

City of San Clemente Climate Action Plan

April 2012





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ACKNOWLEDGEMENTS

Krout & Associates



Healthy Buildings



Fehr & Peers Transportation Consultants



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INTRODUCTION TO THE CLIMATE ACTION PLAN

Background

The “greenhouse effect” is an atmospheric process during which incoming solar energy is trapped by greenhouse gases in the Earth’s ozone layer. This trapped heat maintains the temperature on the Earth’s surface. Human emissions from transportation, buildings, and industry have raised the concentration of CO₂ in the atmosphere from 280 parts per million in pre-industrial times, to 350 ppm in 1990 and 379 ppm in 2005.

¹Worldwide, the scientific community now agrees that the current global warming trend is a result of human activity and that warming will increase unless global carbon dioxide levels are stabilized.

Public awareness of climate change has broadened over the last decade as a result of increases in scientific evidence for global warming. 2010 ranked as the warmest year in recorded history, and it was also marked by a series of extreme weather events. ²Similarly, at the close of 2010, arctic sea ice cover was the lowest on record. ³ Research indicates that the average rate of warming will double in the 21st century as compared to the 1900s. Climate change models predict that Earth’s average surface temperature will rise between 2 and 11.5 degrees Fahrenheit by the end of this century.

The international community solidified its commitment to address climate change in 1992 with the United Nations Framework Convention on Climate Change (UNFCCC). Annually, representatives from around the world meet at UNFCCC meetings to assess ongoing climate mitigation efforts, and to work towards stabilizing greenhouse gas emissions at a level that prevents dangerous, anthropogenic impacts on the global climate. Today, 194 countries are UNFCCC signatories. In 2010 at the Cancun 16th Conference of the Parties on the United Nations Framework Convention on Climate Change (Cancun COP 16), the UNFCCC recognized the important role for local governments in reducing greenhouse gas emissions. For the first time, the UNFCCC identified sub-national entities as key governmental stakeholders in global climate change efforts.

California Climate Change Legislation

The State of California has taken several policy steps to address climate change. State actions alone cannot solve global warming, however the adoption and implementation of this legislation demonstrates California’s efforts in addressing the challenge.

California’s climate action goals are rooted in the California Global Warming Solutions Act, or AB32, which seeks to reduce state greenhouse gas emissions to 1990 levels by 2020, and the California Environmental Quality Act (CEQA), which requires that local governments consider the impact of greenhouse gases in proposed development projects and General Plan updates.



Summary of Key California Climate Legislation:

Executive Order S-3-05 states that California is vulnerable to the effects of climate change, including reduced snowpack in the Sierra Nevada Mountains, exacerbation of California’s existing air quality problems, and sea level rise. To address these concerns, the executive order established statewide targets to reduce GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

Assembly Bill 32 requires California to reduce statewide GHG emissions to 1990 levels by 2020, and directs the Air Resources Board to develop and implement regulations to reduce statewide GHG emissions. The Climate Change Scoping Plan outlines the State’s plan to achieve the AB 32’s GHG reductions and contains the strategies California will implement to achieve a reduction of approximately 28 percent from the state’s projected 2020 emission levels. The Plan identifies California’s cities and counties as “essential partners” within the overall statewide effort and recommends that local governments set a GHG reduction target of 15 percent below 2005-2008 levels by the year 2020.

Senate Bill 375 established a process to establish regional targets for reduced passenger vehicle and light duty truck GHG emissions for each Metropolitan Planning Organization in the state, including the Southern California Association of Governments (SCAG). The Air Resources Board targets for the SCAG region include an eight percent per capita reduction by 2020 and a 13 percent per capita reduction by 2035.

Senate Bill 97 acknowledges that climate change is a prominent environmental issue that requires analysis under the California Environmental Quality Act (CEQA). CEQA Guidelines were updated in 2010 to include provisions for mitigating GHG emissions and/or the effects of GHG emissions.

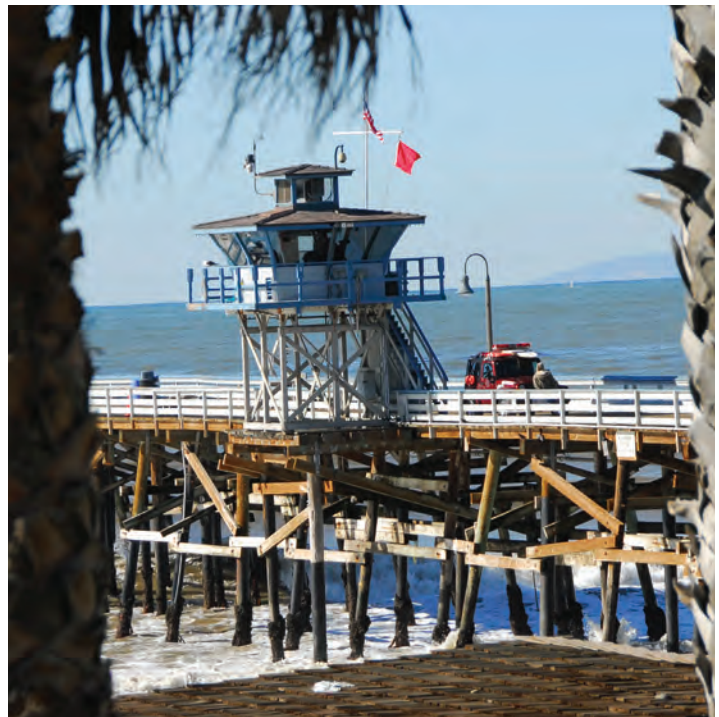
Attorney General Guidance given in March 2009 through correspondence with local governments completing General Plan updates stated that communitywide targets should align with an emissions trajectory that reflects California’s aggressive near term, interim (1990 levels by 2020), and long-term (80 percent below 1990 levels by 2050) GHG emissions limits set forth in AB 32 and Executive Order S-3-05.

Purpose

A Climate Action Plan is the City of San Clemente’s strategy to actively anticipate and plan for the future. The CAP is the first step in the city’s development of a long range, comprehensive plan to move from business-as-usual growth practices to an environmentally and economically sustainable growth model. With that objective, the CAP provides a roadmap to reduce our municipal and community emissions.

Background on Greenhouse Gas Emissions

There are both naturally occurring and anthropogenic greenhouse gas (GHG) emissions. Such things as decomposition of organic material and volcanic eruptions naturally contribute to GHG in the atmosphere. The anthropogenic GHG are primarily from our use of fossil fuels, deforestation, and farming and ranching practices. The percentage of GHG from human activity has grown over the past 150 years, and so the impacts we are experiencing today are from the activities of previous generations. Likewise, the GHG we put into the atmosphere today will affect our children, grandchildren and generations to come. Therefore, our success at mitigating GHG is part of our legacy to the future.



The Greenhouse Gas Effect

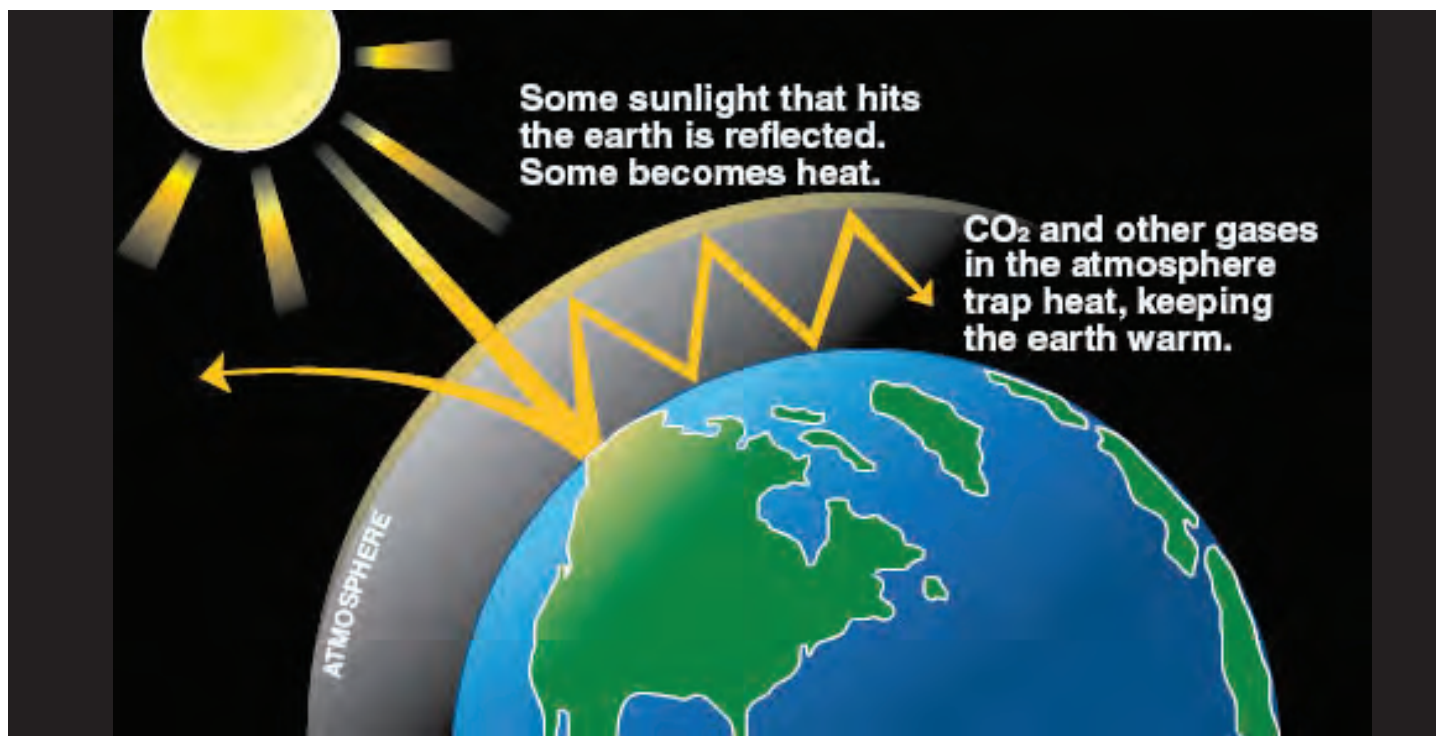


Figure 1-1 How greenhouse gas emissions can contribute to the Earth's changing temperatures.

In San Clemente, potential impacts of global climate change include reduced air quality, diminished water supplies, higher seasonal temperatures, sea level increases, coastal erosion and potential loss of protected species and habitats. The City of San Clemente has assessed community and government emissions, and has created a plan to decrease these emissions utilizing the best technology and strategies available today. The City of San Clemente will use effective strategies to minimize emissions across households, businesses and the government.

The CAP includes San Clemente's "greenhouse gas inventory" and establishes citywide GHG reduction goals for 2020 and 2030. To implement these goals, the CAP includes a series of strategies designed to reduce our local emissions and meet reduction targets.

In the state of California, there are over 50 municipalities that are pursuing a similar climate response strategy, by creating and adopting a Climate Action Plan. Similarly, major cities around the United States have implemented Climate Action Plans including Portland, Seattle, Chicago, New York, Miami, Denver, Pittsburgh, and Albuquerque.

The Importance of Individual Actions

For San Clemente to reach its GHG reduction goals, the City needs all individuals and businesses to take ownership of the CAP and make changes to reduce emissions. While climate change is undoubtedly a global problem, total emissions are a cumulative result of individual actions. By paying attention to our choices and behaviors, San Clemente residents can make easy changes to reduce our individual carbon footprints.

ⁱ IPCC, Climate Change 2007: Synthesis Report http://www.ipcc.ch/publications_and_data/ar4/syr/en/spms1.html

ⁱ IPCC, Climate Change 2007: Synthesis Report http://www.ipcc.ch/publications_and_data/ar4/syr/en/spms1.html

ⁱⁱ Press Release No. 906, World Meteorological Association. http://www.wmo.int/pages/mediacentre/press_releases/pr_906_en.html

ⁱⁱⁱ Press Release No. 906, World Meteorological Association. http://www.wmo.int/pages/mediacentre/press_releases/pr_906_en.html

^{iv} Press Release No. 904, World Meteorological Association. http://www.wmo.int/pages/mediacentre/press_releases/pr_904_en.html

PLANNING PROCESS

Relationship to the General Plan

The Plan is linked to the City’s General Plan and San Clemente’ Sustainability Action Plan (SAP, adopted in 2010).

The CAP was designed to advance San Clemente’s General Plan mission to guide responsible growth and preserve the “Spanish Village” character. The San Clemente General Plan remarks on the critical role the natural environment plays in sustaining community lifestyle and the local economy. As such, the 2012 Climate Action Plan builds upon the environmental values set forth in San Clemente’s General Plan. Notably, the City of San Clemente is working on a General Plan Update. Adoption of the Climate Action Plan will occur simultaneously with the General Plan Update. This will allow consistency between the two policy documents. In the hierarchy of City planning documents, the CAP is situated below the General Plan (and forthcoming General Plan Update) but above individual development proposals.

The Sustainability Action Plan serves as an overall roadmap for San Clemente to increase sustainability of

its operational practices. The Sustainability Action Plan further links the Climate Action Plan to San Clemente’s General Plan. The Sustainability Action Plan (SAP) is a strategy for San Clemente to meet current and future needs through resource conservation and efficiency. The CAP represents further implementation of the SAP’s established goals through a focus on reducing Greenhouse Gas Emissions over time.

The Sustainability Action Plan and the Climate Action Plan have independent goals, yet both are mutually reinforcing. Both the Climate Action Plan and the SAP focus on water, energy, and waste consumption as areas targeted for action. Moreover, both the SAP and the CAP will benefit public and environmental health. The Sustainability Action Plan protects health through measures that minimize pollution in our air, soil, and water. Likewise, the CAP addresses public health through individual behavior modifications that can reduce emissions, such as walking or biking in lieu of driving. Both plans identify community engagement and ownership of San Clemente’s environment as a key to success.



The CAP and the SAP diverge in methodology used to measure and evaluate progress. The SAP uses a general ranking system that examines the feasibility, cost, and benefit of each proposed measure. The CAP addresses each of these indicators, and then moves further with quantitative greenhouse gas measurement and projected reduction potential.

Relationship to the California Environmental Quality Act (CEQA)

On March 18th 2010, the State of California published updated CEQA amendments that added greenhouse gas emissions to the list of environmental impacts that jurisdictions are required to examine. The CEQA amendments require that GHG significance be assessed at both a project and a cumulative level. A “Greenhouse Gas Threshold” is a metric for evaluating whether emissions from a proposed project will cross established quantitative or qualitative significance thresholds and contribute “significantly” to global emissions.

According to CEQA, one option for evaluating GHG significance is by testing for compliance and consistency with a Climate Action Plan. If a lead agency wants to rely on its CAP as a threshold, it is important that CAP emission reduction targets are consistent with AB 32 and that mechanisms for oversight and monitoring of each reduction measure are included to evaluate GHG reduction progress.

San Clemente’s approach to GHG reduction is consistent with the climate change planning process being followed in over 50 other California municipalities.

This process includes:

- Complete a baseline GHG inventory and forecasting future emissions
- Establish a city-wide GHG reduction target
- Develop a CAP that creates strategies to meet the reduction target
- Evaluate the CAP’s environmental impact
- Include monitoring and enforcement measures in the CAP

This method is in compliance with the California Environmental Quality Act (CEQA) guidelines that require cities to measure and mitigate GHG emissions at a programmatic level. Further, an Initial Study (IS) and Negative Declaration (ND) accompany the CAP.

AB 32 does not require cities in the State of California to complete Climate Action Plans. However, the Attorney General’s Office has confirmed that Climate Action Plans are acceptable mitigation strategies for cities conducting General Plan Updates. Specifically, the Attorney General recommends that CAPs are prepared at the same time as a General Plan Update and EIR to expedite CEQA clearance for the GP. Further, the Attorney General urges cities to incorporate any Climate Action Plans into their general plan to ensure that provisions are applied to all relevant projects.



2009 Greenhouse Gas Inventory

To measure greenhouse gases in San Clemente, the city commissioned a “Greenhouse Gas Inventory” to quantify the overall magnitude of emissions from all municipal and community sources. A GHG Inventory is an accounting

of the quantities of GHGs emitted by various sources over a specific period of time. San Clemente's inventory was prepared using the Local Government Operations Protocol (LGOP), which was designed to assist local governments in quantifying and reporting GHG emissions. The GHG inventory used emissions factors recommended by the US Environmental Protection Agency (EPA) and the Intergovernmental Panel on Climate Change (IPCC), among others, to estimate CO₂e emissions for municipal operations and community activities.

The results of the inventory were broken down into emissions sectors under the City's jurisdiction that the CAP will target for reduction. The 2009 inventory was compiled for the following emissions sectors: energy consumption (electricity and natural gas), road transportation, solid waste, and water use and wastewater treatment. By better understanding emissions by sector, the city can more effectively focus emissions reductions strategies to achieve the greatest emissions reductions.

Baseline Year

Reporting GHG inventories on a calendar year basis is a standard practice; the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, The European Union Emission Trading System (EU ETS), The California Climate Action Registry (CCAR), The Climate Action Reserve, and the state of California's mandatory reporting regulation under AB 32 all require GHG inventories to be tracked and reported on a calendar year basis.

Work to develop San Clemente's CAP was initiated in 2010. The City's community and municipal inventories were prepared for the year 2009 because this was the most recent year with complete utility records available. Thus, the year 2009 serves as the "Baseline Inventory" for the purposes of this CAP. Additionally, selecting 2009 as the baseline year allowed the inventory to capture the impact of the economic recession on GHG emissions. Selecting 2009 as the baseline year allowed the inventory to capture the impact of the economic recession on GHG emissions (as opposed to utilizing records from 2005 or 2006 when GHG emissions were higher and possibly skewed emissions forecasts). Additionally, this approach is consistent with the state's methodology. The estimated

2020 GHG emission reductions for measures described in the 2008 Scoping Plan were based on the best available information as of December 2008. California Air Resource Board (ARB) staff has since revised the expected 2020 emission reductions in consideration of the economic recession.

Inventory Approach

The municipal inventory was prepared using the Local Government Operations Protocol (LGOP), which was developed, by the California Air Resources Board (ARB), California Climate Action Registry (CCAR), and Local Governments for Sustainability (ICLEI), in collaboration with The Climate Registry (ARB 2010). The LGOP is designed to provide a standardized set of guidelines to assist local governments in quantifying and reporting GHG emissions associated with their government operations. The LGOP strongly encourages local governments to utilize operational control when defining their organizational boundary. The LGOP states that operational control most accurately represents the emission sources that local governments can influence. Operational control is also the consolidation approach required under AB 32's mandatory reporting program and is consistent with the requirements of many other types of environmental and air quality reporting. This inventory was prepared using the operational control approach.



Why Conduct an Inventory?

The purpose of the GHG emissions inventory is to identify source types, distribution, and overall magnitude of GHG emissions to enable policy makers to implement cost-effective GHG-reduction strategies in policy areas over which they have operational or discretionary control.

A GHG inventory is an accounting of the quantities of GHGs emitted by various sources over a specific period of time. The inventory is often developed by local governments and used in larger planning documents called climate action plans (CAPs) that provide estimates of baseline GHG emissions, business-as-usual projections, and measures to reduce future emissions, generally in conformance with the Global Warming Solutions Act of 2006 (AB 32).

Inventories for the community and local government operations were developed for the City, and each inventory is broken down into emissions sectors. An emissions sector is a distinct subset of a market, society, industry, or economy, whose components share similar characteristics. The 2009 inventory was compiled for the following emission sectors: energy consumption (electricity and natural gas use), on-road transportation, solid waste, and water use and wastewater treatment. Government-related GHG emission sources can be considered a subset of the community-wide emissions inventory, and a municipal inventory typically comprises a small fraction of a community-wide inventory.

This inventory focuses on the three GHGs most relevant to community-wide and municipal operations: carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Converting emissions of non-CO₂ gases to units of CO₂e allows GHGs to be compared on a common basis (i.e. on the ability of each GHG to trap heat in the atmosphere). Non-CO₂ gases are converted to CO₂e using internationally recognized global warming potential (GWP) factors. GWPs were developed by the Intergovernmental Panel on Climate Change (IPCC) in its Third Assessment Report (TAR) to represent the heat-trapping ability of each GHG relative to that of CO₂. For example, the 100-year GWP of CH₄ is 23 because one metric ton of CH₄ has 23 times more ability to trap heat in the atmosphere than one metric ton of CO₂, on a 100-year timescale. The GWP of N₂O is 296.

Currently, there is no standard community emissions protocol; however, many documents have been developed to guide development of community GHG inventories. The boundary for defining community emissions is generally the physical geographic boundary of the community. The community inventory, then, will include governmental, residential, industrial, and commercial activities. While the geographic definition of a community's boundary works well for direct emissions (i.e. GHGs emitted from within the City's boundaries), indirect source emissions produced outside the City's boundaries (such as those resulting from imported electricity and water) and mobile source emissions are more challenging. Methodologies for estimating emissions from each sector are described below.

Unlike local pollutants such as diesel exhaust, it is unimportant where GHGs are actually released, because of their long atmospheric lifetimes and subsequent impact on global climate change; the important issue is reducing overall GHG emissions under the City's operational control by reducing fossil fuel combustion through conservation or low-carbon energy alternatives.

Methodology

City staff and the consultant team collected data from various sources, including City departments, public utilities, and private entities that provide services to and within the community. Data collection included activities specific to municipal operations (e.g. local government energy use, vehicle fuel use/mileage, water use, and solid waste disposal) and community-wide activities (e.g., total citywide energy use, vehicle miles traveled (VMT), solid waste disposal, water use, and wastewater generation) that occurred in 2009.

Energy Consumption – Electricity and Natural Gas

The energy consumption sector includes electricity and natural gas use by residential, commercial, and industrial establishments within the legal boundaries of the city. Although emissions associated with electricity production are likely to occur in a different jurisdiction, consumers are considered accountable for the generation of those emissions. Electricity-related GHG emissions are considered indirect emissions. Indirect emissions



are those that are generated as a result of activities occurring within the jurisdiction, but are released in different geographic areas. For example, a (city) resident may consume electricity within the city, but the electricity may be generated in a different region. Direct emissions are those occurring where they are generated (e.g., natural gas combustion for heating or cooling).

Transportation

The transportation sector includes the operation of on-road vehicles. Emissions from mobile combustion can be estimated based on vehicle fuel use and/or miles traveled data in conjunction with either fuel-specific emission factors from The California Climate Action Registry (CCAR), or Vehicle-Miles Traveled (VMT)-specific emission factors from EMFAC 2007 (see subsequent discussion). CO₂ emissions, which account for the majority of emissions from mobile sources, are directly related to the types and quantities of fuel combusted and thus can be calculated using fuel consumption data. CH₄ and N₂O emissions are more dependent on vehicular emissions control technologies and distance traveled. The calculation of CH₄ and N₂O emissions requires data on vehicle characteristics (which takes into account emission control technologies) and Vehicle miles traveled (VMT).

Solid Waste

The solid waste sector includes emissions associated with the collection, processing, and disposal of solid waste. Fugitive CH₄ emissions are released from solid waste facilities, namely landfills that accept organic waste. Emissions generated from solid waste disposal are primarily CO₂, which occur under aerobic conditions, and CH₄, which are generated under anaerobic conditions. Biogenic CO₂ emissions are considered part of the short-term carbon cycle, and are not included in GHG emissions inventories.

Wastewater

The wastewater sector generates fugitive CH₄ emissions associated with wastewater treatment processes,

including primary and secondary treatment, sludge digestion and N₂O emissions associated with effluent discharge. CO₂ emissions associated with energy needed to treat wastewater are included in the “water” sector. As mentioned previously, biogenic CO₂ emissions associated with wastewater treatment are not counted in GHG emissions inventories.

Water Consumption

The water sector includes emissions from energy associated with water treatment, distribution, and conveyance of water to the City, as well as wastewater treatment and discharge. Water for the City is provided by local (well) sources, as well as imports and recycled water. Approximately 16 percent of the City’s water production/consumption is from local sources (8 percent recycled water and 8 percent groundwater). In addition, most water is treated to be potable, but water used in outdoor activities, such as landscape irrigation, is not subject to wastewater treatment, and therefore energy demand associated with wastewater treatment is not included in outdoor water consumption estimates. An average emissions factor from the CEC was used to account for both indoor and outdoor water uses.

Results

Reporting emissions by sector provides a useful way to understand the sources of both community-wide and municipal emissions. By better understanding the relative scale of emissions from each of the sectors, the City can more effectively focus emissions reductions strategies to achieve the greatest emissions reductions. Mobile sources and energy consumption are the largest contributors to the City of San Clemente’s 2009 community-wide GHG inventory. The transportation and energy sectors account for approximately 67 percent and 28 percent of the total 620,024 MT CO₂e/yr., respectively. The next largest emissions sector is water use, which accounts for approximately 3 percent of the total community-wide emissions in 2009. The contributions of solid waste and wastewater each contributed less than 1 percent of the total (see Figure 2-2).

Baseline Community-wide Emissions

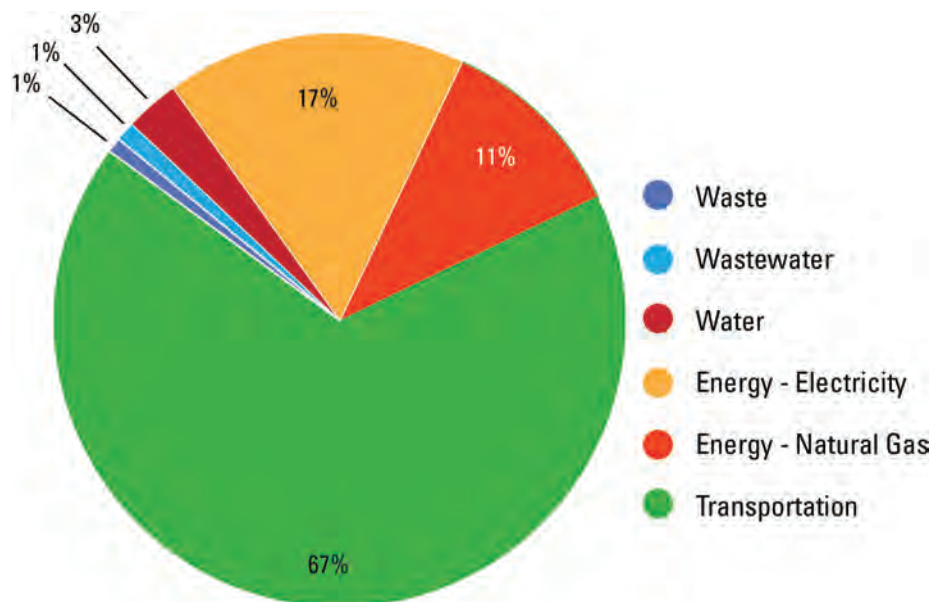


Figure 2-2 Baseline Community-wide GHG Emissions by Source Type

The largest sources of GHG emissions in San Clemente during 2009 were the following (in descending order):

- Transportation (67 percent)
- Electricity consumption (17 percent)
- Natural gas consumption (11 percent)
- Water consumption (3 percent)

The remaining sources, comprising 2 percent of total 2009 GHG emissions, are similar in magnitude:

- Solid waste disposal
- Wastewater generation

The City will likely be able to achieve the largest, most cost-effective emissions reductions from VMT reduction and energy conservation-related GHG reduction measures, which will be strong, focus areas within the CAP. Per-capita emissions for the City were 10 MT CO₂e/person in 2009. This is relatively low in comparison to the United States’ average, which was 17.5 MT CO₂e/person

in 2008, according to the United States Department of Energy's Carbon Dioxide Information Analysis Center (CDIAC). Per capita emissions are generally higher in richer countries. The most notable contrasts are between some of the rich countries and the less industrialized, but rapidly growing ones. The United States produces four times the per capita emissions that China does and 18 times that of India, according to the World Resources Institute.

Municipal operations within the City during 2009 contributed 5,995 MT CO₂e, with less than 1 percent of the total community-wide GHG emissions (See Figure 2-3). The primary source of municipal GHG emissions was energy consumption. Therefore, City will likely be able to achieve the largest, most cost-effective emissions reductions from energy conservation-related GHG reduction measures.

Baseline Municipal Emissions

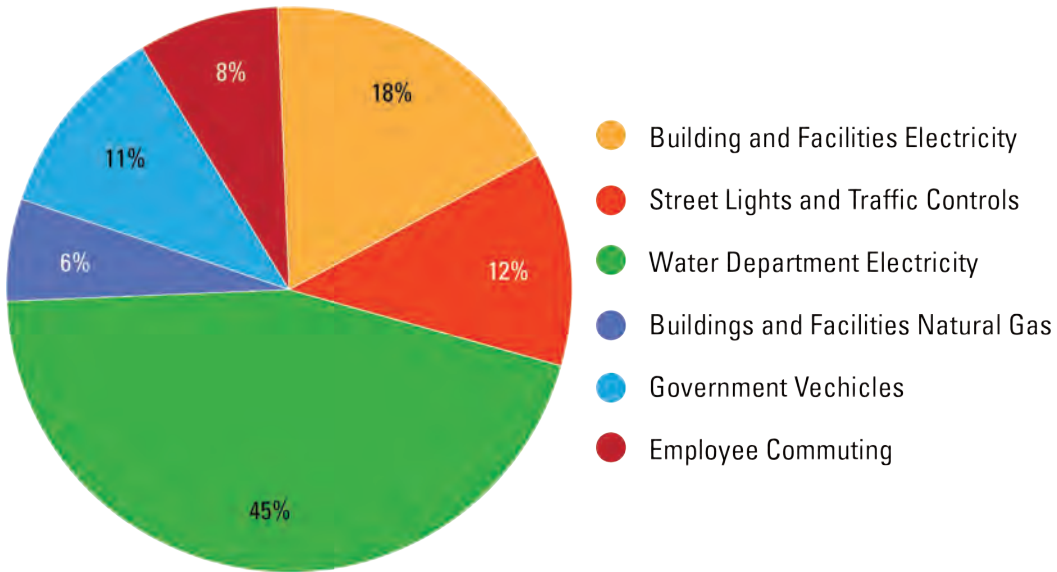


Figure 2-3 Baseline Municipal GHG Emissions by Source Type

2020 and 2035 Business-as-Usual Greenhouse Gas Forecasts

San Clemente conducted a forecast emissions scenario under business-as usual (BAU) conditions, which used available data on growth conditions within the City (community-wide and municipal). The city then determined growth conditions derived from historical trends in population, employees, energy consumption, and land use. The CAP outlines forecasts for 2020 and 2030 (build out of the upcoming General Plan Update) to comply with federal, state, and local regulations (i.e., AB 32 and SB 375).

The City quantified emissions and established a baseline emissions inventory for 2009 against which to measure future progress, and understand the scale of emissions from various sources. During the baseline year, San Clemente’s operational greenhouse gas emissions, expressed in terms of metric tons of carbon dioxide equivalent (MTCO₂e), totaled 625,555 MTCO₂e. For 2009, the majority of San Clemente’s footprint was attributed to community transportation at 67 percent of the total CO₂e emissions, which is typical for most city inventories. Residential building energy usage contributes 18.5

percent, commercial/industrial building energy usage contributed 9.4 percent, and municipal building energy usage contributed 0.2 percent.

The City’s community and municipal emissions are estimated to increase 0.8 percent from 2010 to 2020 and 0.8 percent from 2020 to 2030. The City anticipates an increase in community emissions by 0.3 percent for 2020 and 0.8 percent for 2030 using business-as-usual forecasting. Forecast emissions do not show a significant increase, because the population is expected to remain relatively consistent. Community transportation contributed 68 percent of community emissions. Municipal emissions consist of less than 1 percent of the inventoried baseline emissions. The City anticipates an increase in municipal emissions by 2.7 percent for 2020 and 0.3 percent for 2030 using business-as-usual forecasting. The estimated increase for 2020 is primarily based on developments of a sports park and fire station/senior center. Electricity for the water department contributes 45 percent of municipal emission for the baseline year.

The City of San Clemente carbon trends tell the story about its forecasts energy efficiency and environmentally responsible practices. Forecast Summary shows

forecasted years 2020 and 2030 compared to the City’s 2009 baseline. They identify each emission subsector’s contribution and forecasting proxy. For community emissions, the consultant analyzed forecasting proxies including population change, commercial and/or industrial land usage, vehicles miles traveled and community job change. Municipal emissions were estimated using municipal area change, population, employee commuting, vehicle miles traveled and municipal employee counts.

Community Forecasts

The City anticipates an increase in community emissions by 0.3 percent for 2020 and 0.8 percent for 2030 using business-as-usual forecasting (Figure 2-4).

Municipal Forecasts

Municipal emissions consist of less than 1 percent of the inventoried baseline emissions (Figure 2-5). The City anticipates an increase in municipal emissions by 2.7 percent for 2020 and 0.3 percent for 2030 using business-as-usual forecasting. Electricity for the water department contributes 45 percent of municipal emission for the baseline year.



Total Community GHG Emissions

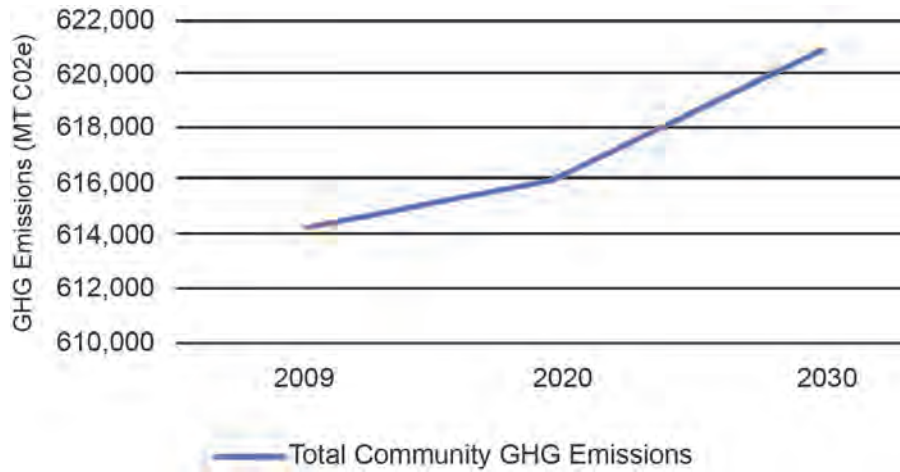


Figure 2-4 Total Community GHG Emissions by Forecast Year

Total Municipal GHG Emissions

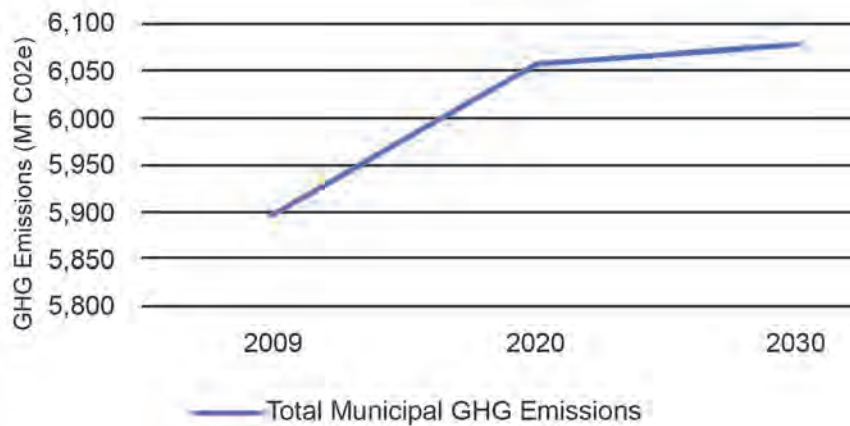


Figure 2-5 Total Municipal GHG Emissions by Forecast Year

State Greenhouse Gas Emissions Measures

The majority of emissions reductions in San Clemente will be achieved through state measures (Figure 2-6). The State of California has implemented the following measures targeted at statewide GHG reduction:

California Renewable Portfolio Standard

Legislation signed into law in 2011 requires California’s electric utilities to provide 33 percent of electricity supplies from renewable sources. This requirement

is known as the Renewable Portfolio Standard (RPS). Increasing the level of renewable energy supply lowers the greenhouse gas intensity of electricity (lbs./MWh). The following assumptions are used to calculate the emissions reductions expected from the Renewable Portfolio Standard.

Statewide Energy Efficiency Standards

California has established aggressive appliance and new building standards. The City of San Clemente includes estimates for how much statewide efficiency standards will reduce emissions. Note that under the auspices of

the California Public Utilities Commission (CPUC) the states' investor-owned utilities, including San Diego Gas & Electric (SDG&E), administer energy efficiency programs. Electricity, natural gas and greenhouse gas reductions associated with these programs are not included in the energy reductions of this measure and are included in the local buildings measures described below. The following assumptions are used to calculate the emissions reductions expected from statewide efficiency standards.

CAFE standards (Pavley): Passenger Vehicle and Light Duty Truck Fuel Economy

California and other states agreed to conform to the latest federal mile per gallon (mpg) standards, known as the Corporate Average Fuel Economy Standards, CAFE, announced in May 2009, in place of the state AB 1493 (2002, Pavley I), which required manufacturers to conform to stringent tailpipe emissions standards for greenhouse gases. California has thus amended AB 1493 (Pavley I) to conform to the federal CAFE standard from 2012 to 2016, on condition that it receives a waiver to set its own vehicle standards after 2016 and enforce its standards for model years 2009 to 2011. CAFE

mandates the sales-weighted average fuel economy (in mpg) of the passenger cars and light-duty trucks for a manufacturer's fleet. New passenger vehicles must meet a sales weighted average of 39 mpg, light duty trucks a value of 30 mpg, resulting in an average 35.5 mpg for the fleet if it is met only by fuel economy improvements. This corresponds to a CO2e target of 250 grams/mile in 2016 from those vehicles.

Low Carbon Fuel Standard (LCFS)

The California LCFS (2010) requires that, starting January 1, 2011 and for each year thereafter, a regulated party must meet the average carbon intensity requirement of 10 percent reduction in carbon intensity per Mega joule for its transportation gasoline and diesel fuel in 2020. Electricity suppliers are considered regulated parties only if they elect to provide credit to fuel distributors. At this time, there are no monitoring reports of the status of use of electricity credits for the LCFS to indicate the magnitude of carbon intensity reduction that electric vehicles will play in 2020. Therefore, for the City of San Clemente purposes, miles driven by electric vehicles are not considered a part of this standard. The City of San Clemente also assumes no new low carbon fuel

Local Verses State Measures

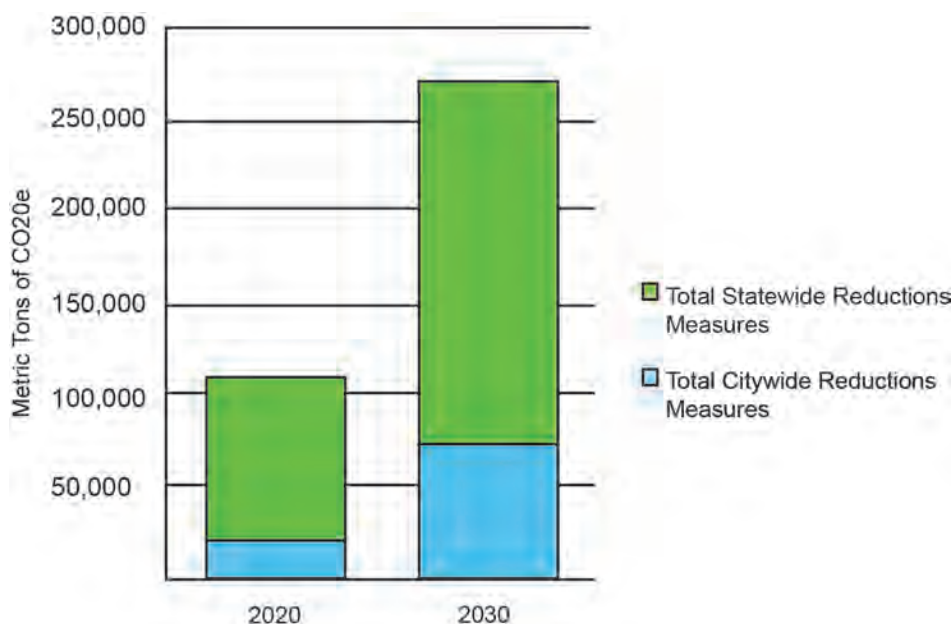


Figure 2-6 Aggregated Local and State Measures by Milestone Year

Target Year	2020	Interim Year Between 2020-2050	2050
AB 32 Scoping Plan Recommended Target	15% below 2005-2008 levels	NA	NA
Attorney General’s Office Guidance	15% below 2005-2008 levels	Demonstrate a trajectory toward 2050 levels (e.g., 37.7% below 2005-2008 levels by 2030)	80% below 1990 levels or 83% below 2005-2008 levels

Table 2-1 Summary of State Guidance on Local Government Targets

mandates in 2035. It is possible that the interaction of this standard with electric vehicles will have to be re-visited in a few years.

Water Conservation Program

California Senate Bill X7-7 (2009) requires all water suppliers to reduce urban per capita water consumption by 2020 – either through the “standard target”, a 20 percent reduction from the average water demand between 1994 and 2004, or the “alternative minimum”, a five percent reduction from the average water demand between 2003 and 2007. The City should select this alternative if it has adopted or is preparing a plan that demonstrates a SB X7-7 compliance path. If selected, the CAP would not prescribe additional specific conservation measures but rather take credit for the policies and actions that the City will implement to achieve the SB X7-7 conservation target. Emissions reductions would be based on the programs total anticipated water savings in the target years.

2020 and 2030 Reduction Targets

The City of San Clemente used State of California greenhouse gas (GHG) reduction targets to guide the development of the City’s CAP.

Summary of State Guidance on Local Government Targets

Table 2-1 provides a summary of the State of California’s guidance to local governments regarding GHG reduction targets. This guidance applies to both municipal

operations and community-wide emissions reductions efforts.

Recommended GHG Targets for the City of San Clemente

The City should select GHG emissions reduction targets that are effective and attainable. Because 2009 serves as the year of the baseline inventory, the reduction targets are expressed as percent reductions below 2009 levels. The targets would apply to both community-wide and municipal operation GHG reduction efforts.

2020 Target: 15 Percent below 2009 Levels

Selecting a reduction target that calls for GHG emissions to be 15 percent below 2009 levels by 2020 offers the following benefits:

- Consistent with current guidance offered by ARB and the California Attorney General’s Office
- Demonstrates contribution to State AB 32 GHG emissions reduction goals for 2020
- Attaining a 15 percent reduction below 2009 levels would require community-wide emissions to be reduced by approximately 93,004 MT CO₂e/year from existing levels by 2020. Municipal operations emissions would need to be reduced by approximately 901 MT CO₂e/year from existing levels by 2020.

2030 Target: 37.7 Percent below 2009 Levels

A target that strives to reduce GHG emissions to be 37.7 percent below 2009 levels by 2030 provides the following benefits:

- Consistent with the guidance offered by the California Attorney General’s Office
- Demonstrates a trajectory toward the State’s long-term (EO-S-3-05) emissions reduction goals
- Aligns with the City of San Clemente General Plan update planning horizon
- Achieving the 37.7 percent reduction below 2009 levels would require community-wide emissions to be reduced by approximately 233,718 MT

CO₂e/year from existing levels by 2030. Municipal operations emissions would need to be reduced by approximately 2,265 MT CO₂e/year from existing levels by 2030.

To simplify target setting, the City of San Clemente is pursuing a 15% reduction for 2020 and 40% reduction for 2030.

These forecast years for 2020 and 2030 reflect federal, state, and local regulations (i.e., AB 32 and EO S-3-05) and coincide with the build out of the upcoming General Plan Update. Combined Citywide and Statewide reduction measures are expected to decrease emission by 17% in 2020 and 43% for 2030 as indicated in Table 2-2. Reduction measures for 2020 are included in the values for 2030.

Categories	2020 Emissions		2030 Emissions	
	MT CO ₂ e	% of Total Reduction	MT CO ₂ e	% of Total Reduction
Total Forecasted Emissions (BAU)	627,958		632,784	
Target	533,764	15%	379,671	40%
Total After Measures	518,759	17%	365,295	43%

Table 2-2 Target Feasibility Summary. Reduction measures compared to forecasted and targeted emission reductions.



In summary, Figure 2-7 demonstrates the City of San Clemente's 2009 baseline year, the business-as-usual forecasts for 2020 and 2030, emission targets of 15% and 40%, and the proposed GHG emission reduction strategies including federal, state and local measures that will be necessary to reach the emission targets.

San Clemente Emission Trends and Targets

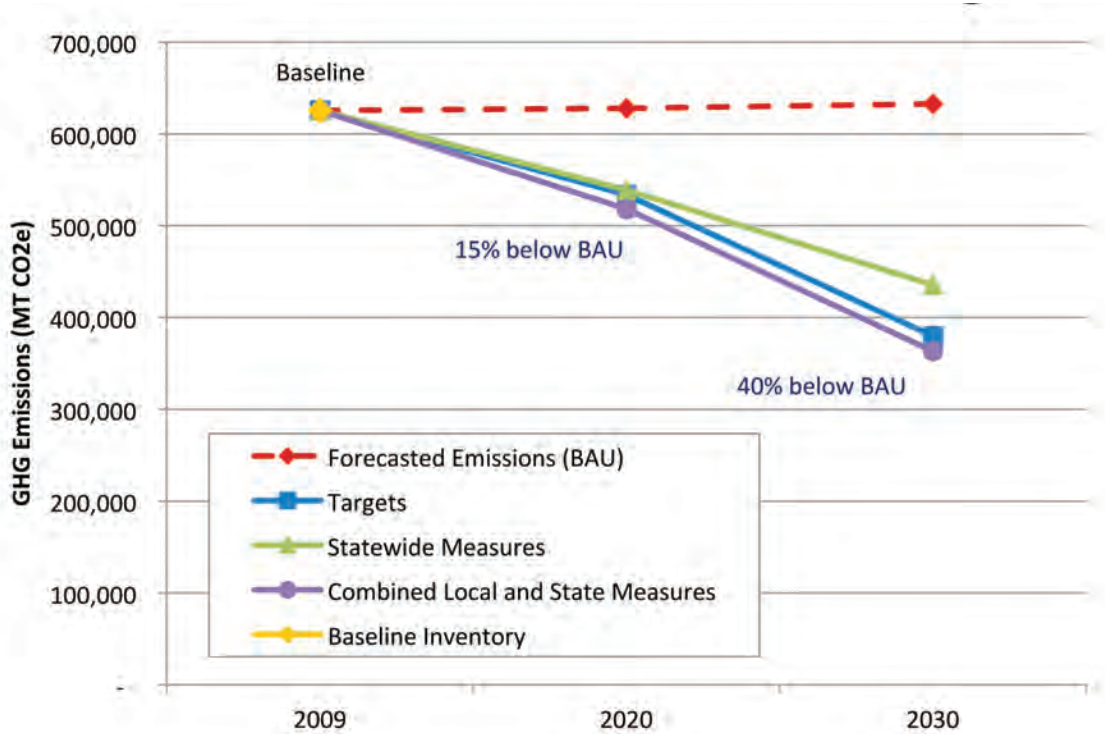


Figure 2-7 GHG Emission Trends and Targets. This Graph includes the baseline year 2009, business-as-usual forecasts for 2020 and 2030, emission targets, and GHG emission reduction measures including federal, state, and local measures.

1. http://www.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf.

LOCAL EMISSIONS REDUCTION MEASURES

Design and Benefits

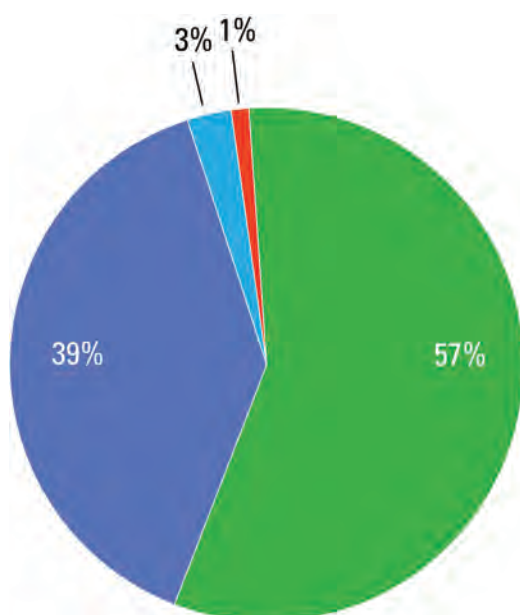
Through collaboration between the city government, residents, and businesses, San Clemente will be able to reach its emissions targets efficiently and on-schedule. As indicated previously, state and federal actions will comprise the bulk of San Clemente’s emissions reductions. The following measures detailed in this CAP are meant to support State GHG reduction targets and measures at the local level.

Each CAP measure is categorized according to “reduction measures” that have been identified as key areas for emissions reduction. The CAP strategies are based on the analysis of the quantity and sources of greenhouse gas emissions gathered during the inventory, and seek to create emissions reductions that are realistic and achievable for our City. Where possible, the predicted reductions from each strategy are quantified. The City has designed these reduction measures to meet our 2020 and 2030 targets. Likewise, the CAP measures are flexible to ensure that each reduction strategy can be adjusted depending on its observed emissions reduction performance. Table 3-1 demonstrates the

Emission Sector	2020 Emissions		2030 Emissions	
	MT CO2e	% of Total Reduction	MT CO2e	% of Total Reduction
Energy	62,186	57%	106,781	68%
Transportation	42,103	39%	45,982	29%
Water	3,372	3%	3,372	2%
Waste	1,538	1%	2,156	1%
Total GHG Reductions	107,701	100%	156,215	100%

Table 3-1 Reduction Measures by Emission Sector

Reduction Measures 2020



Reduction Measures 2030

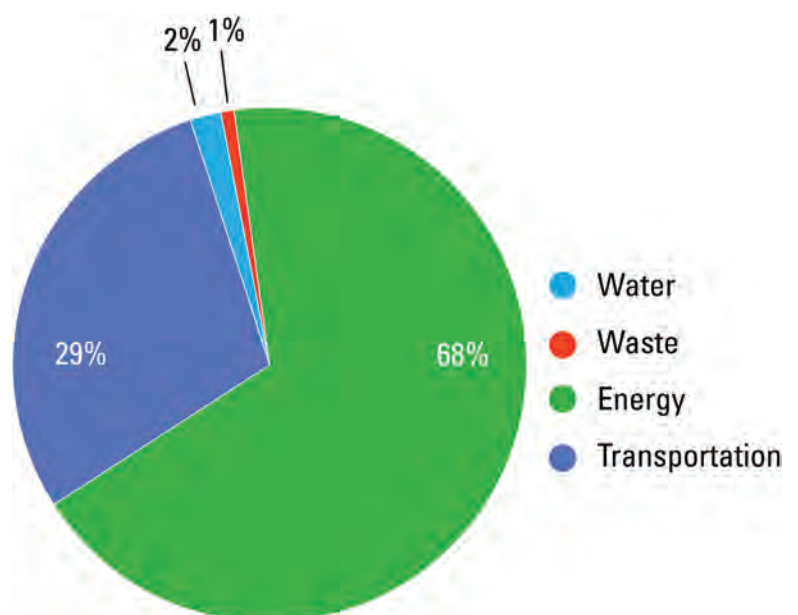


Figure 3-1 Contribution of Reduction Measure Categories for 2020 and 2030

emissions reduction contributions from each sector and, what percentage each category will contribute to the City’s overall target. Figure 3-1 shows the percentage contribution of each reduction category to the City’s 2020 and 2030 goals.

Co-benefits

In addition to GHG reduction, several CAP actions will create important benefits to the community. The “co-benefits” positively impact San Clemente lifestyle and protect the earth’s climate beyond reducing GHG emissions.

Significant co-benefits that can be achieved through San Clemente’s CAP include decreased air pollution and overall strengthening of the natural ecosystem.

Economic Feasibility

The importance of individual actions for San Clemente to reach its GHG reduction goals, the City needs all individuals and businesses to take ownership of the CAP and make changes to reduce emissions. While climate change is undoubtedly a global problem, total emissions are a cumulative result of individual actions. By paying attention to our choices and behaviors, San Clemente residents can make easy changes to reduce our individual carbon footprints.

Whenever possible, the CAP measures have been designed to be economically advantageous to San Clemente businesses, residents, and government. Many of the CAP measures decrease energy costs for consumers. Investing in energy efficiency and

Sector	Reduction Measure	2020 Emissions		2030 Emissions	
		MT CO2e	% of Reduction	MT CO2e	% of Reduction
Local Reduction Measures					
Energy	Residential Efficiency Retrofits	3,487	3%	8,746	3%
	Commercial Efficiency Retrofits	1,796	2%	4,549	2%
	Residential New Construction Efficiency	2,044	2%	6,216	2%
	Commercial New Construction Efficiency	1,611	1%	4,900	2%
	Residential Solar Water Heaters	5,505	5%	19,342	7%
Transportation	Combined Transportation Measures	4,200	5%	4,223	2%
Waste	Expand Waste Material Diversion	1,538	1%	2,156	1%
Total Citywide Reduction Measures		20,181	18%	70,313	26%
State Reduction Measures					
Energy	CA Renewable Portfolio Standard	40,894	37%	40,894	15%
	CA Electricity Energy Efficiency Standards	5,487	5%	16,071	6%
	CA Natural Gas Efficiency Standards	1,361	1%	6,064	2%
Transportation	CAFE (Pavley) & LCFS	37,903	35%	41,758	16%
Water	Water Conservation Program	3,372	3%	3,372	1%
Total Statewide Reductions Measures		89,018	82%	197,177	74%
Total GHG Reductions		109,199	100%	267,490	100%

Table 3-2 Summary of Emission Local and State Reduction Measures. All values are shown in terms of MT CO2e.

renewable energy can assist individuals, households and businesses by reducing energy demand and by providing long-term savings for operations and maintenance budgets. Similarly, the energy conservation and efficiency activities will increase energy security and independence. Measures that reduce emissions of greenhouse gasses also decrease demand for imported energy from unstable sources, and especially target carbon-intensive fuels like oil. These measures include infill development, alternative transportation, and smarter building design and construction practices. Table 3-2 demonstrates the relative contributions of local and state measures to the City's GHG reduction targets (state measures will account for the majority of emissions reduction in San Clemente).

Transportation Greenhouse Gas Reduction Strategies

San Clemente's development history has created transportation infrastructure that relies almost exclusively on passenger vehicles to provide for the mobility needs of the city's residents. In San Clemente, 68 percent of all greenhouse gas emissions from the jurisdiction originate from transportation.

The preponderance of emissions from transportation in San Clemente is not surprising since the dominant mode of development throughout the Southern California region has relied on highways and passenger vehicles for mobility for nearly a century. Though daunting, the challenge of low-carbon mobility has been confronted by other cities in California and around the world and have answered it with strategies including neighborhood electric vehicles, enhanced amenities for pedestrians and cyclists, and regional mass transportation partnerships.

San Clemente citizens can have a significant impact on community-wide emissions by reducing their driving. Alongside reducing individual emissions, San Clemente will experience health benefits through walking or biking to their destinations whenever feasible.

Worker trip data, based on the 2009 Census Longitudinal-Employer Household Dynamics Origin Destination Employments Statistic (LODES), was collected and analyzed to quantify and understand the work trips

related to San Clemente. The LODES data showed that there are a total of 16,194 jobs in the City of San Clemente and have the following patterns:

Work Flows:

- 12,761 employees live outside the City, but work in the City
 - 3,433 employees live and work in the City
- a. 15,913 employees live in the City, but work outside the City. Of these, the distance to work is:
- 38 percent drive under 10 miles
 - 19 percent drive between 10-24 miles
 - 27 percent drive between 25 and 50 miles
 - 16 percent drive over 50 miles

This data ultimately aids in the development of strategies and also helps develop the potential strategies and reductions.

Transportation Strategy #1: Expand Pedestrian Network

Providing a pedestrian access network encourages people to walk instead of drive. The mode shift results in people driving less and thus reducing VMT. Some strategies included in this category are completion of any gaps in the sidewalk network, or the extension of any existing sidewalks (i.e. new sidewalks) to provide access to desired areas of the City. This would also require eliminating physical barriers such as walls, landscaping, and slopes that impede pedestrian circulation. It is anticipated that much of this pedestrian network expansion would occur in conjunction with development and redevelopment throughout the City.

Predicted Level of Implementation

The implementation mechanism is the San Clemente Bicycle and Pedestrian Master Plan which serves as a roadmap for developing pedestrian infrastructure and programs in the City. It encourages development

of practical, safe, and enjoyable environments all while emphasizing and promoting walking as a viable transportation option.

Potential VMT Reductions

Empirical research indicates that pedestrian network improvements yield 1-2 percent reduction in VMT, based on the scale of the proposed improvements. As these improvements are potentially limited in scale to various areas of the City, we would recommend applying the more limited VMT reduction at 1 percent.

Transportation Strategy #2: Require Bicycle Parking

One way to facilitate bicycle travel is to require bicycle parking for both public and private uses. This strategy identifies additional opportunities to place public use bicycle parking or to modify existing parking requirements for bicycle with the aim of increasing the supply of parking. This strategy is limited in that it applies to selected new developments within the City which are larger than an identified threshold in terms of building size, number of employees, or other applicable criteria.

Some potential strategies in this category are:

- Commercial and Residential Bicycle Parking- This measure includes requiring non-residential projects to provide permanent bicycle parking facilities to meet peak season maximum demand along with requiring residential multi-family projects to provide long-term parking facilities for all residents.
- Transit Bicycle Parking- This measure provides short-term and long-term bicycle parking near rail stations, transit stops, freeway access points, and park-and-ride lots. Bicycle parking provides a “first-mile” solution to commuters who may have limited access to major transportation hubs.

Local implementation could take the form of the following such as a “San Clemente Community Building through Bicycling” campaign, which would be similar to the San Francisco Critical Mass, which takes place monthly on Friday nights. The campaign could include volunteer





Incentives, community service hours for earning a new bike, and potential tax benefits for employees that ride their bikes to work.

Predicted Level of Implementation

The implementation mechanism is the recently completed San Clemente Bicycle and Pedestrian Master Plan, and General Plan scheduled for completion in fall of 2012. The City should also work with local transit providers to implement parking at transit facilities.

Potential VMT Reductions

The effects of bicycle parking on worker trips is most applicable to those workers who live and work in the City of San Clemente, which comprises about 21 percent of the total trips within San Clemente. Additionally, these facilities may also be used by shorter work trips, which make up about 38 percent of all work trips. Empirical studies indicate that the maximum reduction in VMT achieved with this strategy is approximately 0.5 percent. We would therefore consider that this reduction should be likely maximum that the City could achieve, particularly given the limited scale of application that might occur by limiting the requirements to a subset of new development.

Transportation Strategy #3: Develop Off-Street Bicycle Facilities

Another means to encourage bicycle travel is to develop and implement off-street bicycle trails which can be used for both recreational travel and commuting purposes. One potential strategy is requiring buildings of certain size or adjacent to bikeways to include off-street bicycle paths or lanes in their plans and to construct them as part of their project approval.

Predicted Level of Implementation

Similar to Strategy #2, the implementation mechanism is the San Clemente Bicycle and Pedestrian Master Plan, which serves as a roadmap for developing bicycle infrastructure and programs in the City. It encourages development of off-street bicycle paths and lanes to improve the City's ease of use for bicyclists.

Potential VMT Reductions

Research has shown that adding bicycle facilities can increase the percentage of commuters who travel by bicycle. As such, we would assume that the benefits of this strategy would be 1 percent of VMT as this represents the typical experience observed.

Transportation Strategy #4: Incorporate Bike Lane Street Design Through San Clemente Bike Plan

The City's Bike Plan incorporates bicycle lanes, routes, and shared-use paths into street systems, new subdivisions, and large developments. These on-street bike accommodations will be created to provide a continuous network of routes, facilitated with markings and signage. These improvements can help reduce peak-hour vehicle trips by making commuting by bike easier and more convenient for more people. In addition, improved bicycle facilities can increase access to and from transit hubs, thereby expanding the "catchment area." Bicycle access can also reduce parking pressure on heavily used and/or heavily subsidized feeder bus lines and auto-oriented park-and-ride facilities.

Predicted Level of Implementation

The implementation mechanism is the San Clemente Bicycle and Pedestrian Master Plan, which serves as a roadmap for developing bicycle infrastructure and programs in the City. It encourages development of practical, safe, and enjoyable environments all while emphasizing and promoting bicycling as a viable transportation option.

Potential VMT Reductions

The benefits of this strategy would be 1 percent of VMT as this represents the typical experience observed.

Transportation Strategy #5: Encourage the Use of Electric Vehicles

San Clemente will help accelerate the transition to plug-in hybrids and electric vehicles by supporting the installation of a network of electric car charging stations.



Predicted Level of Implementation

San Clemente will support any electric vehicle charging stations by providing signs that designate parking for electric vehicles.

Transportation and Land Use Strategy #6: Encourage Planting New Trees

San Clemente will encourage the planting of new trees in both residential and commercial areas, with a special emphasis in parking lots. Planting trees sequesters CO₂. Therefore, increasing the city-wide tree canopy will contribute to efforts to reduce GHG emissions and will have the added benefit of improving public spaces.

Predicted Level of Implementation

CO₂ reduction varies by the number and type of trees planted.

Energy Greenhouse Gas Reduction Measures

The strategies in this section address San Clemente's second-largest source of emissions: the use of electricity and natural gas. Natural gas use accounts for 11 percent of total community emissions, while electricity use



accounts for an additional 17 percent. This 28 percent of emissions represents the energy used to heat and power homes and businesses. Efficiency reduction in this area and is critical to achieving the city's emissions improvements goals.

The residential sector in the City of San Clemente accounts for about 9% of electricity use and 9% of natural gas use is associated with existing buildings. The following measure estimates the energy and greenhouse gas reductions associated with implementing energy efficiency retrofits in single family and multi-family homes. The commercial sector accounts for 7% of electricity use and 2% of natural gas use in the City of San Clemente.

1. Adopt a voluntary Energy Efficiency and Conservation Policy for commercial and residential retrofits. The calculations assume 10% of existing residential homes are retrofit to reduce energy use by 30% per unit by 2020, and 15% of existing residential homes are retrofit for an energy savings of 30% per unit by 2030. The calculations assume 10% of existing non-residential square footage is retrofit to reduce energy use by 30% per square foot by 2020, and 15% of existing non-residential homes are retrofit for an energy savings of 30% per

unit by 2030. Energy reductions are calculated as a percentage of average residential and commercial energy consumption. The average cost of a residential retrofit that achieves 50% energy savings is \$20,000. Rebate programs that reduce the initial cost and/or retrofit financing programs will be necessary to achieve the City's target participation.

Energy efficiency improvements to residential and commercial structures can reduce energy bills and GHG emissions. The City will partner with San Diego Gas & Electric (SDG&E) and community organizations to conduct public education and outreach campaigns that encourage residents and businesses to voluntarily complete energy efficiency improvements within their homes and businesses and to take advantage of the low cost energy efficiency-financing program described in the Reporting Chapter.

As part of the outreach program, the City will enhance its website by linking to information on existing energy efficiency rebates and other financial incentives. SDG&E provides numerous incentives to residents and businesses for energy efficiency improvements. The website could also contain local case studies of homes and businesses that have completed cost effective energy efficiency improvements.

2. Adopt a voluntary Energy Efficiency and Conservation Policy for new constructions that would become mandatory only if necessary participation is not achieved by 2016. The program would encourage energy efficiency standards above current State energy standards. Under this option the City would adopt voluntary energy efficiency standards for new construction higher than current Title-24. The program could apply to residential and commercial. It would require new construction to exceed Title-24 energy efficiency standards by 15%, a level comparable to GreenPoint minimum requirements, Energy Star Rated Homes, and achieving the California Green Building Code Tier I performance criteria. The City calculations assume that 15% of residential projects

participate through 2016 and then 100% of projects participate through 2020 (assuming that the anticipated level of is not achieved by 2016).

3. Promote the California Solar Initiative's solar water heating incentive program to subsidize the purchase of solar water heaters and replace/ recycle old water heaters in homes and commercial buildings. The City estimate assumes that solar water heaters are installed in combination with both electric and natural gas water heaters. We further assume that 40% offset electric water heaters and 60% of the systems offset natural gas water heaters. This would be part of the Energy Efficiency and Conservation Policy mentioned above. On January 21, 2010, the CPUC approved a Decision creating the CSI-Thermal Program, which allocates significant funding to promote solar water heating (SWH) through a program of direct financial incentives to retail customers, training for installers and building inspectors, and a statewide marketing campaign.

Waste Greenhouse Gas Reduction Measure

Solid waste accounts for approximately 1 percent of the the community emissions. Therefore, the City is proposing the following measure:

1. Adopt a Waste Diversion Ordinance that would require waste diversion of 75 percent by 2020 and 90 percent by 2030. The City of San Clemente estimates baseline citywide waste is 50,571 tons per year with 71% of total waste diverted from landfill and/or recycled. The City is targeting a 75% diversion rate by 2020 and 90% diversion rate by 2030. This would be accomplished by adopting an ordinance that requires the contracted waste haulers to achieve and demonstrate the prescribed reduction rates.

IMPLEMENTATION AND MONITORING

To be effective, the CAP strategies need to bridge the gap between well-intentioned policy and real world emissions reductions that can be observed and quantified. This section discusses the implementation and monitoring mechanisms that have been designed to ensure that San Clemente reaches its GHG reduction targets. Further, the chapter includes a schedule for evaluating CAP progress and instructions for revising the plan (if necessary) to meet established targets. In addition to functioning as a progress indicator, these monitoring mechanisms are essential if the City plans to use this Climate Action Plan as a qualified GHG significance threshold in compliance with CEQA.

Implementation

The CAP recommends that the City of San Clemente designate a staff member to act as “CAP Manager” and monitor overall progress of the CAP. Additionally, each CAP measure will be assigned to a relevant department within the City to monitor and provide feedback in regards to that action. The following table categorizes each measure according to “responsible City department” and “implementation timeframe.” The designated year for “implementation timeframe” indicates the year measure implementation will begin; maintenance and reduction effects will extend far beyond the designated year.

Potential Financing Opportunities

Interagency collaboration is critical to success. Strategic public funding by the City, regional government agencies, and the State for capital projects, incentives, outreach/education, and new legislation will be required to achieve CAP objectives.

To decrease costs and improve the plan’s efficiency, actions should be pursued concurrently whenever possible.

Funding sources have not been identified for all actions; however, numerous federal, State, and regional grants are available. Additionally, San Clemente should partner

with nearby cities to administer joint programs when feasible. As many businesses in the Los Angeles area

California Comprehensive Residential Building Retrofit Program: The California Comprehensive Residential Building Retrofit Program is a program under the State Energy Program (SEP) administered by the CEC to create jobs and stimulate the economy through a comprehensive program to implement energy retrofits in existing residential buildings. The Program focuses on deploying re-trained construction workers and contractors, and youth entering the job market to improve the energy efficiency and comfort of California’s existing housing, creating a sustainable energy workforce in the process.

Energy Upgrade California Program: The California Energy Commission joined regional efforts to increase energy efficiency and encourage clean jobs with the statewide launch of Energy Upgrade California, the new energy efficiency program. Part of this comprehensive program is the integrated Web Portal, www.EnergyUpgradeCA.org. These efforts will support construction-related jobs that lead to increased sales for local building suppliers and retailers. The Energy Upgrade web portal is a one-stop clearinghouse for information, incentives, scholarship and rebates including alternative financing for residential and commercial building improvements and financial incentives by lenders. Using the program’s Web portal, property owners can enter their zip code or county name to learn about available upgrade programs, rebates, financing options and participating contractors available to them. The Energy Upgrade California program is available for single-family detached homes. Multifamily properties (2+ units) will be phased in. Upgrades are available in two rebate packages: the Basic Upgrade Package and the Advanced Upgrade Package. The Basic Package consists of seven required elements designed to improve energy efficiency by approximately 10 percent, and includes a fixed rebate of \$1,000. The Advanced Package is customized for the property owner, with rebates based on the energy savings achieved between 15-40 percent, with rebates ranging from \$1,500 to more than \$4,000 (depending on the utility provider and energy savings achieved).

Energy Efficiency Mortgages: Energy Efficiency Mortgages provide owners additional financing (whether at time-of-sale or upon refinancing) for energy efficiency improvements at discounted interest rates. Energy efficiency upgrades could be chosen that would allow owners to realize a net monthly savings. The goal is to provide capital for energy efficiency upgrades at a discounted interest rate. The Federal Housing Administration (FHA) offers an Energy Efficient Mortgage Loan program that helps current or potential homeowners lower their utility bills by enabling them to incorporate the cost of adding energy-efficient improvements into their new home or existing housing.

Self-Financing Mechanisms: CAP measures include incentives, as well as regulations or fees, to encourage change in communitywide transportation, energy and water use, and solid waste disposal habits. It is important that the fees established in the CAP be self-financing. The money raised through the fees would then be used to implement the CAP measures determined to provide the best mitigation results. San Clemente will actively explore opportunities to establish programs that are self-financing, and thus sustainable over the long term.

Recommended Local Greenhouse Gas Reduction Measures	Implementation	Responsible City Department	Implementation Timeframe		
			2016	2020	2030
Transportation Greenhouse Gas Reduction Measures					
Expand "Pedestrian Network" through widening sidewalks, completing gaps in the sidewalk network, or extending sidewalks to provide access to desired areas of the City.	<p>The Bicycle and Pedestrian Master Plan, which contains the following policies that identify gaps in the network and prioritize construction activities:</p> <p>1.4 The City will prepare and maintain an inventory of sidewalk facilities to determine where pedestrian improvements are most needed to insure a continuous safe route for pedestrians throughout San Clemente.</p> <p>1.5 The City will continue to identify and repair sidewalks and public areas that have pedestrian hazards.</p> <p>3.2 The City will work towards closing existing gaps in San Clemente's pedestrian network.</p> <p>4.3 The City will identify weak links and discontinuities in the existing network and develop a plan to prioritize and fund solutions that improve or complete links.</p>	Public Works and Community Development		X	

Recommended Local Greenhouse Gas Reduction Measures	Implementation	Responsible City Department	Implementation Timeframe		
			2016	2020	2030
Transportation Greenhouse Gas Reduction Measures					
<p>Require Bicycle Parking. One way to facilitate bicycle travel is to require bicycle parking for both public and private uses. This strategy would identify additional opportunities to place public use bicycle parking or to modify existing parking requirements for bicycle with the aim of increasing the supply of parking.</p>	<p>This strategy applies to selected new developments within the City which are larger than an identified threshold in terms of building size, number of employees, or other applicable criteria.</p>	<p>Community Development</p>	<p>X</p>		
<p>Develop Off-Street Bicycle Facilities. Another means to encourage bicycle travel is to develop and implement off-street bicycle trails which can be used for both recreational travel and commuting purposes.</p>	<p>Some potential strategies that would be included in this category would include requiring buildings of certain size or adjacent to bikeways to include off-street bicycle paths or lanes in their plans and to construct them as part of their project approval.</p>	<p>Public Works and Planning Department</p>		<p>X</p>	

Recommended Local Greenhouse Gas Reduction Measures	Implementation	Responsible City Department	Implementation Timeframe			
			2016	2020	2030	
Transportation Greenhouse Gas Reduction Measures						
<p>Incorporate Bike Lane Street Design Through San Clemente Bicycle and Pedestrian Master Plan. The City’s Bicycle and Pedestrian Master Plan incorporates bicycle lanes, routes, and shared-use paths into street systems, new subdivisions, and large developments. These on-street bike accommodations will be created to provide a continuous network of routes, facilitated with markings and signage. These improvements can help reduce peak-hour vehicle trips by making commuting by bike easier and more convenient for more people. In addition, improved bicycle facilities can increase access to and from transit hubs, thereby expanding the “catchment area” of these transit stops or stations and increasing ridership. Bicycle access can also reduce parking pressure on heavily used and/or heavily subsidized feeder bus lines and auto-oriented park-and-ride facilities.</p>	<p>The Bicycle and Pedestrian Master Plan, which will identify gaps in the network and prioritize bike lane siting and striping.</p>	<p>Public Works and Planning Department</p>				<p>X</p>

Recommended Local Greenhouse Gas Reduction Measures	Implementation	Responsible City Department	Implementation Timeframe		
			2016	2020	2030
Energy Greenhouse Gas Reduction Measures					
<p>Adopt a voluntary Energy Efficiency and Conservation Policy for commercial and residential retrofits. The calculations assume 10% of existing residential homes are retrofitted to reduce energy use by 30% per unit by 2020, and 15% of existing residential homes are retrofit for an energy savings of 30% per unit by 2030. The calculations assume 10% of existing non-residential square footage is retrofit to reduce energy use by 30% per square foot by 2020, and 15% of existing non-residential homes are retrofit for an energy savings of 30% per unit by 2030. Potential voluntary retrofit measures include light bulb replacement, increased insulation, etc.</p>	<p>Development of a Energy Efficiency and Conservation Policy.</p>	<p>Planning and Building Department</p>		X	X

Recommended Local Greenhouse Gas Reduction Measures	Implementation	Responsible City Department	Implementation Timeframe		
			2016	2020	2030
Energy Greenhouse Gas Reduction Measures					
<p>Adopt a voluntary Energy Efficiency and Conservation Policy for new constructions that would become mandatory only if necessary participation is not achieved by 2016. The program would encourage energy efficiency standards above current State energy standards. Under this option the City would adopt voluntary energy efficiency standards for new construction higher than current Title-24. The program could apply to residential and commercial. It would require new construction to exceed Title-24 energy efficiency standards by 15%, a level comparable to GreenPoint minimum requirements, Energy Star Rated Homes, and achieving the California Green Building Code Tier I performance criteria. The City calculations assume that 15% of residential projects participate through 2016 and then 100% of projects participate through 2020 (assuming that the anticipated level of is not achieved by 2016).</p>	<p>Development of an Energy Efficiency and Conservation Policy.</p>	<p>Planning and Building Department</p>	X	X	

Recommended Local Greenhouse Gas Reduction Measures	Implementation	Responsible City Department	Implementation Timeframe		
			2016	2020	2030
Energy Greenhouse Gas Reduction Measures					
Promote the California Solar Initiative’s solar water heating incentive program to subsidize the purchase of solar water heaters and replace/ recycle old water heaters in homes and commercial buildings. The City estimate assumes that solar water heaters are installed in combination with both electric and natural gas water heaters. We further assume that 40% offset electric water heaters and 60% of the systems offset natural gas water heaters.	Development of a Energy Efficiency and Conservation Policy.	Planning and Building Department		X	X
Waste Greenhouse Gas Reduction Measure					
Adopt a Waste Diversion Ordinance that would require waste diversion of 75 percent by 2020 and 90 percent by 2030. The City of San Clemente has estimated that baseline citywide waste is 50,571 tons per year with 71% of total waste diverted from landfill and/or recycled. The City is targeting a 75% diversion rate by 2020 and 90% diversion rate by 2030. This would be accomplished by adopting an ordinance that requires the contracted waste haulers to achieve and demonstrate the prescribed reduction rates.	Development of a Waste Diversion Ordinance.	Planning and Building Department		X	X

Table 4-1 Implemetation timeline

Monitoring

To ensure that San Clemente is on track to reach its reduction targets, the City staff will periodically evaluate the entire plan (with respect to 2020 and 2030 targets) and evaluate the individual strategies. This section establishes a timeline for monitoring, and grants the City the ability to make amendments to the plan as needed.

To check overall CAP progress, the City will re-inventory community-wide GHG emissions every five years for comparison against the baseline 2009 inventory. The same methodology will be used to evaluate GHG emissions in each five-year interval as was used in the baseline year. This will ensure that the future inventories are comparable to the baseline inventory.

Updating the Climate Action Plan

It is possible that future GHG inventories may find insufficient reductions have been achieved to meet CAP targets within the established timeline. In this event, the City will use results from the “monitoring” procedures described above to strategically modify the CAP measures. Similarly, the City may choose to modify the CAP in response to changes in federal or state climate policy, or to account for newly developed emissions reduction technologies.



CONCLUSION

This Climate Action Plan represents the City of San Clemente's commitment to fighting global climate change by reducing greenhouse gas emissions from both government operations and community activities. Though climate change presents a daunting challenge for people and businesses, San Clemente's actions to combat climate change represent local action that is a powerful tool in meeting this challenge.

In addition to the global benefits of climate action, the citizens of San Clemente will benefit from the public health protection and sustainable economic development afforded by the strategies adopted in the CAP. These strategies create public health benefits by reducing pollution of resources like air and water, which are two basic necessities for life with direct impacts on human health, and by reducing potential disruptions to the climate system that protect people from extreme weather events.

Finally, although the government of San Clemente is taking action against climate change, community action is critical to achieving emissions reductions goals that support physical well being and economic vitality. By building on the framework set out in this Climate Action Plan, the citizens of San Clemente have the tools to build a community that not only creates a sustainable, healthy environment for itself, but which also allows other communities around the world to enjoy the same rights.



GLOSSARY OF TERMS AND ACRONYMS

TERMS

Baseline: The baseline serves as a reference point to assess changes in greenhouse gas emission from year to year.

Business-as-Usual: A scenario used for the projection of greenhouse gas emissions at a future date based on current technologies and regulatory requirements in absence of other reductions.

Carbon Dioxide (CO₂): A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1.

Carbon Dioxide Equivalent (CO₂E): This is a common unit for combining emissions of greenhouse gases with different levels of impact on climate change. It is a measure of the impact that each gas has on climate change and is expressed in terms of the potency of carbon dioxide. For carbon dioxide itself, emissions in tons of CO₂ and tons of CO₂E are the same, whereas for nitrous oxide and methane, stronger greenhouse gases, one ton of emissions is equal to 310 tons and 21 tons of CO₂E respectively.

Chlorofluorocarbons (CFCs): A family of inert, nontoxic, and easily liquefied chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere, they drift into the upper atmosphere, where their chlorine components destroy ozone.

Climate: Climate in a narrow sense is usually defined as the "average weather," or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years. The classical period is

three decades, as defined by the World Meteorological Organization. These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system.

Climate Action Plan: A description of the measures and actions that a local government will take to reduce greenhouse gas emissions and achieve an emissions reduction target. Most plans include a description of existing and future year emissions; a reduction target; a set of measures, including performance standards that will collectively achieve the target; and a mechanism to monitor the plan and require amendment if its not achieving specified levels. Interchangeable with Greenhouse Gas Reduction Plan.

Climate Change: Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change results from: natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun; natural processes within the climate system (e.g. changes in ocean circulation); human activities that change the atmosphere's composition (e.g. through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.).

Co-Benefit: The benefits of policies that are implemented for various reasons at the same time – including climate change mitigation – acknowledging that most policies designed to address greenhouse gas mitigation also have other, often at least equally important, rationales (e.g., related to objectives of development, sustainability, and equity). The term co-impact is also used in a more generic sense to cover both the positive and negative side of the benefits.

Corporate Average Fuel Economy (CAFE): The CAFE standards were originally established by Congress



for new automobiles, and later for light trucks, in Title V of the Motor Vehicle Information and Cost Savings Act with subsequent amendments. Under CAFE, automobile manufacturers are required by law to produce vehicle fleets with a composite sales-weighted fuel efficiency, which cannot be lower than the CAFE standards in a given year. Standardized tests are used to rate the fuel economy of new vehicles.

Emissions: The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere.

Emissions Factor: A set of coefficients used to convert data provided on energy use and energy use reductions to emissions. These emission factors are the ratio of emissions of a particular pollutant (e.g., carbon dioxide) to the quantity of the fuel used (e.g., kilograms of coal). For example, when burned, 1 ton of coal = 2.071 tons of CO₂.

Forecast Year: Any future year in which predictions are made about emissions levels based on growth multipliers applied to the base year.

Global Warming: Global warming is an average increase in the temperature of the atmosphere near the Earth's surface and in the troposphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, "global warming" often refers to the warming that can occur as a result of increased emissions of greenhouse gases.

Greenhouse Effect: Trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. Some of the heat flowing back toward space from the Earth's surface is absorbed by water vapor, carbon dioxide, ozone, and several other gases in the atmosphere and then reradiated back toward the Earth's surface. If the atmospheric concentrations of these greenhouse gases rise, the average temperature of the lower atmosphere will gradually increase.

Greenhouse Gas: Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), ozone (O₃), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆).

Heating, Ventilation, and Air Conditioning (HVAC): Controls the ambient environment (temperature, humidity, air flow and air filtering) of a building and must be planned for and operated along with other data center components such as computing hardware, cabling, data storage, fire protection, physical security systems and power.

Hydrofluorocarbons (HFCs): Man-made compounds containing hydrogen, fluorine, and carbon, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products, that have a range of global warming potentials. HFCs do not have the potential to destroy stratospheric ozone, but they are still powerful greenhouse gases.

Intergovernmental Panel on Climate Change (IPCC): The IPCC was established jointly by the United Nations Environment Program and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. The IPCC draws upon hundreds of the world's expert scientists as authors and thousands as expert reviewers. Leading experts on climate change and environmental, social, and economic sciences from some 60 nations have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change and its consequences. With its capacity for reporting on climate change, its consequences, and the viability of adaptation and mitigation measures, the IPCC is also looked to as the official advisory body to the world's governments on the state of the science of the climate change issue. For example, the IPCC organized the development of internationally accepted methods



for conducting national greenhouse gas emission inventories.

Methane (CH₄): A hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 23 times that of carbon dioxide (CO₂). Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Measures: Any action taken to reduce emissions.

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

Mixed-Use: In a suburban context, a project that has at least three of the following on- or off-site within a 1/4 mile radius: residential development, retail development, park, open space, or office. Mixed-use developments should encourage walking and other non-auto modes of transport from residential to office/commercial locations (and vice versa). The project should minimize the need for external trips by including services/facilities for day care, banking/ATM, restaurants, vehicle refueling, and shopping (CAPCOA, 2010).

Natural Gas: Underground deposits of gases consisting of 50 to 90 percent methane and small amounts of heavier gaseous hydrocarbon compounds such as propane and butane.

Perfluorocarbons (PFCs): Potent greenhouse gases that accumulate in the atmosphere and remain there for thousands of years. Aluminum production and semiconductor manufacture are the largest known man-made sources of perfluorocarbons.

Sector: A term used to describe emission inventory source categories for greenhouse gases based on broad economic sectors.

Target Year: The year by which the emissions reduction target should be achieved.

Transit Oriented Development: A moderate- to high-density development located within a 5- 10 minute walk (or roughly 1/4 mile) of a major transit stop, generally with a mix of residential, employment, and shopping opportunities. TOD encourages walking, bicycling, and transit use without excluding the automobile.

Vehicle-Miles Traveled (VMT): One vehicle traveling the distance of one mile. Total vehicle miles is the aggregate mileage traveled by all vehicles. VMT is a key measure of street and highway use. Reducing VMT is often a major objective in efforts to reduce vehicular congestion and achieve air quality goals.



ACRONYMS

- AB** - Assembly Bill
- CACP** - Clean Air and Climate Protection Software
- CAP** - Climate Action Plan
- CAPPA** - Climate and Air Pollution Planning Assistant
- CARB** - California Air Resources Board
- CCAR**- The California Climate Action Registry
- CEC** - California Energy Commission
- CEQA** - California Environmental Equality Act
- CH4** - Methane
- CO2** - Carbon dioxide
- CO2E** - Carbon dioxide equivalent
- EPA** - U.S. Environmental Protection Agency
- GHG** - Greenhouse gas
- HFC** - Hydrofluorocarbons
- HVAC** - Heating, ventilating, and air conditioning
- IPCC** - Intergovernmental Panel on Climate Change
- KWh** - Kilowatt hours
- LCFS** - Low Carbon Fuel Standard
- MPG - Miles per gallon
- MMT** - Million metric tons
- N2O** - Nitrous oxide
- PPM** - Parts per million
- SCAG** - Southern California Association of Governments
- SCAQMD** - South Coast Air Quality Management District

- SB** - Senate Bill
- TOD** - Transit oriented development
- UNFCCC** - United Nations Framework Convention on Climate Change
- USGBC** - U.S. Green Building Council
- VMT** - Vehicle miles traveled

Global Warming Potential and CO2E

The global warming potential of a greenhouse gas is the potential of a gas or aerosol to trap heat in the atmosphere. Because greenhouse gases absorb different amounts of heat, a common reference gas (CO2) is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as “CO2 equivalent,” and is the amount of greenhouse gases emitted multiplied by its global warming potential. In this report CO2 equivalent is measured in metric tons (CO2E). Carbon dioxide has a global warming potential of one. By contrast, methane (CH4) has a global warming potential of 21, meaning its global warming effect is 21 times greater than carbon dioxide on a molecule per molecule basis.

List of Contributors

Krout & Associates, in collaboration with Healthy Buildings, Fehr and Peers, and AECOM, prepared this Climate Action Plan under contract to the City of San Clemente. Persons involved in research, analysis, report preparation, project management, and quality control include:

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