

The image features a background of palm tree silhouettes against a sunset sky. The sky transitions from a pale blue at the top to a bright yellow and orange near the horizon. A semi-transparent, geometric orange overlay is positioned in the lower half of the image, creating a layered effect. The palm trees are scattered across the frame, with some taller and more prominent than others. The overall mood is serene and tropical.

# Oceanside Climate Action Plan

Final

# Oceanside Climate Action Plan

April 2019

Prepared for:

*city of*  
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## ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ARB	Air Resources Board
BAU	Business-As-Usual
CAP	Climate Action Plan
CCE	Community Choice Energy
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFD	Community Facilities District
CH <sub>4</sub>	Methane
CIP	Capital Improvements Project
City	City of Oceanside
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> e	carbon dioxide equivalent
CSI	California Solar Initiative
EEM	energy efficient mortgages
EIR	environmental impact report
EO	Executive Order
Energy Code	California Energy Code
EPA	Environmental Protection Agency
EV	Electric Vehicle
GHG	greenhouse gas
GWP	global warming potential
HERO	Home Energy Renovation Opportunity
IPCC	Intergovernmental Panel on Climate Change
JPA	Joint Powers Authority
kW	kilowatts
kWh	kilowatt-hours
LIWP	Low-Income Weatherization Program
MPO	metropolitan planning organization
MT	metric tons
N <sub>2</sub> O	nitrous oxide
NCTD	North County Transit District
NOAA	National Oceanic & Atmospheric Administration
OTC	Oceanside Transit Center
PACE	Property Assessed Clean Energy
ppm	parts per million
PV	photovoltaic

## ACRONYMS AND ABBREVIATIONS

ReCAP	Regional Climate Action Planning Framework
RPS	Renewable Portfolio Standard
SASH	Single-Family Affordable Solar Housing
SALC	Sustainable Agricultural Lands Conservation
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCS	Sustainable Communities Strategy
SDG&E	San Diego Gas & Electric
SGOA	Smart Growth Opportunity Areas
TDM	Transportation Demand Management
VMT	vehicle miles traveled
ZEV	Zero Emission Vehicle

# Executive Summary

The City of Oceanside's (City) Climate Action Plan (CAP) seeks to align with state efforts to reduce greenhouse gas (GHG) emissions while balancing a variety of community interests: e.g., quality of life, economic development, and social equity. The CAP outlines measures the Oceanside community will take to make progress towards meeting the State of California's 2050 GHG reduction goal.

While federal and state measures are contributing significantly to GHG emissions reduction, climate action at the local level is essential in reducing global emissions to sustainable levels. In California, achieving the State's 2050 GHG reduction target will require local jurisdictions to complement state measures such as low-carbon fuel standards, vehicle fuel-efficiency standards, and the Cap-and-Trade Program.

Reducing the City's carbon footprint requires both local government action as well as a commitment from residents, business owners, and others in the community to reduce their reliance on fossil fuels; pursue clean and renewable energy sources; reduce, reuse, recycle, and compost solid waste; conserve water and carefully manage the City's land resources. Indeed, given that the vast majority of the City's GHG emissions are generated by activities in the private sector, the bulk of the GHG reduction measures outlined in the City's CAP address emissions associated with residential, commercial, industrial, and agricultural uses.

Nevertheless, the City recognizes its role as an exemplar for the Oceanside community and is thus committed to reducing GHG emissions from municipal operations. Led by the Water Utilities and Public Works Departments, the City has already significantly reduced its GHG emissions through a variety of means, including methane (CH<sub>4</sub>) cogeneration, streetlight retrofitting, solar photovoltaic installation at numerous municipal facilities, solid waste diversion, energy efficiency retrofitting in municipal buildings, and the Green Oceanside campaign's community education programs. The City will continue to pursue GHG reduction in local government operations while encouraging emissions reduction in the community at-large through a combination of requirements, incentives, and community outreach efforts.

As climate action planning continues to evolve, through advancements in climate science, technology, and public policy, the City's CAP will need to be periodically updated. These updates will be informed by new GHG emissions inventories, which will show how the City's emissions are trending and reveal which emissions reduction measures are most effective. In light of new information, and as new constraints and opportunities arise, the City will adjust its emissions reduction strategy to achieve state-aligned targets.

While the City is on track to meet its state-aligned emissions reduction targets for 2020 and 2030 without additional emissions reduction measures, it is understood that meeting long-term reduction targets requires aggressive action and that taking action now will better position the City to reach long-term reduction targets. Thus, the City intends to begin implementing the CAP measures outlined herein as soon as possible following the CAP's adoption.

## Local Context

Oceanside is a 42-square-mile coastal community in northern San Diego County that borders Marine Corps Base Camp Pendleton, the cities of Carlsbad and Vista, and unincorporated areas of San Diego County. The Pacific Ocean serves as the western boundary for the City. The City is situated on the periphery of the San Diego metropolitan area and features a largely suburban land use pattern. However, the City's downtown and coastal areas are becoming increasingly urbanized. As of 2017, Oceanside was home to approximately 175,000 residents, 60,000 households, and 2,900 brick-and-mortar businesses. As these numbers indicate, the City is predominantly residential, with the vast majority of existing housing units constructed between 1970 and 2000.

The City boasts one of the most robust transit hubs in Southern California, the Oceanside Transit Center (OTC). The OTC serves three different passenger rail operations (Amtrak, Metrolink, and the North County Transit District) that provide service to San Diego, Escondido, Orange County, Los Angeles, and other Southern California destinations. The North County Transit District also operates its Breeze bus service from the OTC.

While once heavily dependent on Camp Pendleton, the City's economy has significantly diversified over the past 25 years. Prominent economic sectors present in Oceanside today include health care, sports and active lifestyle product manufacturing, farm-to-table culinary arts, biotechnology, warehousing and distribution, and information/communication technology. Moreover, with a variety of unique coastal amenities, Mission San Luis Rey, Guajome Regional Park, and the SoCal Sports Complex, Oceanside has seen significant growth in its hospitality sector. A number of new lodging uses have been established in recent years, and more hotel development is anticipated in the near future.

Despite recent employment growth, the City's jobs-to-housing ratio remains among the lowest in the San Diego region. Roughly 80 percent of the City's working population commutes to jobs outside of the City, with many of these jobs located on Camp Pendleton, within the Highway 78 corridor, and in the cities of Carlsbad and San Diego (with a strong concentration in the Sorrento Valley area). Many residents also commute to work in Orange County. According to the U.S. Census, the average one-way commute time for Oceanside residents is over 26 minutes, which is similar to the state average. Nearly 80 percent of Oceanside workers drive to work alone.

Oceanside has roughly 3,200 acres of agricultural land in the South Morro Hills Community. With high demand for housing, this area faces intense development pressure. Moreover, the long-term viability of farming is threatened by the cost of water, the cost of labor, and international competition. In an effort to improve the long-term viability of farming in South Morro Hills, the City is exploring ways to facilitate agritourism uses that will provide farmers with additional revenue.

As the City has little remaining vacant land available for new development, it is anticipated that housing and employment growth will occur primarily through infill and redevelopment of already urbanized areas within the City's transit-served commercial corridors, including Coast Highway, Mission Avenue, Oceanside Boulevard, and Vista Way.

## Regulatory Background

### STATE

In 2005, the State of California adopted legislation that called for the establishment of statewide GHG emissions reduction targets. Since then, California has continued to expand its legislative framework for clarifying and achieving these targets. Executive Order S-3-05 set emissions reduction targets for 2010, 2020, and 2050. These and other interim targets through 2030 were later codified in the Global Warming Solutions Acts of 2006 (Assembly Bill 32) and 2016 (Senate Bill 32). As directed by the legislature, the California Air Resources Board has adopted and periodically revised a State Scoping Plan that outlines the program framework designed to meet the State's GHG emission reduction targets. Concurrently, the California Air Resources Board has developed tools to improve preparedness for climate-related phenomena such as sea-level rise, more frequent and more intense wildfires, and diminished water supply. Since the original Scoping Plan was adopted in 2011, the State has identified local governments as essential partners in meeting the statewide emissions reduction goals. In keeping with this expectation, the California Environmental Quality Act has been revised to require local governments to address the impacts of GHG emissions in both long-range planning and project review.

### REGIONAL

The San Diego Association of Governments (SANDAG) is the region's transportation planning agency. In addition to planning and implementing transportation infrastructure and a variety of mobility programs, SANDAG promotes regional GHG emissions reduction through its Sustainable Community Strategy, Electric Vehicle Readiness Plan, and other policies and programs. SANDAG's recently established Climate Framework aids local jurisdictions with CAP preparation and implementation. Oceanside has relied upon the Climate Framework to produce a benefit-cost analysis of the emissions reduction measures outlined in this document. This benefit-cost analysis is attached to the CAP as Appendix D.

SANDAG's regional growth forecasts and recommendations for sustainable transportation options and land use development patterns are expected to play a key role in reducing the City's GHG emissions related to automotive travel.

### CITY OF OCEANSIDE

This CAP is being prepared concurrently with the City's focused General Plan Update. The focused General Plan Update will include a new General Plan element, the Energy and Climate Action Element, which will include goals and policies that support the emissions reduction measures.

## Plan Purpose

The City of Oceanside CAP demonstrates the City’s commitment to developing programs, standards, guidelines, and incentives that support sustainable land use patterns, healthy living, and community character. The CAP integrates the City’s past and current GHG reduction efforts with additional measures that seek to balance GHG reduction with other priorities, including quality of life, economic development, and fiscal responsibility. By using energy more efficiently, harnessing renewable energy, reducing, reusing, recycling, and composting waste, conserving water, and enhancing access to sustainable modes of transportation, the City can reduce costs, increase business activity, generate new green jobs, and improve the lives of Oceanside residents in sustainable ways.

To ensure that Oceanside remains on track to achieve the long-term GHG emissions reduction goals of the State, the City will implement reduction measures proactively. Success in implementing these measures will require the City to invest in both capital improvements and human resources to develop sustainable infrastructure, implement new policies and programs, elicit the active participation of the Oceanside community at-large, and monitor progress in reducing the City’s carbon footprint.

## Inventories

The City, with help from the Energy Policy Initiatives Center of the University of San Diego and the CivicSpark AmeriCorps Program, prepared community and municipal GHG inventories based on emissions in 2013, the earliest year for which the most complete and reliable data was available (see Appendix B). The 2013 “baseline” emissions serve as a starting point against which future inventories may be compared and GHG emissions targets adjusted. The results of the 2013 community inventory are shown in **Figure ES-1**.

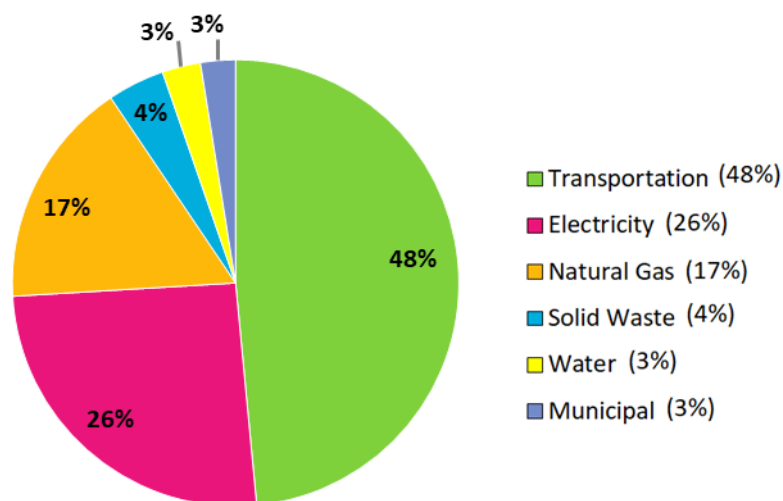


Figure ES-1 Community GHG Emissions by Source for the Baseline Year (2013)

Municipal emissions are a subset of community emissions and account for about 2.5 percent of community emissions. The results of the 2013 municipal inventory are shown in **Figure ES-2**.

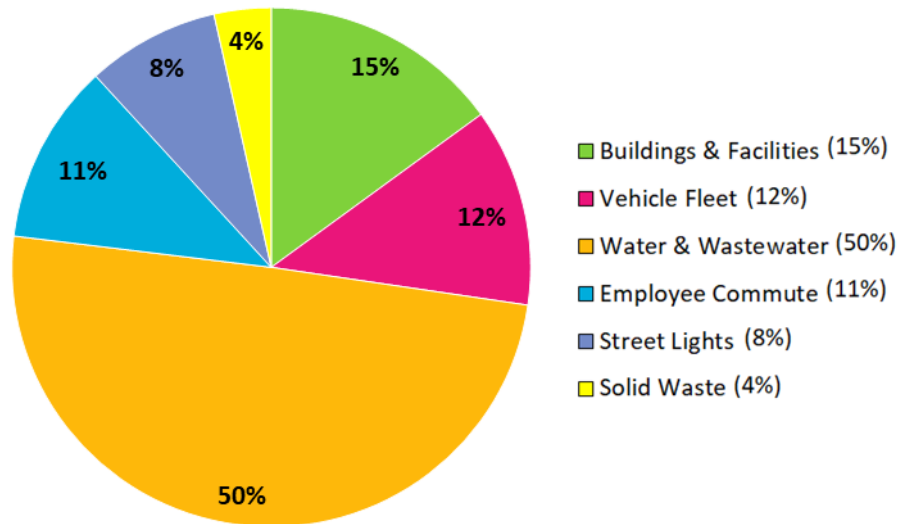


Figure ES-2 Municipal GHG Emissions by Source for the Baseline Year (2013)

## Forecasts and Target Setting

Future GHG emissions were initially forecasted under two conditions: “Business-as-Usual” (BAU) and an “Adjusted Business-as-Usual.” The BAU condition reflects projected growth in population, employment, and automotive use under existing conditions – i.e., without the benefit of federal, state, or local GHG reduction measures.

Programs and policies implemented at the state and federal levels, including California’s Advanced Clean Cars Program and Renewable Portfolio Standards and the federal Corporate Average Fuel Economy standards, will affect local emission levels. Therefore, under the Adjusted BAU scenario, future emissions estimates account for legislation adopted at the state and federal levels. Both the BAU and Adjusted BAU forecasts are shown in **Figure ES-3**.

The City is on track to meet its state-aligned emissions reduction targets for 2020 and 2030 without additional emissions reduction measures. However, it is understood that meeting long-term reduction targets requires aggressive action. The sooner the City takes action, the better positioned it will be to reach long-term reduction targets. Therefore, the City has developed near-term local GHG emissions targets that are more aggressive than State targets and require continuous effort to achieve. Near-term local GHG emissions targets will ensure that local emissions remain on a trajectory that is consistent with the state’s 2050 GHG emissions target, which represents the level necessary to help stabilize the climate in the latter half of the 21st century. The City’s local GHG emissions targets are expressed in terms of metric tons (MT) of carbon dioxide equivalent (CO<sub>2</sub>E) in **Figure ES-3**.

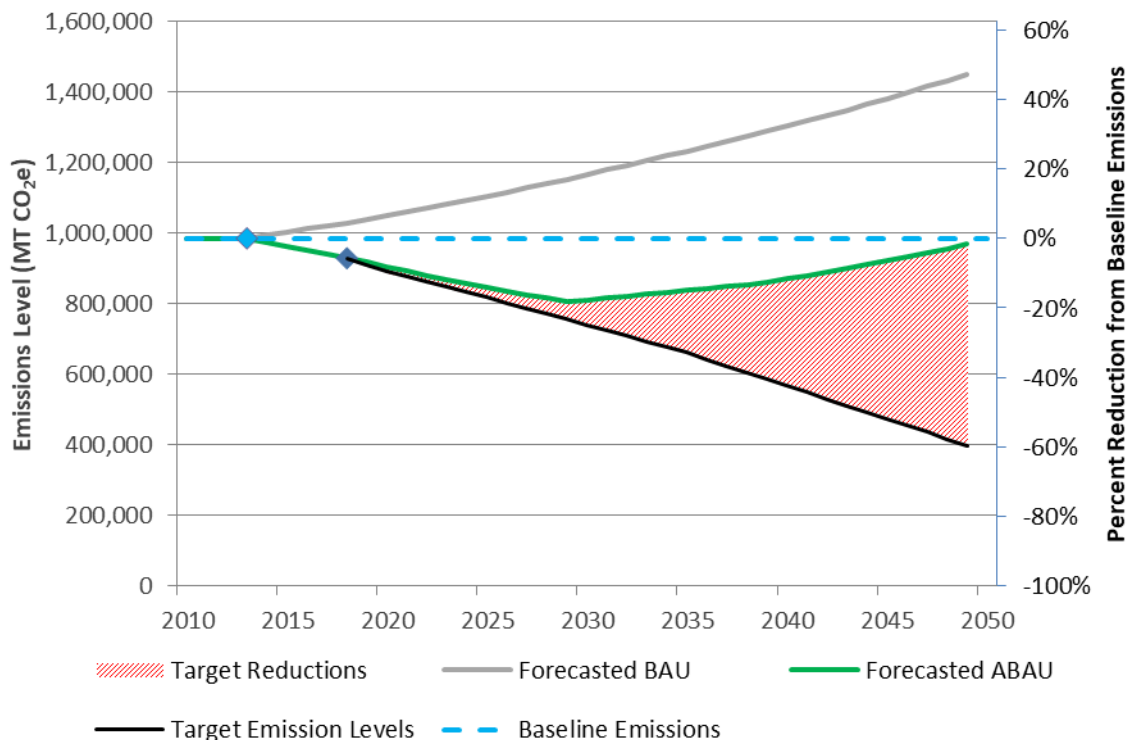


Figure ES-3 Community Emissions Inventory, Forecast, and Targets

## Reduction Measures

Due to ongoing efforts by the City, as well as state and federal programs, the City has achieved emission levels of 5.8 MT CO<sub>2</sub>e per capita. Continued implementation of existing programs is anticipated to result in emission levels of approximately 4.4 MT CO<sub>2</sub>e per capita by 2030. Thus, the City is already well positioned to achieve emission levels consistent with state-aligned targets through 2030. However, growth in population, employment, and vehicle use would result in increased emissions beyond 2030, and without additional reduction measures local emissions would exceed state-aligned targets beyond 2037. **Figure ES-4**, below, illustrates the near-term emission reductions that would be achieved by CAP reduction measures. As **Figure ES-4** shows, without additional reduction measures (i.e., beyond those specified in the CAP), local emissions begin to trend upward around 2030. Meanwhile, state-aligned reduction targets become more aggressive, resulting in a significant gap between these targets and local emission levels. It will thus be necessary for the City to redouble its emission reduction efforts in the years ahead—particularly if future federal and state actions do not produce significant emissions reduction.

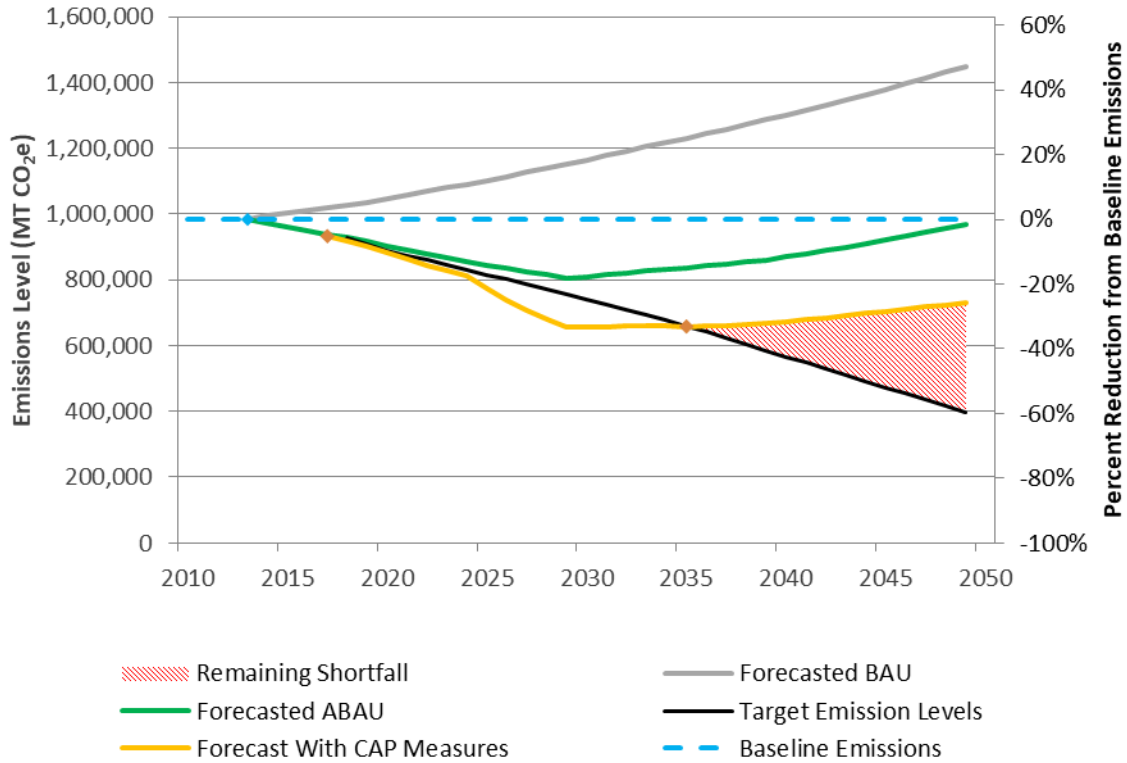


Figure ES-4 Reduced Community Emissions Forecast

## Implementation

The Oceanside CAP itself will not achieve the above-noted emission reduction targets. The CAP must be implemented through a variety of concrete actions, and regular monitoring must be performed to ensure policies and programs are functioning as they were intended. The Implementation Chapter of the CAP outlines an implementation timeline, departmental responsibilities, potential funding sources, and monitoring requirements. The six key components of implementation are summarized in **Figure ES-5**, below.



Figure ES-5 Key Components of Implementing the Oceanside Climate Action Plan

# 01 | Introduction



# Chapter 1 Introduction

The City of Oceanside (City) is committed to continuing to provide a high quality of living in a way that supports sustainable land use patterns, healthy living, and community character. By using energy more efficiently, harnessing renewable energy to power buildings, reducing, reusing, recycling, and composting waste, conserving water, and enhancing access to sustainable transportation modes, the City can keep dollars in its local economy, create new green jobs, and improve residents’ quality of life in sustainable ways. To that end, the City has implemented a number of sustainability and conservation efforts through the Green Oceanside Campaign. The City seeks to continue these efforts in partnership with the local community and regional groups. The Climate Action Plan (CAP) integrates the City’s past and current greenhouse gas (GHG) reduction efforts with additional measures that seek to balance GHG reduction with other priorities, including quality of life, economic development, and fiscal responsibility.

PURPOSE
<p>The Oceanside CAP has three primary purposes:</p> <ol style="list-style-type: none"><li>1. Present the City’s plan for achieving sustainability by utilizing resources effectively and reducing GHG emissions.</li><li>2. Provide a framework for the City to effectively implement this CAP by promoting economic competitiveness, obtaining funding for program implementation, and tracking and monitoring the progress of CAP implementation over time.</li><li>3. Streamline environmental review of future development.</li></ol>

## Climate Change Science

The term “climate” refers to the meteorological patterns in an area such as average seasonal temperatures, precipitation, and wind patterns. Climate is generally defined as the “average weather” over at least a three-decade period (U.S. Environmental Protection Agency [EPA] 2017). Whereas “weather” refers to changes in temperatures, precipitation, and wind patterns from day to day, climate may remain relatively constant over long-periods, even several millennia.

Global climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind. While the effects of climate change vary regionally, the primary effect of global climate change has been a rise in average global tropospheric temperature of 0.07 degrees Celsius per decade since 1880 and an average rate of 0.17 degrees Celsius per decade since 1970 (National Oceanic & Atmospheric Administration [NOAA] 2017a). Climate change modeling based on year 2000 emissions rates shows that further warming is likely to occur, which would induce further changes in the environment within the current century.

These climate changes are occurring due to the “greenhouse effect,” which is an atmospheric process wherein incoming solar energy is trapped in the earth’s atmosphere, similar to the glass walls of a greenhouse capture solar energy; gases that contribute to this greenhouse effect are called GHGs. A visual representation of the greenhouse effect is shown in **Figure 1**.

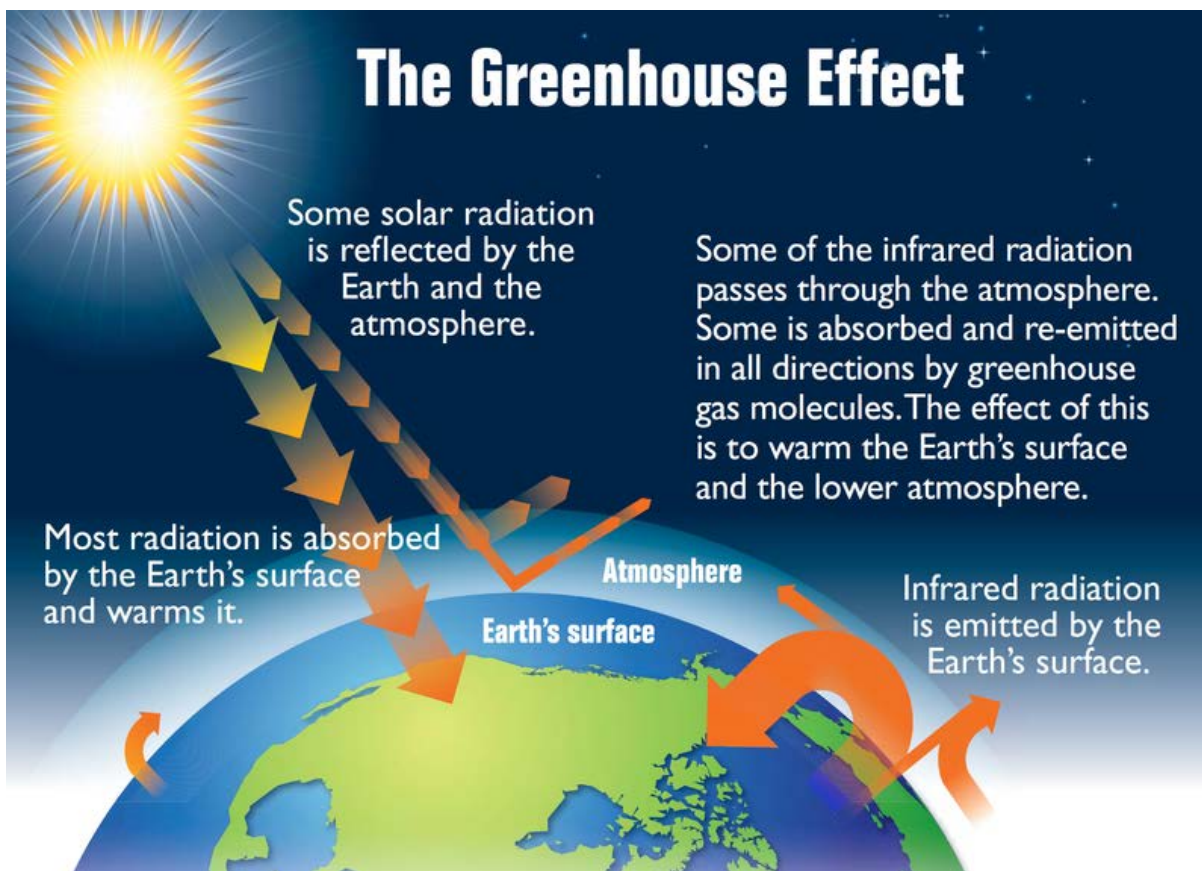


Image Source: Climate Change Indicators in the United States, Second Edition (U.S. EPA 2012).

**Figure 1 The Greenhouse Effect**

Human-generated GHGs from transportation, energy production, and industry have raised the concentration of carbon dioxide (CO<sub>2</sub>) in the atmosphere from an estimated 280 parts per million (ppm) in pre-industrial times, to approximately 350 ppm in 1990, 379 ppm in 2005, and 406 ppm in February 2016 (NOAA 2017b). GHG are generated from both natural processes and human activity. Human-generated GHGs are thought to have significantly contributed to the changes in the global atmospheric concentrations since the beginning of the industrial age. These relatively recent increases in human-generated GHG emissions are largely the result of increasing energy consumption, particularly through the combustion of fossil fuels.

Different GHGs have varying amounts of time that they remain stable in the atmosphere (i.e. atmospheric lifetime) and a varying capacity to trap heat in the atmosphere (i.e. global warming potential [GWP]). Most GHGs have long atmospheric lifetimes, staying in the atmosphere hundreds or thousands of years. GWP is reported as a unitless factor representing the potential for the gas to affect global climate relative to the potential of CO<sub>2</sub> over a period of time. The GWP of a GHG is related to its

atmospheric lifetime as well as many other factors such as the chemical reactivity of the GHG. For example, although methane (CH<sub>4</sub>) has a shorter atmospheric lifetime than CO<sub>2</sub>, it has a 100-year GWP of 28; this means that CH<sub>4</sub> has 28 times more effect on global warming than CO<sub>2</sub> over a 100-year period. Emissions GHGs are generally reported in metric tons (MT) of CO<sub>2</sub> equivalents (CO<sub>2</sub>e); where CO<sub>2</sub>e is calculated using the mass emissions of an individual GHG multiplied by its GWP. The CO<sub>2</sub>e metric provides a consistent methodology for comparing the potential of GHG emissions to contribute to global climate change. It should be noted, the GWP of certain gases have been adjusted over time as greater understanding of the effects on global warming is gained. This CAP reports CO<sub>2</sub>e using the 100-year GWP Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, which is consistent with the reporting methodology used by the California Air Resources Board (ARB) in the development of the 2017 Scoping Plan (IPCC 2014, California ARB 2017a).

The three most prevalent GHGs, CO<sub>2</sub>, CH<sub>4</sub>, and nitrous oxide (N<sub>2</sub>O) are emitted by many common activities, such as on-road travel, and consequently represent over 96 percent of the GHG emissions in California (California ARB 2017a). These GHGs are reported in this CAP as further described below.

**Carbon Dioxide (CO<sub>2</sub>)** is the most important anthropogenic GHG and accounts for more than 75 percent of all GHG emissions caused by humans. Because CO<sub>2</sub> is the reference gas for establishing GWP, by definition its GWP is 1. The primary sources of human-generated CO<sub>2</sub> 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).

**Methane (CH<sub>4</sub>)** is the second most abundant GHG and has a GWP of 28. The atmospheric lifetime of methane is relatively short (12 years). Methane is the main component of natural gas. Sources of human-generated emissions of CH<sub>4</sub> include using natural gas, burning fossil fuels, landfill outgassing, certain agricultural practices, and mining coal.

**Nitrous Oxide (N<sub>2</sub>O)** is a powerful GHG, with an atmospheric lifetime of 121 years and a GWP of 298. Human-generated sources of N<sub>2</sub>O include combustion of fossil fuels, agricultural processes (e.g., fertilizer application), and nylon production. In the United States, more than 70 percent of N<sub>2</sub>O emissions are related to agricultural soil management practices, particularly fertilizer application.

Other GHGs include numerous perfluorocarbons (PFC), sulfur hexafluoride (SF<sub>6</sub>), and hydrofluorocarbons (HFC). These GHGs are emitted in extremely small quantities by certain industrial processes, however may have GWPs in the order of the tens of thousands. These “high-GWP gases” are subject to specific California ARB regulations.

## Local Implications of Climate Change

Although climate change is anticipated to affect all areas of the planet, there are numerous implications of direct importance to California. Statewide average temperatures are anticipated to increase by between 4.7 and 10.5 degrees Fahrenheit by 2100 (California Energy Commission [CEC] 2006). Impacts of global warming in California will include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, increased magnitude and frequency of wildfires, and more drought years (California ARB 2017a). Several recent studies have explored the possible negative consequences that climate change, left unchecked, could have in California. The CEC recently developed the Cal-Adapt

website that provides a synthesis of existing California climate change scenarios based on input from the state’s scientific and research community. Based on generalized projections, climate change impacts in Oceanside will include reduced air quality, diminished water supplies, higher seasonal temperatures (including more extreme heat days), sea level rise, and potential loss of protected species and habitats (California ARB 2017a).

## Benefits of the Climate Action Plan

This CAP benefits the City in many direct and indirect ways.

- **Local Control**—This CAP 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 CAP 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 CAP 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, which are 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 to demonstrate that the City is aligned with state goals for reducing GHG emissions to a level considered less than cumulatively considerable.
- **Meet California Environmental Quality Act Requirements**—The California Environmental Quality Act (CEQA) requires impacts from GHG emissions to be reviewed for discretionary projects (such as proposed development projects). This CAP will serve as a Qualified GHG Reduction Strategy consistent with CEQA Guidelines. Environmental review will be simplified; and future development within Oceanside that is consistent with the guidance contained herein would not substantially contribute to global climate change.

## Regulatory Setting

In response to rising concern associated with increasing GHG emissions and global climate change impacts, several plans and regulations have been adopted at the international, national, and state levels with the aim of reducing GHG emissions. International, federal, and state actions to stabilize GHG emissions and reduce impacts associated with climate change have been 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

### United States Environmental Protection Agency

The U.S. EPA provides technical expertise and encourages voluntary reductions from the private sector. One of the voluntary programs is the Energy Star program, a joint program of U.S. EPA and the U.S. Department of Energy, which promotes energy-efficient products and practices. Tools and initiatives include the Energy Star Portfolio Manager, which helps track and assess energy and water consumption across an entire portfolio of buildings, and the Energy Star Most Efficient, which provides information on exceptional products that represent the leading edge in energy-efficient products.

### Corporate Average Fuel Economy Standards

The federal Corporate Average Fuel Economy standards determine the fuel efficiency of certain vehicle classes in the U.S. Current Corporate Average Fuel Economy standards require vehicle manufacturers of passenger cars and light-duty trucks to achieve an average fuel economy of 35.5 miles per gallon by 2016 (Phase I) and an average fuel economy of 54.5 miles per gallon by 2025 (Phase II). With improved gas mileage, fewer gallons of transportation fuel would be combusted to travel the same distance, thereby reducing nationwide GHG emissions associated with vehicle travel.

On April 13, 2018, the U.S. EPA issued the *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model year 2022-2025 Light-duty Vehicles* notice. The U.S. EPA notice stated that assumptions of the previous Corporate Average Fuel Economy determination for Phase II standards have significantly changed and that the current standards will remain in effect while the U.S. EPA initiates a rulemaking process to further consider appropriate standards (U.S. EPA 2018). Following a legal challenge by a coalition of 16 states, the U.S. Court of Appeals for the Second Circuit issued an April 23, 2018 ruling that overturned the U.S. EPA notice (U.S. Court of Appeals 2018).

## State

### California Air Resources Board

The California ARB, a part of the California 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, the California ARB conducts research, sets the California Ambient Air Quality Standards, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. The California ARB establishes emissions standards for motor vehicles sold in California, consumer products, and various types of commercial equipment.

### State GHG Emission Reduction Targets

#### EXECUTIVE ORDER S-3-05

On June 1, 2005, California Governor Arnold Schwarzenegger announced through Executive Order (EO) 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

## **ASSEMBLY BILL 32—THE CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006**

Assembly Bill 32 requires the California ARB to reduce statewide GHG emissions to 1990 levels by 2020. As part of this legislation, the California ARB 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 to 2008 levels by 2020.

### **EXECUTIVE ORDER B-30-15**

On April 29, 2015, California Governor Jerry Brown announced through EO B-30-15, the following Interim 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.

## **SENATE BILL 32—CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006**

Approved in September 2016, Senate Bill (SB) 32 updates the California Global Warming Solutions Act of 2006. Under SB 32, the state would reduce its GHG emissions to 40 percent below 1990 levels by 2030. In implementing the 40 percent reduction goal, the California ARB is required to prioritize emissions reductions to consider the social costs of the emissions of GHGs; where “social costs” is defined as “an estimate of the economic damages, including, but not limited to, changes in net agricultural productivity; impacts to public health; climate adaptation impacts, such as property damages from increased flood risk; and changes in energy system costs, per metric ton of [GHG] emission per year.”

### **Climate Change Scoping Plan**

As directed by the California Global Warming Solutions Act of 2006, in 2008, the California ARB adopted the *Climate Change Scoping Plan: A Framework for Change* (Original Scoping Plan). The California ARB has periodically revised GHG emissions forecasts and prepared supplemental revisions to the Original Scoping Plan. The Original Scoping Plan identified focus areas comprising major components of the state’s economy to evaluate and describe the larger transformative actions that will be needed to meet the state’s GHG emission reduction targets. The Original Scoping Plan described local jurisdictions as “essential partners” in achieving the state’s emission reduction targets. Guidance in the Initial State Scoping Plan was for local governments to “reduce [GHG] emissions by 15 percent from current levels [2005 to 2008] by 2020. On a per-capita bases that means reducing annual emissions of 14 tons of carbon dioxide equivalent for every man, woman and child in California down to about 10 tons per person by 2020” (California ARB 2008).

In 2014, the California ARB adopted the comprehensive *First Update to the Climate Change Scoping Plan: Building on the Framework* (First Update to the Scoping Plan). The First Update to the Scoping Plan “. . . highlights California’s success to date in reducing its GHG emissions and lays the foundation for establishing a broad framework for continued emission reductions beyond 2020” (California ARB 2014).

In November 2017, the California ARB released *The 2017 Climate Change Scoping Plan Update, The Strategy for Achieving California's 2030 Greenhouse Gas Target* (2017 Scoping Plan). Measures under the 2017 Scoping Plan Scenario build-on existing programs such as Low Carbon Fuel Standard, Advanced Clean Cars Program, Renewable Portfolio Standards (RPS), Sustainable Communities Strategy, Short-Lived Climate Pollutant Reduction Strategy, and the Cap-and-Trade Program. Additionally the 2017 Scoping Plan proposes new strategies to reduce GHG emissions from natural and working lands. The 2017 Scoping Plan identifies State strategy for achieving the State's 2030 Interim GHG emission reductions target codified by SB 32. Guidance from the 2017 Scoping Plan calls for local governments to achieve emissions “of no more than six metric tons CO<sub>2</sub>e per capita by 2030 and no more than two metric tons CO<sub>2</sub>e per capita by 2050” (California ARB 2017a).

### **Assembly Bill 1493, Clean Car Standards**

Known as “Pavley I,” AB 1493 standards were the nation’s first GHG standards for automobiles. AB 1493 requires the California ARB to adopt vehicle standards that will lower GHG emissions from new light-duty autos to the maximum extent feasible. Additional strengthening of the Pavley standards (referred to previously as “Pavley II,” now referred to as the “Advanced Clean Cars Program”), adopted in 2012, is applicable for vehicle model years 2017 to 2025.

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

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 for transportation fuels be established in California.

### **Senate Bill 375, Sustainable Communities Strategy**

SB 375, the 2008 Sustainable Communities and Climate Protection Act, provides for a new planning process that coordinates land use planning, regional transportation plans, and funding priorities to help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans developed by metropolitan planning organizations (MPOs) to incorporate a Sustainable Communities Strategy in their plans. The goal of the Sustainable Communities Strategy 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.

### **Renewable Portfolio Standard**

The RPS requires energy providers to derive 33 percent of their electricity from qualified renewable sources by 2020 and 50 percent of their energy from qualified renewable sources by 2030. This is anticipated to lower emission factors (i.e., fewer GHG emissions per kilowatt-hour used) from utilities across the state.

### **California Code of Regulations Title 24, Parts 6 & 11**

California Code of Regulations (CCR), Title 24, Part 6 is the Energy Efficiency Standards or California Energy Code (Energy Code). CCR Title 24, Part 11 is the California Green Building Standard Code or CalGreen. These codes, originally enacted in 1978, establish energy-efficiency and green building standards for residential and non-residential buildings in order to reduce California’s energy

consumption, water use, and waste generation. New construction and major renovations must demonstrate their compliance with the current Energy Code and CalGreen through submission and approval of a Title 24 Compliance Report to the local building permit review authority and the CEC. By reducing California's energy consumption, water use, and waste generation, statewide GHG emissions may also be reduced. The Energy Code and CalGreen are updated periodically to incorporate and consider new energy-efficiency technologies and methodologies as they become available. The current 2016 Energy Code and 2016 CalGreen, became effective January 1, 2017. The CEC Impact Analysis for the 2016 Energy Code concludes that the 2016 Energy Code results in an 11.7 percent reduction in electricity demand and a 21.1 percent reduction in natural gas use from newly constructed single-family homes (CEC 2015b). Additionally, the 2016 Energy Code results in a 4.6 percent reduction in electricity demand and a 0.5 percent reduction in natural gas use from newly constructed non-residential buildings (CEC 2015b).

The next version of the Energy Code, known as the 2019 Energy Code, was adopted May 9 and will take effect on January 1, 2020. The 2019 Energy Code will include provisions for smart residential photovoltaic (PV) systems, updated thermal envelope standards (preventing heat transfer from the interior to exterior and vice versa), residential and nonresidential ventilation requirements, and nonresidential lighting requirements. The new Energy Code aims to reduce energy use in new homes by requiring that all new homes include individual or community solar PV systems or community shared battery storage system that achieves equivalent time-dependent value energy use reduction. Accounting for solar PV requirements, the CEC's preliminary estimates indicate that homes built under the 2019 Energy Code will result in 53 percent less energy use than those built under the 2016 standards.

### Senate Bill 1383

In September 2016, Governor Brown signed SB 1383, establishing methane emissions reduction targets in a statewide effort to reduce emissions of short-lived climate pollutants in various sectors of California's economy. As it pertains to the California Department of Resources Recycling and Recovery (CalRecycle), SB 1383 establishes targets to achieve a 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025. The law grants CalRecycle the regulatory authority required to achieve the organic waste disposal reduction targets and establishes an additional target that not less than 20 percent of currently disposed edible food is recovered for human consumption by 2025. The bill also codifies the California ARB's Short-Lived Climate Pollutant Reduction Strategy, in order to achieve reductions in the statewide emissions of short-lived climate pollutants.

### 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. CEQA Guidelines Section 15183.5 describes the criteria needed in a GHG reduction plan that would allow for the tiering and streamlining of CEQA analysis for development projects. A plan for the reduction of GHG emissions must contain the following six components to be qualified for tiering CEQA documents:

1. Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;
2. Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable;
3. Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area;
4. Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;
5. Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels; and
6. Be adopted in a public process following environmental review.

## Regional

### San Diego Association of Governments

The San Diego Association of Governments (SANDAG) is the council of governments and transportation planning agency for San Diego County and the 18 cities located within its territory. SANDAG is responsible for cooperative regional planning and furthering an efficient multi-modal transportation system countywide. As the MPO and Regional Transportation Planning Agency, SANDAG supports freeway construction projects, regional and local road improvements, train and bus transportation, railroad crossings, call boxes, ridesharing, congestion management efforts and long-term planning studies.

The California ARB is required to review and update regional SB 375 targets at least every eight years. Following the California ARB Board Hearing on March 22, 2018, the regional GHG emission reduction targets from automobiles and light duty trucks are:

- 15-percent reduction from the 2005 per capita amount by 2020
- 19-percent reduction from the 2005 per capita amount by 2035

To achieve these targets, SANDAG developed and adopted the San Diego Forward. The strategy set forth in San Diego Forward is to “focus housing and job growth in the urbanized areas where there is existing and planned infrastructure, protect sensitive habitat and open space, invest in a network that gives residents and workers transportation options that reduce GHG emissions, promote equity for all, and implement the plan through incentives and collaboration” (SANDAG 2015).

## City Setting

The City of Oceanside is a 42-square-mile community of approximately 175,000 residents, 60,000 households, and 2,900 brick-and-mortar businesses. The City of Oceanside is a coastal community in northern San Diego County. Surrounding areas include Camp Pendleton to the north and the cities of Carlsbad to the south and Vista to the east. The median age is approximately 35 years old; 24 percent of the population is younger than 18 years old and approximately 13 percent of the population is at least 65 years old. The median household income in Oceanside is approximately \$58,000 per year.

## Plan Structure

The remainder of this CAP includes the following 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 measures that will be implemented to meet the targets identified in Chapter 2.
- **Chapter 4** includes the implementation of the reduction measures, potential funding sources, and how the CAP will be monitored and updated over time.

# 02 | Emissions Inventory, Forecast, and Targets



# Chapter 2 Emissions Inventory, Forecast, and Targets

## GHG Emissions Inventory

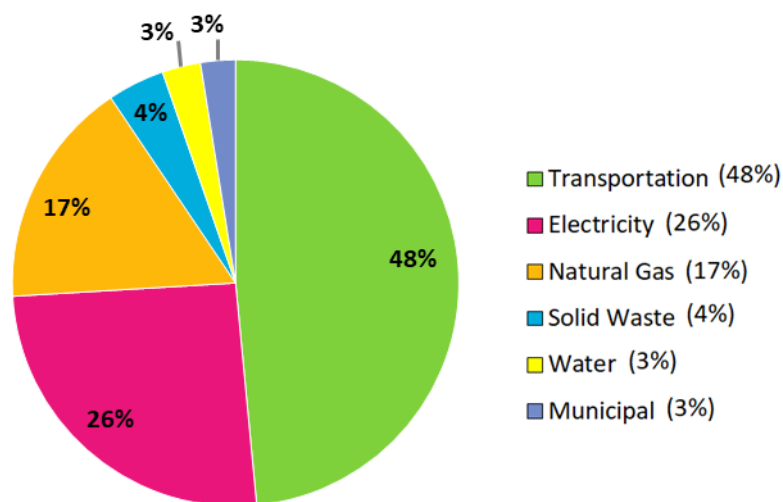
GHG emissions inventories are the foundation of planning for future emissions reductions. Establishing an inventory of emissions helps to identify and categorize the major sources of emissions produced over a single calendar year. The Community Inventory identifies GHG emissions that result from the activities of residents and businesses in the City. The Community Inventory accounts for GHG emissions generated within the City and many indirect GHG emissions that occur outside the City that result from community activities (e.g., electricity generation). Emissions not accounted for in the Community Inventory include upstream emissions inherently associated with production of food and goods, marginal emissions associated with certain agricultural processes, and the community’s contribution to regional shipping, airfare, and rail freight. The Municipal Inventory identifies GHG emissions that result from government operations in the City and are a subset of the Community Inventory.

The City prepared Community and Municipal Inventories for the year 2013, which will now serve as the GHG emissions baseline against which future inventories may be compared. Detailed GHG inventory reports prepared by the Energy Policy Initiatives Center of the University of San Diego and the CivicSpark Americorps Program are included as Appendix A and Appendix B. The emission sources evaluated in the inventories are provided in **Table 1**, below.

Table 1 Community and Municipal Sources Evaluated in the Inventories	
<ul style="list-style-type: none"> <li>■ Electricity</li> <li>■ Natural Gas</li> <li>■ On-road Transportation</li> <li>■ Waste</li> <li>■ Water</li> <li>■ Wastewater</li> </ul>	<ul style="list-style-type: none"> <li>■ Building and Facilities</li> <li>■ Vehicle Fleet</li> <li>■ Water and Wastewater</li> <li>■ Employee Commute</li> <li>■ Street Lights</li> <li>■ Solid Waste</li> </ul>

## Baseline Year (2013) Community Emissions Summary

The Community Inventory includes the GHG emissions that result from activities within the community, including municipal operations. In the baseline year (2013), the community produced 984,012 MT CO<sub>2</sub>e emissions. As shown in **Figure 2** and **Table 2**, below, the on-road transportation sources accounted for the greatest percentage of emissions, contributing 48 percent (477,178 MT CO<sub>2</sub>e) of the community’s emissions. Electricity use contributed over a quarter (approximately 26 percent) of the community’s emissions, producing 256,070 MT CO<sub>2</sub>e. Natural gas use contributed approximately 16 percent of the community’s emissions, producing 162,447 MT CO<sub>2</sub>e. The remaining sources (solid waste, water and wastewater, municipal) accounted for about 9 percent of total emissions.



**Figure 2** Community GHG Emissions by Source for the Baseline Year (2013)

Source	Activity	Emissions (MT CO <sub>2</sub> e)	Percent of Inventory
Transportation	1,014,698,962 VMT	477,178	48.5%
Electricity	675,419,693 kWh	251,524	25.6%
Natural Gas	3,072,959 MMBtu	162,447	16.5%
Solid Waste	120,718 tons	40,615	4.1%
Water*	18,736 Million Gallons	27,420	2.8%
Municipal	Municipal Operations	24,828	2.5%
<i>Municipal Water Facilities</i>	<i>Community Water Treatment &amp; Distribution</i>	7,767	-
<i>Municipal Wastewater Facilities</i>	<i>Community Wastewater Treatment</i>	3,999	-
<b>Total</b>	-	<b>984,012</b>	<b>100.0%</b>

\* Emissions associated with water and wastewater treatment at City-operated facilities were accounted for as Municipal emissions. Water emissions include upstream emissions from import of water to the City.

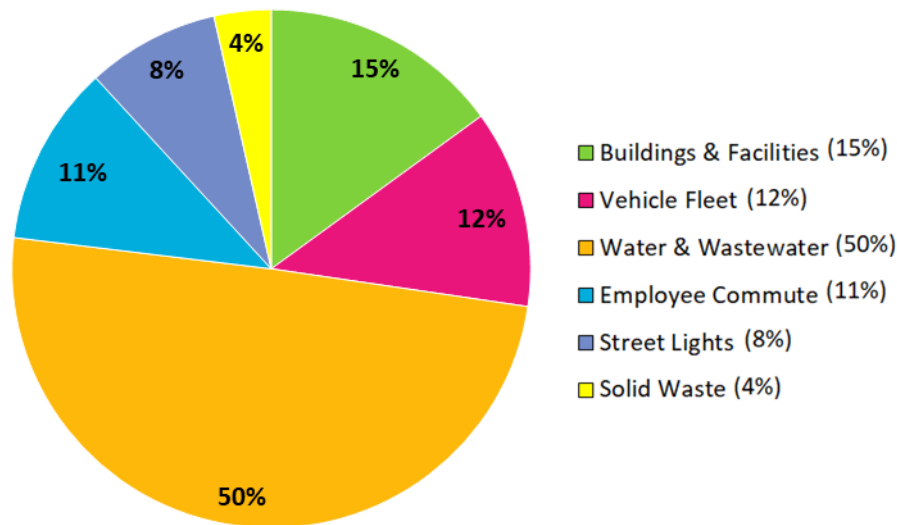
## Baseline Year (2013) Municipal Emissions Summary

The Municipal Inventory is a subset of the Community Inventory. The Municipal Inventory includes emissions from activities conducted as part of government operations in the City.

The City’s municipal emissions were 24,828 MT CO<sub>2</sub>e in 2013, which represents 2.5 percent of the total community emissions. As shown in **Figure 3** and **Table 3** below, the water and wastewater emissions accounted for the greatest percentage of emissions, contributing 50 percent (12,313 MT CO<sub>2</sub>e) of the emissions. At 15 percent (3,720 MT CO<sub>2</sub>e), building and facilities energy use is the second largest source of emissions in 2013, followed by vehicle fleet at 12 percent (3,066 MT CO<sub>2</sub>e), employee commute at 11 percent (2,793 MT CO<sub>2</sub>e), street lights at 8 percent (2,054 MT CO<sub>2</sub>e), and solid waste at 4 percent (882 MT CO<sub>2</sub>e).

**Municipal Emissions**

Municipal emissions account for 2.5% 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.



**Figure 3** Municipal GHG Emissions by Source for the Baseline Year (2013)

Table 3 Municipal GHG Emissions by Source for the Baseline Year (2013)		
Source	Emissions (MT CO <sub>2</sub> e)	Percent of Inventory
Water & Wastewater*	12,313	49.6%
Building & Facilities	3,720	15.0%
Vehicle Fleet	3,066	12.3%
Employee Commute	2,793	11.2%
Street Lights	2,054	8.3%
Solid Waste	882	3.6%
Total	24,828	100.0%

\* Water and wastewater includes 7,767 MT CO<sub>2</sub>E for water treatment, 3,999 MT CO<sub>2</sub>E for wastewater treatment, and 547 MT CO<sub>2</sub>E of other unspecified Water Utilities Department energy use.

## Inventory Forecast

Forecasting future GHG emissions allows the City to understand the variables that will affect emissions in the future. Increases in population, employment, and vehicle miles traveled may affect how to best plan to reduce emissions in the future. GHG emissions are initially forecasted under two conditions: a BAU and an Adjusted BAU, or ABAU, condition. The BAU condition reflects projected growth in population, employment, and automotive use and does not consider policies that will reduce emissions in the future (i.e., the policies and related efficiency levels in place in 2013 are assumed to remain constant through 2050).

The Adjusted BAU condition describes emissions based on projected growth and considers state programs that will achieve GHG reductions in the future. State programs, described in the Regulatory Setting section of Chapter 1, include state-adopted or approved legislation that will affect future emissions such as California’s Advanced Clean Cars Program, the California Energy Code, and RPS. By evaluating the two conditions, the City is able to see the effect that existing policies may have on future emissions and thus be better informed about how local actions can provide additional emissions reductions.

Projected growth is estimated using data from regional planning scenarios developed by SANDAG with input from the City. Growth forecasts and associated emissions calculation methods are detailed in the GHG Inventory Report located in Appendix A. The City is expecting growth in population, employment, and vehicle miles traveled during the forecast period. The City also expects growth in its municipal services. **Table 4** below shows the growth projections used to develop the emissions forecasts.

**Table 4 Growth Indicators for 2013, 2020, 2030, 2035 and 2050**

Community Sector	Growth Indicator	2013	2020	2030	2035	2050
Residential Energy Solid Waste Water & Wastewater	Population	170,361	177,840 (+4%)	184,941 (+9%)	188,597 (+11%)	189,377 (+11%)
Commercial Energy	Commercial Employment	30,030	34,647 (+15%)	45,206 (+51%)	51,637 (+72%)	76,958 (+156%)
Industrial Energy	Industrial Employment	6,002	7,685 (+28%)	10,561 (+76%)	12,380 (+106%)	19,945 (+232%)
Transportation	Vehicle Miles Traveled	1,014,698,962	1,058,495,996 (+4%)	1,118,974,444 (+10%)	1,150,497,401 (+13%)	1,250,495,302 (+23%)
Municipal Source	Growth Indicator	2013	2020	2030	2035	2050
Buildings & Facilities Employee Commute Vehicle Fleet Solid Waste Facilities	Municipal Employment	840	940 (+12%)	1,147 (+37%)	1,266 (+51%)	1,704 (+103%)
Water & Wastewater Street Lights	Population	170,361	177,840 (+4%)	184,941 (+9%)	188,597 (+11%)	189,377 (+11%)

Forecasts are made for several milestone years: 2020, 2030, 2035, and 2050. The 2020 forecast year parallels the goals identified in AB 32, which identifies a statewide GHG reduction target by 2020. The 2030 forecast year parallels the goals identified in SB 32, which establishes a statewide GHG reduction target by 2030. The 2035 forecast year corresponds to the horizon year of the City's General Plan. The 2050 forecast year parallels the goals identified in Executive Order S-03-05, which establishes a statewide GHG reduction target by 2050.

## Community Forecasts

### Community BAU Forecast

Under the BAU condition, projected emissions scale with the community's projected growth in population, employment, and vehicle miles traveled. The community's BAU emissions in 2020 are estimated to be 1,047,245 MT CO<sub>2</sub>e (5.9 MT CO<sub>2</sub>e per capita), or 6.4 percent above the baseline level. By 2030, emissions are estimated to increase to 18.3 percent above the baseline level to 1,164,466 MT CO<sub>2</sub>e (6.3 MT CO<sub>2</sub>e per capita). By 2035, emissions are estimated to increase to 25.2 percent above the baseline level to 1,231,500 MT CO<sub>2</sub>e (6.5 MT CO<sub>2</sub>e per capita). By 2050, emissions are estimated to increase to 47.3 percent above the baseline level to 1,449,240 MT CO<sub>2</sub>e (7.7 MT CO<sub>2</sub>e per capita) (**Figure 4** and **Table 5**, below).

### Community Adjusted BAU Forecast

Under the Adjusted BAU condition, projected emissions also scale with the community's projected growth in population, employment, and vehicle miles traveled. However, the Adjusted BAU condition also accounts for state and federal regulations, notably vehicle emission regulations that increase fuel efficiency and thereby reduce emissions. The community's Adjusted BAU emissions are anticipated to decrease through 2030, at which point they are estimated to be 810,293 MT CO<sub>2</sub>e (4.4 MT CO<sub>2</sub>e per capita), or 17.7 percent below the baseline level. Existing California Renewable Portfolio Standard mandates do not extend beyond 2030. Subsequent to 2030, the City's Adjusted BAU emissions show an increasing emissions trend as growth in the residential, commercial, and industrial energy sectors emissions outpace transportation reductions achieved by Clean Cars Programs.

By 2050, emissions are estimated to increase to 1.7 percent below the baseline level to 967,458 MT CO<sub>2</sub>e (5.1 MT CO<sub>2</sub>e per capita) (**Figure 4** and **Table 6**, below).

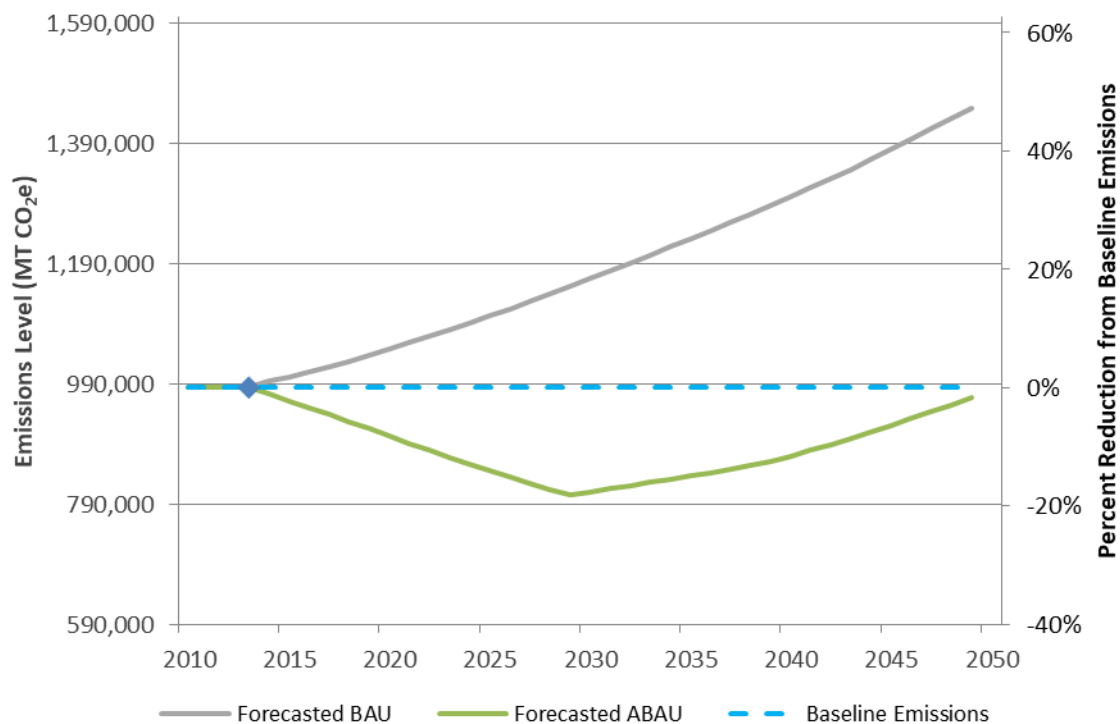


Figure 4 Community BAU and Adjusted BAU Emissions

Table 5 Community BAU

Sector	BAU MT CO <sub>2</sub> e					
	2013	2020	2030	2035	2040	2050
Residential Energy	222,963	229,668	238,839	242,675	243,009	243,611
Commercial Energy	159,370	185,470	241,992	276,417	315,739	401,146
Industrial Energy	41,957	53,453	73,459	86,116	100,953	134,395
Transportation	483,037	499,795	528,352	543,237	558,541	587,184
Solid Waste	41,498	42,614	44,131	44,757	44,348	44,458
Water & Wastewater	35,187	36,245	37,693	38,298	38,351	38,446
Total	984,012	1,047,245	1,164,466	1,231,500	1,300,941	1,449,240

Table 6 Community Adjusted BAU

Sector	Adjusted BAU MT CO <sub>2</sub> e					
	2013	2020	2030	2035	2040	2050
Residential Energy	222,963	207,587	187,422	188,533	188,624	188,789
Commercial Energy	159,370	162,721	179,404	204,180	232,209	293,089
Industrial Energy	41,957	45,345	49,922	58,193	67,743	89,268
Transportation	483,037	415,229	323,975	315,553	310,627	325,907
Solid Waste	41,498	42,614	44,131	44,757	44,348	44,458
Water & Wastewater	35,187	30,592	25,439	25,848	25,883	25,947
Total	984,012	904,088	810,293	837,064	869,434	967,458

As reflected in the difference between Table 5 and 6, California Renewable Portfolio Standard mandates and Energy Code requirements result in an approximate 25 percent reduction in the Adjusted BAU emissions from the residential, commercial, industrial energy sectors by 2030. California Renewable Portfolio Standards also result in a 33 percent reduction to the water and wastewater sector by 2030 as it reduces emissions associated with energy used to treat and distribute water. Vehicle efficiency regulations such as the Clean Cars Program result in an approximate 44 percent reduction in Adjusted BAU transportation emissions by 2050.

## Municipal Forecasts

### Municipal BAU Forecast

The City's municipal BAU emissions in 2020 are estimated to be 26,638 MT CO<sub>2</sub>e, or a 7.3 percent increase from baseline emissions. By 2030, emissions are estimated to increase to 20.7 percent above the baseline level to 29,964 MT CO<sub>2</sub>e. By 2035, emissions are estimated to increase to 28.1 percent above the baseline level to 31,808 MT CO<sub>2</sub>e. By 2050, emissions are estimated to increase to 50.4 percent above the baseline level to 37,329 MT CO<sub>2</sub>e (**Figure 5** and **Table 7**, below).

### Municipal Adjusted BAU Forecast

The municipal Adjusted BAU emissions are anticipated to decrease through 2030, at which point they are estimated to be 21,979 MT CO<sub>2</sub>e, or an 11.5 percent from the baseline level. Existing state Renewable Portfolio Standard mandates do not extend beyond 2030. Subsequent to 2030, the City's Adjusted BAU emissions show an increasing emissions trend as growth in the buildings and facilities energy use, water and wastewater, and street light emissions outpace vehicle fleet and employee commute reductions achieved by Clean Cars Programs. By 2050, emissions are estimated to increase to 6.7 percent above the baseline level, 26,500 MT CO<sub>2</sub>e (**Figure 5** and **Table 8**, below).

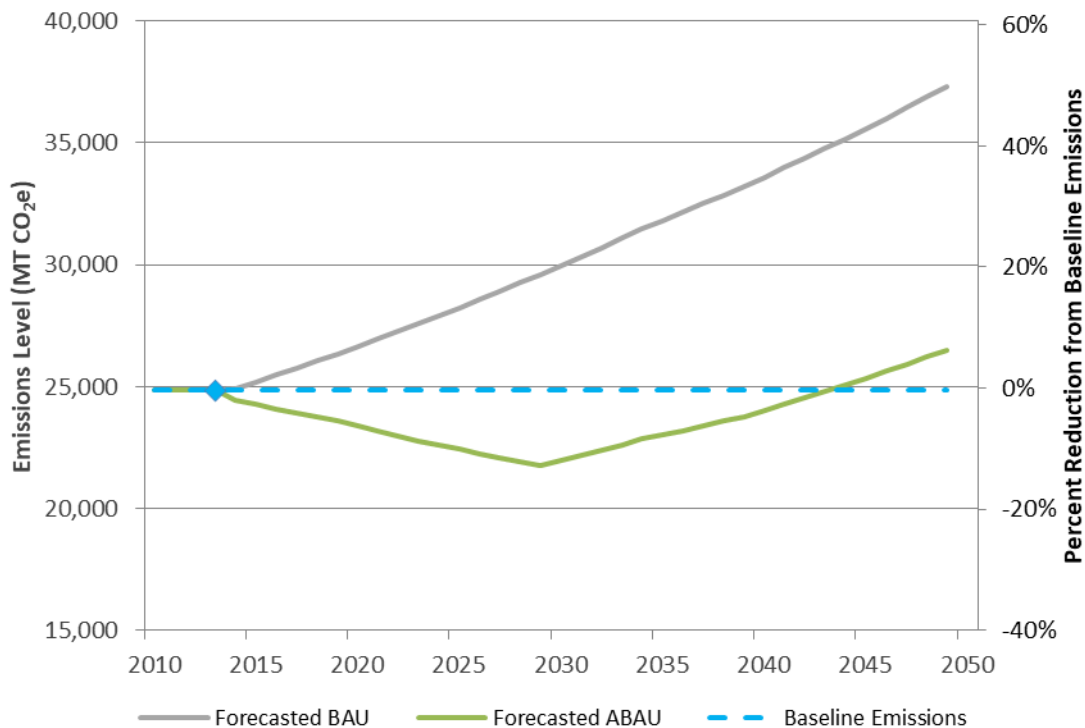


Figure 5 Municipal BAU and Adjusted BAU Emissions

Table 7 Municipal BAU						
Source	BAU MT CO <sub>2</sub> e					
	2013	2020	2030	2035	2040	2050
Building & Facilities	3,720	4,210	5,182	5,750	6,380	7,692
Vehicle Fleet	3,066	3,470	4,272	4,739	5,258	6,340
Water & Wastewater	12,313	12,683	13,190	13,401	13,420	13,453
Employee Commute	2,793	3,161	3,891	4,318	4,790	5,776
Street Lights	2,054	2,116	2,200	2,236	2,239	2,244
Solid Waste	882	998	1,229	1,364	1,513	1,824
<b>Total</b>	<b>24,828</b>	<b>26,638</b>	<b>29,964</b>	<b>31,808</b>	<b>33,600</b>	<b>37,329</b>

Table 8 Municipal Adjusted BAU						
Source	Adjusted BAU MT CO <sub>2</sub> e					
	2013	2020	2030	2035	2040	2050
Building & Facilities	3,720	3,657	3,764	4,177	4,634	5,587
Vehicle Fleet	3,066	2,957	2,829	3,005	3,220	3,877
Water & Wastewater	12,313	11,386	10,378	10,545	10,559	10,585
Employee Commute	2,793	2,626	2,386	2,508	2,664	3,206
Street Lights	2,054	1,744	1,393	1,416	1,418	1,421
Solid Waste	882	998	1,229	1,364	1,513	1,824
<b>Total</b>	<b>24,828</b>	<b>23,368</b>	<b>21,979</b>	<b>23,015</b>	<b>24,008</b>	<b>26,500</b>

As reflected in the difference between Table 7 and 8, California Renewable Portfolio Standard mandates result in an approximate 21 to 37 percent reduction in the BAU emissions from the streetlights, building and facility energy use, and water and wastewater treatment and distribution between 2013 and 2030. Vehicle efficiency regulations such as the Clean Cars Program result in approximate 40 and 44 percent reductions in BAU emissions from the municipal vehicle fleet and employee commute between 2013 and 2050.

## GHG Emissions Targets

As discussed in Chapter 1, state GHG reduction efforts were initiated by EO S-3-05 in 2005. The EO established a 2050 GHG emissions target that “represents the level of greenhouse gas emissions that advanced economies must reach if the climate is to be stabilized in the latter half of the 21st century” (California ARB 2008). The EO also established a 2020 GHG emissions target goal “to be an aggressive, but achievable, mid-term target” (California ARB 2008). The 2020 target was codified by the State Legislature as AB 32.

A decade later, EO B-30-15 established an additional interim 2030 GHG emissions target “in order to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050.” The 2030 target was codified by the State Legislature as SB 32.

These GHG emissions targets include:

- by 2020, reduce GHG emissions to 1990 levels (431 million MT CO<sub>2</sub>e);
- by 2030, reduce GHG emissions to 40 percent below 1990 levels (260 million MT CO<sub>2</sub>e); and
- by 2050, reduce GHG emissions to 80 percent below 1990 levels.

On a per-capita basis the 2020 GHG emissions target requires that emissions be reduced to “about 10 tons per person by 2020” (California ARB 2008) and the subsequent targets require that emissions be reduced to “no more than six metric tons CO<sub>2</sub>e per capita by 2030 and no more than two metric tons CO<sub>2</sub>e per capita by 2050” (California ARB 2017).

This document establishes GHG reduction targets for 2030 that are more rigorous than the State’s six MT CO<sub>2</sub>e per capita goal. The City’s goal is to achieve GHG emission levels of four MT CO<sub>2</sub>e per capita. A 2050 target of 2.0 MT CO<sub>2</sub>e per capita is established for the City consistent with recommendations of the 2017 Scoping Plan and international agreements, such as the “Under 2 MOU,” which requires that all “signatories agree to reduce their GHG emissions to two metric tons CO<sub>2</sub>E per capita by 2050.” This is the most commonly agreed upon 2050 target and directly relates to the long term target of EO-S-05.

## Community Targets

### State-aligned Per Capita Targets

The state also has provided guidance to local jurisdictions as essential partners in achieving the state’s goals. Guidance in the Original State Scoping Plan was for local jurisdictions to “reduce [GHG] emissions by 15 percent from current levels [2005-2008] by 2020”. Newer guidance from the 2017 Scoping Plan recommends that local jurisdictions adopt plan-level GHG reduction goals “that align with the statewide per capita targets” (California ARB 2017). Thus, local jurisdictions must establish GHG emissions targets “of no more than six metric tons CO<sub>2</sub>e per capita by 2030 and no more than two metric tons CO<sub>2</sub>e per capita by 2050” (California ARB 2017).

Reduction targets consistent with current regulations and in line with state goals are shown below (“State-aligned Emissions Targets”; **Figure 6**). As shown, the City has already achieved emission levels consistent with state-aligned per capita targets for 2030. Due to ongoing efforts by the City, as well as state and federal programs, the City is forecasted to achieve emission levels consistent with state-aligned per capita targets through 2037. However, without further local action, the City would not achieve per capita emission levels consistent with the state’s 2050 GHG emissions target.

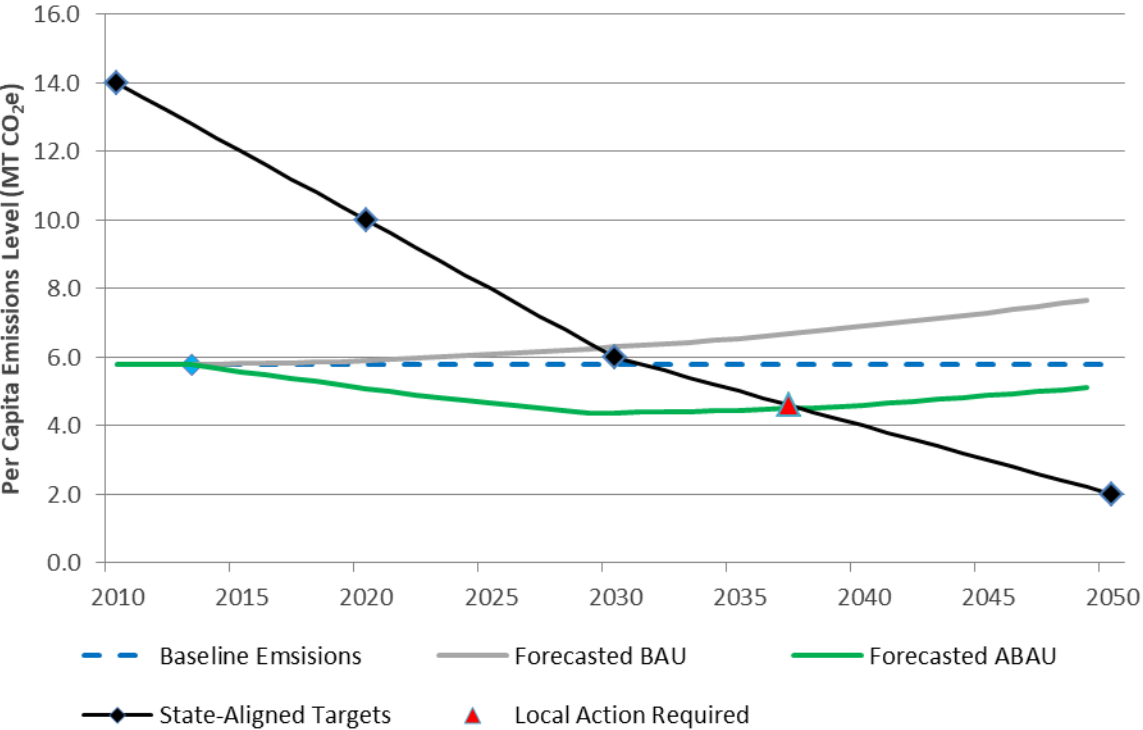


Figure 6 Community Emissions Inventory, Forecast, and Targets

**Accelerated Local Per Capita Targets**

While the City is on track to meet its state-aligned emissions reduction targets for 2020 and 2030 without additional emissions reduction measures, meeting long-term reduction targets requires aggressive action and actions taken now will better position the City to reach these long-term reduction targets.

The City has developed local GHG emissions targets that follow a linear path from baseline emission levels to the long-term per capita target of 2 MT CO<sub>2</sub>e per capita by 2050. These local GHG emissions targets include:

- by 2020, reduce GHG emissions levels to 5 MT CO<sub>2</sub>e per capita;
- by 2030, reduce GHG emissions levels to 4 MT CO<sub>2</sub>e per capita;
- by 2040, reduce GHG emissions levels to 3 MT CO<sub>2</sub>e per capita; and
- by 2050, reduce GHG emissions levels to 2 MT CO<sub>2</sub>e per capita.

In the near-term, local GHG emissions targets (“Oceanside Emissions Goals”; **Table 9** and **Figures 7 and 8**) are substantially more aggressive than state-aligned per capita targets; achieving these targets requires immediate action. Over the long-term, local GHG emissions targets gradually approach state-aligned per capita targets; continuous effort to achieve these targets will ensure that local emissions remain on a trajectory that is consistent with the state’s 2050 GHG emissions target.

Table 9 Local GHG Emissions Targets								
Metric	Emissions (MT CO <sub>2</sub> e)							
	2013	2020	2025	2030	2035	2040	2045	2050
City Population Forecast	170,361	177,840	181,356	184,941	188,597	188,857	189,117	189,377
City Employment Forecast	37,721	44,068	50,466	57,793	66,184	75,793	86,797	99,399
Total Service Population	208,083	221,908	231,822	242,734	254,781	264,650	275,914	288,776
Per Capita Adjusted BAU Emissions	5.8	5.1	4.7	4.4	4.4	4.6	4.9	5.1
Per Service Population Adjusted BAU Emissions	4.7	4.1	3.6	3.3	3.3	3.3	3.3	3.4
Adjusted BAU Emissions	984,012	904,088	845,114	810,293	837,064	869,434	921,234	967,458
Oceanside Per Capita Emissions Goals	-	5.0	4.5	4.0	3.5	3.0	2.5	2.0
Oceanside Per Service Population Emissions Goals	-	4.0	3.5	3.0	2.6	2.1	1.7	1.3
Oceanside Emissions Goals	-	889,200	816,101	739,764	660,090	566,570	472,792	378,754
Oceanside Target Reductions From Baseline <sup>†</sup>		94,812 (10%)	167,911 (17%)	244,248 (25%)	323,922 (33%)	417,442 (42%)	511,220 (52%)	605,258 (62%)
Oceanside Target Reductions From Adjusted BAU <sup>†</sup>	-	14,888 (2%)	29,013 (3%)	70,529 (9%)	176,974 (21%)	302,864 (35%)	448,442 (49%)	588,704 (61%)

<sup>†</sup> Oceanside Target Reductions are defined as the difference between the baseline (2013) emissions or the Adjusted BAU emissions and the Oceanside Reduction Goals.

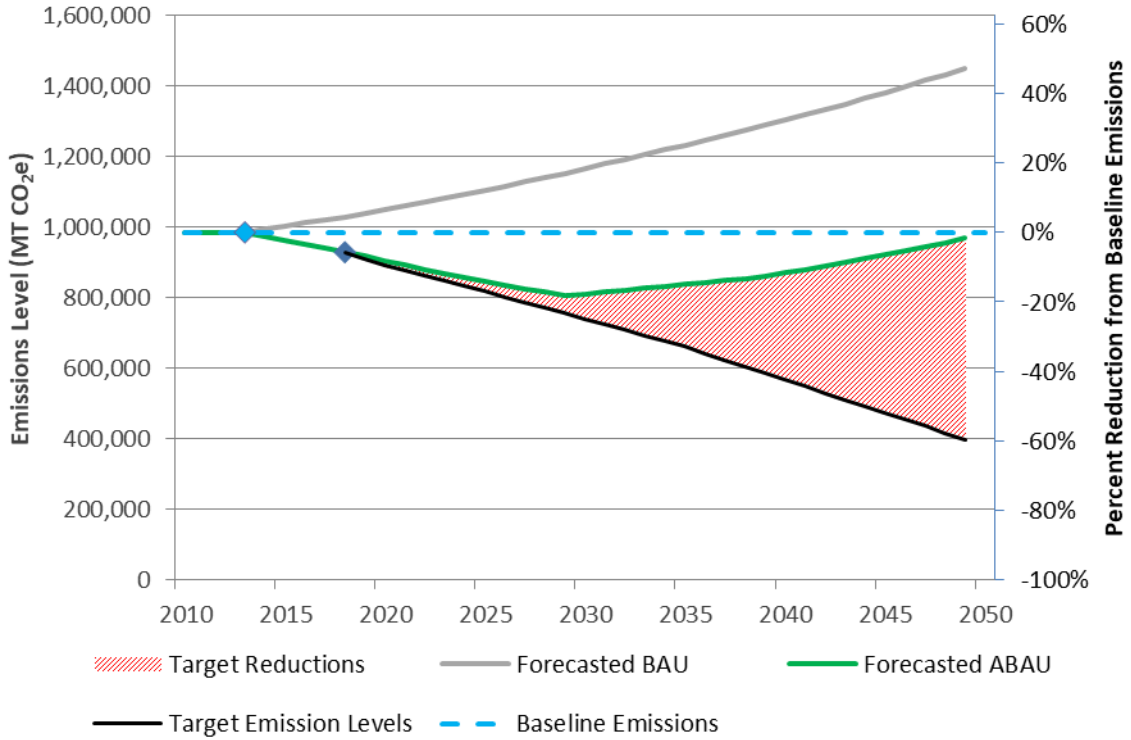


Figure 7 Community Emissions Inventory, Forecast, and Targets

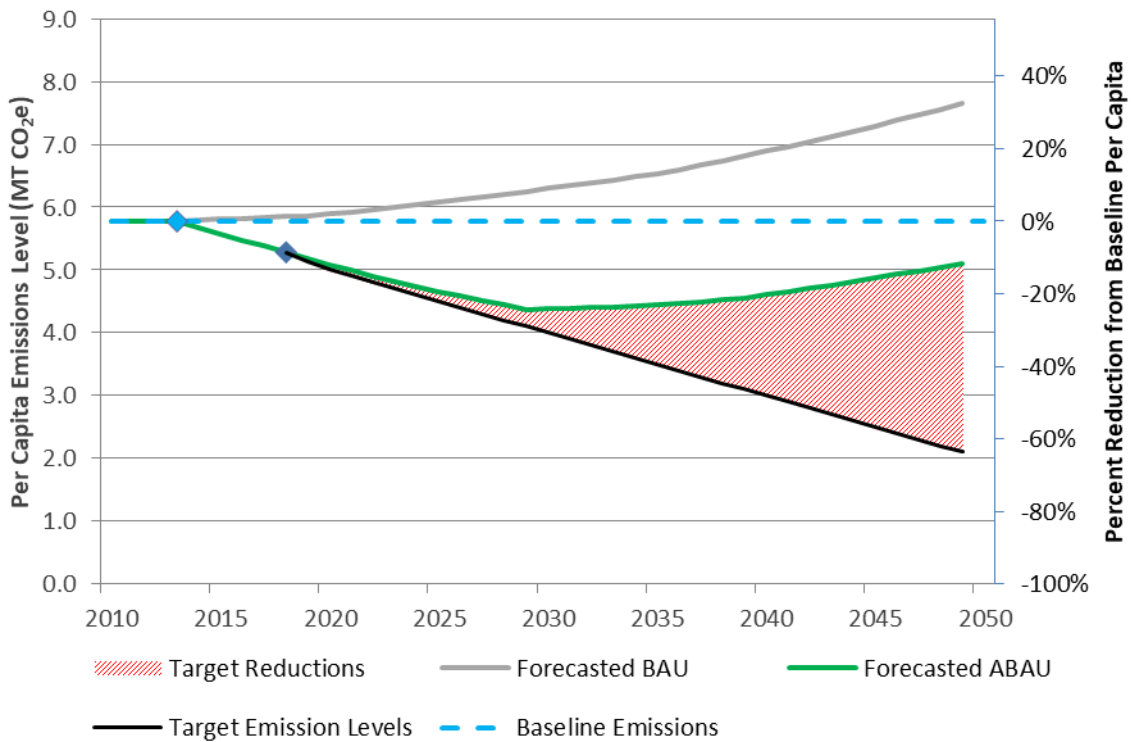


Figure 8 Per Capita Community Emissions Inventory, Forecast, and Targets

# 03 | Reduction Measures



# Chapter 3 Reduction Measures

To ensure the City remains on track to achieve the long-term emission reduction goals of the State, the City has chosen to implement GHG emission reduction measures proactively. This chapter details how the City will reduce its near-term GHG emissions and establish infrastructure to support continued reductions beyond 2030. As the City is already projected to meet state-aligned per capita near-term emissions targets (2020 and 2030), reduction measures were primarily selected based on their ability to achieve substantial, long-term GHG emission reductions in a cost-effective manner.

Each measure describes the overarching goal, such as increasing energy efficiency in residential building units or offsetting energy consumption. Reduction measures are further divided into one or more discrete strategies that the City may implement. Strategies are designed to include the steps needed to implement the GHG reduction measure and are considered essential to guiding staff in implementation. Strategies may be added or removed over time, depending on their relevancy, funding availability, and whether reduction measures are effective as they are monitored over time. In addition, co-benefits for each reduction measure are indicated by the following icons:

## Local Co-Benefits

- |   |   |   |  |   |  |
|---|---|---|--|---|--|
|  | Air Quality Improvement                           |  | Energy Demand Reduction                |  | Sustainability/ Climate Action Education |
|  | Infrastructure and Service Efficiency Improvement |  | Land Use/ Community Design Enhancement |  | Local Energy Generation                  |
|  | Non-motorized Transportation Increases            |  | Public Health Improvement              |  | Increased Resiliency                     |
|  | Resource Conservation                             |  | Zero Waste                             |  | Water Conservation                       |

## Energy and Buildings

Electricity consumption and natural gas use account for about 26 and 16 percent of Oceanside’s community GHG emissions, respectively. As such, many of the reduction measures target residential and non-residential (commercial, industrial, municipal) electricity and natural gas use.

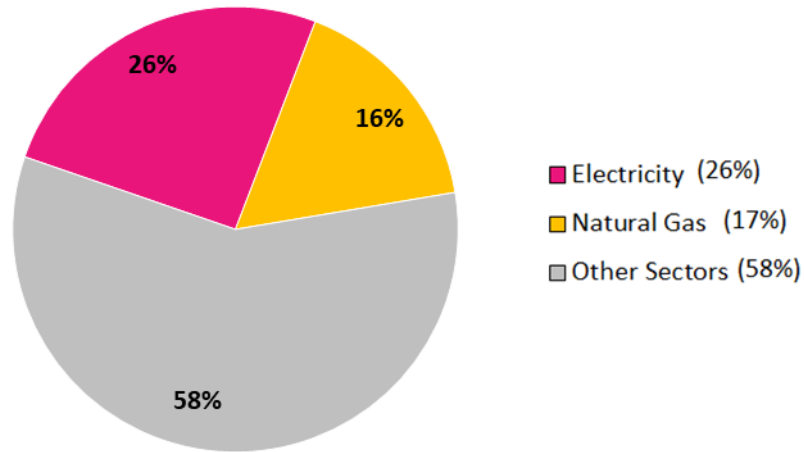


Figure 9 Energy Use Sector Emissions Relative to Total Community Emissions

### Measures

- E1—Renewable Energy Procurement
- E2—Solar Photovoltaic Promotion Program
- E3—Residential Energy Conservation and Disclosure
- E4—Promotion of Low-Income Financing Programs
- E5—Non-Residential Building Energy Benchmarking and Disclosure

## Measure E1: Renewable Energy Procurement

Different modes of electricity generation have different GHG emission intensities. While the amount of renewable energy generation has risen dramatically in recent years, the majority of electricity, both nationwide and in California, is still generated using non-renewable resources such as natural gas, coal, and other fossil fuels. Renewable energy sources such as wind, solar, biomass, and geothermal generate electricity without releasing GHG emissions, thus, transitioning from fossil fuels to renewable energy source has potential to drastically reduce community GHG emissions from the energy sector.

As discussed previously, California RPS requires that electricity supply companies (i.e., investor-owned utilities, electric service providers, and community choice aggregators) source a share of electricity from renewable sources – 33 percent of electricity must be procured from renewable energy sources by 2020 and 50 percent of electricity must be procured from renewable energy sources by 2030. The local utility, San Diego Gas & Electric (SDG&E), has already achieved renewable energy procurement that exceeds the 2020 mandate (43 percent).

The City can indirectly influence energy procurement through collaboration with SDG&E or can directly manage energy procurement through a Community Choice Energy (CCE) Program. If the City creates a CCE Program, it would assume responsibility for negotiating power purchase agreements with generation facilities on behalf of its residents and businesses, while SDG&E would continue to maintain transmission and distribution infrastructure. The goal of this measure is procure 75 percent of local energy from renewable sources by 2030 and thereby exceed California RPS mandates.

### Strategies

- Adopt a Renewable Energy Procurement Policy that mandates that the City will procure 75 percent of local energy from renewable sources. Mechanisms for achieving Renewable Energy Procurement goals could include partnership with SDG&E, Community Choice Aggregation, or similar program.
- Collaborate with SDG&E to explore potential mechanisms to achieve Renewable Energy Procurement goals through partnership with SDG&E such as encouraging homeowners or businesses to participate in SDG&E's EcoChoice or EcoShare Programs.
- Collaborate with SDG&E to reassess community energy procurement annually based on CPUC RPS Program Compliance Reports and participation in SDG&E EcoChoice or EcoShare Programs annually and make results available to the public.
- Conduct a CCE Program Feasibility Study and collaborate with neighboring jurisdictions to explore opportunities to establish a regional Joint Powers Authority CCE Program.

## E1: Renewable Energy Procurement

GHG Reductions Achievable by Measure

2030:

73,685 MT CO<sub>2</sub>e



Co-Benefits:



## Measure E2: Solar Photovoltaic Promotion Program

Solar photovoltaic (PV) panels generate electricity without releasing emissions and thereby reduce electricity demand and emissions from non-renewable energy generation. Additionally, solar generation is well suited for on-site renewable energy generation, which can both improve accountability.

As of late 2016, Oceanside currently has approximately 10.2 megawatts (MW) of grid interconnected solar panels<sup>2</sup>. This is approximately 16 percent higher than it was at the end of the 2013 baseline year (8.8 MW)<sup>2</sup>. Oceanside's grid-interconnected solar panels are 73 percent commercial (7.5 MW), 21 percent residential (2.2 MW), 4 percent governmental (0.5 MW) and 1 percent non-profit (0.1 MW).<sup>1</sup> Additionally the City operates 1 MW of solar panels at the San Luis Rey Wastewater Treatment Plant as well as solar arrays at various other municipal buildings. For reference, a typical residential solar panel system is approximately 5 kilowatts (kW).

### Strategies

- Adopt an ordinance that requires all new development projects that include 50 or more off-street parking spaces to offset at least 50 percent of forecasted energy demand through on-site renewable energy sources<sup>2</sup>.
- Continue to promote financing options and rebates available through SDG&E, the California Solar Initiative, and Property Assessed Clean Energy (PACE) Programs such as the Home Energy Renovation Opportunity (HERO), California First, Ygrene, Figtree, and California Statewide Communities Development Authority Programs.
- Maintain the Expedited Permitting for Residential Solar PV Systems and, on a continuing basis, ensure that regulatory provisions such as compliance with zoning regulations, structure height limitations, permits submittal, review process, etc. do not hinder solar PV installation.
- Collaborate with local solar PV system vendors to establish an Aggregated Demand Solar PV Program. To implement the program, the City will advertise to the community on behalf of local vendors in exchange for negotiated for discounted "bulk pricing."

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<sup>1</sup> Data from the California Solar Initiative. Includes CEC-rating for all installations through 1/20/2017 (California Solar Initiative 2017a).

<sup>2</sup> The Energy Code will require that new residential projects incorporate renewable energy beginning January 1, 2020. The residential-component of the Ordinance will achieve GHG emission reductions by enforcing renewable energy requirements beginning at an earlier date. Emissions reductions estimates conservatively exclude this effect and only account for reductions from the commercial- and industrial-components of this measure.

## E2: Solar (PV) Promotion Program

GHG Reductions Achievable by Measure

2020:  
5,089 MT CO<sub>2</sub>e

2030:  
19,448 MT CO<sub>2</sub>e



Co-Benefits:



## Measure E3: Residential Energy Conservation and Disclosure

California's first energy efficiency standards, known as Title 24 Standards, were adopted in 1977 and became effective in 1978. Title 24 standards have been updated every 2 to 5 years, creating increasingly stringent energy efficiency requirements for new construction. As a result of these aggressive energy efficiency standards, per capita electricity use in California is one of the lowest in the nation.<sup>3</sup> Approximately 25 percent of the City's housing stock was constructed prior to 1980 and thus were not subject to any energy efficiency standards (City of Oceanside 2013). Households constructed under previous, less stringent versions of Title 24 also may not include energy efficiency upgrades. Promoting residential energy conservation and time-of-sale disclosure can increase the efficiency of the City's housing stock by encouraging energy efficiency upgrades to existing homes

### Strategies

- Promote disclosure of historic building energy use, energy use benchmark scores, and energy audits at the time-of-sale of residential real estate.
- Promote financing options and rebates for residential energy efficiency upgrades available through SDG&E, the California Solar Initiative, and PACE Programs.

### E3: Residential Energy Conservation and Disclosure

GHG Reduction – Not Quantified  
Disclosure remains voluntary.



Co-Benefits:



<sup>3</sup> As of 2015, California is ranked 49<sup>th</sup> (of 51) for per capita electricity use. Note that per capita electricity use does not correct for factors such as average household size or climate zone. The State's with the lowest average household electricity use were New York and Rhode Island (U.S. Energy Information Administration 2017).

## Measure E4: Promotion of Low-Income Financing Programs

Solar PV and energy efficiency upgrades can often provide long-term financial relief to families struggling with high and unpredictable energy costs. Unfortunately, the capital investment remains a significant barrier for the families who most need relief from rising bills. Recently, the typical cost of solar panels has dropped substantially, from approximately \$11 per watt in 2007 to \$3 to \$5 per watt in 2016 (California Solar Initiative 2017b). However, as of 2016 a typical kW solar electric system will still cost homeowners from \$15,000 to \$25,000 including materials, installation, and labor. This may be a daunting amount to many homeowners, as the median yearly household income in Oceanside is approximately \$58,000 (U.S. Census 2017). The State offers alternative financing to households with incomes below 80 percent of the area median income as part of the Single-Family Affordable Solar Housing (SASH) Program and offers alternative financing for other energy efficiency upgrades as part of the Low-Income Weatherization Program (LIWP).

### Strategies


- Promote financing options available through the SASH Program and offer alternative financing for other energy efficiency upgrades as part of the LIWP.

### E4: Promotion of Low-Income Financing Programs

GHG Reduction – Not Quantified  
 Number of homes that would qualify for SASH and LIWP Programs has not been identified.



Co-Benefits:



## Measure E5: Non-Residential Building Energy Benchmarking and Disclosure

More than 40 percent of existing nonresidential buildings were constructed prior to California's first adoption of the Title 24 Standards<sup>4</sup>. Oceanside includes 28,142 acres; non-residential land uses include 1,122 acres of commercial uses (11.5 percent), 54 acres of office space (0.2 percent), and 992 acres of industrial uses (3.5 percent).<sup>5</sup> Benchmarking and time-of-sale disclosure of energy use can increase the efficiency of the City's existing commercial and industrial building stock by increasing awareness of energy saving retrofits. There are 2,905 brick-and-mortar businesses in Oceanside. Energy use associated with these businesses is accounted for in the Commercial and Industrial Energy Use sectors (approximately 201,000 MT CO<sub>2</sub>e in 2013). Studies by the U.S. EPA found that benchmarking energy use resulted in an average annual savings of 2.4 percent per year for the first three years.

### Strategies

- Promote use of building energy use benchmarking using tools such as ENERGY STAR Portfolio Manager. Additionally promote SDG&E's San Diego Retrocommissioning Program for buildings with more than 50,000 square feet of air-conditioned space.<sup>6</sup>
- Promote disclosure of building energy use and energy use benchmark scores at the time-of-sale of non-residential real estate.

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<sup>4</sup> California Energy Commission. Existing Buildings Energy Efficiency Action Plan (CEC 2015a).

<sup>5</sup> City of Oceanside Jurisdictional Runoff Management Plan. June 2015.

<sup>6</sup> Assembly Bill 802 requires that all businesses with more than 50,000 square feet of gross floor area participate in building energy benchmarking with ENERGY STAR Portfolio Manager. Measure E5 will require all brick-and-mortar businesses to participate regardless of gross floor area.

## E5: Non-Residential Building Energy Benchmarking and Disclosure

GHG Reduction – Not Quantified  
Benchmarking and disclosure remains voluntary.



Co-Benefits:



## Water and Wastewater

Water systems need energy for water extraction, conveyance, treatment, distribution, and end uses. Drinking water may be pumped to the treatment plant, treated, and then pumped again to consumers. Treatment of wastewater and storm water also requires energy use. In areas where fresh water is scarce, drinking water may be transported long distances and over a high elevation, requiring extremely high-energy use. According to the CEC, this water-related energy consumes 19 percent of the state’s electricity and 32 percent of statewide natural gas (California Department of Water Resources 2017). General strategies for reducing energy use associated with the water and wastewater sectors include increasing the efficiencies of local water and wastewater treatment and distribution facilities, reducing reliance on imported water sources, and reducing overall water use.

Water distribution and wastewater treatment account for approximately 4 percent of Oceanside’s community GHG emissions. To reduce emissions from this sector, the CAP includes several additional measures to reduce indoor and outdoor water consumption.

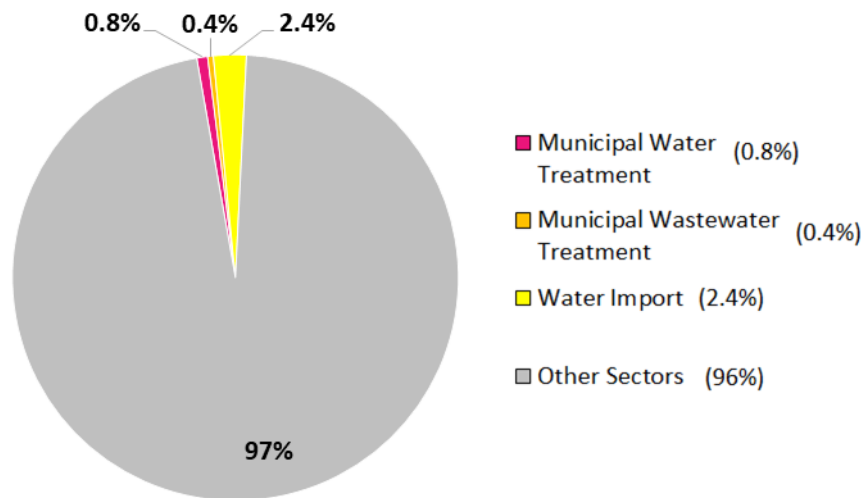


Figure 10 Water Sector Emissions Relative to Total Community Emissions

### Measures

- W1—Implementation of the Water Conservation Master Plan
- W2—Non-Residential Water Use Benchmarking and Disclosure
- W3—Local Water Supply Development

## Measure W1: Implementation of the Water Conservation Master Plan

The 2009 Water Conservation Act (SB X7-7) set an overall goal of reducing per capita urban water use by 10 percent by 2015 and by 20 percent by 2020. Additionally SB X7-7 required each urban water supplier to develop water use targets and update local urban water management plans to discuss per capita water use and water use targets. The City Water Conservation Master Plan was adopted in 2011. The primary goal of the plan was to reduce water use rates targets from baseline levels of 171 gallons per capita per day to 137 gallons per capita per day in 2020.

A statewide drought began in the winter of 2011-2012. In 2015, the Governor issued EO B-30-15, which directed the State Water Resources Control Board to implement mandatory water reductions in cities and towns across California to reduce overall water usage by 25 percent and called on local water agencies to adjust their rate structures to discourage wasteful practices. The State Water Resources Control Board established emergency conservation standards ranging up to 36 percent depending on the existing residential water use rates between June 2015 and February 2016. Based on existing residential water use rates, the conservation standard for Oceanside was established at 20 percent.

In April 2016, the City prepared a comprehensive update of the Water Conservation Master Plan. The updated Water Conservation Master Plan outlines measures necessary to comply with state requirements and evaluates additional potential measures to reduce water use.

Following winter rains of 2016-2017, the drought state of emergency was lifted in April 2017 for nearly all Counties. Although the drought has ended, the Governor directed the State Water Resources Control Board to retain water conservation targets in an effort to “make conservation a way of life in California.”

### Strategies

**Table 10** summarizes water conservation measures included in the City’s 2016 Water Conservation Master Plan.

Table 10 City Water Conservation Master Plan Measures	
Measure	Measure Description
<i>Measures Adopted in the Original Water Conservation Master Plan</i>	
Water Loss	Maintain a thorough annual accounting of water production, sales by customer class, and quantity of water produced but not sold (non-revenue water). In conjunction with system accounting, include audits that identify and quantify known legitimate uses of non-revenue water in order to determine remaining potential for reducing water losses.
Single Family Indoor Water Surveys	Indoor and outdoor water surveys for existing single-family residential customers. Target those with high water use and provide a customized report to owner.
High Efficiency Faucet Aerator, Showerhead, and Soil Moisture Sensor Giveaway	Utility would buy showerheads, kitchen and bathroom faucet aerators, and soil moisture sensors in bulk and give them away at Utility office or community events.
Residential Clothes Washer Rebate	Provide a rebate for efficient washing machines to single-family homes and apartment complexes that have common laundry rooms. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) and only offer the best available technology.
Residential Outdoor Water Surveys	Outdoor water surveys offered for existing customers. Prioritize those with high water use and provide a customized report on how to save water.

**Table 10 City Water Conservation Master Plan Measures**

Large Landscape Outdoor Water Audit	Outdoor water audits offered for existing large landscape customers. Prioritize those with high water use and provide a customized report on how to save water. All large multifamily residential, commercial, industrial and institutional, and public irrigators of large landscapes would be eligible for free landscape water audits upon request.
Large Landscape Water Budgeting/Monitoring	Website that provides feedback on irrigation water use (budget vs. actual). Individual customer interface and portal for additional analytics.
Rotating Sprinkler Nozzle Rebates	Provide rebates to replace standard spray sprinkler nozzles with rotating nozzles that have lower application rates.
Provide Rain Barrel Incentive	Provide incentive for installation of residential rain barrels.
Top Water Users Program	Top water customers from each category would be offered a professional water survey that would evaluate ways for each to save water and money. The surveys would be for high volume users (i.e., accounts that use more than 5,000 gallons of water per day), such as hotels, restaurants, stores, and schools.
Commercial, Industrial and Institutional Rebates to Replace Inefficient Equipment	Program to provide rebates for a standard list of water efficient equipment. Included per current SoCal WaterSmart program are the following devices and base rebate amounts: Premium High-Efficiency Toilets, Ultra Low and Zero Water Urinals, Plumbing Flow Control Valves, Connectionless Food Steamers, Air-cooled Ice Machines, Cooling Tower Conductivity Controllers, Cooling Tower pH Controllers, Dry Vacuum Pumps, and Laminar Flow Restrictors.
Public Information	Public information includes the following: conservation print media; electronic conservation options/web site/social media; speakers bureau/event participation; billing report educational tools; media campaigns, such as "Take Control of your Controller;" recognition programs for water savings by residences, apartments, businesses program; outdoor residential focused public awareness information program and efficient outdoor use education and training programs; training for landscape maintenance workers, networking with landscaping industry, landscape water calculator, and climate appropriate demonstration gardens.
Model Water Efficient Landscape Ordinance	Adopt the California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO). MWELO promotes efficient landscapes in new developments and retrofitted landscapes while increasing water efficiency standards for new and retrofitted landscapes through more efficient irrigation systems, on-site storm water capture, and by limiting the portion of landscapes that can be covered in turf.
<i>Measures Adopted in the 2016 Water Conservation Master Plan Update</i>	
Automated Meter Infrastructure (AMI)	City will install AMI meters and provide a means of viewing daily consumption inside their home/business either through the internet or separate device. The AMI system would, on demand, indicate to the customer and Utility where and how their water is used, facilitating water use reduction and prompt leak identification. Also require that larger or irrigation customers install such AMI meters.
Require Plan Review for New Commercial, Industrial, and Institutional	Require plan reviews for water use efficiency for all new business customers.
Promote High Efficiency Pre-Rinse Spray Valves	Provide free spray rinse valves and possibly free installation operation in restaurants, commercial kitchens, grocery stores, and other locations.
School Education	Work with local school districts to develop classroom programs to promote water use efficiency education. Consider poster contests, etc. Some programs would require dedicated utility staff to assist and present.
Incentive for Recycled Water Conversions	Provide incentives for recycled water conversion.
Ag Water Audit Program	Water audit offered for existing agricultural customers. Those with high water use are targeted, offered a survey, and provided a customized report on how to save water.

## W1: Implementation of the Water Conservation Master Plan

### GHG Reductions Achievable by Measure

2020:  
268 MT CO<sub>2</sub>e

2030:  
909 MT CO<sub>2</sub>e

2040:  
1,610 MT CO<sub>2</sub>e



Co-Benefits:



## Measure W2: Non-Residential Water Use Benchmarking and Disclosure

In 2016, the U.S. EPA added water consumption tracking to the Portfolio Manager benchmarking tool. Similar to benchmarking energy use, benchmarking and time-of-sale disclosure of water use can increase the efficiency of the City’s existing commercial and industrial building stock by increasing awareness of water saving retrofits.

### Strategies

- Promote use of building water consumption benchmarking using tools such as Portfolio Manager.
- Promote disclosure of building water consumption and water consumption benchmark scores at the time-of-sale of non-residential real estate.

## W2: Non-Residential Building Water Consumption Benchmarking and Disclosure

GHG Reduction – Not Quantified  
Benchmarking and disclosure remains voluntary.



Co-Benefits: 

## Measure W3: Local Water Supply Development

As discussed previously, water systems consume energy for water extraction, conveyance, treatment, distribution, and end uses. Due to southern California's reliance on imported water, water is typically transported long distances and thus requires extremely high-energy use. Following use, wastewater is generally recaptured, retreated, and then discharged to the environment. Through additional treatment, wastewater may be processed to meet standards for reuse. Water recycling does not involve water extraction or conveyance and therefore requires substantially lesser energy use.

Oceanside is a member of the North San Diego County Water Reuse Coalition (Coalition), which seeks to convert facilities for recycled water service, increase recycled water storage capacity, connect discrete recycled water systems to one another, distribute recycled water to effectively meet recycled water demands, and replace potable water uses with recycled water components wherever appropriate. Previous efforts in Oceanside have included development of recycled water infrastructure at the San Luis Rey Water Recycling Facility to supply recycled water for use at the Oceanside Municipal Golf Course and Whelan Lake. Additionally, implementation of the Water Conservation Master Plan includes the provision of incentives such as reduced rates for customers who use recycled water. As identified in the City's Recycled Water Master Plan, infrastructure at the San Luis Rey Water Reclamation Facility can treat up to 3.0million gallons per day to meet standards for non-potable uses. Infrastructure improvements to the San Luis Rey Water Reclamation could greatly increase the availability of recycled water. The CAP goal is for to offset 3.0 million gallons per day of potable water with recycled water by the year 2025.

### Strategies

- Identify and implement capital improvements to the San Luis Rey Water Reclamation Facility that increase the supply capacity of recycled water that meets Title 22 requirements for unrestricted use to at least 3.0 million gallons per day by 2025; 5.5 million gallons per day by 2035, and 7.5 million gallons by 2045.

### W3: Local Water Supply Development

#### GHG Reductions Achievable by Measure

2025:  
2,102 MT CO<sub>2</sub>e

2035:  
3,971 MT CO<sub>2</sub>e

2045:  
5,608 MT CO<sub>2</sub>e



Co-Benefits:



## Solid Waste

The disposal of solid waste in landfills produces GHG emissions (primarily CH<sub>4</sub>) from decomposition of organic matter. Additional transportation emissions are associated with the collection and export of solid waste. The City contracts with Waste Management for its solid waste collection and disposal needs.

Solid waste disposal accounts for approximately 4 percent of Oceanside’s community GHG emissions. Due to longstanding conservation and recycling programs, Oceanside achieved a 57 percent solid waste diversion rate in 2010 and a 67 percent solid waste diversion rate in 2016.<sup>7</sup> Oceanside has continued to exceed CalRecycle target disposal rates. Whereas the target daily residential waste is 6.3 pounds per person, the City has achieved a rate of approximately 4.2 pounds per person (CalRecycle 2018). Whereas the target daily commercial waste is 29.4 pounds per employee, the City has achieved a rate of approximately 17.5 pounds per employee (CalRecycle 2018).

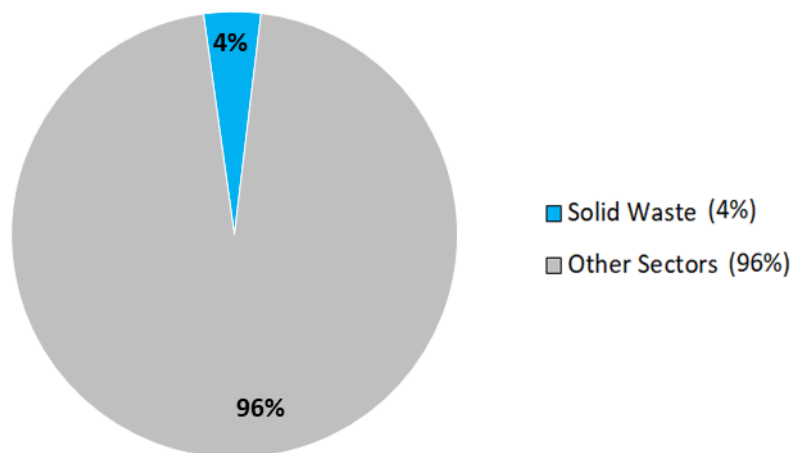


Figure 11 Solid Waste Sector Emissions Relative to Total Community Emissions

## Measures

- SW1—Implementation of Zero Waste Strategic Resource Plan
- SW2—Beyond 2020 - Enhanced Waste Diversion and Organics Waste to Energy/Biosolids Master Plan

<sup>7</sup> Oceanside Zero Waste Strategic Resource Management Plan. June 2012.

## Measure SW1: Implementation of Zero Waste Strategic Resource Plan

On August 25, 2010, Oceanside adopted a Zero Waste Resolution (Resolution Number 10-R0636-1) with the goal to achieve 75 to 90 percent solid waste diversion by 2020. In 2011, the Solid Waste Diversion Act (AB 341) established a state policy goal of 75 percent of solid waste be source reduced, reused, recycled, or composted by 2020. Additionally, AB 341 established commercial recycling requirements and directed CalRecycle to provide recommendations on legislation on how to achieve the 75 percent waste diversion goal.

The City had achieved a 57 percent solid waste diversion rate by 2010. Following adoption of AB 341, the City adopted a Zero Waste Strategic Resource Management Plan in June of 2012. The Plan established a 75 percent to 90 percent solid waste diversion goal by 2020 with direction to update the Zero Waste Plan in 2022. The Plan discussed current waste collection services, inventoried local existing solid waste recycling facilities and outreach efforts, and identified areas for improvement. Key recommendations of the Plan are to develop food waste reduction programs through food donors and food banks, provide incentives for producer “cradle-to-cradle” takeback programs, develop reuse partnerships and a reuse warehouse, expand composting services and introduce food waste recycling services, expand recycling education and outreach, and develop partnerships with local businesses. The plan also identified a goal of ultimately achieving the international standard for Zero Waste Community of 90 percent solid waste diversion.

### Strategies

**Table 11** summarizes zero waste measures included in the City’s 2012 Zero Waste Strategic Resource Management Plan.

Table 11 Zero Waste Strategic Resource Management Plan Measures	
Measure Description	Implementation Status
<i>Phase 1 (2012–2017) Year 1</i>	
Successfully implement new single-stream recycling program to increase recycling participation through the standardization of services and collection containers.	Complete
Update the City’s recycling ordinance and provide technical assistance to businesses to comply with the AB 341 State mandatory commercial recycling program.	Ongoing
Place recycling containers at public facilities wherever trash containers are located, phased (only highest use coastal areas).	Ongoing
Expand education outreach regarding the CalGreen, which requires a minimum a 65 percent recycling rate.	Ongoing
Develop and adopt an extended producer responsibility resolution to support phasing out toxic products and products that cannot be reused, recycled, or composted.	Pending
Develop a Plastic Bag Reduction Ordinance coordinated with Solana Beach and other nearby jurisdictions.	Implemented by State Measure (SB 270)
Support and expand school composting, commercial on-site composting, and home composting programs. Educate all landscapers working in the City about the cost savings and other benefits of using composting facilities.	Ongoing (Love Your Planet Program)
Support and expand reuse opportunities in Oceanside.	Ongoing (CurbUp Program)
Waste Management to conduct a waste generation/characterization study to provide a solid baseline for measuring progress toward its Zero Waste Goal.	Complete (Organics Feasibility Study)

**Table 11 Zero Waste Strategic Resource Management Plan Measures**

<i>Phase 1 (2012-2017) Years 2-5</i>	
<b>Measure Description</b>	<b>Implementation Status</b>
Adopt Plastic Bag Reduction Ordinance.	Implemented by State Measure (SB 270)
Develop a program for business and institution waste reduction services that includes: workshops tailored to specific industries, waste audits, technical assistance, educational materials, and a recognition program. Medium and large businesses and institutions could be provided expert support and funding to prevent waste, reduce operating costs, and use all resources more efficiently. These services would be offered through the Green Oceanside Campaign and would be designed according to principles of community-based social marketing for sustainability.	Ongoing (Unified Environmental Inspection Program)
Develop and adopt a construction and demolition recycling ordinance.	Implemented by State Measure (2016 Title 24)
Enhance outreach, education, training, and enforcement/reinforcement programs.	Ongoing
Place recycling containers at all public facilities wherever trash containers are located phased in as soon as possible. (public parks, shopping malls, and transportation depots).	Ongoing
Develop and adopt an environmental preferable purchasing program.	Complete
Develop list on City website of businesses or nonprofits that will take back products and packaging from customers that are otherwise difficult to reuse, recycle, or compost locally.	Ongoing
Develop and adopt take-back policies for sharps, mercury batteries, light bulbs, and pharmaceuticals.	Complete
Develop plans and timelines for implementing residential and/or commercial food scrap programs. Programs for food scrap diversion should give precedence to the following hierarchy: prevent food waste, feed people, convert material to animal feed and/or rendering, and composting/anaerobic digestion.	Ongoing (Organics to Energy Biosolids Master Plan)
The City and Waste Management should work with a reuse collaborative to develop a reuse warehouse to help sort and store products, and absorb the ebb and flow of products that are collected prior to distribution. Explore need and interest in Reuse Warehouse and other collaborative ventures or services to expand reuse businesses and nonprofits.	Ongoing
Implement the above policies and programs over first five years after adoption of Zero Waste Strategic Resource Management Plan	Ongoing
<i>Phase 2 (2017-2022)</i>	
Support the development of one or more Resource Recovery Parks in the region.	Pending
Develop take-back policies or industry-sponsored programs for diapers.	Pending
Evaluate options for going beyond composting of just vegetative food scraps.	Ongoing (Biosolids Master Plan)
Evaluate progress towards Zero Waste by 2020 and develop strategy on how to address next solid waste and recycling contract.	Pending

## SW1: Implementation of Zero Waste Strategic Resource Plan

GHG Reductions Achievable by Measure

2020:  
10,331 MT CO<sub>2</sub>e



Co-Benefits:



## Measure SW2: Beyond 2020 - Enhanced Waste Diversion

Between 2010 and 2015, statewide recycling rates have ranged from 47 to 50 percent (CalRecycle 2017). As discussed previously, the City had achieved a 67 percent solid waste diversion rate by 2016. Due to continued efforts associated with the Zero Waste Resource Management Plan, solid waste diversion had increased to 71 percent as of late 2016. Although local recycling rates are well above statewide averages, further opportunities still exist; organic materials such as paper, plant trimmings, food waste, textiles, and manures still comprise a substantial portion of the City's landfilled waste.

Additional measures that can reduce disposal of organic materials in landfills includes (1) increased outreach and incentives for residential and commercial recycling, (2) source reduction of organics, (3) reduced barriers to composting, and (4) further development of local facilities capable of receiving and/or processing organics for beneficial reuse (e.g. for compost and renewable energy via biogas cogeneration facilities). These facilities include those with anaerobic digestion capacity such as the City's San Luis Rey Water Reclamation Facility.

### Strategies

- Continue to promote and implement programs, policies, and services for source reduction, material/product reuse, recycling, composting, and system/product redesign opportunities through the Green Oceanside Campaign and Zero Waste program.
- Reduce edible food waste generation through the implementation of food donation programs and services.
- Develop infrastructure to process recoverable excess food such as the Green Oceanside Kitchen at El Corazon.
- Prepare and implement a plan to divert organic waste from landfills to local facilities capable of receiving and/or processing organics for beneficial reuse (e.g. for compost and renewable energy via biogas cogeneration facilities). These facilities include those with anaerobic digestion capacity such as the City's San Luis Rey Water Reclamation Facility.
- Divert waste locally to minimize transportation emissions.
- Co-locate local waste facilities with compatible end products to minimize transportation emissions.
- In 2020, the City will reevaluate the effectiveness of the Zero Waste Resource Management Plan and draft an update to the Zero Waste Resource Management Plan that will reset targets to ensure a minimum 90 percent diversion rate in the near future.

## SW2: Beyond 2020 - Enhanced Solid Waste Diversion

GHG Reductions Achievable by Measure

2030:  
11,016 MT CO<sub>2</sub>e

2035:  
16,524 MT CO<sub>2</sub>e



Co-Benefits:



## Transportation and Land Use

On-road transportation sources account for nearly half of Oceanside’s community GHG emissions. The following measures aim to reduce these emissions by promoting a compact urban landform, promoting increased deployment of low emission vehicles, and furthering automotive alternatives—including options for biking, walking, and public transit.

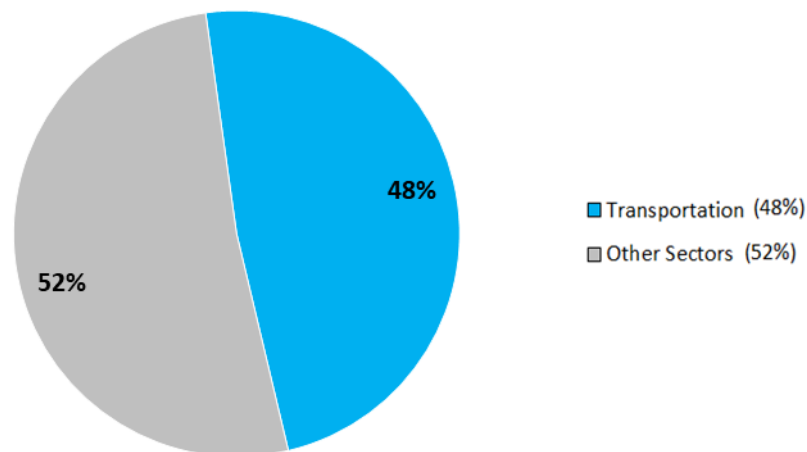


Figure 12 Transportation Sector Emissions Relative to Total Community Emissions

### Measures

- TL1— Smart Growth Policies
- TL2—Electric Vehicle Promotion
- TL3—Preferential Parking Spaces for Clean Air Vehicles
- TL4—Expand Complete Streets Programs
- TL5—Transportation Demand Management Plans

## Measure TL1: Smart Growth Policies

By designing communities that better integrate the connections between land use and transportation planning, the City can reduce vehicle trip lengths (vehicle miles traveled) and encourage alternative modes of transportation. The term “smart growth” refers to a compact, efficient, and environmentally sensitive urban development pattern. Smart growth focuses future growth and infill development close to employment, services, and public facilities to maximize the use of existing infrastructure and preserve open space and natural resources. Smart growth is characterized by more compact, higher density development in urbanized areas throughout the region. These areas are walkable, bike-friendly, near public transit, and promote good community design, resulting in housing and transportation choices for those who live and work in these areas. As population increases, smart growth development characteristics can often be the difference between a sense of overcrowding and a feeling of vibrancy.

SANDAG performed previous studies of land use, housing, employment, and transit system densities to identify seven types of Smart Growth Opportunity Areas (SGOA) throughout the County of San Diego. Types of SGOAs include metropolitan centers, urban centers, town centers, community centers, rural villages, mixed-use transit corridors, and special use centers. Existing SGOAs within Oceanside include<sup>8</sup>:

- The town center generally located north of Seagaze Drive, south of Harbor Drive, and west of Interstate 5;
- The mixed-use transit corridor along South Coast Highway between Mission Avenue and the Buena Vista Lagoon (west of Ditmar Street and east of the North County Transit District [NCTD] Coaster line); and
- The mixed-use transit corridor along Oceanside Boulevard between Interstate 5 and Canyon Drive.

SANDAG’s *Smart Growth Concept Map* also identifies three *potential* SGOAs in Oceanside<sup>9</sup>:

- A community center centered within ¼-mile of the intersection of Oceanside Boulevard and El Camino Real;
- The community center centered within ¼-mile of the intersection of Oceanside Boulevard and Rancho Del Oro Drive; and
- The community center centered within ¼-mile of the intersection of Oceanside Boulevard and Melrose Drive.

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<sup>8</sup> Town Centers are areas with a mix of office and commercial development, including residential mixed-use, that draw from their subregional areas and are served by regional or corridor transit lines, local bus services or shuttle services. SANDAG’s minimum target densities for town centers are generally 20 dwelling units per acre and 30 employees per acre.

Mixed-use transit corridors are linear corridors with residential, commercial, and mixed-use development along the corridor, as well as similar development within one or two blocks of the arterial. Mixed-use transit corridors must be served by high-frequency bus service. SANDAG’s minimum target density for mixed-use transit corridors is 25 dwelling units per acre.

<sup>9</sup> Community centers are areas with residential, commercial, and mixed-use development that serve the surrounding neighborhoods, with high-frequency local bus service. SANDAG’s minimum target density for mixed-use transit corridors is 20 dwelling units per acre.

## Strategies

- The City will establish a smart growth development goal of locating the majority of new housing units and employment generating land uses developed between 2017 and 2030 within existing and potential SGOAs. The City will assess land use development patterns annually and make results available to the public.
- The City will adopt policies that accommodate and incent development within SGOAs to achieve the SGOA development goals. Policies will be relaxed or reinforced to achieve the smart growth development goal and may include, but are not limited to, streamlined permitting and review in for development in SGOAs, public infrastructure improvements, zoning amendments, relaxed development fees, development requirement variances (such as parking requirements, floor area ratio requirements, etc.), and development density credits.



## Measure TL2: Electric Vehicle Promotion

Zero emission vehicles (ZEVs) include plug-in electric vehicles (EV), such as battery EV and plug-in hybrid EV, and hydrogen fuel cell vehicles. Use of ZEVs in place of traditional fossil fuel combustion engines results in substantial GHG reductions. ZEVs result in no direct tailpipe emissions. Grid electricity consumed by ZEVs results in approximately 40 percent of the emissions of a traditional fossil fueled vehicle. Additionally, the emissions associated with this electricity are forecasted to decline as renewable energy sources increase.

As of summer 2016, Californians drive over 230,000, or approximately 47 percent, of all ZEVs in the U.S (California Office of the Governor 2016). California ZEV Program goals include increasing ZEV market penetration to 1 million vehicles by 2020 (3.9 percent of passenger vehicles); 1.5 million by 2025 (5.4 percent of passenger vehicles); and 4.2 million by 2030 (14.1 percent of passenger vehicles) (California ARB 2017c). Oceanside can reduce barriers to ZEV market penetration through increased charging structure, incentives, and outreach. As identified in SANDAG's San Diego Regional Plug-in EV Readiness Plan, expansion of residential charging station infrastructure is most critical, followed by workplace, retail, and public charging stations (SANDAG 2014). CAP goals include increasing local ZEV market share to 20 percent of passenger vehicles by 2030.

### Strategies

- Require all new single-family residential developments to include prewiring of the site with a dedicated 240-volt branch circuit to allow for future installation of a level 2 charging circuit and electrical retrofits to support EV charging stations at an interior or exterior space such as the garage or driveway.
- Require all single-family residential solar PV systems installations to include prewiring of the garage with a dedicated 240-volt branch circuit to allow for installation of a level 2 charging circuit and electrical retrofits to support EV charging stations.
- Consistent with state requirements for pre-wiring for level 2 charging circuits in multi-family developments (currently 10 percent of all resident surface parking),<sup>10</sup> require charging stations to be installed at half of all pre-wired spaces.
- Consistent with state requirements for pre-wiring for charging circuits in commercial and industrial developments, require charging stations to be installed at half of all pre-wired spaces.
- Promote incentives for purchase of ZEVs such as available federal tax credits (up to \$7,500) and available rebates offered through the California Clean Vehicle Rebate Project (up to \$2,500).
- Provide permit fee waivers for construction related solely to the installation of EV charging station circuitry such as electrical rewire permitting, electrical service upgrade permitting, or other miscellaneous permitting that is typically charged at an hourly rate.

<sup>10</sup> The 2017 Energy Code requires prewiring in all one- and two-family dwelling and townhouses with attached garages and 3 percent of all parking spaces for multi-family dwellings with greater than 17 dwelling units.

- Allow by-right sale of ZEV vehicles within all retail-oriented commercial zones.
- Incentivize installation of direct current fast charging stations at gas stations and other retail.
- Establish public-private partnerships to increase charging infrastructure at existing office and industrial facilities.
- Promote commercial businesses and industry that provides EV charging stations and incentives for EV use to employees through added marketing and benefits from City’s Green Oceanside Business Network program.
- Collaborate with local EV retailers to establish an Aggregated Demand EV Program. To implement the program, the City will advertise to the community on behalf of local vendors in exchange for negotiated for discounted “bulk pricing.”



## Measure TL3: Preferential Parking Spaces for Clean Air Vehicles

Increasing the number of preferential parking spaces for clean air vehicles such as ZEVs and other alternative-fuel vehicles will encourage people to transition from conventional vehicles to zero or low emission vehicles. This measure can act as a support and boost to the implementation of Measure TL2.

### Strategies

- Require commercial and industrial developments to incorporate 12 percent designated parking for clean air vehicles.
- Provide incentives through Green Oceanside Business Network to businesses that designate additional parking for clean air vehicles.

### TL3: Increase Number of Preferential Parking Spaces for Clean Air Vehicles

GHG Reduction – Calculated along with TL2. See above.



Co-Benefits:



## Measure TL4: Expand Complete Streets Programs

Complete streets are streets designed and operated to enable safe access for all modes of travel, including walking, biking, using public transit, and driving cars or commercial vehicles. Improving pedestrian and bicycle infrastructure encourages residents to walk or bicycle to work and to various destinations within town as opposed to using their personal vehicles, thereby reducing vehicle use. A network of complete streets with bicycle lanes and sidewalks, and connections to off-street multiuse pathways that are safe and convenient are crucial to promoting walking and bicycling use. Bicycle routes should be well marked and separated from motor vehicle lanes where possible. The City prepared a Bicycle Master Plan in 2008 and a Pedestrian Master Plan in 2009 to identify opportunities to improve bicycle and pedestrian networks.

### Strategies

- Establish criteria for identifying opportunity sites for new off-street multiuse pathways along transportation corridors. Incorporate these criteria into the next update to the City’s Bicycle Master Plan, Pedestrian Master Plan, and General Plan Circulation Element.
- Require new developments to provide connections and/or extensions of the bicycle and pedestrian networks where applicable. Other bicycle improvements would be supported by TL4—Transportation Demand Management Plans and General Plan Circulation Element Policies.
- Establish complete streets criteria checklist for Capital Improvements Projects (CIP). Require that all CIP roadway construction and maintenance projects be reviewed for potential opportunities to incorporate complete street improvements. The complete streets criteria checklist shall establish criteria for identifying potential opportunities to convert signalized intersections to roundabouts.
- Periodically update the Citywide Traffic Signal Priority List to maintain optimized traffic signal timing that reduced fuel consumption.
- Collaborate with NCTD and neighboring jurisdictions to develop a neighborhood electric vehicle (NEV) implementation plan. The plan shall consider a coastal zone NEV circulator shuttle system and a NEV shuttle loop connecting the Ocean Ranch Business and Technology Center to the Rancho Del Oro Sprinter Station, as well as other opportunities to reduce first-mile-last-mile barriers to transit use.
- Collaborate with Oceanside Unified School District to promote walking, bicycling, or carpooling to school. As applicable, consider opportunities to provide incentives or infrastructure improvements that will encourage walking, bicycling, or carpooling to school.

## TL4: Expand Complete Streets Programs

GHG Reduction – Not Quantified

Goals will be established as part of the next update to the City’s Bicycle and/or Pedestrian Master Plan.



Co-Benefits:



## Measure TL5: Transportation Demand Management Programs

Transportation Demand Management (TDM) refers to programs and strategies that manage and reduce congestion during peak traffic hours by encouraging the use of transportation alternatives. The City is able to promote TDM strategies through expanded complete street infrastructure; however, site design and employer participation are critical for overcoming first/last mile barriers to alternative modes of travel. A TDM Ordinance can increase implementation of TDM measures and thereby reduce vehicle use associated with new commercial and industrial developments.

Common examples of TDM measures implemented during site design include convenient connections to nearby transit stops and off-site walkways, safety improvements to nearby pedestrian pathways (e.g. curb bulb-outs or speed tables at road crossings), street lighting, the off-site network, transit stops, secure bicycle parking, bicycle end-trip facilities such as showers and lockers, preferential carpool/vanpool parking, and improvements to adjacent transit stops such as shelters, benches, or other street furniture. Other examples of TDM measures implemented by employers include providing education of the transit network, employee carpool/vanpool matching programs, parking pricing and/or cash-out, bicycle-sharing programs, alternative work schedules, telecommuting, park-and-ride lots, and coordination with the NCTD. CAP goals include reducing VMT associated with new development by 10 percent.

### Strategies

- Adopt a TDM Ordinance that requires new commercial and industrial developments, or commercial and industrial developments that undergo a permitted renovation affecting more than 10,000 square feet, that would generate more than 100 vehicle commute trips per day to prepare a TDM Plan. The City shall prepare and maintain a checklist of common TDM measures to streamline preparation of TDM plans.
- Conduct surveys of business to determine existing TDM measure implementation rates. Require businesses complete survey during business license renewal. Provide rebates for implementation of TDM measures such as addition of bicycle parking or transit stop shelter improvements.
- Provide incentives and marketing promotion through Green Oceanside Business Network for businesses that incorporate TDM measures.

## TL5: Transportation Demand Management Programs

### GHG Reductions Achievable by Measure

2020:	2030:	2040:	2050:
675 MT CO <sub>2</sub> e	2,222 MT CO <sub>2</sub> e	3,668 MT CO <sub>2</sub> e	4,161 MT CO <sub>2</sub> e



Co-Benefits:



## Agriculture and Forestry

In addition to measures that reduce emissions, the City intends to increase carbon sinks that absorb carbon dioxide from the atmosphere. Carbon capture, or carbon sequestration is the removal of carbon dioxide and other GHG emissions from the atmosphere; trees and other vegetation naturally assimilate carbon from the atmosphere into organic matter. When plants die, carbon stored as organic matter may decompose and be released back into the atmosphere or may accumulate in soils. In general, well aerated and saturated soils are conducive to decomposition, and dry or undisturbed soils are conducive to long-term carbon storage. Strategies to promote carbon capture and storage generally include (1) increased tree canopy, (2) preservation of agricultural lands, (3) sustainable soils management and limited vegetation clearing, and (4) application of compost-based soil amendments.

### Measures

- AF1—Urban Forestry Program
- AF2—Urban Agriculture and Community Gardens
- AF3—South Morro Hills Agricultural Lands Conservation Program
- AF4—Carbon Farming Program

## Measure AF1: Urban Forestry Program

Urban tree planting sequesters carbon while also helping to cool an environment by providing shade and evapotranspiration (the movement of water from the soil and plants to the air). Trees planted near pavement can reduce the surface temperatures of streets and parking lots, and trees planted strategically near windows or roofs of buildings can effectively reduce interior temperatures, thereby reducing energy used for cooling. Based on data from SANDAG's Healthy Communities Assessment Tool, neighborhoods in Oceanside have between a 0.2 and 3.0 percent tree canopy cover, with an average of 1.4 percent canopy cover (SANDAG 2017). Oceanside's canopy is consistent with the average for cities in San Diego County (1.4 percent canopy cover). Oceanside neighborhoods with the least tree canopy coverage include the tri-city neighborhood, San Luis Rey community, and the Townsite neighborhood (also known as downtown). A Green Streets Ordinance can increase tree planting associated with new development and the City's Public Works Department can facilitate plantings along transportation corridors or other public rights-of-way. The City's Green Oceanside campaign can facilitate community events dedicated to tree plantings in public or private areas or within community gardens and schools. Typical street trees in Southern California sequester about 0.063 tons of carbon dioxide per tree per year less releases associated with maintenance and decomposition (Center for Urban Forest Research 2001). The CAP goals are to plant 200 trees each year on public rights-of-way and to require development projects to incorporate an annual average of 200 additional trees per year.

### Strategies:

- Compile a street tree inventory that identifies all trees in public rights-of-way. Identify tree species that are drought tolerant, low maintenance, and do not pose safety risks. The tree species should contribute to neighborhood character.
- Adopt a Green Streets Ordinance that requires all new development projects to incorporate shade trees. Establish criteria for the number of shade trees. Criteria may reasonably be linked to metrics such as the number of residences, building area, or impervious area.
- Establish a green streets criteria checklist for CIP. Require that all roadway CIP roadway construction and maintenance projects be reviewed for potential opportunities to incorporate additional shade trees.
- Provide streamlined development review for projects that would incorporate additional tree installation on-site or within the community.
- Provide incentives through Green Oceanside Business Network and campaign that promote increased tree plantings.
- Include urban forestry in the Green Oceanside educational outreach program as a means of encouraging residents and business owners to expand tree canopy on their private property and within adjacent parkways in the public right-of-way.
- Establish public-private partnerships that support volunteer tree planting and stewardship efforts.
- Allow proposed development projects to mitigate climate change impacts through off-site tree planting and stewardship plans.

## AF1: Urban Tree Planting Program

### GHG Reductions Achievable by Measure

2020:  
50 MT CO<sub>2</sub>e

2030:  
302 MT CO<sub>2</sub>e

2040:  
554 MT CO<sub>2</sub>e

2050:  
806 MT CO<sub>2</sub>e



Co-Benefits:



## Measure AF2: Urban Agriculture and Community Gardens

Urban agriculture is the growing, processing, and distribution of food through intensive plant cultivation in and around cities. Food that is grown locally requires less packaging, preservation, and transportation than imported foods and may reduce food waste. Urban agriculture can reduce the consumption of natural resources and GHG emissions associated with food production.

Community gardens, a type of urban agriculture, are pieces of land gardened collectively by a group of people. Community gardens can facilitate revitalization of underutilized lands, provide open space within compact communities, contribute to neighborhood character, promote physical activity, foster community interaction, and improve access to healthy foods for residents that lack the financial resources to purchase fresh or organic produce. Additionally, community gardens can help reduce the urban heat island effect, lessen urban run-off, improve air quality, increase access to composting opportunities, and provide “breathing room” within compact segments of communities.

### Strategies:

- Adopt an Urban Agriculture Incentive Zone Ordinance consistent with Assembly Bill 551. The Urban Agriculture Incentive Zone Ordinance will establish an administrative process that allows local landowners to apply for reduced property taxes in exchange for converting unimproved or blighted property to agricultural uses.
- Establish a population ratio goal for community gardens within the City and ensure that community gardens are equally accessible to all members of the community.
- Identify potentially feasible site locations for urban agriculture and community gardens on public land or underutilized privately owned parcels. Potential opportunities include undeveloped open space, utility right of ways, conversion of portions of public parks, closure and conversion of redundant streets, or underdeveloped lots in residential neighborhoods.
- Create and implement a Community Garden Program through the Green Oceanside Campaign to designate community garden coordinators for each garden and provide guidance on appropriate design, maintenance, and operations of community gardens.
- Amend zoning regulations to allow for urban agriculture and community gardens in appropriate zones.
- Encourage the development of community gardens in conjunction with school sites or other institutional uses as both an educational and food resource.
- Provide incentives to multi-family developments that include community gardens for residents.
- Provide incentives to Green Oceanside Business Network members who participate or sponsor community garden projects.
- The City will promote urban agriculture, community gardening, and backyard-composting education through the Green Oceanside Campaign.

## AF2: Urban Agriculture and Community Gardens

GHG Reduction – Not Quantified

Criteria would be established in the next update to the Community Facilities Element of the General Plan.



Co-Benefits:



## Measure AF3: Agricultural Lands Conservation Program

Protecting agricultural lands from conversion to urban or rural residential development promotes smart growth infill developments, ensures open space remains available, and supports a healthy agricultural economy and resulting food security. A healthy and resilient agricultural sector is becoming increasingly important in meeting the challenges occurring and anticipated as a result of climate change. Recent University of California research estimates that land in agricultural and healthy open space use sequesters up to 70 times more carbon than any form of urban development (California Strategic Growth Council 2017). The California Strategic Growth Council established the Sustainable Agricultural Lands Conservation (SALC) Grant Program to fund plans and conservation acquisitions in order to avoid increases in emissions associated with the development of agricultural lands. Grants through the SALC Program are evaluated based on difference between property fair market value (price a developer may pay) and agricultural restricted value (price a farmer may pay). Through these grants, willing agricultural property owners are compensated for placing an easement on their agricultural property that limits future uses and extinguishes future development potential. As a result, the agricultural land is preserved and the property owner receives compensation that can make its continued use for agriculture more viable. The SALC Program requires a minimum 10 percent local funds match.

The City includes agricultural lands in the 3,450-acre Morro Hills Community (also known as South Morro Hills). Based on City surveys, agricultural production in Morro Hills is estimated to include approximately 700 acres of avocado trees, 400 acres of tomatoes plants, 400 acres of cut flowers, 150 acres of nut trees, 100 acres of bell pepper plants, and 415 acres of other agricultural products such as tropical fruit trees, lemons, limes, berries, wine grapes, brussel sprouts, and herbs. Due to the increasing real estate prices and potential challenges to the financial viability of several agricultural operations, pressure to open Morro Hills to development has increased in recent years. Proposed alternative uses for Morro Hills have included residential development or agriculture based tourism (“agritourism”). An agricultural easement program can preserve agricultural uses for future generations and avoid increased emissions associated with the development of agricultural lands for residential uses.<sup>11</sup>

### Strategies:

- Collaborate with landowners to prepare agricultural easement grant applications to the SALC Program. Between 2020 and 2024, identify internal or external funding sources for minimum matching funds for up to 250 acres of agricultural preservation easements. Between 2025 and 2029, identify internal or external funding sources for minimum matching funds for up to 250 acres of agricultural preservation easements.

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<sup>11</sup> Morro Hills is within the City boundary and therefore is assessed against potential upzone to residential. Rights to be extinguished would be calculated at the time of grant application. Avoided emissions are estimated based on the existing maximum allowable development density of one residence per 2.5-acre lot (0.4 units per acre) and the base density for single family zoning districts, 3.6 units per acre. Thus, conservation easements were estimated to preclude development of 3.2 residences per acre (1,600 total residences). Each precluded residence is estimated to avoid 8.1 MT CO<sub>2</sub>E.

## AF3: South Morro Hills Agricultural Lands Conservation Program

GHG Reductions Achievable by Measure

2030:

12,990 MT CO<sub>2</sub>e



Co-Benefits:



## Measure AF4: Carbon Farming Program

The term “carbon farm” refers to farms that are engineered to maximize carbon sequestration. Alternative management practices such as reduced tillage, cover cropping, organic farming, and reduced synthetic nitrogen fertilization (or replacement with compost-based fertilizers) have been demonstrated to result in quantifiable carbon sequestration (CEC 2009). Additional conservation measures include compost application, anaerobic digestion of waste, silvopasture, range planting, windbreak establishment, filter strips, conservation crop rotation, improved nutrient management, and multistory cropping. Base scenarios for demonstrative carbon farming practices indicate that application of compost topsoil can increase carbon sequestration by 14 MT CO<sub>2</sub>e per hectare. Establishment of local carbon farms can demonstrate benefits of sustainable agriculture practices and thereby encourage other agricultural operations to incorporate these practices (Marin Carbon Project Carbon Farming Project 2016).

### Strategies:

- Collaborate with agricultural landowners and provide incentives for the establishment of up to 50 acres of demonstration carbon farms by 2025.
- Expand the Green Oceanside Business Network to include members with agriculture-based businesses.

### AF4: Carbon Farming Program

GHG Reduction – Not Quantified

The intent of this measure is to promote sustainable practices throughout the agricultural community. Reductions will be quantified once demonstrated sustainable practices and adoption rates are identified.



Co-Benefits:





## Summary of the Reductions

### Implementation and Effective Life of Measures

Each GHG reduction strategy is designed with a specific implementation timeframe, useful life, and horizon year. Implementation timeframes are generally summarized as near-term (0–2 years), mid-term (2–5 years), or long-term (5+ years). Once implemented the annual reductions achieved by a strategy are rarely static and may be either increase or diminish with time. Reductions achieved by strategies that remove barriers to emerging technologies (e.g., electric vehicle charging infrastructure) generally increase as the emerging technology becomes more independently competitive, while reductions achieved by measures that promote efficiency improvements (e.g., benchmarking) generally diminish as the remaining stock of unimproved buildings decreases. The end of the useful life of a strategy, or horizon year, refers to the point at which the strategy becomes standard for the industry, required by regulation, or the strategy no longer achieves additional GHG emission reductions.

For example, the City recently retrofitted streetlights with General Electric’s LightGrid™ smart-grid light-emitting diode fixtures. This emerging technology was unveiled at the 2013 LightFair exhibition. The measure was identified by the City in 2014 and the implementation timeframe include a year for securing financing, contract negotiations, and fixture replacement. Thus, the initial implementation year was 2015. Over the useful life of this early adoption measure, GHG emission reductions will slowly decrease due to the cleaning of grid electricity (RPS). The horizon year of this measure would be the year in which similar technologies become standard for the industry.

The majority of CAP GHG reduction strategies would be implemented in the near-term. Strategies with delayed or partially delayed implementation include E1—Renewable Energy Procurement (long-term goal for 2030), W3—Local Water Supply Development (long-term goals for 2035 and 2045), SW2—Enhanced Waste Diversion (accelerates after 2020), and AF3—South Morro Hills Agricultural Lands Conservation Program (begins in 2020 and accelerates in 2025).

The majority of CAP GHG reduction strategies would achieve all reductions (i.e. reach the horizon year) by 2030. Strategies with long-term horizons include W1—Implementation of the Water Conservation Master Plan (horizon year is 2040), W3—Local Water Supply Development (long-term goals to 2045), TL4—Expand Complete Streets Programs (no definitive horizon), TL5—Transportation Demand Management Plans (no definitive horizon), AF1—Urban Forestry Program (no definitive horizon), and AF3—South Morro Hills Agricultural Lands Conservation Program (horizon year is 2055).

### Reduced Forecast

**Table 12** summarizes the emissions reductions achieved by implementation of all local reduction measures. As shown, the identified measures would reduce emissions by approximately 3 percent compared to the 2020 Adjusted BAU emissions and by 19 percent compared to the 2030 Adjusted BAU emissions. Certain reduction measures would continue to achieve further reductions throughout the forecast horizon while others exceed their useful life. For example, while agricultural preservation easements would be anticipated to last indefinitely; many solar panels installed prior to 2020 would

likely begin to be removed by 2040. The reduction measures would continue to reduce emissions by approximately 24 percent as compared to the Adjusted BAU throughout the forecast horizon.

Sectors	Emissions Reductions (MT CO <sub>2</sub> e)			
	2020	2030	2040	2050
Residential Energy	0 (0%)	31,503 (17%)	31,719 (17%)	31,750 (17%)
Commercial Energy	5,089 (3%)	53,666 (30%)	77,147 (33%)	99,899 (34%)
Industrial Energy	2,286 (5%)	21,021 (42%)	32,397 (48%)	44,356 (50%)
Transportation	4,633 (1%)	22,621 (7%)	23,227 (7%)	24,682 (8%)
Solid Waste	10,331 (24%)	21,346 (48%)	26,854 (61%)	26,854 (60%)
Water & Wastewater	268 (1%)	2,816 (11%)	5,586 (22%)	7,227 (28%)
Total Emissions Reduction	22,607 (3%)	152,973 (19%)	196,930 (23%)	234,768 (24%)
CO <sub>2</sub> Sequestration	50	302	554	806
Total Net Emissions Reduction	22,657	153,276	197,485	235,574

MT CO<sub>2</sub>e = metric tons of carbon dioxide equivalent

## Comparison to Reduction Targets

**Table 13** summarizes the baseline emissions, as well as the reduced emissions after implementation of the state and local reduction measures. As discussed in Chapter 2, recent guidance from the 2017 Scoping Plan, is for local governments to achieve “emissions of no more than six MT CO<sub>2</sub>e per capita by 2030 and no more than two MT CO<sub>2</sub>e per capita by 2050” (California ARB 2017). Thus, state-aligned targets for interim years 2035, 2040, and 2045 roughly equate five, four, and three CO<sub>2</sub>e per capita, respectively. The City has developed local GHG emission reduction goals that go beyond state-aligned targets to demonstrate its commitment to further long-term GHG reduction goals. Local reduction goals for interim years 2020, 2030, 2040, and 2050 equate to five, four, three, and two CO<sub>2</sub>e per capita.

With incorporation of GHG reduction strategies, emission levels are anticipated to decrease from currently levels (5.8 CO<sub>2</sub>e per capita) to approximately 5.0 CO<sub>2</sub>e per capita in 2020 and 3.6 CO<sub>2</sub>e per capita in 2030. These emission levels meet the state-aligned reduction targets of 10 CO<sub>2</sub>e per capita in 2020 and 6 CO<sub>2</sub>e per capita in 2030 and would meet local reduction goals.

As discussed previously, the majority of CAP GHG reduction strategies would achieve all reductions by 2030. After 2030, per capita emission levels would remain nearly constant through 2040 and would begin to increase again after 2040 due to continued commercial and industrial growth.

As shown in **Figures 13 and 14**, below, the City will meet their communitywide reduction goals from 2020 through 2035; however, additional reductions are needed to meet the 2040 through 2050 reduction targets. As the planning horizon of the City’s General Plan and other City conservation plans generally do not extend beyond 2035, provision of additional reduction measures to fully address emission levels in 2040 and 2050 may be speculative. The City may consider and establish additional reduction measures in subsequent updates to this CAP.

**Table 13 Community Emissions and Targets Comparison**

Metric	Emissions (MT CO <sub>2</sub> e)							
	2013	2020	2025	2030	2035	2040	2045	2050
City Population Forecast	170,361	177,840	181,356	184,941	188,597	188,857	189,117	189,377
City Employment Forecast	37,721	44,068	50,466	57,793	66,184	75,793	86,797	99,399
Total Service Population	208,083	221,908	231,822	242,734	254,781	264,650	275,914	288,776
Per Capita Adjusted BAU Emissions	5.8	5.1	4.7	4.4	4.4	4.6	4.9	5.1
Per Service Population Adjusted BAU Emissions	4.7	4.1	3.6	3.3	3.3	3.3	3.3	3.4
Adjusted BAU Emissions	984,012	904,088	845,114	810,293	837,064	869,434	921,234	967,458
Local Reductions	-	22,657	73,221	153,276	178,733	197,485	218,382	235,574
Reduced Forecast	-	881,431	771,893	657,017	658,331	671,949	702,852	731,884
Per Capita Reduced Forecast	-	5.0	4.3	3.6	3.5	3.6	3.7	3.9
Per Service Reduced Forecast	-	4.0	3.3	2.7	2.6	2.5	2.5	2.5
Oceanside Emissions Goals	-	889,200	816,101	739,764	660,090	566,570	472,792	378,754
Additional Reductions Needed	-	<b>Target Met</b>	<b>Target Met</b>	<b>Target Met</b>	<b>Target Met</b>	<b>105,379</b>	<b>230,061</b>	<b>353,130</b>

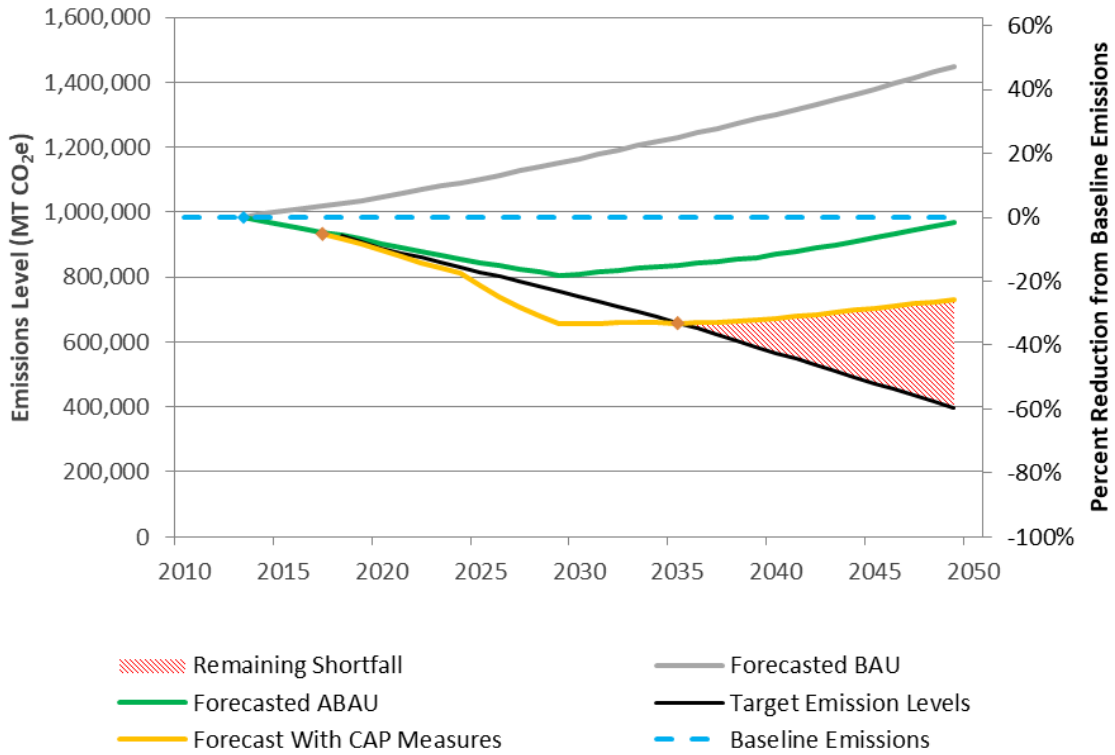


Figure 13 Reduced Community Emissions Forecast

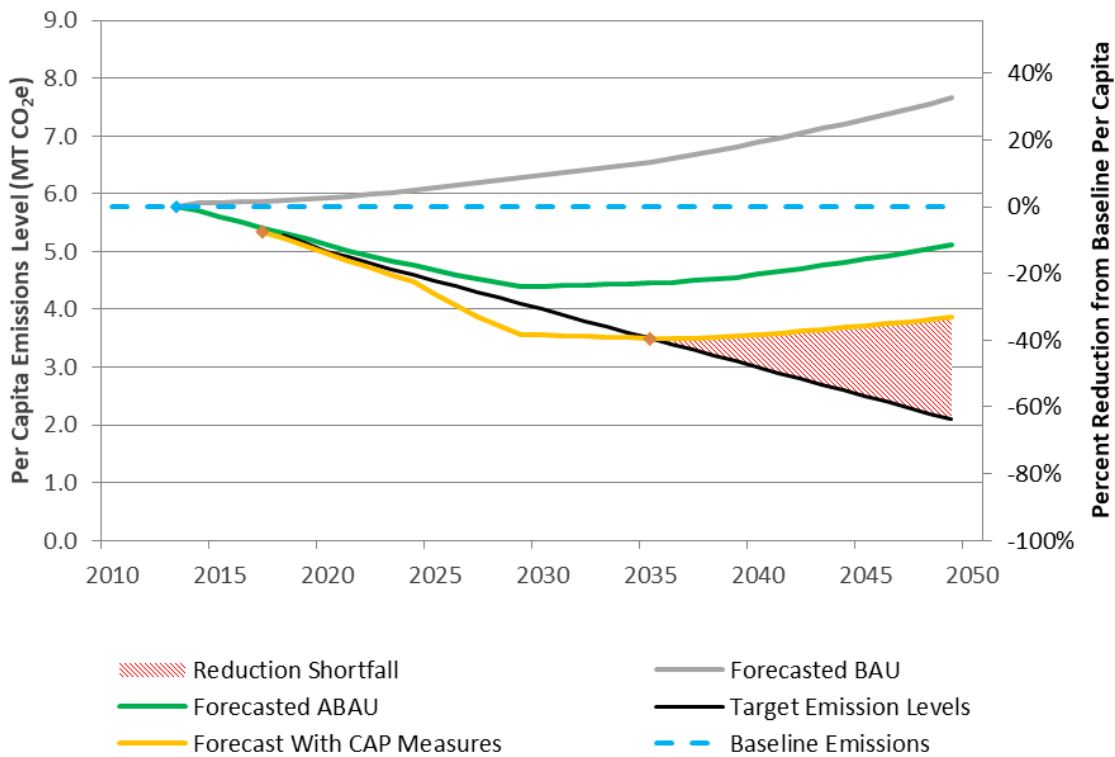


Figure 14 Per Capita Reduced Community Emissions Forecast

# 04 | Implementation



# Chapter 4 Implementation

This chapter describes how the CAP will be implemented. Success in meeting the City’s GHG emission reduction goals requires cooperative and innovative actions by City officials, residents, local businesses, and other local government entities, such as the SANDAG, SDG&E, and NCTD. This chapter outlines key steps for the implementation of this CAP.

## Administration and Staffing

Implementation of the CAP and recommended reduction measures requires ongoing management, oversight, and staffing. An interdisciplinary Climate Action Planning Team is proposed to support and guide the City’s efforts to conserve energy and reduce emissions. The Climate Action Planning Team would include members from the following core departments, with other disciplines engaged as needed to ensure coordinated leadership in plan implementation: City Manager’s Office, Development Services, Public Works, Water Utilities, Neighborhood Services, and Economic Development.

The Climate Action Planning Team would collaborate with various City departments to ensure ongoing implementation of reduction strategies with each department’s purview and would be responsible for securing and allocating funding, monitoring the effectiveness of emission reduction programs, preparation of annual progress reports, and community outreach. The Climate Action Planning Team would be composed of members of the City’s Green Oceanside Campaign. The Climate Action Planning Team would collaborate with Green Oceanside Campaign volunteers and leverage existing outreach opportunities, such as the community events and Green Oceanside mobile phone application.

## Measure Financing

Implementation of the local reduction measures may require cash output for the capital improvements and other investments, as well as result in increased operations and maintenance costs. This section presents a summary of funding and financing options (see **Table 14**, below).

The City intends to avail itself of technical support and other resources provided through SANDAG’s Regional Climate Action Planning Framework (ReCAP). With the goal of establishing consistent methodologies and data sources for local climate action efforts, ReCAP offers best practices for developing, implementing, monitoring, and updating the technical components of local CAPs. The City has already engaged ReCAP to provide a benefit-cost assessment of emissions reduction measures as well as a CAP implementation cost analysis. It is anticipated that future GHG emissions inventories for the City will be prepared with ReCAP support, and that ReCAP will provide guidance and resources for CAP implementation and monitoring.

The City will also likely seek support from the Center for Sustainability Energy and SDG&E in implementing and monitoring certain emissions reduction measures. For instance, the City intends to work with the Center for Sustainability Energy to develop a means of monitoring compliance with the energy and water use disclosure and benchmarking requirements established in the CAP. The City will also try to leverage grants and technical assistance from SDG&E to promote energy efficiency programs, electric vehicle charging infrastructure, and renewable energy programs.

**Table 14 Municipal Funding Sources**

Municipal Funding Source	Description
<b>General Funding Sources</b>	
General Obligation Bond	<ul style="list-style-type: none"> <li>■ A general obligation bond is a form of long-term borrowing and could be utilized to fund municipal improvements. General obligation bonds may be levied to fund nearly any municipal action.</li> </ul>
General Fund	<ul style="list-style-type: none"> <li>■ The General Fund is the City’s primary discretionary budget, used to fund most City programs including public safety. The extent that programs and projects are of high priority and do not meet the criteria for other, more restrictive funding sources, the City Council allocated General Funds through the annual budget process. Sources for the General Fund include property taxes, transient occupancy taxes, and local sales taxes.</li> </ul>
Enterprise Funds	<ul style="list-style-type: none"> <li>■ Enterprise funds are funds raised by a government entity by selling goods and services to the public. City enterprise funds include utility fees for water supply, wastewater treatment, and solid waste collection.</li> </ul>
Development Impact Fees	<ul style="list-style-type: none"> <li>■ Pursuant to the California Subdivision Map Act, the City may impose fees on individuals that subdivide land for the purpose of development. These fees, commonly referred to as “development impact fees,” may be used to fund public facility improvements such as construction of parks, recreational facilities, fire stations, or libraries. The City currently levies \$4,431 parks fee and a \$2,621 public facility fee per residential dwelling unit, \$902 public facilities fee per thousand square feet of non-residential building space, \$362 thoroughfare fee per vehicle trip, and several other school, traffic signal, water, wastewater, water utilities, drainage, and inclusionary housing in lieu fees.</li> </ul>
Mello-Roos Taxes	<ul style="list-style-type: none"> <li>■ Pursuant to the Community Facilities Act of 1982, the City of Oceanside may propose a Community Facilities District (CFD) measure. With two-thirds voter approval, the measure would establish a CFD tax on all properties within a specified boundary. CFD taxes are collected with property taxes and may be used to fund eligible projects.</li> </ul>
<b>Municipal Grant Opportunities</b>	
San Diego Association of Governments (SANDAG)	<ul style="list-style-type: none"> <li>■ For funding measures related to transit, bicycle, or pedestrian improvements, the following funding sources from SANDAG may be utilized:                             <ul style="list-style-type: none"> <li>• Smart Growth Incentive Program</li> <li>• Active Transportation Grant Program</li> </ul> </li> <li>■ Employment Access and Reverse Commute and New Freedom Programs</li> <li>■ The Regional Energy and Climate Change Program provides guidance and resources jurisdictions.</li> </ul>
California Air Resources Board (California ARB)	<ul style="list-style-type: none"> <li>■ Clean Vehicle Rebate Project provides incentives for public fleets located in or serving disadvantaged communities. Rebates offered to public fleets located in or serving disadvantaged communities are up to \$15,000 for fuel cell vehicles, \$10,000 for battery electric vehicles, and \$5250 for plug-in hybrid electric vehicles.</li> <li>■ The Water-Energy Grant Program allocates funds for projects that reduced water and energy use. Specific focuses of the program include commercial or institutional water efficiency programs and residential water efficiency programs that benefit disadvantaged communities.</li> </ul>
California Dept. of Forestry and Fire Protection (CAL FIRE)	<ul style="list-style-type: none"> <li>■ California Department of Forestry and Fire Protection Urban and Community Forestry Program works to optimize the benefits of trees and related vegetation through multiple-objective projects.</li> <li>■ Projects must include a tree-planting component, preferably near an urban area or urban cluster.</li> </ul>

Table 14 Municipal Funding Sources	
Municipal Funding Source	Description
California Dept. of Resources Recycling and Recovery (CalRecycle)	<ul style="list-style-type: none"> <li>■ The GHG Reduction Loan Program provides funds to support new or expanded organics infrastructure such as composting and anaerobic digestion facilities. Loans are subject to 4.0 percent interest.</li> <li>■ CalRecycle grant programs allow jurisdictions to assist public and private entities in management of waste streams such as food waste, organics, recycled fiber, bottles and cans, used oil, plastic, and glass.</li> <li>■ Incorporated cities and counties in California are eligible for funds.</li> </ul>
California Dept. of Transportation (Caltrans)	<ul style="list-style-type: none"> <li>■ The Active Transportation Program provides grant funding for projects that encourage active modes of transportation such as walking and bicycling.</li> </ul>
California Natural Resources Agency (CNRA)	<ul style="list-style-type: none"> <li>■ The Urban Greening Program will fund projects that acquire, create, or enhance community parks and green spaces. At least 25 percent of available funds are allocated to benefit disadvantaged communities and 10 percent are allocated to projects within disadvantage communities.</li> </ul>
California Strategic Growth Council (SGC)	<ul style="list-style-type: none"> <li>■ The SALC Program allocates grant funds for preservation of agricultural lands at-risk of conversion to other uses such as residential.</li> <li>■ The Affordable Housing and Sustainable Communities Program provides grant funding for affordable housing loans for compact transit-oriented development and related infrastructure programs. Examples of projects eligible for funding include construction, rehabilitation, or acquisition of affordable housing, walkway improvements, bikeway improvements, non-capacity increasing streetscape improvements, street crossing improvements, traffic calming, street furniture, bicycle parking, transit service expansion, transit subsidy programs, etc.</li> </ul>

Some funding sources are not necessarily provided directly to a City, but may be given to individuals, businesses, institutions, or larger regional agencies such as SANDAG. In addition to funding sources available to the City, the City should also understand how to promote funding sources available to local residents, businesses, and institutions. Promoting the benefits of sustainable practices and providing resources on how financing can be secured is one of the most important roles a local government can play in helping the community to implement many of the reduction measures. **Table 15** identifies funding sources available to local residents, businesses, and institutions.

Table 15 Non-Municipal Funding Sources		
Other Funding Source	Eligible Candidate	Description
California Air Resources Board (California ARB)	Local Fleets	<ul style="list-style-type: none"> <li>■ Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project provides vouchers to help California fleets purchase advanced technology trucks and hybrids</li> </ul>
California Community Services and Development	Low-income Households	<ul style="list-style-type: none"> <li>■ The LIWP provides financial assistance for energy efficiency and weatherization improvements. Projects include sealing cracks and holes, increasing insulation, replacing windows, water heater blankets, and air conditioning tune-ups. Low-income homeowners and renters are qualified applicants; funds are distributed based on need and typically prioritize elderly, disabled, or households with young children.</li> </ul>
California Department of Food and Agriculture	Agricultural Operations	<ul style="list-style-type: none"> <li>■ The Healthy Soils Incentives Program allocates grant funds for projects that build soil carbon and reduce agricultural GHG emissions.</li> </ul>

Table 15 Non-Municipal Funding Sources		
Other Funding Source	Eligible Candidate	Description
California Department of Transportation (Caltrans)	NTCD	<ul style="list-style-type: none"> <li>The Low Carbon Transit Operations Program provides operating and capital assistance for transit agencies that serve disadvantaged communities. Grants may fund new or expanded transit routes, intermodal transit facilities, and facility and equipment maintenance.</li> </ul>
	SANDAG	<ul style="list-style-type: none"> <li>The Active Transportation Program provides grant funding for projects that encourage active modes of transportation such as walking and bicycling. Forty percent of the overall budget is reserved for MPO projects such as those administered by SANDAG.</li> </ul>
Energy Upgrade California	Residents or Businesses	Energy Upgrade California is a statewide collaboration between the California Public Utilities Commission, California Energy Commission, and utility providers. The program provides up to \$4,000 in rebates to offset the cost of energy efficiency improvements. Energy Upgrade California is funded by the American Recovery and Reinvestment Act, California utility ratepayers, and private contributions.
Federal Housing Administration (FHA)	Residents	<p>The U.S. Department of Housing and Development piloted Energy Efficient Mortgages (EEM) in 1992 and expanded the program to be national in 1995.</p> <ul style="list-style-type: none"> <li>EEMs typically are used to purchase a new home that is already energy efficient, such as an ENERGY STAR® qualified home.</li> <li>An EEM is a mortgage that credits a home's energy efficiency in the mortgage itself.</li> <li>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.</li> </ul>
Federal Tax Credits for Energy Efficiency	Residents	<ul style="list-style-type: none"> <li>Tax credits for many energy efficiency upgrades concluded in 2016.</li> <li>Ongoing federal tax credits are available for solar energy systems (solar water heaters or solar photovoltaic panels) at 30 percent rebate through 2019, 26 percent rebate for 2020, and 22 percent rebate for 2021.</li> </ul> <p>Upgrades may be promoted to residents.</p>
Green Oceanside Business Network	Businesses	<ul style="list-style-type: none"> <li>The Green Oceanside Business Network is a free program that seeks to spur innovation and environmental responsibility. Member benefits include marketing incentives such as public recognition through the Green Oceanside mobile app and website and recognition at certain city-sponsored events. Additionally the program offers technical assistance and network support to members.</li> </ul>
Property-Assessed Clean Energy (PACE)	Residents or Businesses	<p>PACE Programs provide financing for energy and water efficiency improvements through property-secured loans that are repaid through property tax assessments and may transfer with sale of the property. PACE Programs generally offer long-term, low-interest loans and alleviate many concerns that a homeowner may move before the return on investment period of energy efficiency upgrades. The City of Oceanside passed a resolution to permit PACE programs in June 2013.</p> <ul style="list-style-type: none"> <li>SANDAG has implemented the HERO (a PACE program) in the County to assist residents in financing residential energy efficiency and solar retrofits. HERO launched in Oceanside in February 2014. By August 2016, the HERO Program had provided \$17 million of financing for energy and water efficiency upgrades in Oceanside.</li> <li>Ygrene is a privately funded PACE Program. By July 2016, the Ygrene Program had provided nearly \$3.7 million in financing for energy and water efficiency upgrades in Oceanside.</li> </ul>

Table 15 Non-Municipal Funding Sources		
Other Funding Source	Eligible Candidate	Description
San Diego Gas & Electric (SDG&E)	Residents, Businesses, or Institutions	<p>SDG&amp;E oversees several local components of Energy Upgrade California and Go Solar California. SDG&amp;E’s identifies and distributes rebates for a wide variety of energy efficiency upgrades and also provides educational resources. Specific rebate programs administered under the umbrella of the Go Solar California initiative include:</p> <ul style="list-style-type: none"> <li>■ The CSI General Market Program funds solar photovoltaics and other solar thermal generating technologies for residential, commercial, agricultural, governmental, and non-profit buildings.</li> <li>■ The CSI Thermal Program funds solar hot water systems for homes and businesses.</li> <li>■ The SASH Program funds solar photovoltaic systems for low-income households.</li> <li>■ The Multi-family Affordable Solar Homes Program funds solar photovoltaic systems for low-income households.</li> <li>■ The CSI Research, Development, Demonstration and Deployment Program provides grants for demonstrative projects.</li> </ul>

## Implementation Timeline and Prioritization

The success of the CAP depends upon the timely implementation of reduction measures and the active participation of the Oceanside community at-large. Few reduction measures involve a singular, unilateral implementation by a City employee or department; many reduction measures include distinct outreach, feedback, planning, and implementation actions. Determining which reduction measures are difficult to achieve and require substantial investment of time or money and which reduction measures are “low-hanging fruit,” are important considerations for climate action planning. Prioritization of reduction measures is generally based on the following factors:

- Level of City Authority/Control
- Required Time for Implementation
- Funding Availability
- GHG Reduction Efficiency
- Implementation Cost/Cost Efficiency
- Required Staff Effort
- Stakeholder Input
- Measure Co-Benefits
- Other Implementation/Feasibility Constraints

In consideration of these factors, the following is an outline of key priorities and phases of implementation.

- **Commencement Phase – Concurrent with CAP adoption (2019):**  
Appoint Climate Action Planning Team members and incorporate CAP goals into the Green Oceanside Campaign.
- **Phase 1 – Within two years of CAP adoption (2019–2020):**  
Develop key ordinances; implement the measures that the City has independent control over; establish outreach programs through the Green Oceanside Campaign, and prepare supporting research for Phase 2 measures.
- **Phase 2 – Within five years of CAP adoption (2019–2023):**  
Implement remaining measures that were contingent on outreach efforts, supporting research, or other planning efforts.
- **Phase 3 – Beyond five years of CAP adoption (2024–2030):**  
Continue to implement Phase 1 and Phase 2 measures; implement long-term measures.

The reduction measures were evaluated qualitatively to assess the level of effort required for implementation. The level of effort associated with each GHG reduction measure have been categorized based on the convention of low, moderate, or high accounting for the amount of staff time and the financial burden on the City. Criteria are shown in **Table 16**, below.

Table 16 Measure Implementation Criteria	
Level of Effort	Implementation Difficulty
Low	The measure could be implemented by existing staff and/or programs and that upfront costs are minimal or would be nearly offset by available funding sources.
Moderate	The measure would burden existing staff and/or programs to the point that additional staff may be required. Additionally, the measure would involve direct short-term costs that are unlikely to be offset by available funding sources.
High	The measure would burden existing staff and/or programs to the point that additional staff may be required. Additionally, the measure would involve direct long-term recurring costs that are unlikely to be offset by available funding sources.

Individual assessment of each the level of effort associated with each measure is summarized in **Table 17**, below. For reference, Table 3 also includes the GHG emission reduction that would be achieved by each measure.

**Table 17 Level of Effort of Reduction Measures**

Measure Strategies	Level of Effort	Reduction Potential
<b>E1—Renewable Energy Procurement</b> Promote Participation in SDG&E EcoChoice and Ecoshare Programs Annual Reporting on SDG&E Procurement and Program Participation Conduct Community Choice Energy Program Feasibility Study	High	High 73,685 MT CO <sub>2</sub> e by 2030
<b>E2—Solar Photovoltaic Promotion Program</b> Adopt Solar Ordinance for New Development Promote Solar Financing Options Maintain Expedited Permitting for Residential Solar PV Systems Establish an Aggregated Demand Solar PV Program	Low	High 19,448 MT CO <sub>2</sub> e by 2030
<b>E3—Residential Energy Conservation and Disclosure</b> Promote Residential Energy Use Disclosure Promote Energy Efficiency Improvement Financing Options	Moderate	Moderate Not Quantified
<b>E4—Promotion of Low-Income Financing Programs</b> Promote Low-Income Financing Options	Moderate	Moderate Not Quantified
<b>E5—Non-Residential Building Energy Benchmarking and Disclosure</b> Promote Non-Residential Energy Use Disclosure	Moderate	Moderate Not Quantified
<b>W1—Implementation of the Water Conservation Master Plan</b> Implement Water Conservation Master Plan	Moderate	Moderate 1,610 MT CO <sub>2</sub> e by 2040
<b>W2—Non-Residential Water Use Benchmarking and Disclosure</b> Promote Non-Residential Water Use Disclosure	Moderate	Moderate Not Quantified
<b>W3— Increased Local Water Supply</b> Implement Capital Improvements to Increase the Supply Capacity of Recycled Water	High	Moderate 5,608 MT CO <sub>2</sub> e by 2045
<b>SW1—Implementation of Zero Waste Strategic Resource Plan</b> Implement the Zero Waste Strategic Resource Management Plan	High	High 10,331 MT CO <sub>2</sub> e by 2020
<b>SW2— Beyond 2020 - Enhanced Waste Diversion</b> Beyond 2020 - Enhanced Waste Diversion	High	High 16,524 MT CO <sub>2</sub> e by 2035
<b>TL1— Smart Growth Policies</b> Adopt Smart Growth Policy Annual Reporting on Development Patterns Incent Development in SGOA	High	Moderate <sup>12</sup> 2,486 MT CO <sub>2</sub> e by 2030
<b>TL2—Electric Vehicle Promotion</b> Adopt Electric Vehicle Infrastructure Ordinance to Require EV stations Promote Incentives for EVs and EV Charging Stations Establish an Aggregated Demand EV Program	Moderate	Moderate 4,923 MT CO <sub>2</sub> e by 2030
<b>TL3—Preferential Parking Spaces for Clean Air Vehicles</b> Adopt Clean Air Vehicle Parking Ordinance	Low	Low Not Quantified

<sup>12</sup> Smart Growth Policies would achieve be anticipated to achieve greater long-term reductions than reflected by the reported reduction potential. Increased density in development clusters such as SGOAs facilitates implementation of subsequent GHG reduction measures such as enhanced transit, reduced parking requirements, etc.

Table 17 Level of Effort of Reduction Measures		
Measure Strategies	Level of Effort	Reduction Potential
<b>TL4—Expand Complete Streets Programs</b> Incorporate Criteria for Multiuse Pathways Opportunity Sites in the Bicycle/Pedestrian Master Plan Update. Adopt Complete Streets Policy to Facilitate Incorporation of Complete Streets Concepts Periodically Update the Citywide Traffic Signal Priority List Develop a Neighborhood Electric Vehicle Implementation Plan Promote Walking, Bicycling, or Carpooling to School	Low	Low Not Quantified
<b>TL5—Transportation Demand Management Plans</b> Adopt a TDM Ordinance to require TDM Plans for New Developments Conduct Surveys to Determine Existing TDM Measure Implementation Provide Incentives for Implementation of TDM Measures at Existing Businesses	Moderate	Moderate 4,161 MT CO <sub>2</sub> e by 2050
<b>AF1—Urban Forestry Program</b> Inventory Existing Tree Canopy Adopt a Green Streets Ordinance to Require Shade Trees in New Developments Adopt a Green Streets Policy to Require Shade Trees in CIP Roadway Projects Promote Tree Canopy Expansion in Public Right-of-Way Support Volunteer Tree Planting and Stewardship Efforts Allow CEQA Impact Mitigation through Tree Planting and Stewardship	Low	Low 806 MT CO <sub>2</sub> e
<b>AF2—Urban Agriculture and Community Gardens</b> Adopt an Urban Agriculture and Community Gardens Policy to Establish Goals and Measures Implement an Urban Agriculture and Community Gardens Program Adopt an Urban Agriculture Incentive Zone Ordinance Promote Urban Agriculture and Community Gardening	Low	Low Not Quantified
<b>AF3—South Morro Hills Agricultural Lands Conservation Program</b> Develop an Agricultural Lands Conservation Program	Moderate	High 12,990 MT CO <sub>2</sub> e
<b>AF4—Carbon Farming Program</b> Implement a Demonstrative Carbon Farming Program	High	Low Not Quantified

The implementation actions associated with each GHG reduction measure as well as the responsible department are shown in **Table 18**, below. The prioritization of reduction measures including phasing and recommended schedule milestones is also included. As discussed previously, the prioritization of reduction measures is based on which measures are anticipated to be “low hanging fruit”; the City may revise schedule milestones based the level of effort experienced during implementation.

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
<b>E1—Renewable Energy Procurement</b>			
Promote Participation in SDG&E EcoChoice and Ecoshare Programs	Lead Department: <u>Water Utilities Department</u>  Ordinance Approved by: <u>City Council</u>	Phase 1	Plan Outreach Effort <u>Within 1 year of CAP Adoption</u>
			Identify Outreach Plan in Initial Annual Progress Report <u>Completed (Y/N)</u>
Annual Reporting on SDG&E Procurement and Program Participation		Phase 1 Phase 2 Phase 3	Report CPUC Forecasted RPS Procurement for SDG&E Annually <u>Completed (Y/N)</u>
			Report Program Participated and Report Minimum Diversion Rates Annually <u>Completed (Y/N)</u>
			Renewable Energy Procurement Goals for Aggregate Demand of Local Accounts <u>50 Percent by 2025</u> <u>75 Percent by 2030</u>
Conduct Community Choice Energy (CCE) Program Feasibility Study		Phase 3	Conduct Feasibility Study Within One Year of Forecasted Shortfall of Renewable Energy Procurement Goals Above <u>Completed (Y/N)</u>
	Recommend Creation of Municipal CCE Program or Joint Powers Authority CCE Program As needed <u>Completed (Y/N/NA)</u>		
<b>E2—Solar Photovoltaic Promotion Program</b>			
Adopt Solar Ordinance for New Development	Lead Department: <u>Development Services Department</u>  Ordinance Approved by: <u>City Council</u>	Phase 1	Ordinance Drafted <u>Within 3 months of CAP Adoption</u>
			Schedule Hearing Date <u>Within 6 months of CAP Adoption</u>
			Ordinance Adoption <u>Within 6 months of CAP Adoption</u>
			Target Requirement for New Development <u>50% Forecasted Energy Demand</u>
Promote Solar Financing Options	Lead Department: <u>Economic Development Department</u>  Collaborating with: <u>Water Utilities Department</u> & <u>Development Services Department</u>	Phase 1 Phase 2 Phase 3	Publish Information to Website <u>Within 1 year of CAP Adoption</u>
			Coordinate with SANDAG <u>Within 1 year of CAP Adoption</u>
			Plan Outreach Effort <u>Within 1 year of CAP Adoption</u>
			Target Households Notified <u>To be Established</u>
Maintain Expedited Permitting for Residential Solar PV Systems	Lead Department: <u>Development Services Department</u>	Phase 1 Phase 2 Phase 3	Target Average Residential PV Permitting <u>Less than 5 days</u>
			Target Average Commercial PV Permitting <u>Less than 12 days</u>

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
Establish an Aggregated Demand Solar PV Program	Lead Department: <u>Economic Development Department</u>  Collaborating with: <u>Water Utilities Department</u> & <u>Development Services Department</u>	Phase 1 Phase 2 Phase 3	Review California Solar Initiative Data to Identify Average Installation Costs for Various Solar PV System Sizes <u>Within 6 months of CAP Adoption</u>
			Compile List of Solar System Vendors Operating in Oceanside <u>Within 6 months of CAP Adoption</u>
			Solicit Interest from Vendors and Negotiate A Reduced "Bulk Pricing" for Installation Various Solar PV System Sizes <u>Within 1 year of CAP Adoption</u>
			Publish Information to Website <u>Within 18 months of CAP Adoption</u>
			Assess and Report Program Participation Annually <u>Completed (Y/N)</u>
<b>E3—Residential Energy Conservation and Disclosure</b>			
Promote Residential Energy Use Disclosure	Lead Department: <u>Water Utilities Department</u>	Phase 1	Plan Outreach Effort <u>Within 1 year of CAP Adoption</u>
			Identify Outreach Plan in Initial Annual Progress Report <u>Completed (Y/N)</u>
Promote Energy Efficiency Improvement Financing Options	Lead Department: <u>Development Services Department</u>  Collaborating with: <u>Water Utilities Department</u>	Phase 1 Phase 2 Phase 3	Publish Information to Website <u>Within 1 year of CAP Adoption</u>
			Coordinate with SANDAG <u>Within 1 year of CAP Adoption</u>
			Plan Outreach Effort <u>Within 1 year of CAP Adoption</u>
			<i>Target Households Notified <u>To be Established</u></i>
<b>E4—Promotion of Low-Income Financing Programs</b>			
Promote Low-Income Financing Options	Lead Department: <u>Development Services</u>  Collaborating with: <u>Water Utilities Department</u>	Phase 1 Phase 2 Phase 3	Publish Information to Website <u>Within 1 year of CAP Adoption</u>
			Identify Low-Income Households <u>Within 18 months of CAP Adoption</u>
			Plan Outreach Effort <u>Within 18 months of CAP Adoption</u>
			<i>Target Households Notified <u>To be Established</u></i>

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
<b>E5—Non-Residential Building Energy Benchmarking and Disclosure</b>			
Promote Non-Residential Energy Use Disclosure	Lead Department: <u>Water Utilities Department</u>	Phase 1	Plan Outreach Effort <u>Within 1 year of CAP Adoption</u>
			Identify Outreach Plan in Initial Annual Progress Report <u>Completed (Y/N)</u>
<b>W1—Implementation of the Water Conservation Master Plan</b>			
Implement Water Conservation Master Plan	Lead Department: <u>Water Utilities Department</u>	Phase 1 Phase 2 Phase 3	Continue Offering Rebates on Water Efficient Fixtures <u>Continued (Y/N)</u>
			Continue Requiring Automated Landscape Watering <u>Continued (Y/N)</u>
			Continue Outreach Efforts through Green Oceanside <u>Continued (Y/N)</u>
<b>W2—Non-Residential Water Use Benchmarking and Disclosure</b>			
Promote Non-Residential Water Use Disclosure	Lead Department: <u>Water Utilities Department</u>	Phase 1	Plan Outreach Effort <u>Within 1 year of CAP Adoption</u>
			Identify Outreach Plan in Initial Annual Progress Report <u>Completed (Y/N)</u>
<b>W3— Increased Local Water Supply</b>			
Implement Capital Improvements to Increase the Supply Capacity of Recycled Water	Lead Department: <u>Water Utilities Department</u>	Phase 1 Phase 2 Phase 3	Implement Phase I Recommendations from the Recycled Water Facility Plan <u>Within 5 years of CAP Adoption</u>
			Implement Phase II Recommendations from the Recycled Water Facility Plan <u>Within 7 years of CAP Adoption</u>
		Phase 3	Update the Recycled Water Facility Plan <u>Within 10 years of CAP Adoption</u>
			Target Recycled Water Supply <u>5.5 MGD by 2035</u> <u>7.5 MGD by 2045</u>
<b>SW1—Implementation of Zero Waste Strategic Resource Plan</b>			
Implement the Zero Waste Strategic Resource Management Plan	Lead Department: <u>Water Utilities Department</u>	Phase 1 Phase 2	Implement Phase 2 Recommendations <u>Support Resource Recovery Parks</u> <u>Take-back Diaper Policy</u> <u>Extended Producer Responsibilities</u> <u>Disposable Product Bans</u> <u>Construction Waste Recycling</u> <u>Food Recovery and Waste Recycling</u> <u>Increased Composting</u>
			Waste Diversion Rate <u>75% by 2020</u>

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
<b>SW2— Beyond 2020 - Enhanced Waste Diversion</b>			
Beyond 2020 - Enhanced Waste Diversion	Lead Department: <u>Water Utilities Department</u>	Phase 2 Phase 3	Continue Outreach Efforts through Green Oceanside <u>Continued (Y/N)</u>
			Reduce edible food waste generation through the implementation of food donation programs and services. <u>Completed (Y/N)</u>
			Prepare and implement a plan to divert organic waste from landfills to local facilities capable of receiving and/or processing organics for beneficial reuse (e.g. for compost and renewable energy via biogas cogeneration facilities). These facilities include those with anaerobic digestion capacity such as the City’s San Luis Rey Water Reclamation Facility. <u>Completed (Y/N)</u>
			Divert waste locally to minimize transportation emissions. <u>Completed (Y/N)</u>
			Co-locate local waste facilities with compatible end products to minimize transportation emissions <u>Completed (Y/N)</u>
			In 2020, the City will reevaluate the effectiveness of the Zero Waste Resource Management Plan’s programs as well as the City’s solid waste diversion rate. Through this effort, the City may establish new baseline diversion rates for consideration such as 80% by 2025, 85% by 2030, and 90% by 2035.
<b>TL1— Smart Growth Policies</b>			
Adopt Smart Growth Policy to Focus New Development in SGOAs	Lead Department: <u>Development Services Department</u>	Phase 1 Phase 2 Phase 3	SGOA Delineation by Parcel Number <u>Within 1 year of CAP Adoption</u>
	Ordinance Approved by: <u>City Council</u>		Policy Adoption <u>Within 18 months of CAP Adoption</u>
	Enforcement Established Through Annual Reporting to: <u>City Council</u>		Publish SGOA Delineation on website <u>Within 18 months of CAP Adoption</u>

**Table 18 Implementation Actions**

Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
Annual Reporting on Development Patterns and Recommendations	Lead Department(s): <u>Development Services Department</u> & <u>Neighborhood Services, Code Enforcement</u>	Phase 1 Phase 2 Phase 3	Quantify Annual and Cumulative Development Since CAP Adoption <u>Completed (Y/N)</u>
			Quantify Proposed Development <u>Completed (Y/N)</u>
			Estimate Future Development <u>Completed (Y/N)</u>
			<i>Target Residential Development in SGOA</i> <u>50 Percent of New Dwelling Units -</u> <u>300 new dwelling units by 2020</u> <u>550 new dwelling units by 2024</u> <u>890 new dwelling units by 2027</u> <u>1,150 new dwelling units by 2030</u>
			<i>Target Commercial Development in SGOA</i> <u>50 Percent of New Employment -</u> <u>1,160 new jobs by 2020</u> <u>3,030 new jobs by 2024</u> <u>5,770 new jobs by 2027</u> <u>8,030 new jobs by 2030</u>
			Assess Consistency with Smart Growth Policy <u>Completed (Y/N)</u>
Incent Development in SGOA	Lead Department(s): <u>Development Services Department</u> & <u>Public Works Department</u>  Collaborating with: <u>Water Utilities Department</u>  Approved by: <u>City Council</u>	Phase 1 Phase 2 Phase 3	Recommend Smart Growth Incentives As needed <u>Completed (Y/N/NA)</u>
			Implement Smart Growth Streamlined Permitting As needed <u>Completed (Y/N/NA)</u>
			Implement Public Infrastructure Improvements As needed <u>Completed (Y/N/NA)</u>
			Implement Zoning Amendments As needed <u>Completed (Y/N/NA)</u>
			Implement Relaxed Development Fees and Requirements As a Master Plan As needed <u>Completed (Y/N/NA)</u>
			Implement Smart Growth Development Credit Exchange Program As needed <u>Completed (Y/N/NA)</u>

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
<b>TL2—Electric Vehicle Promotion</b>			
Adopt EV Infrastructure Ordinance to Require EV stations	Lead Department(s): <u>Development Services Department</u>  Ordinance Approved by: <u>City Council</u>  Enforced by: <u>Neighborhood Services, Code Enforcement</u>	Phase 1	Ordinance Drafted <u>Within 3 months of CAP Adoption</u>
			Ordinance Adoption <u>Within 6 months of CAP Adoption</u>
			Target Pre-wiring for EV Charging Stations <u>All Residential Garages</u> <u>5% Residential Surface Parking</u> <u>10% Non-Residential Parking Spaces</u>
			Target EV Charging Station Requirement <u>50% of Pre-wired Spaces</u>
Promote Incentives for EVs and EV Charging Stations	Lead Department(s): <u>Development Services Department</u> & <u>Economic Development Department</u>  Collaborating with: <u>Water Utilities Department</u>  Zoning Amendment Approved by: <u>City Council</u>	Phase 1 Phase 2 Phase 3	Publish Information to Website <u>Within 1 year of CAP Adoption</u>
			Provide Permit Fee Waivers for EV Charging Station Installation <u>Within 1 year of CAP Adoption</u>
			Amend Zoning Code for By-Right Sale of EV in Commercial Zones <u>Within 1 year of CAP Adoption</u>
			Establish Incentives for EV Charging at Gas Stations <u>Within 2 year of CAP Adoption</u>
			Establish Incentives for EV Charging at Employment Centers <u>Within 2 year of CAP Adoption</u>
			Target Rebate Incentives Offered by City: <u>\$3,000 Level 2 Charging Station</u> <u>\$10,000 per DC Fast Charger</u> <u>Rebate Capped at 50% of Cost</u> <i>(limited rebates per property)</i>
Establish an Aggregated Demand EV Program	Lead Department: <u>Economic Development Department</u>  Collaborating with: <u>Water Utilities Department</u> & <u>Development Services Department</u>	Phase 1 Phase 2 Phase 3	Compile List of Various EV Models and Identify Average Prices <u>Within 1 year of CAP Adoption</u>
			Solicit Interest from Vendors and Negotiate A Reduced "Bulk Pricing" for Various EV <u>Within 18 months of CAP Adoption</u>
			Publish Information to Website <u>Within 2 years of CAP Adoption</u>
			Assess and Report Program Participation Annually <u>Completed (Y/N)</u>

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
<b>TL3—Preferential Parking Spaces for Clean Air Vehicles</b>			
Adopt Clean Air Vehicle Parking Ordinance	Lead Department: <u>Development Services Department</u>	Phase 1	Ordinance Drafted <u>Within 3 months of CAP Adoption</u>
	Ordinance Approved by: <u>City Council</u>		Ordinance Adoption <u>Within 6 months of CAP Adoption</u>
	Enforced by: <u>Neighborhood Services, Code Enforcement</u>		<i>Target Parking Requirement</i> <u>12% of Commercial and Industrial Parking Spaces</u>
<b>TL4—Expand Complete Streets Programs</b>			
Incorporate Criteria for Multiuse Pathways Opportunity Sites in the Bicycle/Pedestrian Master Plan Update.	Lead Department: <u>Public Works Department</u>	Phase 2	Pedestrian/Bicycle Master Plan Update <u>Within 5 years of CAP Adoption</u>
Adopt Complete Streets Policy to Facilitate Incorporation of Complete Streets Concepts	Lead Department(s): <u>Development Services Department</u> & <u>Public Works</u>  Enforcement Established Through Annual Reporting to: <u>City Council</u>	Phase 1	Require New Developments Provide Connections to/Extensions of Existing Bicycle and Pedestrian Networks <u>Within 6 months of CAP Adoption</u>
			Establish a complete streets criteria checklist for Capital Improvement Projects <u>Within 1 year of CAP Adoption</u>
			Establish criteria for identifying opportunities to convert intersections to roundabouts <u>Within 1 year of CAP Adoption</u>
		Phase 1 Phase 2 Phase 3	Require CIP roadway construction and maintenance projects be reviewed for potential opportunities to incorporate complete street improvements <u>Within 1 year of CAP Adoption</u>  <i>Target Single Passenger Vehicle Commute</i> <u>Maintained at less than 80%<sup>13</sup></u>
Periodically Update the Citywide Traffic Signal Priority List	Lead Department: <u>Public Works Department</u>	Phase 1 Phase 2 Phase 3	Continue Periodically Update the City Traffic Signal Priority List <u>Continued (Y/N)</u>
Develop a Neighborhood Electric Vehicle Implementation Plan	Lead Department: <u>Public Works Department</u>	Phase 1	Identify and Contact Interested Parties <u>Within 3 months of CAP Adoption</u>
			Establish Plan Goals, Identify Costs, and Solicit Community Feedback <u>Within 1 year of CAP Adoption</u>
Promote Walking, Bicycling, or Carpooling to School	Lead Department: <u>Water Utilities Department</u>	Phase 1 Phase 2 Phase 3	Plan Outreach Effort <u>Within 1 year of CAP Adoption</u>

<sup>13</sup> Data obtained from U.S. Census Data Finder Web Tool indicates that the mode share of drive-alone cars, trucks, or vans in Oceanside has steadily increased from approximately 75 percent in 2009 to 79 percent in 2015.

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
<b>TL5—Transportation Demand Management Plans</b>			
Adopt a TDM Ordinance to require TDM Plans for New Developments	Lead Department: <u>Development Services Department</u>	Phase 1	Ordinance Drafted <u>Within 6 months of CAP Adoption</u>
	Collaborating with: <u>Economic Development Department</u>		Ordinance Adoption <u>Within 1 year of CAP Adoption</u>
	Ordinance Approved by: <u>City Council</u>		<i>Target TDM Requirement Applicability Commercial of Industrial Developments that generate 100 vehicle commute trips per day</i>
Conduct Surveys to Determine Existing TDM Measure Implementation	Lead Department: <u>Economic Development Department</u>	Phase 1	Develop Survey Questionnaire <u>Within 1 year of CAP Adoption</u>
		Phase 1 Phase 2	<i>Target Surveyed Businesses</i> <u>25% within 1 years</u> <u>50% within 2 years</u> <u>75% within 3 years</u> <u>100% within 4 years</u>
Provide Incentives for Implementation of TDM Measures at Existing Businesses	Lead Department: <u>Economic Development Department</u>  Collaborating with: <u>Water Utilities Department</u>	Phase 2	Use Survey Results to Identify TDM Opportunities <u>Within 18 months of CAP Adoption</u>
			Provide Incentives as Appropriate for Infrastructure Improvements to Support Alternative Modes of Transit <u>Within 2 years of CAP Adoption</u>
			<i>Target Financing Alternatives</i> <u>To be Established</u>
			<i>Target Rebate Incentives</i> <u>To be Established</u>
<b>AF1—Urban Forestry Program</b>			
Inventory Existing Tree Canopy	Lead Department(s): <u>Public Works</u> & <u>Neighborhood Services, Parks and Recreation</u>	Phase 1	Quantify Number and Species of Existing Trees <u>Within 1 year of CAP Adoption</u>
			Identify Trees That Provide Co-benefits Such as Building Neighborhood Character <u>Within 1 year of CAP Adoption</u>
Adopt a Green Streets Ordinance to Require Shade Trees in New Developments	Lead Department(s): <u>Public Works</u> & <u>Development Services Department</u>  Ordinance Approved by: <u>City Council</u>	Phase 1 Phase 2 Phase 3	Ordinance/Policy Drafted <u>Within 3 months of CAP Adoption</u>
			Ordinance/Policy Adoption <u>Within 6 months of CAP Adoption</u>
			<i>Target Requirements for New Developments</i> <u>35% tree canopy cover</u>
			Provide Streamlined Development Review for Projects that Substantially Exceed Requirements <u>Within 2 year of CAP Adoption</u>

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
Adopt a Green Streets Policy to Require Shade Trees be Incorporated in CIP Roadway Projects.	Lead Department(s): <u>Public Works</u> & <u>Development Services Department</u>  Ordinance Approved by: <u>City Council</u>	Phase 1 Phase 2 Phase 3	Ordinance/Policy Drafted <u>Within 3 months of CAP Adoption</u>
			Ordinance/Policy Adoption <u>Within 6 months of CAP Adoption</u>
			Establish a Green Streets Checklist for CIP Projects <u>Within 1 year of CAP Adoption</u>
Promote Tree Canopy Expansion in Public Right-of-Way	Lead Department: <u>Water Utilities Department</u>	Phase 1 Phase 2 Phase 3	Plan Outreach Effort <u>Within 1 year of CAP Adoption</u>
Support Volunteer Tree Planting and Stewardship Efforts	Collaborating with: <u>Public Works</u> & <u>Neighborhood Services, Parks and Recreation</u>		Identify Outreach Plan in Initial Annual Progress Report <u>Completed (Y/N)</u>
Allow CEQA Impact Mitigation through Tree Planting and Stewardship	Lead Department: <u>Development Services Department</u>	Phase 1 Phase 2 Phase 3	Continue Environmental Review <u>Completed (Y/N)</u>
<b>AF2—Urban Agriculture and Community Gardens</b>			
Adopt an Urban Agriculture and Community Gardens Policy to Establish Goals and Measures	Lead Department: <u>Neighborhood Services Department</u>	Phase 1	Policy Drafted <u>Within 1 year of CAP Adoption</u>
			Policy Adoption <u>Within 18 months of CAP Adoption</u>
			<i>Policy Establishes a Population Ratio Goal and Service Distance Criterion</i> <u>Completed (Y/N)</u>
Implement an Urban Agriculture and Community Gardens Program	Lead Department: <u>Neighborhood Services Department</u>	Phase 1 Phase 2	Identify Potentially Feasible Site Locations for Urban Agriculture and Community Gardens <u>Within 2 years of CAP Adoption</u>
			Identify Service Areas with No Feasible Site Locations for Urban Agriculture or Community Gardens <u>Within 2 years of CAP Adoption</u>
			Amend zoning regulations to allow for urban agriculture and community gardens in appropriate zones. <u>Within 2 years of CAP Adoption</u>
			Construct Community Gardens to Meet Urban Agriculture and Community Gardens Policy Goals <u>Within 5 years of CAP Adoption</u>
		Collaborate with Parties to Identify Appropriate Design, Maintenance, and Operations of Community Gardens <u>Within 5 years of CAP Adoption</u>	
		Phase 1 Phase 2 Phase 3	Collaborate with Parties to designate community garden coordinators <u>Within 5 years of CAP Adoption</u>

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
Adopt an Urban Agriculture Incentive Zone Ordinance	Lead Department(s): <u>Economic Development Department</u>  Ordinance Approved by: <u>City Council</u>	Phase 1	Ordinance/Policy Drafted <u>Within 3 months of CAP Adoption</u>
			Ordinance/Policy Adoption <u>Within 6 months of CAP Adoption</u>
Promote Urban Agriculture and Community Gardening	Lead Department: <u>Water Utilities Department</u>	Phase 2 Phase 3	Plan Outreach Effort <u>Within 1 year of Urban Agriculture and Community Gardens Program</u>
<b>AF3—South Morro Hills Agricultural Lands Conservation Program</b>			
Develop an Agricultural Lands Conservation Program	Lead Department: <u>Development Services Department</u>  Collaborating with: <u>Water Utilities</u>	Commencement Phase	Designate a Climate Action Planning Team Member to Become Knowledgeable on SALC Grant Guidelines <u>Completed (Y/N)</u>
		Phase 1 Phase 2 Phase 3	Identify Funding Sources for 2020-2024 <u>Before July 2020</u>
			Perform Outreach to Identify Interested Parties <u>Before January 2020</u>
			Identify Funding Sources for 2025-2029 <u>Before July 2024</u>
			Prepare Annual Report Quantifying Program Participation and Funds, and identify At-Risk Agricultural Lands <u>Completed (Y/N)</u>
			<i>Target Lands Places Under Ag Conservation Easements</i> <u>50 acres per year -</u> <u>100 acres by 2022</u> <u>200 acres by 2024</u> <u>300 acres by 2024</u> <u>400 acres by 2028</u> <u>500 acres by 2030</u>

Table 18 Implementation Actions			
Actions	Responsible Department	Phase	Schedule Milestones/ Performance Targets
<b>AF4—Carbon Farming Program</b>			
Implement a Demonstrative Carbon Farming Program	Lead Department: <u>Water Utilities</u>  Collaborating with: <u>Development Services Department</u>	Commencement Phase	Designate a Climate Action Planning Team Member to Become Knowledgeable on Sustainable Practices <u>Completed (Y/N)</u>
		Phase 1 Phase 2	Policy Drafted <u>Within 2 year of CAP Adoption</u>
			<i>Policy Quantifies Program Goals Tied to Concrete Metrics (i.e. technologies, acres, water reduction)</i> <u>Requirements (Y/N)</u>
			Identified Funding Sources for Program <u>Within 30 months of CAP Adoption</u>
			Identify Interested Parties <u>Within 30 months of CAP Adoption</u>
		Phase 1 Phase 2 Phase 3	Policy Adoption and Implementation <u>Within 3 year of CAP Adoption</u>
Prepare Annual Report to Quantifying Program Participation and Findings <u>Completed (Y/N)</u>			

## Development Project Review Checklist

For proposed land use development projects, proponents shall complete the CAP Project Review Checklist. The Project Review Checklist is designed to assess consistency with GHG reduction measures identified in Chapter 3. The CAP and Project Review Checklist are intended as living documents. The City may amend the Project Review Checklist as adoption of policies and ordinances identified in **Table 19** establish more refined criteria.

**Table 19 Project Review Checklist**

Checklist Item	Inclusion
<b>Project Information</b>	
Applicant: _____	
Project Name: _____	
Project Number: _____	
Property Address: _____	
Project Area: _____	acres
Proposed Uses:	
Single-family Residential _____	units
Multi-family Residential _____	units
Commercial _____	square feet
Industrial _____	square feet
Other _____	square feet
Project Description: _____ _____	
<b>Smart Growth</b>	
1. Is the project located within an existing or potential SANDAG smart growth opportunity area (SGOA)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
If "Yes" proceed to Item 2 of the Checklist If "No" proceed to Item 3 of the Checklist	
2. Do the proposed land use densities meet or exceed SANDAG's minimum target densities?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<u>Town Center SGOA Target Densities</u> 20 dwelling units per acre; or 30 employees per acre; or Combination thereof	
<u>Mixed-Use Transit Corridor SGOA Target Densities</u> 24 dwelling units per acre; or Any density commercial development;	
<u>Community Center SGOA Target Densities</u> 20 dwelling units per acre; or Any density commercial development	
If "Yes" the project is consistent with Smart Growth Land Use; Skip to Item 4 of the Checklist; If "No" proceed to Item 3 of the Checklist	
3. Does the project propose land use that is consistent with, or less GHG-intensive than, the existing General Plan Land Use Designation?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
If "Yes" the project is consistent with Smart Growth Land Use; If "No" proceed to Item 4 of the Checklist	

**Table 19 Project Review Checklist**

**Alternative-Fueled Vehicle Infrastructure**

<p>4. For single-family residential projects, does the project include prewiring to allow for future electric vehicle charging stations in the garage or driveway of each residence?</p> <p>For multi-family residential projects, does the project include prewiring to allow for future electric vehicle charging stations in all garages and 5 percent of resident and visitor parking spaces (2 minimum)?</p> <p>For commercial or industrial projects, does the project include prewiring to allow for future electric vehicle charging stations in 10 percent of surface parking spaces (2 minimum) and include immediate installation of charging stations at half of these prewired parking spaces?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> No  <input type="checkbox"/> N/A</p>
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**Alternative-Fueled Vehicle Parking**

<p>5. For commercial or industrial projects, does the project include reserved parking for clean air vehicles at 12 percent of parking spaces?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> No  <input type="checkbox"/> N/A</p>
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**Transportation Demand Management**

<p>6. For commercial or industrial projects that would generate more than 100 vehicle commute trips per day, does the project include a minimum of 10 points of transportation demand management strategies?  <i>[Transportation demand management strategies will be expanded in TDM Ordinance]</i></p> <p>Employee Rideshare Programs (4 points per project)</p> <p>Secure Bicycle End-trip Facilities (i.e. secure parking, lockers, and showers) (2 points per project)</p> <p>Improvements to Adjacent Bicycle Lane (2 points per project)</p> <p>Pedestrian/Bicycle Connections to Off-site Paths (1 point per project)</p> <p>Unbundled Parking Pricing/  Employee Parking Cash-Out Programs (2 points per \$20 monthly cash-out)</p> <p>Discounted Transit Program (2 points per \$0.75 of subsidy)</p> <p>Roadway Safety improvements (e.g. curb bulb-outs, raised pedestrian crossings, count-down signal timers, chicanes, raised medians, etc.) (1 point per feature/intersection)</p> <p>Improvements to Nearby Transit Stops (i.e. improved shelters, benches, and street lighting) (1 point per stop)</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> No  <input type="checkbox"/> N/A</p>
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**Energy Efficiency**

<p>7. For projects that include more than 50 surface parking spaces - Does the project incorporate on-site renewable energy sources capable of offsetting at least 50 percent of forecasted electricity demand?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> No  <input type="checkbox"/> N/A</p>
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**Recycled Water**

<p>8. Does the project incorporate service connections for immediate or future recycled water use?</p> <p><i>Recycled water may be feasible for landscape, agricultural, or natural system irrigation, recreational impoundment, industrial processes, or for toilet or urinals.</i></p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> No  <input type="checkbox"/> N/A</p>
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**Tree Canopy**

<p>9. Does the project promote a walkable environment through incorporation of shade trees in parking lots, recreation areas, and along frontage?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> No  <input type="checkbox"/> N/A</p>
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If "Yes" for all checklist items, then the project is considered consistent with the CAP.  
If "No" for any checklist item, the project's GHG impact is significant. The project must incorporate each checklist item to the maximum extent feasible; however the project's GHG impact would remain significant.

## Monitoring, Reporting, and Adaptive Management

Regular monitoring is important to ensure programs are functioning as they were originally intended. Early identification of effective strategies and potential issues will 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 will be responsible for developing a protocol for monitoring the effectiveness of emissions reduction programs as well as for undertaking emissions inventory updates:

- **Track Implementation of Reduction Measures**—The City will keep track of reduction measures implemented and schedule milestones identified in the CAP, including progress reports on the reduction measures, funding, and savings.
- **Track Progress Activity Indicators**—The City will keep track of easily quantified metrics including communitywide electricity demand, natural gas use, and water use. This will allow at least a rough attribution of quantified emissions reductions when combined with GHG reduction measure tracking.
- **Track State Progress**—Forecasted emissions rely heavily on State-level measures. The City will be responsible for tracking the State’s progress on implementing State-level programs. Close monitoring of the real gains being achieved by State programs will allow the City to identify potential gaps or redundancies between state and local reduction measures, and to adjust its CAP, if needed.
- **Annual Progress Reports**—The City will report annually to the City Council on CAP implementation progress, activity indicators, and relevant changes in State measures. Presentations to the City Council will be published on the City webpage. If needed, the CAP will be adjusted, amended, or supplemented following annual reports.
- **Update GHG Inventory**—The City will comprehensively update its 2020 GHG inventory to evaluate progress toward meeting its GHG reduction goals. This includes data collection in each of the primary inventory sectors (electricity demand, natural gas use, regional vehicle miles traveled, solid waste disposal, water and wastewater, and municipal facilities), and comparing the inventory to the City’s baseline GHG emissions. Information will be consolidated in a database or spreadsheet that can be used to evaluate the effectiveness of individual reduction measures. Moving beyond 2020, the City will comprehensively update its GHG inventory every five years.
- **CAP Updates**—The City is committed to preparing updates to the CAP every five years following each comprehensive GHG inventory update.

# 05 | References



# Chapter 5      References

## California Air Resources Board (ARB)

- 2008 *Climate Change Scoping Plan: A Framework for Change*. December.
- 2014 *First Update to the Climate Change Scoping Plan, Building on the Framework Pursuant to AB 32 – The California Global Warming Solutions Act of 2006*. May.
- 2017a *The 2017 Climate Change Scoping Plan Update, The Strategy for Achieving California’s 2030 Greenhouse Gas Target*. December.
- 2017b *Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets*. June.
- 2017c *Draft 2017 Scoping Plan, Modeling Information, Pathways Stock Charts*. January.

## California Department of Resource Recycling and Recovery (CalRecycle)

- 2017 CalRecycle Webpage, California’s Statewide Recycling Rate. Accessed August 30.
- 2018 CalRecycle Webpage, Jurisdiction Diversion/Disposal Rate Detail, Oceanside, 2016. Accessed February 21.

## California Department of Water Resources

- 2017 *Connecting the Dots between Water, Energy, Food, and Ecosystems Issues for Integrated Water management in a Changing Climate*. February.

## California Energy Commission (CEC)

- 2009 *Assessment of Greenhouse Gas Mitigation in California Agricultural Soils*. January.
- 2015a *Existing Buildings Energy Efficiency Action Plan*. March.
- 2015b *Impact Analysis 2016 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings*. Prepared by Noresco United Technologies on behalf of California Energy Commission. June 3, 2015. Accessed at [http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/15-day\\_language/impact\\_analysis/2016\\_Impact\\_Analysis\\_2015-06-03.pdf](http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/15-day_language/impact_analysis/2016_Impact_Analysis_2015-06-03.pdf)

## California Office of the Governor

- 2016 *2016 ZEV Action Plan, An Updated Roadmap Toward 1.5 Million Zero-Emission Vehicles on California Roadways by 2025*. October.

## California Solar Initiative

- 2017a California Solar Statistics City of Oceanside Data. Accessed January 20, 2017.
- 2017b California Solar Statistics Cost by Quarter. March 1, 2017.

## California Strategic Growth Council

- 2017 *2016-2017 Final Guidelines and Request for Grant Applications*. April.

Center for Urban Forest Research

2001 *Benefit-Cost Analysis of Santa Monica's Municipal Forests*. November.

Intergovernmental Panel on Climate Change (IPCC)

2014 *Fifth Assessment Report (AR5), Climate Change 2014, Synthesis Report*.

Marcia DeLonge, Rebecca Ryaals, & Whendee Silver.

2013 *A Lifecycle Model to Evaluate Carbon Sequestration Potential and Greenhouse Gas Dynamics of Managed Grasslands*. April.

Marin Carbon Project Carbon Farming Project

2016 *Marin Carbon Project Carbon Farming Project Factsheet*. October.

National Oceanic & Atmospheric Administration (NOAA)

2017a NOAA National Centers for Environmental information, *Climate at a Glance: Global Time Series*, published August 2017. Accessed August 31.

2017b Global Greenhouse Gas Reference Network, *Trends in Atmospheric Carbon Dioxide*. Accessed August 30.

Oceanside, City of

2012 *City of Oceanside Zero Waste Strategic Resource Management Plan*. June.

2013 *City of Oceanside 2013-2021 Housing Element*. April.

2015 *City of Oceanside Jurisdictional Runoff Management Plan*. June.

2016 *City of Oceanside Water Conservation Master Plan Update*. April.

San Diego Association of Governments (SANDAG)

2014 *San Diego Regional Plug-in Electric Vehicle Readiness Plan*. January.

2015 *San Diego Forward, The Regional Plan*. October.

2017 Healthy Communities Assessment Tool, San Diego, California, Tree Cover. Accessed March 7.

U.S. Census Bureau

2017 Quick Facts, Oceanside city, California, Median Household Income 2011-2015.

U.S. Court of Appeals

2018 Case 17-2780, Document 196, U.S. Court of Appeals for the Second Circuit Ruling NRDC et al. v. National Highway Traffic Safety Administration et al. April 23, 2018.

U.S. Energy Information Administration

2017 Rankings: Total Energy Consumed per Capita, 2015. Accessed August 30.

U.S. Environmental Protection Agency (U.S. EPA)

2012 *Climate Change Indicators in the United States, Second Edition*. December.

2017 EPA Webpage, Glossary of Climate Change Terms. Accessed August 30.

2018 EPA Notice, Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model year 2022-2025 Light-duty Vehicles, Federal Register Volume 83 Number 72, 16077. April 13, 2018

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A

City of Oceanside 2013  
Community Greenhouse  
Gas Emissions Inventory  
and Forecast

# City of Oceanside Greenhouse Gas Emissions Inventory and Forecast

January 2016

Prepared for the City of Oceanside



Prepared by the Energy Policy Initiatives Center



## **About EPIC**

The Energy Policy Initiatives Center (EPIC) is a nonprofit academic and research center of the USD School of Law that studies energy policy issues affecting the San Diego region and California. EPIC integrates research and analysis, law school study, and public education, and serves as a source of legal and policy expertise and information in the development of sustainable solutions that meet our future energy needs.

For more information, please visit the EPIC website at [www.sandiego.edu/epic](http://www.sandiego.edu/epic).

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## 1 INTRODUCTION

This report presents a summary of community-scale greenhouse gas (GHG) emissions for 2013 and business-as-usual (BAU) GHG emissions projection for 2020, 2030 and 2035 from the City of Oceanside.

### 1.1 Greenhouse Gases

The primary greenhouse gases (GHGs) included in this inventory are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). Each GHG has a different capability of trapping heat in the atmosphere, known as its global warming potential (GWP), which is normalized relative to CO<sub>2</sub> and expressed in carbon dioxide equivalents (CO<sub>2</sub>e). In general, the 100-year GWPs reported by the Intergovernmental Panel on Climate Change (IPCC) are used to estimate greenhouse gas emissions. The GWPs used in this inventory are from IPCC Forth Assessment Report (AR4)<sup>1</sup>, given in Table 1.

**Table 1 Global Warming Potentials Used in the Oceanside Inventory**

Greenhouse Gas	Global Warming Potential (GWP)
Carbon dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	25
Nitrous oxide (N <sub>2</sub> O)	298

### 1.2 Sectors

The U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions published by ICLEI USA (referred to as the ICLEI Community Protocol) recommends including emissions from six sectors for a typical community-scale GHG inventory.<sup>2</sup> These sectors are: electricity, natural gas, transportation, solid waste, water, and wastewater. GHG emissions are calculated by multiplying activity data (kilowatt-hours of electricity, tons of solid waste) by an emissions factor. For these sectors, methods used in this inventory were based on the ICLEI Community Protocol standard methods, with modifications based on regional- or city-specific data when available.

Section 2 provides a summary of the GHG emissions based on the methods. More details on methods, input data, and emissions factors are provided in Section 3. The methods used to make BAU emission projections are provided in Section 4.

## 2 SUMMARY OF GHG EMISSIONS

In 2013, the total GHG emissions from the City of Oceanside were **717,960 metric tons CO<sub>2</sub>e (MT CO<sub>2</sub>e)**, distributed into six sectors as shown in Figure 1. The per capita emission was 4.2 MT CO<sub>2</sub>e.<sup>3</sup> The

<sup>1</sup> IPCC Forth Assessment Report: Climate Change 2007. Direct Global Warming Potentials.

[https://www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/ch2s2-10-2.html](https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html)

<sup>2</sup> ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). <http://icleiusa.org/tools/ghg-protocols/>

<sup>3</sup> Per capita emission in 2013 was calculated based on total 2013 emissions (717,960 MT CO<sub>2</sub>e) and population (169,996) in Oceanside. The 2013 total population is from SANDAG's 2013 Estimates. The SANDAG Population Estimates are released annually and modified based on *E-5 Population and Housing Estimates for Cities, Counties, and the State*. California Department of Finance. SANDAG Data Surfer. <http://datasurfer.sandag.org/> Download Date: 01/18/16

electricity sector contributed the most to overall GHG emissions (36%), followed by the transportation sector (29%), while the wastewater sector contributed the least (1%).

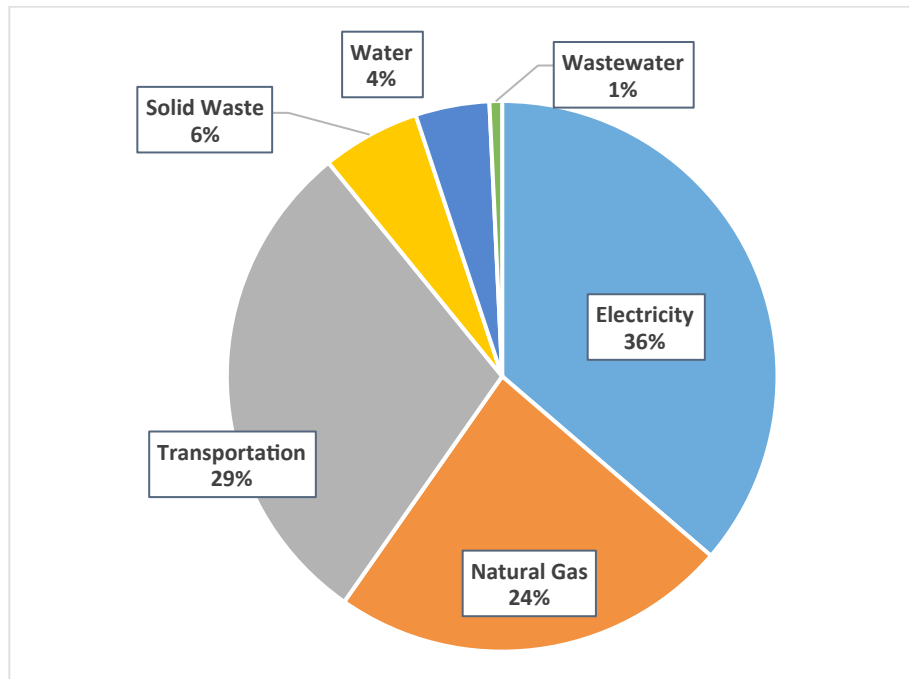


Figure 1 Breakdown of GHG Emissions in City of Oceanside by Sector (2013)

### 3 SUMMARY OF METHODS BY SECTOR

#### 3.1 Electricity

GHG emissions from electricity consumption by the City of Oceanside were estimated using method BE.2 Emissions from Electricity Use, from the ICLEI Community Protocol.<sup>4</sup> Electricity consumption in the City of Oceanside was provided by the local utility, San Diego Gas & Electric (SDG&E), for three customer classes: residential, commercial, industrial.<sup>5</sup> Two modifications were made to the consumption for this inventory. First, the annual electricity consumption obtained from SDG&E was grossed up, using a loss factor<sup>6</sup> of 1.067 to account for transmission and distribution losses.<sup>7</sup> Second, in order to avoid double counting, the portion of electricity consumption associated with water treatment and distribution was subtracted from the electricity sector and attributed to the water sector.

<sup>4</sup> ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). Appendix C: Built Environment Emission Activities and Sources. <http://icleiusa.org/tools/ghg-protocols/>

<sup>5</sup> Communication with SDG&E. Data provided to EPIC on 11/25/15.

<sup>6</sup> Transmission and Distribution Loss Factor is used to scale end-use demand or retail sales to produce net energy for load (gross generation). Wong (2011). *A review of transmission losses in planning studies*. CEC Staff Paper. <http://www.energy.ca.gov/2011publications/CEC-200-2011-009/CEC-200-2011-009.pdf>

<sup>7</sup> California Energy Commission (CEC). *California Energy Demand 2015-2025 Final Forecast Mid-Case Final Baseline Demand Forecast Forms*. SDG&E Mid. Download Date: 06/23/15. The transmission and distribution loss factor, 1.067, is calculated based on the ratio of gross generation and total consumption in 2013 from SDG&E Form 1.2 Mid. [http://www.energy.ca.gov/2014\\_energypolicy/documents/demand\\_forecast\\_cmf/Mid\\_Case/](http://www.energy.ca.gov/2014_energypolicy/documents/demand_forecast_cmf/Mid_Case/)

The modified electricity consumption was multiplied by the electricity emission factor for Oceanside in 2013, given in Table 2, expressed in pounds of CO<sub>2</sub>e per megawatt-hour (lbs CO<sub>2</sub>e/MWh). For a given year, the electricity emissions factor is developed specifically for the city, using the city specific power mix of SDG&E bundled power (MWh)<sup>8</sup>, Direct Access power (MWh)<sup>9</sup>, and their respective emission factors (lbs CO<sub>2</sub>e/MWh). The SDG&E bundled emission factor was calculated using Federal Energy Regulatory Commission (FERC) Form 1<sup>10</sup> and California Energy Commission (CEC) Power Source Disclosure Program<sup>11</sup> on SDG&E owned and purchased power, and U.S. EPA Emissions and Generating Resource Integrated Database (eGRID)<sup>12</sup> on specific power plant emissions. The Direct Access emission factor is calculated based on CPUC Decision D.14-12-037<sup>13</sup>.

The total electricity consumption, electricity emission factor, and corresponding GHG emissions in the City of Oceanside in 2013 are given in Table 2.

**Table 2 Electricity Consumption, Emissions Factor and GHG Emissions in Oceanside (2013)**

Electricity Consumption (MWh)	731,121
Emission Factor (lbs CO <sub>2</sub> e/MWh)	737
GHG Emissions (MT CO <sub>2</sub> e)	<b>260,631</b>

The total emissions from electricity consumption can be broken down further into residential, commercial and industrial customer classes, given in Figure 2. In 2013, residential customers contributed the most (45%) to total emissions in electricity sector, industrial customers contribute the least (13%).

<sup>8</sup> SDG&E bundled power includes the electricity from SDG&E owned power plants and the electricity from its net procurements.

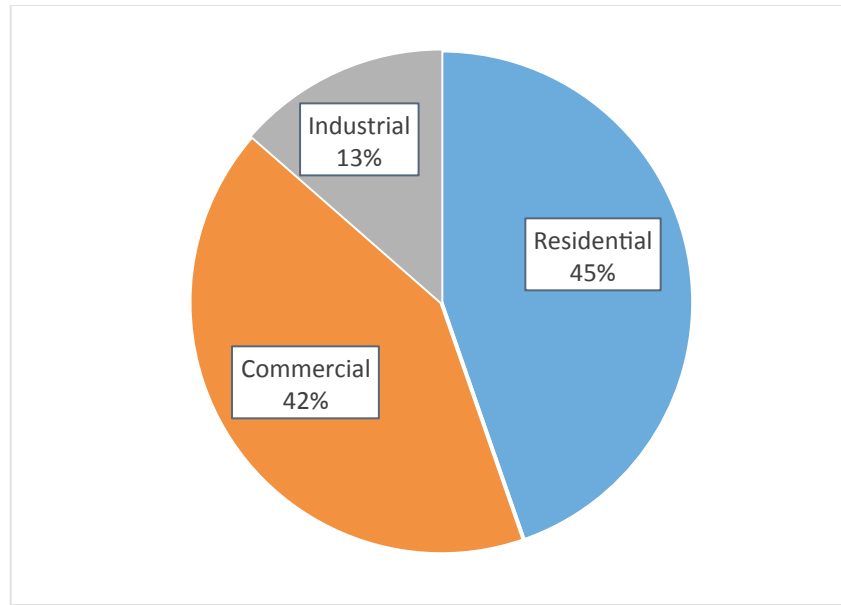
<sup>9</sup> Direct Access Program includes the electricity customers purchased from electric service providers (ESPs) but SDG&E provides transmission and distribution services. <http://www.sdge.com/customer-choice/electricity/direct-access-faq>

<sup>10</sup> Federal Energy Regulatory Commission (FERC). Form 1- Electricity Utility Annual Report. <http://www.ferc.gov/docs-filing/forms/form-1/viewer-instruct.asp>. Downloaded Date: 07/20/2015

<sup>11</sup> California Energy Commission (CEC) Power Source Disclosure Program under Senate Bill 1305. <http://www.energy.ca.gov/sb1305/> Obtained SDG&E annual report, 2010-2014, from CEC staff on 08/07/2015.

<sup>12</sup> U.S. EPA. eGRID 2012. (2015) <http://www2.epa.gov/energy/egrid> Download Date: 10/09/2015

<sup>13</sup> Decision 14-12-037, December 18, 2014 in Rulemaking 11-03-012 (Filed March 24, 2011). <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M144/K130/144130487.pdf>



**Figure 2 Breakdown of GHG Emissions from the Electricity Sector in City of Oceanside (2013)**

### 3.2 Natural Gas

GHG emissions from combustion of natural gas for end-uses applications in City of Oceanside were estimated based on method BE.1 Emissions from Stationary Fuel Combustion of the ICLEI Community Protocol.<sup>14</sup> Natural gas consumption in the City of Oceanside was provided by SDG&E for three customer classes: residential, commercial and industrial.<sup>15</sup>

Natural gas consumption in 2013 was multiplied by the natural gas GHG emission factor, given in Table 3, expressed in million metric ton CO<sub>2</sub>e per million therm (MMT CO<sub>2</sub>e/MMTherm). For a given year, the natural gas emission factor is calculated based on the heat content of natural gas, fuel CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emission from the latest California’s Greenhouse Gas Inventory developed by California Air Resources Board (ARB)<sup>16</sup>, and GWP of CH<sub>4</sub>, and N<sub>2</sub>O from Table 1.

The total natural gas consumption, emission factor, and corresponding GHG emissions in the City of Oceanside, 2013, are given in Table 3.

**Table 3 Natural Gas Consumption, Emission Factor and GHG Emissions in Oceanside (2013)**

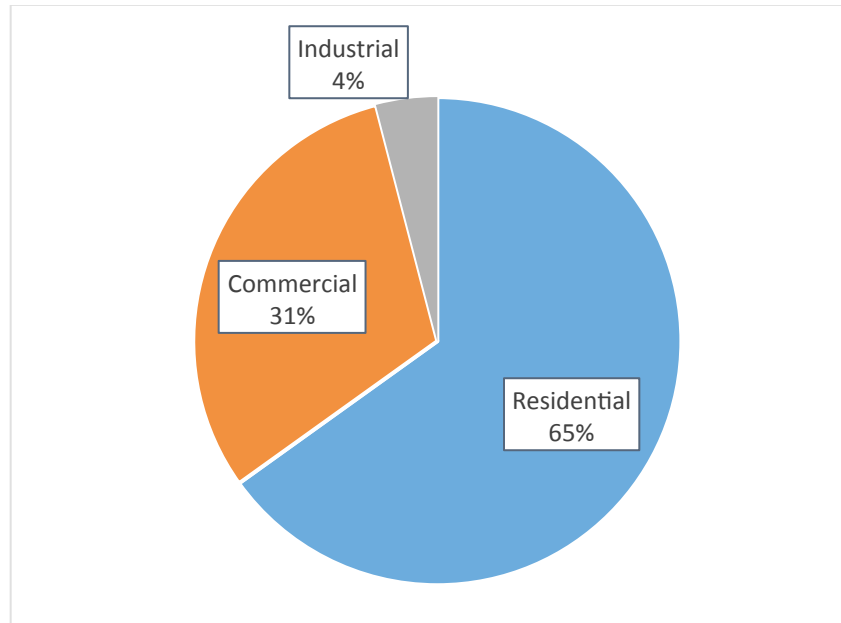
Natural Gas Consumption (MMTherms)	30.7
Emission Factor (MMT CO <sub>2</sub> e/MMTherms)	0.0055
GHG Emissions (MT CO <sub>2</sub> e)	<b>168,164</b>

<sup>14</sup> ICLEI 2012. See Note 4.

<sup>15</sup> Communication with SDG&E. Data provided to EPIC on 11/25/15.

<sup>16</sup> ARB. 2014. Documentation of California’s Greenhouse Gas Inventory. 8<sup>th</sup> Edition. Fuel Combustion – Natural Gas. [http://www.arb.ca.gov/cc/inventory/doc/docs1/1a1ai\\_instategenerationutilityowned\\_fuelcombustion\\_naturalgas\\_ch4\\_2013.htm](http://www.arb.ca.gov/cc/inventory/doc/docs1/1a1ai_instategenerationutilityowned_fuelcombustion_naturalgas_ch4_2013.htm)

The total emissions from natural gas consumption can be broken down further into residential, commercial and industrial customer classes, given in Figure 3. In 2013, residential customers contributed the most (65%) to total emissions from natural gas sector, industrial customers contribute the least (4%).



**Figure 3 Breakdown of GHG Emissions from Natural Gas Sector in City of Oceanside (2013)**

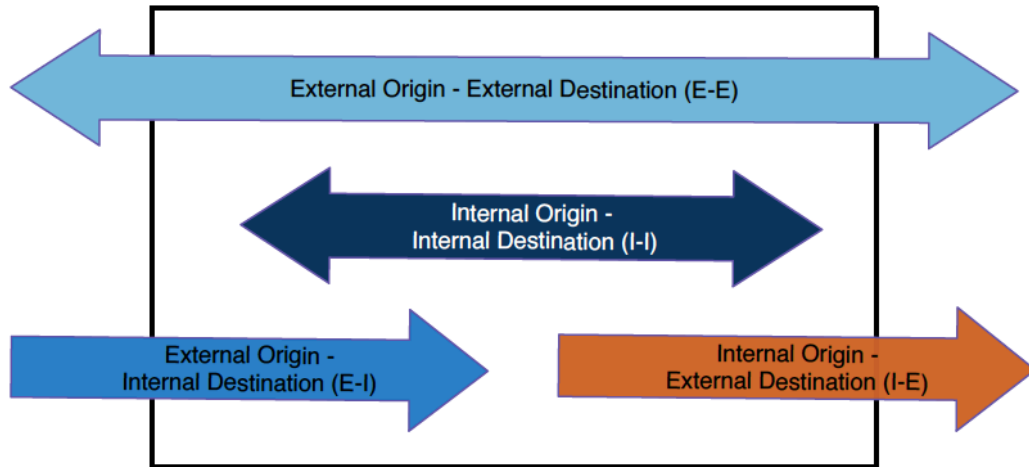
### 3.3 Transportation

GHG emissions from transportation in the City of Oceanside were estimated based on vehicle miles traveled (VMT) and the emission rates associated with the vehicle fleet in 2013. VMT in the City of Oceanside was provided by San Diego Association of Government (SANDAG), based on its activity-based model<sup>17</sup> and the Origin-Destination (O-D) method. The O-D VMT method proposed by the ICLEI Community Protocol estimates miles traveled based on where a trip originates and where it ends to accurately allocate on-road emissions to cities and regions with policy jurisdiction over miles traveled (Figure 4).<sup>18</sup>

<sup>17</sup> SANDAG Activity Based Model.

<http://www.sandag.org/index.asp?subclassid=120&fuseaction=home.subclasshome>

<sup>18</sup> ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). Appendix D: Transportation and Other Mobile Emission Activities and Sources.



**Figure 4 Components of Origin-Destination (O-D) method for Calculation of Vehicle Miles Traveled**

O-D VMT include trips that originate and end within the boundary, in this case within the City of Oceanside (referred to as Internal-Internal), and trips that either begin within the boundary and end outside the boundary (referred to as Internal-External) or vice versa (referred to as External-Internal). VMT from trips that begin and end outside the boundary that were only passing through the City of Oceanside (referred to as External-External) were excluded. Emissions from External-External VMT were not allocated to the City of Oceanside. Series 13 O-D VMT data for each trip type in 2013 are given in Table 4.<sup>19</sup>

**Table 4 Original-Destination (O-D) VMT for Trips in Oceanside (2013)**

Trip Type	VMT (miles/weekday)
Internal-Internal	631,178
External-Internal/Internal-External	1,269,516
External-External	980,792

To calculate total VMT, all Internal-Internal VMT were included. External-Internal/Internal-External VMT were divided by two to evenly allocate the miles to the outside jurisdictions. The total VMT were multiplied by 0.96 to adjust from average weekday VMT to average daily VMT including weekends.<sup>20</sup>

The emission rate in grams CO<sub>2</sub>e/mile was derived from the statewide mobile source emissions inventory EMFAC2014, developed by California Air Resources Board (ARB).<sup>21</sup> EMFAC2014 was used to generate emission rates for SANDAG on a metropolitan planning organization (MPO) basis, for calendar

<sup>19</sup> Communication with SANDAG. 2012 and 2014 O-D VMT Data provided to EPIC on 01/15/2016. 2013 data was interpolated linearly based on 2012 and 2014 data.

<sup>20</sup> The “5 to 7 day conversion” factor for VMT for freeways and highways, was provided by Caltrans, Kim Sturmer (2009).

<sup>21</sup> California Air Resources Board. Mobile Source Emissions Inventory. EMFAC2014 (2015). <http://www.arb.ca.gov/msei/msei.htm>

year 2013 with all vehicle classes (EMFAC2011 Categories), model years, speed and fuel types.<sup>22</sup> The fleetwide g CO<sub>2</sub>/mile emission rate was calculated based on the distribution of VMT for each vehicle class and its emission rates, then adjusted to account for total greenhouse gas emissions including CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O.<sup>23</sup> Table 5 summarizes the fleetwide emission rate, total VMT and corresponding GHG emissions in 2013.

**Table 5 Total VMT, Emission Rate and GHG Emissions in Oceanside (2013)**

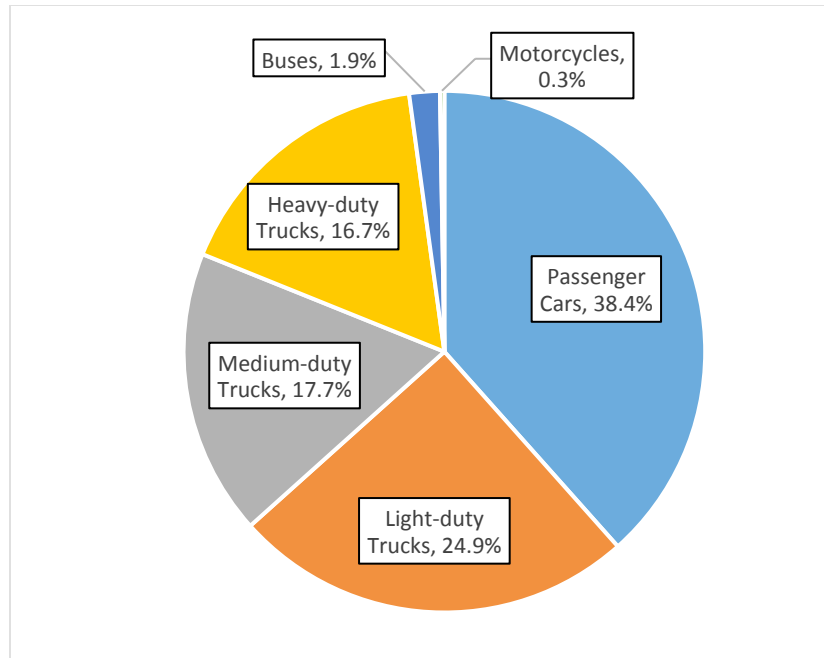
Total VMT (miles/day)	1,215,298
Emissions Rate (g CO <sub>2</sub> e /mile)	476.0
GHG Emissions (MT CO <sub>2</sub> e)	<b>211,163</b>
VMT Excluded (miles/day)	941,560
GHG Emissions Excluded (MT CO <sub>2</sub> e)	163,600

The total emissions from transportation, 211,163 MT CO<sub>2</sub>e, can be broken down further by vehicle class (EMFAC2011 Categories), given in Figure 5. The emission distribution of each vehicle class was estimated based on EMFAC2014 with the same criteria as vehicle fleet emission rate. Passenger cars contributed the most to total emissions in the on-road transportation sector with 38.4% (81,128 MT CO<sub>2</sub>e), while motorcycles contributed the least with 0.3% (569 MT CO<sub>2</sub>e).<sup>24</sup>

<sup>22</sup> EMFAC2014 Web Database. Emission Rates for SANDAG, Calendar Year 2013. Download Date: 01/15/2016  
<http://www.arb.ca.gov/emfac/2014/>

<sup>23</sup> The conversion factor, 1.01, was calculated based on the ratio of CO<sub>2</sub> emissions to total greenhouse gas emissions (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O expressed as CO<sub>2</sub>e) using method from EPA GHG Equivalencies Calculations and References (<http://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references>). Emissions were from mobile fossil fuel combustion in transportation end-use sector in 2013, on-road emissions. EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013*. (2015). Table 3-12 to 3-14.  
<http://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2015-Main-Text.pdf>

<sup>24</sup> In EMFAC2011 Vehicle Categories, passenger cars are cars of all types using all fuel types and designated as LDA. LDTs are light duty trucks divided into LDT1 and LDT2, where LDT1 includes gas, diesel and electric fuel trucks while LDT2 does not include electric fuel. Medium duty trucks, MDTs, included MDV ( 5751-8500 lbs) and motor homes. Heavy duty trucks, HDTs, weight from 8,500 to 60,000 lbs. <http://www.arb.ca.gov/msei/modeling.htm>



**Figure 5 Breakdown of Emissions from Transportation Sector in City of Oceanside (2013)**

### 3.4 Solid Waste

GHG Emissions from the decomposition of organic material in waste disposed at landfills are broken down to two parts in the solid waste sector: emissions from community-generated mixed waste based on method SW.4 from ICLEI Community Protocol, wherever it is disposed, and emissions from biodegradable waste that is in place at in-boundary landfills, based on method SW.1 from ICLEI Community Protocol.<sup>25</sup>

For emissions from community-generated mixed waste, solid waste disposed by in the City of Oceanside was multiplied by the mixed waste emission factor<sup>26</sup> to estimate the total emissions. The impact of recycling and composting diversion programs on emissions reduction were not captured in this inventory because the waste disposed data already exclude waste diverted from these programs.<sup>27</sup> The recycling and diversion programs contribute to lowering the amount of community-generated waste sent to the landfills.<sup>28</sup>

<sup>25</sup> ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). Appendix E: Solid Waste Emission Activities and Sources. <http://iclei.org/tools/ghg-protocols/>

<sup>26</sup> ICLEI Community protocol. Appendix E: Solid Waste Emission Activities and Sources. Table SW.5 CH<sub>4</sub> Yield for Solid Waste Components.

<sup>27</sup> City of Oceanside has achieved a 72% Diversion/Recycling rate and anticipates a 75% diversion rate by 2020. [https://www.ci.oceanside.ca.us/gov/water/services\\_programs/recycling/mandate.asp](https://www.ci.oceanside.ca.us/gov/water/services_programs/recycling/mandate.asp)

<sup>28</sup> ICLEI, 2012. See 25.

Solid waste disposed into landfills in 2013 was obtained from California Department of Resources Recycling and Recovery (CalRecycle) Disposal Reporting System (DRS)<sup>29</sup>. Most of the solid waste from the City of Oceanside was disposed in El Sobrante Landfill and Otay Landfill. The total waste disposed was multiplied by mixed solid waste emission factor, 0.06 MT CH<sub>4</sub>/wet short ton<sup>30</sup> then converted to MT CO<sub>2</sub>e. The landfill gas capture rate was assumed to be 75% based on ICLEI Community Protocol.<sup>31</sup> The total and per capita solid waste disposed, and post-capture emissions in 2013 are given in Table 6.

**Table 6 Solid Waste Disposed by Oceanside and GHG Emissions (2013)**

Community Solid Waste Generation (metric tons)	109,332
Per Capita Solid Waste Generation (kg/day)	1.8
GHG Emissions (MT CO <sub>2</sub> e)	40,675

For in-boundary landfills, emissions from landfill waste-in-place are included, regardless of where waste accepted by the landfills was generated. There are two landfills in the City of Oceanside boundary, Maxson Street Landfill and Mission Avenue Landfills, both closed at 1969. Emissions were estimated using the Landfill Emissions Tool developed by ARB<sup>32</sup> with the first-order-decay (FOD) model<sup>33</sup>, the landfill waste-in-place<sup>34</sup> and the default landfill gas capture rate.<sup>35</sup> The post-capture emissions from both in-boundary landfills are given in Table 7.

**Table 7 GHG Emissions from in-boundary Landfills in Oceanside (2013)**

Landfills	GHG Emissions (MT CO <sub>2</sub> e)
Mission Avenue Landfill	462
Maxson Street Landfill	346
Total	808

The total GHG emissions in the solid waste sector, from community generated waste and in-boundary landfills, were **41,483 MT CO<sub>2</sub>e** in 2013. 98% of emissions were from community-disposed waste.

<sup>29</sup> CalRecycle. Disposal Reporting System (DRS): Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility. <http://www.calrecycle.ca.gov/LGCentral/Reports/DRS/Destination/JurDspFa.aspx> Download Date: 08/03/2015

<sup>30</sup> ICLEI, 2012. Table SW.5. See Note 26.

<sup>31</sup> ICLEI, 2012. See Note 25.

<sup>32</sup> ARB. Landfill Methane Control Measure. Landfill Emissions Tool Version 1.3 (2011)

<http://www.arb.ca.gov/cc/landfills/landfills.htm> Download Date: 10/05/15

<sup>33</sup> IPCC Guidelines for National Greenhouse Gas Inventories. Chapter 3: Solid Waste Disposal. [http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5\\_Volume5/V5\\_3\\_Ch3\\_SWDS.pdf](http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf)

<sup>34</sup> Waste-in-place at both landfills were based communication with Larry Hunsaker. ARB. Data provided to EPIC on 03/20/08. Both landfills have estimated operation date from 1942-1969 (<http://www.arb.ca.gov/regact/2009/landfills09/appf.pdf>). Waste-in-place were divided by total operation years to get annual disposal tonnage.

<sup>35</sup> ICLEI, 2012. See Note 25.

### 3.5 Water

Emissions from water supplied to the City of Oceanside were estimated based on method WW.14 from the ICLEI Community Protocol.<sup>36</sup> The method accounts for each element of the water system (upstream supply and conveyance, groundwater extraction, local water distribution, and treatment) individually, using the energy intensity per unit of water for each segment of the water system given in Table 8.

**Table 8 Energy Intensity for Each Segment of Water System**

Segment of Water System	Energy Intensity (kWh/Million Gallons)
Upstream Supply and Conveyance <sup>37</sup>	9,727
Groundwater Extraction <sup>38</sup>	1,820
Conventional Water Treatment <sup>39</sup>	684
Advance Water Treatment with Reverse Osmosis <sup>40</sup>	3,600
Local Water Distribution <sup>41</sup>	292

City's Water Utility Department is responsible for purchasing and delivering water throughout the city. In 2013, the total water supplied to the City of Oceanside was 9,388 million gallons (151 gallons/person/day) including agricultural use.<sup>42</sup> The breakdown of water source is given in Figure 6 below.<sup>43</sup>

<sup>36</sup> ICLEI – Local Governments for Sustainability USA. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.0. (2012). Appendix F. Wastewater and Water Emission Activities and Sources.

<sup>37</sup> California Energy Commission (CEC), Navigant, *Refining Estimates of Water-Related Energy Use in California* (December 2006).

<sup>38</sup> California Public Utility Commission (CPUC). *Embedded Energy in Water Studies 1, 2 and 3. Groundwater Energy Use.* (2011). Convert from Energy Intensity for South Coast Hydrologic Region, 593 kWh/AF.

[http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/Embedded+Energy+in+Water+Studies1\\_and\\_2.htm](http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/Embedded+Energy+in+Water+Studies1_and_2.htm)

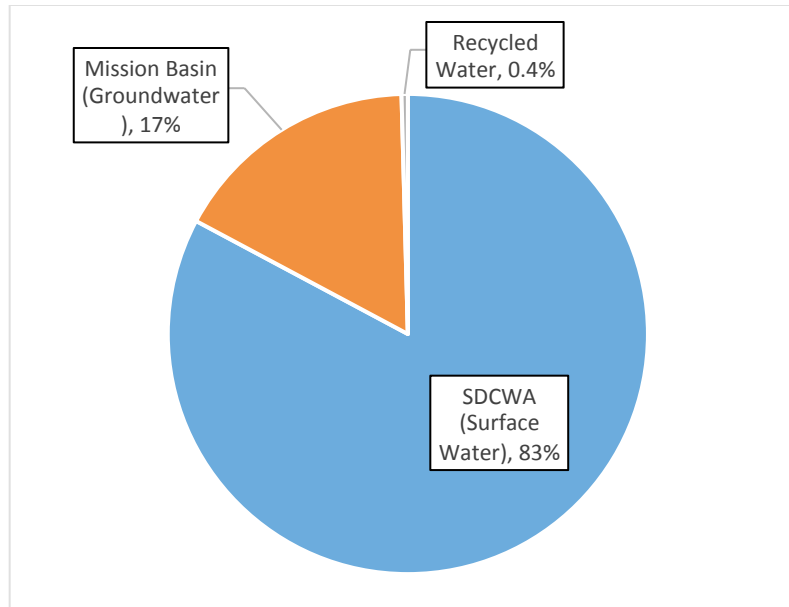
<sup>39</sup> Conventional water treatment processes include coagulation/flocculation, sedimentation, filtration and disinfection. Energy intensity of standard treatment are calculated based on data from City of San Diego's three Water Treatment Plants, provided to EPIC in 2014. (Value for 2010)

<sup>40</sup> The advance water treatment is specifically the energy requirement for brackish groundwater desalination with reverse osmosis. The source water salinity in San Diego region is 1000-3000 mg/L, the average of energy intensity between 3000-4200 kWh/million gallon was taken. WaterReuse Research Foundation. *Implications of Future Water Supply Sources for Energy Demands.* (2012) Table. 4.5. <http://www.pacinst.org/wp-content/uploads/2013/02/report19.pdf>

<sup>41</sup> City of San Diego. See Note 39.

<sup>42</sup> Total water supplied to the City of Oceanside and source of the water supply was provided from communication with Teresa Gomez. City of Oceanside. Data provided to EPIC on 12/04/15.

<sup>43</sup> Total and breakdown of water supplied to City of Oceanside in 2013 was provided by Teresa Gomez, City of Oceanside. Data provided to EPIC on 12/04/15.



**Figure 6 Breakdown of Water Sources Supplied to Oceanside (2013)**

83% water supply (7,773 million gallons) was imported raw and treated surface water from the San Diego County Water Authority (SDCWA). Based on City of Oceanside’s Urban Water Management Plan, the raw water purchased from SDCWA was treated at its Robert A. Weese Filtration Plant. 17% water supply (1,575 million gallons) was local brackish groundwater from Mission Basin, treated at City’s Mission Basin Groundwater Purification Facility. The remaining 0.4% recycled water supply (39.7 million gallons) was from City’s San Luis Rey Wastewater Treatment Plant (SLR WWTP).<sup>44</sup> The water source supplied to City of Oceanside is given in Table 9.

**Table 9 Water Source and Supplied to Oceanside (2013)**

Total Water Supplied (million gallons/year)	9,388
<i>Groundwater</i>	1,575
<i>Surface Water</i>	7,773
<i>Recycled Water</i>	39.7
Per Capita Water Supplied (gal/person/day)	151

For surface water supply, both SDCWA’s water treatment plant and Robert A. Weese Filtration Plant are outside City of Oceanside boundary and have conventional water treatment processes. The total surface water supplied was multiplied by the upstream energy intensity, conventional water treatment energy intensity, and local distribution energy intensity to obtain the total electricity consumption. The

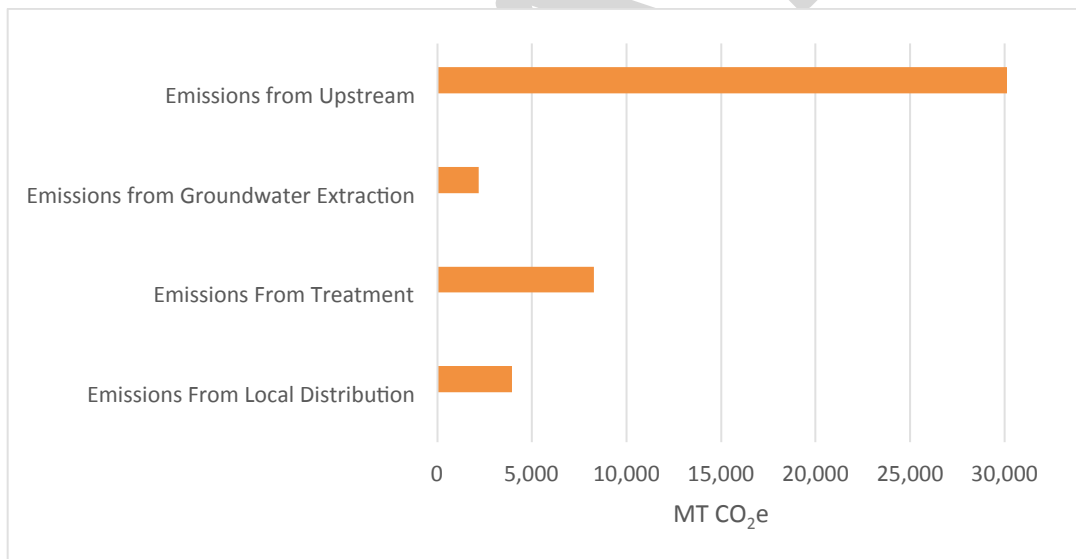
<sup>44</sup> City of Oceanside. 2010 Urban Water Management Plan. (2011) <http://www.ci.oceanside.ca.us/gov/water/admin/uwmp.asp>

electricity consumption was then multiplied by the SDG&E service territory electricity emission factor in 2013 (747 lbs CO<sub>2</sub>e/MWh) to calculate GHG emissions.<sup>45</sup>

For groundwater supply, Mission Basin Groundwater Purification Facility is located inside city boundary and has advance membrane treatment for the brackish groundwater. The total groundwater supplied was multiplied by the groundwater extraction energy intensity, advance water treatment energy intensity, and local distribution energy intensity to obtain the total electricity consumption. All segments associated with groundwater were inside the city boundary, therefore the City of Oceanside electricity emission factor in 2013 was used to calculate GHG emissions.

For recycled water supply, it is assumed that after the tertiary treatment in SLR WWTP, the recycled water was directly supplied for non-potable use with no further water treatment needed.<sup>46</sup> The total recycled water supplied was multiplied only by the local distribution energy intensity to obtain electricity consumptions and then GHG emissions.

All electricity associated with groundwater supply, recycled water supply, and local distribution of surface water supply is inside the city boundary, therefore is already captured in the electricity sector. This electricity consumption and GHG emissions were deducted from the electricity sector to avoid double counting. The total GHG emissions from the water sector in 2013 were **31,188 MT CO<sub>2</sub>e**. The breakdown of emissions in each segment of the water system is given in Figure 7. 82% of emissions from water sector in 2013 (25,619 MT CO<sub>2</sub>e) were from upstream supply and conveyance for surface water.



**Figure 7 Breakdown of Emissions from Water Sector in City of Oceanside (2013)**

<sup>45</sup> SDG&E service territory electricity emission factor is the best available emission factor to represent the region outside city boundary but still in SDG&E service territory.

<sup>46</sup> Based on City of Oceanside’s 2010 UMWP, the recycled water is pumped to city’s municipal gold course or Whelan Lake. See Note 44.

### 3.6 Wastewater

GHG emissions from wastewater generation by the City of Oceanside were estimated based on the total amount of wastewater generated in a given year, multiplied by the emission factor of wastewater treatment processes. All wastewater generated by the City of Oceanside is collected by the City's Water Utilities Department, Wastewater Division, and treated at either San Luis Rey Wastewater Treatment Plant (SLR WWTP) or La Salina Wastewater Treatment Plant (La Salina WWTP).<sup>47</sup>

The wastewater treated by each WWTP for the City of Oceanside in 2013 is given in Table 10. The wastewater treated at SLR WWTP was modified to exclude the wastewater inflow from Rainbow Municipal Water District and City of Vista. All wastewater treated at La Salina WWTP was from City of Oceanside.<sup>48</sup>

**Table 10 Oceanside Wastewater Generation and Treatment Facilities (2013)**

Wastewater Treatment Facility	Wastewater Flow from Oceanside (Million Gallons)
La Salina WWTP	1,084
SLR WWTP*	2,808
Total	3,892

\*Modified

The emission factors of wastewater treatment processes for SLR WWTP and La Salina WWTP were collected from plant operators via surveys during the preparation of government operations inventory. The emissions include 1) stationary methane emissions from anaerobic digester 2) process N<sub>2</sub>O emissions from aerobic processes. The total emissions, effluent flow and emission factor are given in Table 11.<sup>49</sup>

**Table 11 Emissions, Flow and Emissions Factor for Oceanside Wastewater Treatment Facilities (2013)**

	La Salina WWTP	SLR WWTP
Total Emissions (MT CO <sub>2</sub> e)	1,220	2,779
Effluent (Million Gallons)	1,084	3,084
Emissions Factor (MT CO <sub>2</sub> e /Million Gallons)	1.13	0.90

The total and per capita wastewater generation, and corresponding emissions in 2013 are given in Table 12.

<sup>47</sup> City of Oceanside. Wastewater Division Overview. <http://www.ci.oceanside.ca.us/gov/water/waste/default.asp>

<sup>48</sup> The wastewater inflow to each WWTP and its origin was provided from communication with Teresa Gomez. City of Oceanside. Data provided to EPIC on 10/19/15.

<sup>49</sup> The survey on wastewater treatment process was part of the preparation for government operation inventory, and the data were provided by City of Oceanside. The effluent flow at two WWTPs was collected during the preparation for this community inventory.

**Table 12 Wastewater Generation and GHG Emissions in Oceanside (2013)**

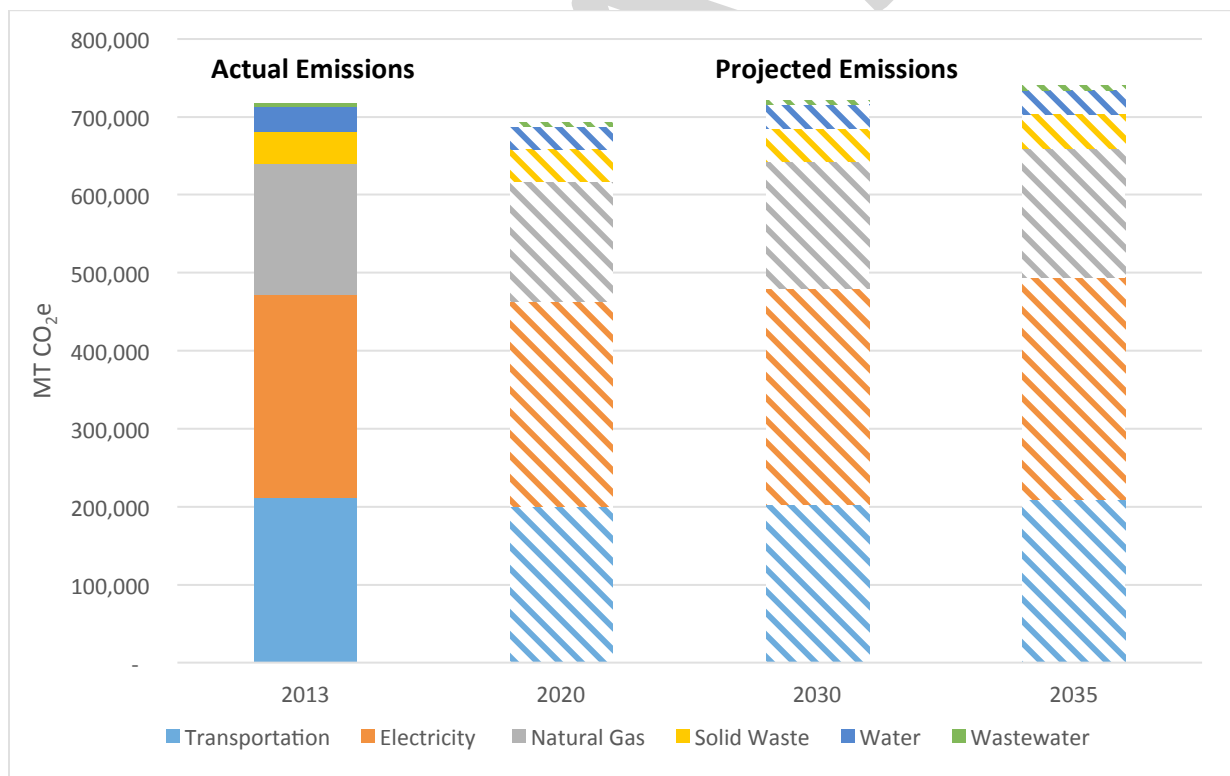
Community Wastewater Generation (million gallons/year)	3,892
Per Capita Wastewater Generation (gallon/day)	63
GHG Emissions (MT CO <sub>2</sub> e)	5,332

#### 4 EMISSION FORECAST TO 2020, 2030 AND 2035

GHG emissions inventories provide a retrospective view of emissions within a city; however, to best plan for future reduction opportunities, emissions are often projected using information about a city’s anticipated growth and development but without additional changes to policy at the baseline year. Such projections are often known as business-as-usual (BAU) projections. The total GHG projections are the sum of the emissions projected by sector for year 2020, 2030 and 2035.

##### 4.1 Summary of Emission Forecasts

The total GHG emissions in 2020 were projected to be 693,037 MT CO<sub>2</sub>e, 3% lower than emissions in 2013. GHG emissions in 2035 were projected to be 740,219 MT CO<sub>2</sub>e, 3% higher than emissions in 2013. This is due to the changes in growth and development in each sector, as well as changes in the emission factor in each sector. Figure 8 below shows a comparison of the emissions breakdown by sector for inventory year 2013 and forecast years 2020, 2030 and 2035.



**Figure 8 Comparison of Emissions Breakdown by Sector in Oceanside (2013, 2020, 2030 and 2035)**

## 4.2 Summary of Projection Methods by Sector

In general, SANDAG Series 13 Regional Growth Forecast<sup>50</sup> was used to obtain the population and job growth in City of Oceanside. The population and job forecast for the City of Oceanside is given in Table 13.

**Table 13 Population and Job Forecast for Oceanside (2020, 2030 and 2035)**

Year	Population	Commercial Jobs <sup>51</sup>	Industrial Jobs <sup>52</sup>
2020	177,840	42,658	4,887
2030	185,859	45,625	5,068
2035	188,597	47,491	5,183

Each sector was projected to 2035 separately using a method specifically for the sector. Data from inventory year (2013) or latest available data year (2014) were used and kept constant for all years through 2035.

### 4.2.1 Electricity

Electricity consumption in the City of Oceanside was projected separately for residential, commercial and industrial customers. For residential customer class, the per capita electricity consumption in 2014 (1,931 kWh/person/year), the latest year with SDG&E data, was calculated by dividing the total electricity consumption in the residential class by the population in 2014.<sup>53</sup> The per capita electricity consumption is held constant and multiplied by forecasted population (Table 13) to project total consumption for future years.

Similar methods were used for the commercial and industrial customer classes. The total commercial electricity consumption was forecasted based on commercial job growth (Table 13) and per job electricity consumption in 2014 (8,464 kWh/commercial job/year). The total industrial electricity consumption was forecasted based on industrial job growth (Table 13) and per job electricity consumption in 2014 (29,141 kWh/industrial job/year).

The total projected electricity consumption, including residential, commercial and industrial electricity consumption, was modified to avoid double counting the projected electricity consumption associated water treatment and distribution. The resulting consumption was then multiplied by the Oceanside specific electricity emission factor calculated for 2014, 651 lbs CO<sub>2</sub>e/MWh, held constant, to obtain the total GHG emission for all years until 2035. The projected total electricity consumption and corresponding GHG emissions for forecast years are given in Table 14.

<sup>50</sup> SANDAG Series 13 Regional Growth Forecast. <http://datasurfer.sandag.org/> Download Date. 11/25/15

<sup>51</sup> The employment types include in commercial jobs are all except construction, manufacturing and agriculture.

<sup>52</sup> The employment types include in industrial jobs are construction and manufacturing.

<sup>53</sup> The 2014 total population is from SANDAG's 2014 Estimates. The SANDAG Population Estimates are released annually and modified based on *E-5 Population and Housing Estimates for Cities, Counties and the State*, California Department of Finance. SANDAG Data Surfer. <http://datasurfer.sandag.org/> Download Date. 01/18/16

**Table 14 Projected Electricity Consumption and GHG Emissions in Oceanside (2020, 2030 and 2035)**

Year	Total Projected Electricity Consumption (GWh)	GHG Emissions (MT CO <sub>2</sub> e)
2020	834	262,925
2030	880	277,200
2035	905	284,835

#### 4.2.2 Natural Gas

The projection method for the natural gas sector is similar to that for the electricity sector, by each customer class separately. For residential customer class, the per capita natural gas consumption in 2014 (93 therms/person/year), the latest year with SDG&E data, was calculated by dividing the total electricity consumption in the residential class by the population in 2014. The per capita electricity consumption is held constant and multiplied by forecasted population (Table 13) to project total consumption for future years.

Similar methods were used for the commercial and industrial customer classes. The total commercial electricity consumption was forecasted based on commercial job growth (Table 13) and per job electricity consumption in 2014 (239 therms/commercial job/year). The total industrial electricity consumption was forecasted based on industrial job growth (Table 13) and per job electricity consumption in 2014 (276 therms/industrial job/year).

The total projected electricity consumption was then multiplied by the natural gas emission factor used in Section 3.2, held constantly, to obtain the total GHG emission for all years until 2035. The projected total natural consumption and corresponding GHG emissions for forecast years are given in Table 15.

**Table 15 Projected Natural Gas Consumption and GHG Emissions in Oceanside (2020, 2030 and 2035)**

Year	Total Projected Natural Gas Consumption (MMTherms)	GHG Emissions (MT CO <sub>2</sub> e)
2020	28.2	154,153
2030	29.7	162,412
2035	30.4	166,430

#### 4.2.3 Transportation

Vehicle Miles Traveled (VMT) forecasts for 2014, 2015, 2020 and 2035 in the City of Oceanside were provided by SANDAG based on its Series 13 activity based model. 2030 and other intermediate years were interpolated linearly. VMT was multiplied by the adjusted GHG emission rate derived from EMFAC2014 for all years until 2035. Two adjustments were made on the emission rate derived from EMFACT2014. First, the electric vehicle penetration rate in 2014 was kept constant for all years until 2035.<sup>54</sup> Second, for new vehicles entering the fleet after calendar year 2014, including all vehicle classes

<sup>54</sup> Using fixed electric vehicle penetration rate in 2014 avoids including the impact of the ZEV (Zero Emission Vehicle) program on BAU projection. The ZEV program requires manufacturers to make and sell ZEVs that will increase VMTs driven by ZEVs. The 2014 electric vehicle penetration rate was calculated based on the ratio of VMT

and fuel types, their emission rates equal to new model year 2014 vehicles emission rates (calendar year 2014 and vehicle year 2014).<sup>55</sup> The total VMT, adjusted emission rate and corresponding GHG emissions for forecast years are given in Table 16.

**Table 16 Total VMT, Adjusted Emission Rate and GHG Emissions in Oceanside (2020, 2030 and 2035)**

Year	Total VMT (miles/day)	Emissions Rate (g CO <sub>2</sub> e/mile)	GHG Emissions (MT CO <sub>2</sub> e)
2020	1,304,611	428.7	199,987
2030	1,393,707	406.5	202,564
2035	1,438,255	405.7	208,659

#### 4.2.4 Solid Waste

The solid waste generation in the City of Oceanside was projected using the population growth and the per capita solid waste generated (1.68 kg/person/day) in 2014, the latest year with available data. Total emissions were calculated by multiplying solid waste generation and the default mixed waste emission factor and gas capture rate provided in Section 3.4. The emissions from waste-in-place were projected using the Landfill Emission Tool developed by ARB. The projected GHG emissions from in-boundary landfills and solid waste generation for the forecast years are given in Table 17.

**Table 17 Projected GHG Emissions from Waste Generation and In-boundary Landfills in Oceanside (2020, 2030 and 2035)**

Year	GHG Emission from Solid Waste Generation (MT CO <sub>2</sub> e)	GHG Emission from In-Boundary Landfills (MT CO <sub>2</sub> e)	Total GHG Emissions (MT CO <sub>2</sub> e)
2020	40,675	702	41,378
2030	42,509	548	43,057
2035	43,135	472	43,607

#### 4.2.5 Water

The total water supplied to the City of Oceanside was determined using the same method as in the above solid waste section, based on per capita water supplied and population growth. The per capita water supplied (151 gallon/person/day) in 2013, the latest year with data available, energy intensity for each element of the water system (Table 8), electricity emission factors were held constant for all years until 2035. The projected total water supplied and the corresponding GHG emissions for the forecast years are given in Table 18.

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driven by ZEV in passenger car level and VMT driven by all passenger cars (gasoline, diesel and electricity). EMFAC2014. Technical Documentation. Section 3.2.2.4.3.

<http://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf>

<sup>55</sup> Avoid the impact of other vehicle regulations on BAU projection.

**Table 18 Projected Water Supplied and GHG Emissions in Oceanside (2020, 2030 and 2035)**

<b>Year</b>	<b>Total Water Supplied (million gallons)</b>	<b>GHG Emissions (MT CO<sub>2</sub>e)</b>
2020	9,821	29,018
2030	10,264	30,326
2035	10,415	30,773

#### 4.2.6 Wastewater

The total wastewater generation in the City of Oceanside was determined using the same method as the solid waste and water sections, based on per capita wastewater generation and population growth. The per capita wastewater generation (63 gallon/person/day) in 2013, the latest year with data available, and wastewater emission factor in SLR WWTP and La Salina WWTP were held constant for all years until 2035. The projected total wastewater generation and the corresponding GHG emissions for the forecast years are given in Table 19.

**Table 19 Projected Wastewater Generation and GHG Emissions in Oceanside (2020, 2030 and 2035)**

<b>Year</b>	<b>Wastewater Generation (Million Gallons)</b>	<b>GHG Emissions (MT CO<sub>2</sub>e)</b>
2020	4,071	5,578
2030	4,255	5,829
2035	4,318	5,915

## 5 COMPARISON WITH 2005 INVENTORY

A GHG inventory, published in 2011, was prepared by ICLEI for the City of Oceanside using previous ICLEI methodology (International Local Government GHG Emissions Analysis Protocol) and 2005 data (referred to as the 2005 inventory). Emissions were calculated for both government operations and the community. For the community inventory, the five sectors included in the 2005 inventory were residential, commercial/industrial, transportation, solid waste and wastewater, as advised by previous ICLEI methodologies and these are different from sectors in the current ICLEI methodology (2012 ICLEI Community Protocol). The emissions by sector from the 2005 inventory and this 2013 inventory are provided in Table 20.

**Table 20 Comparison of Emission Breakdown By Sector between 2005 and 2103 Inventory (MT CO<sub>2</sub>e)**

Sector	2005 Inventory (prepared by ICLEI)	2013 Inventory (prepared by EPIC)
Electricity <sup>56</sup>	192,686	260,631
Natural Gas	154,498	168,164
Transportation	579,873	211,163
Water	Not available	31,188
Solid Waste	31,423	41,483
Wastewater	1,292	5,332
<b>Total Emissions</b>	959,772	717,960
<b>Per Capita Emissions</b>	5.5	4.2

\*Highlighted sectors cannot be directly compared for reasons described in the text

Total and per capita emissions in the 2005 Inventory are higher than in the current 2013 inventory. However, this is largely due to difference in methodologies between two inventories, therefore, a direct comparison of the total or per capita emissions is not possible. A summary of differences between methodologies by sector is given in the following.

### 5.1 Electricity

For the electricity sector, the emissions are calculated by multiplying electricity consumption in the community with an emission factor in both inventories. The total electricity consumption in 2013, including residential, commercial and industrial customer class, is 1% higher than the total electricity consumption in 2005.<sup>57</sup> However, the electricity emission factors used in two inventories are very different. The electricity emission factors used in the 2005 inventory is 546.5 lbs CO<sub>2</sub>/MWh for SDG&E bundled electricity and 724 lbs CO<sub>2</sub>/MWh for direct access electricity (WECC California).<sup>58</sup> Both emission factors are significantly lower compared with emission factors used to derive Oceanside specific

<sup>56</sup> Neither electricity nor natural gas is one of the five sectors in 2005 Inventory. They are sub-categories under the residential and commercial/industrial sectors, and calculated separated. The 2005 Inventory Master Data Workbook was provided by City of Oceanside to EPIC during the preparation of this community inventory.

<sup>57</sup> The total electricity consumption in 2013 excludes electricity consumption associated with water sector. The total electricity consumption in 2005 is from 2005 Inventory Master Data Workbook.

<sup>58</sup> WECC, Western Electricity Coordinating Council, one of the eight Regional Entities with delegated authority from North American Electric Reliability Corporation (NERC) and FERC.

electricity emission factors in the 2013 inventory.<sup>59</sup> Therefore, the total emissions from electricity sector were lower in the 2005 inventory as well.

## 5.2 Natural Gas

For the natural gas sector, there are no methodological differences between two inventories. The difference in emissions is due to different natural gas consumptions. The total natural consumption in 2013, including residential, commercial and industrial customer class, is 6% higher than the total natural gas consumption in 2005.<sup>60</sup>

## 5.3 Transportation

For the transportation sector, the methodologies are very different between two inventories. The current ICLEI method recommends using data of travel originating or terminating within the jurisdictional boundaries of a community, from either an activity-based regional travel demand model with trip origin and destination data or a trip-based travel demand model with trip origin and destination data (four step models). The VMT used in this inventory was estimated based on the activity-based model. In the 2005 inventory, the emissions were calculated based on “local” versus “state” road categories and included miles traveled through the city. Due the difference in methodologies, no comparison can be made here.

## 5.4 Solid Waste

There are no methodological differences in solid waste sector between two inventories. For emissions from community waste generation, the difference in emissions is due to different waste generation. For emissions from waste-in-place, since both landfills are closed, the emissions keep decreasing through the years.

## 5.5 Water

Emissions from water supplied to the community were not included as a main sector in the previous ICLEI methodology, therefore not included in 2005 inventory. No comparisons can be made here.

## 5.6 Wastewater

For the wastewater sector, the methodologies are very different between two inventories. The emissions from wastewater in the 2005 inventory were downscaled from the 2008 San Diego Regional GHG inventory based on the local population. In this 2013 inventory emissions were calculated based on the wastewater generation in the City of Oceanside and the facility-specific treatment emissions factors. Due the difference in methodologies, no comparison can be made here.

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<sup>59</sup> The 2013 SDG&E bundled electricity emission factor used in this inventory is 729 lbs CO<sub>2</sub>e/MWh. The 2013 Direct Access emission factor used in this inventory is 836 lbs CO<sub>2</sub>e/MWh.

<sup>60</sup> The total natural gas consumption in 2005 is from the 2005 Inventory Master Data Workbook.

The background of the page is composed of numerous overlapping triangles in various shades of blue, ranging from light sky blue to a deeper cerulean. The triangles are arranged in a non-uniform, organic pattern that fills the entire page, creating a modern, geometric aesthetic.

**B**

City of Oceanside 2013  
Local Government  
Operations Greenhouse  
Gas Emissions Inventory

# City of Oceanside

## 2013 Local Government Operations Greenhouse Gas Emissions Inventory



### Conducted by:

Basma Gaber, CivicSpark Americorps Program  
In partnership with  
The San Diego Regional Climate Collaborative  
and SANDAG

*February 2016*

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# Executive Summary

## The Purpose of Conducting an Inventory

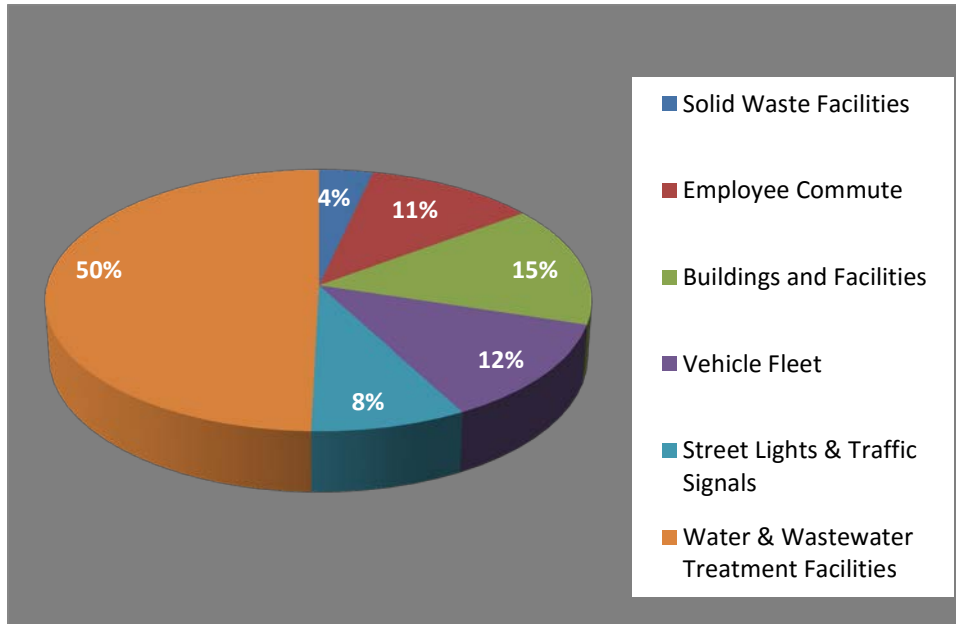
Each day, local governments operate buildings, vehicle fleets, street lights, traffic signals, water systems, and wastewater plants; local government employees consume resources commuting to work and generate solid waste which is sent for disposal. All of these activities directly or indirectly cause the release of carbon dioxide and other greenhouse gases (GHGs) into the atmosphere. This report presents the findings and methodology of a local government operations (LGO) GHG emissions inventory for the City of Oceanside. The inventory measures the GHG emissions resulting specifically from Oceanside's government operations, arranged by sector to facilitate detailed analysis of emissions sources. The inventory addresses where and what quantity of emissions are generated through various local government activities. Through analysis of a local government's emissions profile, the City of Oceanside can tailor strategies to achieve the most effective GHG emission reductions.

A separate GHG inventory has been prepared for the City of Oceanside to track community-scale emissions. The Energy Policy Initiatives Center (EPIC) at the University of San Diego summarized 2013 emissions from electricity, natural gas, transportation, solid waste, water, and wastewater. The City's operations make up 3 percent of Oceanside's community-wide GHG emissions. The community inventory and this municipal inventory can be used as partner documents.

## Inventory Results

The following figures and tables summarize the results of the LGO GHG emissions inventory for the City of Oceanside, by sector, scope, and source.

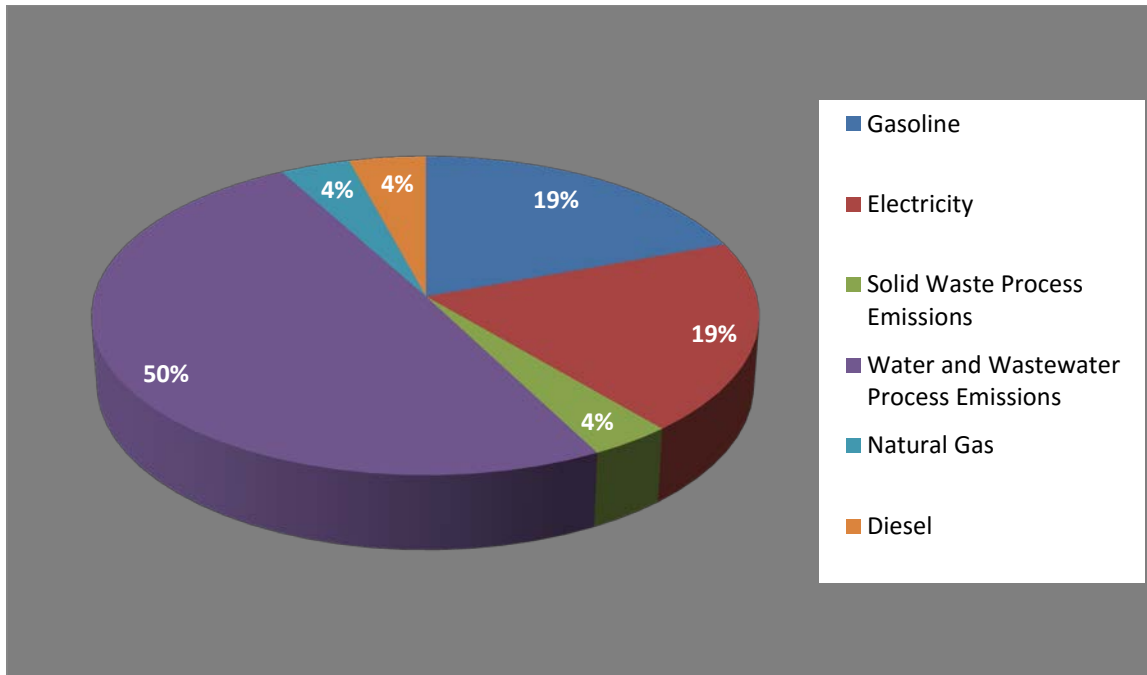
**Figure 1: 2013 Government Operations CO<sub>2</sub>e Emissions by Sector**



**Table 1: Government Operations CO<sub>2</sub>e Emissions by Sector (2005 vs. 2013)**

Sector	2005 metric tons CO <sub>2</sub> e	2013 metric tons CO <sub>2</sub> e
Solid Waste Facilities	2,668	882
Water & Wastewater Treatment Facilities	8,194	12,313
Buildings and Facilities	2,772	3,720
Vehicle Fleet	1,821	3,066
Employee Commute	3,974	2,793
Street Lights & Traffic Signals	1,533	2,054
<b>Totals</b>	<b>20,963</b>	<b>24,828</b>

**Figure 2: 2013 Government Operations CO<sub>2</sub>e Emissions by Source**



**Table 2: Government Operations CO<sub>2</sub>e Emissions by Source (2005 vs. 2013)**

Source	2005 metric tons CO <sub>2</sub> e	2013 metric tons CO <sub>2</sub> e
Gasoline	4,778	4,811
Electricity	4,831	4,827
Solid Waste Process Emissions	2,668	882
Water and Wastewater Process Emissions	6,075	12,313
Natural Gas	1,574	945
Diesel	885	1,036

**Table 3: 2013 Overall Emissions by Scope**

Source	metric tons CO <sub>2</sub> e
Scope 1	9,167
Scope 2	11,985
Scope 3	3,674

Emissions can be measured by “scope” in order to understand the entity’s degree of control over the emissions’ source and location. This can either be direct (Scope 1) or indirect (Scopes 2 and 3). Scope 1 includes emissions from sources within a jurisdiction’s operations that it owns

or controls, including process emissions, mobile combustion of fuels, stationary combustion to produce electricity, and fugitive emissions from producing and processing fuels. Scope 2 includes emissions from consumption of electricity, heating, cooling, and steam that are purchased from a utility. Scope 3 includes all other emissions sources, such as tailpipe emissions from employee commutes.

## Introduction

### Regional and Local Context

#### Climate Change Mitigation Activities in California

Since 2005, the State of California has responded to growing concerns over the effects of climate change by adopting a comprehensive approach to addressing emissions in the public and private sectors. This approach was officially initiated with the passage of the Global Warming Solutions Act of 2006 (AB 32), which requires the state to reduce its GHG emissions to 1990 levels by 2020. The AB 32 Scoping Plan was developed to identify strategies for meeting the AB 32 goal, and was adopted by ARB in December 2008. Among many other strategies, it encourages local governments to reduce emissions in their jurisdictions by 15 percent below current levels by 2020. In addition, it identifies the following strategies that will impact local governance:

- Develop a California cap-and-trade program
- Expand energy efficiency programs
- Establish and seek to achieve reduction targets for transportation-related GHG emissions
- Expand the use of green building practices
- Increase waste diversion, composting, and commercial recycling toward zero-waste
- Continue water efficiency programs and use cleaner energy sources to move and treat water
- Reduce methane emissions at landfills
- Preserve forests that sequester carbon dioxide

Other measures taken by the state include mandating stronger vehicle emissions standards (AB 1493, 2002), establishing a low-carbon fuel standard (EO # S-01-07, 2007), mandating a climate adaptation plan for the state (S-EO # 13-08, 2008), establishing a Green Collar Job Council, and establishing a renewable energy portfolio standard for power generation or purchase in the state. The state also has made a number of legislative and regulatory changes that have significant implications for local governments:

- SB 97 (2007) required the Office of Planning and Research to create GHG planning guidelines for the California Environmental Quality Act (CEQA). In addition, ARB is tasked with creating energy-use and transportation thresholds in CEQA reviews, which may require local governments to account for GHG emissions when reviewing project applications.
- AB 811 (2007) authorizes all local governments in California to establish special districts that can be used to finance solar or other renewable energy improvements to homes and businesses in their jurisdiction.
- SB 375 (2008) revises the process of regional transportation planning by metropolitan planning organizations (MPOs), which are governed by elected officials from local jurisdictions. The statute calls on ARB to establish regional transportation-related GHG targets and requires the large MPOs to develop regional “Sustainable Communities Strategies” of land use, housing and transportation policies that will move the region towards its GHG target. The statute stipulates that transportation investments must be consistent with the Sustainable Communities Strategy and provides CEQA streamlining for local development projects that are consistent with the Strategy.

## **Climate Change Mitigation Activities in the City of Oceanside**

In 2010, the City of Oceanside adopted a Zero Waste goal of 75% to 90% by 2020. In 2012, the City adopted a Zero Waste Strategic Plan, that includes the direction to implement an expansive community based recycling program that focuses on waste reduction, reuse, recycling, and

composting programs for all public spaces, City facilities, residential homes, apartments, businesses, and schools in Oceanside. Since the adoption of our Zero Waste goals, the City has increased its 57% rate to 72%, and as a result, the City boasts one of the highest diversion rates in California. Current Diversion/Recycling totals represent an actual mitigation of approximately 3,000 metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e) emissions from landfill (Base year study and emission totals were calculated in 2010, based on the EPA's Warm Model). At full implementation of the City of Oceanside's Zero Waste Plan and subsequent diversion goals by 2020, the City is anticipating reducing GHG emissions by 191,905 MTCO<sub>2</sub>e per year, the equivalent of removing 37,628 cars from Oceanside roadways each day.

In 2014, the City began retrofitting its streetlights, replacing lights with energy-efficient LED bulbs. 7,700 lights were retrofitted, with an energy reduction of 2.6 million kilowatt hours (kWh) per year, as well as a reduction in CO<sub>2</sub> of approximately 1.7 million pounds per year. Since this inventory is for 2013, the emissions reduced from this retrofit project are not reflected; reductions should be seen in future GHG inventories.

## **General Methodology**

### **Local Government Operations Protocol**

A national standard called the Local Government Operations Protocol (LGO Protocol) has been developed and adopted by the California Air Resources Board (ARB) in conjunction with ICLEI, the California Climate Action Registry, and The Climate Registry. This standard provides accounting principles, boundaries, quantification methods, and procedures for reporting GHG emissions from local government operations. The LGO Protocol forms the basis of ICLEI's ClearPath tool, which allows local governments to compile data and perform the emissions calculations using standardized methods.

### **Greenhouse Gases and Carbon Dioxide Equivalent**

In accordance with LGO Protocol recommendations, ClearPath calculates and reports all six internationally recognized GHGs regulated under the Kyoto Protocol (Carbon Dioxide, Methane,

Nitrous Oxide, Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride). Emissions summaries found throughout this report also use ClearPath’s ability to combine emissions from the various GHGs into carbon dioxide equivalent, CO<sub>2</sub>e. Since equal quantities of each GHG have more or less influence on the greenhouse effect, converting all emissions to a standard metric, CO<sub>2</sub>e, allows apples-to-apples comparisons amongst quantities of all six emissions types. GHG emissions are reported in this inventory as metric tons of CO<sub>2</sub>e (MTCO<sub>2</sub>e).

Table 4 exhibits the GHGs and their global warming potential (GWP), a measure of the amount of warming a GHG may cause compared to the amount of warming caused by carbon dioxide.

**Table 4: Greenhouse Gases and Their Global Warming Potential**

Gas	Chemical Formula	Activity	Global Warming Potential (CO <sub>2</sub> e)
Carbon Dioxide	CO <sub>2</sub>	Combustion	1
Methane	CH <sub>4</sub>	Combustion, Anaerobic Decomposition of Organic Waste (Landfills, Wastewater), Fuel Handling	25
Nitrous Oxide	N <sub>2</sub> O	Combustion, Wastewater Treatment	298
Hydrofluorocarbons	Various	Leaked Refrigerants, Fire Suppressants	12–14,800
Perfluorocarbons	Various	Aluminum Production, Semiconductor Manufacturing, HVAC Equipment Manufacturing	7,390–17,340
Sulfur Hexafluoride	SF <sub>6</sub>	Transmission and Distribution of Power	22,800

### Calculating Emissions

In general, emissions can be quantified in two ways.

**1. Measurement-based methodologies** refer to the direct measurement of GHG emissions from a monitoring system. Emissions measured this way may include those emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility. This method is the most accurate way of inventorying emissions from a given source, but is generally available for only a few sources of emissions.

**2. Calculation-based methodologies** refer to an estimate of emissions calculated based upon measurable *activity data* and *emission factors*. Table 5 provides examples of common emissions calculations.

**Table 5: Basic Emissions Calculations**

Activity Data	x	Emissions Factor	=	Emissions
Electricity Consumption (kilowatt hours)		CO <sub>2</sub> emitted/kWh		CO <sub>2</sub> emitted
Natural Gas Consumption (therms)		CO <sub>2</sub> emitted/therm		CO <sub>2</sub> emitted
Gasoline/Diesel Consumption (gallons)		CO <sub>2</sub> emitted/gallon		CO <sub>2</sub> emitted
Waste Generated by Government Operations (tons)		CH <sub>4</sub> emitted/ton of waste		CH <sub>4</sub> emitted

### The Scopes Framework

This inventory reports GHG emissions by sector and additionally by “scope”, in line with the LGO Protocol and World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD) GHG Protocol Corporate Standard.

**Scope 1:** Direct emissions from sources within a local government’s operations that it owns and/or controls, with the exception of direct CO<sub>2</sub> emissions from biogenic sources. This includes stationary combustion to produce electricity, steam, heat, and power equipment; mobile combustion of fuels; process emissions from physical or chemical processing; fugitive emissions that result from production, processing, transmission, storage and use of fuels; leaked refrigerants; and other sources.

**Scope 2:** Indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling.

**Scope 3:** All other emissions sources that hold policy relevance to the local government that can be measured and reported. This includes all indirect emissions not covered in Scope 2 that occur as a result of activities within the operations of the local government. Scope 3 emission sources include (but are not limited to) tailpipe emissions from employee commutes, employee business travel, and emissions resulting from the decomposition of government-generated solid waste.

ICLEI and the LGO Protocol provide standard methodologies for calculating emissions from the sources shown in the following table. Other sources of emissions, such as those associated with the production of consumed products do not yet have standard calculation methodologies and are thus excluded from this inventory.

**Table 6: Inventoried Emissions Sources by Scope**

Scope 1	Scope 2	Scope 3
Fuel consumed at facilities	Purchased electricity consumed by facilities	Solid waste generated by government operations
Fuel consumed by vehicle fleet and mobile equipment	Purchased electricity consumed by electric vehicles	Fuel consumed by vehicles during employee commuting
Fuel consumed to generate electricity	Purchased steam	
Leaked refrigerants from facilities and vehicles	Purchased cooling (chilled water)	
Leaked / deployed fire suppressants		
Solid waste in government landfills		
Wastewater decomposition and treatment at a municipal wastewater treatment plant		

### Organizational Boundaries

The organizational boundary for the inventory determines which aspects of operations are included in the emissions inventory, and which are not. Under the LGO Protocol, two control approaches are used for reporting emissions: operational control or financial control. A local government has operational control over an operation if it has full authority to introduce and implement policies that impact the operation. A local government has financial control if the operation is fully consolidated in financial accounts. If a local government has joint control over an operation, the contractual agreement will have to be examined to see who has authority over operating policies and implementation, and thus the responsibility to report emissions under operational control.

LGO Protocol strongly encourages local governments to utilize operational control as the organization boundary for a government operations emissions inventory. Operational control is believed to most accurately represent the emissions sources that local governments can most directly influence, and this boundary is consistent with other environmental and air quality reporting program requirements. For this reason, this inventory was conducted according to the operational control framework.

### **Types of Emissions**

As described in the LGO Protocol, emissions from each of the GHGs can come in a number of forms:

- **Stationary or mobile combustion:** These are emissions resulting from on-site combustion of fuels (natural gas, diesel, gasoline, etc.) to generate heat, electricity, or to power vehicles and mobile equipment.
- **Purchased electricity:** These are emissions produced by the generation of power from utilities outside of the jurisdiction.
- **Fugitive emissions:** Emissions that result from the unintentional release of GHGs into the atmosphere (e.g., leaked refrigerants, methane from waste decomposition, etc.).
- **Process emissions:** Emissions from physical or chemical processing of a material (e.g., wastewater treatment).

### **Understanding Totals**

It is important to realize that the totals and sub-totals listed in the tables and discussed in this report are intended to represent all-inclusive, complete totals for Oceanside's operations. However, these totals are only a summation of inventoried emissions using available estimation methods. Each inventoried sector may have additional emissions sources associated with them that were unaccounted for, such as Scope 3 sources that could not be estimated.

Also, local governments provide different services to their citizens, and the scale of the services (and thus the emissions) is highly dependent upon the size and purview of the local government. For these reasons, comparisons between local government totals should not be made without keen analysis of the basis for figures and the services provided.

# Inventory Results

## Emissions Total

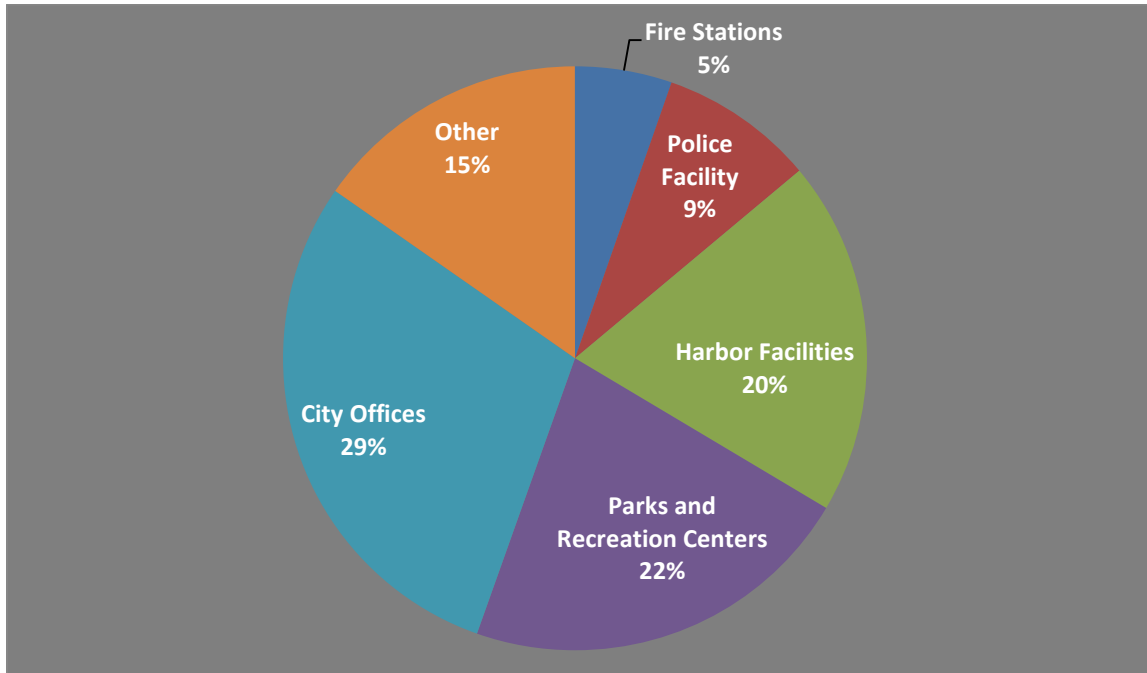
In 2013, Oceanside's GHG emissions from government operations totaled 22,241 metric tons of CO<sub>2</sub>e. This number represents a roll-up of emissions. While the roll-up is a valuable figure, information on the breakdown of emissions from local government operations by sources and sectors allows the comparative analysis and insight needed for effective decision-making on target setting, developing GHG reduction measures, or monitoring. Details on the breakdown of Oceanside's emissions by sources and sectors can be found in the subsequent sections of this report.

## Buildings and Other Facilities

Of the six sectors in the municipal inventory, Buildings and Facilities represents the second largest GHG-emitting sector at 3,719 MTCO<sub>2</sub>e (14.9 percent) (see Figure 1 and Table 1 in the Executive Summary). Facility operations contribute to GHG emissions through the consumption of electricity and fuels such as natural gas. Table 8 shows that electricity consumption from Oceanside buildings and facilities accounted for 2,773 MTCO<sub>2</sub>e (11.1 percent of total MTCO<sub>2</sub>e) and natural gas consumption from Oceanside buildings and facilities contributed another 945 MTCO<sub>2</sub>e (3.8 percent of total MTCO<sub>2</sub>e).

For the purposes of this inventory, facilities were grouped into 13 categories (see Figure 3 and Table 7). In 2013, the City offices and Parks and Recreation buildings were the two largest single-building contributors to emissions, accounting for 1,088 metric tons (29 percent) and 813 MTCO<sub>2</sub>e (22 percent) of the total Buildings and Facilities total MTCO<sub>2</sub>e.

**Figure 3: City Buildings and Other Facilities Emissions by Department**



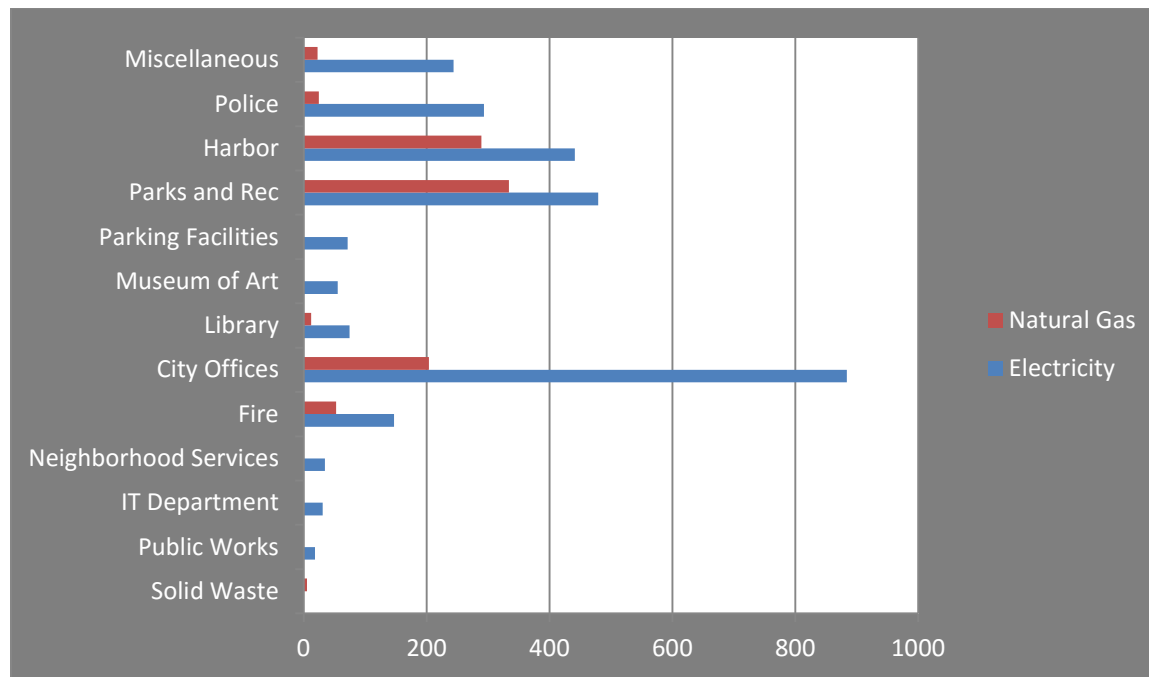
**Table 7: City Buildings and Other Facilities Emissions by Department**

Department	metric tons CO <sub>2</sub> e
City Offices	1,088
Parks and Recreation Centers	813
Harbor Facilities	730
Police Facility	318
Miscellaneous Facilities	266
Fire Stations	200
Libraries	87
Parking	72
Museums	55
Neighborhood Services	34
IT Facilities	31
Public Works	18
Solid Waste Facilities	6
<b>Totals</b>	<b>3,718</b>

**Table 8: City Buildings and Other Facilities Emissions by Source**

Source	metric tons CO <sub>2</sub> e	Percentage
Electricity	2,773	75%
Natural Gas	945	25%
<b>Totals</b>	<b>3,718</b>	<b>100%</b>

**Figure 4: Emission Contributions from Buildings by Department and Source**



**Table 9: Top 5 Largest Contributors to Emissions from Buildings Sector**

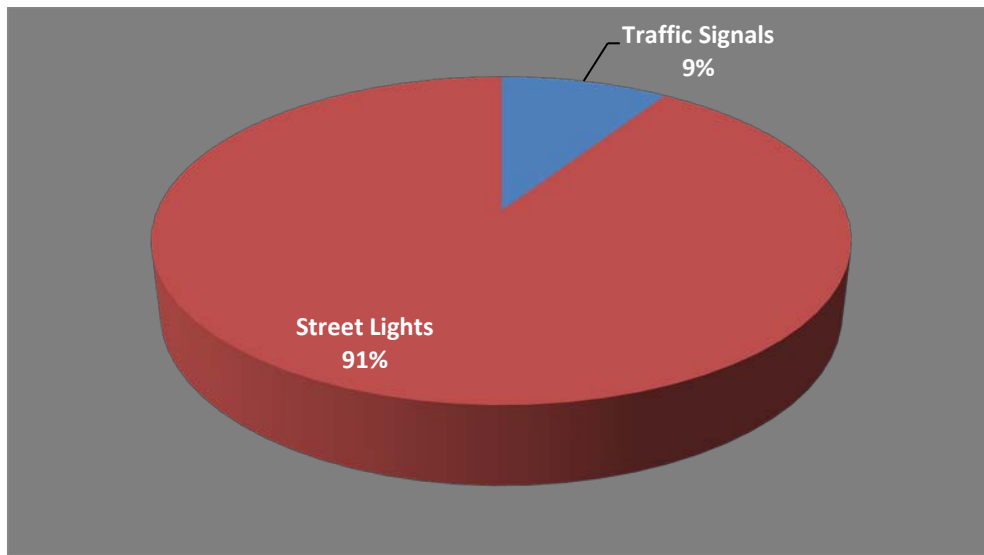
Facility	% of Total Buildings Emissions from Electricity	% of Total Buildings Emissions from Natural Gas	CO <sub>2</sub> e Emissions from Electricity	CO <sub>2</sub> e Emissions from Natural Gas	Total CO <sub>2</sub> e Emissions
City Offices	32%	22%	884	204	1,088
Parks and Recreation	17%	35%	479	334	813
Harbor	16%	31%	441	289	730
Police	11%	3%	293	25	318
Miscellaneous	8%	2%	244	22	266
<b>Totals</b>	<b>84%</b>	<b>93%</b>	<b>2,370</b>	<b>874</b>	<b>3,215</b>

## Streetlights, Traffic Signals, and Other Public Lighting

The majority of emissions associated with the operation of this infrastructure are due to electricity consumption. Data relating to electricity consumption for public lighting was obtained from SDG&E.

In 2014, Public Lighting in the City of Oceanside ranked fifth in GHG emissions of the six sectors in the municipal inventory, (see Figure 1 and Table 1). Table 10 shows that public lighting consumed a total of 6,414,284 kilowatt hours of electricity, producing approximately 2,054 MTCO<sub>2</sub>e (8.3 percent). Streetlights consumed approximately 91 percent of the electricity and traffic signals and controllers accounted for nine percent.

**Figure 5: Public Lighting Emissions by Subsector**



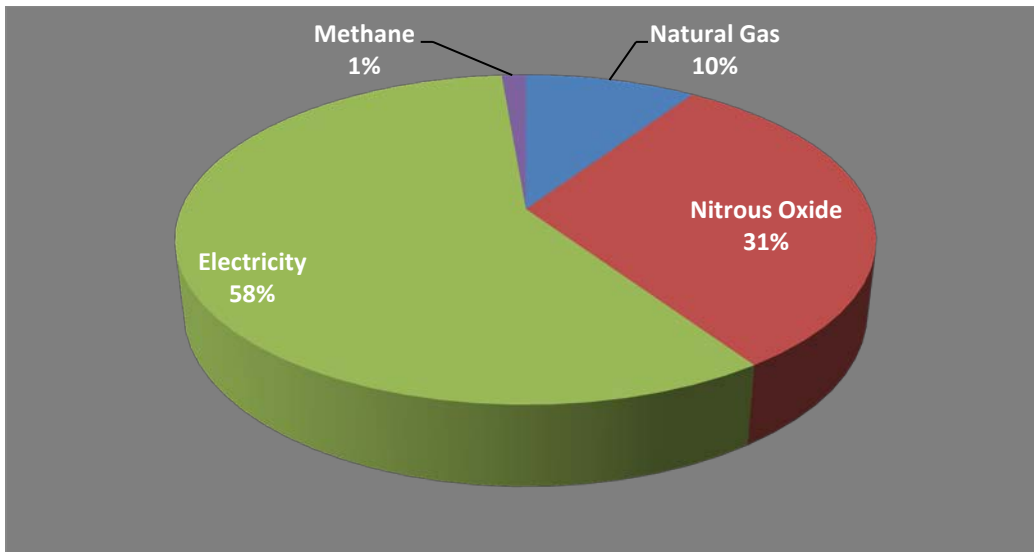
**Table 10: Public Lighting Emissions by Subsector**

Subsector (Light Type)	metric tons CO <sub>2</sub> e	% of Sector Emissions	Electricity Use (kWh)
Traffic Signals/ Controllers	189	9%	591,214
Streetlights	1,865	91%	5,823,070
<b>Totals</b>	<b>2,054</b>	<b>100%</b>	<b>6,414,284</b>

## Water and Wastewater Treatment

Of the six sectors in the municipal inventory, water transport and wastewater treatment ranks first, accounting for 12,313 (49.6 percent) MTCO<sub>2</sub>e (see Figure 1 and Table 1). This sector includes emissions from equipment used for the distribution or transport of water and sewer discharges, including drinking water, sprinkler systems and irrigation and process emissions from the La Salina and San Luis Rey wastewater treatment facilities located in the City of Oceanside. The most significant source of GHG emissions in this sector is the electricity usage at both of the wastewater treatment plants, totaling 7,156 MTCO<sub>2</sub>e in 2014. N<sub>2</sub>O emissions from the aerobic processes of both wastewater treatment plants accounted for the second largest source in this sector, totaling 3,835 MTCO<sub>2</sub>e (31 percent).

**Figure 6: Water and Wastewater Treatment Emissions by Source**



**Table 11: Water and Wastewater Treatment Emissions by Source**

Sources	metric tons CO <sub>2</sub> e	% of Sector Emissions
Municipal Consumption of Grid Electricity from Sewer and Water Department	7,156	58%
Municipal Consumption of Natural Gas from Sewer and Water Department	1,158	9%
CH <sub>4</sub> Emissions from Anaerobic Digesters	164	1.3%
Process N <sub>2</sub> O Emissions from Aerobic Processes	3,835	31.7%
<b>Totals</b>	<b>12,313</b>	<b>100%</b>

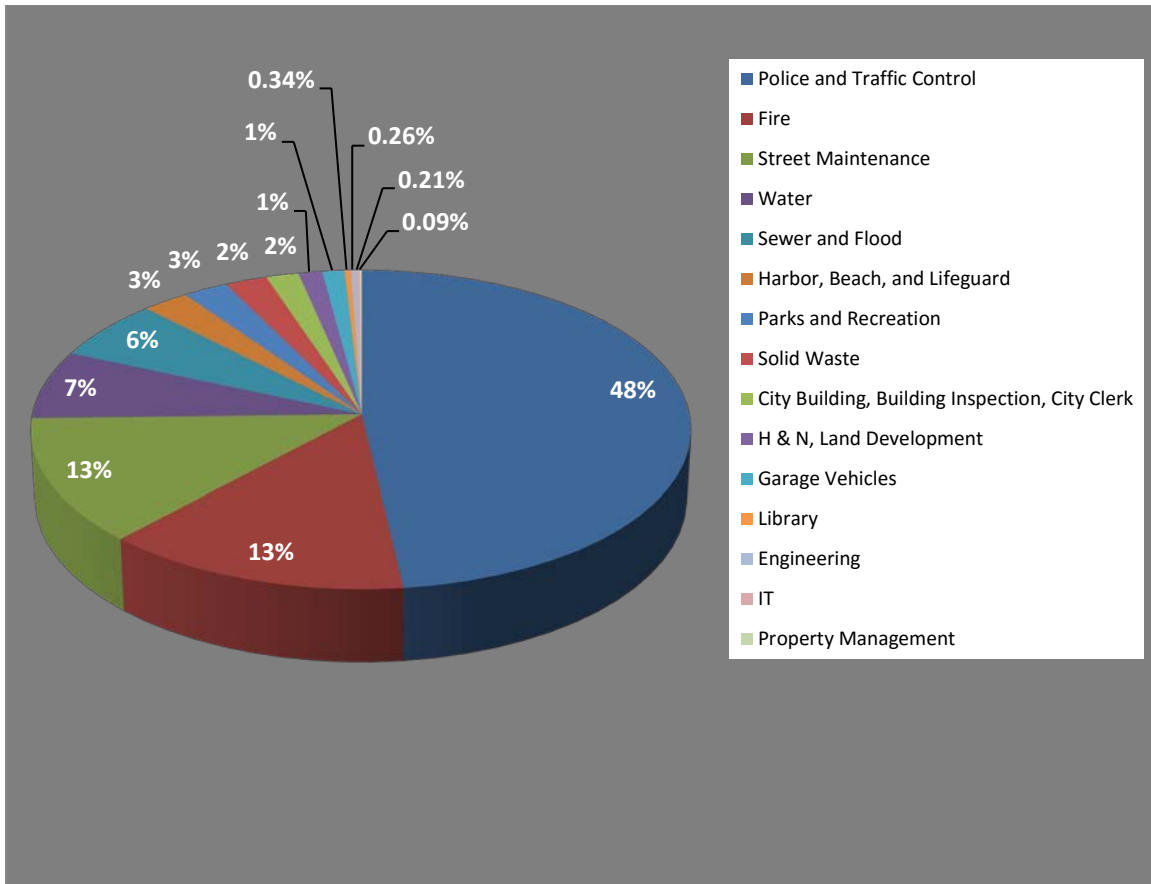
### Vehicle Fleet

Of the six sectors in the municipal inventory, vehicle fleet ranks third, accounting for 3,066 MTCO<sub>2</sub>e (12.3 percent) (see Figure 1 and Table 1). The vehicles used in the City of Oceanside’s daily operations, including maintenance trucks used for parks and recreation to police cruisers and fire trucks, burn gasoline and diesel, which results in GHG emissions. The most significant source of GHG emissions was from Police Department vehicles, which accounted for 1,476 MTCO<sub>2</sub>e (48 percent) in 2013.

**Table 12: Top 5 Vehicle Fleet Emissions Contributors by Department**

Sources	metric tons CO <sub>2</sub> e	% of Sector Emissions	Annual Unleaded Fuel Use (gallons)	Annual Diesel Fuel Use (gallons)
Police Department and Traffic Control	1,476	48%	166,411	1,413
Fire Department	421	14%	10,842	31,945
Street Maintenance	389	13%	10,194	28,963
Water Department	213	7%	19,080	4,487
Sewer and Flood Department	187	6%	8,576	10,987
<b>Totals</b>	<b>2,686</b>	<b>88%</b>	<b>215,103</b>	<b>77,795</b>

**Figure 7: Vehicle Fleet Emissions by Department**



**Government-Generated Solid Waste**

Of the six sectors in the municipal inventory, solid waste ranks sixth, accounting for 882 MTCO<sub>2</sub>e (3.5 percent) (see Figure 1 and Table 1). The data collected for this inventory is based on the number of times the City of Oceanside’s municipal trash dumpsters were serviced by Waste Management in 2013 at all City Facilities, no matter how full. Therefore the data is in total yards serviced in 2013, and does not necessarily represent actual waste generated in the bin, due to the inability to audit the actual amount of material within bin at time of servicing.

Additionally, it is noted that in 2014, City staff conducted a field audit of all city services, and found that the majority of the 2013 service data was inaccurate, and unfortunately reflected a significant amount of trash service than what was actually being provided at City Facilities.

Since this time, the City of Oceanside has removed a significant amount of trash service, and increased recycling by over 50%.

**Table 13: Government Waste Emissions by Scope and Emission Type**

Scope	Emission Type	Greenhouse Gas Emissions (metric tons)	
		CO <sub>2</sub> e	CH <sub>4</sub>
<b>SCOPE 3</b>	Trash	882	35
	<b>INDICATORS</b> Yards of solid waste	51,324	

### Employee Commute

Of the six sectors in the municipal inventory, employee commute ranks fourth, accounting for 2,793 MTCO<sub>2</sub>e (11.2 percent) (see Figure 1 and Table 1). Emissions in the Employee Commute sector are due to combustion of fuels in vehicles used by the City of Oceanside’s employees for commuting to work. Results from a survey designed by ICLEI and administered by the City of Oceanside was used to collect the data needed to calculate emissions, with 200 employee survey responses.

**Table 14: Employee Commute Emissions by Source and Emission Type**

Emission Type	Greenhouse Gas Emissions (metric tons)			
	CO <sub>2</sub> e	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Gasoline	2,668	2,587	0.198	0.255
Diesel	125	125	0.0001	0.0003
<b>TOTAL</b>	<b>2,793</b>	<b>2,712</b>	<b>0.199</b>	<b>0.258</b>

---

Vehicle Miles Traveled\* 6,106,212

## **Conclusion**

By updating its GHG inventories, the City of Oceanside continues to take important steps towards reducing its environmental impacts and promoting a sustainable future. Tracking emissions can illustrate areas where the City can further reduce GHGs caused by its municipal operations and highlight sectors that could use programs or policy measures to help meet state and local climate goals.

C

# Oceanside Climate Action Plan Technical Methods



# Oceanside Climate Action Plan Technical Methods

April 2019

Prepared for:



City of Oceanside  
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Prepared by:



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## Attachments

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# Chapter 1 Introduction

While preparing the Climate Action Plan (CAP), RECON Environmental, Inc. has made minor refinements to the previous City of Oceanside inventory reports, forecasted future emissions under multiple scenarios, identified emissions reductions associated with a list of recommended sustainability measures, and identified a project review checklist for determining the consistency of future development projects with CAP assumptions. The intent of this technical appendix is to provide a more thorough discussion of the sources of data used, as well as the approach used to develop the greenhouse gas (GHG) emission forecasts. All GHG emissions forecasts are reported in terms of total metric tons (MT) of carbon dioxide equivalent (CO<sub>2</sub>e).

## Chapter 2 Emissions Inventory

Detailed greenhouse gas inventories incorporated into the CAP included the April 2016 *Draft City of Oceanside Greenhouse Gas Inventory and Forecast*, which assessed communitywide emission sources within the City in 2013 and the February 2016 *Draft 2013 Local Government Operations Greenhouse Gas Emissions Inventory*, which assessed municipal emissions (municipal emissions are a subset of communitywide emissions). These inventories were prepared by the Energy Policy Initiatives Center (EPIC) of the University of San Diego and the CivicSpark Americorps Program and are included in Appendix A and Appendix B of the CAP. Previous inventories, as well as the inventory as refined by RECON were prepared using the Statewide Energy Efficiency Collaborative (SEEC) Clearpath Model. This section details and explains the differences in the emissions inventory resulting from use of the SEEC Clearpath Model for preparation of the CAP.

The Local Government Operations Protocol (LGO Protocol) and the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (Community Protocol) are standardized sets of guidelines to assist local governments in developing municipal and community GHG inventories. The LGO Protocol and was developed in partnership by the California Air Resources Board, California Climate Action Registry, ICLEI – Local Governments for Sustainability, and The Climate Registry. The Community Protocol was developed by ICLEI – Local Governments for Sustainability. The previous inventory reports were reviewed and determined to be consistent with the LGO and Community protocols. Additionally, all emission factors were reviewed and were generally determined to be up-to-date and applicable to the City. As the previous inventory data sources, emission factors, and methodology were accurate and consistent with relevant guidance, the refined inventory was generally prepared using the same data and methodology from the previous inventories. For discussion of inventory data and methodology see CAP Appendix A and Appendix B.

The differences between results of the previous inventories and refined inventory were minor. **Table 1** below summarizes the difference between the previous communitywide inventory and the refined communitywide inventory; a breakout of municipal and non-municipal emissions is provided for the refined inventory. Refinements in methodology that resulted in these differences are discussed below. As municipal emissions are a subset of the communitywide emissions, the refinements in methodology to the communitywide inventory were also applied to the municipal inventory. The municipal inventory and forecast is not discussed further.

Table 1 Comparison of GHG Emissions by Inventories (2013)			
Source	Activity	Emissions (MT CO <sub>2</sub> e)	
		Previous	Refined
Transportation <i>Non-Municipal</i> <i>Municipal</i>	1,014,833,210 VMT	483,099 - -	483,037 477,178 5,859
Electricity <i>Non-Municipal</i> <i>Municipal</i>	675,419,693 kWh	260,631 - -	260,899 251,524 9,375
Natural Gas <i>Non-Municipal</i> <i>Municipal</i>	3,072,959 MMBtu	168,164 - -	163,392 162,447 945
Solid Waste <i>Non-Municipal</i> <i>Municipal</i>	120,718 tons	41,483 - -	41,497 40,615 882
Water <i>Non-Municipal</i> <i>Municipal</i>	18,736 Million Gallons	31,188 - -	35,187 27,420 7,767
Total <i>Non-Municipal</i> <i>Municipal</i>	-	988,316 - -	984,012 959,184 24,828

As shown in Table 1, emissions differences within each emission sector, i.e. transportation, electricity, solid waste, and water, are all less than 0.1 percent and can generally be attributed primarily to rounding differences.

The difference in estimated transportation emissions is attributable to a revision in the inventoried vehicle miles traveled (VMT). The EPIC inventory report linearly interpolated annual vehicle miles traveled in 2013 from San Diego Association of Governments (SANDAG) Series 13 Forecast 2012 and 2014 forecasts. For consistency with SEEC Clearpath Model growth factors, the annual VMT in 2013 was interpolated based on exponential regression (constant percent reduction). This difference in methodology reduced the estimated annual VMT in 2013 from 1,014,833,210 to 1,014,833,210, a difference of approximately 0.01 percent.

The difference in estimated natural gas emissions is attributable to the emission factor used in the different methodologies. The EPIC inventory report was based on an emission factor of 0.0055 MT CO<sub>2</sub>e/therm, which is based on 2014 California Greenhouse Gas Inventory emission factors. The emission factor used in the SEEC Clearpath Model is 0.0053 MT CO<sub>2</sub>e/therm, which is based on Method BE.1 and associated emission factors from the Community Protocol. This difference in emissions factors reduced the reported GHG emissions from natural gas by approximately three percent.

Similarly, the difference in estimated water emissions is attributable to a difference in in the EPIC inventory methodology and the methodology employed in refined inventory. The EPIC inventory report was modified to exclude emissions associated with wastewater inflow from the Rainbow Municipal Water District and the City of Vista to the San Luis Rey Wastewater Treatment Plan. The refined inventory reported the emissions for treatment of this wastewater because the San Luis Rey Wastewater Treatment Plant is operated by the City and thus is included within the municipal inventory. This increase in the estimated wastewater emissions results in an associated increase in GHG emissions by approximately seven percent.

Differences between the EPIC communitywide inventory and the refined communitywide inventory result in an approximate 0.4 percent reduction in total estimated communitywide emissions.

# Chapter 3 Communitywide Emissions Forecast

As discussed in the CAP, communitywide GHG emissions were initially forecasted under two conditions: a Business-as-Usual (BAU) condition and an “Adjusted” Business-as-Usual (Adjusted BAU) condition. The BAU condition describes emissions based on projected growth in population, employment, and automotive use and does not consider policies that will reduce emissions in the future (i.e., the policies and related efficiency levels in place in 2013 are assumed to remain constant through 2035). The Adjusted BAU condition describes emissions based on projected growth and considers state programs that will achieve GHG reductions in the future.

Forecasts were modeled in the SEEC Clearpath Model, which uses 5-year increment growth and emission factors (factor sets). Basic growth indicators included forecasted population, VMT, commercial jobs, industrial jobs, and municipal jobs. Emission factor indicators were developed for vehicle emission factors and electricity intensity factors to reflect the effects of California’s Advanced Clean Cars Program and Renewable Portfolio Standard (RPS). For example, on-road transportation emissions in 2015 were calculated based on 2013 baseline levels, a 1.510 percent annual growth rate for VMT, and a -2.515 annual decay rate for vehicle emission rates; on-road transportation emission in 2020 were further forecast based on 2015 forecasted levels, a 0.272 percent annual growth rate for VMT, and a -2.515 annual decay rate for vehicle emission rates; and so forth.

**Table 2** below summarizes the growth indicators used in the CAP emission forecasts for each sector/source. **Tables 3–6** summarize the sources used to develop growth forecasts and emission factor sets are discussed and shown below. Additionally, original sources are included in Attachment 1. **Tables 7 and 8** summarize the development of growth and emission factor sets. The BAU and Adjusted BAU forecasts for each year are shown in **Table 9**.

Forecasted population growth was based on the San Diego Association of Governments’ (SANDAG) Series 13 Regional Growth Forecast for the City of Oceanside as shown in Table 3. As shown, the Regional Growth Forecast identified population estimates for 2012, 2020, 2035, and 2050. The population for intermediate years was interpolated assuming a steady growth rate for each interval (for example approximately 0.62 percent growth per year from 2012–2020).

Forecasted VMT was based on a SANDAG Series 13 Forecast for regional VMT by jurisdiction as shown in Table 4. All VMT associated with trips with an origin and destination within the City was included; half of the VMT associated with trips with an origin or destination outside the City was included; pass-through

trips were excluded. As shown, the Regional Growth Forecast identified VMT estimates for 2012, 2014, 2015, 2020, and 2035. The VMT for intermediate years was interpolated assuming a steady growth rate for each interval; the VMT for years after 2035 was estimated assuming the growth rate for the 2020–2035 interval would continue.

Forecasted employment was based on projections developed by Keyser Marston Associates as shown below. Commercial jobs were assumed to include all employment from the commercial office and commercial retail sectors as well as the education services subsector, the arts entertainment and recreation subsector, and the other services subsector. Industrial jobs were assumed to include all employment from the industrial sector. Municipal jobs were assumed to include all employment from the institutional public administration subsector. As shown, the employment projections identified employment estimates for 2009, 2014, and 2035. The employment for intermediate years was interpolated assuming a steady growth rate for each interval; the employment for years after 2035 was estimated assuming the growth rate for the 2014–2035 interval would continue.

Vehicle emission factors sets were derived from the California Air Resource Board's (California ARB) motor vehicle emission inventory program, EMFAC2014 and are shown in Table 6. Specific runs were input for the San Diego Subarea of the San Diego Air Basin for the years 2013, 2020, 2030, 2040, and 2050. The decay rate for the overall CO<sub>2</sub>E per mile was determined for each model year and was entered in the factor set.

Electricity intensity factors sets were derived from the based on the 11.9 percent reported 2010 RPS procurement from the 2016 Biennial RPS Program Update and the minimum RPS mandated energy mix of 33 percent renewables by 2020 and 50 percent renewables by 2030 (California Public Utilities Commission 2016). The intensity factors for intermediate years was interpolated assuming a steady growth rate for each interval. No additional reduction in electricity intensity factors was forecast beyond 2030.

Forecasted energy use was modified to account for the effects of California Code of Regulations, Title 24, Part 6 – Energy Efficiency Standards (Energy Code), which establishes energy-efficiency standards for residential and non-residential buildings in order to reduce California's energy consumption. The 2016 Energy Code became effective January 1, 2017 and will be effective until it is replaced by the 2019 Energy Code, which becomes effective on January 1, 2020. The California Energy Commission (CEC) Impact Analysis for the 2016 Energy Code concludes that the 2016 Energy Code results in an 11.7 percent reduction in electricity demand and a 21.1 percent reduction in natural gas use from newly constructed single-family homes (CEC 2015). Additionally, the 2016 Energy Code results in a 4.6 percent reduction in electricity demand and a 0.5 percent reduction in natural gas use from newly constructed non-residential buildings (CEC 2015). Thus, residential energy use growth from 2017 to 2019 was reduced accordingly.

Based on CEC estimates, the 2019 Energy Code will further reduce energy use from new residences by an additional 53 percent (CEC 2018). Thus, residential energy use growth for 2020 and beyond was reduced by an additional 53 percent. Estimates of additional non-residential energy use reductions have not been released, thus the reduction from the 2016 Energy Code was carried forward for 2020 and beyond.

Table 2 Growth Indicators and Emission Factor Sets		
Sector/Source	Growth Indicator	Factor Sets
Residential Electricity	Population	California RPS Mandate
Residential Natural Gas	Population	No Growth
Commercial Electricity	Commercial Jobs	California RPS Mandate
Commercial Natural Gas	Commercial Jobs	No Growth
Industrial Electricity	Industrial Jobs	California RPS Mandate
Industrial Natural Gas	Industrial Jobs	No Growth
Transportation	Vehicle Miles Traveled	EMFAC Vehicle Emission Factors
Solid Waste	Population	No Growth
Water Supply Energy	Population	California RPS Mandate
Wastewater Process Emissions	Population	No Growth
Municipal Buildings & Facilities Electricity	Municipal Jobs	California RPS Mandate
Municipal Buildings & Facilities Natural Gas	Municipal Jobs	No Growth
Municipal Street Lights	Population	California RPS Mandate
Municipal Vehicle Fleet	Municipal Jobs	EMFAC Vehicle Emission Factors
Municipal Employee Commute	Municipal Jobs	EMFAC Vehicle Emission Factors
Municipal Solid Waste Facilities	Municipal Jobs	No Growth
Municipal Water Supply Energy	Population	California RPS Mandate
Municipal Wastewater Process Emissions	Population	No Growth

Table 3 SANDAG Series 13 Regional Growth Forecast, City of Oceanside				
Forecasted Metric	2012	2020	2035	2050
<b>Population and Housing</b>				
Total Population	169,319	177,840	188,597	189,377
Total Housing Units	65,469	67,817	70,395	70,942
Single Family	42,196	42,996	43,363	43,709
Multiple Family	19,761	21,518	23,729	23,934
Mobile Homes	3,512	3,303	3,303	3,299
Persons per Household	2.80	2.86	2.87	2.86

Table 4 SANDAG VMT Projections						
Oceanside Total	2012	2013	2014	2015	2020	2035
Total "Clipped" Vehicle Miles Traveled (VMT) within City boundaries, (miles/weekday)	2,845,391	-	2,927,580	2,956,856	3,103,945	3,403,004
Internal Origin - Internal Destination (I-I) Trips (miles/weekday)	616,005	-	646,351	652,815	663,798	731,385
External Origin or Destination (I-E or E-I) Trips (miles/weekday)	4,466,226	-	4,593,915	4,654,641	4,714,048	5,103,996
Pass-through (E-E) Trips (miles/weekday)	970,667	-	990,917	1,000,826	1,105,120	1,198,973
Total VMT (100% I-I, 50% I-E, 50% E-I) (miles/weekday)	2,849,118	-	2,943,309	2,980,135	3,020,822	3,283,383
<b>Total VMT (100% I-I, 50% I-E, 50% E-I) (miles/year)*</b>	998,330,995	1,014,698,962	1,031,335,287	1,044,239,566	1,058,495,996	1,150,497,401

Notes

- Weekday VMT (miles/weekday) were multiplied by 0.96 to adjust from average weekday to average daily (accounts for lower weekend VMT), and converted to annual VMT (miles/year) by multiplying by 365.
- Total 2013 VMT was interpolated and used in modeling (shown in light grey fill)

**Table 5 KMA Employment Projections**

Employment Sector	Number of Employees		
	2009	2014	2035
<b>Commercial</b>			
<i>Office</i>			
Information	454	465	705
Finance and Insurance	508	624	1,161
Real Estate and Rental, and Leasing	674	790	1,470
Professional, Scientific, and Technical Services	3,192	1,745	2,645
Management of Companies and Enterprises	305	314	476
Administration & Support, Waste Management and Remediation	2,384	2,401	3,639
Health Care and Social Assistance	4,992	6,111	13,926
<i>Retail</i>			
Wholesale Trade	1,779	1,702	2,580
Retail Trade	4,918	5,506	9,248
Accommodation and Food Services	4,729	5,082	9,454
<b>Industrial</b>			
Mining, Quarrying, and Oil and Gas Extraction	1	0	0
Utilities	172	152	230
Construction	1,719	1,532	1,888
Manufacturing	2,199	3,781	8,616
Transportation and Warehousing	701	885	1,646
<b>Agriculture, Open Space, and Institutional</b>			
Agriculture, Forestry, Fishing, and Hunting	1,077	731	901
Education Services	5,287	2,373	2,924
Arts, Entertainment, and Recreation	971	932	1,149
Public Administration	861	835	1,266
<b>Other</b>			
Other Services (excluding Public Administration)	1,895	1,491	2,260
<b>Total</b>	<b>38,818</b>	<b>37,452</b>	<b>66,182</b>

**Table 6 Vehicle Emission Factor Set**

Forecasted Metric	2013	2020	2030	2040	2050
<b>San Diego County Emission Factors</b>					
Total Daily Vehicle Miles Traveled	72,341,078	82,315,741	89,623,697	95,616,887	100,696,455
Total Daily CO <sub>2</sub> Emissions (tons)	38,972	37,128	29,197	27,954	29,374
Total Daily CH <sub>4</sub> Emissions (tons)	2.85	1.87	1.37	1.32	1.36
Total Daily NO <sub>x</sub> Emissions (tons)	60.23	31.94	16.32	14.53	15.24
<b>Aggregate Emission Factor (kg CO<sub>2</sub>e/mile)</b>	<b>0.490</b>	<b>0.410</b>	<b>0.296</b>	<b>0.266</b>	<b>0.265</b>

**Table 7 Growth Indicators – Calculated Factor Sets**

Year	Population	Population Growth Rate	Population Factor Set	VMT	VMT Growth Rate	VMT Factor Set	Commercial Employment	Commercial Employment Growth Rate	Commercial Employment Factor Set
2009	-	-	-	-	-	-	<b>32,088</b>	-1.644%	-1.644%
2010	-	-	0.616%	-	-	31,561	-0.791%		
2011	-	-		-	-	31,042			
2012	<b>169,319</b>	-		-	-	30,531			
2013	170,361	0.616%	0.616%	<b>1,014,698,962</b>	1.510%	30,030		2.696%	
2014	171,410			1,031,335,287		<b>29,536</b>			
2015	172,465			<b>1,044,239,566</b>	30,332				
2016	173,527		1,047,075,408	31,150					
2017	174,595		0.616%	1,049,918,950	0.272%	0.272%	31,990		
2018	175,670		1,052,770,215	32,852					
2019	176,752		1,055,629,224	33,738					
2020	<b>177,840</b>		0.392%	0.392%	<b>1,058,495,996</b>	0.557%	34,647		2.696%
2021	178,538				1,064,393,747		35,581		
2022	179,238				1,070,324,358		36,540		
2023	179,941	1,076,288,015		37,526					
2024	180,647	1,082,284,899		38,537					
2025	181,356	1,088,315,197		39,576					
2026	182,067	1,094,379,095		40,643					
2027	182,781	0.392%		1,100,476,780	0.557%		41,739		
2028	183,498	1,106,608,440		42,864					
2029	184,218	1,112,774,264		44,019					
2030	184,941	1,118,974,444	45,206						
2031	185,666	1,125,209,169	46,425						
2032	186,395	0.392%	1,131,478,634	0.557%	47,676	2.696%			
2033	187,126	1,137,783,031	48,962						
2034	187,860	1,144,122,555	50,281						
2035	<b>188,597</b>	0.392%	0.392%	<b>1,150,497,401</b>	0.557%	<b>51,637</b>	2.696%		
2036	188,649			1,156,907,767		53,029			
2037	188,701			1,163,353,850		54,459			
2038	188,753		1,169,835,850	55,927					
2039	188,805		1,176,353,967	57,434					
2040	188,857		1,182,908,401	58,983					
2041	188,909		1,189,499,355	60,573					
2042	188,961		0.392%	1,196,127,033		0.557%		62,206	2.696%
2043	189,013		1,202,791,639	63,883					
2044	189,065		1,209,493,379	65,605					
2045	189,117	1,216,232,460	67,374						
2046	189,169	1,223,009,090	69,190						
2047	189,221	0.392%	1,229,823,478	0.557%	71,055	2.696%			
2048	189,273	1,236,675,835	72,971						
2049	189,325	1,243,566,372	74,938						
2050	<b>189,377</b>	-	-	1,250,495,302	-	76,958	-		

**Bolded** quantities are direct from original forecast.

Table 7 Growth Indicators – Calculated Factor Sets (Cont.)						
Year	Industrial Employment	Industrial Employment Growth Rate	Industrial Employment Factor Set	Municipal Employment	Municipal Employment Growth Rate	Municipal Employment Factor Set
2009	<b>4,792</b>	5.792%	-	<b>861</b>	-0.611%	-0.094%
2010	5,070		5.274%	856		
2011	5,363			851		
2012	5,674			845		
2013	6,002			840		
2014	<b>6,350</b>	3.230%	3.230%	<b>835</b>	2.002%	
2015	6,555			852		
2016	6,767			869		
2017	6,985			886		
2018	7,211		904			
2019	7,444		922			
2020	7,685		3.230%	940		
2021	7,933			959		
2022	8,189			978		
2023	8,454			998		
2024	8,727	3.230%	1,018			
2025	9,008		1,038			
2026	9,299		1,059			
2027	9,600		1,080			
2028	9,910		1,102			
2029	10,230	3.230%	1,124			
2030	10,561		1,147			
2031	10,902		1,170			
2032	11,254		1,193			
2033	11,617		1,217			
2034	11,993	3.230%	1,241			
2035	<b>12,380</b>		<b>1,266</b>			
2036	12,780		1,291			
2037	13,193		1,317			
2038	13,619	1,344				
2039	14,059	3.230%	1,370			
2040	14,513		1,398			
2041	14,982		1,426			
2042	15,466		1,454			
2043	15,965	3.230%	1,484			
2044	16,481		1,513			
2045	17,013		1,543			
2046	17,563		1,574			
2047	18,130	3.230%	1,606			
2048	18,716		1,638			
2049	19,321		1,671			
2050	19,945	-	-	1,704	-	-

**Bolded** quantities are direct from original forecast.

**Table 8 Emissions Factor Sets – Calculated Factor Sets**

Year	Renewable Energy Procurement	Electricity Factor Decay Rate	Electricity Factor Set	Vehicle Emission (kg CO <sub>2</sub> E/mile)	Vehicle Emission Decay Rate	Vehicle Emission Factor Set	
2010	<b>11.9% / 88.1%</b>	-2.701%	-2.701%	-	-	-2.515%	
2011	14.3% / 85.7%			-	-		
2012	16.6% / 83.4%			-	-		
2013	18.8% / 81.2%			<b>0.490</b>	-2.515%		
2014	21.0% / 79.0%			0.477			
2015	23.2% / 76.8%			0.465			
2016	25.2% / 74.8%			0.454			
2017	27.3% / 72.7%			-2.701%			0.442
2018	29.2% / 70.8%			0.431			
2019	31.1% / 68.9%			0.420			
2020	<b>33.0% / 67.0%</b>	-2.884%	-2.884%	<b>0.410</b>		-3.202%	
2021	34.9% / 65.1%			0.397			
2022	36.8% / 63.2%			0.384			
2023	38.6% / 61.4%			0.372			
2024	40.4% / 59.6%			0.360			
2025	42.1% / 57.9%			0.348			
2026	43.8% / 56.2%			0.337			
2027	45.4% / 54.6%			-2.884%	0.326		
2028	47.0% / 53.0%			0.316			
2029	48.5% / 51.5%			0.306			
2030	<b>50.0% / 50.0%</b>	0%	0%	<b>0.296</b>	-1.077%		
2031	50.0% / 50.0%			0.293			
2032	50.0% / 50.0%			0.290			
2033	50.0% / 50.0%			0.286			
2034	50.0% / 50.0%			0.283			
2035	50.0% / 50.0%			0.280			
2036	50.0% / 50.0%			0.277			
2037	50.0% / 50.0%			0%		0.274	
2038	50.0% / 50.0%			0.271			
2039	50.0% / 50.0%			0.268			
2040	50.0% / 50.0%	0%	0%	<b>0.266</b>	-0.022%		
2041	50.0% / 50.0%			0.266			
2042	50.0% / 50.0%			0.265			
2043	50.0% / 50.0%			0.265			
2044	50.0% / 50.0%			0.265			
2045	50.0% / 50.0%			0.265			
2046	50.0% / 50.0%			0.265			
2047	50.0% / 50.0%			0.265			
2048	50.0% / 50.0%			0.265			
2049	50.0% / 50.0%			0.265			
2050	50.0% / 50.0%	-	<b>0.265</b>	-			

**Bolded** quantities are direct from original forecast.

<b>Table 9 Community Emission Forecasts</b>						
Sector	Emissions (MT CO <sub>2</sub> e)					
	2013	2020	2030	2035	2040	2050
<b>Business-As-Usual Forecast</b>						
Residential Energy	222,963	229,668	238,839	242,675	243,009	243,611
Commercial Energy	159,370	185,470	241,992	276,417	315,739	401,146
Industrial Energy	41,957	53,453	73,459	86,116	100,953	134,395
Transportation	483,037	499,795	528,352	543,237	558,541	587,184
Solid Waste	41,498	42,614	44,131	44,757	44,348	44,458
Water & Wastewater	35,187	36,245	37,693	38,298	38,351	38,446
<b>Total</b>	<b>984,012</b>	<b>1,047,245</b>	<b>1,164,466</b>	<b>1,231,500</b>	<b>1,300,941</b>	<b>1,449,240</b>
<b>Adjusted Business-As-Usual Forecast</b>						
Residential Energy	222,963	207,587	187,422	188,533	188,624	188,789
Commercial Energy	159,370	162,721	179,404	204,180	232,209	293,089
Industrial Energy	41,957	45,345	49,922	58,193	67,743	89,268
Transportation	483,037	415,229	323,975	315,553	310,627	325,907
Solid Waste	41,498	42,614	44,131	44,757	44,348	44,458
Water & Wastewater	35,187	30,592	25,439	25,848	25,883	25,947
<b>Total</b>	<b>984,012</b>	<b>904,088</b>	<b>810,293</b>	<b>837,064</b>	<b>869,434</b>	<b>967,458</b>

# Chapter 4 Reduction Measures

## Energy Related Measures

Assumptions used in calculating GHG reductions related to electric, natural gas, and energy measures, including federal and State actions are described herein. The emissions factor for electricity is the amount of GHGs in each unit of electricity is supplied to residents and businesses within the City. The electricity emission factor is used in different ways throughout the CAP, such as calculating the emissions associated with electricity production emissions inventories and estimating the effect of various (MWh) GHG reduction measures in the CAP. As example, the amount of GHG emissions per megawatt-hour delivered is reduced as the energy comes from more renewable sources. Accordingly, the related emission reductions are reduced from increased energy efficiency as more renewables are included in the energy mix. For modeling purposes, the electricity emissions factor is measured in units of pounds of CO<sub>2</sub>e per MWh (lbs. CO<sub>2</sub>e/MWh). The CAP uses electricity emissions factors based on energy supplied to San Diego Gas & Electric (SDG&E), a model community-choice-energy program or similar program, and considers effects of California's solar programs. Each energy supply has its own renewable content, which changes the emissions factor used in different scenarios.

The following sections describe the method used to determine the emission factor for the different forms of energy supply. The 2013 inventory emissions factor was developed in a similar way and provided by EPIC. The BAU and Adjusted BAU (ABAU) incorporate state level actions such as RPS and California Building Code requirements. The CAP scenario calculations incorporate reductions due to Community Choice Energy (CCE), solar photovoltaic (PV), and other sources the City can affect.

Based on the requirements of the State's RPS, as the percentage of renewable energy increases, the amount of non-renewable GHG emissions decrease. Thus, the overall average energy emissions factor used in the CAP decreases throughout the planning period.

## San Diego Gas & Electric

The emissions factor for SDG&E includes the emissions from SDG&E owned power plants and from power purchased by SDG&E. SDG&E energy emissions factors were developed based on required reporting under California's RPS and the EPIC 2013 emissions inventory.

## Community Choice Energy Programs

The CAP includes a goal to achieve a 75 percent renewable electricity supply in the City. The CAP includes measure E1–Renewable Energy Procurement, which includes the formation of a CCE or similar

program to achieve the renewable electricity supply goal. Under a CCE style program, the City would enable the alternative supply of electricity residents and businesses within the City. A CCE essentially is an alternative supplier of electric energy that would use the existing distribution and transmission system to supply the electricity. For evaluating scenarios, the CAP assumes that 10 percent of all eligible customers participate in a CCE or another program each year. The CAP also assumes the electricity supply from a CCE or another program is 75 percent renewable by 2030 through a combination of renewable energy contracts and purchases. The rate of adoption is based on results of similar CCE style programs developed throughout the state, such as in Marin, Sonoma, Napa, San Francisco, San Mateo, and Los Angeles Counties. Included in all scenarios are the requirements of the California RPS, which sets the renewable electricity supply target to 50 percent by 2030.

In the assessment of Measure E1, the energy emissions factor is adjusted to match the quantity of renewable energy supplied by a CCE style program from a baseline emissions factor of 736.6 lbs. CO<sub>2</sub>e/MWh from SDG&E supplied electricity. There is no effect from a CCE or similar program until after 2025 (CAP Phase 3) because a CCE style program is not likely to be fully implemented until after that date and this approach ensures speculative reductions are not taken.

During preparation of the CAP, California's RPS required all electric service providers to procure 50 percent of electricity sales from renewable sources by 2030. Therefore, depending on when a CCE is adopted the percentage of total emission reductions from achieving a 75 percent renewable supply (e.g., through CCE program) may be attributed to RPS while the remaining is attributed to local action. This is to say that the renewables mix for SDG&E in 2018 is approximately 43 percent, this is anticipated to increase to at least 50 percent by 2030. Therefore, a CCE would effectively make up the remaining 25 percent for purposes of assessing total GHG emissions.

## CA Solar Programs

The CAP also considered the Solar Photovoltaic Promotion Program, Measure E-2, as part of the overall supply of electricity for the City as opposed to a demand reduction (i.e., it was deducted from the total electricity demand in the City or a “de-carbonizing” of the grid electricity). This program is recognized as a reduction in the source so it does not show emission reductions benefits for programs that would not have an effect on future emissions when the grid energy is 100 percent renewable. For purposes of estimating emissions reductions in the CAP, solar PV energy is 100 percent renewable and has no associated GHG emissions. Therefore, energy produced by solar PV systems adjusts the energy emissions factor in the near term but has no effect in the future. Including solar PV as part of the electricity supply for the City allows for the appropriate allocation of emissions reductions attributable to solar PV programs without double counting.

## Emissions Factor for Electricity

To develop the overall 2013 emissions factor for electricity of 736.6 lbs. CO<sub>2</sub>e/MWh, the weighted average of all sources of electricity were used. The 2013 energy emissions factor was weighted by the percentage of gross generation supplied by each source. Each source is also affected by the amount of renewable content associated with the source. In 2013, renewables contributions are from SDG&E and the CA Solar Programs.

The 2013 energy emissions factor for electricity supplied by SDG&E is 736.6 lbs. CO<sub>2</sub>e/MWh. This emissions factor includes the effects of the existing RPS renewable content requirement in the electricity supplied by SDG&E in year 2013. CO<sub>2</sub>e /MWh was adjusted down per the requirements of RPS through 2030. Since the CAP was finalized for public review, Senate Bill 100 was signed in to law and would require all electricity to be 100 percent renewable by 2045. This new law is not reflected in the 2050 ABAU or proposed CAP forecasts. A CCE would result in the City achieving 100 percent renewable energy supply earlier than mandated by the state but would not have a greater effect in reducing emissions after that point.

## Energy and Buildings

### ■ E1—Renewable Energy Procurement

#### Quantified

As described in the Greenhouse Gas Emissions Factor for Electricity section above, several categories of supply contribute to the goal of reaching 75 percent renewable electricity supply by 2030, including the renewable electricity supply by the utility (SDG&E), CA Solar Programs, and CCE programs. Given the assumptions included in the CAP for those categories, 75 percent of electricity supply would be renewable by 2030. This level of renewable supply allows the City to achieve a reduction of 73,685 MT CO<sub>2</sub>e by 2030. As the CAP is reviewed and updated, the renewable electricity supply will be reviewed to determine how the City is progressing in meeting the 75 percent renewable energy goal by 2030.

To estimate the effect of policies due to a CCE or another program, it is necessary to account for the interaction among the categories of supply. The percentage of electricity and renewable content associated with CA Solar Programs, CCE style programs, and the investor-owned utility supplier are described in Attachment 2. As mentioned in the Greenhouse Gas Emissions Factor for Electricity section above, it is assumed that an additional 10 percent of citywide energy will be supplied by a CCE or similar program annually. The potential success of the measure is based on the success of similar programs around the state, such as Marin Clean Energy, Sonoma Clean Power, Clean Power SF, Monterey Bay Community Power, all of which offer 100 percent clean power options and have 75 percent or higher participation rates. To estimate the GHG reductions from Measure E1, the emission reduction rate is based on an annual average rate of enrollment. It should be noted that, former Governor Jerry Brown signed legislation to increase the renewable portfolio standard supply targets to 60 percent renewable electricity by 2030 and 100 percent by 2045; however, the CAP only includes the previous requirement to achieve a 50 percent renewable mix by 2030. Detailed calculations are included in Attachment 2.

### ■ E2—Solar Photovoltaic Promotion Program

#### Quantified

The 2019 Energy Code will require that new residential projects incorporate renewable energy beginning January 1, 2020. Therefore, the residential component of an ordinance may achieve GHG emission reductions earlier than 2020 by enforcing renewable energy requirements beginning at an earlier date. However, emissions reductions estimates conservatively exclude residential and only account for the commercial- and industrial-components of this measure. Detailed calculations are included in Attachment 2.

- E3—Residential Energy Conservation and Disclosure

**Not quantified**

For the Residential Energy Conservation and Disclosure Ordinance, the CAP evaluated the effect of requiring residential units being sold or remodeled to disclose energy use. Additionally, it was assumed that rented units would not be captured by this measure. To calculate reductions from this measure the estimated number of residential units affected were identified by using the rate of remodels and additions and the historic rate of sales of residential units. However, due to concerns over the potential speculative nature of the reductions in GHG reductions the City included the measure in the CAP, but has not included the measure in the calculation of any reductions in GHG emissions. As the City implements this measure, there will be an effort to develop data necessary to include emission reductions attributed to this type of measure in future CAP updates.

- E4—Promotion of Low-Income Financing Programs

**Not quantified**

The State offers alternative financing to households with incomes below 80 percent of the area median income as part of the Single-Family Affordable Solar Housing Program and offers alternative financing for other energy efficiency upgrades as part of the Low-Income Weatherization Program. The City will promote these services and evaluate programs that would lower costs or other barriers associated with any City requirements. However, due to concerns over the potential speculative nature of the reductions in GHG reductions the City include any reductions in GHG emissions associated with this measure. As the City implements this measure, there will be an effort to develop data necessary to include emission reductions associated with this measure in future CAP updates.

- E5—Non-Residential Building Energy Benchmarking and Disclosure

**Not quantified**

A large portion of the existing nonresidential buildings were constructed prior to California's first adoption of the energy code standards. A time-of-sale disclosure of energy use can increase the efficiency of the City's existing commercial and industrial building stock by increasing awareness of energy saving retrofits. Studies by the U.S. Environmental Protection Agency (U.S. EPA) found that benchmarking energy use resulted in an average annual savings of 2.4 percent per year for the first three years. However, due to concerns over the potential speculative nature of the reductions in GHG reductions the City included the measure in the CAP, but has not calculated any GHG emission reductions associated with this measure. As the City implements this measure, there will be an effort to develop data necessary to include emission reductions associated with this measure in future CAP updates.

## Water and Wastewater

- W1—Implementation of the Water Conservation Master Plan

### Quantified

W1 is based on the comprehensive update of the Water Conservation Master Plan. The updated Water Conservation Master Plan outlines measures necessary to comply with state requirements and identifies additional measures to reduce water use that the City is currently implementing and will continue to implement. Based on the water savings included in the plan the City would achieve a reduction in water use of 913 acre-feet as compared to 2013. By 2025, the proposed plan would reduce the City's water consumption by 1,564 acre-feet per year. For modeling purposes, the reductions assume a linear annual reduction stabilizing in 2030. The total reduction in water consumption would be 2,104 acre-feet through 2030. The ratio of imported to local water in 2013 was applied to future water sources for determining GHG emission associated with importing water. The amount of electricity, in kilowatt hours, for water distribution was taken from statewide data and applied to the City's total distributed water to develop the emission reductions. Please refer to the City's Water Conservation Master Plan for water reduction estimates. Detailed GHG reduction calculations are included in Attachment 2.

- W2—Non-Residential Water Use Benchmarking and Disclosure

### Not quantified

A large portion of the existing non-residential buildings were constructed prior to California's first adoption of the energy code standards. A time-of-sale disclosure of energy use can increase the efficiency of the City's existing commercial and industrial building stock by increasing awareness of energy saving retrofits. However, due to concerns over the potential speculative nature of GHG reductions, the City has not included any GHG reductions associated with this measure in the calculation of GHG emission reductions. As the City implements this measure, there will be an effort to develop data necessary to include emission reductions associated with this measure in future CAP updates.

- W3—Local Water Supply Development

### Quantified

Oceanside is a member of the North San Diego County Water Reuse Coalition, which seeks to convert facilities for recycled water service, increase recycled water storage capacity, connect discrete recycled water systems to one another, distribute recycled water to effectively meet recycled water demands, and replace potable water uses with recycled water components wherever appropriate. Previous efforts in Oceanside have included development of recycled water infrastructure at the San Luis Rey Water Recycling Facility to supply recycled water for use at the Oceanside Municipal Golf Course and Whelan Lake. The CAP incorporates a goal to offset 3.0 million gallons per day of potable water with recycled water by the year 2025. Emission reductions are primarily associated with reductions in the amount of electricity required to treat water and reductions in electricity used to import water to the City. Please refer to the North San Diego County Regional Recycled Water Facilities Plan for water recycling estimates. Detailed GHG reduction calculations are included in Attachment 2.

## Solid Waste

- SW1—Implementation of Zero Waste Strategic Resource Plan

### Quantified

The City adopted a Zero Waste Strategic Resource Management Plan in June of 2012; however, based on California Department of Resources Recycling and Recovery data, the City had achieved a 57 percent solid waste diversion rate by 2010 under Assembly Bill 341. The Zero Waste Strategic Resource Management Plan established a 75 percent solid waste diversion goal by 2020, which would equate to a total 90 percent reduction in total when considered in light of total reductions. Key recommendations of the Zero Waste Strategic Resource Management Plan are to develop food waste recycling through food banks, provide incentives for producer “cradle-to-cradle” take-back programs, develop reuse partnerships and a reuse warehouse, expand composting services and introduce food composting, expand recycling education and outreach, and develop partnerships with local businesses. The plan also identified a goal of ultimately achieving the international standard for Zero Waste Community of 90 percent solid waste diversion. For modeling purposes, the 75 percent waste diversion was applied to the emission projections through 2020, while the 90 percent goal was applied to the 2035 emissions projections. While some of these measures will have greater effects at different points in time, the total reductions were projected in equal annual reductions. Detailed emission calculations are included in Attachment 2.

- SW2—Beyond 2020 - Enhanced Waste Diversion and Cogeneration

### Quantified

Additional measures that can reduce disposal of organic materials in landfills includes (1) increased outreach and incentives for residential and commercial recycling, (2) source reduction of organics, (3) reduced barriers to composting, and (4) further development of local facilities capable of receiving and/or processing organics for beneficial reuse (e.g., for compost and renewable energy via biogas cogeneration facilities). These facilities include those with anaerobic digestion capacity such as the City’s San Luis Rey Water Reclamation Facility. Based on waste diversion and emission factors contained in the Zero Waste Strategic Resource Management Plan and the SEEC Clearpath model, these additional waste diversion measures are projected to achieve the 90 percent reduction goal of the City and were incorporated in to the CAP as Measure SW2. Detailed emission calculations are included in Attachment 2.

## Transportation and Land Use

- TL1— Smart Growth Policies

### Quantified

The term “smart growth” refers to a compact, efficient, and environmentally sensitive urban development pattern. Smart growth focuses future growth and infill development close to employment, services, and public facilities to maximize the use of existing infrastructure and preserve open space and natural resources. Smart growth is characterized by more compact, higher density development in urbanized areas throughout the region. These areas are walkable, bike-friendly, near public transit, and promote good community design, resulting in housing and transportation choices for those who live and

work in these areas. As population increases, smart growth development characteristics can often be the difference between a sense of overcrowding and a feeling of vibrancy.

SANDAG performed previous studies of land use, housing, employment, and transit system densities to identify seven types of Smart Growth Opportunity Areas (SGOA) throughout the County of San Diego. Existing SGOAs within Oceanside include:

- The town center, generally located north of Seagaze Drive, south of Harbor Drive, and west of Interstate 5;
- The mixed-use transit corridor along South Coast Highway between Mission Avenue and the Buena Vista Lagoon (west of Ditmar Street and east of the North County Transit District [NCTD] Coaster line); and
- The mixed-use transit corridor along Oceanside Boulevard between Interstate 5 and Canyon Drive.

SANDAG's *Smart Growth Concept Map* also identifies three *potential* SGOAs in Oceanside<sup>1</sup>:

- A community center centered within ¼-mile of the intersection of Oceanside Boulevard and El Camino Real;
- The community center centered within ¼-mile of the intersection of Oceanside Boulevard and Rancho Del Oro Drive; and
- The community center centered within ¼-mile of the intersection of Oceanside Boulevard and Melrose Drive.

Smart growth policies are anticipated to achieve a total VMT reduction by 2030 of 7,603,285, which was modeled as a 633,607 annual decrease affecting the projected annual increases in VMT through 2030. This assumed the Smart Growth Policy would achieve a 24 percent reduction in distance traveled due to increased density.

#### ■ TL2—Electric Vehicle Promotion

### Quantified

Zero emission vehicles (ZEVs) include plug-in electric vehicles (EV), such as battery EV and plug-in hybrid EV, and hydrogen fuel cell vehicles. Use of ZEVs in place of traditional fossil fuel combustion engines results in substantial GHG reductions. ZEVs result in no direct tailpipe emissions. Grid electricity consumed by ZEVs results in approximately 40 percent of the regional emissions of a traditional fossil fueled vehicle. However, unlike the emissions associated with this electricity, which are forecasted to decline as renewable energy sources increase, fossil fueled emission would continue to rise with VMT.

Oceanside can reduce barriers to ZEV market penetration through increased charging structure, incentives, and outreach. As identified in SANDAG's San Diego Regional Plug-in EV Readiness Plan,

<sup>1</sup> Community centers are areas with residential, commercial, and mixed-use development that serve the surrounding neighborhoods, with high-frequency local bus service. SANDAG's minimum target density for mixed-use transit corridors is 20 dwelling units per acre.

expansion of residential charging station infrastructure is most critical, followed by workplace, retail, and public charging stations (SANDAG 2014). CAP goals include increasing local ZEV market share to 20 percent of passenger vehicles by 2030 through promotion of EV infrastructure within the City. Detailed emission calculations are included in Attachment 2.

- TL3—Preferential Parking Spaces for Clean Air Vehicles

#### **Quantified**

Emissions are embedded in TL2 as this measure is a support measure for TL2. No additional reductions were taken for this measure.

- TL4—Expand Complete Streets Programs

#### **Quantified**

- Due to the speculative nature of the reductions in GHG reductions associated with calculating the mode split from private vehicles to bicycles this measure has not been included in the calculation of any reductions in GHG emissions. TL5—Transportation Demand Management Plans.

#### **Quantified**

Transportation Demand Management (TDM) refers to programs and strategies that manage and reduce congestion during peak traffic hours by encouraging the use of transportation alternatives. The City is able to promote TDM strategies through expanded complete street infrastructure; however, site design and employer participation are critical for overcoming first/last mile barriers to alternative modes of travel. A TDM Ordinance can increase implementation of TDM measures and thereby reduce vehicle use associated with new commercial and industrial developments.

Common TDM measures implemented on projects include connections to nearby transit stops and off-site walkways, safety improvements to nearby pedestrian pathways, street lighting, on-site secure bicycle parking, bicycle end-trip facilities such as showers and lockers, preferential clean car and carpool parking, and improvements to adjacent transit stops such as shelters, benches, or other street furniture. Based on research conducted by the California Air Pollution Control Officers Association, measures such as these can achieve a 10 to 30 percent reduction in VMT associated with individual developments. The proposed TDM Ordinance is estimated to achieve a 10 percent reduction in annual VMT from commercial activity in the City. The growth of VMT in this measure is based by employment growth through 2030 and emissions reductions are based on the annual reduction in VMT as employment grows. Detailed calculations are included in Attachment 2.

## **Agriculture and Forestry**

- AF1—Urban Forestry Program

#### **Quantified**

Urban tree planting sequesters carbon while also helping to cool an environment by providing shade and evapotranspiration. Based on data from SANDAG's Healthy Communities Assessment Tool,

neighborhoods in Oceanside have between a 0.2 and 3.0 percent tree canopy cover, with an average of 1.4 percent canopy cover (SANDAG 2017). Oceanside neighborhoods with the least tree canopy coverage include the tri-city neighborhood, San Luis Rey community, and the Townsite neighborhood (also known as downtown). A Green Streets Ordinance would be developed to increase tree planting associated with new development and the City's Public Works Department. Trees would be planted along transportation corridors and other public rights-of-way. It is anticipated the City's will use the Green Oceanside campaign to facilitate community events dedicated to tree plantings in public or private areas or within community gardens and schools. Based the data developed by the US Forest Service, typical street trees in Southern California sequester about 0.063 tons of CO<sub>2</sub> per tree per year (Center for Urban Forest Research 2001). The 0.063 ton of CO<sub>2</sub> accounts for releases associated with maintenance and decomposition. The CAP goal is to plant a net 200 new trees each year on public rights-of-way and to require development projects to incorporate an annual average of 200 new trees per year for an annual average of 400 net new trees in the City though 2050. Annual tree counts associated with future development is based on the anticipated annual development based on the average number of trees that are typically planted per dwelling units by type, and by square footage of commercial and industrial development. Detailed calculations are included in Attachment 2.

- AF2—Urban Agriculture and Community Gardens

#### **Not Quantified**

Urban agriculture includes growing, processing, and distributing food through plant cultivation in and around cities. Food that is grown locally requires less packaging, preservation, and transportation than imported foods and may reduce food waste. Urban agriculture would reduce the consumption of natural resources and generation of GHG emissions associated with food production. However, due to the speculative nature of GHG reductions associated with urban agriculture at this time, the City has not quantified any reductions in GHG emissions associated with implementation of this measure. As the City implements this measure, all available data will be collected so that emission reductions attributed to this type of measure can be quantified in the future.

- AF3—South Morro Hills Agricultural Lands Conservation Program

#### **Quantified**

The City includes agricultural lands in the 3,450-acre Morro Hills Community (also known as South Morro Hills). Agricultural production in Morro Hills is estimated to include approximately 700 acres of avocado trees, 400 acres of tomatoes plants, 400 acres of cut flowers, 150 acres of nut trees, 100 acres of bell pepper plants, and 415 acres of other agricultural products such as tropical fruit trees, lemons, limes, berries, wine grapes, brussel sprouts, and herbs. An agricultural easement program can preserve agricultural uses for future generations and avoid increased emissions associated with the development of agricultural lands for residential uses. Based on an easement over 250 acres, the measure would result in an annual average VMT reduction of 4,315,840 over the BAU condition with the existing zoning and land use designations. Detailed calculations are included in Attachment 2.

- AF4—Carbon Farming Program

### Not Quantified

The Marin Carbon Project demonstrative carbon farming practices indicate that application of compost topsoil can increase carbon sequestration by 14 MT CO<sub>2</sub>e per hectare. Establishment of local carbon farms can demonstrate benefits of sustainable agriculture practices and thereby encourage other agricultural operations to incorporate these practices and develop local carbon credits. However, due to the speculative nature of the reductions from carbon farming at this date, the City has not included any GHG reductions associated with implementation of this measure. As the City implements this measure, there will be an effort to develop data necessary to include emission reductions associated with this measure in future CAP updates.

## Summary and Resources

With the exception of three reduction measures—SW1-Implementation of Zero Waste Strategic Resource Plan, SW2-Beyond 2020-Enhanced Waste Diversion, and AF1-Urban Forestry Program—emission reduction estimates for all reduction measures were developed and incorporated into the SEEC Clearpath Model. SEEC Clearpath model data (comma-separated summaries) can be provided upon request. As the SEEC Clearpath Model is unable to account for solid waste reduction strategies or carbon sequestration strategies, emission reduction estimates for the remaining three measures were developed outside the SEEC Clearpath Model and manually applied to forecasts. Emission reduction estimates for various measures were developed based on data from a multitude of sources including:

- U.S. EPA data analysis reports on benchmarking and energy use (U.S. EPA 2012)
- U.S. Department of Agriculture (USDA) Forest Service’s benefit-Cost analysis of tree carbon sequestration (USDA Forest Service 2001)
- U.S. Department of Energy *Alternative Fuels Data Center Comparison Electricity Sources and Annual Vehicle Emissions, California* (U.S. Department of Energy 2017)
- California Energy Commission (CEC) *Options for Energy Efficiency in Existing Buildings* survey data (CEC 2005);
- California ARB’s EMFAC2014 vehicle mix (California ARB 2015)
- SANDAG *Regional Growth Forecast Series 13* population, employment, and housing projections (SANDAG 2013);
- SANDAG *Regional Growth Forecast Series 12* Average Trip Length in San Diego County (SANDAG 2014)
- SANDAG *Trip Generation for Smart Growth Planning Tools for the San Diego Region* study findings (SANDAG 2010)
- City of Oceanside *2015 Water Conservation Master Plan* water use projections (Oceanside 2015)

The reduced communitywide emission forecast and the quantity of emissions reductions for each sector are summarized in **Table 10**. Calculations supporting the development of parameters entered in the SEEC Clearpath Model are included as Attachment 2.

**Table 10 Community Emission Forecasts**

Sector	Emissions (MT CO <sub>2</sub> e)			
	2020	2030	2040	2050
<b>Reduced Forecast</b>				
Residential Energy	207,587	155,919	156,905	157,039
Commercial Energy	157,632	125,738	155,062	193,190
Industrial Energy	43,059	28,901	35,346	44,912
Transportation	410,596	301,354	287,400	301,225
Solid Waste*	32,283	22,785	17,494	17,604
Water & Wastewater	30,324	22,623	20,297	18,720
CO <sub>2</sub> Sequestration*	50	302	554	806
<b>Total</b>	<b>881,431</b>	<b>657,017</b>	<b>671,949</b>	<b>731,884</b>
<b>Reductions from Adjusted Business-As-Usual Forecast</b>				
Residential Energy	0	31,503 (17%)	31,719 (17%)	31,750 (17%)
Commercial Energy	5,089 (3%)	53,666 (30%)	77,147 (33%)	99,899 (34%)
Industrial Energy	2,286 (5%)	21,021 (42%)	32,397 (48%)	44,356 (50%)
Transportation	4,633 (1%)	22,621 (7%)	23,227 (7%)	24,682 (8%)
Solid Waste*	10,331 (24%)	21,346 (48%)	26,854 (61%)	26,854 (60%)
Water & Wastewater	268 (1%)	2,816 (11%)	5,586 (22%)	7,227 (28%)
CO <sub>2</sub> Sequestration*	50	302	554	806
<b>Total</b>	<b>22,657 (3%)</b>	<b>153,276 (19%)</b>	<b>197,485 (23%)</b>	<b>235,574 (24%)</b>

\* Reductions in solid waste emissions and CO<sub>2</sub> Sequestration were calculated outside of the SEEC Clearpath Model.



# Chapter 5 Project Review Checklist

As discussed in the CAP, the Project Review Checklist was designed to assess consistency with GHG reduction measures identified in Chapter 3 of the CAP. Thus, the checklist was developed by identifying measures that would require project-level implementation and identifying specific criteria that can be used to determine if a future development project would include an equitable contribution toward measure goals. **Table 11** below summarizes the relationship between program-level reduction measures and project-level implementation through the Project Review Checklist.

Table 11 Development of Project Review Checklist		
CAP Measure	Project-Level Implementation	Checklist?
E1—Renewable Energy Procurement	Measure E1 does not identify strategies that would be implemented at the project-level.	No
E2—Solar Photovoltaic Promotion Program	Measure E1 would include adoption of a Solar Ordinance for New Development. The Ordinance would require that new developments with 50 or more surface parking spaces to offset 50 percent of energy use through on-site renewable energy sources. As the Ordinance and associated enforcement program will be adopted several months after CAP adoption, the checklist measure includes the Ordinance’s requirement for renewable energy. This checklist item would be applicable wherever future development would include 50 or more surface parking spaces and would have a non-negligible electricity demand.	Yes
E3—Residential Energy Conservation and Disclosure Ordinance	Measure E2 does not identify strategies that would be implemented at the project-level.	No
E4—Promotion of Low-Income Financing Programs	Measure E3 does not identify strategies that would be implemented at the project-level.	No
E5—Non-Residential Building Energy Benchmarking and Disclosure	Measure E4 does not identify strategies that would be implemented at the project-level.	No
W1—Implementation of the Water Conservation Master Plan	Measure W1 would include implementation of the City’s Water Conservation Master Plan. Plan measures that apply to new development include the California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO) requirements, required plan review for water use efficiency for all new business customers, and require installation of Automated Meter Infrastructure (AMI) meters for all new customers. As the Water Utilities Department has already established an enforcement program for these Plan measures, no checklist measure is necessary.	No
W2—Non-Residential Water Use Benchmarking and Disclosure	Measure W2 does not identify strategies that would be implemented at the project-level.	No

**Table 11 Development of Project Review Checklist**

CAP Measure	Project-Level Implementation	Checklist?
W3—Local Water Supply Development	Measure W3 would include capital improvements to increase the supply capacity of recycled water. While Measure W3 does not specifically call for implementation at the project-level, it is assumed that future development would use recycled water where feasible. The checklist item includes incorporation of service connections for recycled water use; this checklist item would be applicable wherever future development may feasibly offset potable water use with recycled water and where the project is located in a serviceable area.	Yes
SW1—Implementation of Zero Waste Strategic Resource Plan	Measure SW1 does not identify strategies that would be implemented at the project-level.	No
SW2—Beyond 2020 – Enhanced Waste Diversion	Measure SW2 does not identify strategies that would be implemented at the project-level.	No
TL1— Smart Growth Policies	<p>Transportation forecasts are based on the proposed land use pattern from the 2017 General Plan Update that is being prepared concurrently with the CAP. Measure TL1 would include adopting smart growth development policies – specifically, the majority of new development of housing units and employment generating land uses would be sited in Smart Growth Opportunity Areas (SGOAs).</p> <p>Thus, at the project-level, all projects sited outside an SGOA are assumed to develop uses that would be consistent with land use designation and all projects sited inside an SGOA are assumed to develop uses that are consistent with the character of the SGOA type. The minimum SGOA target densities identified by SANDAG are considered the most applicable criteria for determining whether a proposed land use would be consistent with the character of an SGOA type.</p> <p>The set of checklist item includes the limitations on proposed land uses. This set of checklist item would be applicable wherever future development would result in non-negligible vehicle trip generation.</p>	Yes
TL2—Expanded Electric Vehicle Charging Infrastructure	Measure TL2 would include adoption of an Electric Vehicle Infrastructure Ordinance. The Ordinance would require all residential, commercial, and industrial development projects to prewire a portion of parking spaces to allow for future installation of electric vehicle charging stations. As the Ordinance and associated enforcement program will be adopted several months after CAP adoption, the checklist measure includes the Ordinance’s requirement for prewiring parking spaces. This checklist item would be applicable wherever future development would include parking spaces.	Yes
TL3—Preferential Parking Spaces for Zero Emission Vehicles	Measure TL3 would include adoption of a Clean Air Vehicle Parking Ordinance. The Ordinance would require commercial and industrial development projects incorporate 12 percent designated parking spaces for clean air vehicles. As the Ordinance and associated enforcement program will be adopted several months after CAP adoption, the checklist measure includes the Ordinance’s requirement for providing preferential parking for clean air vehicles. This checklist item would be applicable wherever future development would include commercial or industrial uses with parking spaces.	Yes
TL4—Expand Complete Streets	Measure TL4 would include requiring new developments to provide connections and/or extensions of the bicycle and pedestrian networks where applicable. This requirement would be enforced at the City’s discretion subsequent to the next Bicycle and/or Pedestrian Master Plan Update. As the criteria for enforcement would not be established until the Bicycle and/or Pedestrian Master Plan Update reductions associated with Measure TL4 were not quantified. Until specific criteria for enforcement are identified, no checklist measure is necessary.	No

**Table 11 Development of Project Review Checklist**

CAP Measure	Project-Level Implementation	Checklist?
<p>TL5—Transportation Demand Management Plans</p>	<p>Measure TL5 would include adoption of a Transportation Demand Management (TDM) Ordinance. The Ordinance would require new or renovated commercial and industrial development projects that would generate more than 100 vehicle trips per day. The Ordinance, associated enforcement program, and specific TDM measures will be adopted approximately a year after CAP adoption.</p> <p>Measure TL5 goals include reducing VMT associated with new commercial and industrial development projects that would generate more than 100 vehicle trips per day by 10 percent. The checklist measure includes the TDM strategies with a point system where each point is estimated to equate to a 1 percent VMT reduction. The number of points associated with implementation of each TDM measure was based on data from the California Air Pollution Control District’s (CAPCOA) Report Quantifying Greenhouse Gas Mitigation Measures, A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures (CAPCOA 2010). The dollar amount per point for monthly parking cash-out programs and discounted transit programs was also derived from pertinent study data and mode choice elasticities identified in the report<sup>2,3</sup>. Projects that would achieve 10 points would be anticipated to achieve a 10 percent VMT reduction, and thus would be consistent with the Measure TL5 goal.</p> <p>This checklist item would be applicable wherever future development would include commercial or industrial uses that would generate more than 100 vehicle trips per day.</p>	<p>Yes</p>
<p>AF1—Urban Forestry Program</p>	<p>Measure E1 would include adoption of a Green Streets Ordinance. The Ordinance would require that new developments projects incorporate shade trees and establishes a goal of requiring that overall new development projects incorporate an average of 200 additional trees per year.</p> <p>The criteria for determining how many trees each individual development project would need to incorporate would not be established in the Green Streets Ordinance. Until adoption of the Green Streets Ordinance, interim criteria shall be one tree per each single-family residence, one tree per three multi-family residences, and one tree for each 14 jobs.</p> <p>Based on the SANDAG Series 13 Regional Growth Forecast between 2020 and 2030, development in Oceanside is anticipated to result in approximately 367 single-family residences and 2,221 multi-family residences. Based on employment projections developed by Keyser Marston Associates, employment is anticipated to increase by approximately 28,732 between 2014 and 2035. Therefore, it is estimated that average annual development would include at least 37 single-family residences, 221 multi-family residences, and non-residential uses that create 1,368 jobs. Based on this development that meets the interim criteria would result approximately 226 additional trees per year; this would demonstrate consistency with the Measure AF1 goal of planting an additional 200 trees per year.</p>	<p>Yes</p>

<sup>2</sup> Assuming an annual vehicle cost of \$4,000, each \$20 parking fee/cash-out equates to 6% increase/decrease in transportation costs. Based on a transportation mode choice elasticity of 0.4 and 0.85 factor adjustment for vehicle ownership to VMT, a \$20 parking fee/cash-out would result in a 2.0% reduction in automotive use. Thus, \$20 parking fee/cash-out was valued at 2 points.

<sup>3</sup> Commute trip reduction for a “low density suburb, mode neutral” is identified at approximately 8% for a \$3 daily transit subsidy. Assuming commute trip reduction scales linearly with the amount of the subsidy, a \$0.75 daily transit subsidy would equate to a 2.0% reduction. Thus, each \$0.75 of daily transit subsidy was valued at 2 points.

**Table 11 Development of Project Review Checklist**

CAP Measure	Project-Level Implementation	Checklist?
	This checklist item would be applicable wherever future development would develop new land uses.	
AF2—Urban Agriculture and Community Gardens	Measure AF2 does not identify strategies that would be implemented at the project-level.	No
AF3—South Morro Hills Agricultural Lands Conservation Program	Measure AF3 does not identify strategies that would be implemented at the project-level.	No
AF4—Carbon Farming Program	Measure AF4 does not identify strategies that would be implemented at the project-level.	No

# Chapter 6      References

## California Air Resources Board (ARB)

2015    2014 Emission FACTors (EMFAC) Model, Version 1.07. March.

## California Energy Commission (CEC)

2005    *Options for Energy Efficiency in Existing Buildings*. December.

2015    *Impact Analysis 2016 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings*. Prepared by Noresco United Technologies on behalf of California Energy Commission. June 3, 2015. Accessed at [http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/15-day\\_language/impact\\_analysis/2016\\_Impact\\_Analysis\\_2015-06-03.pdf](http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/15-day_language/impact_analysis/2016_Impact_Analysis_2015-06-03.pdf)

2018    2019 Building Energy Efficiency Standards Frequently Asked Questions Accessed at [http://www.energy.ca.gov/title24/2019standards/documents/2018\\_Title\\_24\\_2019\\_Building\\_Standards\\_FAQ.pdf](http://www.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf)

## California Air Pollution Control Officers Association (CAPCOA)

2010    *Quantifying Greenhouse Gas Mitigation Measures, A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures*. August.

## California Public utilities Commission (CPUC)

2016    *Biennial RPS Program Update In Compliance with Public Utilities Code Section 913.6*. January 1, 2016.

## Oceanside, City of

2016    *City of Oceanside Water Conservation Master Plan Update*. April.

## San Diego Association of Governments (SANDAG)

2010    *Trip Generation for Smart Growth Planning Tools for the San Diego Region*. June.

2013    *Series 13 Regional Growth Forecast*, City of Oceanside. October.

2014    Correspondence with RECON and SANDAG on 03/20/14 confirming the urban regional trip length of 5.8 miles derived from Series 12 base year (2008) model.

2015    *San Diego Forward, The Regional Plan*. October.

## CHAPTER 6 REFERENCES

### U.S. Census Bureau

2017 Quick Facts, Oceanside city, California, Median Household Income 2011-2015.

### U.S. Department of Agriculture (USDA) Center for Urban Forest Research

2001 *Benefit-Cost Analysis of Santa Monica's Municipal Forests*. November.

### U.S. Department of Energy

2017 U.S. Department of Energy Webpage, Alternative Fuels Data Center Comparison Electricity Sources and Annual Vehicle Emissions, California. Accessed August 30, 2017.

### U.S. Energy Information Administration

2017 Rankings: Total Energy Consumed per Capita, 2015. Accessed August 30.

### U.S. Environmental Protection Agency (U.S. EPA)

2012 Energy Star Portfolio Manager, Data Trends, Benchmarking and Energy Savings. October.

## **ATTACHMENT 1**

Technical Sources

# SERIES 13 REGIONAL GROWTH FORECAST



City of Oceanside

## POPULATION AND HOUSING

	2012	2020	2035	2050	2012 to 2050 Change*	
					Numeric	Percent
<b>Total Population</b>	169,319	177,840	188,597	189,377	20,058	12%
Household Population	168,383	177,023	187,609	188,278	19,895	12%
Group Quarters Population	936	817	988	1,099	163	17%
Civilian	936	817	988	1,099	163	17%
Military	0	0	0	0	0	0%
<b>Total Housing Units</b>	65,469	67,817	70,395	70,942	5,473	8%
Single Family	42,196	42,996	43,363	43,709	1,513	4%
Multiple Family	19,761	21,518	23,729	23,934	4,173	21%
Mobile Homes	3,512	3,303	3,303	3,299	-213	-6%
<b>Occupied Housing Units</b>	60,097	61,902	65,370	65,880	5,783	10%
Single Family	39,229	39,715	40,820	41,156	1,927	5%
Multiple Family	17,825	19,280	21,660	21,883	4,058	23%
Mobile Homes	3,043	2,907	2,890	2,841	-202	-7%
<b>Vacancy Rate</b>	8.2%	8.7%	7.1%	7.1%	-1.1	-13%
Single Family	7.0%	7.6%	5.9%	5.8%	-1.2	-17%
Multiple Family	9.8%	10.4%	8.7%	8.6%	-1.2	-12%
Mobile Homes	13.4%	12.0%	12.5%	13.9%	0.5	4%
<b>Persons per Household</b>	2.80	2.86	2.87	2.86	0.1	2%

## HOUSEHOLD INCOME (real 2010 dollars, adjusted for inflation)

Households by Income Category	2012	2020	2035	2050	2012 to 2050 Change*	
					Numeric	Percent
Less than \$15,000	4,506	4,277	3,782	3,186	-1,320	-29%
\$15,000-\$29,999	6,695	6,736	6,162	5,360	-1,335	-20%
\$30,000-\$44,999	7,976	7,848	7,473	6,738	-1,238	-16%
\$45,000-\$59,999	7,637	7,758	7,663	7,155	-482	-6%
\$60,000-\$74,999	7,126	7,013	7,180	6,931	-195	-3%
\$75,000-\$99,999	9,393	9,388	10,047	10,113	720	8%
\$100,000-\$124,999	6,118	6,613	7,452	7,871	1,753	29%
\$125,000-\$149,999	3,659	4,422	5,230	5,766	2,107	58%
\$150,000-\$199,999	3,929	4,698	5,903	6,892	2,963	75%
\$200,000 or more	3,058	3,149	4,478	5,868	2,810	92%
<b>Total Households</b>	60,097	61,902	65,370	65,880	5,783	10%

### \*IMPORTANT INFORMATION ABOUT THIS FORECAST:

This forecast was accepted by the SANDAG Board of Directors in October 2013 for distribution and use in planning and other studies. This forecast represents one possibility for future growth in the San Diego region. It is intended to represent a likely prediction of future growth, but it is not intended to be a prescription for growth. The Series 13 Regional Growth Forecast represents a combination of economic and demographic projections, existing land use plans and policies, as well as potential land use plan changes that may occur in the region between 2030 and 2050. In general, growth between 2012 and 2030 is based on adopted land use plans and policies, and growth between 2030 and 2050 includes alternatives that may, in some cases, reach beyond existing adopted plans.

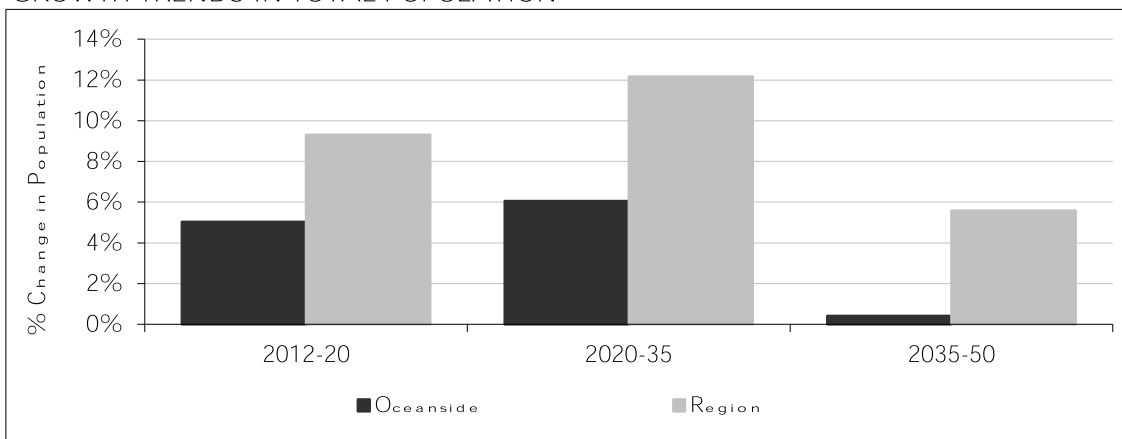
POPULATION BY AGE

	2012	2020	2035	2050	2012 to 2050 Change*	
					Numeric	Percent
Total Population	169,319	177,840	188,597	189,377	20,058	12%
Under 5	13,346	15,572	14,558	14,671	1,325	10%
5 to 9	10,783	11,541	11,774	11,944	1,161	11%
10 to 14	10,683	10,358	11,067	11,180	497	5%
15 to 17	7,058	6,093	6,542	6,488	-570	-8%
18 to 19	4,879	3,674	3,826	3,619	-1,260	-26%
20 to 24	13,202	12,842	12,069	11,507	-1,695	-13%
25 to 29	13,262	14,245	12,573	12,591	-671	-5%
30 to 34	11,611	12,068	11,882	12,134	523	5%
35 to 39	10,095	11,417	11,878	11,194	1,099	11%
40 to 44	10,761	10,160	12,486	10,987	226	2%
45 to 49	11,000	9,979	11,136	10,691	-309	-3%
50 to 54	11,693	10,538	11,169	11,362	-331	-3%
55 to 59	10,195	10,776	9,440	11,271	1,076	11%
60 to 61	3,355	4,057	3,379	3,771	416	12%
62 to 64	4,932	5,939	5,239	5,872	940	19%
65 to 69	6,204	8,612	8,657	9,277	3,073	50%
70 to 74	4,622	7,293	9,085	7,937	3,315	72%
75 to 79	4,024	5,092	8,768	7,380	3,356	83%
80 to 84	3,673	3,556	6,871	6,554	2,881	78%
85 and over	3,941	4,028	6,198	8,947	5,006	127%
Median Age	34.9	36.1	39.2	39.7	4.8	14%

POPULATION BY RACE AND ETHNICITY

	2012	2020	2035	2050	2012 to 2050 Change*	
					Numeric	Percent
Total Population	169,319	177,840	188,597	189,377	20,058	12%
Hispanic	63,050	73,732	89,615	100,879	37,829	60%
Non-Hispanic	106,269	104,108	98,982	88,498	-17,771	-17%
White	79,983	76,616	67,812	56,413	-23,570	-29%
Black	6,561	6,197	4,183	1,857	-4,704	-72%
American Indian	626	568	539	478	-148	-24%
Asian	10,791	11,926	16,025	18,228	7,437	69%
Hawaiian / Pacific Islander	2,044	2,050	1,975	2,033	-11	-1%
Other	348	359	404	425	77	22%
Two or More Races	5,916	6,392	8,044	9,064	3,148	53%

GROWTH TRENDS IN TOTAL POPULATION



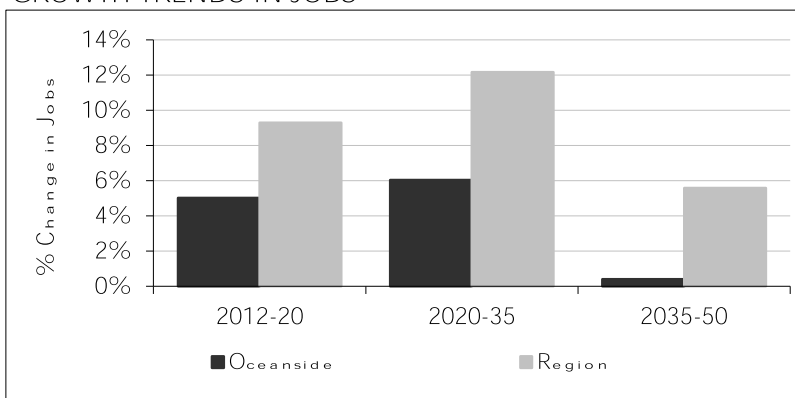
## EMPLOYMENT

	2012	2020	2035	2050	2012 to 2050 Change*	
					Numeric	Percent
Jobs	41,974	48,199	53,277	53,992	12,018	29%
Civilian Jobs	41,974	48,199	53,277	53,992	12,018	29%
Military Jobs	0	0	0	0	0	0%

## LAND USE<sup>1</sup>

	2012	2020	2035	2050	2012 to 2050 Change*	
					Numeric	Percent
Total Acres	26,834	26,834	26,834	26,834	0	0%
Developed Acres	20,516	21,499	21,964	22,063	1,548	8%
Low Density Single Family	671	671	671	671	0	0%
Single Family	7,009	7,669	7,811	7,881	873	12%
Multiple Family	941	1,040	1,122	1,128	187	20%
Mobile Homes	212	199	199	199	-13	-6%
Other Residential	45	45	45	45	0	-1%
Mixed Use	0	55	43	43	43	--
Industrial	942	893	984	994	51	5%
Commercial/Services	1,786	1,842	1,913	1,924	138	8%
Office	85	103	120	121	36	43%
Schools	658	667	680	680	22	3%
Roads and Freeways	3,853	4,003	4,003	4,003	150	4%
Agricultural and Extractive <sup>2</sup>	2,750	2,745	2,807	2,807	57	2%
Parks and Military Use	1,563	1,567	1,567	1,567	4	0%
Vacant Developable Acres	1,653	684	219	120	-1,533	-93%
Low Density Single Family	81	81	5	5	-75	-93%
Single Family	947	278	122	47	-900	-95%
Multiple Family	78	6	2	1	-77	-99%
Mixed Use	44	11	0	0	-44	-100%
Industrial	229	128	38	28	-201	-88%
Commercial/Services	190	128	23	12	-179	-94%
Office	31	12	2	0	-31	-99%
Schools	22	13	0	0	-22	-100%
Parks and Other	4	0	0	0	-4	-100%
Future Roads and Freeways	26	26	26	26	0	0%
Constrained Acres	4,651	4,651	4,651	4,651	0	0%
Employment Density <sup>3</sup>	12.1	13.6	14.3	14.4	2.3	19%
Residential Density <sup>4</sup>	7.4	7.0	7.1	7.1	-0.2	-3%

## GROWTH TRENDS IN JOBS



### Notes:

- 1 - Figures may not add to total due to independent rounding.
- 2 - This is not a forecast of agricultural land, because the 2050 Regional Growth Forecast does not account for land that may become agricultural in the future. Also, some types of development that occur on agricultural land, such as low density single family residential, may allow for the continuation of existing agricultural use.
- 3 - Civilian jobs per developed employment acre (industrial, retail, office, schools, and half of mixed use acres).
- 4 - Total housing units per developed

2012					
JURISDICTION	TOTAL VMT	TOTAL City of Oceanside VMT	Two Trip End City of Oceanside VMT	One Trip End City of Oceanside VMT	NON-City of Oceanside VMT
		I-I, I-E and E-I	I-I	I-E and E-I	E - E
CARLSBAD TOTAL	3,116,717	615,509	-	615,509	2,501,208
CHULA VISTA TOTAL	3,336,416	4,574	-	4,574	3,331,842
CORONADO TOTAL	371,399	356	-	356	371,043
DEL MAR TOTAL	78,140	1,384	-	1,384	76,756
EL CAJON TOTAL	1,723,964	2,052	-	2,052	1,721,912
ENCINITAS TOTAL	1,901,087	187,797	-	187,797	1,713,290
ESCONDIDO TOTAL	2,703,709	73,071	-	73,071	2,630,638
External TOTAL	204,259	5,374	-	5,374	198,885
IMPERIAL BEACH TOTAL	85,821	5	-	5	85,816
LA MESA TOTAL	1,525,835	1,110	-	1,110	1,524,725
LEMON GROVE TOTAL	710,306	514	-	514	709,792
NATIONAL CITY TOTAL	1,505,957	3,180	-	3,180	1,502,777
<b>OCEANSIDE TOTAL</b>	<b>2,845,391</b>	<b>1,874,724</b>	<b>616,005</b>	<b>1,258,719</b>	<b>970,667</b>
POWAY TOTAL	842,944	3,616	-	3,616	839,328
SAN DIEGO TOTAL	36,132,397	375,951	-	375,951	35,756,446
SAN MARCOS TOTAL	1,801,500	169,407	-	169,407	1,632,093
SANTEE TOTAL	884,395	3,849	-	3,849	880,546
SOLANA BEACH TOTAL	527,188	42,950	-	42,950	484,238
Unincorporated TOTAL	17,064,917	1,219,852	-	1,219,852	15,845,065
VISTA TOTAL	1,554,384	496,956	-	496,956	1,057,428
REGIONWIDE TOTAL	78,916,726	5,082,231	616,005	4,466,226	73,834,495

2015 (Factored from 2014)					
JURISDICTION	TOTAL VMT	TOTAL City of Oceanside VMT	Two Trip End City of Oceanside VMT	One Trip End City of Oceanside VMT	NON-City of Oceanside VMT
		I-I, I-E and E-I	I-I	I-E and E-I	E - E
CARLSBAD TOTAL	3,176,367	629,406	-	629,406	2,546,961
CHULA VISTA TOTAL	3,581,943	4,753	-	4,753	3,577,190
CORONADO TOTAL	395,934	398	-	398	395,536
DEL MAR TOTAL	79,850	1,452	-	1,452	78,397
EL CAJON TOTAL	1,834,279	2,279	-	2,279	1,832,001
ENCINITAS TOTAL	1,939,925	195,016	-	195,016	1,744,909
ESCONDIDO TOTAL	2,799,486	76,438	-	76,438	2,723,048
External TOTAL	237,659	6,021	-	6,021	231,638
IMPERIAL BEACH TOTAL	88,910	4	-	4	88,906
LA MESA TOTAL	1,598,212	1,356	-	1,356	1,596,855
LEMON GROVE TOTAL	753,179	657	-	657	752,523
NATIONAL CITY TOTAL	1,569,263	3,140	-	3,140	1,566,123
<b>OCEANSIDE TOTAL</b>	<b>2,956,856</b>	<b>1,956,030</b>	<b>652,815</b>	<b>1,303,215</b>	<b>1,000,826</b>
POWAY TOTAL	860,404	3,786	-	3,786	856,617
SAN DIEGO TOTAL	37,499,219	399,911	-	399,911	37,099,309
SAN MARCOS TOTAL	1,865,468	177,799	-	177,799	1,687,669
SANTEE TOTAL	917,075	4,165	-	4,165	912,910
SOLANA BEACH TOTAL	538,687	45,182	-	45,182	493,504
Unincorporated TOTAL	17,727,423	1,275,924	-	1,275,924	16,451,499
VISTA TOTAL	1,613,023	523,740	-	523,740	1,089,283
REGIONWIDE TOTAL	82,033,162	5,307,456	652,815	4,654,641	76,725,705

### 2020 Revenue Constrained

JURISDICTION	TOTAL VMT	TOTAL City of	Two Trip End City of	One Trip End City of	NON-City of
		Oceanside VMT	Oceanside VMT	Oceanside VMT	Oceanside VMT
		I-I, I-E and E-I	I-I	I-E and E-I	E-E
CARLSBAD TOTAL	3,528,338	699,086	-	699,086	2,829,252
CHULA VISTA TOTAL	3,923,612	5,167	-	5,167	3,918,445
CORONADO TOTAL	375,290	463	-	463	374,827
DEL MAR TOTAL	76,846	1,541	-	1,541	75,305
EL CAJON TOTAL	1,826,681	2,383	-	2,383	1,824,298
ENCINITAS TOTAL	2,075,730	209,696	-	209,696	1,866,034
ESCONDIDO TOTAL	2,946,344	67,302	-	67,302	2,879,042
External TOTAL	232,506	6,191	-	6,191	226,315
IMPERIAL BEACH TOTAL	84,253	9	-	9	84,244
LA MESA TOTAL	1,599,071	1,181	-	1,181	1,597,890
LEMON GROVE TOTAL	738,270	598	-	598	737,672
NATIONAL CITY TOTAL	1,577,884	3,322	-	3,322	1,574,562
<b>OCEANSIDE TOTAL</b>	<b>3,103,945</b>	<b>1,998,825</b>	<b>663,798</b>	<b>1,335,027</b>	<b>1,105,120</b>
POWAY TOTAL	899,898	3,739	-	3,739	896,159
SAN DIEGO TOTAL	38,618,913	409,299	-	409,299	38,209,614
SAN MARCOS TOTAL	1,954,357	174,450	-	174,450	1,779,907
SANTEE TOTAL	958,856	4,225	-	4,225	954,631
SOLANA BEACH TOTAL	575,262	49,723	-	49,723	525,539
Unincorporated TOTAL	18,734,276	1,230,385	-	1,230,385	17,503,891
VISTA TOTAL	1,621,429	510,261	-	510,261	1,111,168
<b>REGIONWIDE TOTAL</b>	<b>85,451,761</b>	<b>5,377,846</b>	<b>663,798</b>	<b>4,714,048</b>	<b>80,073,915</b>

### 2035 Revenue Constrained

JURISDICTION	TOTAL VMT	TOTAL City of	Two Trip End City of	One Trip End City of	
		Oceanside VMT	Oceanside VMT	Oceanside VMT	Oceanside VMT
		I-I, I-E and E-I	I-I	I-E and E-I	E - E
CARLSBAD TOTAL	3,745,078	735,114	-	735,114	3,009,964
CHULA VISTA TOTAL	4,592,962	7,150	-	7,150	4,585,812
CORONADO TOTAL	378,495	490	-	490	378,005
DEL MAR TOTAL	75,012	1,205	-	1,205	73,807
EL CAJON TOTAL	2,003,424	2,597	-	2,597	2,000,827
ENCINITAS TOTAL	2,184,918	217,318	-	217,318	1,967,600
ESCONDIDO TOTAL	3,188,414	70,022	-	70,022	3,118,392
External TOTAL	277,760	7,079	-	7,079	270,681
IMPERIAL BEACH TOTAL	91,980	17	-	17	91,963
LA MESA TOTAL	1,780,837	1,838	-	1,838	1,778,999
LEMON GROVE TOTAL	778,729	538	-	538	778,191
NATIONAL CITY TOTAL	1,748,880	4,228	-	4,228	1,744,652
<b>OCEANSIDE TOTAL</b>	<b>3,403,004</b>	<b>2,204,031</b>	<b>731,385</b>	<b>1,472,646</b>	<b>1,198,973</b>
POWAY TOTAL	964,141	3,859	-	3,859	960,282
SAN DIEGO TOTAL	41,817,585	429,589	-	429,589	41,387,996
SAN MARCOS TOTAL	2,249,551	190,759	-	190,759	2,058,792
SANTEE TOTAL	1,040,136	4,472	-	4,472	1,035,664
SOLANA BEACH TOTAL	613,882	51,609	-	51,609	562,273
Unincorporated TOTAL	21,070,411	1,335,612	-	1,335,612	19,734,799
VISTA TOTAL	1,865,470	567,854	-	567,854	1,297,616
<b>REGIONWIDE TOTAL</b>	<b>93,870,669</b>	<b>5,835,381</b>	<b>731,385</b>	<b>5,103,996</b>	<b>88,035,288</b>

## 2014

JURISDICTION	TOTAL VMT	TOTAL City of	Two Trip End City of	One Trip End City of	NON-City of
		Oceanside VMT	Oceanside VMT	Oceanside VMT	Oceanside VMT
		I-I, I-E and E-I	I-I	I-E and E-I	E-E
CARLSBAD TOTAL	3,144,918	623,174	-	623,174	2,521,744
CHULA VISTA TOTAL	3,546,478	4,706	-	4,706	3,541,772
CORONADO TOTAL	392,014	394	-	394	391,620
DEL MAR TOTAL	79,059	1,438	-	1,438	77,621
EL CAJON TOTAL	1,816,118	2,256	-	2,256	1,813,862
ENCINITAS TOTAL	1,920,718	193,085	-	193,085	1,727,633
ESCONDIDO TOTAL	2,771,768	75,681	-	75,681	2,696,087
External TOTAL	235,306	5,961	-	5,961	229,345
IMPERIAL BEACH TOTAL	88,030	4	-	4	88,026
LA MESA TOTAL	1,582,388	1,343	-	1,343	1,581,045
LEMON GROVE TOTAL	745,722	650	-	650	745,072
NATIONAL CITY TOTAL	1,553,726	3,109	-	3,109	1,550,617
<b>OCEANSIDE TOTAL</b>	<b>2,927,580</b>	<b>1,936,663</b>	<b>646,351</b>	<b>1,290,312</b>	<b>990,917</b>
POWAY TOTAL	851,885	3,749	-	3,749	848,136
SAN DIEGO TOTAL	37,127,940	395,951	-	395,951	36,731,989
SAN MARCOS TOTAL	1,846,998	176,039	-	176,039	1,670,959
SANTEE TOTAL	907,995	4,124	-	4,124	903,871
SOLANA BEACH TOTAL	533,353	44,735	-	44,735	488,618
Unincorporated TOTAL	17,551,904	1,263,291	-	1,263,291	16,288,613
VISTA TOTAL	1,517,198	503,913	-	503,913	1,013,285
<b>REGIONWIDE TOTAL</b>	<b>81,141,098</b>	<b>5,240,266</b>	<b>646,351</b>	<b>4,593,915</b>	<b>75,900,832</b>

TABLE 1

**EMPLOYMENT PROJECTIONS, 2014 - 2035**  
**GENERAL PLAN UPDATE**  
**CITY OF OCEANSIDE**

<b>Sector</b>	<b>Number of Employees 2014 <sup>(1)</sup></b>	<b>Projected Average Annual Rate 2014 - 2035 <sup>(2)</sup></b>	<b>Number of Employees 2035</b>
<b>Commercial</b>			
<i>Office</i>			
Information	465	2.0%	705
Finance and Insurance	624	3.0%	1,161
Real Estate and Rental, and Leasing	790	3.0%	1,470
Professional, Scientific, and Technical Services	1,745	2.0%	2,645
Management of Companies and Enterprises	314	2.0%	476
Administration & Support, Waste Management and Remediation	2,401	2.0%	3,639
Health Care and Social Assistance	6,111	4.0%	13,926
<i>Retail</i>			
Wholesale Trade	1,702	2.0%	2,580
Retail Trade	5,506	2.5%	9,248
Accommodation and Food Services	5,082	3.0%	9,454
<b>Industrial</b>			
Mining, Quarrying, and Oil and Gas Extraction	0	0.0%	0
Utilities	152	2.0%	230
Construction	1,532	1.0%	1,888
Manufacturing	3,781	4.0%	8,616
Transportation and Warehousing	885	3.0%	1,646
<b>Agriculture, Open Space, and Institutional</b>			
Agriculture, Forestry, Fishing, and Hunting	731	1.0%	901
Education Services	2,373	1.0%	2,924
Arts, Entertainment, and Recreation	932	1.0%	1,149
Public Administration	835	2.0%	1,266
<b>Other</b>			
Other Services (excluding Public Administration)	1,491	2.0%	2,260
<b>Total</b>	<b>37,452</b>	<b>2.7%</b>	<b>66,182</b>

(1) Source: Work Area Profile Report - City of Oceanside, U.S. Census Bureau, OnTheMap Application. Reflects employment by place of work for 2014.

(2) KMA estimates based on review of City and County recent average annual growth rates. See Worksheet 1.

WORKSHEET 1

HISTORIC EMPLOYMENT TRENDS, CITY VS. COUNTY, 2009 - 2014 <sup>(1)</sup>  
 GENERAL PLAN UPDATE  
 CITY OF OCEANSIDE

Sector	City of Oceanside			County of San Diego		
	Number of Employees 2009	Number of Employees 2014	Average Annual Rate 2009 - 2014	Number of Employees 2009	Number of Employees 2014	Average Annual Rate 2009 - 2014
<b>Commercial</b>						
<i>Office</i>						
Information	454	465	0.5%	37,981	26,813	-6.7%
Finance and Insurance	508	624	4.2%	41,040	41,913	0.4%
Real Estate and Rental, and Leasing	674	790	3.2%	26,085	27,473	1.0%
Professional, Scientific, and Technical Services	3,192	1,745	-11.4%	115,285	137,436	3.6%
Management of Companies and Enterprises	305	314	0.6%	18,055	23,384	5.3%
Administration & Support, Waste Management...	2,384	2,401	0.1%	74,366	81,544	1.9%
Health Care and Social Assistance	4,992	6,111	4.1%	132,666	169,418	5.0%
<i>Retail</i>						
Wholesale Trade	1,779	1,702	-0.9%	43,768	48,223	2.0%
Retail Trade	4,918	5,506	2.3%	116,681	131,523	2.4%
Accommodation and Food Services	4,729	5,082	1.5%	126,001	148,902	3.4%
<b>Industrial</b>						
Mining, Quarrying, and Oil and Gas Extraction	1	-	-100.0%	374	420	2.3%
Utilities	172	152	-2.4%	4,604	7,097	9.0%
Construction	1,719	1,532	-2.3%	61,748	64,916	1.0%
Manufacturing	2,199	3,781	11.4%	97,304	98,472	0.2%
Transportation and Warehousing	701	885	4.8%	20,180	22,070	1.8%
<b>Agriculture, Open Space, and Institutional</b>						
Agriculture, Forestry, Fishing, and Hunting	1,077	731	-7.5%	9,933	10,233	0.6%
Education Services	5,287	2,373	-14.8%	136,374	132,044	-0.6%
Arts, Entertainment, and Recreation	971	932	-0.8%	36,062	37,433	0.7%
Public Administration	861	835	-0.6%	31,914	51,105	9.9%
<b>Other</b>						
Other Services (excluding Public Administration)	1,895	1,491	-4.7%	62,516	48,952	-4.8%
<b>Total</b>	<b>38,818</b>	<b>37,452</b>	<b>-0.7%</b>	<b>1,192,937</b>	<b>1,309,371</b>	<b>1.9%</b>

(1) Source: Work Area Profile Report - City of Oceanside/County of San Diego, U.S. Census Bureau, OnTheMap Application.

### Vehicle Emission Factor Set Derivation

EMFAC Outputs							Derived Factors						tons CO2e/mile	kg CO2e/mile
Year	sub_area	vehicle	CO2	CH4	NOx	vmt	CO2/mile	CH4/mile	Mix	CO2 Contribution	CH4 Contribution	CO2e/mile		
2013	San Diego (SD)	LDA	14996.53	0.79485	8.438426	38040859	0.000394	2.09E-08	0.525854	0.000207303	1.09875E-08	0.000208		
2013	San Diego (SD)	LDT1	1867.808	0.170159	1.956557	4067991.1	0.000459	4.18E-08	0.056233	2.58195E-05	2.35217E-09	2.59E-05		
2013	San Diego (SD)	LDT2	7868.841	0.300733	4.874767	14640587	0.000537	2.05E-08	0.202383	0.000108774	4.15715E-09	0.000109		
2013	San Diego (SD)	MDV	6709.144	0.305758	4.549628	9735300.1	0.000689	3.14E-08	0.134575	9.27432E-05	4.22662E-09	9.29E-05		
2013	San Diego (SD)	MH	208.0742	0.016098	0.395436	148552.3	0.001401	1.08E-07	0.002053	2.87629E-06	2.22526E-10	2.88E-06		
2013	San Diego (SD)	MCY	108.3258	0.265539	0.747646	528379.95	0.000205	5.03E-07	0.007304	1.49743E-06	3.67065E-09	1.6E-06		
2013	San Diego (SD)	LHDT1	1590.84	0.113446	6.577916	1900576.6	0.000837	5.97E-08	0.026272	2.19908E-05	1.56821E-09	2.2E-05		
2013	San Diego (SD)	LHDT2	371.631	0.014409	1.453187	424708.33	0.000875	3.39E-08	0.005871	5.13721E-06	1.99175E-10	5.14E-06		
2013	San Diego (SD)	MHDT	1364.242	0.058226	8.212191	990656.73	0.001377	5.88E-08	0.013694	1.88585E-05	8.04878E-09	1.89E-05		
2013	San Diego (SD)	HHDT	3162.542	0.222613	18.43634	1492711.5	0.002119	1.49E-07	0.020634	4.37171E-05	3.07727E-09	4.38E-05		
2013	San Diego (SD)	SBUS	67.82497	0.005284	0.539197	48555.948	0.001397	1.09E-07	0.000671	9.37572E-07	7.30403E-11	9.4E-07		
2013	San Diego (SD)	UBUS	447.3406	0.569955	3.273778	188058.57	0.002379	3.03E-06	0.0026	6.18377E-06	7.87872E-09	6.4E-06		
2013	San Diego (SD)	OBUS	209.2943	0.008768	0.777172	134140.91	0.00156	6.54E-08	0.001854	2.89316E-06	1.21205E-10	2.9E-06		
2020	San Diego (SD)	LDA	15555.41	0.496217	5.007943	48427688	0.000321	1.02E-08	0.588316	0.000189972	6.02822E-09	0.000189		
2020	San Diego (SD)	LDT1	1417.713	0.068194	0.791729	3532449.5	0.000401	1.93E-08	0.042913	1.72229E-05	8.28445E-10	1.72E-05		
2020	San Diego (SD)	LDT2	6833.662	0.137385	1.945325	15183036	0.00045	9.05E-09	0.184449	8.30177E-05	1.6689E-09	8.31E-05		
2020	San Diego (SD)	MDV	5452.596	0.156827	2.159541	9120030.4	0.000598	1.72E-08	0.110793	6.624E-05	1.90519E-09	6.63E-05		
2020	San Diego (SD)	MH	143.6086	0.006526	0.207493	1046265.65	0.001373	6.24E-08	0.001271	1.74461E-06	7.92827E-11	1.75E-06		
2020	San Diego (SD)	MCY	108.174	0.287346	0.701227	508817.78	0.000213	5.65E-07	0.006181	1.31414E-06	3.49078E-09	1.41E-06		
2020	San Diego (SD)	LHDT1	1118.44	0.052703	3.666739	1423541.1	0.000786	3.7E-08	0.017294	1.35872E-05	6.40251E-10	1.36E-05		
2020	San Diego (SD)	LHDT2	374.6354	0.007315	0.738492	457477.15	0.000819	1.6E-08	0.005558	4.5512E-06	8.88631E-11	4.55E-06		
2020	San Diego (SD)	MHDT	1732.702	0.019171	3.844465	1278664.7	0.001355	1.5E-08	0.015534	2.10495E-05	2.32899E-10	2.11E-05		
2020	San Diego (SD)	HHDT	3705.794	0.266802	10.34641	1894969.4	0.001956	1.41E-07	0.023021	4.50193E-05	3.24121E-09	4.51E-05		
2020	San Diego (SD)	SBUS	82.35252	0.002769	0.428609	61314.352	0.001343	4.52E-08	0.000745	1.00045E-06	3.6406E-11	1E-06		
2020	San Diego (SD)	UBUS	363.5794	0.367401	1.652069	166596.28	0.002182	2.21E-06	0.002024	4.41689E-06	4.46331E-09	4.54E-06		
2020	San Diego (SD)	OBUS	239.0971	0.004254	0.454003	156530.59	0.001527	2.72E-08	0.001902	2.90463E-06	5.1685E-11	2.91E-06		
2030	San Diego (SD)	LDA	12217.92	0.334568	3.21197	55246599	0.000221	6.06E-09	0.616428	0.000136325	3.73303E-09	0.000136		
2030	San Diego (SD)	LDT1	984.0759	0.023951	0.285671	3332668.8	0.000295	7.19E-09	0.037185	1.09801E-05	2.67242E-10	1.1E-05		
2030	San Diego (SD)	LDT2	4619.13	0.065372	0.836919	15899422	0.000291	4.11E-09	0.177402	5.15392E-05	7.2941E-10	5.16E-05		
2030	San Diego (SD)	MDV	3277.529	0.056303	0.734604	8754804.3	0.000374	6.43E-09	0.097684	3.65699E-05	6.28214E-10	3.66E-05		
2030	San Diego (SD)	MH	92.64672	0.000858	0.076951	70992.82	0.001322	1.22E-08	0.000782	1.03373E-06	9.57114E-12	1.03E-06		
2030	San Diego (SD)	MCY	109.3842	0.301101	0.685945	503373.32	0.000217	5.98E-07	0.005617	1.22048E-06	3.35961E-09	1.31E-06		
2030	San Diego (SD)	LHDT1	769.4434	0.017347	1.222671	1083576.9	0.00071	1.6E-08	0.01209	8.58527E-06	1.93552E-10	8.59E-06		
2030	San Diego (SD)	LHDT2	359.4808	0.003899	0.197447	473166.03	0.00076	8.24E-09	0.005279	4.011E-06	4.35034E-11	4.01E-06		
2030	San Diego (SD)	MHDT	2073.127	0.008287	2.850391	1583034.3	0.00131	5.23E-09	0.017663	2.31315E-05	9.24603E-11	2.31E-05		
2030	San Diego (SD)	HHDT	4052.885	0.355548	5.299615	2283255.4	0.001775	1.56E-07	0.025476	4.52211E-05	3.96712E-09	4.53E-05		
2030	San Diego (SD)	SBUS	88.22328	0.002647	0.204827	70343.813	0.001254	3.76E-08	0.000785	9.84374E-07	2.95347E-11	9.85E-07		
2030	San Diego (SD)	UBUS	296.9925	0.199621	0.486036	150269.2	0.001976	1.33E-06	0.001677	3.31377E-06	2.22732E-09	3.38E-06		
2030	San Diego (SD)	OBUS	256.3712	0.002401	0.231852	173091.91	0.001481	1.39E-08	0.001931	2.86053E-06	2.62785E-11	2.86E-06		
2040	San Diego (SD)	LDA	11544.55	0.314455	2.944549	58997047	0.000196	5.33E-09	0.617015	0.000120738	3.2887E-09	0.000121		
2040	San Diego (SD)	LDT1	879.8204	0.009317	0.123097	3458612.8	0.000254	2.69E-09	0.036172	9.20152E-06	9.74414E-11	9.2E-06		
2040	San Diego (SD)	LDT2	3979.219	0.041999	0.555261	16872616	0.000236	2.49E-09	0.176461	4.16163E-05	4.39244E-10	4.16E-05		
2040	San Diego (SD)	MDV	2604.714	0.03245	0.429289	6246079.5	0.000282	3.51E-09	0.096699	2.72412E-05	3.39377E-10	2.73E-05		
2040	San Diego (SD)	MH	84.54032	0.000358	0.050134	65284.503	0.001295	5.49E-09	0.000683	8.84157E-07	3.7458E-12	8.84E-07		
2040	San Diego (SD)	MCY	115.7669	0.317682	0.722744	528802.79	0.000219	6.01E-07	0.00553	1.21074E-06	3.32244E-09	1.3E-06		
2040	San Diego (SD)	LHDT1	715.5173	0.009348	0.462457	1054635.8	0.000678	8.86E-09	0.011103	7.48317E-06	9.77673E-11	7.49E-06		
2040	San Diego (SD)	LHDT2	376.5984	0.003589	0.098506	505721.44	0.000745	7.1E-09	0.005289	3.93862E-06	3.75309E-11	3.94E-06		
2040	San Diego (SD)	MHDT	2375.891	0.008607	3.153	1831298.6	0.001297	4.7E-09	0.019152	2.4848E-05	9.00157E-11	2.49E-05		
2040	San Diego (SD)	HHDT	4617.406	0.418893	5.457027	2638122.8	0.00175	1.59E-07	0.027591	4.82907E-05	4.38095E-09	4.84E-05		
2040	San Diego (SD)	SBUS	92.76965	0.003178	0.130251	77481.245	0.001197	4.1E-08	0.00081	9.70222E-07	3.32379E-11	9.71E-07		
2040	San Diego (SD)	UBUS	290.9889	0.161633	0.176078	153135.42	0.0019	1.06E-06	0.001602	3.04328E-06	1.69042E-09	3.09E-06		
2040	San Diego (SD)	OBUS	275.7658	0.002444	0.225614	188049.57	0.001466	1.3E-08	0.001967	2.88407E-06	2.55551E-11	2.88E-06		
2050	San Diego (SD)	LDA	11960.23	0.327679	3.044997	61929442	0.000193	5.29E-09	0.615011	0.000118775	3.25413E-09	0.000119		
2050	San Diego (SD)	LDT1	884.3905	0.00728	0.101424	3620948.4	0.000244	2.01E-09	0.035959	8.78274E-06	7.22937E-11	8.78E-06		
2050	San Diego (SD)	LDT2	4051.499	0.039856	0.527582	17695838	0.000229	2.25E-09	0.175734	4.02348E-05	3.95799E-10	4.02E-05		
2050	San Diego (SD)	MDV	2505.97	0.023533	0.305284	9672644.5	0.000259	2.43E-09	0.096057	2.48864E-05	2.33703E-10	2.49E-05		
2050	San Diego (SD)	MH	86.62282	0.000323	0.046498	67231.832	0.001288	4.8E-09	0.000668	8.60237E-07	3.2034E-12	8.6E-07		
2050	San Diego (SD)	MCY	121.5646	0.333588	0.758513	554061.22	0.000219	6.02E-07	0.005502	1.20724E-06	3.3128E-09	1.3E-06		
2050	San Diego (SD)	LHDT1	726.9445	0.008005	0.227951	1086771.3	0.000669	7.37E-09	0.010793	7.21917E-06	7.94951E-11	7.22E-06		
2050	San Diego (SD)	LHDT2	396.5753	0.003727	0.090429	533647.07	0.000743	6.98E-09	0.0053	3.93832E-06	3.70093E-11	3.94E-06		
2050	San Diego (SD)	MHDT	2695.998	0.009494	3.607898	2082167.6	0.001295	4.56E-09	0.020678	2.67735E-05	9.42829E-11	2.68E-05		
2050	San Diego (SD)	HHDT	5249.505	0.456047	6.060598	3009899.6	0.001744	1.52E-07	0.029891	5.2132E-05	4.52893E-09	5.23E-05		
2050	San Diego (SD)	SBUS	95.03437	0.003555	0.133157	80441.421	0.001181	4.42E-08	0.000799	9.43771E-07	3.53026E-11	9.45E-07		
2050	San Diego (SD)	UBUS	301.8606	0.14284	0.085201	160426.31	0.001882	8.9E-07	0.001593	2.99773E-06	1.41852E-09	3.04E-06		
2050	San Diego (SD)	OBUS	298.1652	0.002547	0.245955	202935.98	0.001469	1.26E-08	0.002015	2.96103E-06	2.52971E-11	2.96E-06		

## **ATTACHMENT 2**

### Reduction Measure Quantification

# Quantification of Measures

## Parameters

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### Energy Measures

#### E1 Renewable Energy Procurement

*Energy Reduction calculated outside of ClearPath*

2030 RPS Mandate	50%
2030 Local Procurement Goal	75%
Overall Reduction	50%
Procurement Goal Milestones	50% renewable by 2025 55% renewable by 2026 60% renewable by 2027 65% renewable by 2028 70% renewable by 2029 75% renewable by 2030
Reduction per Year	10% per year (2025-2030)

#### E2 Solar Photovoltaic Program

*Solar Capacity installed per year calculated outside of ClearPath*

BAU Growth Indicator	
2013 Commercial Jobs	30,030 jobs
2018 Commercial Jobs	32,852 jobs
2035 Commercial Jobs	51,637 jobs
2050 Commercial Jobs	76,958 jobs
2013 Industrial Jobs	6,002 jobs
2018 Industrial Jobs	7,211 jobs
2035 Industrial Jobs	12,380 jobs
2050 Industrial Jobs	19,945 jobs
Commercial Growth	
2013 Commercial Electricity Use	326,127,182 kWh
2018 Commercial Electricity Use	356,779,673 kWh
2035 Commercial Electricity Use	560,787,245 kWh
2050 Commercial Electricity Use	835,777,165 kWh
New Commercial Electricity (2018-2035)	204,007,572 kWh
50 Percent Offset	102,003,786 kWh
Annualized Offset Generation	6,000,223 kWh
Solar Generation Capacity	1,704 kWh/kW installed
Solar Panel Capacity (2018-2035)	3,521 kW
New Commercial Electricity (2035-2050)	274,989,920 kWh
50 Percent Offset	137,494,960 kWh
Annualized Offset Generation	8,087,939 kWh
Solar Generation Capacity	1,704 kWh/kW installed
Solar Panel Capacity (2035-2050)	4,746 kW
Industrial Growth	
2013 Industrial Electricity Use	105,803,463 kWh
2018 Industrial Electricity Use	127,109,863 kWh
2035 Industrial Electricity Use	218,221,826 kWh
2050 Industrial Electricity Use	351,562,972 kWh

## Quantification of Measures

New Industrial Electricity (2018-2035)	91,111,963 kWh
50 Percent Offset	45,555,981 kWh
Annualized Offset Generation	2,679,764 kWh
Solar Generation Capacity	1,704 kWh/kW installed
Solar Panel Capacity (2018-2035)	1,573 kW

New Industrial Electricity (2035-2050)	133,341,146 kWh
50 Percent Offset	66,670,573 kWh
Annualized Offset Generation	3,921,798 kWh
Solar Generation Capacity	1,704 kWh/kW installed
Solar Panel Capacity (2035-2050)	2,302 kW

### E3 Residential Energy Conservation and Disclosure

*Not Quantified*

### E4 Promotion of Low-Income Financing Programs

*Not Quantified*

### E5 Non-Residential Building Energy Benchmarking and Disclosure

*Not Quantified*

## Water and Wastewater Measures

### W1 Implementation of the Water Conservation Master Plan

*Energy Reduction from reduced water use calculated outside of ClearPath*

Water Use Projections (acre-feet)	2020	2025	2030	2035	2040
Demand	32,641	34,479	34,976	35,263	35,641
Demand with Program B	31,728	32,915	32,813	33,190	33,537
Reduction	913	1,564	2,163	2,073	2,104

Reduction 2,104 acre-feet

2013 Imported Water	7,773 million gallons
2013 Electricity for Water Import	80,924,703 kWh
Import Intensity	10,411 kWh/million gallons

2013 Distributed Water	9,388 million gallons
2013 Electricity for Water Distribution	2,741,208 kWh
Distribution Intensity	292 kWh/million gallons

Total Electricity for Water Delivered	10,703 kWh/million gallons
Reduction	686 million gallons
Reduction	7,337,869 kWh
Reduction	25,019 MMBtu
Reduction Per Year	1,088 MMBtu/Year

### W2 Non-Residential Water Use Benchmarking and Disclosure

*Measure not quantified*

## Quantification of Measures

### W3 Local Water Supply Development

*Energy Reduction from reduced water use calculated outside of ClearPath*

Target Recycled Water 2025	3.0 million gallons per day
Recycled Water 2017	0.7 million gallons per day
Reduction in Potable Water Supply	2.3 million gallons per day 840 million gallons per year

2013 Imported Water	7,773 million gallons
2013 Electricity for Water Import	80,924,703 kWh
Import Intensity	10,411 kWh/million gallons

Total Electricity Demand Avoided	8,740,035 kWh per year
Reduction	29,799 MMBtu/Year

Target Recycled Water 2035	5.5 million gallons per day
Recycled Water 2025	3.0 million gallons per day
Reduction in Potable Water Supply	2.5 million gallons per day 913 million gallons per year

Total Electricity Demand Avoided	9,500,038 kWh per year
Reduction	32,390 MMBtu/Year

Target Recycled Water 2045	7.5 million gallons per day
Recycled Water 2035	5.5 million gallons per day
Reduction in Potable Water Supply	2.0 million gallons per day 730 million gallons per year

Total Electricity Demand Avoided	7,600,030 kWh per year
Reduction	25,912 MMBtu/Year

### Solid Waste Measures

#### SW1 Implementation of Zero Waste Strategic Resource Plan

*Calculated entirely outside ClearPath - ClearPath does not contain a module for calculating solid waste reduction*

2013 Solid Waste Emissions	41,498 MT CO <sub>2</sub> E
Waste Growth Indicator	Population
2020 ABAU Forecasted Emissions	42,614 MT CO <sub>2</sub> E
2035 ABAU Forecasted Emissions	44,757 MT CO <sub>2</sub> E

2013 Diversion Rate	67%
2020 Target Diversion Rate	75%
Increased Waste Diversion	24%
2020 Emissions Reduction	10,331 MT CO <sub>2</sub> E
2020 Reduced Emissions	32,283 MT CO <sub>2</sub> E
Annual Incremental Emission Reduction (2013-2020)	1,476 MT CO <sub>2</sub> E

#### SW2 Beyond 2020 - Enhanced Waste Diversion

*Calculated entirely outside ClearPath - ClearPath does not contain a module for calculating solid waste reduction*

2020 Target Diversion Rate	75%
2035 CAP Target Diversion Rate	90%
Increased Waste Diversion	60%
2035 Emissions Reduction	26,854 MT CO <sub>2</sub> E
2035 Reduced Emissions	17,903 MT CO <sub>2</sub> E
Annual Incremental Emission Reduction (2020-2035)	1,102 MT CO <sub>2</sub> E

## Quantification of Measures

### Transportation and Land Use Measures

#### TL1 Smarth Growth Policies

*VMT Reduction calculated outside of ClearPath*

Sources: Smart Growth Reduction - [http://www.sandag.org/uploads/publicationid/publicationid\\_1500\\_11604.pdf](http://www.sandag.org/uploads/publicationid/publicationid_1500_11604.pdf)

2018 Single Family Housing	42,795 dwelling units		
2018 Multi Family Housing	21,065 dwelling units		
2018 Mobile Home Housing	3,354 dwelling units		
2018 Total Housing	67,213 dwelling units		41,742
2030 Single Family Housing	43,240 dwelling units	43,363	
2030 Multi Family Housing	22,968 dwelling units	23,729	
2030 Mobile Home Housing	3,303 dwelling units	3,303	
2030 Total Housing	69,511 dwelling units	70,395	66,184
New Single Family Housing 2018-2030	446 dwelling units	568	
New Multi Family Housing 2018-2030	1,903 dwelling units	2,664	
New Mobile Home Housing 2018-2030	0 dwelling units	-51	
Total New Housing 2018-2030	2,349 dwelling units	3,182	24,442
Target SGOA Development Rate	50.0%	2,007	16,412
Non-SGOA Housing	1,174 dwelling units		
SGOA Housing	1,174 dwelling units		
Annual VMT of Each Unit	26,974 miles/unit	*CalEEMod Output	21170
Trip Reduction from Smart Growth	24.0%		
Overall VMT Reduction (2017-2030)	7,603,285 VMT		
Annual VMT Reduction	633,607 VMT		

#### T2 Electric Vehicle Promotion

Sources: Comparison Electricity Sources and Annual Vehicle Emissions California - [https://www.afdc.energy.gov/vehicles/electric\\_emissions.ph](https://www.afdc.energy.gov/vehicles/electric_emissions.ph)

2013 Community VMT	1,014,698,962 miles
2030 Community VMT	1,118,974,444 miles
2030 EMFAC regional LDA VMT	61.6%
2030 Community LDA VMT	689,288,257 miles
Alternative Fuels Data Center Data	
Gasoline Car Emissions	11,435 lbs CO <sub>2</sub> E/year
All Electric Car Emissions	4,587 lbs CO <sub>2</sub> E/year
Annual Mileage	11,824 miles/year
Gasoline Car Emissions	0.439 MT CO <sub>2</sub> E/thousand miles
All Electric Car Emissions	0.176 MT CO <sub>2</sub> E/thousand miles
Reduction, EV vs Gasoline	59.9% reduced VMT
Statewide Target	14.1% by 2030
Community Target EV Share	20.0% by 2030
Increased ZEV use	5.9% by 2030
Reduced VMT	16,313,437 miles
Reduction per Year (2018-2030)	1,254,880 miles per year

#### T3 Preferential Parking Spaces for Clean Air Vehicles

*Measure not quantified*

#### T4 Expand Complete Streets Program

*Measure not quantified*

# Quantification of Measures

## T5 Transportation Demand Management Programs

*VMT Reduction calculated outside of ClearPath*

*County Average Trip Length From SANDAG Series 12 Traffic Forecast*

2018 Total Employment	41,742 jobs
2030 Total Employment	57,793 jobs
New Development Employment	16,051 jobs
County Average Trip Length	5.8 miles
Roundtrip Average Commute	11.6 miles
New Job Commute Miles	67,960,145 miles
VMT Reduction	10%
VMT Reduction	6,796,015 miles
VMT Reduction	<span style="border: 1px solid black; padding: 2px;">566,335</span> miles/year

## Carbon Capture And Storage Measures

### AF1 Urban Forestry Program

*Calculated entirely outside ClearPath - ClearPath does not contain a module for calculating urban forestry*

[https://www.fs.fed.us/psw/topics/urban\\_forestry/products/cufr47\\_SMonicaBCA.pdf](https://www.fs.fed.us/psw/topics/urban_forestry/products/cufr47_SMonicaBCA.pdf)

Average Annual Sequestration	63 kg CO <sub>2</sub> per tree
Average Annual Sequestration	0.063 MT CO <sub>2</sub> E/tree
Annual Right of Way Trees Planted	200 trees
Annual Incremental Reduction	<span style="border: 1px solid black; padding: 2px;">12.6</span> MT CO <sub>2</sub> E/year
Annual Reductions by 2035	163.8 MT CO <sub>2</sub> E/year
Annual Private Development Trees	200 trees
Annual Incremental Reduction	<span style="border: 1px solid black; padding: 2px;">12.6</span> MT CO <sub>2</sub> E/year
Annual Reductions by 2035	163.8 MT CO <sub>2</sub> E/year
Reductions by 2020	50 MT CO <sub>2</sub> E
Reductions by 2030	302 MT CO <sub>2</sub> E
Reductions by 2040	554 MT CO <sub>2</sub> E
Reductions by 2049	781 MT CO <sub>2</sub> E

### AF2 Urban Agriculture and Community Gardens

*Measure not quantified*

### AF3 Agricultural Lands Conservation Program

*Calculated VMT Reduction outside ClearPath*

Initial Implementation (2020-2024)	
Easements	250 acres
Residential Development Intensity	3.6 du/acre
Agricultural Zoning Intensity	0.4 du/acre
Rights Extinguished	3.2 du/acre
Precluded Residences	800 units
Annual VMT Reduction	26,974 miles/unit
Total Reduction (30-year)	21,579,200 miles
Reduction per Year (2020-2024)	4,315,840 miles
Secondary Implementation (2025-2029)	
Easements	250 acres
Total Reduction (30-year)	21,579,200 miles
Reduction per Year (2025-2029)	4,315,840 miles

\*CalEEMod Output per SALC Guidelines

## Quantification of Measures

### **AF4 Carbon Farms Program**

*Measure not quantified*