | 2020 (MT $CO_2e$) | 2020 % of Total | 2030 (MT $CO_2e$) | 2030 % of Total | 2035 (MT $CO_2e$) | 2035 % of Total |
|---|---|---|---|---|---|---|---|---|
| Outdoor Lighting | 586 | 702 | 514 | 32% | 529 | 32% | 536 | 32% |
| Fleet & Equipment | 359 | 396 | 379 | 24% | 390 | 24% | 396 | 24% |
| Buildings & Facilities | 275 | 346 | 261 | 16% | 268 | 16% | 272 | 16% |
| Solid Waste | 210 | 247 | 252 | 16% | 259 | 16% | 263 | 16% |
| Employee Commute | 208 | 188 | 180 | 11% | 185 | 11% | 188 | 11% |
| Water Pumping | 19 | 30 | 25 | 2% | 26 | 2% | 26 | 2% |
| **Total** | **1,657** | **1,909** | **1,611** | **100%** | **1,657** | **100%** | **1,681** | **100%** |
| **% Change from 2005** | | **15%** | **-3%** | | **0%** | | **1%** | |

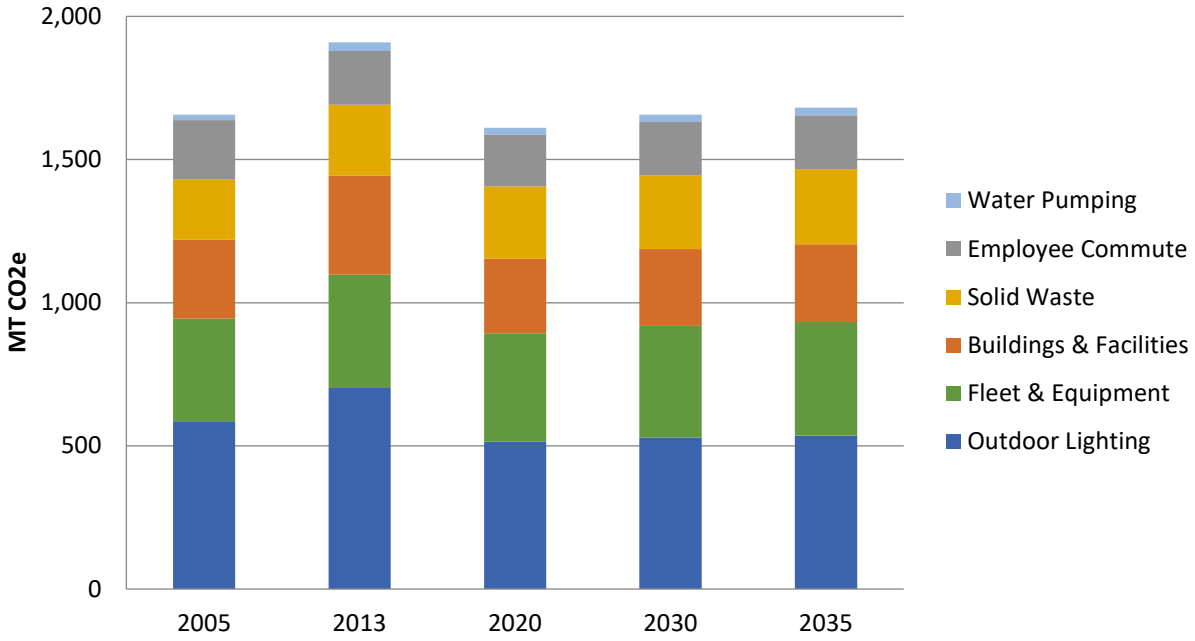



**Figure 6. Municipal Adjusted BAU Emissions**

# Reduction Targets

The State has set goals for reducing GHG emissions by 2020 and 2050 through AB 32 and Executive Order (EO) S-3-05, respectively. The State has also provided guidance to local jurisdictions as "essential partners" in achieving the State's goals by identifying a 2020 recommended reduction goal. That goal, stated in the AB 32 Scoping Plan, was for local governments to achieve a 15% reduction below 2005 levels by 2020, which aligns with the State's goal of not exceeding 1990 emissions levels by 2020.[4] The State's long term target is to emit no more than 20% of 1990 levels by 2050 (or, a reduction of 80%

[4] In an analysis, the State concluded that a 15% reduction in emissions from 2005 levels by 2020 would be equivalent to achieving 1990 emissions levels.

below 1990 levels by 2050). On April 29, 2015, Executive Order B-30-15 set an interim reduction goal of 40% from 1990 levels by the year 2030. However, the state has not assigned a corresponding interim goal for local governments. The newly adopted interim state goal is not recommended for the City since some of the emission sources, such as major industrial processes, are not under the control of local governments. In this case, according to the Scoping Plan, a straight-line projection from the 2020 to 2050 goals would be recommended, which result in a reduction goal of 38% below 2005 levels by 2030, and 49% below 2005 levels by mid-2035.

The 2017 Scoping Plan Update released by ARB in January 2017 provides strategies for achieving the 2030 target established by Executive Order B-30-15 and codified in SB 32 (40 percent below 1990 levels by 2030). The 2017 Scoping Plan Update recommends local plan level GHG emission reduction goals. ARB recommends that local governments aim to achieve community-wide goal to achieve emissions of no more than 6 MT $CO_2e$ per capita by 2030 and no more than 2 MT $CO_2e$ per capita by 2050.

Ultimately, the City will determine the level of reductions that it can and should achieve. Both mass emissions (performance target) and per capita emissions (efficiency target) GHG reduction targets are identified for 2020, 2030, and 2035. The targets provided below are guidance based on consistency with the State's goals for local governments and are provided to guide the City in determining targets.

## Recommended Community Targets

In 2030, under the Adjusted BAU scenario, the City would meet the State-Aligned efficiency target, but would need to reduce 135,531 MT $CO_2e$ to meet the performance target. In 2035, under the Adjusted BAU scenario, the City would meet the State-Aligned efficiency target, but would need to reduce 163,157 MT $CO_2e$ to meet the performance target (Table 16, Figure 8 and Figure 9).

### Table 17. State-Aligned GHG Reduction Targets

| Sector | 2005 | 2013 | 2020 | 2030 | 2035 |
|---|---|---|---|---|---|
| BAU Emissions (MT $CO_2e$) | 339,972 | 402,574 | 432,982 | 486,170 | 515,462 |
| Adjusted BAU Emissions (MT $CO_2e$) | 339,972 | 402,574 | 352,106 | 339,514 | 336,543 |
| Service Population (Population + Jobs) | 70,152 | 71,663 | 76,437 | 81,499 | 84,200 |
| Adjusted BAU Per Capita Emissions (MT $CO_2e$/SP) | | | | 2.55 | 2.51 |
| State-Aligned Performance Target (% change from 2005) | | | | -40% | -49% |
| State-Aligned Performance Target (MT $CO_2e$) | | | | 203,983 | 173,386 |
| Reductions from Adjusted BAU needed to meet the Performance Target (MT $CO_2e$) | | | | 135,531 | 163,157 |
| State-Aligned Efficiency Target (MT $CO_2e$/SP) | | | | 3.80 | 3.16 |
| Reductions from Adjusted BAU needed to meet the Efficiency Target (MT $CO_2e$/SP) | | | | Target Met | Target Met |

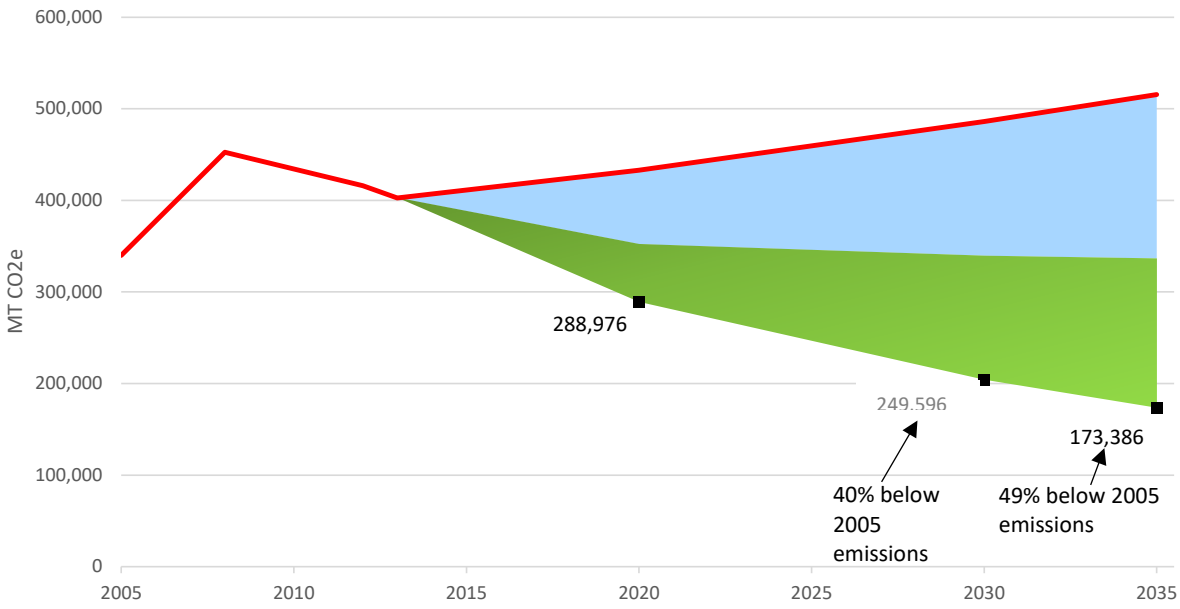



**Figure 7. Community Emissions Inventories, Projections, and Performance Targets**

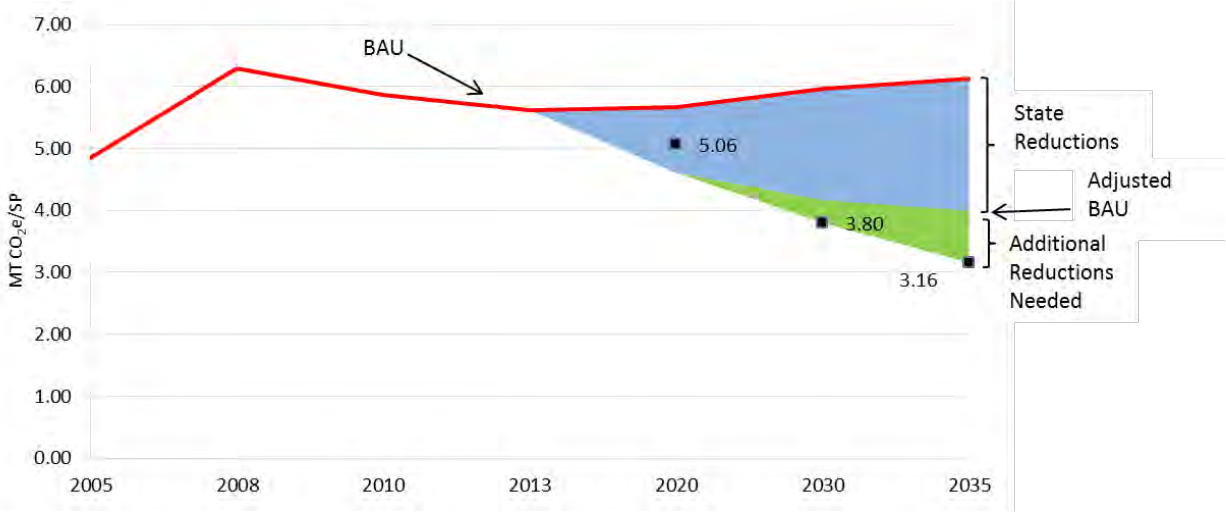



**Figure 8. Community Emission Inventories, Projections, and Efficiency Targets**

Looking at all the sectors of emissions the California Air Resources Board categorizes within the statewide inventory, the City has jurisdictional control over approximately 63% of total source categories. The remaining 37% of sources are not within the City's control. This was determined by comparing the percentage of GHG emissions within the State inventory (2015) with those sources that the City has jurisdictional control.. This is summarized in Table 16A below:

### Table 16A Statewide GHG Emissions by Source

| Sector | 2015 Statewide Emissions (MMT $CO_2e$) | Percent of Total 2015 Statewide Emissions |
|---|---|---|
| **Sectors of Emissions Within Santee and Within the Jurisdictional Control of the City** | | |
| Commercial Natural Gas | 10.50 | 2.38 |
| Residential Natural Gas | 21.90 | 4.97 |
| Solid Waste | 8.73 | 1.98 |
| On-Road Transportation | 149.42 | 33.93 |
| Residential and Commercial Electricity and Water | 83.67 | 19.00 |
| Wastewater | 1.82 | 0.41 |
| Off-Road | 2.53 | 0.58 |
| **Above Sectors Total** | **278.57** | **63.26** |
| **Sectors of Emissions Not Within Santee or Not within the City's Jurisdictional Control** | | |
| Aviation (Intrastate) | 4.20 | 0.95 |
| Oceangoing Ships and Commercial Boats | 3.89 | 0.88 |
| Railroad | 2.42 | 0.55 |
| Other Unspecified Intrastate Transportation | 2.16 | 0.49 |
| Industrial Processes Regulated by the State | 89.89 | 20.41 |
| ODS substitutes, SF6, Semiconductor Manufacturing | 19.05 | 4.33 |
| Electric Generation Other | 5.53 | 1.26 |
| Agricultural Livestock and Crops | 34.65 | 7.87 |
| **Statewide Total** | **440.36** | **100** |

Source: CARB. California Greenhouse Gas Emission Inventory (2018).

## Recommended Municipal Targets

In 2020, the City would need to reduce its emissions by 203 MT $CO_2e$ from the Adjusted BAU forecast to achieve a reduction goal consistent with the State (Table 17 and Figure 10). The City will also need to implement measures to continue to achieve GHG reductions beyond 2020. Early implementation of measures demonstrates the City's commitment to the CAP, leadership in the community, and allows the City to phase implementation of new strategies so that ongoing reductions may be achieved. By 2030, the City will need to reduce municipal operation emissions by 1,033 MT $CO_2e$ from an Adjusted BAU forecast to meet a 38% reduction goal below 2005 levels. By 2035, the City will need to reduce municipal operation emissions by 836 MT $CO_2e$ from an Adjusted BAU forecast to meet a 49% reduction goal (below 2005 levels).

### Table 18. State-Aligned Municipal GHG Reduction Targets

| | 2005 | 2013 | 2020 | 2030 | 2035 |
|---|---|---|---|---|---|
| BAU Emissions (MT $CO_2e$) | 1,657 | 1,909 | 1,948 | 2,003 | 2,031 |
| Adjusted BAU Emissions (MT $CO_2e$) | 1,657 | 1,909 | 1,611 | 1,657 | 1,681 |
| State-Aligned Target (% change from 2005) | | | | -38% | -49% |
| State-Aligned Target (% change from 2013) | | | | -46% | -56% |
| State-Aligned Emissions Goal (MT $CO_2e$) | | | | 994 | 845 |
| Reductions from Adjusted BAU needed to meet the Target (MT $CO_2e$) | | | | 663 | 836 |

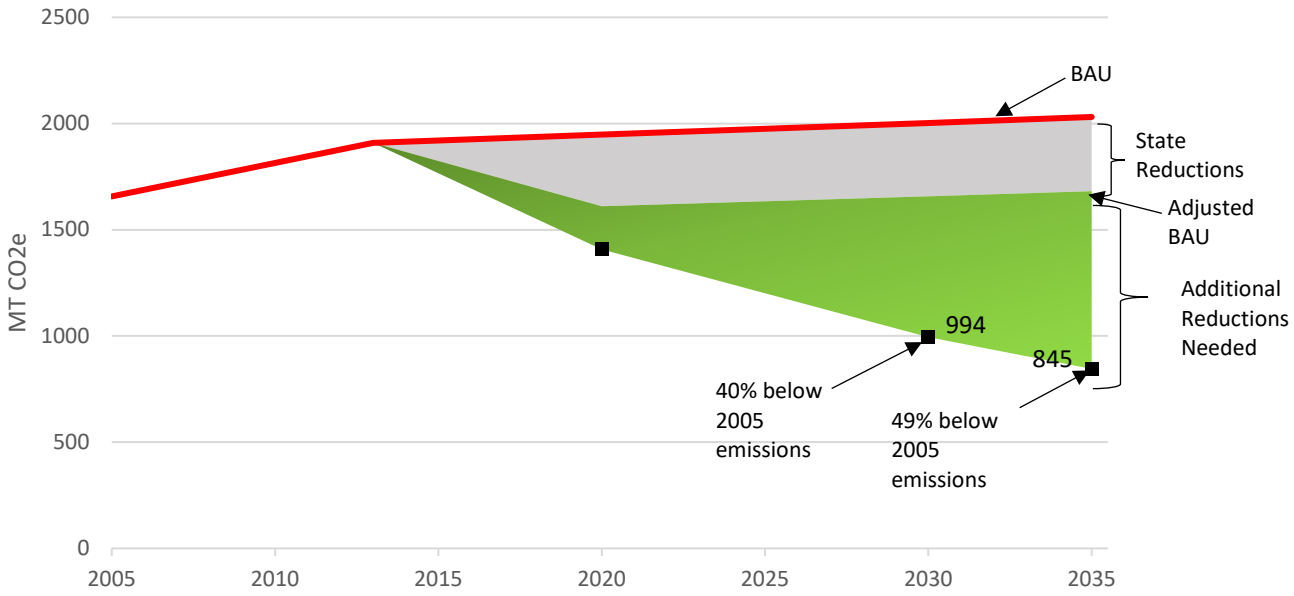



**Figure 9. Municipal Emissions and Targets**

# Conclusions and Next Steps

This Report presents the City's community and municipal inventories, forecasts, and recommended reduction targets. It provides the City a first look at what will be needed to meet emissions reductions that are aligned with the State and to mitigate the City's impacts on climate change. This Report also helps to guide the City in determining feasible energy efficiency and GHG reduction opportunities by detailing the sources of emissions by sector.

The next steps in the CAP development process are to review the information provided in this Report and to determine preliminary GHG reduction targets for the community and municipal operations.

# References

Association of Environmental Professionals (AEP). 2013. The California Supplement to the United States Community-Wide Greenhouse Gas (GHG) Emissions Protocol.

California Air Resources Board (ARB). 2010. Local Government Operations Protocol For the quantification and reporting of greenhouse gas emissions inventories version 1.1.

California Air Resources Board (ARB). 2011. California Greenhouse Gas Emissions Inventory: 2000-2009.

ICLEI 2012. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions version 1.0.

Intergovernmental Panel on Climate Change. (IPCC) 1996. Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories.

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

# Attachment A: Glossary of Terms

**Adjusted Business-as-Usual:** A GHG forecast scenario that accounts for known policies and regulations that will affect future emissions. Generally, these are state and federal initiatives that will reduce emissions from the business-as-usual scenario.

**Baseline Year:** The inventory year used for setting targets and comparing future inventories against.

**Business-as-Usual (BAU):** A GHG forecast scenario used for the estimation of greenhouse gas emissions at a future date based on current technologies and regulatory requirements and in the absence of other reduction strategies.

**Carbon Dioxide Equivalent ($CO_2e$):** This is a common unit for normalizing greenhouse gases with different levels of heat trapping potential. For carbon dioxide itself, emissions in tons of $CO_2$ and tons of $CO_2e$ are the same, whereas one ton of nitrous oxide emissions equates to 298 tons of $CO_2e$ and one ton of methane equates to 25 tons of $CO_2e$. The values are based on the gases' global warming potentials.

**Community Inventory:** GHG emissions that result from the activities by residents and businesses in the city. An inventory reports emissions that occur over a single calendar year.

**Emissions Factor:** A coefficient used to convert activity data into greenhouse gas emissions. The factor is a measure of the greenhouse gas intensity of an activity, such as the amount of $CO_2$ in one kilowatt-hour of electricity.

**Global Warming Potential (GWP):** The relative effectiveness of a molecule of a greenhouse gas at trapping heat compared with one molecule of $CO_2$.

**Metric Ton (MT):** Common international measurement for the quantity of greenhouse gas emissions. A metric ton is equal to 2205 lbs. or 1.1 short tons.

**Municipal Inventory:** GHG emissions that result from the activities performed as part of the government operations in the city and are a subset of the community inventory. An inventory reports emissions that occur over a single calendar year.

**Reduction Targets:** GHG emissions levels not to be exceeded by a specific date. Reduction targets are often informed by state recommendations and different targets may be established for different years.

**Sector:** A subset of the emissions inventory classified by a logical grouping such as economic or municipal-specific category.

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# Attachment B: Methodology

See Appendix B of the Sustainable Santee Plan.

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# Attachment C: Vehicle Miles Traveled (VMT) Calculations

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## 2008 Base Year

| JURISDICTION | TOTAL VMT | TOTAL City of Santee VMT | Two Trip End City of Santee VMT | One Trip End City of Santee VMT | NON-City of Santee VMT |
|---|---|---|---|---|---|
| | | | I-I | I-E and E-I | |
| CARLSBAD TOTAL | 3,344,347 | 14,245 | - | 14,245 | 3,330,102 |
| CHULA VISTA TOTAL | 3,943,542 | 32,507 | - | 32,507 | 3,911,035 |
| CORONADO TOTAL | 431,181 | 2,874 | - | 2,874 | 428,307 |
| DEL MAR TOTAL | 97,064 | 264 | - | 264 | 96,800 |
| EL CAJON TOTAL | 2,167,286 | 282,301 | - | 282,301 | 1,884,985 |
| ENCINITAS TOTAL | 2,078,290 | 16,997 | - | 16,997 | 2,061,293 |
| ESCONDIDO TOTAL | 2,802,466 | 16,903 | - | 16,903 | 2,785,563 |
| External TOTAL | 347,582 | 3,127 | - | 3,127 | 344,455 |
| IMPERIAL BEACH TOTAL | 119,733 | 343 | - | 343 | 119,390 |
| LA MESA TOTAL | 1,831,122 | 163,686 | - | 163,686 | 1,667,436 |
| LEMON GROVE TOTAL | 834,635 | 53,702 | - | 53,702 | 780,933 |
| NATIONAL CITY TOTAL | 1,648,766 | 12,206 | - | 12,206 | 1,636,560 |
| OCEANSIDE TOTAL | 3,194,608 | 5,040 | - | 5,040 | 3,189,568 |
| POWAY TOTAL | 1,107,533 | 17,169 | - | 17,169 | 1,090,364 |
| SAN DIEGO TOTAL | 38,705,172 | 882,135 | - | 882,135 | 37,823,037 |
| SAN MARCOS TOTAL | 2,020,178 | 5,470 | - | 5,470 | 2,014,708 |
| SANTEE TOTAL | 881,909 | 627,655 | 200,301 | 427,354 | 254,254 |
| SOLANA BEACH TOTAL | 572,631 | 6,133 | - | 6,133 | 566,498 |
| Unincorporated TOTAL | 17,398,289 | 417,937 | - | 417,937 | 16,980,352 |
| VISTA TOTAL | 1,721,580 | 1,137 | - | 1,137 | 1,720,443 |
| REGIONWIDE TOTAL | 85,247,914 | 2,561,831 | 200,301 | 2,361,530 | 82,686,083 |
| | | | 100% * (I-I )+ 50% * (I-E + E-I) | 1,381,066 | |

## 2013 Verification

| JURISDICTION | TOTAL VMT | TOTAL City of Santee VMT | Two Trip End City of Santee VMT | One Trip End City of Santee VMT | NON-City of Santee VMT |
|---|---|---|---|---|---|
| | | I-I, I-E and E-I | I-I | I-E and E-I | |
| CARLSBAD TOTAL | 3,376,864 | 14,282 | - | 14,282 | 3,362,582 |
| CHULA VISTA TOTAL | 3,964,512 | 33,677 | - | 33,677 | 3,930,835 |
| CORONADO TOTAL | 431,668 | 2,948 | - | 2,948 | 428,720 |
| DEL MAR TOTAL | 95,056 | 254 | - | 254 | 94,802 |
| EL CAJON TOTAL | 2,055,440 | 265,255 | - | 265,255 | 1,790,185 |
| ENCINITAS TOTAL | 2,110,816 | 17,144 | - | 17,144 | 2,093,672 |
| ESCONDIDO TOTAL | 2,859,486 | 17,618 | - | 17,618 | 2,841,868 |
| External TOTAL | 353,337 | 3,275 | - | 3,275 | 350,062 |
| IMPERIAL BEACH TOTAL | 120,868 | 357 | - | 357 | 120,511 |
| LA MESA TOTAL | 1,745,064 | 168,487 | - | 168,487 | 1,576,577 |
| LEMON GROVE TOTAL | 842,238 | 54,908 | - | 54,908 | 787,330 |
| NATIONAL CITY TOTAL | 1,656,923 | 12,875 | - | 12,875 | 1,644,048 |
| OCEANSIDE TOTAL | 3,188,610 | 5,053 | - | 5,053 | 3,183,557 |
| POWAY TOTAL | 1,074,614 | 16,974 | - | 16,974 | 1,057,640 |
| SAN DIEGO TOTAL | 39,384,287 | 878,189 | - | 878,189 | 38,506,098 |
| SAN MARCOS TOTAL | 2,055,701 | 5,806 | - | 5,806 | 2,049,895 |
| SANTEE TOTAL | 1,121,191 | 667,430 | 210,476 | 456,954 | 453,761 |
| SOLANA BEACH TOTAL | 583,015 | 6,175 | - | 6,175 | 576,840 |
| Unincorporated TOTAL | 17,512,378 | 422,155 | - | 422,155 | 17,090,223 |
| VISTA TOTAL | 1,734,411 | 1,322 | - | 1,322 | 1,733,089 |
| REGIONWIDE TOTAL | 86,266,479 | 2,594,184 | 210,476 | 2,383,708 | 83,672,295 |
| | | | 100% * (I-I )+ 50% * (I-E + E-I) | 1,402,330 | |

## City Preferred 2035 Scenario A

| JURISDICTION | TOTAL VMT | TOTAL City of Santee VMT | Two Trip End City of Santee VMT | One Trip End City of Santee VMT | NON-City of Santee VMT |
|---|---|---|---|---|---|
| | | I-I, I-E and E-I | I-I | I-E and E-I | E-E |
| CARLSBAD TOTAL | 4,280,026 | 21,770 | - | 21,770 | 4,258,256 |
| CHULA VISTA TOTAL | 5,642,301 | 48,222 | - | 48,222 | 5,594,079 |
| CORONADO TOTAL | 470,638 | 3,258 | - | 3,258 | 467,380 |
| DEL MAR TOTAL | 100,867 | 325 | - | 325 | 100,542 |
| EL CAJON TOTAL | 2,477,835 | 318,427 | - | 318,427 | 2,159,408 |
| ENCINITAS TOTAL | 2,554,267 | 24,559 | - | 24,559 | 2,529,708 |
| ESCONDIDO TOTAL | 3,491,727 | 23,639 | - | 23,639 | 3,468,088 |
| External TOTAL | 526,361 | 5,057 | - | 5,057 | 521,304 |
| IMPERIAL BEACH TOTAL | 134,250 | 348 | - | 348 | 133,902 |
| LA MESA TOTAL | 2,148,837 | 212,975 | - | 212,975 | 1,935,862 |
| LEMON GROVE TOTAL | 979,458 | 75,353 | - | 75,353 | 904,105 |
| NATIONAL CITY TOTAL | 1,987,933 | 15,640 | - | 15,640 | 1,972,293 |
| OCEANSIDE TOTAL | 4,055,786 | 7,782 | - | 7,782 | 4,048,004 |
| POWAY TOTAL | 1,312,994 | 22,861 | - | 22,861 | 1,290,133 |
| SAN DIEGO TOTAL | 47,645,328 | 1,075,221 | - | 1,075,221 | 46,570,107 |
| SAN MARCOS TOTAL | 2,721,799 | 6,797 | - | 6,797 | 2,715,002 |
| SANTEE TOTAL | 1,386,488 | 871,692 | 268,056 | 603,636 | 514,796 |
| SOLANA BEACH TOTAL | 717,427 | 8,690 | - | 8,690 | 708,737 |
| Unincorporated TOTAL | 24,372,628 | 575,904 | - | 575,904 | 23,796,724 |
| VISTA TOTAL | 2,216,087 | 1,132 | - | 1,132 | 2,214,955 |
| REGIONWIDE TOTAL | 109,223,037 | 3,319,652 | 268,056 | 3,051,596 | 105,903,385 |
| | | | 100% * (I-I )+ 50% * (I-E + E-I) | 1,793,854 | |

# Attachment D: Emission Factors

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**Emission Factors**

The emission factors for the built environment used in this analysis were the same as employed by the Energy Policy Initiatives Center (EPIC) in 2014.

GHG emissions associated with the on-road activity data was calculated using the California Air Resources Board (ARB) on-road emissions factor model 2014 (EMFAC2014).

**Emission Factors**

| Built Environment | | |
|---|---|---|
| Input Type | Value | Source |
| Natural Gas (MMT CO2e/ MM Therms) | 0.0053052 | ARB |
| Electricity (2010 lb/MWh) | 680.4 | FERC/SDG&E/EPA E-Grid |
| Electricity (2011 lb/MWh) | 676.2 | FERC/SDG&E/EPA E-Grid |
| Electricity (2012 lb/MWh) | 778.5 | FERC/SDG&E/EPA E-Grid |

Source: Dr. Nilmini Silva-Send email of September 12, 2014.

# APPENDIX B

# SUPPORTING DATA

This appendix contains input and output data from the ClearPath Tool for the City of Santee's greenhouse gas (GHG) emissions inventory and forecasts. ClearPath Tool was developed by the Statewide Energy Efficiency Collaborative (SEEC) which is a partnership between several statewide agencies, utilities, and non-profits to assist cities and counties in climate mitigation planning. The ClearPath Tool is an all-in-one suite of online tool to help local agencies complete government operations and community-wide greenhouse gas inventories, forecasts and climate action plans. The tools are offered at no-cost to California local governments through the SEEC partnership.

The following tables are provided in this appendix:

- Factor Sets
- Community Inventory Input (Excluding Off-Road and Water Sectors)
- Community Business-As-Usual Forecast Input
- Community Adjusted Business-As-Usual Forecast Input
- Community Inventory Input (Off-Road Sector)
- Community Inventory Input (Water Sector)
- Municipal Inventory and Forecasts Input (Excluding Vehicle Fleet Sector)
- Municipal Inventory Input (Vehicle Fleet Sector)
- Community Inventories, Business-As-Usual Forecast, and Adjusted Business-As-Usual Forecast Output
- Municipal Inventories, Business-As-Usual Forecast, and Adjusted Business-As-Usual Forecast Output

## Factor Sets

**Global Warming Potential**

| Year | GHG | Sector | Full Name | Units | Factor | Proxy Year | Source | SEEC Entry Name |
|---|---|---|---|---|---|---|---|---|
| **ALL** | CO2 | GWP | GWP_AR4_CO2 | NA | 1 | NA | IPCC AR4 2007 | NA; Choose IPCC 4th AR in Parameters |
| **ALL** | CH4 | GWP | GWP_AR4_CH4 | NA | 25 | NA | IPCC AR4 2007 | NA; Choose IPCC 4th AR in Parameters |
| **ALL** | N2O | GWP | GWP_AR4_N2O | NA | 298 | NA | IPCC AR4 2007 | NA; Choose IPCC 4th AR in Parameters |
| **ALL** | CO2 | NaturalGas | NaturalGas_CO2 | kg CO2/MMBtu | 53.02 | NA | Community Protocol Appendix C B.1 | N/A; embedded in Tool |
| **ALL** | CH4 | NaturalGas | NaturalGas_CH4 | kg CH4/MMBtu | 0.005 | NA | Community Protocol Appendix C B.3 | N/A; embedded in Tool |
| **ALL** | N2O | NaturalGas | NaturalGas_N2O | kg N2O/MMBut | 0.0001 | NA | Community Protocol Appendix C B.3 | N/A; embedded in Tool |

**SDG&E Electricity** 550.488

| Year | GHG | Sector | Full Name | Units | Factor | Proxy Year | Source | SEEC Entry Name |
|---|---|---|---|---|---|---|---|---|
| **2005** | CO2 | Electricity | Electricity_SDGE_CO2_2005 | lbs CO2/MWh | 546.46 | NA | Climate Registry/SDG&E | SDGE_2005 |
| **2005** | CH4 | Electricity | Electricity_SDGE_CH4_2005 | lbs CH4/MWh | 0.030 | NA | Community Protocol Appendix C | SDGE_2005 |
| **2005** | N2O | Electricity | Electricity_SDGE_N2O_2005 | lbs N2O/MWh | 0.011 | NA | Community Protocol Appendix C | SDGE_2005 |
| **2008** | CO2 | Electricity | Electricity_SDGE_CO2_2007 | lbs CO2/MWh | 739.05 | NA | Climate Registry/SDG&E | SDGE_2008 |
| **2008** | CH4 | Electricity | Electricity_SDGE_CH4_2007 | lbs CH4/MWh | 0.029 | NA | Community Protocol Appendix C | SDGE_2008 |
| **2008** | N2O | Electricity | Electricity_SDGE_N2O_2007 | lbs N2O/MWh | 0.010 | NA | Community Protocol Appendix C | SDGE_2008 |
| **2012** | CO2 | Electricity | Electricity_SDGE_CO2_2010 | lbs CO2/MWh | 778.50 | NA | EPIC - FERC/SDG&E/EPA E-Grid | SDGE_2012 |
| **2012** | CH4 | Electricity | Electricity_SDGE_CH4_2010 | lbs CH4/MWh | 0.029 | NA | Community Protocol Appendix C | SDGE_2012 |
| **2012** | N2O | Electricity | Electricity_SDGE_N2O_2010 | lbs N2O/MWh | 0.006 | NA | Community Protocol Appendix C | SDGE_2012 |
| **2013** | CO2 | Electricity | Electricity_SDGE_CO2_2012 | lbs CO2/MWh | 778.50 | NA | NA | SDGE_2013_2012proxy |
| **2013** | CH4 | Electricity | Electricity_SDGE_CH4_2012 | lbs CH4/MWh | 0.029 | NA | NA | SDGE_2013_2012proxy |
| **2013** | N2O | Electricity | Electricity_SDGE_N2O_2012 | lbs N2O/MWh | 0.006 | NA | NA | SDGE_2013_2012proxy |

**Statewide Electricity--for Water-related Energy**

| Year | GHG | Sector | Full Name | Units | Factor | Proxy Year | Source | SEEC Entry Name |
|---|---|---|---|---|---|---|---|---|
| **2005** | CO2 | Electricity | Electricity_CA_CO2_2005 | lbs CO2/MWh | 948.28 | NA | Community Protocol Appendix C | CA_2005 |
| **2005** | CH4 | Electricity | Electricity_CA_CH4_2005 | lbs CH4/MWh | 0.03 | NA | Community Protocol Appendix C | CA_2005 |
| **2005** | N2O | Electricity | Electricity_CA_N2O_2005 | lbs N2O/MWh | 0.011 | NA | Community Protocol Appendix C | CA_2005 |
| **2008** | CO2 | Electricity | Electricity_CA_CO2_2007 | lbs CO2/MWh | 919.64 | 2007 | Community Protocol Appendix C | CA_2008_2007proxy |
| **2008** | CH4 | Electricity | Electricity_CA_CH4_2007 | lbs CH4/MWh | 0.029 | 2007 | Community Protocol Appendix C | CA_2008_2007proxy |
| **2008** | N2O | Electricity | Electricity_CA_N2O_2007 | lbs N2O/MWh | 0.01 | 2007 | Community Protocol Appendix C | CA_2008_2007proxy |
| **2012** | CO2 | Electricity | Electricity_CA_CO2_2012 | lbs CO2/MWh | 658.68 | 2009 | Community Protocol Appendix C | CA_2012_2009proxy |
| **2012** | CH4 | Electricity | Electricity_CA_CH4_2012 | lbs CH4/MWh | 0.02894 | 2009 | Community Protocol Appendix C | CA_2012_2009proxy |
| **2012** | N2O | Electricity | Electricity_CA_N2O_2012 | lbs N2O/MWh | 0.00617 | 2009 | Community Protocol Appendix C | CA_2012_2009proxy |
| **2013** | CO2 | Electricity | Electricity_CA_CO2_2013 | lbs CO2/MWh | 658.68 | 2009 | Community Protocol Appendix C | CA_2013_2009proxy |
| **2013** | CH4 | Electricity | Electricity_CA_CH4_2013 | lbs CH4/MWh | 0.02894 | 2009 | Community Protocol Appendix C | CA_2013_2009proxy |
| **2013** | N2O | Electricity | Electricity_CA_N2O_2013 | lbs N2O/MWh | 0.00617 | 2009 | Community Protocol Appendix C | CA_2013_2009proxy |

**Waste Characterization Factor Sets**

| **Name** | ADC_EPA | CalRecycle_2005_2004proxy | CalRecycle_2007+2010+2012_2008proxy | |
|---|---|---|---|---|
| **Year** | 2005/2008/2012/2013 | 2005 | 2008/2012/2013 | |
| | Alternative Daily Cover (ADC) | Municipal Solid Waste (MSW) | Municipal Solid Waste (MSW) | Corresponding Name in California Integrated Waste Management Board Report |
| **Unit** | % | % | % | |
| **Mixed MSW** | 0 | 0 | 0 | |
| **Newspaper** | 0 | 2.2 | 1.3 | Newspaper |
| **Office Paper** | 0 | 5.4 | 4.9 | White/Colored Ledger Paper + Other Office Paper + Other Miscellaneous Paper |
| **Cardboard** | 0 | 6.7 | 5.2 | Uncoated Corrugated Cardboard + Paper Bags |
| **Magazine/Third Class Mail** | 0 | 6.5 | 5.9 | Magazines and Catalogs + Remainder/Composite Paper |
| **Food Scraps** | 0 | 14.6 | 15.5 | Food |
| **Grass** | 30 | 2.1 | 1.9 | Leaves and Grass |
| **Leaves** | 40 | 2.1 | 1.9 | Leaves and Grass |
| **Branches** | 30 | 2.6 | 3.3 | Branches and Stumps + Prunings and Trimmings |
| **Lumber** | 0 | 9.6 | 14.5 | Lumber |

**Conversions**

| | |
|---|---|
| **lb/MT** | 2204.623 |
| **therm/MMBTU** | 0.10000040 |
| **kg/MT** | 0.001 |

| **g/mi** | Gasoline On Road Average Factor | Gasoline On Road Average Factor | Gasoline On Road Average Factor | Diesel On Road Average Factor | Diesel On Road Average Factor | Diesel On Road Average Factor | | |
|---|---|---|---|---|---|---|---|---|
| | CO2 | CH4 | N2O | CO2 | CH4 | N2O | % vehicles gasoline | % vehicles diesel |
| **2005** | 460.853 | 0.03 | 0.034 | 1291.165 | 0.001 | 0.001 | 94.7% | 5.3% |
| **2008** | 464.489 | 0.028 | 0.029 | 1308.058 | 0.001 | 0.001 | 94.0% | 6.0% |
| **2012** | 449.894 | 0.028 | 0.029 | 1282.669 | 0.001 | 0.001 | 94.4% | 5.6% |
| **2013** | 442.092 | 0.028 | 0.029 | 1271.538 | 0.001 | 0.001 | 94.3% | 5.7% |

**CH4 and N2O Community Protocol Appendix D Table TR.1.4**
**CO2 from EMFAC2014 for San Diego County**
**Division of gasoline and diesel: XX% VMT gasoline/diesel**

**Transportation**

| | | | 2005 | 2008 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| **Gasoline** | **Passenger Vehicle** | MPG | 22.91 | 22.92 | 23.17 | 23.50 |
| | | g CH4/mi | 0.03 | 0.028 | 0.028 | 0.028 |
| | | g N2O/mi | 0.034 | 0.029 | 0.029 | 0.029 |
| | **Light Truck** | MPG | 18.26 | 18.24 | 18.44 | 18.68 |
| | | g CH4/mi | 0.035 | 0.031 | 0.031 | 0.031 |
| | | g N2O/mi | 0.049 | 0.043 | 0.043 | 0.043 |
| | **Heavy Truck** | MPG | 7.45 | 7.46 | 7.38 | 7.39 |
| | | g CH4/mi | 0.0333 | 0.0333 | 0.0333 | 0.0333 |
| | | g N2O/mi | 0.0134 | 0.0134 | 0.0134 | 0.0134 |
| **Diesel** | **Passenger Vehicle** | MPG | 27.09 | 27.29 | 29.03 | 29.57 |
| | | g CH4/mi | 0.001 | 0.001 | 0.001 | 0.001 |
| | | g N2O/mi | 0.001 | 0.001 | 0.001 | 0.001 |
| | **Light Truck** | MPG | 21.23 | 21.70 | 23.55 | 23.78 |
| | | g CH4/mi | 0.001 | 0.001 | 0.001 | 0.001 |
| | | g N2O/mi | 0.001 | 0.001 | 0.001 | 0.001 |
| | **Heavy Truck** | MPG | 12.39 | 12.40 | 12.35 | 12.38 |
| | | g CH4/mi | 0.0051 | 0.0051 | 0.0051 | 0.0051 |
| | | g N2O/mi | 0.0048 | 0.0048 | 0.0048 | 0.0048 |

**Note: MPG is from EMFAC2014 for San Diego County; CH4 and N2O emission factors are from US Community Protocal Version 1.0 October 2012 Appendix D; Passenger Vehicle and Light Truck emission factors only have data for 2005, and 2006 and after, Heavy Truck only have 2010, so that other years are approximate.**

## Community Inventory Input (Excluding Off-Road and Water Sectors)

| Year | Variable | SEEC Entry Name | Santee | County | Data Source |
|---|---|---|---|---|---|
| 2005 | **Population** | Multiple Entries | 54,370 | 3,034,388 | GHG Emission inventory (ICLEI 2011) |
| 2008 | **Population** | Multiple Entries | 55,850 | 3,131,552 | SANDAG Data Warehouse online September 2014 |
| 2012 | **Population** | Multiple Entries | 54,643 | 3,143,429 | SANDAG Series 13 e-mail |
| 2013 | **Population** | Multiple Entries | 55,033 | 3,150,178 | Local Profile 2013 |
| 2020 | **Population** | NA (For Forecast Growth Rate Calculation Only) | 59,488 | 3,435,713 | SANDAG Series 13 e-mail |
| 2035 | **Population** | NA (For Forecast Growth Rate Calculation Only) | 63,518 | 3,853,698 | SANDAG Series 13 e-mail |
| 2005 | **Households** | Multiple Entries | 18,563 | 1,058,265 | GHG Emission inventory (ICLEI 2011) |
| 2008 | **Households** | Multiple Entries | 19,080 | 1,074,896 | SANDAG Data Warehouse online September 2014 |
| 2013 | **Households** | Multiple Entries | 19,725 | 1,105,120 | Local Profile 2013 |
| 2020 | **Households** | NA (For Forecast Growth Rate Calculation Only) | 20,995 | 1,180,923 | SANDAG Series 13 Housing Units and Local Profile 2013 vacancy rates (Per John's email: add 2,000 extra dwelling units as a growth buffer) |
| 2035 | **Households** | NA (For Forecast Growth Rate Calculation Only) | 24,165 | 1,317,980 | SANDAG Series 13 Housing Units and Local Profile 2013 vacancy rates |
| 2005 | **Jobs_Total** | Multiple Entries | 15,782 | 1,498,781 | GHG Emission inventory (ICLEI 2011) |
| 2008 | **Jobs_Total** | Multiple Entries | 16,009 | 1,522,204 | Estimated based on CAGR between 2005 and 2020 estimates |
| 2012 | **Jobs_Total** | Multiple Entries | 16,316 | 1,554,005 | Estimated based on CAGR between 2005 and 2020 estimates |
| 2013 | **Jobs_Total** | Multiple Entries | 16,630 | 1,586,471 | Estimated based on CAGR between 2005 and 2020 estimates |
| 2020 | **Jobs_Total** | NA (For Forecast Growth Rate Calculation Only) | 16,949 | 1,619,615 | CA Dept of Finance |
| 2035 | **Jobs_Total** | NA (For Forecast Growth Rate Calculation Only) | 20,682 | 1,815,149 | CA Dept of Finance |
| 2005 | **Jobs_Agricultural** | NA (For Off-Road Emissions Calculation Only) | 73 | 10,700 | Santee: City's Facts and Figures on website_2008-2012proxy; County: CA Dept of Finance_2006proxy |
| 2008 | **Jobs_Agricultural** | NA (For Off-Road Emissions Calculation Only) | 73 | 10,700 | Santee: City's Facts and Figures on website_2008-2012proxy; County: CA Dept of Finance_2006proxy |
| 2012 | **Jobs_Agricultural** | NA (For Off-Road Emissions Calculation Only) | 73 | 10,700 | Santee: City's Facts and Figures on website_2008-2012proxy; County: CA Dept of Finance_2006proxy |
| 2013 | **Jobs_Agricultural** | NA (For Off-Road Emissions Calculation Only) | 73 | 10,700 | Santee: City's Facts and Figures on website_2008-2012proxy; County: CA Dept of Finance_2006proxy |
| 2005 | **Jobs_Manufacturing** | NA (For Off-Road Emissions Calculation Only) | 2,303 | 103,633 | Santee: City's Facts and Figures on website_2008-2012proxy; County: CA Dept of Finance_2006proxy |
| 2008 | **Jobs_Manufacturing** | NA (For Off-Road Emissions Calculation Only) | 2,303 | 103,633 | Santee: City's Facts and Figures on website_2008-2012proxy; County: CA Dept of Finance_2006proxy |
| 2012 | **Jobs_Manufacturing** | NA (For Off-Road Emissions Calculation Only) | 2,303 | 103,633 | Santee: City's Facts and Figures on website_2008-2012proxy; County: CA Dept of Finance_2006proxy |
| 2013 | **Jobs_Manufacturing** | NA (For Off-Road Emissions Calculation Only) | 2,303 | 103,633 | Santee: City's Facts and Figures on website_2008-2012proxy; County: CA Dept of Finance_2006proxy |
| 2005 | **Building_Permits** | NA (For Off-Road Emissions Calculation Only) | 284 | 8,208 | US Census Bureau http://censtats.census.gov/bldg/bldgprmt.shtml |
| 2008 | **Building_Permits** | NA (For Off-Road Emissions Calculation Only) | 157 | 2,524 | US Census Bureau http://censtats.census.gov/bldg/bldgprmt.shtml |
| 2012 | **Building_Permits** | NA (For Off-Road Emissions Calculation Only) | 41 | 2,490 | US Census Bureau http://censtats.census.gov/bldg/bldgprmt.shtml |
| 2013 | **Building_Permits** | NA (For Off-Road Emissions Calculation Only) | 32 | 2,817 | US Census Bureau http://censtats.census.gov/bldg/bldgprmt.shtml |
| 2005 | **Income_Median** | NA (For Off-Road Emissions Calculation Only) | 70,048 | 51,920 | Santee: SANDAG local profile_2010proxy; County: SANDAG Regional Growth_2008proxy |
| 2008 | **Income_Median** | NA (For Off-Road Emissions Calculation Only) | 70,048 | 51,920 | Santee: SANDAG local profile_2010proxy; County: SANDAG Regional Growth_2008proxy |
| 2012 | **Income_Median** | NA (For Off-Road Emissions Calculation Only) | 76,261 | 70,926 | SANDAG local profile_2013proxy |
| 2013 | **Income_Median** | NA (For Off-Road Emissions Calculation Only) | 76,261 | 70,926 | SANDAG local profile |
| 2005 | **Electricity_Residential_Bundled_kWh** | Residential_Electricity_Bundled_2005 | 128,600,217 | N/A | GHG Emission inventory (ICLEI 2011) |
| 2005 | **Electricity_Residential_Direct_kWh** | Residential_Electricity_Direct_2005 | 690,222 | N/A | GHG Emission inventory (ICLEI 2011) |
| 2005 | **Electricity_Commercial_Bundled_kWh** | Commercial_Electricity_Bundled_2005 | 89,546,084 | N/A | GHG Emission inventory (ICLEI 2011) |
| 2005 | **Electricity_Commercial_Direct_kWh** | Commercial_Electricity_Direct_2005 | 15,080,916 | N/A | GHG Emission inventory (ICLEI 2011) |
| 2005 | **Electricity_Industrial_Bundled_kWh** | Industrial_Electricity_Bundled_2005 | 16,098,233 | N/A | GHG Emission inventory (ICLEI 2011) |
| 2005 | **Electricity_Industrial_Direct_kWh** | Industrial_Electricity_Direct_2005 | - | N/A | GHG Emission inventory (ICLEI 2011) |
| 2008 | **Electricity_Residential_Bundled_kWh** | Residential_Electricity_Bundled_2008 | 140,698,951 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2008 | **Electricity_Residential_Direct_kWh** | Residential_Electricity_Direct_2008 | 728,868 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2008 | **Electricity_Commercial_Bundled_kWh** | Commercial_Electricity_Bundled_2008 | 92,105,712 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2008 | **Electricity_Commercial_Direct_kWh** | Commercial_Electricity_Direct_2008 | 16,882,266 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2008 | **Electricity_Industrial_Bundled_kWh** | Industrial_Electricity_Bundled_2008 | 14,584,915 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2008 | **Electricity_Industrial_Direct_kWh** | Industrial_Electricity_Direct_2008 | - | N/A | SDG&E 2014 e-mail through City of Santee |
| 2012 | **Electricity_Residential_Bundled_kWh** | Electricity_Residential_Bundled_kWh_2012 | 141,207,940 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2012 | **Electricity_Residential_Direct_kWh** | Electricity_Residential_Direct_kWh_2012 | 441,996 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2012 | **Electricity_Commercial_Bundled_kWh** | Electricity_Commercial_Bundled_kWh_2012 | 87,203,948 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2012 | **Electricity_Commercial_Direct_kWh** | Electricity_Commercial_Direct_kWh_2012 | 15,646,581 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2012 | **Electricity_Industrial_Bundled_kWh** | Electricity_Industrial_Bundled_kWh_2012 | 10,036,932 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2012 | **Electricity_Industrial_Direct_kWh** | Electricity_Industrial_Direct_kWh_2012 | 7,955,195 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2013 | **Electricity_Residential_Bundled_kWh** | Electricity_Residential_Bundled_kWh_2013 | 135,725,055 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2013 | **Electricity_Residential_Direct_kWh** | Electricity_Residential_Direct_kWh_2013 | 383,093 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2013 | **Electricity_Commercial_Bundled_kWh** | Electricity_Commercial_Bundled_kWh_2013 | 95,980,209 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2013 | **Electricity_Commercial_Direct_kWh** | Electricity_Commercial_Direct_kWh_2013 | 19,359,372 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2013 | **Electricity_Industrial_Bundled_kWh** | Electricity_Industrial_Bundled_kWh_2013 | N/A | N/A | SDG&E 2014 e-mail through City of Santee |
| 2013 | **Electricity_Industrial_Direct_kWh** | Electricity_Industrial_Direct_kWh_2013 | N/A | N/A | SDG&E 2014 e-mail through City of Santee |
| 2005 | **NatGas_Res_therms** | Residential_NatGas_2005 | 5,878,287 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2005 | **NatGas_Commercial_therms** | Commercial_NatGas_Bundled_2005 | 1,418,681 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2005 | **NatGas_Commercial_therms** | Commercial_NatGas_Direct_2005 | 1,109 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2008 | **NatGas_Res_therms** | Residential_NatGas_2008 | 5,797,758 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2008 | **NatGas_Commercial_therms** | Commercial_NatGas_2008 | 1,494,426 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2012 | **NatGas_Res_therms** | NatGas_Res_therms_2012 | 5,734,216 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2012 | **NatGas_Commercial_therms** | NatGas_Commercial_therms_2012 | 1,568,104 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2013 | **NatGas_Res_therms** | Residential_NatGas_2013 | 5,723,205 | N/A | SDG&E 2014 e-mail through City of Santee |
| 2013 | **NatGas_Commercial_therms** | Commercial_NatGas_2013 | 1,347,484 | N/A | SDG&E 2014 e-mail through City of Santee |

| | | | | | |
|---|---|---|---|---|---|
| 2005 | **Transportation_VehicleMilesTraveled** | On-road_Gasoline/Diesel_2005 | 352,711,238 | N/A | City of Santee 2005 GHG Emissions Inventory by ICLEI |
| 2008 | **Transportation_VehicleMilesTraveled** | On-road_Gasoline/Diesel_2008 | 479,229,830 | N/A | SANDAG 2014 e-mail through Chen Ryan |
| 2012 | **Transportation_VehicleMilesTraveled** | On-road_Gasoline/Diesel_2012 | 485,123,704 | N/A | Estimated based on 2008 and 2013 data |
| 2013 | **Transportation_VehicleMilesTraveled_Gas** | On-road_Gasoline_2013 | 458,785,827 | N/A | SANDAG 2014 e-mail through Chen Ryan |
| 2013 | **Transportation_VehicleMilesTraveled_Diesel** | On-road_Diesel_2013 | 27,822,637 | N/A | SANDAG 2014 e-mail through Chen Ryan |
| 2013 | **Transportation_VehicleMilesTraveled_Total** | | 486,608,464 | N/A | SANDAG 2014 e-mail through Chen Ryan |
| 2020 | **Transportation_VehicleMilesTraveled_Gas** | On-road_Gasoline_2020 | 493,494,150 | N/A | Estimated based on 2013 and 2035 data |
| 2020 | **Transportation_VehicleMilesTraveled_Diesel** | On-road_Diesel_2020 | 32,536,348 | N/A | Estimated based on 2013 and 2035 data |
| 2020 | **Transportation_VehicleMilesTraveled_Total** | | 526,265,689 | N/A | Estimated based on 2013 and 2035 data |
| 2035 | **Transportation_VehicleMilesTraveled_Gas** | On-road_Gasoline_2035 | 576,966,520 | N/A | SANDAG 2014 e-mail through Chen Ryan |
| 2035 | **Transportation_VehicleMilesTraveled_Diesel** | On-road_Diesel_2035 | 45,500,895 | N/A | SANDAG 2014 e-mail through Chen Ryan |
| 2035 | **Transportation_VehicleMilesTraveled_Total** | | 622,467,415 | N/A | SANDAG 2014 e-mail through Chen Ryan |
| 2005 | **SolidWaste_Landfilled_tons** | SolidWaste_Landfilled_2005 | 60,825 | 4,181,732 | CalRecycle DRS Single-year Countywide Origin Deatail |
| 2005 | **SolidWaste_ADC_tons** | SolidWaste_ADC_2005 | 8,136 | 359,066 | CalRecycle DRS Single-year Countywide Origin Deatail |
| 2008 | **SolidWaste_Landfilled_tons** | SolidWaste_Landfilled_2008 | 52,184 | 3,413,957 | CalRecycle DRS Single-year Countywide Origin Deatail |
| 2008 | **SolidWaste_ADC_tons** | SolidWaste_ADC_2008 | 7,362 | 519,266 | CalRecycle DRS Single-year Countywide Origin Deatail |
| 2012 | **SolidWaste_Landfilled_tons** | SolidWaste_Landfilled_2012 | 46,644 | 2,875,288 | CalRecycle DRS Single-year Countywide Origin Deatail |
| 2012 | **SolidWaste_ADC_tons** | SolidWaste_ADC_2012 | 8,531 | 293,545 | CalRecycle DRS Single-year Countywide Origin Deatail |
| 2013 | **SolidWaste_Landfilled_tons** | SolidWaste_Landfilled_2013 | 38,742 | 3,007,351 | CalRecycle DRS Single-year Countywide Origin Deatail |
| 2013 | **SolidWaste_ADC_tons** | SolidWaste_ADC_2013 | 8,185 | 274,480 | CalRecycle DRS Single-year Countywide Origin Deatail |

## Business-As-Usual Forecast

| | | | |
|---|---|---|---|
| 2020 | **Annual Growth Rate_Jobs_2013-2020** | CAGR_Jobs_2013-2035 | 0.002721364 |
| 2035 | **Annual Growth Rate_Jobs_2020-2035** | CAGR_Jobs_2013-2035 | 0.01335877 |
| 2020 | **Annual Growth Rate_Households_2013-2020** | CAGR_Households_2013-2035 | 0.008952073 |
| 2035 | **Annual Growth Rate_Households_2020-2035** | CAGR_Households_2013-2035 | 0.009420159 |
| 2020 | **Annual Growth Rate_Population_2013-2020** | CAGR_Population_2013-2035 | 0.011182289 |
| 2035 | **Annual Growth Rate_Population_2020-2035** | CAGR_Population_2013-2035 | 0.004379477 |
| 2020 | **Annual Growth Rate_ServPop_2013-2020** | CAGR_ServPop_2013-2035 | 0.009256531 |
| 2035 | **Annual Growth Rate_ServPop_2020-2035** | CAGR_ServPop_2013-2035 | 0.006469373 |
| 2035 | **Annual Growth Rate_VMT_Gas_2013-2035** | CAGR_VMT_Gas_2013-2035 | 0.010472674 |
| 2035 | **Annual Growth Rate_VMT_Diesel_2013-2035** | CAGR_VMT_Diesel_2013-2035 | 0.022610094 |

## Adjusted Business-As-Usual Forecast

| | | |
|---|---|---|
| **kWh/hh x 11.1% (residential savings from Title 24)** | State_Title24_Res_Electricity_2013-2020/2021-2035 | 766 |
| **kWh/job x 16.8% (commercial savings from Title 24)** | State_Title24_Comm_Electricity_2013-2020/2021-2035 | 1,375 |
| **therm/hhx 5% (residential savings from Title 24)** | State_Title24_Res_NatGas_2013-2020/2021-2035 | 15 |
| **therm/job x 11.7% (commercial savings from Title 24)** | State_Title24_Comm_NatGas_2013-2020/2021-2035 | 9 |
| **Primary Driver_2013-2020 (units/yr)** | State_Title24_Res_Electricity/NatGas_2013-2020 | 181 |
| **Primary Driver_2013-2020 (jobs/yr)** | State_Title24_Comm_Electricity/NatGas_2013-2020 | 46 |
| **Primary Driver_2021-2035 (units/yr)** | State_Title24_Res_Electricity/NatGas_2021-2035 | 211 |
| **Primary Driver_2021-2035 (jobs/yr)** | State_Title24_Comm_Electricity/NatGas_2021-2035 | 249 |
| **Renewable Portfolio Standards (Change Carbon Intensity)** | State_Water_RPS | -3.4%/yr |
| **Water Conservation SBX7-7 (Change Carbon Intensity)** | State_Water_SBx7-7 | -0.0177%/yr |
| **On-Road Transportation (Change Carbon Intensity)** | State_On-RoadTrans_Gasoline_2013-2020 | -2.70862%/yr |
| **On-Road Transportation (Change Carbon Intensity)** | State_On-RoadTrans_Gasoline_2021-2035 | -2.83902%/yr |
| **On-Road Transportation (Change Carbon Intensity)** | State_On-RoadTrans_Diesel_2013-2020 | -1.00156%/yr |
| **On-Road Transportation (Change Carbon Intensity)** | State_On-RoadTrans_Diesel_2021-2035 | -0.49729%/yr |

## Community Inventory Input (Off-Road Sector)

**I. Agriculture Equipment**

| | | | |
|---|---|---|---|
| 2005 | Offroad_Agriculture_2005 | CO2 | 646.70886688 |
| | | CH4 | 0.13595977 |
| | | N2O | 0.00815018 |
| 2008 | Offroad_Agriculture_2008 | CO2 | 621.05342982 |
| | | CH4 | 0.11237621 |
| | | N2O | 0.00819854 |
| 2012 | Offroad_Agriculture_2012 | CO2 | 588.46580971 |
| | | CH4 | 0.08549678 |
| | | N2O | 0.00814043 |
| 2013 | Offroad_Agriculture_2013 | CO2 | 580.60044987 |
| | | CH4 | 0.07697063 |
| | | N2O | 0.00809648 |

**II. Construction Equipment**

| | | | |
|---|---|---|---|
| 2005 | Offroad_Construction_2005 | CO2 | 21826.26638092 |
| | | CH4 | 4.14028780 |
| | | N2O | 0.14581015 |
| 2008 | Offroad_Construction_2008 | CO2 | 41225.76830578 |
| | | CH4 | 6.45366100 |
| | | N2O | 0.27009424 |
| 2012 | Offroad_Construction_2012 | CO2 | 11609.15090898 |
| | | CH4 | 1.39999237 |
| | | N2O | 0.07180479 |
| 2013 | Offroad_Construction_2013 | CO2 | 8126.98029351 |
| | | CH4 | 0.91856409 |
| | | N2O | 0.04944612 |

**III. Industrial Equipment**

| | | | |
|---|---|---|---|
| 2005 | Offroad_Industrial_2005 | CO2 | 2952.69289979 |
| | | CH4 | 2.62138581 |
| | | N2O | 0.25958183 |
| 2008 | Offroad_Industrial_2008 | CO2 | 3052.94061733 |
| | | CH4 | 1.95452538 |
| | | N2O | 0.21802527 |
| 2012 | Offroad_Industrial_2012 | CO2 | 3139.04377381 |
| | | CH4 | 1.25373361 |
| | | N2O | 0.18494107 |
| 2013 | Offroad_Industrial_2013 | CO2 | 3148.54644167 |
| | | CH4 | 1.14878796 |
| | | N2O | 0.18123649 |

**IV. Lawn and Garden Equipment**

| | | | |
|---|---|---|---|
| 2005 | Offroad_Lawn&Garden_2005 | CO2 | 917.84749295 |
| | | CH4 | 1.78713075 |
| | | N2O | 0.71393926 |
| 2008 | Offroad_Lawn&Garden_2008 | CO2 | 937.96489060 |
| | | CH4 | 1.60651933 |
| | | N2O | 0.65032237 |
| 2012 | Offroad_Lawn&Garden_2012 | CO2 | 1045.32869629 |
| | | CH4 | 1.63260091 |
| | | N2O | 0.69674675 |
| 2013 | Offroad_Lawn&Garden_2013 | CO2 | 1059.25927089 |
| | | CH4 | 1.63167235 |
| | | N2O | 0.70138107 |

**V. Light Commercial Equipment**

| | | | |
|---|---|---|---|
| 2005 | Offroad_Commercial_2005 | CO2 | 771.34342212 |
| | | CH4 | 0.41933756 |
| | | N2O | 0.13267233 |
| 2008 | Offroad_Commercial_2008 | CO2 | 797.21977639 |
| | | CH4 | 0.34173724 |
| | | N2O | 0.13886125 |
| 2012 | Offroad_Commercial_2012 | CO2 | 819.30410668 |
| | | CH4 | 0.27755417 |
| | | N2O | 0.13974122 |
| 2013 | Offroad_Commercial_2013 | CO2 | 821.63806142 |
| | | CH4 | 0.26400412 |
| | | N2O | 0.13865934 |

**VI. Recreational Equipment**

| | | | |
|---|---|---|---|
| 2005 | Offroad_Recreation_2005 | CO2 | 295.90169994 |
| | | CH4 | 1.92934981 |
| | | N2O | 0.56321666 |
| 2008 | Offroad_Recreation_2008 | CO2 | 316.17042500 |
| | | CH4 | 2.04575942 |
| | | N2O | 0.60905296 |
| 2012 | Offroad_Recreation_2012 | CO2 | 311.31753057 |
| | | CH4 | 2.00750512 |
| | | N2O | 0.59786287 |
| 2013 | Offroad_Recreation_2013 | CO2 | 311.23288667 |
| | | CH4 | 2.00542747 |
| | | N2O | 0.59771265 |

## Community Inventory Input (Water Sector)

| Million Gallons of Water Consumed | 2005 | 2008 | 2012 | 2013 |
|---|---|---|---|---|
| Single Family | 1257.56 | 1135.03 | 990.03 | 956.77 |
| Multi Family | 522.13 | 507.49 | 488.61 | 484.01 |
| Government | 101.48 | 87.81 | 72.41 | 69.00 |
| Hotel | 5.43 | 5.66 | 5.97 | 6.05 |
| Commercial-Other | 189.27 | 182.41 | 173.64 | 171.51 |
| Construction-Conventional | 12.32 | 13.37 | 14.92 | 15.33 |
| Construction-Recycled | 3.23 | 3.33 | 3.46 | 3.50 |
| Irrigation-Conventional | 108.81 | 112.54 | 117.71 | 119.04 |
| Irrigation-Recycled | 229.20 | 250.09 | 280.92 | 289.21 |
| Fire-Conventional | 0.0066 | - | - | - |
| **Total MG** | **2,429** | **2,298** | **2,148** | **2,114** |

| kWh Electricity Used | 2005 | 2008 | 2012 | 2013 |
|---|---|---|---|---|
| Single Family | 14861964.02 | 13413921.65 | 11700250.99 | 11307198.90 |
| Multi Family | 6170534.62 | 5997576.19 | 5774482.65 | 5720018.16 |
| Government | 1199297.74 | 1037761.31 | 855706.35 | 815420.40 |
| Hotel | 64180.39 | 66850.67 | 70584.64 | 71550.28 |
| Commercial-Other | 2236827.38 | 2155697.12 | 2052082.29 | 2026966.30 |
| Construction-Conventional | 145623.44 | 158059.82 | 176309.23 | 181191.77 |
| Construction-Recycled | 4463.63 | 4599.12 | 4786.20 | 4834.14 |
| Irrigation-Conventional | 1285902.92 | 1329968.80 | 1391081.20 | 1406793.13 |
| Irrigation-Recycled | 316990.10 | 345872.03 | 388515.58 | 399973.93 |
| Fire-Conventional | 73 | - | - | - |
| **Total kWh** | **26,285,858** | **24,510,307** | **22,413,799** | **21,933,947** |

Conversions for Water to Energy

| | Indoor | Outdoor | | San Diego |
|---|---|---|---|---|
| Supply and Conveyance | 9727 | 9727 | 0.37 | indoor |
| Treatment | 111 | 111 | 0.63 | outdoor |
| Dist | 1272 | 1272 | | |
| | | | | |
| | | | | |
| | | | | |
| WWTmt | 1911 | 0 | | |
| Total | 13022 | 11111 | | |
| | | | | |
| Conventional kWh/MG | 11,818.07 | kWh/MG | | |
| Recycled | 1383 | kWh/MG | | |

Notes:

1 Water usage data from Padre Dam Municipal Water District. Conversion from MG to kWh uses CEC 2006 Refining Estimates for Water-Related Energy Use in California for Southern California (CEC 2006)

2 Conventional water conversion uses assumptions for indoor vs. outdoor water use. Percentages according to http://bcn.boulder.co.us/basin/local/residential.html for San Diego. 37% indoor use (63% outdoor does not undergo wastewater treatment) and recycled water excludes energy for water supply and conveyance. Conversion: 11,818.07 kWh/MG

3 Recycled water conversion uses assumptions that all is for outdoor use and does not use energy for supply/conveyance. Conversion: 1,383 kWh/MG.

4 Fire use assumes conventional, outdoor.

Indoor/Outdoor water assumption is similar to California-wide 2010 report stating 57% residential water use is for outdoor. Likely higher in Southern California, which matches with the more specific information used.
http://www.cbia.org/go/cbia/?LinkServID=E242764F-88F9-4438-9992948EF86E49EA
Water Use in the California Residentail Home, 2010

## Municipal Inventory and Forecasts Input (Excluding Vehicle Fleet Sector)

| Year | Variable | SEEC Entry Name | Santee |
|---|---|---|---|
| 2005 | **Municipal Full-Time-Equivalent Employee** | Multiple Entries | 121.5 |
| 2013 | **Municipal Full-Time-Equivalent Employee** | Multiple Entries | 112.8 |
| 2020 | **Municipal Full-Time-Equivalent Employee** | Multiple Entries | 115.0 |
| 2035 | **Municipal Full-Time-Equivalent Employee** | Multiple Entries | 120.0 |
| 2005 | **Buildings & Facilities Electricity (kWh)** | Bld&Fac_Electricity_2005 | 968,991 |
| 2005 | **Buildings & Facilities Natural Gas (therms)** | Bld&Fac_NatGas_2005 | 6,136 |
| 2005 | **Street Lights, Area Lights & Traffic Control/Area Lights-City Owned (kWh)** | Streetlight&TC_City-Owned_Electricity_2005 | 613,342 |
| 2005 | **Street Lights, Area Lights & Traffic Control/Area Lights-SDG&E Owned (kWh)** | Streetlight&TC_SDG&E-Owned_Electricity_2005 | 1,735,514 |
| 2005 | **Water Delivery/Water Pumping (kWh)** | WaterPumping_Electricity_2005 | 77,535 |
| 2013 | **Buildings & Facilities Electricity (kWh)** | Bld&Fac_Electricity_2013 | 900,602 |
| 2013 | **Buildings & Facilities Natural Gas (therms)** | Bld&Fac_NatGas_2013 | 5,013 |
| 2013 | **Street Lights, Area Lights & Traffic Control/Area Lights-City Owned (kWh)** | Streetlight&TC_City-Owned_Electricity_2013 | 1,271,181 |
| 2013 | **Street Lights, Area Lights & Traffic Control/Area Lights-SDG&E Owned (kWh)** | Streetlight&TC_SDG&E-Owned_Electricity_2013 | 712,155 |
| 2013 | **Water Delivery/Water Pumping (kWh)** | WaterPumping_Electricity_2013 | 83,990 |
| 2005 | **Employee Commute VMT (miles)** | EmpComm_Gas_2005 | 516,764.6174 |
| 2013 | **Employee Commute VMT (miles)** | EmpComm_Gas_2013 | 479,549.0585 |
| 2005 | **Solid Waste (tons)** | Waste_Generated_2005 | 863.93 |
| 2013 | **Solid Waste (tons)** | Waste_Generated_2013 | 1,005.58 |
| 2020 | **Annual Growth Rate_Municipal_2013-2020** | CAGR_Muni_Growth | 0.002826723 |
| 2035 | **Annual Growth Rate_Municipal_2020-2035** | CAGR_Muni_Growth | 0.002841337 |
| 2010 | **Renewable Portfolio Standards (SDG&E) 2010-2014** | RPS_SDGE_33percent | -0.058 |
| 2015 | **Renewable Portfolio Standards (SDG&E) 2015-2019** | RPS_SDGE_33percent | -0.053 |
| 2013-2020 | **Low Carbon Fuel Standard** | LCFS | -0.010368573 |

# Municipal Inventory Input (Vehicle Fleet Sector)

**2005**

| | Gasoline | Diesel | Hybrid |
|---|---|---|---|
| **Annual Fuel Usage** | 13996 | 22842 | 0 |
| **Annual VMT** | 193069 | 166596 | 0 |
| **% VMT Passenger Vehicle** | 20.1% | 0.0% | 0.0% |
| **% VMT Light Truck** | 79.9% | 5.6% | 0.0% |
| **% VMT Heavy Truck** | 0.0% | 94.1% | 0.0% |

**2013**

| | Gasoline | Diesel | Hybrid |
|---|---|---|---|
| **Annual Fuel Usage** | 12573.14972 | 27392.13095 | 369 |
| **Annual VMT** | 174514 | 153460 | 12546 |
| **% VMT Passenger Vehicle** | 15.0% | 0.0% | 0.0% |
| **% VMT Light Truck** | 84.7% | 9.5% | 100.0% |
| **% VMT Heavy Truck** | 0.0% | 89.2% | 0.0% |

## Output from SEEC - Community Inventories

| | 2005 | 2008 | 2012 | 2013 |
|---|---|---|---|---|
| **Inventory Record** | **CO2e (MT)** | **CO2e (MT)** | **CO2e (MT)** | **CO2e (MT)** |
| Commercial_Electricity | 26127 | 36719 | 36436 | 40860 |
| Commercial_NatGas | 7550 | 7947 | 8338 | 7165 |
| Industrial_Electricity | 4020 | 4914 | 6374 | 0 |
| Offroad_Agriculture | 653 | 626 | 593 | 585 |
| Offroad_Commercial | 821 | 847 | 868 | 870 |
| Offroad_Construction | 21973 | 41468 | 11666 | 8165 |
| Offroad_Industrial | 3096 | 3167 | 3225 | 3231 |
| Offroad_Lawn&Garden | 1175 | 1172 | 1294 | 1309 |
| Offroad_Recreation | 512 | 549 | 540 | 539 |
| On-Road_Diesel | 24302 | 37798 | 34865 | 35387 |
| On-Road_Gasoline | 157510 | 213386 | 210306 | 207112 |
| Residential_Electricity | 32286 | 47648 | 50181 | 48218 |
| Residential_NatGas | 31258 | 30829 | 30492 | 30433 |
| SolidWaste_ADC | 1611 | 1458 | 1689 | 1621 |
| SolidWaste_Landfilled | 14765 | 12837 | 11474 | 9530 |
| Wastewater_Digester | 4 | 4 | 4 | 4 |
| Wastewater_Effluent | 890 | 914 | 895 | 901 |
| Wastewater_NDN | 65 | 67 | 65 | 66 |
| Water_Conventional | 11215 | 10089 | 6604 | 6457 |
| Water_Recycled | 139 | 146 | 118 | 121 |

## Output from SEEC - Community Business-As-Usual Forecasts

| Year | Usage | CO2e (MT) | Output Name |
|---|---|---|---|
| 2013 | 464533 | 48218 | Residential Electricity (MMBtu) |
| 2020 | 494666 | 51346 | Residential Electricity (MMBtu) |
| 2030 | 543290 | 56393 | Residential Electricity (MMBtu) |
| 2035 | 569366 | 59100 | Residential Electricity (MMBtu) |
| 2013 | 572321 | 30433 | Residential Natural Gas (MMBtu) |
| 2020 | 609446 | 32407 | Residential Natural Gas (MMBtu) |
| 2030 | 669352 | 35593 | Residential Natural Gas (MMBtu) |
| 2035 | 701479 | 37301 | Residential Natural Gas (MMBtu) |
| 2013 | 393650 | 40860 | Commercial Electricity (MMBtu) |
| 2020 | 405467 | 42087 | Commercial Electricity (MMBtu) |
| 2030 | 463007 | 48059 | Commercial Electricity (MMBtu) |
| 2035 | 494770 | 51356 | Commercial Electricity (MMBtu) |
| 2013 | 134748 | 7165 | Commercial Natural Gas (MMBtu) |
| 2020 | 138793 | 7380 | Commercial Natural Gas (MMBtu) |
| 2030 | 158489 | 8427 | Commercial Natural Gas (MMBtu) |
| 2035 | 169362 | 9006 | Commercial Natural Gas (MMBtu) |
| 2013 | 1 | 14699 | Off Road Energy Equivalent (MMBtu) |
| 2020 | 1 | 15710 | Off Road Energy Equivalent (MMBtu) |
| 2030 | 1 | 17490 | Off Road Energy Equivalent (MMBtu) |
| 2035 | 1 | 18454 | Off Road Energy Equivalent (MMBtu) |
| 2013 | 458785827 | 207112 | Gasoline - On Road VMT |
| 2020 | 493494148 | 222780 | Gasoline - On Road VMT |
| 2030 | 547681085 | 247242 | Gasoline - On Road VMT |
| 2035 | 576966516 | 260463 | Gasoline - On Road VMT |
| 2013 | 27822637 | 35387 | Diesel - On Road VMT |
| 2020 | 32536349 | 41382 | Diesel - On Road VMT |
| 2030 | 40688302 | 51750 | Diesel - On Road VMT |
| 2035 | 45500896 | 57871 | Diesel - On Road VMT |
| 2013 | 20100803 | 4 | Annual Gas Production (scf / Year) |
| 2020 | 21380772 | 4 | Annual Gas Production (scf / Year) |
| 2030 | 22804944 | 5 | Annual Gas Production (scf / Year) |
| 2035 | 23552219 | 5 | Annual Gas Production (scf / Year) |
| 2013 | 55033 | 66 | Process N2O Population Served |
| 2020 | 58537 | 70 | Process N2O Population Served |
| 2030 | 62437 | 75 | Process N2O Population Served |
| 2035 | 64482 | 77 | Process N2O Population Served |
| 2013 | 74858 | 6578 | Water Supply Energy Equivalent (MMBtu) |
| 2020 | 79625 | 6997 | Water Supply Energy Equivalent (MMBtu) |
| 2030 | 84929 | 7463 | Water Supply Energy Equivalent (MMBtu) |
| 2035 | 87712 | 7707 | Water Supply Energy Equivalent (MMBtu) |
| 2013 | 1055 | 901 | Daily N Load at Facility with Release to Environment (kg N/day) |
| 2020 | 1122 | 958 | Daily N Load at Facility with Release to Environment (kg N/day) |
| 2030 | 1197 | 1022 | Daily N Load at Facility with Release to Environment (kg N/day) |
| 2035 | 1236 | 1056 | Daily N Load at Facility with Release to Environment (kg N/day) |
| 2013 | 46927 | 11151 | Waste Generated (wet tons) |
| 2020 | 49915 | 11861 | Waste Generated (wet tons) |
| 2030 | 53240 | 12651 | Waste Generated (wet tons) |
| 2035 | 54985 | 13066 | Waste Generated (wet tons) |

## Output from SEEC - Community Adjusted Business-As-Usual Forecasts

| Year | Category | CO2e (MT) |
|---|---|---|
| 2013 | Residential Energy | 78651 |
| 2020 | Residential Energy | 65424 |
| 2030 | Residential Energy | 71292 |
| 2035 | Residential Energy | 74438 |
| 2013 | Commercial Energy | 48025 |
| 2020 | Commercial Energy | 34597 |
| 2030 | Commercial Energy | 38543 |
| 2035 | Commercial Energy | 40721 |
| 2013 | Solid Waste | 11151 |
| 2020 | Solid Waste | 11861 |
| 2030 | Solid Waste | 12651 |
| 2035 | Solid Waste | 13066 |
| 2013 | Water & Wastewater | 7549 |
| 2020 | Water & Wastewater | 5941 |
| 2030 | Water & Wastewater | 6336 |
| 2035 | Water & Wastewater | 6544 |
| 2013 | Transportation & Mobile Sources | 257198 |
| 2020 | Transportation & Mobile Sources | 234283 |
| 2030 | Transportation & Mobile Sources | 210692 |
| 2035 | Transportation & Mobile Sources | 201774 |

## Output from SEEC - Municipal Inventories

| Inventory Record | 2005 | 2013 |
|---|---|---|
| | CO2e (MT) | CO2e (MT) |
| Bld&Fac_Electricity | 242 | 319 |
| Bldg&Fac_NatGas | 33 | 27 |
| EmpComm_Gas | 208 | 188 |
| Fleet_City_Diesel | 233 | 280 |
| Fleet_City_GasReg | 126 | 113 |
| Fleet_City_GasHyb | 0 | 3 |
| Streetlight&TC_City-Owned_Electricity | 153 | 450 |
| Streetlight&TC_SDG&E-Owned_Electricity | 433 | 252 |
| Waste_Generated | 210 | 247 |
| WaterPumping_Electricity | 19 | 30 |

## Output from SEEC - Municipal Business-As-Usual Forecasts

| Year | Category | CO2e (MT) |
|---|---|---|
| 2013 | Water & Wastewater Treatment Facilities | 30 |
| 2020 | Water & Wastewater Treatment Facilities | 31 |
| 2030 | Water & Wastewater Treatment Facilities | 31 |
| 2035 | Water & Wastewater Treatment Facilities | 32 |
| 2013 | Buildings & Facilities | 346 |
| 2020 | Buildings & Facilities | 353 |
| 2030 | Buildings & Facilities | 363 |
| 2035 | Buildings & Facilities | 368 |
| 2013 | Street Lights & Traffic Signals | 702 |
| 2020 | Street Lights & Traffic Signals | 716 |
| 2030 | Street Lights & Traffic Signals | 737 |
| 2035 | Street Lights & Traffic Signals | 747 |
| 2013 | Vehicle Fleet | 396 |
| 2020 | Vehicle Fleet | 404 |
| 2030 | Vehicle Fleet | 416 |
| 2035 | Vehicle Fleet | 421 |
| 2013 | Employee Commute | 188 |
| 2020 | Employee Commute | 192 |
| 2030 | Employee Commute | 197 |
| 2035 | Employee Commute | 200 |
| 2013 | Solid Waste Facilities | 247 |
| 2020 | Solid Waste Facilities | 252 |
| 2030 | Solid Waste Facilities | 259 |
| 2035 | Solid Waste Facilities | 263 |

## Output from SEEC - Municipal Adjusted Business-As-Usual Forecasts

| Year | Category | CO2e (MT) |
|---|---|---|
| 2013 | Vehicle Fleet | 396 |
| 2020 | Vehicle Fleet | 2020 |
| 2030 | Vehicle Fleet | 390 |
| 2035 | Vehicle Fleet | 396 |
| 2013 | Buildings & Facilities | 346 |
| 2020 | Buildings & Facilities | 261 |
| 2030 | Buildings & Facilities | 268 |
| 2035 | Buildings & Facilities | 272 |
| 2013 | Street Lights & Traffic Signals | 702 |
| 2020 | Street Lights & Traffic Signals | 514 |
| 2030 | Street Lights & Traffic Signals | 529 |
| 2035 | Street Lights & Traffic Signals | 536 |
| 2013 | Employee Commute | 188 |
| 2020 | Employee Commute | 180 |
| 2030 | Employee Commute | 185 |
| 2035 | Employee Commute | 188 |
| 2013 | Solid Waste Facilities | 247 |
| 2020 | Solid Waste Facilities | 252 |
| 2030 | Solid Waste Facilities | 259 |
| 2035 | Solid Waste Facilities | 263 |
| 2013 | Water & Wastewater Treatment Facilities | 30 |
| 2020 | Water & Wastewater Treatment Facilities | 25 |
| 2030 | Water & Wastewater Treatment Facilities | 26 |
| 2035 | Water & Wastewater Treatment Facilities | 26 |

# Appendix C

# City of Santee Methods of Estimating GHG Emission Reductions for the Sustainable Santee Plan

Prepared for:

City of Santee
10601 Magnolia Avenue
Santee, California 92071

Prepared by:

LSA

December 2019

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## LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| AB | Assembly Bill |
| AEP | Association of Environmental Professionals |
| BAU | Business-as-Usual |
| CAP | Climate Action Plan |
| CAPCOA | California Air Pollution Control Officers Association |
| CARB | California Air Resources Board |
| CEC | California Energy Commission |
| $CH_4$ | methane |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalent |
| Community Protocol | United States Community Protocol for Accounting and Reporting Greenhouse Gas Emissions |
| E-Grid | Emissions and Generation Resource Integrated Database |
| EMFAC2014 | California Emission Factor Model, Version 2014 |
| EO | Executive Order |
| EPA | United States Environmental Protection Agency |
| EPIC | University of San Diego Energy Policy Initiatives Center |
| GHG | greenhouse gas |
| GWP | Global Warming Potential |
| IFT | Inventory, Long-Term Forecasts, and Target-Setting |
| IPCC | Intergovernmental Panel on Climate Change |
| kWh | kilowatt-hour(s) |
| LCFS | Low Carbon Fuel Standard |
| MG | million gallons |
| MT | metric ton(s) |
| N/DN | nitrification/denitrification |
| $N_2O$ | nitrous oxide |
| RPS | Renewable Portfolio Standard |
| RTP | Regional Transportation Plan |
| SANDAG | San Diego Association of Governments |

| | |
|---|---|
| SDG&E | San Diego Gas & Electric |
| SEEC | Statewide Energy Efficiency Collaborative |
| VMT | vehicle miles traveled |
| WECC | Western Electricity Coordinating Council |

# INTRODUCTION

This report provides a summary of the methods used to calculate greenhouse gas (GHG) emission reductions for the reduction goals and actions included in the Sustainable Santee Action Plan.

Reduction targets for Santee in 2020, 2030 and 2035 along with emission reductions potential for each emission category from federal and state regulations can be found in the Emissions Inventory, Forecasting and Target Setting (IFT) Report. During the development of the Sustainable Santee Action Plan LSA provided forecasts, reduction targets, and drafted reduction measures for years 2020, 2030, and 2035. However, given the timing of consideration for adoption of the Sustainable Santee Action Plan in January 2020, LSA revised the Plan eliminating the 2020 reduction measures The Sustainable Santee Action Plan now has reduction measures focused on 2030 and 2035. The City made this decision because there is not sufficient time to implement the 2020 reduction measures and for the reduction measures to be in place long enough to affect city-wide GHG emissions in 2020. Given these circumstances, once the City adopts the Sustainability Action Plan, the City will focus efforts on implementing the 2030 reduction measures starting in 2020 and implement 2035 reduction measures starting in 2030. Therefore, this report quantified reductions for years 2020, 2030, and 2035 while the Sustainable Santee Action Plan only shows reductions for 2030 and 2035.

The following section provides common data sources and methods used in quantifying the reduction measures.

# BACKGROUND ON COMMON ASSUMPTIONS

A set of common assumptions and sources was used to calculate potential emissions reduction for the measures and actions included in the Sustainable Santee Action Plan. The following describes the assumptions and methods used in each of the major categories of emissions including energy (electricity and natural gas), on-road transportation, and solid waste.

## ENERGY (ELECTRICITY AND NATURAL GAS)

LSA used the following assumption and methods to calculate emissions reductions for electricity and natural gas related measures.

### Greenhouse Gas Emission Factors for Electricity

The greenhouse gas (GHG) emission factors for electricity, expressed in pounds of carbon dioxide equivalents per megawatt-hour (lbs. $CO_2e$/MWh) is used throughout the Sustainable Santee Action Plan, including to determine the emissions from electricity in the overall GHG emissions inventory and to estimate the effect of city actions in the Plan.

The emission factors for electricity take into account varying emission levels over time and future options for electrical supply within the City of Santee. Currently, the primary supply of electricity is through San Diego Gas and Electric (SDG&E). A minor amount of electricity is currently provided from distributed photovoltaic (PV) solar panels throughout the City. One of the goals for the Sustainable Santee Action Plan is to increase distributed PV solar. Another goal associated with

electricity sources is Community Choice Aggregation (CCA). Assumptions and methods for quantifying the reduction of GHG emissions as a result of these goals and City actions are discussed later under the title GHG Reduction Strategies and City Actions. The following sections discuss the renewable mix within each source of electricity.

### *Electricity provided by SDG&E*

SDG&E's power mix includes electricity generated from SDG&'s own power plants and electricity procured by SDG&E. SDG&E is on track to meet the California Renewable Portfolio Standard (RPS) of 33 percent by year 2020. LSA assumed that SDG&E will also meet the RPS of 50 percent by 2030 and factored an RPS increase to 60 percent by 2035 in order to meet the State's RPS goal of 100 percent by 2045.

### *Electricity provided by Community Choice Aggregation (CCE).*

The Sustainable Santee Action Plan Goal 10, Measure 10.2 presents to City Council for consideration a Community Choice Aggregation (CCA) program, which would allow the City's energy users to choose an alternative option to SDG&E and use more renewable energy. The ongoing CCA programs have renewable energy percentages between 20 and 100, and the national opt-out rates for the program range from 3 percent to 5 percent. On October 8, 2019, the Santee City Council voted unanimously to move forward with a CCA. The City is actively evaluating opportunities for local jurisdiction partners within SDG&E's territory to develop and implement a CCA that would produce mutually beneficial results. LSA assumes that the CCA program would be initiated sometime in2022. The CCA would have a 100 percent renewable energy goal. Because the California RPS requires 50 percent renewables by 2030, that portion of GHG reductions is considered a State requirement and shown in the Adjusted Business As Usual (ABAU) forecasts. The remaining reduction is attributable to the City action in Measure 10.2.

### *Distributed PV*

Electricity generation from distributed PV systems in the City, including residential, institutional, and commercial PV systems, is considered part of the overall electricity supply. To estimate emissions reduction in the Sustainable Santee Action Plan, electricity generation from PV is assumed to be 100 percent emissions free renewable.

Considering distributed PV as a supply source rather than a reduction in grid supplied electricity does not affect the overall accounting of GHG emissions within the City—while it lowers the emissions factor it increases the total supply of electricity—but it does affect the weighted emissions factor that is used to estimate the emissions reductions from energy efficiency improvements to buildings.

### *Weighted Average Emission Factor for Electricity*

LSA calculated the weighted average emission factor for electricity based on the percentage of gross generation supplied by the two categories above and the percentage of renewable content in each of the sources. Table 1 presents the contribution from each category to gross generation and overall renewable content, as well as the weighted average emission factor for years 2020, 2030, and 2035.

## Table 1: Baseline & Forecasted Weighted Average Emission Factor for Electricity in Santee

| Year | CCA | | SDG&E | | Solar PV | | Citywide | |
|---|---|---|---|---|---|---|---|---|
| | % of Gross Generation Supplied | Renewable Content of Supply | % of Gross Generation Supplied | Renewable Content of Supply | % of Gross Generation Supplied | Renewable Content of Supply | Citywide Renewable | Weighted Average Emission Factor (lbs. $CO_2e$/MWh) |
| 2013 | -- | -- | 99% | 19% | >1% | 100% | 19% | 747 |
| 2020 | -- | 100% | 99% | 33% | 1% | 100% | 34% | 610 |
| 2030 | 66% | 100% | 16% | 50% | 18% | 100% | 92% | 76 |
| 2035 | 72% | 100% | 5% | 60% | 23% | 100% | 97% | 30 |

In 2020 the forecasted electricity supply from distributed PV solar is expected to be approximately one percent of the gross generation without any contribution from CCA. In 2030 the forecasted electric supply from distributed PV solar is expected to be approximately 18 percent and CCA contribution of total generation supplied to be 66 percent.

LSA used the weighted average emission factor to estimate the total reduction from measures that increase renewable supply, including RPS (both utility and CCA), from CCA, from CCA and from distributed PV solar. The total reduction from measures to increase renewable supply is given in Table 2, calculated using gross generation and the difference between 2013 emission factor and the weighted average emission factor in the target year.

## Table 2: Emissions Reduction from Increasing Renewable Supply in Santee

| Year | Gross Generation (MWh) | 2013 Emission Factor (lbs. $CO_2e$/MWh) | Weighted Average Emission Factor (lbs. $CO_2e$/MWh) | Emissions from Electricity using 2013 Emissions Factor (MT $CO_2e$) | Emissions from Electricity using Weighted Average Emissions Factor (MT $CO_2e$)) | Total Emissions Reduction from Increasing Renewable Supply (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| 2013 | 256,448 | 747 | 747 | 87,192 | 87,192 | -- |
| 2020 | 292,738 | 747 | 610 | 99,531 | 78,986 | 16,925 |
| 2030 | 426,800 | 747 | 76 | 145,112 | 14,937 | 130,175 |
| 2035 | 588,200 | 747 | 30 | 199,988 | 8,246 | 191,742 |

### GHG Emissions Reduction from Increasing Renewable Supply

The State's RPS requirements, CCA above RPS requirements, and distributed PV solar generation, all increase the citywide renewable supply. As shown in Table 1, the projected citywide renewable content for electricity would be 97% in 2035 if reduction measures were implemented on CCA and distributed PV solar. To estimate the impact of each supply on increasing renewable electricity citywide, LSA allocated the total emissions reduction from increasing renewable supply (Table 2) to each supply category based on the contribution of each category to citywide renewable electricity totals. The allocation is shown in Table 3 below.

## Table 3: Allocation of Emissions Reductions from Increasing Renewable Supply in Santee

| Year | Electric Supplier | Total | CCA | Utility | Solar PV |
|---|---|---|---|---|---|
| 2020 | Emissions Reduction from Increasing Renewable Supply (MT $CO_2e$) | 16,925 | -- | 16,427 | 498 |
| | Percent of Gross Generation supplied by renewable | 34% | -- | 33% | 1% |
| 2030 | Emissions Reduction from Increasing Renewable Supply (MT $CO_2e$) | 130,175 | 92,644 | 17,662 | 19,869 |
| | Percent of Gross Generation supplied by renewable | 92% | 66% | 16% | 18% |
| 2035 | Emissions Reduction from Increasing Renewable Supply (MT $CO_2e$) | 191,742 | 142,330 | 5,311 | 44,101 |
| | Percent of Gross Generation supplied by renewable | 97% | 72% | 2% | 23% |

In Table 3, using 2030 as an example, the total GHG reduction from increasing renewable electricity supplies is 130,175 MT $CO_2e$. Overall, in 2030, 92 percent of gross generation is forecast to be supplied by renewables, 66 percent by CCA, 16 percent by the utility's renewable supply, and 18 percent by distributed PV solar. Therefore, 71 percent (.66/.92) of the total emissions reduction from increasing renewable supply in 2030 ( 130,175 MT $CO_2e$) was allocated to the CCA (92,644 MT $CO_2e$). The same process was used to allocate the total emissions associated with increasing renewable percentages for each electricity supplier for 2020, 2030, and 2035.

### GHG Emission Factors for Natural Gas

For all state regulations and city actions related to natural gas, LSA used the emission factor of 0.0054 MT $CO_2e$ per therm[1] for all years to estimate emissions reduction potential from reducing natural gas use.

## ON-ROAD TRANSPORTATION RELATED STRATEGIES

LSA used the following assumptions to calculate emissions reductions from all of the transportation related reduction measures in the Sustainable Santee Action Plan.

### GHG Emission Factors for On-road Transportation

The emission factor for vehicle miles traveled, expressed in grams of $CO_2e$ per mile (g $CO_2e$/mile), is used in several ways in the Draft Sustainable Santee Action Plan, including to determine the emissions associated with on-road transportation for the overall inventory, business as usual (BAU) forecasts, estimated impacts of Federal and State regulations or Adjusted BAU (ABAU), and city actions reducing vehicle miles traveled (VMT).

LSA used the California Air Resources Board's (ARB's) Mobile Source Emissions Inventory EMFAC2014 model to determine the average vehicle emissions rates in the San Diego region.[2] The

[1] ARB 2014. Documentation of California's Greenhouse Gas Inventory. Fuel Combustion—Natural Gas. http://www.arb.ca.gov/cc/inventory/doc/docs1/1a1ai_instategenerationutillityowned_fuelcombustion_naturalgas_ch4_2013.htm

average vehicle emissions rates for the San Diego region were used as a proxy for the City because those emissions rates are the only data available for the City and closely approximate what is expected to occur in the City of Santee. The EMFAC2014 model includes the ability to show reductions in emissions associated with all Federal and State regulations on tailpipe emissions.

Using EMFAC2014 output, LSA calculated the average emissions rates (g $CO_2$/mile) based on the distribution of VMT for each vehicle class and its emissions rate. We adjusted the results to convert g $CO_2$/mile to g $CO_2e$/mile to account for total GHG emissions.

The average vehicle emissions rates shown in Table 4 were used to estimate the GHG emissions reduction impact of policies to increase vehicle efficiency, decrease VMT, and increase the use of electric vehicles on the road.

### Table 4: Average Vehicle Emissions Rate (g CO2e/mile) in San Diego Region

| Year | Average Vehicle Emission Rates with the impact of all adopted policies (g $CO_2e$/mile) |
|---|---|
| 2013 | 483 |
| 2020 | 398 |
| 2030 | 297 |
| 2035 | 242 |

### GHG Emission Reductions from Increasing Zero Emission Electric Vehicles (EVs)

The Sustainable Santee Action Plan includes goals and measures (Goal 7—Electrify the Fleet, Measure 7.1 Electric Vehicle Charger Program, and Measure M-4.4 Install Electric Vehicle Chargers) to increase electric vehicle charging stations at residential, commercial, and municipal land uses that result in an increase in the number of electric vehicles used in the City of Santee. This goal and measure complement the State's Zero Emissions Vehicle (ZEV) Program, which requires auto manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles.

To calculate the emissions reduction due to the State ZEV Program, LSA compared the emissions rate with no policy impact after year 2013 used for the BAU forecast of 2020, 2030, and 2035 as a fixed EV market penetration rate through the horizon year and the emission rate with the impact of the State ZEV Program. Note that the average vehicle emissions rate decreases over time due to the replacement of older, less efficient vehicles, with new cleaner vehicles. Using this approach, total emissions due to statewide programs would be 7,616 MT $CO_2e$ in 2020, 31,807 MT $CO_2e$ in 2030, and 40,770 MT $CO_2e$ in 2035.

To calculate the projected ZEVs associated with the Statewide ZEV Program, LSA applied the ratio of miles driven by ZEVs and total VMT region-wide to the total projected VMT in the City. This yields

[2] ARB EMFAC2014 https://www.arb.ca.gov/emfac/2014/

the total ZEVs miles in the City. This value was then converted to the number of ZEVs by dividing total ZEVs miles in the City with the average 35 miles driven per ZEV per day[3].

To estimate the GHG emissions reduction associated with the Draft Sustainable Santee Action Plan goals and measures, LSA allocated a portion of the statewide emissions reduction total based on the total number of ZEVs that would result from the local action. Table 5 provides key assumptions and results of allocating GHG emissions reduction from increasing ZEVs to City actions. This yields the total ZEVs that would result from local actions. Table 5 provides the key assumptions and results of allocating GHG emissions reduction to the local actions.

## Table 5: Allocation of GHG Emissions Reduction from Increasing Zero Emission Vehicles

| Year | Average Vehicle Emissions Rate (g $CO_2e$/mile) | | Total Emissions Reduction from Increasing ZEVs (MT $CO_2e$) | Projected Number of ZEVs | Projected ZEVs due to the impact of Local Actions | Emissions Reduction from ZEVs Allocated to Local Actions |
|---|---|---|---|---|---|---|
| | With no policy impact after 2013 | With Impact of Adopted State ZEV Program | | | | |
| 2020 | 429 | 425 | 12,392 | 2,708 | 826 | 6,196 |
| 2030 | 406 | 385 | 43,446 | 9,836 | 3,000 | 21,723 |
| 2035 | 395 | 365 | 99,890 | 16,667 | 4,500 | 47,414 |

Electric vehicles emissions are derived by the emissions associated with the electricity consumption used to fuel these vehicles. Additional electrify consumption associated with fueling electric vehicles is accounted for in the forecasted gross electric generation and associated emissions in the electricity category.

## ROUNDING OF VALUES IN THE TABLES AND FIGURES

Within the tables, charts, and figures found throughout the appendices, rounding of values is often required. Within the actual calculations and model outputs, values are not rounded at intermediary steps to avoid introducing unnecessary rounding errors. As a result of rounding, some totals in the tables and charts may not equal the values summed.

## SUSTAINABLE SANTEE ACTON PLAN GOALS, MEASURES AND ACTIONS

. The Sustainable Santee Action Plan includes the following eleven goals:

[3] Miles driven by ZEV per day was derived from EMFAC2014 EV VMT and number of EVs for the San Diego region. The average, 35 miles/day, is the average from 2012-2030. Percent of miles driven by ZEV of total vehicles was derived for each year from 2012-2030 using EMFAC2014 EV VMT and total VMT.

- Goal 1: Increase Energy Efficiency in Existing Residential Units
- Goal 2: Increase Energy Efficiency in New Residential Units
- Goal 3: Increase Energy Efficiency in Existing Commercial Units
- Goal 4: Increase Energy Efficiency in New Commercial Units
- Goal 5: Decrease Energy Demand by Reducing the Urban Heat Island Effect
- Goal 6: Decrease GHG Emissions through Reducing Vehicle Miles Traveled
- Goal 7: Increase Use of Electric Vehicles
- Goal 8: Improve Traffic Flow
- Goal 9: Decrease GHG Emissions through Reducing Solid Waste Generation
- Goal 10: Decrease GHG Emissions through Increasing Clean Energy Use

Each goal is supported by several quantifiable city actions, which are described below.

## GOAL 1: INCREASE ENERGY EFFICIENCY IN EXISTING RESIDENTIAL UNITS

The goal is to reduce the energy consumption within existing single-family and multi-family homes. Data from two energy efficiency programs, which are currently voluntary, are used to calculate the impact of the mandatory reduction measures. The first voluntary program is the SDG&E Energy Efficiency Program that gave free energy audits and energy efficiency incentives (rebates, partial rebates) or free devices such as LED light bulbs to participants. Program participation included replacing weather stripping, light bulbs and light fixture replacement. From 2013 through 2017, SDG&E performed energy audits for approximately 130 residential properties per year in the City of Santee. Approximately 30 percent of those homes also took advantage of modest energy efficiency retrofits program that included LED lighting, weather stripping, new windows, and energy efficient water heaters. The average energy efficiency increase from these improvements was a 14 percent reduction in energy use. Using the 2014 through 2017 data trends, LSA assumes that 65 homes in 2030 and an additional 65 homes in 2035 would implement energy efficiency retrofits from this action.

The second voluntary program  is the Home Energy Renovation Opportunity (HERO) program. LSA used HERO participation data of homeowners in the city of Santee between 2013 through 2017 to estimate the number of participants in the program for 2020, 2030 and 2035. Between 2013 and 2017 approximately 80 homes per year initiated a major energy efficiency renovation using the HERO program financing involving replacement of the heating, ventilation and air conditioning (HVAC) system, increased attic and ducting insulation, window and door replacement. Using the 2013 through 2017 data trends, LSA assumes that 800 homes over a ten year period (2020-2030) and an additional 800 homes by 2035 would implement major energy efficiency retrofits from this action resulting in a 25 percent reduction in energy consumption from the homes.

### Measure 1.1: Energy Audits in the Existing Residential Sector

This measure would require all existing residential units in the City that seek building permits for modifications, alterations and additions to perform energy audits. City actions are divided into two distinct types of building permits.

*City Action: Require Energy Audits of Existing Residential Units Requesting Permits for Minor Modifications.*

This action would require that on or before December 2020 all existing residential units that seek building permits for minor modifications (less than 30 percent of the dwelling unit size), alterations, and additions that do not include bathrooms or kitchens must perform energy audits. In addition, the modification must include energy efficiency retrofit recommendations resulting from the energy audits.

In quantifying this measure, LSA used data from the voluntary energy efficiency program provided by SDG&E described above. Emission reduction from annual electricity savings was calculated by multiplying the number of retrofits, average electricity reductions per retrofit, and the weighted average emissions factor. As the renewable energy content in electricity increases, the emissions reduction from energy retrofits decreases accordingly. Similarly, emissions reduction from annual natural gas savings was calculated by multiplying the number of retrofits, average natural gas reduction per retrofit, and natural gas emissions factor. Emissions reduction from electricity and natural gas savings were summed to determine total emissions reduction. Table 6, energy savings and GHG emissions reductions are the savings and reductions for years 2020, 2030 and 2035.

### Table 6: Key Assumptions and Results for Measure 1.1: SDG&E Energy Efficiency Programs

| Year | Number of Housing Unites Affected | | | Energy Savings | | GHG Emissions Reduction | | |
|---|---|---|---|---|---|---|---|---|
| | % of All Existing Units Affected After 2013 | Units Completing Energy Audits after 2013 | Units Implementing Energy Retrofits after 2013 | Electricity Reduction (kWh) | Natural Gas Reduction (therm) | From Electrify Reduction (MT $CO_2e$) | From Natural Gas Reduction (MT $CO_2e$) | Total GHG Reduction (MT $CO_2e$) |
| 2020 | 3% | 250 | 65 | 66,890 | 3,943 | 23 | 22 | 45 |
| 2030 | 5% | 500 | 130 | 133,780 | 7,886 | 5 | 43 | 48 |
| 2035 | 6% | 750 | 195 | 200,670 | 11,829 | 3 | 64 | 67 |

Table 6 shows the expected reductions from the SDG&E voluntary energy efficiency programs over time. The transition from a voluntary program to a mandatory measure required a review to ensure that under the mandatory elements of the measure, it would meet or exceed the level of participation that was assumed in the voluntary program. From 2013 through 2017, the City of Santee issued approximately 150 building permits per year for residential retrofits and additions. Approximately 35 building permits per year involved retrofits or additions to existing homes that did not include kitchens, bathrooms or increased the size of the unit by 30 percent or more. Using this information in forecasting to 2020 results in a total 1,050 building permits by 2020 (2013-2020), with 250 permits for minor alterations; a total of 2,550 building permits in 2030 (2013-2030) with approximately 575 permits for minor alterations, and a total of 3,300 building permits by 2035 (2013-2035) with approximately 759 permits for minor alterations. The Sustainable Santee Action

Plan assumes 45 MT $CO_2e$ for years 2020, 2030, and 2035, which is the lowest level of reductions expected in Table 6. Because the trends in building permits equals or exceeds the expected participation of the voluntary program and the amount of GHG reductions are conservatively estimated, the transition to the mandatory actions will still meet or exceed the reductions of the voluntary program.

### *City Action: Require Energy Audits of Existing Residential Units Requesting Permits for Major Modifications.*

This action would require that on or before December 2020 require all existing residential unites that seek building permits for modifications, alterations, and additions representing 30 percent or more of the square footage of the dwelling unit size or that include bathrooms or kitchens must perform energy audits and energy efficiency retrofits to meet California Green Building Standards Tier 1 Voluntary Measures, which shall include Energy Star electric water heaters or solar water heaters. Heating, ventilation, and air conditioning (HVAC) equipment shall be evaluated in the energy audit and recommendations made on energy efficiency improvements or replacement of the HVAC system.

In quantifying this measure LSA used data showing HERO participation rates of homeowners in the City of Santee between 2013 through 2017 to estimate the number of participants in the program for 2020, 2030 and 2035. Between 2013 and 2017 approximately 80 homes per year initiated a major energy efficiency renovation using the HERO program financing involving replacement of the heating, ventilation and air conditioning (HVAC) system, increased attic and ducting insulation, window and door replacement. Using the 2013 through 2017 data trends, LSA assumes that 800 homes over a ten year period (2020-2030) and an additional 800 homes by 2035 would implement major energy efficiency retrofits from this action resulting in a 25 percent reduction in energy consumption from the homes. Table 7, energy savings and GHG emissions reductions are the savings and reductions for years 2020, 2030 and 2035.

## Table 7: Key Assumptions and Results for Measure 1.1: HERO Program Energy Efficiency Retrofits

| Year | Number of Housing Unites Affected | | Energy Savings | | GHG Emissions Reduction | | |
|---|---|---|---|---|---|---|---|
| | % of All Existing Units Affected After 2013 | Units Implementing Energy Retrofits after 2013 | Electricity Reduction (kWh) | Natural Gas Reduction (therm) | From Electrify Reduction (MT $CO_2e$) | From Natural Gas Reduction (MT $CO_2e$) | Total GHG Reduction (MT $CO_2e$) |
| 2020 | **3%** | 800 | 15,065,193 | 672,963 | 4,177 | 3,634 | 7,811 |
| 2030 | **5%** | 1,600 | 30,130,386 | 1,345,926 | 1,055 | 7,268 | 8,323 |
| 2035 | **6%** | 2,400 | 45,195,579 | 2,018,899 | 633 | 10,902 | 11,535 |

Table 7 shows the expected reductions from the voluntary HERO energy efficiency financing program over time. The transition from a voluntary program to a mandatory measure required a review to ensure that under the mandatory elements of the measure, it would meet or exceed the level of participation that was assumed in the voluntary program. From 2013 through 2017, the City of Santee issued approximately 150 building permits per year for residential retrofits and additions.

Approximately 115 building permits per year involved retrofits or additions to existing homes that included kitchens, bathrooms or increased the size of the unit by 30 percent or more. Using this information in forecasting to 2020 results in a total 1,050 building permits by 2020 (2013-2020), with 935 permits for major alterations, a total of 2,550 building permits in 2030 (2013-2030) with approximately 1,975 permits for major alterations, and a total of 3,300 building permits by 2035 (2013-2035) with approximately 2,541 permits for major alterations. The Sustainable Santee Action Plan assumes 7,811 MT $CO_2e$ for years 2020, 2030, and 2035, which is the lowest level of reductions expected in Table 7. Because the trends in building permits exceeds the expected participation of the voluntary HERO program and the amount of GHG reductions are conservatively estimated, the transition to the mandatory actions will still meet or exceed the reductions of the voluntary HERO program.

## GOAL 2: INCREASE ENERGY EFFICIENCY OF NEW RESIDENTIAL UNITS

The goal is to reduce the energy consumption within new single-family and multi-family homes.

### Measure 2.1: Energy Efficiency Improvements of the Residential Sector

This action would require that on or before December 2020, require all new residential units including accessory residential units to meet or exceed California Green Building Standards Tier 2 Voluntary Measures. Note that Measure 2.1 makes this a mandatory measure for new construction. New residential can use Green Building Ratings such as Leadership in Energy and Environmental Design (LEED), Build it Green, or Energy Star certified buildings certification in scoring development.

LSA estimated the annual new residential construction in the City based on the difference between the number of building permits in 2019 as compared to the forecasts of new homes in 2030 and 2035 BAU and ABAU forecasts shown in Appendix A of the Sustainable Santee Action Plan. The growth assumptions estimate that approximately 1,600 new single-family residential units will be built between 2020 and 2030. An additional 520 residential units will be built between 2030 and 2035 for a total of 2,120 single family residential units by 2035 (2020-2035). Table 8, energy savings and GHG emissions reductions are the savings and reductions for years 2030 and 2035.

### Table 8: Energy Efficiency Improvements for New Residential Units

| Year | Number of New Homes after 2019 | Energy Savings | | GHG Emissions Reduction | | |
|---|---|---|---|---|---|---|
| | | Electricity Reduction (Kwh) | Natural Gas Reduction (therms) | From Electrify Reduction (MT $CO_2e$) | From Natural Gas Reduction (MT $CO_2e$ | Total GHG Reduction (MT $CO_2e$) |
| 2020 | 135 | 9,600,800 | 429,260 | 2,784 | 2,318 | 5,102 |
| 2030 | 1,500 | 48,971,429 | 2,187,037 | 1,714 | 11,810 | 13,524 |
| 2035 | 2,000 | 69,571,428 | 3,102,963 | 974 | 16,756 | 17,750 |

## GOAL 3: INCREASE ENERGY EFFICIENCY OF EXISTING COMMERCIAL UNITS

The goal is to reduce the energy consumption within existing commercial and industrial buildings in the City. For the purposes of this analysis, commercial and industrial land uses are both considered

"commercial units." Similar to the residential sector, data from two energy efficiency programs, which are currently voluntary, are used to calculate the impact of the mandatory reduction measures for commercial units.

The first voluntary program isthe SDG&E Energy Efficiency Program that gave free energy audits and energy efficiency incentives (rebates, partial rebates) to commercial building owners. Program participation included replacing light bulbs and light fixtures and application of energy efficient film on windows. From 2013 through 2017, SDG&E performed energy audits with energy efficiency retrofits for approximately 12 commercial properties per year in the City of Santee. The average energy efficiency increase from these improvements was a 14 percent reduction in energy use. Using the 2013 through 2017 data trends, LSA assumes that 44 businesses in 2020 and a total of 264 businesses by 2035 would implement energy efficiency retrofits from this action.

The second voluntary program isthe Property-Assessed Clean Energy (PACE) program for commercial properties titled Commercial HERO PACE Program. San Diego County partnered with Western Riverside County Council of Governments (WRCOG) in administering the program. LSA used Commercial HERO PACE Program participation data commercial properties in the city of Santee between 2013 through 2017 to estimate the number of participants in the program for 2020, 2030 and 2035. Between 2013 and 2017 approximately 43 businesses per year initiated a major energy efficiency renovation using the Commercial HERO PACE Program financing involving replacement of the heating, ventilation and air conditioning (HVAC) system, cool roofs, solar installation, window and door replacement. Using the 2013 through 2017 data trends, LSA assumes that 300 businesses would participate in the Commercial HERO PACE Program between 2013 and 2020 and an additional 645 businesses by 2035 would implement major energy efficiency retrofits from this action resulting in a 25 percent reduction in energy consumption from the homes.

### Measure 3.1: Energy Audits in the Existing Commercial Sector

This measure would require all existing commercial buildings in the City that seek building permits for modifications, alterations and additions to perform energy audits. City actions are divided into two distinct types of building permits.

#### *City Action: Require Energy Audits of Existing Commercial Units Requesting Permits for Minor Modifications.*

This action would require that on or before December 2020 all existing commercial buildings of 10,000 sq. ft. or more that seek building permits for minor modifications, alterations, and additions (< 30 percent of total), must perform energy audits and recommendations.

In quantifying this measure LSA used data from the voluntary energy efficiency program provided by SDG&E described above. Emission reduction from annual electricity savings was calculated by multiplying the number of retrofits, average electricity reductions per retrofit, and the weighted average emissions factor. As the renewable energy content in electricity increases, the emissions reduction from energy retrofits decreases accordingly. Similarly, emissions reduction from annual natural gas savings was calculated by multiplying the number of retrofits, average natural gas reduction per retrofit, and natural gas emissions factor. Emissions reduction from electricity and

natural gas savings were summed to determine total emissions reduction. Table 9, energy savings and GHG emissions reductions are the savings and reductions for years 2020 and 2035.

## Table 9: Key Assumptions and Results for Measure 3.1: SDG&E Energy Efficiency Programs

| Year | Number of Commercial Properties Affected | | Energy Savings | | GHG Emissions Reduction | | |
|---|---|---|---|---|---|---|---|
| | Units Implementing Energy Retrofits after 2013 | Total Square Feet of Commercial Buildings Affected | Electricity Reduction (kWh) | Natural Gas Reduction (therm) | From Electrify Reduction (MT $CO_2e$) | From Natural Gas Reduction (MT $CO_2e$) | Total GHG Reduction (MT $CO_2e$) |
| 2020 | 44 | 1,320,000 | 2,075,000 | 14,551 | 581 | 79 | 660 |
| 2030 | 184 | 5,888,000 | 7,262,500 | 67,712 | 332 | 366 | 698 |
| 2035 | 264 | 9,240,000 | 14,525,000 | 101,857 | 203 | 550 | 753 |

Table 9 shows the expected reductions from the SDG&E voluntary energy efficiency programs over time. The transition from a voluntary program to a mandatory measure required a review to ensure that under the mandatory elements of the measure, it would meet or exceed the level of participation that was assumed in the voluntary program. From 2013 through 2017, the City of Santee issued approximately 102 building permits per year for commercial building retrofits and expansion. Approximately 54 building permits per year involved retrofits or expansions to existing businesses that did not increased the size of the unit by 30 percent or more. Using this information in forecasting to 2020 results in a total 714 building permits by 2020 (2013-2020), with 378 permits for minor alterations; and a total of 2,244 building permits by 2035 (2013-2035) with approximately 1,188 permits for minor alterations. The Sustainable Santee Action Plan assumes 660 MT $CO_2e$ for years 2020, 2030, and 2035, which is the lowest level of reductions expected in Table 9. Because the trends in building permits equals or exceeds the expected participation of the voluntary program and the amount of GHG reductions are conservatively estimated, the transition to the mandatory actions will still meet or exceed the reductions of the voluntary program.

### *City Action: Require Energy Audits of Existing Commercial Units Requesting Permits for Major Modifications.*

This action would require that on or before December 2020 require all existing commercial buildings of 10,000 square feet or more that seek building permits for modifications, alterations, and additions representing 30 percent or more of the square footage must perform energy audits and energy efficiency retrofits to meet California Green Building Standards Tier 1 Voluntary Measures.

In quantifying this measure, LSA used data showing the Commercial HERO PACE Participation rates of businesses in the City of Santee between 2013 through 2017 to estimate the number of participants in the program for 2020 and 2035. Between 2013 and 2017 approximately 43 businesses per year initiated a major energy efficiency renovation using the Commercial HERO PACE Program financing involving replacement of the heating, ventilation and air conditioning (HVAC) system, cool roof modifications, and window and door replacement. Using the 2013 through 2017 data trends, LSA assumes that 300 businesses would participate in the Commercial HERO PACE Program by 2020 and an additional 645 businesses by 2035 would implement major energy

efficiency retrofits from this action resulting in a 25 percent reduction in energy consumption from the businesses. Table 10, energy savings and GHG emissions reductions are the savings and reductions for years 2020 and 2035.

### Table 10: Key Assumptions and Results for Measure 3.1: Commercial HERO PACE Program Energy Efficiency Retrofits

| Year | Number of Businesses Affected | | Energy Savings | | GHG Emissions Reduction | | |
|---|---|---|---|---|---|---|---|
| | Units Implementing Energy Retrofits after 2013 | Total Square Feet of Commercial Buildings Affected | Electricity Reduction (kWh) | Natural Gas Reduction (therm) | From Electrify Reduction (MT $CO_2e$) | From Natural Gas Reduction (MT $CO_2e$) | Total GHG Reduction (MT $CO_2e$) |
| 2020 | 300 | 3,000,000 | 20,148,154 | 438,704 | 5,843 | 2,369 | 8,212 |
| 2030 | 775 | 7,750,000 | 52,049,000 | 1,136,296 | 1,874 | 6,136 | 8,010 |
| 2035 | 945 | 9,450,000 | 63,466,685 | 1,381,918 | 889 | 7,462 | 8,351 |

Table 10 shows the expected reductions from the voluntary Commercial HERO PACE Program energy efficiency financing over time. The transition from a voluntary program to a mandatory measure required a review to ensure that under the mandatory elements of the measure, it would meet or exceed the level of participation that was assumed in the voluntary program. From 2013 through 2017, the City of Santee issued approximately 102 building permits per year for commercial building retrofits and expansion. Approximately 48 building permits per year involved retrofits or expansions to existing businesses that increased the size of the unit by 30 percent or more. Using this information in forecasting to 2020 results in a total 714 building permits by 2020 (2013-2020), with 336 permits for major alterations; and a total of 2,244 building permits by 2035 (2013-2035) with approximately 1,056 permits for major alterations. The Sustainable Santee Action Plan assumes 8,010 MT $CO_2e$ for years 2020, 2030, and 2035, which is the lowest level of reductions expected in Table 10. Because the trends in building permits exceeds the expected participation of the voluntary Commercial HERO PACE Program and the amount of GHG reductions are conservatively estimated, the transition to the mandatory actions will still meet or exceed the reductions of the voluntary Commercial HERO Program.

## GOAL 4: INCREASE ENERGY EFFICIENCY OF NEW COMMERCIAL UNITS

The goal is to reduce the energy consumption within new commercial businesses within the City of Santee.

### Measure 4.1: New Commercial Buildings Meet or Exceed California Green Building Standards Tier 2 Voluntary Measures

This action would require that on or before December 2020, all new commercial units meet or exceed California Green Building Standards Tier 2 Voluntary Measures. New commercial development can use Green Building Ratings such as Leadership in Energy and Environmental Design (LEED), Build it Green, or Energy Star certified buildings certification in scoring development.

LSA estimated the annual new residential construction in the City based on the difference between the number of building permits in 2019 as compared to the forecasts of new commercial space in 2030 and 2035 BAU and ABAU forecasts shown in Appendix A of the Sustainable Santee Action Plan. The growth assumptions estimate that approximately 684,000 gross square feet of new retail commercial and offices will be built between 2020 and 2030. An additional 968,000 gross square feet of retail commercial and offices will be built between 2030 and 2035 for a total of 1,652,000 gross square feet of commercial by 2035 (2020-2035). Table 11, energy savings and GHG emissions reductions are the savings and reductions for years 2030 and 2035.

### Table 11: Key Assumptions and Results for Measure 4.1: Energy Efficiency of New Commercial Units

| Year | Number of Businesses Affected | | Energy Savings | | GHG Emissions Reduction | | |
|---|---|---|---|---|---|---|---|
| | Number of Businesses Affected since 2020 | Total Square Feet of Commercial Buildings Affected | Electricity Reduction (kWh) | Natural Gas Reduction (therm) | From Electrify Reduction (MT $CO_2e$) | From Natural Gas Reduction (MT $CO_2e$) | Total GHG Reduction (MT $CO_2e$) |
| 2020 | 7 | 60,000 | 2,700,410 | 121,990 | 783 | 659 | 1,442 |
| 2030 | 70 | 684,000 | 31,514,286 | 1,407,778 | 1,103 | 7,602 | 8,705 |
| 2035 | 165 | 1,652,000 | 93,785,715 | 2,041,482 | 1,313 | 11,024 | 12,337 |

## GOAL 5: DECREASE ENERGY DEMAND THROUGH REDUCING URBAN HEAT ISLAND EFFECT

The goal is to reduce the energy consumption by reducing the urban heat island effect through the use of shade trees, cool roofs, and cool pavement.

### Measure 5.1: Tree Planting for Shade and Energy Efficiency

This action would require  trees along all streets, sidewalks and parking lots on or before December 2020 .  Starting in 2020, City will begin tree planting along existing streets with the goal of having tree shade on 14% of pavement during the summer months by 2030 and 23% by 2035.  City will require new development include trees within parking lots and street scrapes.  The analysis assumes a 2.5 percent reduction in the cooling load for buildings resulting from the reduced urban heat island effect.[4]  Table 12 summaries the key assumptions and results of Measure 5.1.

[4] kWh savings based upon an assumed 2.5 percent reduction in cooling load for buildings resulting from reduced urban heat island effect.  United States Environmental Protection Agency (EPA) Using Trees and Vegetation to Reduce Heat Islands. https://www.epa.gov/heat-islands/using-trees-and-vegetation-reduce-heat-islands.  Accessed August 2018.

## Table 12: Key Assumptions and Results for Measure 5.1: Tree Planting for Shade and Energy Efficiency

| Year | Existing Paved Area and Buildings Affected | | | Energy Savings | GHG Emissions Reduction |
|---|---|---|---|---|---|
| | Percent of pavement shaded during summer months | Gross Square Feet of buildings effected by shading | Percent cooling load reduction | Electricity Reduction (kWh)) | From Electrify Reduction (MT $CO_2e$) |
| 2020 | 14% | 2,026,836 | 2.5% | 934,322 | 261 |
| 2030 | 20% | 2,895,480 | 2.5% | 1,334,745 | 47 |
| 2035 | 23% | 4,756,860 | 2.5% | 1,534,958 | 22 |

### Measure 5.2: Light Reflecting Surfaces for Energy Efficiency

This action would require that on or before December 2020 present to City Council for consideration an ordinance requiring enhanced cool roofs on commercial and municipal buildings. LSA assumed that 40,000 square feet of existing commercial and municipal roofs would be retrofitted with enhanced cool roof materials by each of the target years. Table 13 shows the assumptions used in the original analysis of this action.

## Table 13: Key Assumptions and Results for Measure 5.2: Light Reflecting Surfaces for Energy Efficiency

| Year | Existing Buildings and Roofs Affected | | | Energy Savings | GHG Emissions Reduction |
|---|---|---|---|---|---|
| | Buildings Affected Since 2013 | Gross Square Feet of roof Affected Since 2013 | Percent cooling load reduction[5] | Electricity Reduction (kWh)) | From Electrify Reduction (MT $CO_2e$) |
| 2020 | 4 | 40,000 | 13% | 11,343 | 4 |
| 2030 | 8 | 80,000 | 13% | 22,686 | 1 |
| 2035 | 12 | 120,000 | 13% | 34,029 | 1 |

## GOAL 6: DECREASE GHG EMISSIONS THROUGH REDUCING VEHICLE MILES TRAVELED

The goal of decreasing GHG emissions by reducing vehicle miles traveled (VMT) is outlined through a variety of strategies broadly outlines in the City of Santee's Mobility Element. The City of Santee Mobility Element was approved in October 2017, and includes a goal of "a balanced, interconnected multimodal transportation network that allows for the efficient and safe movement of all people and goods, and that supports the current and future needs of Santee community members and travel generated by planned land uses." The objectives included in the updated element will support the Sustainable Santee Action Plan's measure of encouraging mode shift in the City. Such objectives

[5] Berkeley Lab, Demonstration of Energy Savings of Cool Roofs. June 1998. https://www.osti.gov/servlets/purl/296885

include implementation of AB 1358, the Complete Streets Act, which supports a balanced, multimodal transportation network. Additionally, the element includes objectives to increase the use of public transit, to develop and maintain accessible and safe pedestrian systems that encourage walking, and to remain active in regional transportation coordination, such as the expansion of the San Diego Trolley system. Measures 6.1 through 6.4 in the Draft Sustainable Santee Action Plan implement these strategies.

### Measure 6.1: Non-Motorized Transportation Options

Starting in 2020 with completion by 2030 the City will construct a total of 25 miles of active transportation routes (sidewalks and pedestrian paths) from Santee Light Rail Transit station to surrounding residential areas. The City will amend its zoning ordinances to require commercial centers within ¼ mile of the Santee Light Rail Transit station to reduce parking spaces by 10 percent from current zoning requirements.

LSA converted the avoided VMT, from reduced commuter miles and/or reduced City internal trips, to GHG emissions reduction using the average vehicle emission factor shown in Table 4. Table 14 summarizes the key assumptions and results.

**Table 14: Key Assumptions and Results for Measure 6.1: Non-motorized Transportation Options.**

| Year | Vehicle Miles Traveled Reduction (miles/year) | GHG Emissions Reduction Due to miles avoided (MT $CO_2e$) |
|---|---|---|
| 2020 | 1,052,231 | 419 |
| 2030 | 1,052,231 | 315 |
| 2035 | 1,052,231 | 263 |

### Measure 6.2: Implement Bicycle Master Plan

Starting in 2020 with completion by 2030, the City will expand bike routes to improve bike transit by increasing Class 1 Bike Path from 9.2miles to 14.9miles, Class 2 Bike Lane from 23.1 miles to 34.3 miles, and Class 3 Bike Route from 12.6 miles to 13.6 miles, which would implement City of Santee Bicycle Master Plan. Table 15 provides the key assumptions and results of Measure 6.2.

**Table 15: Key Assumptions and Results for Measure 6.2: Implement Bicycle Master Plan.**

| Year | Vehicle Miles Traveled Reduction (miles/year) | GHG Emissions Reduction Due to miles avoided (MT $CO_2e$) |
|---|---|---|
| 2020 | 1,036,245 | 412 |
| 2030 | 1,036,245 | 311 |
| 2035 | 1,036,245 | 259 |

## GOAL 7: INCREASE USE OF ELECTRIC VEHICLES

Electric vehicles (EVs) produce lower emissions than conventional vehicles. However, more than 95 percent of people still drive conventional gasoline or diesel vehicles. With the statewide EV ownership goal, EV ownership would reach 13 percent by 2035. This goal is implemented through Measure 7.1

### Measure 7.1: Electric Vehicle Charger Program

This measure would require that on or before December2020 all new residential and commercial development install e-chargers. For new single family residential install complete 40 Amp electrical service and one e-charger, for new multi-family residential install e-chargers for 13 percent of total parking, for new office space, regional shopping centers, and movie theaters, install e-chargers for 5 percent of total parking spaces, and for new industrial and other land uses employing 200 or more employees install e-charges for 5 percent of total parking spaces.

LSA estimated the number of e-chargers for residential land uses based upon the number of new single-family homes that are estimated to be built by 2030 and 2035 (one e-charger per home), Multi-family residential based upon the City's parking spaces requirement and number of multi-family residential units being built by 2020 and 2035 (13 percent of total parking spaces for multi-family residential). For new office space, regional shopping centers, and movie theaters LSA also used the City's parking requirements for these land uses to determine the number of e-chargers using the growth assumptions for 2030 and 2035.

To avoid double counting, LSA allocated the emissions reduction from the California ZEV program to Measure 7.1, using the ratio of new EVs as a result of Measure 7.1 to new EV's as a result of the ZEV program. Table 16 summarizes the key assumptions for residential e-chargers, and Table 17 summarizes the key assumptions for commercial and office space and summarizes the results of Measure 7.1.

### Table 16: Key Assumptions and Results for Residential Portion of Measure 7.1: Electric Vehicle Charger Program

| Year | Single-Family | | Multi-Family | | All New Residential |
|---|---|---|---|---|---|
| | Number of Homes | Number of e-chargers | % of Parking Spaces with e-chargers | Number of e-chargers | Total e-chargers |
| 2020 | 135 | 135 | 13% | 45 | 180 |
| 2030 | 1,600 | 1,600 | 13% | 500 | 2,100 |
| 2035 | 2,120 | 2,120 | 13% | 1,280 | 3,400 |

### Table 17: Key Assumptions and Results for Commercial Portion of Measure 7.1: Electric Vehicle Charger Program

| Year | New Commercial Space | | Residential | Total GHG Reductions | |
|---|---|---|---|---|---|
| | % of Parking Spaces with e-chargers | Number of e-chargers | Total Number of e-chargers at Residential | Total e-chargers all land Uses | GHG Emissions Reduced (MT $CO_2e$) |
| 2020 | 5% | 70 | 180 | 250 | 1,810 |
| 2030 | 5% | 900 | 2,100 | 3,000 | 21,723 |
| 2035 | 5% | 1,100 | 3,400 | 4,500 | 47,414 |

## GOAL 8: IMPROVE TRAFFIC FLOW

Improving traffic flow reduces idling time and increases the fuel efficiency of vehicles on the road, which will reduce GHG emissions. Because this goal was added into the Sustainable Santee Action Plan in October 2019, calculations for Measure 8.1 only show reductions in 2030 and 2035.

### Measure 8.1: Traffic Flow Improvement Program

Starting in 2020, the City would begin replacing 10 traffic signals with Smart Signals, retime 40 traffic signals, and install one roundabout. By 2035, the City would retime a total of 60 traffic signals.

The City would retime uncoordinated signals in a centralized manner to improve traffic flow and reduce traffic delays and congestion, which results in on-road fuel reduction. In addition, the City will replace existing, older traffic signals with computer linked Smart Signals. The effect of retiming existing traffic signals or replacing them with Smart Signals on fuel reduction at intersections was estimated based on SANDAG's studies of traffic signal optimization.[6]

The City will also install one roundabout by 2030. Similar to retiming traffic signals, installing roundabouts at intersections can improve traffic flow, which can reduce on-road fuel use. The effect of roundabouts installation on fuel reduction at the intersection was estimated based on technical studies and La Jolla Bird Rock roundabouts case studies.[7]

LSA estimated the emissions reduction based on the number of traffic signals retimed or replaced and the one roundabout installed San Diego region fleet average miles per gallon and the average emission factor. Table 18 summaries the key assumptions and results.

[6] Silva Silva-Send, N., et al., Cost effectiveness comparison of certain transportation measures to mitigate greenhouse gas emissions in San Diego County, California. Energy Policy (2013). SANDAG Traffic Signal Optimization Program. Fuel savings per intersection in future years are modified based on improved fuel economy.

[7] Silva-Send, N., et al., Cost effectiveness comparison of certain transportation measures to mitigate greenhouse gas emissions in San Diego County, California. Energy Policy (2013). Fuel savings per intersection in future years are modified based on improved fuel economy.

### Table 18: Key Assumptions and Results for Measure 8.1: Traffic Flow Improvements

| Year | Roundabout Installation | | | Smart Signals and Traffic Signal Retiming | | | Total |
|---|---|---|---|---|---|---|---|
| | Number of Roundabouts | Equivalent Gallons Fuel Savings Per Intersection | GHG Emissions Reduced (MT $CO_2e$) | Number of Traffic Signals Retimed or Replaces | Equivalent Gallons Fuel Savings Per Intersection | GHG Emissions Reduced (MT $CO_2e$) | Total GHG Emissions Reduced (MT $CO_2e$) |
| 2020 | -- | -- | -- | -- | -- | -- | -- |
| 2030 | 1 | 12,280 | 140 | 50 | 4,811 | 2,290 | 2,430 |
| 2035 | 1 | 10,180 | 105 | 60 | 3,860 | 2,025 | 2,130 |

## GOAL 9: DECREASE GHG EMISSIONS THROUGH REDUCED SOLID WASTE GENERATION

This goal is to divert solid waste from landfills through the Measure 9.1.

### Measure 9.1: Reduce Waste at Landfills

The City currently diverts approximately 50 percent of waste from landfills with a current diversion goal of 70 percent by 2030 and 80 percent by 2035. One gap in the City's diversion requirements is construction waste. Starting in 2020, this measure will also require all development during construction and demolition activities to recycle construction and demolition waste at rates of at least 70 percent by 2030 and 80 percent by 2035. . Table 19 summaries the key assumptions and results.

### Table 19: Key Assumptions and Results for Measure 9.1: Reduce Waste at Landfill

| Year | Target Diversion Rate | Per Capita Waste Disposal Equivalent to Target Diversion Rate (pounds/service population/day)[8] | Citywide Waste Disposal Equivalent to Target Diversion Rate (MT/year) | GHG Emissions Reduced (MT $CO_2e$) |
|---|---|---|---|---|
| 2020 | 60% | 5.4 | 56,679 | 6,242 |
| 2030 | 70% | 4.9 | 49,800 | 7,233 |
| 2035 | 80% | 3.0 | 35,280 | 8,238 |

## GOAL 10: DECREASE GHG EMISSIONS THROUGH INCREASING CLEAN ENERGY USE

This goal is to increase the renewable energy supply within the City of Santee through the following two measures.

[8] Method to convert pounds per person (PPD) to estimated diversion rates is based on CalRecycle. Jurisdiction PPD from 2012-2015 were downloaded from CalRecycle Jurisdictional Diversion Summary showing the 50 percent diversion, then the PPD goal was calculated based on a 70 and 80 percent diversion rate.

### Measure 10.1: Increase Distributed Renewable Energy Generation within the City of Santee

Because Measure 10.1 was added into the Sustainable Santee Action Plan in November 2019, calculations for this measure only show reductions in 2030 and 2035.

This measure requires that on or before December 2020, new single-family homes install at least 2kW per home; multi-family residential to install at least 1kW per unit of PV solar systems, unless the installation is infeasible due to poor solar resources established in a solar feasibility study prepared by a qualified solar consultant submitted with an applicant's formal project submittal to City. This measure also requires new commercial buildings to install at least 1.5 W per square feet of building area (e.g., 2,000 sq.ft. = 3 kW) unless the installation is infeasible due to poor solar resources.

For new residential the photovoltaic (PV) solar system size requirement is a minimum of two kilowatt (kW) capacity systems per home for single family homes and one kW capacity systems per unit for new multi-family residential. Total number of new residential units is 1,800 single-family homes and 900 multi-family dwelling units built between 2020 and 2030; and 2,600 single-family homes and 1,150 multi-family dwelling units built between 2020 and 2035. LSA assumed that approximately 20 percent of the new homes are not subject to Measure 10.1 due to poor solar resources. Details on the forecast of new residential units including the Land Use Buffer are provided in Appendix A of the Sustainable Santee Action Plan.

The PV solar capacity was estimated by multiplying the number of new homes with PV solar systems and the minimum system requirement. The PV solar capacity for these systems is converted to estimated electricity generation using a capacity factor of 0.20. Table 20 summarizes the key assumptions and results from the residential portion of Measure 10.1

### Table 20: Key Assumptions and Results For Measure 10.1: Increase Distributed Renewable Energy Generation within the City of Santee

| Year | Single-Family Homes | | Multi-Family Homes | | GHG Reductions | |
|---|---|---|---|---|---|---|
| | Number of New Homes with Solar PV Systems | PV System Capacity (kW) | Number of New Homes with Solar PV Systems | PV System Capacity (kW) | Total PV Capacity (kW) | GHG Emissions Reduced (MT $CO_2e$) |
| 2020 | -- | -- | -- | -- | -- | -- |
| 2030 | 1,440 | 2,880 | 780 | 280 | 3,160 | 1,800 |
| 2035 | 1,950 | 3,900 | 862 | 862 | 4,762 | 2,783 |

For new commercial, the requirement is a minimum of 1.5 W per square foot, which equates to a 15kW capacity PV solar system for a 10,000 square foot commercial building. Approximately 684,000 total square feet of new commercial buildings is assumed to be built between 2020 and 2030, and 1,652,000 total square feet of new commercial buildings is assumed to be built by 2035 with approximately 20 percent of commercial buildings are not subject to Measure 10.1 due to poor solar resources. These values would yield a total of approximately 821 kW of PV solar in 2030 and 1,652 kW of PV solar in 2035. The reductions shown in the Sustainable Santee Action Plan included

only the residential component of Measure 10.1 as shown in Table 20. This results in a conservative estimate of GHG reductions resulting from Measure 10.1.

### Measure 10.2: Community Choice Aggregation Program

On October 8, 2019, City Council voted unanimously to move forward with a Community Choice Aggregation (CCA) Program. The City is actively evaluating opportunities for local jurisdiction partners within SDG&E's territory to develop and implement a CCA that would product mutually beneficial results. To estimate the associated emissions reductions, LSA assumed that City Council would approve a CCA and launch the program sometime in 2022 with the goal of achieving 100 percent renewable energy by 2035.

As described in the Background and Genera l Assumptions for Energy (Electricity and Natural Gas), renewable energy in the City is supplied by several sources including the renewable energy from SDG&E in compliance with the RPS and distributed PV solar systems.

CCAs are opt-out programs established by a local ordinance. The first area of consideration is historical trends of those who opt out of a CCA within California. According to the City of San Diego Climate Action Plan,[9] the opt-out rates for CCAs within California range between two and five percent. In estimating the opt-out rate for Santee we recommend using five percent. This is to be conservative in estimating total GHG emissions reduced as a result of implementing a CCA. The opt-out rate might be lower, but having a conservative assumption on the amount of GHG emissions reduced better positions the City to achieve the GHG Reduction Targets in the Sustainable Santee Action Plan.

The second are of consideration is the average mix of renewable energy actually achieved by a CCA with a 100 percent renewable goal. In this regard there are several sources of information including trends in California provided by LEAN Energy US[10] which shows an average annual mix of between 70 to 80 percent renewable energy for CCAs with a 100 percent renewable energy goal. The primary reason for the lower mix is due to power purchased at times of the day when renewable energy was unavailable. Additional studies show that renewable energy generation capacity can only accommodate approximately 80 percent of demand due to time of day demand vs ability to generate solar and wind power.[11] LSA assumed that this issue of time of day demand would require the CCA to purchase approximately 11 percent of electricity from the utility or similar power source subject to the RPS in 2030. However, LSA also assumed that by 2035 power storage systems would be functioning in a way to allow the CCA to purchase all of its electricity as renewable power. To account for this transition Table 1 shows 16 percent of SDG&E generation supplying the City of Santee in 2030 (5 percent opt out rate plus 11 percent power purchased from SDG&E or similar source to accommodate time of day demand). By 2035, the percentage of generation from SDG&E supplying electricity to the City of Santee drops to 5 percent to account for the opt out rate.

[9] City of San Diego. 2015. San Diego Climate Action Plan.
[10] LEAN Energy US. 2019. http://leanenergyus.org/cca-by-state/california/. Accessed on January 14, 2019.
[11] Power Electronics. 2018. Is a 100% Renewable-Energy Power-Generation System Feasible?

In addition, the increase in distributed PV solar as shown in Table 20 contributes to the City' overall goal of 100 percent renewable energy by 2035. The good news is that the local distributed PV solar generation will boost the total renewable energy within the City beyond the 70-80 percent range stated above. But, to avoid double counting the reductions associated with distributed PV solar generation within Santee this component is not counted in the total percentage reduction of GHG emissions associated with Measure 10.2. Therefore, the percent of distributed PV solar is subtracted from the percent of gross generation supplied by the CCA but does count toward total Citywide renewable energy within the City as shown in Table 1.

Finally, because the CCA is required to comply with the statewide RPS requirements, a portion of the total emissions reduction resulting from a CCA is attributable to RPS compliance and already counted in the ABAU forecasts for 2030 and 2035. The RPS requirement is 50 percent renewable energy by 2030 and 100 percent renewable energy by 2045. LSA assumed that the RPS would be 60 percent in 2035 as utilities ramp up the percentage of renewable energy to meet the 2045 requirement. To avoid double counting the RPS allocation of reductions associated with the CCA is not included in estimating the GHG reductions associated with Measure 10.2. The emissions reduction from Measure 10.2 in 2030 and 2035 is given in the last column of Table 21.

### Table 21: Key Assumptions and Results for Measure 10.2: Community Choice Aggregation Program

| Year | % of Gross Generation Supplied by CCA | % of Renewable in CCA | % Renewable Needed for RPS Compliance | Emissions Reduction from CCA | Emissions Reduction from CCA RPS Compliance (MT $CO_2e$) | Emissions Reduction from Measure 10.2 (MT $CO_2e$) |
|---|---|---|---|---|---|---|
| 2020 | -- | -- | 33% | -- | -- | -- |
| 2030 | 66 | 100% | 50% | 92,644 | 46,322 | 46,322 |
| 2035 | 72 | 100% | 60% | 142,330 | 85,398 | 56,932 |

## SUMMARY OF REDUCTIONS

By implementing the statewide and local reduction measures described above, the City would reduce its community-wide GHG emissions by nearly 67 percent compared to the 2035 BAU emissions. Statewide measures reduce the City's GHG emissions by 35 percent and the local measures reduce it an additional 32 percent. Table 22 summarizes the strategies and the potential GHG reductions for community and municipal operations, respectively.

## Table 22: Summary of Community GHG Reduction Strategies and Emissions

| Goals and Measures | 2020 | 2030 | 2035 |
|---|---|---|---|
| **Goal 1: Increase Energy Efficiency in Existing Residential Units** | | | |
| 1.1: Energy Audits in the Existing Residential Sector | | | |
| Permits for Minor Modifications | 45 | 45 | 45 |
| Permits for Major Modifications | 7,811 | 7,811 | 7,811 |
| **Goal 2: Increase Energy Efficiency in New Residential Units** | | | |
| 2.1: Exceed Energy Efficiency Standards | 5,102 | 13,534 | 17,750 |
| **Goal 3: Increase Energy Efficiency in Existing Commercial Units** | | | |
| 3.1: Energy Audis in the Existing Commercial Sector | | | |
| Permits for Minor Modifications | 660 | 660 | 660 |
| Permits for Major Modifications | 8,010 | 8,010 | 8,010 |
| **Goal 4: Increase Energy Efficiency in New Commercial Units** | | | |
| 4.1: Exceed Energy Efficiency Standards | 1,442 | 8,705 | 12,337 |
| **Goal 5: Decrease Energy Demand through Reducing Urban Heat Island Effect** | | | |
| 5.1: Tree Planting for Shading and Energy Efficiency | 261 | 47 | 22 |
| 5.2: Light-reflecting Surfaces for Energy Efficiency | 4 | 1 | 1 |
| **Goal 6: Decrease Greenhouse Gas Emissions through Reducing Vehicle Miles Traveled** | | | |
| 6.1: Non-Motorized Transportation Options | 419 | 315 | 263 |
| 6.2: Implement Bicycle Master Plan to Expand Bike Routes in the City | 417 | 311 | 259 |
| **Goal 7: Increase Use of Electric Vehicles** | | | |
| 7.1: Electric Vehicle Charger Program | 3,341 | 21,723 | 47,414 |
| **Goal 8: Improve Traffic Flow** | | | |
| 8.1: Traffic Flow Improvement Program | -- | 2,430 | 2,130 |
| **Goal 9: Decrease Greenhouse Gas Emissions through Reducing Solid Waste Generation** | | | |
| 9.1: Reduce Waste to Landfills | 6,242 | 7,233 | 8,238 |
| **Goal 10: Decrease Greenhouse Gas Emissions through Increasing Clean Energy Use** | | | |
| 10.1: Increase Distributed Renewable Energy Generation within Santee | -- | 1,800 | 2,783 |
| 10.2: Community Choice Aggregation Program[1] | -- | 46,322 | 56,932 |
| **Goal 11: Decrease GHG Emissions from New Development through Performance Standards** | | | |
| | | | |
| **Total Community Measures** | | | |
| **Total of All Measures Excluding CCA** | 33,750 | 72,615 | 107,723 |
| **Total of All Measures Including CCA** | 33,750 | 118,936 | 164,655 |

Notes and Acronyms:
CCA is separated from total of other reduction measures.
BAU = Business as Usual
CCA = Community Choice Aggregation
MT $CO_2e$ = metric tons of carbon dioxide equivalent
SB = Senate Bill

## COMPARISION OF REDUCTIONS TO TARGETS

In 2030, without the CCA, implementation of Statewide and local measures together would reduce emissions from the 2030 BAU level to 266,899 MT $CO_2e$, which does not meet the 40 percent below 2005 levels reduction target of 249,596 MT $CO_2e$. Implementation of the CCA would provide an additional 46,322 MT $CO_2e$ in reductions resulting in the City achieving the 2030 target. In 2035, without the CCA, implementation of statewide and local measures together would reduce emissions

from the 2035 BAU level to 228,820 MT $CO_2e$, which would not meet the 49 percent below 2005 levels reduction target of 173,386 MT $CO_2e$ for 2035. Implementation of the CCA would provide an additional 56,932 MT $CO_2e$ in reductions and result in the City meeting the target. Table 23 summarizes this information.

## Table 23: Community Emissions and Targets Comparison

| Greenhouse Gas Emissions | 2030 | 2035 |
|---|---|---|
| BAU Emissions | 486,170 | 515,462 |
| Reduction Target | 249,596 | 173,386 |
| State and Federal Reductions | 146,656 | 178,919 |
| Local Measures Reductions Excluding CCA | 72,615 | 107,723 |
| Total Adjusted Emissions Without CCA | 266,899 | 228,820 |
| Additional Reductions Needed | 17,303 | 55,434 |
| CCA Reductions | 46,322 | 56,932 |
| Total Adjusted Emissions With CCA | 220,577 | 171,888 |
| Additional Reductions Needed | Target Met | Target Met |

Notes and Acronyms:

BAU = Business as Usual

CCA = Community Choice Aggregation

MT $CO_2e$ = metric tons of carbon dioxide equivalent

# APPENDIX D

# SUSTAINABLE SANTEE ACTION PLAN

# CONSISTENCY CHECKLIST

# Sustainable Santee Action Plan Consistency and Implementation Tracking Checklist

The Sustainable Santee Action Plan Project Consistency Checklist (Checklist) is intended to be a tool for development projects to demonstrate consistency with Santee's (City's) Sustainable Santee Action Plan, which is a qualified greenhouse gas (GHG) emissions reduction plan in accordance with California Environmental Quality Act (CEQA) Guidelines Section 15183.5. This Checklist has been developed as part of the Sustainable Santee Action Plan implementation and monitoring process and will support the achievement of individual GHG reduction measures as well as the City's overall GHG reduction goals. In addition, this Checklist will further the City's sustainability goals and policies that encourage sustainable development and aim to conserve and reduce the consumption of resources, such as energy and water, among others.

CEQA Guidelines Section 15183.5 allows lead agencies to analyze the impacts associated with GHG emissions at a programmatic level in plan-level documents such as Climate Action Plans or sustainability plans, so that project-level environmental documents may tier from the programmatic review. Projects that meet the requirements of this Checklist will be deemed to be consistent with the Sustainable Santee Action Plan and will be found to have a less than significant contribution to cumulative GHG (i.e., the project's incremental contribution to cumulative GHG effects is not cumulatively considerable), pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b). Projects that do not meet the requirements in this Checklist will be deemed to be inconsistent with the Sustainable Santee Action Plan and must prepare a 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. This GHG Checklist can be updated to reflect adoption of new GHG reduction strategies or to comply with any changes and updates in the Plan or local, State or federal regulations.

| 1. Project Information | |
|---|---|
| **Contact Information** | |
| **Project No./Name:** | |
| **Address:** | |
| **Applicant Name:** | |
| **Contact Information:** | |
| | |
| | |
| **Project Description Characteristics** | |
| **1. What is the size of the Project (acres)?** | |
| **2. Identify all Applicable Proposed Land uses:** | |
| **a. Residential-Single Family (Indicate number of single-family units)** | |
| **b. Residential-Multifamily (Indicate number of multifamily units)** | |
| **c. Commercial (total square footage)** | |
| **d. Industrial (total square footage)** | |
| **e. Other (describe)** | |
| **3. Provide a brief description of the project proposed:** | |

| 2. Determining Land Use Consistency | | |
|---|---|---|
| **Checklist Item** | | |
| **As the first step in determining the consistency with the Sustainable Santee Action Plan for the discretionary development projects, this section allows the City to determine the project's consistency with the land use assumptions used in the Plan.** | | |
| | **Yes** | **No** |
| **1. Is the proposed project consistent with the existing General Plan and land use zoning designations? OR** | | |
| **2. If the proposed project is not consistent with the existing land use plan and zoning designations, does the project include a land use plan and/or zoning designation amendment that is identified in the Sustainable Santee Action Plan Land Use Buffer (see Appendix A, Table 11)?** | | |
| **3. If the proposed project is not consistent with the existing land use plan, zoning designations, or Land Use Buffer, does the project include a land use plan and/or zoning designation ammendment that will result in an equivalent or less GHG-intensive project when compared to the existing designations?** | | |

Notes:

For questions 1, if the answer is **Yes**, proceed to the Sustainable Santee Action Plan Consistency Checklist. If the answer is **No**, procced to question 2.

For question 2, if the answer is **Yes**, proceed to the Sustainable Santee Action Plan Consistency Checklist. If the answer is **No**, proceed to question 3.

For question 3, if the answer is **Yes** provide estimated project emissions under both existing and proposed designation (s) for comparison. Compare the maximum buildout of the existing designation and the maximum buildout of the proposed designation. If the answer of question 3 is **No** then, in accordance with the City's Significance Determination Thresholds, the project's GHG impact may be significant. The project must nonetheless incorporate each of the applicable measures identified in the Checklist to mitigate cumulative GHG emissions impacts unless the decision maker finds that a measure is infeasible in accordance with CEQA Guidelines Section 15091.

| Sustainable Santee Action Plan CEQA Project Consistency Checklist | | | | | Notes |
|---|---|---|---|---|---|
| **Greenhouse Gas Reduction Measure** | **Measure Applicability** | | | | This checklist is to be filled out by the applicant |
| | **Yes** | **No** | **N/A** | **Description** | |
| **Emissions Measures Category: Energy Efficiency** | | | | | |
| **Land Use Sector-Residential** | | | | | Measure 1.1 is not on checklist because it focuses on minor residental alterations not subject to CEQA |
| **Goal 1. Increase Energy Efficiency in Existing Residential Units** | | | | | |
| Measure 1.2. For existing Residential Unit Permit for Major Modifications (more than 30% of dwelling unit size, including bathroom and kitchen) that is considered a Project under CEQA must implement energy efficiency retrofits recommended from City Energy Audit and explain the energy efficiency retrofits implemented. | | | | | Measure 1.2 only applies if alteration is subject to CEQA |
| **Goal 2. Increase Energy Efficiency in the New Residential Units** | | | | | |
| Measure 2.1. New residential construction meet or exceed California Green Building Standards Tier 2 Voluntary Measures, such as obtaining green building ratings including LEED, Build it Green, or Energy Star Certified building certifications in scoring development and explain the measures implemented. | | | | | |
| **Land Use Sector-Commercial** | | | | | Measure 3.1 is not on checklist because it focuses on minor alterations which are not subject to CEQA |
| **Goal 3. Increase Energy Efficiency in Existing Commercial Units** | | | | | |
| Measure 3.2. For existing commercial units of 10,000 sq. ft. or more seeking building permits for modifications representing 30% or more sq. ft, and considered a Project under CEQA must implement energy efficiency retrofits recommended by the City to meet California Green Building Standards Tier 1 Voluntary Measures and explain the retrofits implemented. | | | | | Measure 3.2 only applies if alteration is subject to CEQA |
| **Goal 4. Increase Energy Efficiency in New Commercial Units** | | | | | |
| Measure 4.1. New commercial units meet or exceed California Green Building Standards Tier 2 Voluntary Measures such as obtain green building ratings including: LEED, Build it Green, or Energy Star Certified buildings certifications in scoring development and explain the measures implemented. | | | | | |
| | | | | | |
| **Emissions Measures Category: Advanced Goals Measures** | | | | | |
| **Land Use Sector-Commercial** | | | | | |
| **Goal 5. Decrease Energy Demand through Reducing Urban Heat Island Effect** | | | | | |
| Measure 5.1. Project utilizes tree planting for shade and energy efficiency such as tree planting in parking lots and streetscapes. | | | | | |
| Measure 5.2. Project uses light-reflecting surfaces such as enhanced cool roofs on commercial buildings. | | | | | |
| | | | | | |
| **Emissions Measures Category: Transportation** | | | | | |
| **Land Use Sector-Residential and Commercial** | | | | | |
| **Goal 6. Decrease GHG Emissions through a Reduction in VMT** | | | | | |
| Measure 6.1. Proposed project streets include sidewalks, crosswalks, and other infrastructure that promotes non-motorized transportation options. | | | | | |
| Measure 6.2. Proposed project installs bike paths to improve bike transit. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Land Use Sector-Residential and Commercial** | | | | | |
| **Goal 7: Increase Use of Electric Vehicles** | | | | | |
| Measure 7.1. Install electric vehicle chargers in all new residential and commercial developments. | | | | | |
| a. For new Single-Family Residential, install complete 40 Amp electrical service and one e-charger. | | | | | |
| b. For new Multifamily Residential, install e-chargers for 13 percent of total parking. | | | | | |
| c. For new Office Space, Regional Shopping Centers, and Movie Theaters, install e-chargers for 5 percent of total parking spaces. | | | | | |
| d. For new Industrial and other Land Uses employing 200 or more employees, install e-charges for 5 percent of total parking spaces. | | | | | |
| **Land Use Sector-Residential and Commercial** | | | | | |
| **Goal 8. Improve Traffic Flow** | | | | | |
| Measure 8.1. Implement traffic flow improvement program. | | | | | Projects that include traffic controls need to show consistency with one of these |
| a. Install smart traffic signals at intersections warranting a traffic signal, OR | | | | | |
| b. Install roundabout. | | | | | |
| **Emissions Measures Category: Solid Waste** | | | | | |
| **Land Use Sector-Residential and Commercial** | | | | | |
| **Goal 9: Decrease GHG Emissions through Reducing Solid Waste Generation** | | | | | |
| Measure 9.1. Reduce waste at landfills. | | | | | |
| waste. | | | | | |
| **Emissions Measures Category: Clean Energy** | | | | | |
| **Land Use Sector-Residential and Commercial** | | | | | |
| **Goal 10. Decrease GHG Emissions through Increased Clean Energy Use** | | | | | |
| Measure 10.1. Increase distributed energy generation within City of Santee by implementing the following applicable photovoltaic solar systems: | | | | | |
| a. Single-family residential to install at least 2kW per unit of PV solar systems, unless the installation is infeasible due to poor solar resources established in a solar feasibility study prepared by a qualified solar consultant submitted with an application | | | | | |
| b. Multifamily residential to install at least 1kW per unit of PV solar systems, unless the installation is infeasible due to poor solar resources established in a solar feasibility study prepared by a qualified solar consultant submitted with an applicant's formal project submittal to City. | | | | | |
| c. On commercial buildings, install at least 2 kW per square foot of building area (e.g., 2,000 sq. ft. = 3 kW) unless the installation is infeasible due to poor solar resources. | | | | | |