CITY OF BELLFLOWER

RESOLUTION NO. 12-67

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BELLFLOWER ADOPTING THE CITY OF BELLFLOWER CLIMATE ACTION PLAN (CAP)

WHEREAS, the City Council of the City of Bellflower completed a Climate Action Plan (CAP); and

WHEREAS, the State of California has enacted Assembly Bill 32, officially called the Global Warming Solutions Act of 2006 ("Act"), which institutes a mandatory limit on greenhouse gas (GHG) pollution and requires a reduction in emissions in California to 1990 levels by the year 2020 and also directs the California Air Resources Board (CARB) to establish a mandatory reporting system to track and monitor emission levels, and requires CARB to develop various compliance options and enforcement mechanisms; and

WHEREAS, in December 2008, CARB adopted a "Climate Change Scoping Plan" that outlines the actions required for California to reach its 2020 reduction target; and

WHEREAS, Executive Order S-3-05 proclaims California is vulnerable to the effects of climate change, including reduced snowpack in the Sierra Nevada, exacerbation of California's existing air quality problems, and sea level rise; and establishes targets for reducing GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050; and

WHEREAS, the City has completed a baseline Greenhouse Gas Emissions Inventory Report that determined the City of Bellflower generated approximately 339,985 metric tons of carbon dioxide equivalent in 2005; and

WHEREAS, on September 14, 2009, the City of Bellflower was awarded an Energy Efficiency Community Block Grant, in the amount of $135,152, funded by the Department of Energy for the purpose of completing a Climate Action Plan; and

WHEREAS, the City, with the assistance of a climate consultant, has completed a one-year process of collecting and analyzing data about Bellflower and preparing a Climate Action Plan with the goal of reducing the City's GHG emissions by 15% below 2010 baseline emissions by 2020, in accordance with the current CARB guidance for local governments; and

WHEREAS, the proposed CAP includes numerous policies, strategies, and measures for the protection of the environment including reduction of greenhouse gas emissions; and

WHEREAS, an environmental assessment has been conducted for this project in compliance with the California Environmental Quality Act (CEQA) and, in accordance with the provisions of CEQA, an Initial Study has been prepared and determined that the CAP will not have a significant effect on the environment; and

WHEREAS, the City prepared a Negative Declaration for the CAP and delivered copies of the Initial Study-Negative Declaration to the State Clearinghouse, the Los Angeles County Recorder's Office, and other interested parties and agencies on October 29, 2012; and

WHEREAS, the City received comments on the Initial Study from the Los Angeles County Fire Department on November 14, 2012, and the South Coast Air Quality Management District on November 21, 2012; and

WHEREAS, the City issued "Responses to Comments" on November 30, 2012; and

WHEREAS, a public meeting was held before the City Council on October 8, 2012, to present the CAP and to receive comments by the City Council and public, and all comments that were received have been addressed in the CAP; and

WHEREAS, a Public Hearing was held before the City Council on December 10, 2012, at which the City Council considered written and oral testimony regarding the Negative Declaration and the Climate Action Plan; and

WHEREAS, notice of the Public Hearing before the City Council was duly given and posted in the time, form, and manner as required by law.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BELLFLOWER AS FOLLOWS:

SECTION 1. The City Council does hereby find, determine, and declare:

A. An Initial Study (IS) and Negative Declaration (ND) of Environmental Impact were prepared for the Climate Action Plan, in accordance with the provisions of the California Environmental Quality Act (CEQA), State CEQA Guidelines, and the City of Bellflower's Procedures for Implementing CEQA.

B. The Initial Study (IS) and Negative Declaration (ND) were made available to the public for review and comment from October 29, 2012, to, and including, November 19, 2012.

C. A duly noticed Public Hearing was held by the City Council on December 10, 2012, at which time evidence was heard on the Initial Study (IS) and Negative Declaration (ND). At the hearing, the City Council fully reviewed and carefully considered the Initial Study (IS) and Negative Declaration (ND), together with any comments received during the public review period and at the Public Hearing.

SECTION 2. Based upon the above findings and determinations, the Climate Action Plan is approved as presented.

SECTION 3. The Mayor, or presiding officer, is hereby authorized to affix his signature to this Resolution signifying its adoption by the City Council of the City of Bellflower, and the City Clerk, or her duly appointed deputy, is directed to attest thereto.

PASSED, APPROVED, AND ADOPTED BY THE CITY COUNCIL OF THE CITY OF BELLFLOWER THIS 10th DAY OF DECEMBER 2012.

Dan Koops

Dan Koops, Mayor

Attest:

Debra D. Bauchop

Debra D. Bauchop, City Clerk

STATE OF CALIFORNIA)
COUNTY OF LOS ANGELES)SS
CITY OF BELLFLOWER)

I, **Debra D. Bauchop,** City Clerk of the City of Bellflower, California, do hereby certify under penalty of perjury that the foregoing Resolution No. 12-67 was duly passed, approved, and adopted by the City Council of the City of Bellflower at its Regular Meeting of December 10, 2012, by the following vote to wit:

AYES: Council Members - Dunton, Larsen, Santa Ines, and Mayor Koops
VACANT: Council Member - One Seat

Dated: December 11, 2012

Debra D. Bauchop, City Clerk
City of Bellflower, California

(SEAL)

BELLFLOWER CLIMATE ACTION PLAN

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The City of Bellflower Climate Action Plan (CAP) is a roadmap for achieving community-wide energy and greenhouse gas emissions reductions that encourages the City to grow smarter and more sustainably. The CAP:

- Inventories 2010 greenhouse gas emissions to identify and understand the sources and quantities of emissions within the City.
- Develops greenhouse gas emissions reduction strategies and measures to reduce Bellflower's emissions in order to meet voluntary statewide emissions targets outlined in the California Climate Action Scoping Plan and Executive Order S-03-05.
- Outlines an approach for Bellflower to continually monitor progress towards greenhouse gas emissions targets and the effectiveness of greenhouse gas reduction measures.
- Establishes a 2020 emissions reduction target of 17% and a 2030 emissions reduction goal of 19%.
- Serves as a tiering document for the streamlined review of project-level GHG emissions under California Environmental Quality Act within the City.

GREENHOUSE GAS EMISSIONS INVENTORIES

The Bellflower Greenhouse Gas Inventory provides a snapshot of emissions for 2010. It quantifies the main sources of emissions from municipal operations and the community as a whole, accounting for direct emissions from the on-site combustion of fuels and the combustion of fuel in vehicles. It also estimates indirect emissions associated with community electricity consumption and emissions from solid waste generated and water consumed in Bellflower. The inventory also includes a business-as-usual forecast (BAU) of greenhouse gas emissions in 2020 and 2030. The BAU forecast estimates how projected trends in energy use, driving habits, population growth, and employment expansion will affect future emissions, providing a worst-case scenario for emissions growth. Table 1 shows the baseline emissions in 2010 and the BAU forecast for 2020 and 2030.

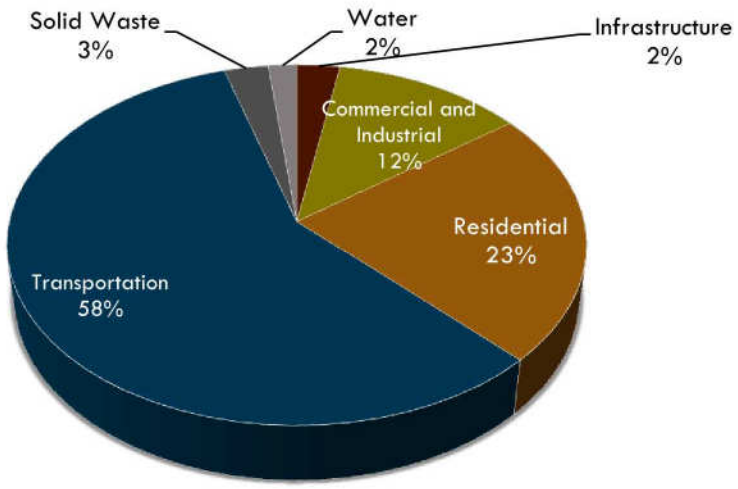
TABLE 1 : SUMMARY OF COMMUNITY-WIDE EMISSIONS BY SECTOR FOR EXISTING AND PROJECTED GREENHOUSE GAS EMISSIONS

	2010	2020	2030
COMMUNITY-WIDE GREENHOUSE GAS EMISSIONS			
Transportation	196,721	206,830	217,237
Commercial & Industrial	40,925	44,162	47,660
Residential	77,493	85,767	95,158
Infrastructure	9,253	9,290	9,290
Solid Waste	9,498	9,697	10,076
Water	6,094	6,701	7,253
Total Emissions	**339,985**	**362,446**	**386,674**
POPULATION, EMPLOYMENT, AND PER CAPITA AND PER SERVICE AREAS EMISSIONS[1]			
Population	76,616	76,600	79,733
Employment	14,926	16,900	17,567
Service Area Population (pop + emp)	91,542	93,500	97,300
Emissions per Capita (MT CO_2e/Pop)	**4.44**	**4.73**	**4.85**
Emissions per Service Population (MT CO_2e/SP)	**3.71**	**3.88**	**3.97**

[1]Future population and employment is based on the Southern California Association of Government's regional growth forecast for 2012.

In 2010, total greenhouse gas emissions in Bellflower were 339,985 metric tons of carbon dioxide equivalent (MT CO_2e), 4.44 MT CO_2e per capita, or 3.71 MT CO_2e per service population.[1] The transportation sector emitted 58% of Bellflower's greenhouse gas emissions, the largest quantity of any sector. The residential sector was the second largest producer of greenhouse gases, contributing 23% of the community total. The remainder of the emissions came from the commercial and industrial (12%), infrastructure (2%), solid waste (3%), and water (2%) sectors.

FIGURE 1: COMMUNITY-WIDE GREENHOUSE GAS EMISSIONS BY SECTOR



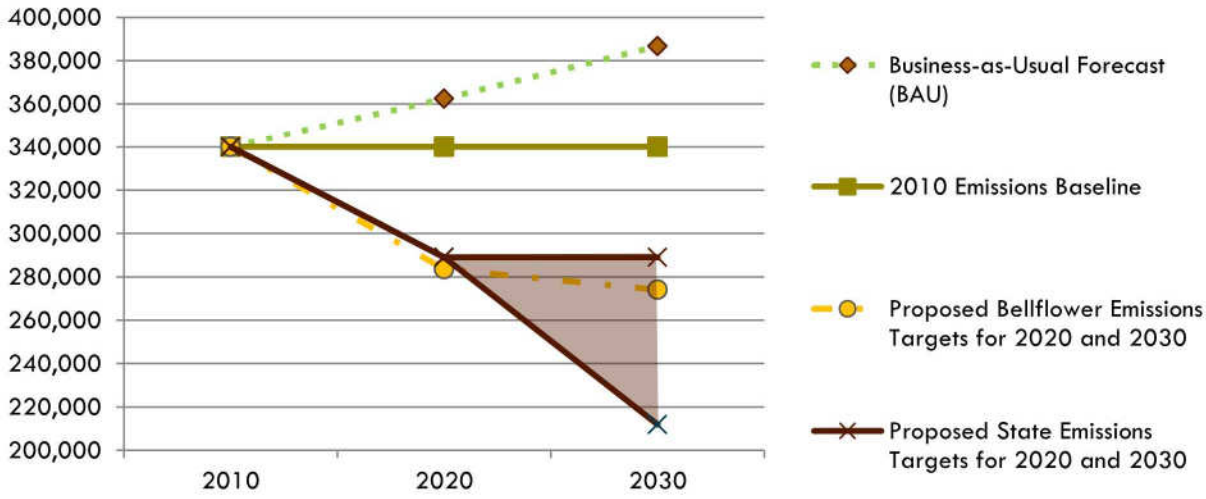
[1] Service population is defined as population (residents) plus employment (jobs).

Emissions are expected to rise significantly under a BAU forecast. Bellflower's greenhouse gas emissions are projected to increase from 339,985 MT CO_2e of emissions in 2010 to 386,674 MT CO_2e of emissions in 2030, a 14% increase. Per capita emissions are expected to rise to 4.85 MT CO_2e and per service population emissions are expected to increase to 3.97 MT CO_2e.

GREENHOUSE GAS EMISSION REDUCTION TARGET

The City of Bellflower proposes to set a greenhouse gas emissions reduction target of 17% below current levels by 2020 and an emissions reduction goal of 19% by 2030. The 2020 target is related to the recommendation of the California Air Resources Board and the California Climate Change Scoping Plan, which suggests local governments establish a 15% reduction below 2005 levels.[2] This target places the City on a pathway towards California's long-term emissions reduction target, which is an ambitious goal to reduce greenhouse emissions by 80% below 1990 levels in 2050.[3] The City anticipates the need to continue reducing emissions beyond 2020, but also recognizes that additional state and federal actions will be needed to achieve an 80% target by 2050. As such, Bellflower proposes to establish a goal to reduce emissions 19% below current levels by 2020 and considers that the state could seek to codify reductions of up to 38% by 2030.[4] Figure 2 shows the proposed state and City greenhouse gas emissions reduction targets for 2020 and 2030.

FIGURE 2: BELLFLOWER'S PROJECTED EMISSIONS, PROPOSED STATE TARGETS, AND BELLFLOWER'S PROPOSED TARGETS



The City of Bellflower baseline inventory established that 2010 emissions totaled 339,985 MT CO_2e. Population growth, increased per capita energy use, and a rebounding economy are expected to increase city-wide emissions to 362,446 MT CO_2e in 2020, an overall increase of 7%. As shown in Table 2, to achieve the 17% reduction target from the 2010 baseline, the City would need to develop and implement strategies that reduce emissions by 78,896 MT CO_2e in 2020. Given projected trends,

[2] California Air Resources Board. 2008. *Climate Change Scoping Plan*. Retrieved from http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm

[3] Governor of the State of California. 2005. *Executive Order S-3-05*. Retrieved from http://www.dot.ca.gov/hq/energy/ExecOrderS-3-05.htm

[4] Thirty-eight percent represents a straight line calculation between the state's recommendation to reduce emissions 15% by 2020 and 80% below 1990 levels by 2050.

this reduction lowers 2020 emissions to approximately 22% below 2020 business-as-usual levels (levels anticipated for 2020 in the absence of any local, state, or federal interventions).

TABLE 2: GREENHOUSE GAS REDUCTIONS AND PROPOSED STATE TARGETS

	2020 $MTCO_2E$	2020 $MTCO_2E$/SP	2030 $MTCO_2E$	2030 $MTCO_2E$/SP
PROPOSED STATE TARGETS				
Projected BAU Emissions	362,446	3.88	386,674	3.97
Proposed State Greenhouse Gas Emissions Targets (15% by 2020 and 80% by 2050)	288,987	3.09	211,924	2.18
Reduction From BAU Required to Meet State Target	**-73,459**	**-0.79**	**-174,750**	**-1.80**
PROPOSED BELLFLOWER TARGETS				
Proposed City Greenhouse Gas Emissions Targets (17% by 2020 and 19% by 2030)	283,550	3.03	274,108	2.82
Reduction From BAU Required to Meet City Target	**-78,896**	**-0.84**	**-112,566**	**-1.16**

CLIMATE ACTION STRATEGIES

To address to the challenge of climate change, Bellflower proposes three greenhouse gas reduction strategies for the City of Bellflower that are applicable to every sector within the City. These strategies contain actions that are a proven, affordable set of measures based on existing technologies. This strategic framework will provide the City with an efficient and cost-effective pathway for implementing emissions reduction policies. The CAP also includes a fourth strategy to help the City begin to prepare for the potential impacts of climate change.

BUILDINGS

Residential and non-residential buildings produce approximately 42% of Bellflower's emissions and are a primary target for the CAP. This strategy facilities energy efficiency in homes and businesses, clean energy generation, lower water consumption, and reduced waste generation, and includes federal and state actions to reduce emssions.

The combination of state and local greenhouse gas emissions reduction strategies are expected to reduce emissions by 24,415 MT CO_2e per year (0.26 MT CO_2e per service population) in 2020 and 33,564 MT CO_2e per year in 2030 (0.34 MT CO_2e per service population).

URBAN FORM AND MOBILITY

Fifty-eight percent of Bellflower's greenhouse gas emissions are attributed to the transportation sector. The urban form and mobility strategy covers a broad range of activities that aim to reduce vehicle miles travelled, improve mobility, and enhance vehicle fuel efficiency. Specific implementation measures involve changing land uses, adopting a new perspective on community design, and promoting non-automobile modes of travel.

State, regional, and local strategies are projected to reduce emissions by 54,453 MT CO_2e per year (0.58 MT CO_2e per service population) in 2020 and 79,020 MT CO_2e (0.81 MT CO_2e per service population) in 2030.

GOVERNMENT OPERATIONS

The City of Bellflower has taken steps to reduce energy and water use, lower vehicle fuel consumption, minimize employee commuting, and diverting solid waste from landfills. This strategy builds on previous projects by continuing energy and water conservation efforts.

Actions to reduce greenhouse gas emissions in Bellflower's operations are expected to reduce emissions by 252 MT CO_2e per year in 2020 and 260 MT CO_2e by 2030.

PREPARING FOR CLIMATE CHANGE

Adaptive actions describe a pathway for the Bellflower to minimize the potential consequences of climate change. Many of these actions overlap with greenhouse gas mitigation measures.

GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

Through a combination of proposed federal, state, and city-level actions, Bellflower can anticipate emissions reductions of 79,120 MT CO_2e per year from the business-as-usual scenario in 2020. State-level actions, such as the Pavley Clean Cars legislation, the Low Carbon Fuel Standard, the Renewables Portfolio Standard, and Title 24 upgrades are expected to reduce emissions by 70,416 MT CO_2e per year by 2020. Local measures are projected to reduce emissions by 8,588 MT CO_2e. This combination of state and local action would place the City 17% below 2010 emission levels in 2020, meeting the City's proposed 2020 greenhouse gas emissions reduction target. Table 3 shows the emissions reduction by strategy in 2020.

TABLE 3 : GREENHOUSE GAS REDUCTION TARGET ANALYSIS

	2020 REDUCTION POTENTIAL $MTCO_2E$	2020 REDUCTION POTENTIAL ($MTCO_2E$/SP)	2030 REDUCTION POTENTIAL $MTCO_2E$	2030 REDUCTION POTENTIAL ($MTCO_2E$/SP)
BUILDING STRATEGIES				
Energy Production	23,423		30,364	
Energy Conservation	843		2,863	
Water Conservation	130		279	
Solid Waste	19		58	
Total Reductions from Building Strategies	**24,415**	**0.26**	**33,564**	**0.34**
URBAN FORM AND MOBILITY STRATEGIES				
Urban Form	3,199		6,230	
Mobility	51,254		72,790	
Reductions from Urban Form and Mobility Strategies	**54,453**	**0.58**	**79,020**	**0.81**
GOVERNMENT OPERATIONS				
Reductions from Government Operations Strategies	**252**	**0.003**	**260**	**0.003**
ALL STRATEGIES				
Total Greenhouse Gas Emissions Reductions	79,120	0.85	112,843	1.16
Adjusted BAU with CAP Measures	283,550	3.03	274,108	2.82

IMPLEMENTATION

In order for the City to meet its low carbon goals, the implementation section provides guidance for City actions and programs that will help mitigate municipal and community-wide greenhouse gas emissions and prepare for adaptation to a changing climate. Each measure includes information about the relative cost of the measure, the department responsible for each the measure, and the implementation time frame.

Along with specific measures for the City, Bellflower proposes establishing a framework for evaluating and mitigating greenhouse gas emissions that could result from new development. It includes a development review process and a checklist of mitigation measures for non-conforming projects.

1 | INTRODUCTION

In the next century, climate change will not only impact our natural environment, but also threaten the health and economic vitality of communities across the California and the country. The extent to which society is impacted by climate change is dependent on our actions today. By curbing greenhouse gas emissions and adapting our communities to the already changing environment, we can significantly reduce the damages incurred from climate change. Local governments in particular are in a unique position to become climate leaders by initiating city-wide policies, incentives, and education programs to deploy the energy technologies that we already have to run our economy cleanly and efficiently.

Recognizing the important role that cities will play in the transition to a low-carbon economy, Bellflower has prepared this Climate Action Plan (CAP) as a roadmap for achieving community-wide energy and greenhouse gas emissions reductions. Bellflower's CAP is a proactive step toward addressing the climate challenge to protect our children and grandchildren before climate change becomes irreversible. The CAP includes a quantitative inventory and analysis of emissions and energy usage, starting with the established 2010 baseline year through to a projection of emissions for 2020 and 2030.

Bellflowers' CAP is designed to provide clear policy guidance to the City staff and decision-makers on how to reduce greenhouse gas emissions. It identifies a pathway to reduce emissions within a range of voluntary, state-level emissions reduction targets. This path includes strategies for improving connectivity and land use patterns, transportation modes and systems, incorporating energy efficiency standards, increasing the City's renewable energy supply, and devising adaptation measures.

The Relationship between Energy and Climate

Energy is used for heating and cooling, transportation, manufacturing, and producing food, and the most common sources of energy are fossil fuels like oil, gas, natural gas, and coal. Fossil fuels are burned or oxidized to create energy, and this burning releases waste gases, which includes everything from tailpipe emissions from cars to smoke rising from a chimney.

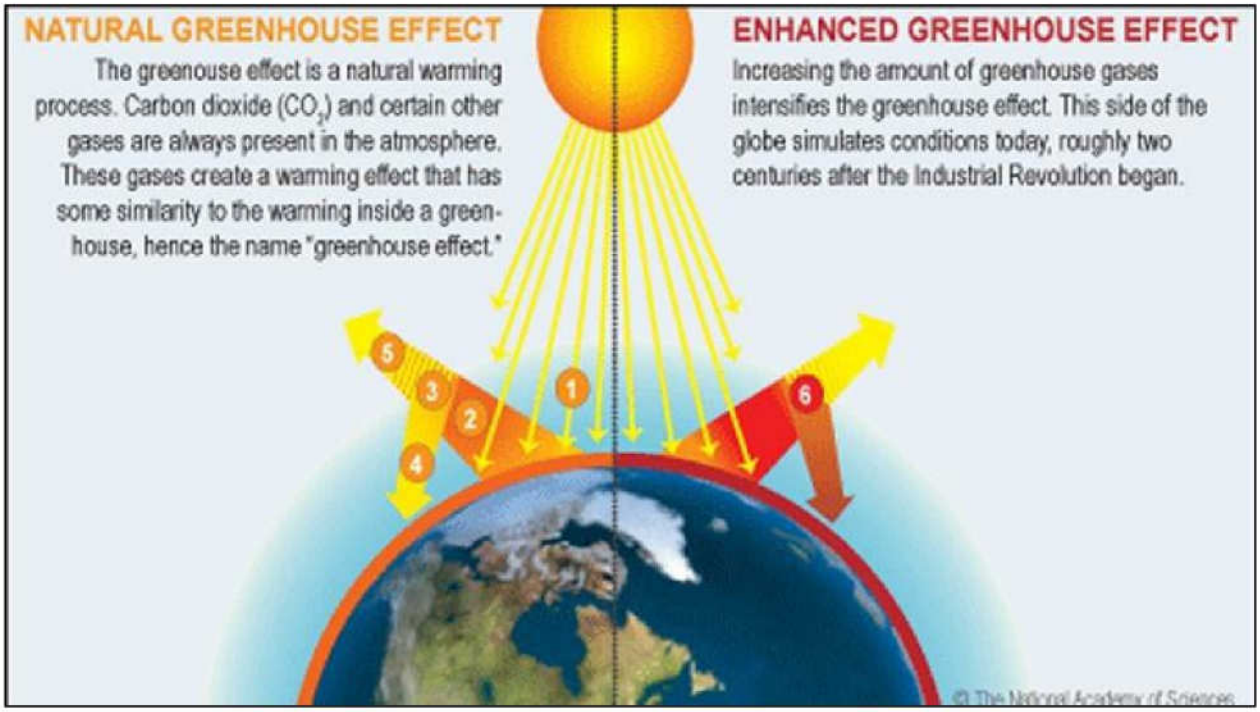
One of the waste gases produced is carbon dioxide, CO_2, a key contributor to the greenhouse effect and global warming (see page 2 for more information). Globally, the use of fossil fuels to produce energy is the main source of greenhouse gas emissions from human activities, contributing two-thirds of the total greenhouse gas emissions. Several categories of reducing energy-related greenhouse gas emissions are explored in the Bellflower CAP, including improving energy efficiency, switching to emission-free and less carbon intensive sources of energy, and capturing and storing emissions.

WHAT IS CLIMATE CHANGE?

During the past several decades, an extensive and scrutinized body of scientific evidence has demonstrated that human activity is altering the Earth's climate by increasing the concentration of greenhouse gases in the atmosphere. While there will always be some uncertainty in understanding a system as complex as Earth, the scientific evidence has been carefully examined and withstood serious evaluation and debate. As a result of this inquiry, there is a recognition that climate change poses significant risks for, and may already be affecting, human and natural systems, including coastal infrastructure, human health, energy sources, agriculture, and freshwater resources.[5]

Greenhouse gases, such as carbon dioxide, ozone, methane, and nitrous oxide, have always been present in the Earth's atmosphere, keeping surface temperatures warm enough to sustain human, plant, and animal life. Greenhouse gases absorb heat radiated from the Earth's surface and then radiate the energy back toward the surface, a process called the "greenhouse effect," which is shown in Figure 3. Without the greenhouse effect, it is estimated that the Earth's average surface temperature would be approximately 60°F colder.

FIGURE 3: THE GREENHOUSE EFFECT



Light passes through the atmosphere without being absorbed, and some of the light strikes the Earth (1) and is absorbed and converted to heat. The Earth's surface (2) emits heat to the atmosphere, where some of it (3) is absorbed by greenhouse gases and (4) re-emitted toward the surface; some of the heat is not trapped by greenhouse gases and (5) escapes into space. Human activities that emit additional greenhouse gases to the atmosphere (6) increase the amount of heat that gets absorbed before escaping to space, thus enhancing the greenhouse effect and amplifying the warming of the earth." Adapted by the Pew Center on Global Climate Change from The National Academy of Sciences).[6]

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[5] National Research Council, 2010. *Advancing the Science of Climate Change*. Washington, DC: The National Academies Press.

[6] Pew Center on Global Climate Change, 2011. *Climate Change 101: Science and Impacts.*

Human activities, such as the combustion of fossil fuels, industrial processes, and land use changes, have increased the amount of greenhouse gases in the atmosphere, intensified the greenhouse effect, and caused changes to the Earth's climate. Since the Industrial Revolution, greenhouse gas concentrations have risen 40% in the Earth's atmosphere and are at a level unequaled during the last 800,000 years.

The six most important greenhouse gases are carbon dioxide, methane, nitrous oxide (N_2O), sulfur hexafluoride, hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).[7] These gases are regulated under the Kyoto Protocol. Since carbon dioxide is the most abundant of these greenhouse gases, greenhouse gas emissions are converted to metric tons of carbon dioxide equivalent (CO_2e) units. Each greenhouse gas has a different potential for trapping heat in the Earth's atmosphere, which is called the global warming potential (see in Table 4). Gases such as methane and nitrous oxide are more potent than carbon dioxide at trapping heat and have higher global warming potential. For instance, methane has twenty-one times more heat trapping potential than carbon dioxide does.

TABLE 4 : GREENHOUSE GASES[8]

GAS	ACTIVITY	ATMOSPHERIC LIFETIME (YEARS)	GLOBAL WARMING POTENTIAL
Carbon Dioxide	Combustion	50 - 200	1
Methane	Combustion, Anaerobic Decomposition of Organic Waste (Landfills, Wastewater), Fuel Handling	12	21
Nitrous Oxide	Combustion, Wastewater Treatment	120	310
HFC-23	Leaked Refrigerants, Fire Suppressants	264	11,700
HFC-134a	Leaked Refrigerants, Fire Suppressants	14.6	1,300
HFC-152a	Leaked Refrigerants, Fire Suppressants	1.5	140
PFC: Tetrafluoromethane (CF_4)	Aluminum Production, Semiconductor Manufacturing, HVAC equipment,	50,000	6,500
PFC: Hexafluoroethane (C_2F_6)	Aluminum Production, Semiconductor Manufacturing, HVAC equipment,	10,000	9,200
Sulfur Hexafluoride	Transmission and Distribution of Power	3,200	23,900

Higher concentrations of greenhouse gases trap additional energy in the atmosphere, resulting in more rapid warming. The warming of the climate system can currently be observed in increases in global average air and ocean temperatures, melting of snow and ice, and rising sea levels. During the last century, the global average temperature rose 1.4°F with significant variation across the planet.[9] In California, average temperatures rose 2.1°F between 1915 and 2000.

Although climate change and global warming are often used interchangeably, warmer temperatures are only one component of climate change. Climate is an average of weather over time, and weather includes temperature, rainfall, winds, flooding, heat waves, and other seasonal patterns. A simple way to

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[7] California Health & Safety Code § 38505(g) recognizes the six listed gases as greenhouse gases.
[8] California Air Resources Board, et al. 2010. *Local Government Operations Protocol: For the quantification and reporting of greenhouse gas emission inventories*. Version 1.1.
[9] Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson (eds.), 2009. *Global Climate Change Impacts in the United States*. Cambridge University Press.

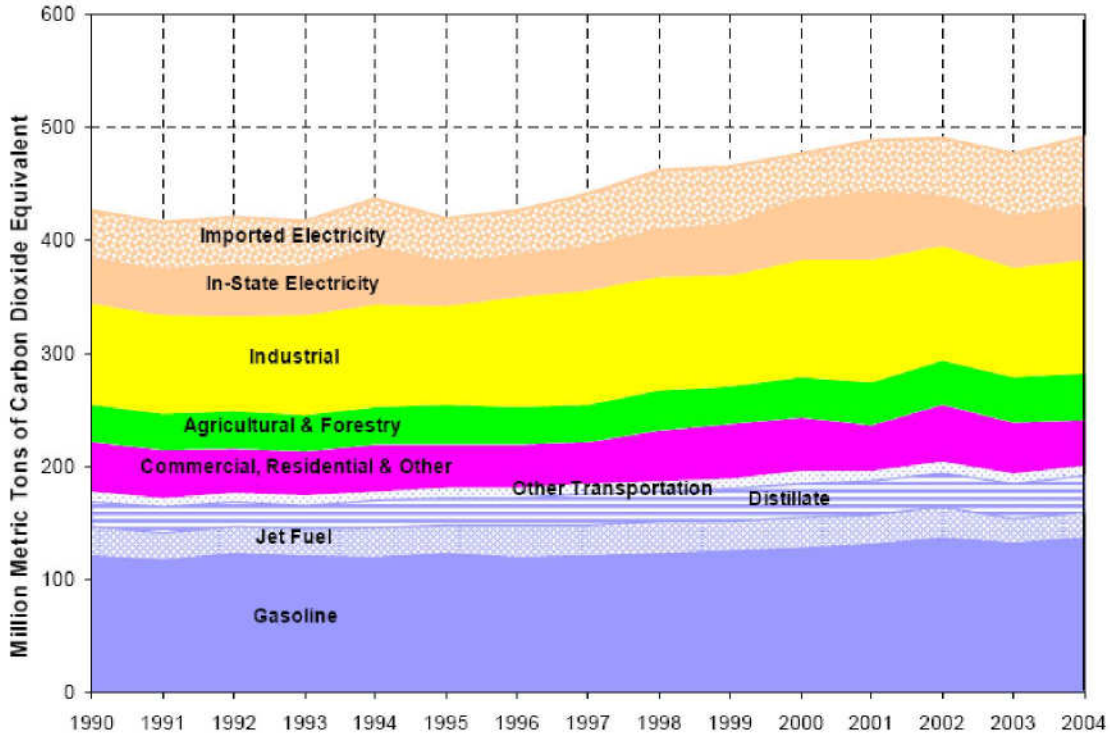
remember the difference between weather and climate is: weather affects whether you bring an umbrella today, and climate influences whether you own an umbrella.[10]

Climate change describes the long-term shift in global and regional weather patterns. This includes average annual temperatures *and* the timing and amount of local precipitation, the frequency and intensity of extreme weather events, sea level changes, and other aspects of weather. Depending on the extent of these changes, climate change may result in significant social, economic, and environmental consequences for residents and businesses in Bellflower.

CALIFORNIA'S CONTRIBUTION TO CLIMATE CHANGE

California contributes significantly to anthropogenic greenhouse gas emissions. As reported by the California Energy Commission (CEC), California contributes 1.4% of global and 6.2% of national greenhouse gas emissions.[11] As shown, the transportation sector is the largest source of California's emissions, responsible for 41% of the State's total emissions.

FIGURE 4: CALIFORNIA'S GROSS GREENHOUSE GAS EMISSIONS TRENDS[12]



[10] Pew Center on Global Climate Change. 2011. *Climate Change 101: Science and Impacts.*

[11] California Energy Commission. 2006. *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004.* Source: California Air Resources Board (ARB), 2007. Draft California Greenhouse Inventory by IPCC Category. Available at http://www.arb.ca.gov/cc/ccei/inventory/tables/rpt_inventory_ipcc_sum_2007-11- 19.pdf

[12] California Energy Commission. 2006. *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004*. Source: California Air Resources Board (ARB), 2007. Draft California Greenhouse Inventory by IPCC Category. Available at http://www.arb.ca.gov/cc/ccei/inventory/tables/rpt_inventory_ipcc_sum_2007-11- 19.pdf

PROJECTIONS OF FUTURE CLIMATE

In California, studies predict that conditions will become hotter and drier, with decreased snow levels and accelerating rates of sea-level rise.[13] California should also expect an increase in the intensity of extreme weather events, such as heat waves, droughts, and floods. California's extreme warm temperatures, which have historically occurred in July and August, will most likely extend into June and September.[14] Bellflower will likely experience very similar impacts.

TEMPERATURE

It is expected that temperatures will continue to increase across the globe and within California. Scientists predict that over the next century, global temperatures will increase between 2.5°F and 10.4°F, depending upon the amount of future emissions and how the earth responds to those emissions.[15] For California, the average annual temperature is expected to rise 1.8°F to 5.4°F by 2050 and 3.6°F to 9°F by the end of the century.[16] For the Bellflower area, scientists expect average temperatures to increase between 3.6°F and 6.1°F as shown in Figure 5.[17] Along with changes to average annual temperature, climate change is expected to alter seasonal temperatures. Average July temperatures could increase by as much as 7°F.[18]

CLIMATE CHANGE MODELING, DOWNSCALING, AND SCENARIOS

Scientists' understanding of the fundamental processes responsible for global climate change has improved over the past decade, and predictive capabilities are advancing. Scientists use atmosphere-ocean general circulation models to simulate the physical processes in the atmosphere, ocean, and land surface, using general circulation models to understand the response of the global climate system to rising greenhouse gas concentrations. These models produce information about temperature, precipitation, cloud cover, humidity, and other variables at a large-scale. These global models, however, produce data that are not precise at the regional and local scale. Therefore, scientists "downscale" model data by incorporating local historic data and adjusting for specific topographic characteristics to understand how climate variables will change in the future.

General circulation models use scenarios that explore future development and greenhouse gas emissions. These scenarios are grouped into families according to a similar storyline that describe the factors driving greenhouse gas emissions. These factors include population growth, technological dispersion, energy sources, ecological factors, and economic growth.

In general, more than one scenario is used to capture the range of future greenhouse gas emissions and uncertainty in the assumptions about population growth, economic development, and technological deployment. This report uses A2 (higher emissions) and B1 (lower emissions) scenario data in the following discussion. It should be noted that these are not the highest or lowest emissions scenarios.

[13] Moser, Susanne, Guido Franco, Sarah Pittiglio, Wendy Chou and Dan Cayan. 2008. The Future is Now: An Update on Climate Change Science Impacts and Response Options for California. 2008 Climate Change Impacts Assessment Project – Second Biennial Science Report to the California Climate Action Team, CEC-500-2008-071.

[14] California Climate Action Team. 2009. *Draft Biennial Climate Action Report*. Available at http://www.energy.ca.gov/2009publications/CAT-1000-2009-003/CAT-1000-2009-003-D.PDF.

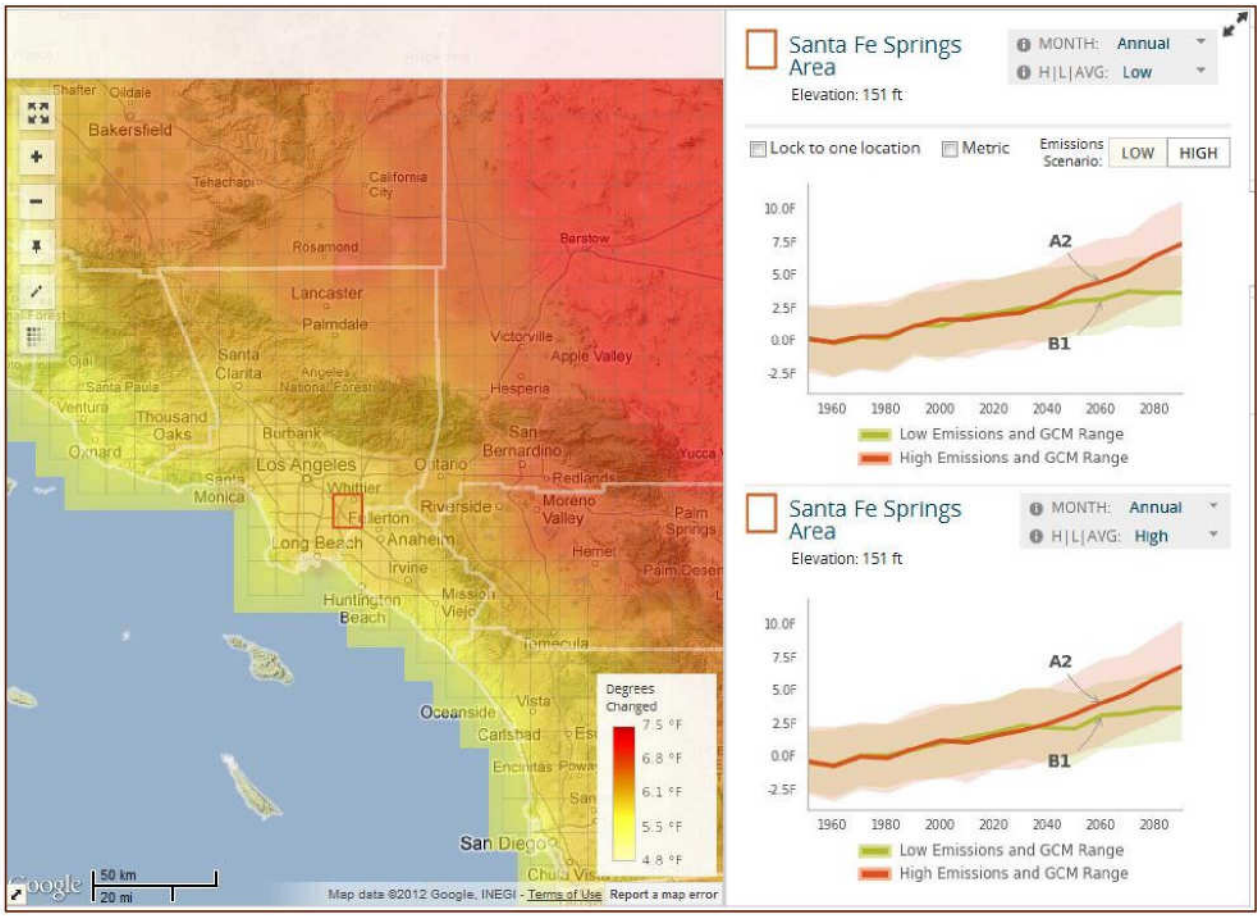
[15] Intergovernmental Panel on Climate Change, 2007. *Climate Change 2007: Mitigation of Climate Change*.

[16] California Natural Resources Agency, 2009. *California Climate Adaptation Strategy*.

[17] Scripps Institution of Oceanography. 2009. *Projected Temperatures Data Set*. Received from http://cal-adapt.org/temperature/century/.

[18] Scripps Institution of Oceanography. 2009. Projected Temperatures Data Set. Received from http://cal-adapt.org/temperature/century/.

FIGURE 5: TEMPERATURE: DEGREES OF CHANGE MAP[19]



These long-term temperature increases will be experienced along with short-term variation (daily, annual, and multi-year) in temperature related to Earth system changes such as El Niño, La Niña, or volcanic eruptions. As a result, temperatures for a single day or year may be higher or lower than the long-term average.[20]

PRECIPITATION

Research suggests that in California climate change is likely to decrease annual precipitation by more than 15% by the end of the 21st century.[21] In Bellflower, precipitation is expected to decline over the next century, falling from around twelve inches per year to approximately ten inches per year as shown in Figure 6. Seasonal precipitation will change more significantly with March and April receiving less rainfall than in the past. As a result of the seasonal change, Bellflower will likely experience longer periods of drought, as the summer dry season extends earlier into the spring and later into the fall.[22]

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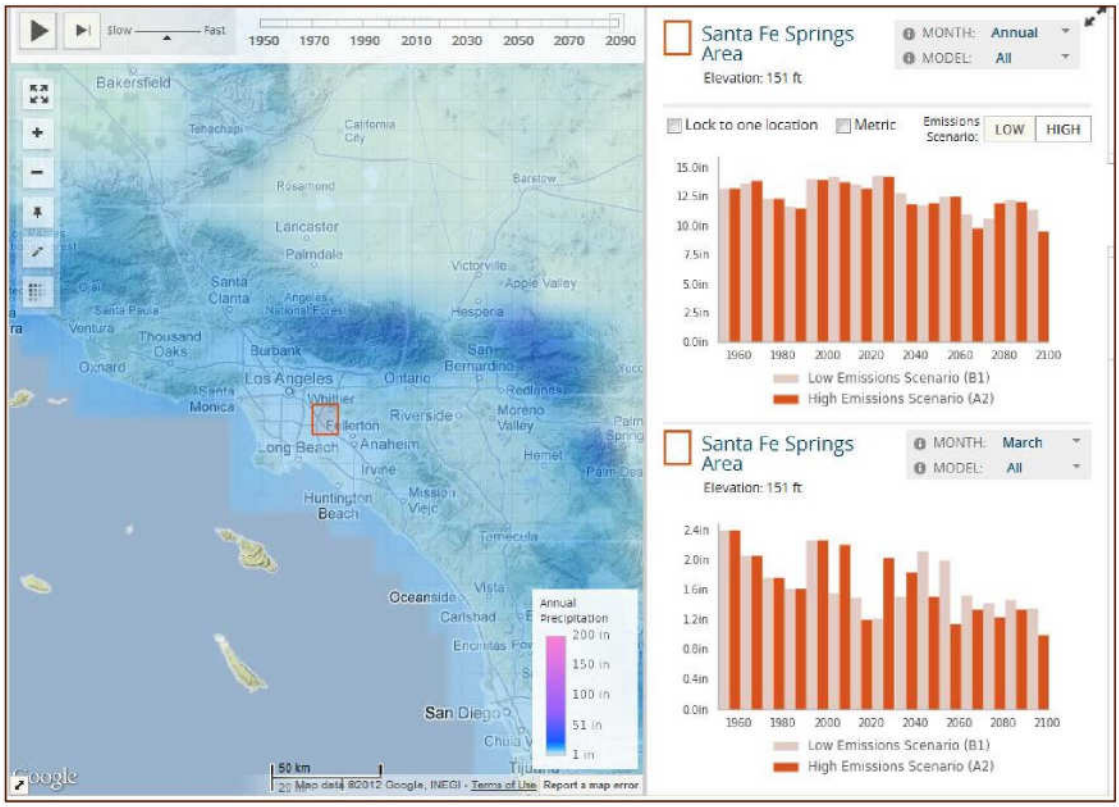
[19] Scripps Institution of Oceanography. 2009. Projected Temperatures Data Set. Received from http://cal-adapt.org/temperature/century/.

[20] National Aeronautics and Space Administration. 2005. What's the difference between weather and climate? Retrieved from http://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html.

[21] California Climate Action Team. 2009. *Draft Biennial Climate Action Report*. Available at http://www.energy.ca.gov/2009publications/CAT-1000-2009-003/CAT-1000-2009-003-D.PDF.

[22] Scripps Institution of Oceanography. 2009. Projected Precipitation Data Set. Received from http://cal-adapt.org/precip/decadal/.

FIGURE 6: PRECIPITATION: DECADAL AVERAGES MAP[23]



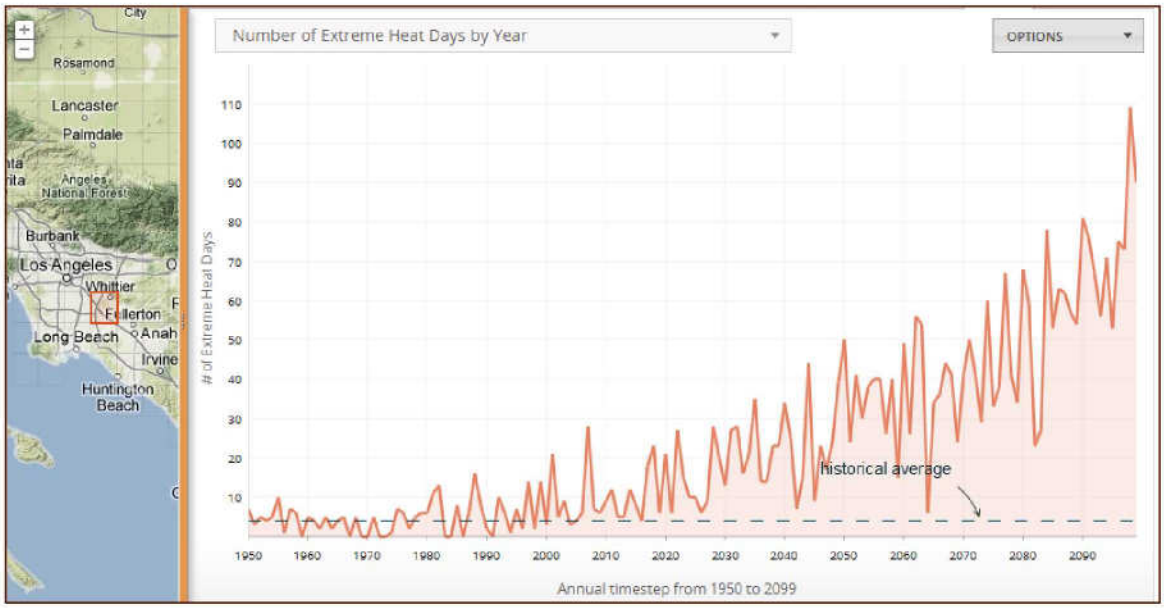
EXTREME EVENTS AND STORMS

California will likely experience changes in heat waves, storms, and extreme weather events due to climate change. For example, heat waves are likely to become more frequent by the end of the century and storm surges and flooding in coastal storms are likely to impact the coast more severely. In addition, California's wet year and drought year cycles, which are connected to the El Niño Southern Oscillation cycles, are likely to become more intense. These changes can have significant impacts on both property and human health and safety as discussed in the following section.

In Bellflower, the frequency, intensity, and duration of heat waves and droughts are expected to increase in the future. Bellflower is likely to see a significant increase in the number of days when temperature exceeds the extreme heat threshold of 94°F. Between 1950 and 2011, the average number of extreme heat days per year was four. As shown in Figure 7, by 2050, the number of extreme heat days could raise to more than forty per year, and by the end of the century, the number of extreme heat days could exceed eighty per year. Warmer days will also be accompanied by warmer nights, which could have a significant, negative effect on public health.

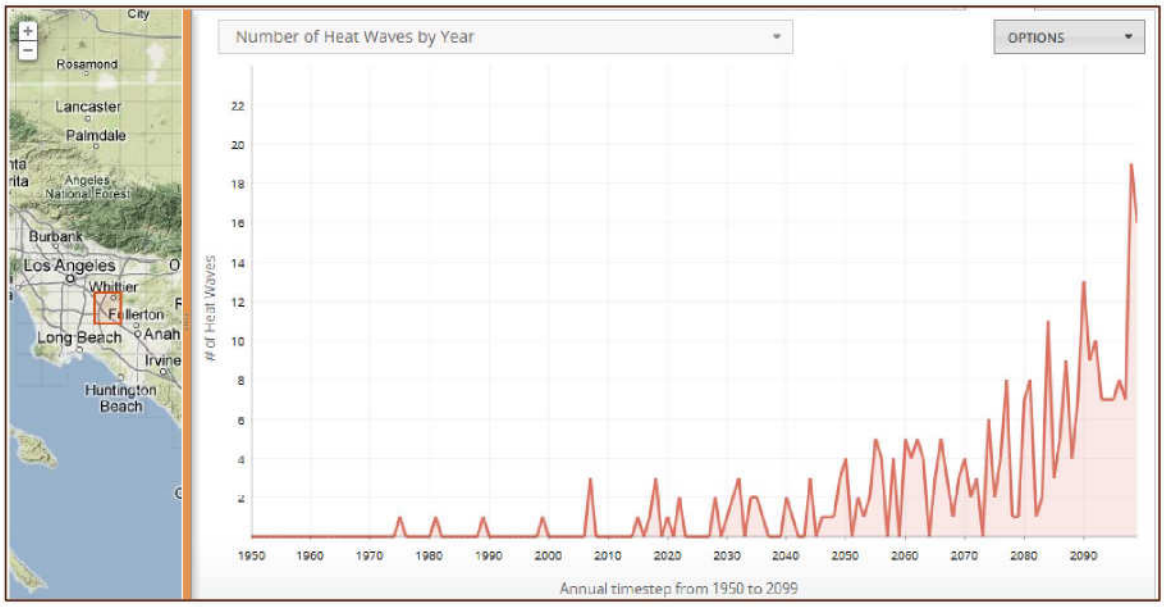
[23] Scripps Institution of Oceanography. 2009. Projected Precipitation Data Set. Received from http://cal-adapt.org/precip/decadal/.

FIGURE 7: NUMBER OF EXTREME HEAT DAYS BY YEAR[24]



Between 1950 and 2005, the Bellflower area experienced four, five-day heat waves, where temperatures exceeded the extreme heat threshold of 94°F. In 2007, there were three five-day heat waves. As average temperatures and extreme heat days continue to increase, it is expected that five-day heat waves will also increase. By mid-century, the number of heat waves could reach five per year, potentially exceeding ten per year by the end of the century as shown in Figure 8.[25]

FIGURE 8: NUMBER OF HEAT WAVES BY YEAR



[24] Scripps Institution of Oceanography. 2009. Projected Daily Temperature Data Set. Received from http://cal-adapt.org/temperature/heat/.

[25] Scripps Institution of Oceanography. 2009. Projected Daily Temperature Data Set. Received from http://cal-adapt.org/temperature/heat/.

IMPACTS OF CLIMATE CHANGE IN BELLFLOWER

Bellflower and other communities in Southern California will face significant challenges associated with rising temperatures, changes to precipitation patterns, and extreme weather. As indicated in the prior sections, many of the phenomena and impacts are already being observed. These climate changes will affect a number of sectors within the region, resulting in significant social and economic consequences across the region. This section describes the likely impacts of climate change to the following sectors: public health, water resources, and economic systems.

The Summary of Climate Change Phenomena by Sector table (Table 5) outlines key climate change phenomena described in the previous chapter and their associated impacts and consequences by sector for Bellflower. Many of the impacts and consequences will be felt across multiple sectors. This summary focuses on climate change impacts to sectors within the purview of the City and does not include those impacts to all sectors.

TABLE 5: SUMMARY OF CLIMATE CHANGE PHENOMENA, IMPACTS, AND CONSEQUENCES BY SECTOR[26]

CLIMATE CHANGE PHENOMENA	SECTOR AFFECTED	ASSOCIATED IMPACTS	ASSOCIATED CONSEQUENCES
Temperature and extreme heat events	Public Health	Heat-related: heat waves and urban heat island Wildfires	Illnesses, injuries, and loss of life Decline in air quality
	Water Resources	Drought	Decline in quantity and quality of freshwater Increased water demand
	Economy	Drought Heat-related	Energy disruption Economic gains/losses
Precipitation and extreme precipitation events	Public Health	Flooding Drought	Illnesses, injuries, and loss of life
	Water Resources	Flooding Drought Nonpoint source pollution	Illnesses, injuries, and loss of life Decline in quality of freshwater Economic losses
	Economy	Flooding Drought	Loss of agricultural productivity Destruction and damage to property Economic gains/losses

PUBLIC HEALTH

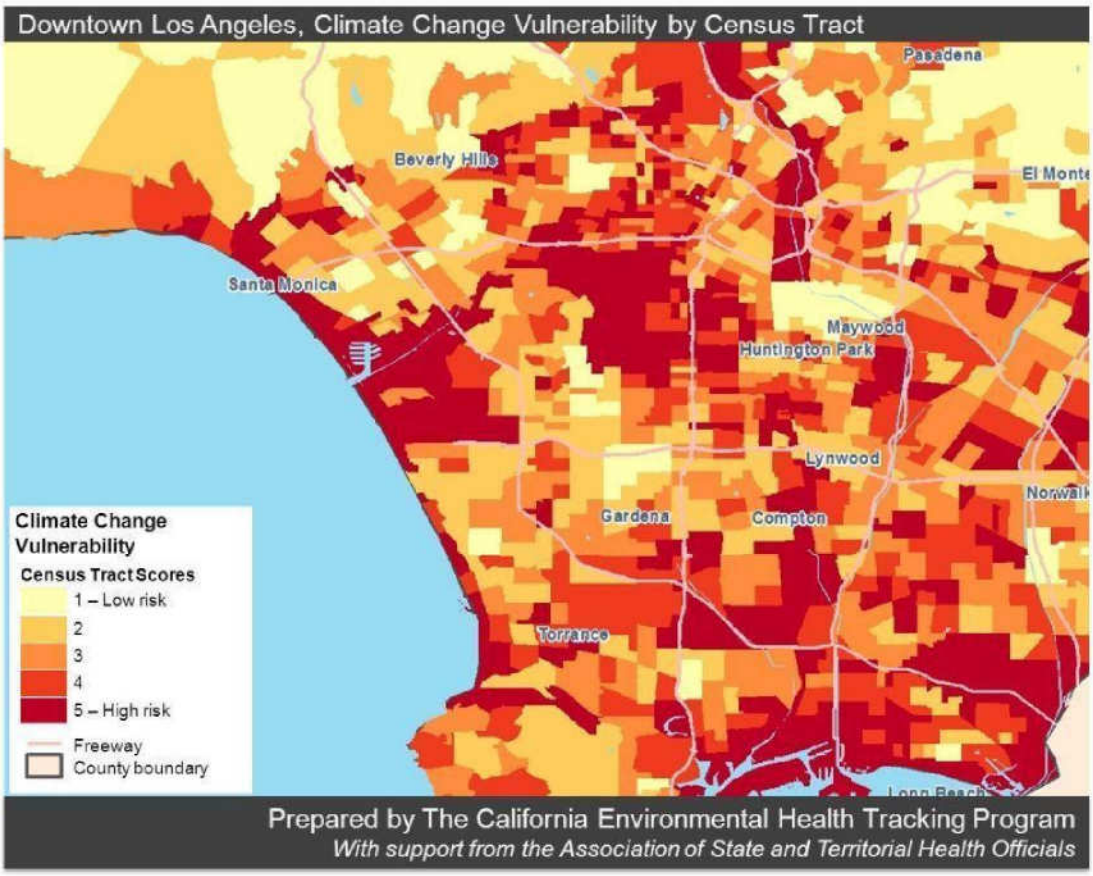
Climate change is expected to affect the health and welfare of people and communities around California and within Bellflower. Climate-related impacts related to heat, drought, and wildfires could have particularly significant health effects within the Bellflower. It is expected that climate change will have differential effects on different subpopulations within the region, where biological sensitivity, socioeconomic factors, and geography that will contribute to the heightened risk for climate-sensitive health outcomes. Vulnerable populations include children, pregnant women, older adults, low-income communities, people with chronic diseases and mobility / cognitive constraints, and outdoor workers.

[26] Adapted from the National Oceanic and Atmospheric Administration's *Adapting to Climate Change: A Planning Guide for State Coastal Managers*. 2010.

Other socioeconomic factors include income, the prices of goods and services, access to vaccines, exposure to pesticides, diet, lifestyles, social networks, and other factors.[27]

The California Environmental Health Tracking Program examined climate change vulnerability among communities in Los Angeles to identify areas most likely to experience substantial climate change impacts (see Figure 9). The vulnerability assessment draws on data from a variety of sources and includes information about air conditioning ownership, tree canopy and impervious surfaces, transit and household car access, elderly living alone, flood risk, wildfire risk, and sea level rise.

FIGURE 9: CLIMATE CHANGE VULNERABILITY BY CENSUS TRACT FOR LOS ANGELES[28]



In Los Angeles County, areas of the highest risk were found along coastal areas, in part because of risks due to sea level rise. Areas in Bellflower ranged from low- to high-risk depending on the Census tract. The assessment also found clear differences in racial and income disparities. African Americans and Latinos were more likely to live in high-risk areas compared to Whites, and low income households were more likely to live in areas of greater climate change vulnerability.[29]

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[27] U.S. Climate Change Science Program. 2008. *Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems*. U.S. Environmental Protection Agency, Washington, DC, USA.

[28] California Environmental Health Tracking Program. 2012. Community Vulnerabilities to Climate Change. Received from http://www.ehib.org/page.jsp?page_key=703

[29] California Environmental Health Tracking Program. 2012. Community Vulnerabilities to Climate Change. Received from http://www.ehib.org/page.jsp?page_key=703

HEAT-RELATED

As discussed earlier, along with seasonal warming, California and Bellflower are likely to experience a larger number of extreme heat days, warm nights, and more prolonged periods of hot weather.[30] Periods of increased high temperatures or extended high temperatures can lead to increased heat-related mortality, cardiovascular-cause mortality, respiratory mortality, heart attacks, and other causes of mortality.[31] Emergency medical services and hospitals also increase during heat waves.[32]

California experienced a similar heat wave during July 2006, which broke temperature records around the state over a ten-day period and caused at least 140 deaths. During the heat wave, hospital and emergency department visits increased statewide, resulting in an estimated 16,166 excess emergency department visits and 1,182 excess hospitalizations. Risk ratios for heat-related illness increased significantly during the heat wave for the South Coast region, which includes Bellflower, but the heat wave also elevated risk ratios for electrolyte imbalance, acute renal failure, and nephritis.[33] In particular, heat-related illnesses impacted people over 65 and Latino and Hispanic persons.[34]

Along with heat-related illness, changes in temperature are expected to worsen air quality, particularly ozone and particulate matter concentrations. Currently, Los Angeles County is ranked as the fourth most polluted county by short-term particle pollution (24-hour $PM_{2.5}$), the third most polluted by year-round particulate pollution (Annual $PM_{2.5}$), and the most ozone-polluted county in the country. Los Angeles County received an F grade for High Ozone Days 2008-2010 with 185 orange days (unhealthy for sensitive populations), 41 red days (unhealthy), and 6 purple days (very unhealthy).[35]

Not only could climate slow California's progress toward attainment of health-based air quality standards and increase pollution control costs, it will increase the risk of incidences of asthma, allergies, chronic obstructive pulmonary disease, other cardiovascular and respiratory diseases, skin cancer, and cataracts.[36]

WILDFIRES

Many ecosystems in California are naturally fire dependent, and therefore, these same forests are prone to wildfire. As California is likely to experience increased temperatures and reduced precipitation, these factors will likely lead to more frequent and intense wildfires and longer fire seasons.[37] For Bellflower, an increase in wildfires will not increase the direct injuries and deaths from fire, but it will likely worsen air quality and negatively impact public health in the Los Angeles basin. The increase in area burned will likely exacerbate eye and respiratory illness, worsening asthma, allergies, chronic obstructive pulmonary disease, and other cardiovascular and respiratory diseases.

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[30] Scripps Institution of Oceanography. 2009. Projected Daily Temperature Data Set. Received from http://cal-adapt.org/temperature/heat/.

[31] U.S. Climate Change Science Program. 2008. Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems. U.S. Environmental Protection Agency, Washington, DC, USA.

[32] Kovats, R.S, and Ebi, K.L. 2006. Heatwaves and Public Health in Europe. European Journal of Public Health 16:592-599.

[33] A risk ratio is a measure of the risk of a certain event happening in one group compared to the risk of the same event happening in another group. National Institutes of Health. 2012.

[34] Knowlton, K., et al. 2009. *The 2006 California Heat Wave: Impacts on Hospitalizations and Emergency Department Visits*. Environmental Health Perspectives: Volume 117, Number 1.

[35] American Lung Association. 2012. *State of the Air*. Available at http://www.stateoftheair.org/2012/assets/state-of-the-air2012.pdf.

[36] California Climate Action Team. 2009. *Draft Biennial Climate Action Report*. Available at http://www.energy.ca.gov/2009publications/CAT-1000-2009-003/CAT-1000-2009-003-D.PDF.

[37] California Department of Forestry and Fire Protection. 2012. *CAL FIRE Climate Change Program*.

Water Resources

Climate change is also expected to affect California's snowpack, precipitation, and, consequently, water supply. There is some uncertainty as to how water supplies will be affected, but even the most conservative models anticipate less stable water supplies and potentially more competition for what are already over-drafted and over-allocated resources. Bellflower's primary sources of water are groundwater production, imported water, and recycled water. The imported water from the State Water Project and Colorado River and local groundwater are likely to be affected by climate change.[38]

In 2010, approximately 35% of Bellflower's water supply was imported, and this water supply will be affected by climate change.[39] An evaluation of climate scenarios on the State Water Project found a 7% - 10% reduction in Sacramento Delta water exports by mid-century and up to a 25% reduction in end of the century. The analysis also found that reservoir storage is likely to decline.[40]

Another important factor to be considered in water supply planning is the occurrence of drought. During periods of drought, water availability decreases and water demand increases. Climate change is expected to increase the frequency and severity of droughts in the region as temperatures rise and precipitation and stream flow decline during the summer.

Along with changes in water supply, demands for water will likely increase with warmer temperatures, higher evapotranspiration, and higher per capita income, straining existing water supplies. Average summer temperatures are a significant factor in water use and Bellflower's average summer temperature is expected to increase by as much as 7°F.[41] This will increase water demand landscape irrigation and urban water use.[42]

Economy

Each of the impacts of climate change discussed above is likely to impose substantial monetary costs to California. In fact, the California Climate Action Team estimates that climate change will cost California tens of billions of dollars annually. If greenhouse gas emissions begin to be reduced, however, these costs could be lowered.[43] Several potential impacts in the region include:

- Storms and heat waves can disrupt the supply of and increase the demand for energy in California, affecting productivity.
- Extreme heat events and worsening air quality will disproportionately affect low-income residents, particularly those that labor outside, such as construction and outdoor workers.

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[38] Bellflower-Somerset Mutual Water Company. 2011. Urban Water Management Plan.
[39] City of Bellflower. 2012. Municipal Water System 2012 Annual Report.
[40] Coachella Valley Water District. 2010. Urban Water Management Plan.
[41] Scripps Institution of Oceanography. 2009. Projected Temperatures Data Set. Received from http://cal-adapt.org/temperature/century/.
[42] Coachella Valley Water District. 2010. Urban Water Management Plan.
[43] California Climate Action Team. 2009. Draft Biennial Climate Action Report. Available at http://www.energy.ca.gov/2009publications/CAT-1000-2009-003/CAT-1000-2009-003-D.PDF.

BENEFITS OF CLIMATE ACTION PLANNING

Careful planning is needed to manage the complex issue of climate change. Fortunately, climate strategies are often associated with many other environmental, social, and economic benefits. This CAP will provide a roadmap for the City of Bellflower to reduce greenhouse gas emissions and help the City and its residents to:

IMPROVE PUBLIC HEALTH AND AIR QUALITY

Minimizing greenhouse gas emissions will reduce other harmful air pollutants, such as carbon monoxide, sulfur dioxide, and particulate matter, whereby benefiting the health and well-being of the community at large. Enabling alternative modes of transportation, such as walking and biking help people get more exercise and live healthier lives.

PROVIDE ENERGY SECURITY AND INDEPENDENCE

Addressing transportation and land use planning by supporting infill development and promoting alternative modes of transportation will reduce demand for imported energy, especially oil. In addition, smarter building design and construction practices, including passive solar heating and cooling, building orientation, and renewable energy systems, will diminish the need for fossil-fuel based energy. It is estimated that CAP implementation will reduce electricity use in Bellflower by over 3 million kWh and 11,000 therms in 2020.

HELP PEOPLE SAVE MONEY

Reducing energy demand can help lower utility costs for individuals, households, and businesses. Investments in energy efficiency and renewable energy sources yield long-term operations and maintenance savings. Many of these actions have simple payback periods of less than five-years. It is estimated that CAP implementation will reduce household costs for energy and water by over $400,000 in 2020.

STIMULATE ECONOMIC DEVELOPMENT

Reinvestment in local buildings and infrastructure will provide new opportunities for skilled trades and a variety of professional services. Local knowledge institutions are well positioned to be incubators for emerging technologies and training grounds for the next generation's regional workforce.

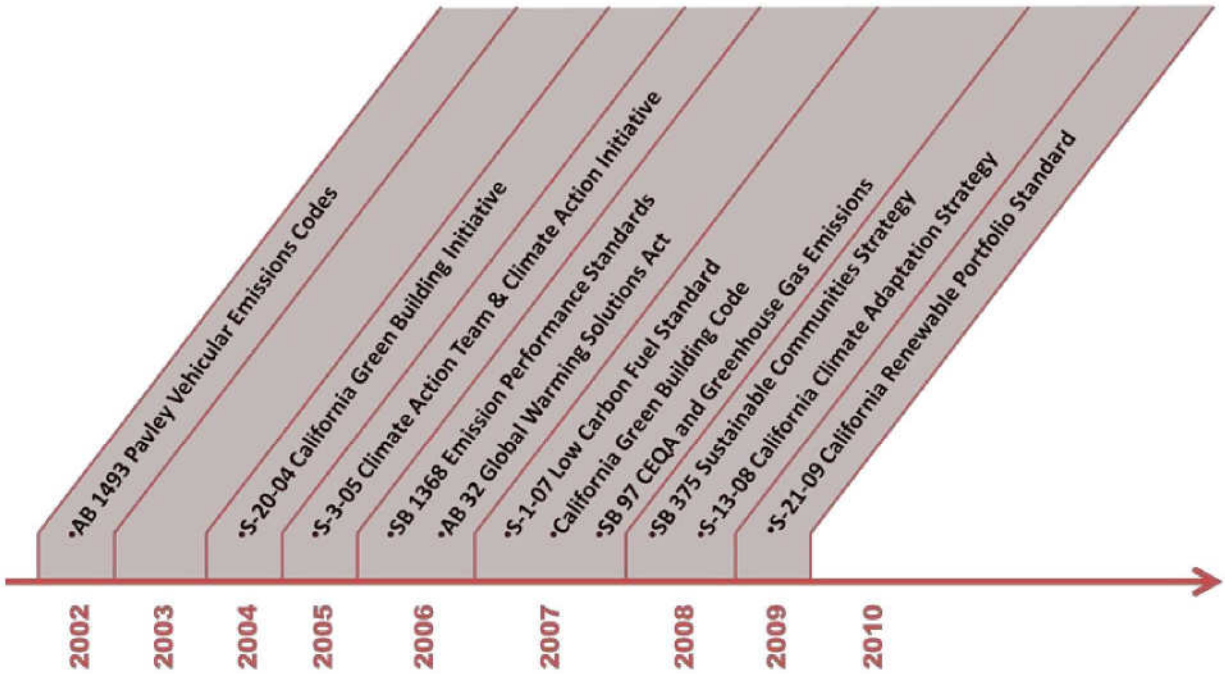
CEQA TIERING

Analyzing and mitigating greenhouse gas at a programmatic level is part of a strategy to address the cumulative impacts of greenhouse gas emissions and to streamline environmental regulatory procedures. The Bellflower CAP is part of a framework that will allow future development projects to reference the CAP in order to tier and streamline the environmental review process.

REGULATORY FRAMEWORK

During the past decade, the State of California made great strides in developing a regulatory framework to curb future greenhouse gas emissions and to adapt to the potential consequence of climate change, as shown by Figure 10. California adopted a series of policies, programs, and regulations that set targets for greenhouse emission reductions and outlined strategic actions that enable government agencies, public institutions, and businesses to collaborate to achieve these reduction targets. There are several other California regulations and laws that directly affect local government efforts to reduce greenhouse gas emissions and to respond to the potential impacts of climate change. A detailed description of these regulations can be found in Appendix B.

FIGURE 10: TIMELINE OF CALIFORNIA CLIMATE CHANGE REGULATIONS

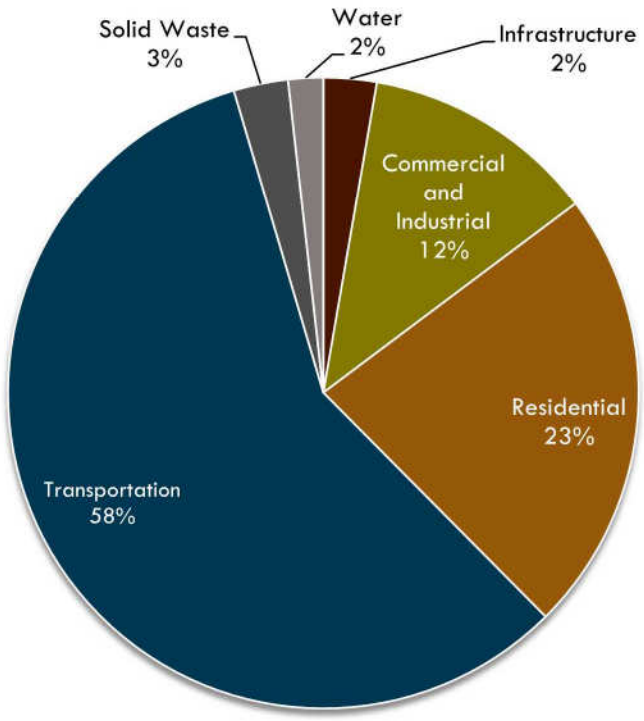


2 | GREENHOUSE GAS EMISSIONS INVENTORIES

2010 EMISSIONS INVENTORY

In 2010, total greenhouse gas emissions in Bellflower were approximately 339,985 MT CO_2e. This aggregate number accounts for direct emissions from the on-site combustion of fuels and the combustion of fuel in vehicles. This figure also includes all indirect emissions associated with community electricity consumption and emissions from solid waste generated and water consumed in Bellflower.

FIGURE 11: COMMUNITY EMISSIONS SUMMARY BY SECTOR IN 2010



The transportation sector emitted 58% of Bellflower's greenhouse gas emissions, the largest quantity of any sector (see Figure 11). The residential sector was the second largest producer of greenhouse gases, contributing 23% of the community total. The remainder of the emissions came from the commercial and industrial (12%), lighting infrastructure (2%), solid waste (3%), and water (2%) sectors.

In 2010, the combustion of gasoline and diesel fuel contributed the largest portion of greenhouse gas emissions by fuel source in Bellflower. Transportation gasoline use resulted in an estimated 170,002 MT CO_2e of emissions or 50% of the community total, while the combustion of diesel fuel accounted for 8% of the emissions. By source, electricity use resulted in the second largest emissions total community-wide. The consumption of electricity in buildings, facilities, water delivery, and lighting infrastructure resulted in 22% of the greenhouse gas emissions. Natural gas combustion contributed 16% of the emissions, and water and solid waste resulted in 2% and 3% of the emissions respectively. TABLE 6 shows community greenhouse gas emissions in 2010.

TABLE 6: COMMUNITY GREENHOUSE GAS EMISSIONS IN 2010

EMISSIONS SECTOR AND SOURCE	SCOPE	ACTIVITY DATA 2010	METRIC TONS OF CO_2E 2010	SHARE OF TOTAL
Transportation				
Gasoline (VMT)	Scope 1	350,802,125	26,719	8%
Diesel (VMT)	Scope 1		170,002	50%
Commercial and Industrial				
Natural Gas (therms)	Scope 1	1,735,288	9,224	3%
Electricity (kWh)	Scope 2	110,130,560	31,701	9%
Residential				
Natural Gas (therms)	Scope 1	8,251,677	43,863	13%
Electricity (kWh)	Scope 2	116,834,565	33,631	10%
Infrastructure				
Electricity (kWh)	Scope 2	32,144,753	9,253	3%
Solid Waste				
Landfill waste (tons)	Scope 3	58,800	9,498	3%
Water				
Water Pumping (kWh)	Scope 2	2,812,586	810	0.2%
Potable Water (acre-feet)	Scope 3	7,984	4,030	1.2%
Recycled water (acre-feet)	Scope 3	99	28	0.01%
Wastewater (acre-feet)	Scope 3	726	1,227	0.4%
Scope 1 Subtotal			**249,808**	**73%**
Scope 2 Subtotal			**75,394**	**22%**
Scope 3 Subtotal			**14,783**	**4%**
Total Emissions			**339,985**	**-**

Emissions per person in Bellflower were 4.44 MT CO_2e in 2010. By including employees in Bellflower, per service population emissions were 3.71 in 2010.

TABLE 7 : EMISSIONS PER PERSON AND PER SERVICE POPULATION IN 2010

SOURCE	2010
Electricity Used (kWh)	261,922,464
Community Greenhouse Gas Emissions (MT CO_2e)	339,985
Population	76,616
Employees	14,926
Electricity Use per Person	3,419
GHG Emissions per Person	4.44
GHG Emissions per Service Population[1]	3.71

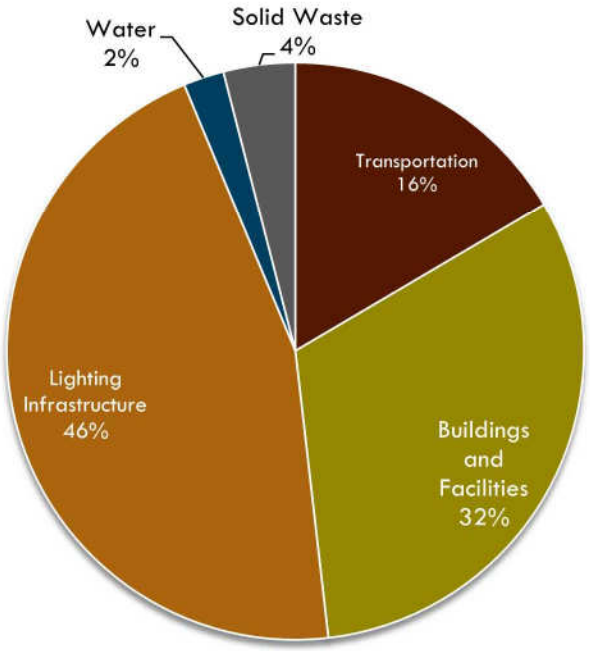
[1] *Service population accounts for both population and employment.*

MUNICIPAL EMISSIONS

In 2010, government operations in Bellflower produced 1,669 MT CO_2e. This roll-up figure includes emissions from municipal buildings and facilities, infrastructure, transportation, water delivery and treatment, and solid waste.

Lighting infrastructure emissions accounted for nearly half of the greenhouse gas emissions from municipal operations. Operation of street lighting and traffic signals and controls produced 46% of the emissions. Municipal building and facilities energy use resulted in 528 MT CO_2e of emissions, 32% of the total government operations emissions. The remainder of the emissions came from transportation (16%), water delivery and treatment (2%), and solid waste (4%).

FIGURE 12: GOVERNMENT OPERATIONS EMISSIONS SUMMARY BY SECTOR IN 2010



COMMUNITY EMISSIONS AND FORECAST

How will projected trends in energy use, driving habits, population growth, and employment expansion affect future greenhouse gas emissions in Bellflower? To answer this question, a business-as-usual (BAU) forecast was developed for the City that estimates future emissions in 2020 and 2030 from six sectors: commercial and industrial; infrastructure; residential; transportation; solid waste; and water. The BAU projects emissions under existing conditions, and it does not include the effects of California regulatory efforts, such as Title 24 updates, the Renewables Portfolio Standard, and the Pavley Clean Car Standards on future greenhouse gas emissions.[44]

Emissions are expected to rise under a business-as-usual forecast. Bellflower's greenhouse gas emissions are projected to increase from 339,985 MT CO_2e of emissions in 2010 to 386,674 MT CO_2e of emissions in 2030, a 14% increase. Emissions per service population emissions are expected to increase to 3.97.

[44] For more information on California's climate change policies, programs, and regulations, see Appendix B.

FIGURE 13: COMMUNITY EMISSIONS TREND AND FORECAST BY SECTOR

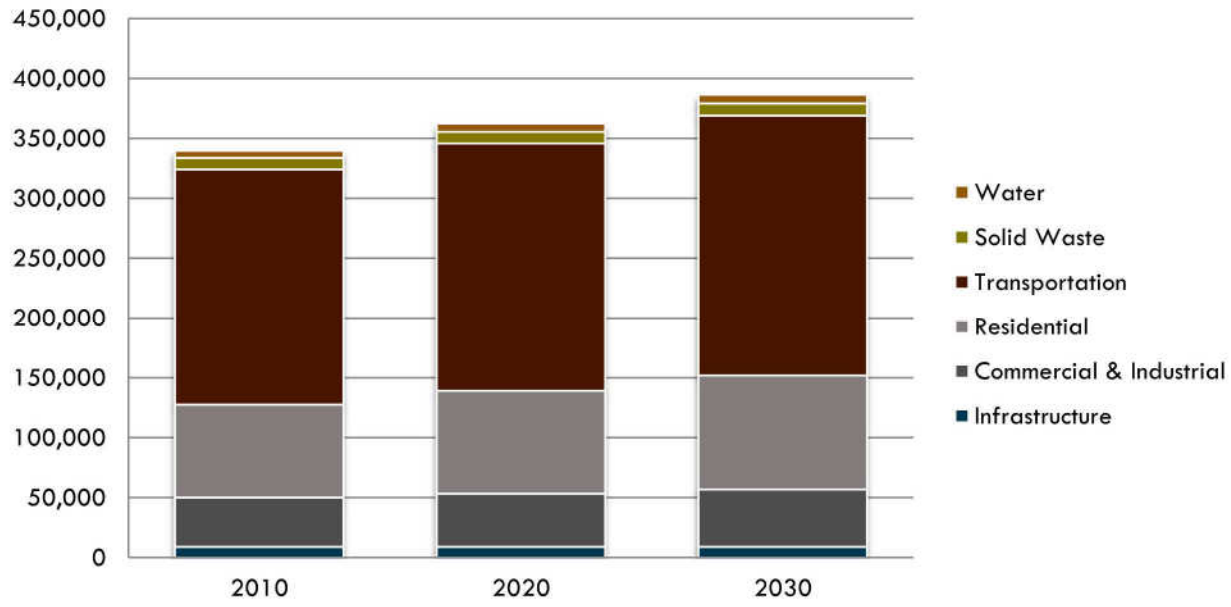


TABLE 8 : SUMMARY OF COMMUNITY-WIDE EMISSIONS BY SECTOR FOR EXISTING AND PROJECTED GREENHOUSE GAS EMISSIONS

	2010	2020	2030
COMMUNITY-WIDE GREENHOUSE GAS EMISSIONS			
Transportation	196,721	206,830	217,237
Commercial & Industrial	40,925	44,162	47,660
Residential	77,493	85,767	95,158
Infrastructure	9,253	9,290	9,290
Solid Waste	9,498	9,697	10,076
Water	6,094	6,701	7,253
Total Emissions	**339,985**	**362,446**	**386,674**
PROJECTED FUTURE GROWTH[1]			
Population	76,616	76,600	79,733
Employment	14,926	16,900	17,567
Service Area Population (pop + emp)	91,542	93,500	97,300
Emissions per Capita (MT CO_2e/Pop)	**4.44**	**4.73**	**4.85**
Emissions per Service Population (MT CO_2e/SP)	**3.71**	**3.88**	**3.97**

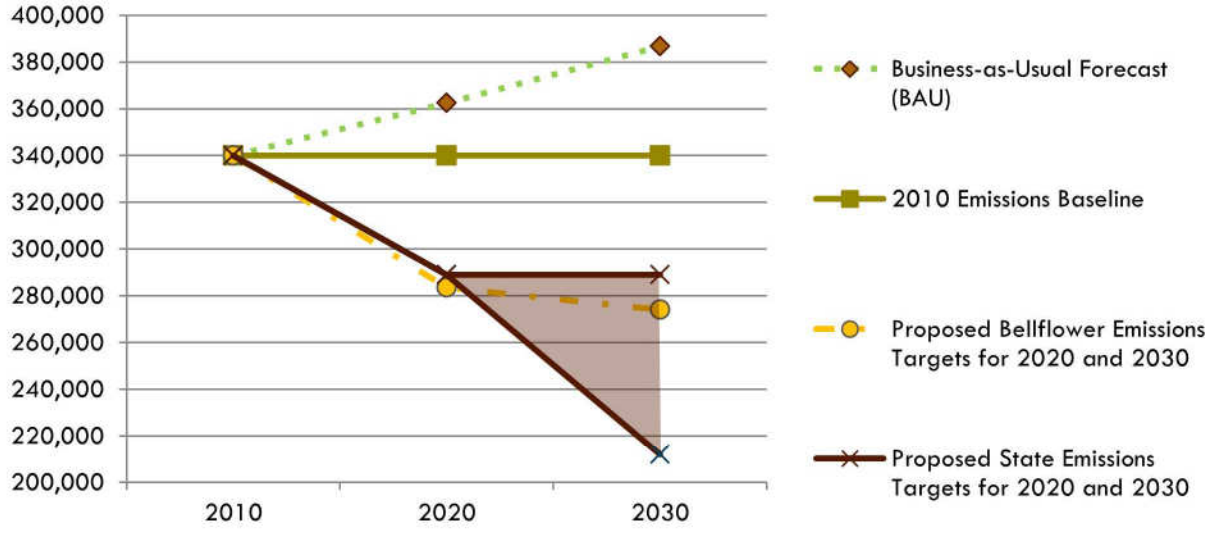
[1]Future population and employment is based on the Southern California Association of Government's regional growth forecast for 2012.

GREENHOUSE GAS EMISSION REDUCTION TARGET

The City of Bellflower proposes to set a greenhouse gas emissions reduction target of 17% below current levels by 2020 and an emissions reduction goal of 19% by 2030. The 2020 target is related to the recommendation of the California Air Resources Board and the California Climate Change Scoping Plan, which suggests local governments establish a 15% reduction below 2005 levels.[45] This target places the City on a pathway towards California's long-term emissions reduction target, which is an ambitious goal to reduce greenhouse emissions by 80% below 1990 levels in 2050.[46] The City recognizes the need to continue reducing emissions beyond 2020, but also recognizes that additional state and federal actions will be needed to achieve an 80% target by 2050. As such, Bellflower proposes to establish a goal to reduce emissions 19% below current levels by 2030. This goal is based on the feasible emissions reductions considered and analyzed as part of this climate action planning process. The City also understands that the state could seek to codify reductions by approximately 38% by 2030, and the range of potential post-2020 emissions reduction targets is shown in Figure 14 as a shaded area.[47] Along with California regulatory framework, the following criteria were used to establish the emissions reduction target for 2020 and goal for 2030:

- Adequate to place the region on a emissions path that avoids the most significant changes to the regional climate;
- Provide co-benefits that improve the quality of life of the Bellflower residents, enhance the local economy, and make municipal operations more efficient;
- Feasible with existing resources and technology; and
- Uncertainty about federal and state actions beyond 2020.

FIGURE 14: BELLFLOWER'S PROJECTED EMISSIONS, PROPOSED STATE TARGETS, AND BELLFLOWER'S PROPOSED TARGETS



[45] California Air Resources Board. 2008. *Climate Change Scoping Plan*. Retrieved from http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm

[46] Governor of the State of California. 2005. *Executive Order S-3-05*. Retrieved from http://www.dot.ca.gov/hq/energy/ExecOrderS-3-05.htm

[47] Thirty-eight percent represents a straight line calculation between the state's recommendation to reduce emissions 15% by 2020 and 80% below 1990 levels by 2050.

The City of Bellflower baseline inventory established that 2010 emissions totaled 339,985 MT CO_2e. Population growth, increased per capita energy use, and a rebounding economy are expected to increase city-wide emissions to 362,446 MT CO_2e in 2020, an overall increase of 7%. As shown in Figure 14, to achieve the 17% reduction target from the 2010 baseline, the City would need to develop and implement strategies that reduce emissions by 78,896 MT CO_2e in 2020. Given projected trends, this reduction lowers 2020 emissions to approximately 22% below 2020 business-as-usual levels (levels anticipated for 2020 in the absence of any local, state, or federal interventions). To continue on a similar emissions pathway for 2030 to achieve a 19% target, Bellflower would need to reduce emission by approximately 112,566 MT CO_2e from business-as-usual levels.

TABLE 9 : GREENHOUSE GAS REDUCTIONS AND PROPOSED STATE TARGETS

	2020 $MTCO_2E$	2020 $MTCO_2E/SP$	2030 $MTCO_2E$	2030 $MTCO_2E/SP$
PROPOSED STATE TARGETS				
Projected BAU Emissions	362,446	3.88	386,674	3.97
Proposed State Greenhouse Gas Emissions Targets (15% by 2020 and 80% by 2050)	288,987	3.09	211,924	2.18
Reduction From BAU Required to Meet State Target	**-73,459**	**-0.79**	**-174,750**	**-1.80**
PROPOSED BELLFLOWER TARGETS				
Proposed City Greenhouse Gas Emissions Targets (17% by 2020 and 19% by 2030)	283,550	3.03	274,108	2.82
Reduction From BAU Required to Meet City Target	**-78,896**	**-0.84**	**-112,566**	**-1.16**

3 | CLIMATE ACTION STRATEGIES

To address the challenge of climate change, Bellflower needs broad-based participation from businesses and residents. Everyone who lives, works, shops, or plays in the City contributes to the community's emissions, and everyone will need to be part of the solution. The following section presents three greenhouse gas reduction strategies for the City of Bellflower that are applicable to every sector within the City. These strategies contain actions that are a proven, affordable set of measures based on existing technologies. This strategic framework will provide the City with an efficient and cost-effective pathway for implementing emissions reduction policies. The CAP also includes a fourth strategy to help the City begin to prepare for the potential impacts of climate change.

The reduction strategies focus on actions within, or associated with activity in, the City that can result in a break from business-as-usual emissions. The strategies do not address the ownership of emissions or, in most cases, responsibility for specific emissions reductions. Rather, the CAP views the City as a nexus for many different types of emissions that may ultimately be owned or controlled by a wide-range of stakeholders. Ultimately, federal, state, regional, and local actions will combine to help the City achieve its emissions reduction goal.

Dozens of greenhouse gas reduction actions were analyzed and reviewed with City staff and key stakeholders. After extensive input, approximately twenty-five reduction measures were selected for the CAP and provide a roadmap to help Bellflower reduce the 2020 greenhouse gas reduction target and 2030 reduction goal. The measures recommended in this CAP were evaluated and selected with the following criteria in mind:

- **Feasibility** - the extent to which the strategy is achievable based on current constraints;
- **Reduction potential** - total anticipated greenhouse gas emissions reductions;
- **Jurisdictional influence** - who has control over measure implementation and the means by which the measure will be implemented, such as a policy, code amendment, or incentive program;
- **Cost** - implementation costs for the City or the community; and
- **Additional impacts** - other potential positive or negative effects not considered by other criteria.

HOW THE PLAN IS BUILT

The reduction strategies are divided into four strategies with supporting actions:

BUILDINGS

Residential and non-residential buildings produce approximately 42% of Bellflower's emissions and are a primary target for the CAP. This strategy facilities energy efficiency in homes and businesses, clean energy generation, lower water consumption, and reduced waste generation.

URBAN FORM AND MOBILITY

Fifty-eight percent of Bellflower's greenhouse gas emissions are attributed to the transportation sector. The urban form and mobility strategy covers a broad range of activities that aim to reduce vehicle miles travelled, improve mobility, and enhance vehicle fuel efficiency. Specific implementation measures involve changing land uses, adopting a new perspective on community design, and promoting non-automobile modes of travel.

GOVERNMENT OPERATIONS

The City of Bellflower has taken steps to reduce energy and water use, lower vehicle fuel consumption, minimize employee commuting, and diverting solid waste from landfills. This strategy builds on previous projects by continuing energy and water conservation efforts.

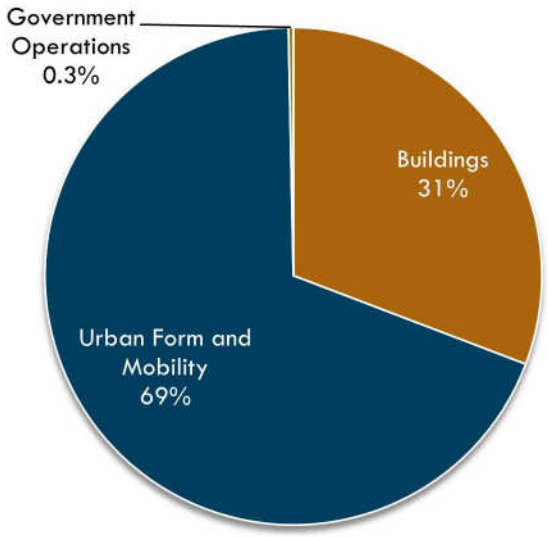
PREPARING FOR CLIMATE CHANGE

Adaptive actions describe a pathway for the Bellflower to minimize the potential consequences of climate change. Many of these actions overlap with greenhouse gas mitigation measures.

GREENHOUSE GAS EMISSIONS REDUCTION POTENTIAL

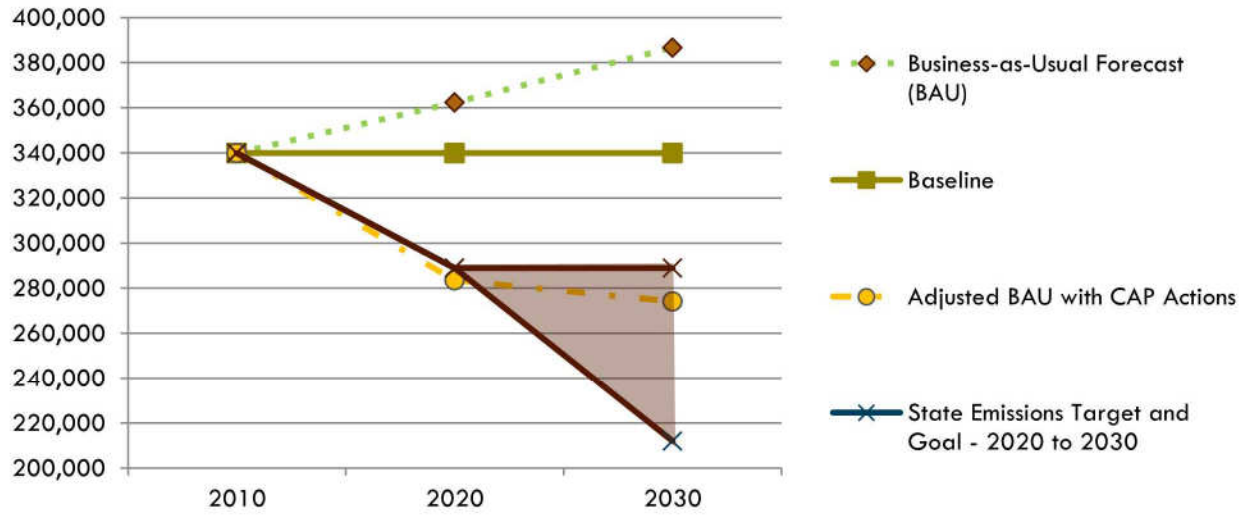
Through a combination of proposed federal, state, and city-level actions, Bellflower can anticipate emissions reductions of 79,120 MT CO_2e from the 2020 business-as-usual scenario. State-level actions, such as the Pavley Clean Cars legislation, the Low Carbon Fuel Standard, the Renewables Portfolio Standard, and Title 24 upgrades are expected to reduce emissions by 70,416 MT CO_2e in 2020. Local measures are projected to reduce emissions by 8,588 MT CO_2e. This combination of state and local action would place the City 17% below 2010 emission levels in 2020, meeting the City's proposed 2020 greenhouse gas emissions reduction target. Figure 15 shows the emissions reduction by strategy in 2020.

FIGURE 15: PROPORTION OF GREENHOUSE GAS REDUCTION POTENTIAL BY STRATEGY IN 2020 FOR BELLFLOWER



By 2030, the combination of state and local greenhouse gas emissions measures is likely to reduce emissions by 122,843 MT CO_2e from the BAU. State measures are expected to account for 92,563 MT CO_2e with local actions resulting in a larger porportion of emissions reductions. These actions put Bellflower 19% below the business-as-usual forecast, between the state's voluntary 15% reduction target by 2020 and the more ambitious 80% goal by 2050 (as shown in the shaded area of Figure 16). This estimate, however, does not account for additional future actions by the state, e.g. requiring utilities to provide additional renewable energy or more stringent autmobile standards, and will require the City to aggressively implement additional actions. Figure 16 shows the City's projected emissions, adjusted BAU with CAP actions, and proposed state targets.

FIGURE 16: BELLFLOWER'S PROJECTED EMISSIONS, ADJUSTED BAU WITH CAP ACTIONS, AND PROPOSED STATE TARGETS

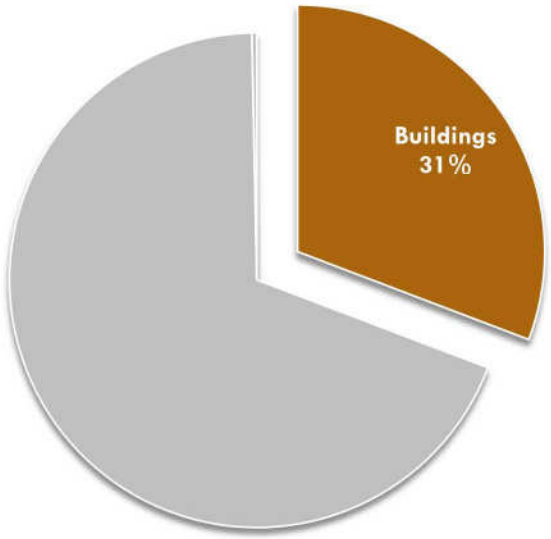


STRATEGY 1: BUILDINGS

Bellflower is expected to grow slowly over the next several decades, so improving the performance of existing buildings is a key target of this CAP. This strategy requires a concerted effort by government, utility companies, businesses, and individual homeowners to increase the energy efficiency of their homes and businesses. Increasing the efficiency of these buildings will result in significant savings for residents, businesses, and the City of Bellflower, and these savings can often cover the upfront costs of a building retrofit.

Even after increasing energy efficiency, energy needs to become cleaner in the future. California adopted a Renewables Portfolio Standard that requires investor-owned utilities, like Southern California Edison, to increase procurement from renewable energy resources to 33% of total procurement by 2020. Bellflower proposes to go beyond this goal by fostering electricity generations within the City.

31% of Bellflower's emissions reduction in 2020
= 24,415 MT CO_2e



TITLE 24 UPDATES

California's Title 24 Building Energy Code is updated every three years, continually increasing energy and water standards and lowering greenhouse gas emissions. The 2013 Building Energy Efficiency Standards, which take effect on January 1, 2014, are 25% more efficient than previous standards for residential construction and 30% more efficient for non-residential construction.[48] As a result of these standards, it is expected that greenhouse gas emissions will fall by 740 MT CO_2e annually in 2020 and 2,264 MT CO_2e annually in 2030.

IMPROVE RESIDENTIAL ENERGY EFFICIENCY

Energy efficiency measures and weatherization of the existing building stock will reduce energy consumption, lower greenhouse gas emissions, and decrease property owners' and tenants' energy bills. Bellflower proposes to expand participation in and promote existing energy efficiency and weatherization programs, such as the Energy Savings Assistance Program and Energy Upgrade California, which provide energy efficiency and conservation education, training, rebates, and incentives. As part of this initiative, Bellflower will explore development of an in-lieu fee program for energy efficiency to expand the deployment of energy measures. This program is expected to reduce greenhouse gas emissions by 95 MT CO_2e in 2020 and 506 MT CO_2e in 2030.

[48] California Energy Commission. 2012. *Energy Commission Approves More Efficient Buildings for California's Future*. Retrieved from http://www.energy.ca.gov/releases/2012_releases/2012-05-31_energy_commission_approves_more_efficient_buildings_nr.html.

RENEWABLES PORTFOLIO STANDARD

California's Renewable Portfolio Standard (RPS) directs investor-owned utilities, such as Southern California Edison, to increase the percentage of renewable energy generated to 33% by 2020. In turn, the RPS will reduce the greenhouse gas emissions from electricity used throughout the state. In 2012, over 20% of the energy purchased by Southern California Edison came from a qualified renewable energy source, increasing from 17.6% in 2005. By 2020, SoCal Edison expects to achieve the 33% renewable portfolio target. By adding renewable energy and reducing the carbon intensity of electricity from other energy sources i.e., switching from coal to natural gas, greenhouse gas emissions from Edison's electricity is expected to fall 27% by 2020.[49] As a result, greenhouse gas emissions in Bellflower are expected to decline by 22,804 MT CO_2e.

SOLAR REBATE PROGRAMS

The California Solar Initiative is a rebate program for customers of Pacific Gas and Electric, Southern California Edison, and San Diego Gas & Electric. Since it was initiated in 2007, Bellflower residents are generating an estimated 81 KW of electricity from solar installations per year, and businesses are contributing an additional 771 KW. Without increasing solar installations within the City, these projects are expected to reduce emissions by 466 MT CO_2e in 2020. Assuming moderate residential and commercial solar growth, it is expected that greenhouse gas emissions will decline by 619 MT CO_2e in 2020 and 1,563 MT CO_2e in 2030.

MAKE APPLIANCES MORE EFFICIENT

In analysis of residential energy use, appliances typically use more than 10% of a home's total energy.[50] Bellflower proposes to promote existing energy efficient appliance upgrade programs to encourage homeownwers and businesses to exchange old appliances for newer, more efficient models. Through Southern California Edison, the Gas Company, and partnership programs like Energy Upgrade California and Socal Water$ense, a number of incentive programs already exist. The City will promote these programs and, when funding is available, will seek to suppliment them with additional money. A residential program would be expected to reduce emissions by 9 MT CO_2e in 2020 and 93 MT CO_2e in 2030.

USE LESS WATER

In 2010, businesses and residents in Bellflower used approximately 24.5 billion gallons of potable water (7,984 acre-feet) and 304 million gallons of recycled water water (99 acre-feet). As a result of the energy used to collect, convey, treat, and deliver water to users, and then the additional energy used to collect, treat, and dispose of the resulting wastewater, it is estimated that energy use for water processes resulted in 6,094 MT CO_2e in 2010. Water use is projected to grow into the future, reaching 27.5 billion gallons in 2020 and increasing greenhouse gas emissions.

To address growing water demands, the City proposes a series of actions to conserve water and reduce the energy used to process water and wastewater. Currently, 1.2% of the water used in Bellflower is already recycled. The City seeks to expand the use of recycled water. By increasing the proportion of recycled water from 1.2% to 3%, approximately 23 MT CO_2e fewer would be produced.

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[49] Energy and Environmental Economics. 2010. *Renewable Energy Standard Calculator*. Retrieved from http://www.arb.ca.gov/research/econprog/econmodels/RES_Calculator/E3_RES_Calculator_Final.zip.

[50] Lawrence Berkeley National Laboratory. 2009. *Typical House Memo*. Retrieved from http://www.energystar.gov/index.cfm?c=products.pr_where_money.

Along with increasing use of recycled water, the City proposes to continue and expand programs to conserve water use. Bellflower residents can already participate in the SoCal Water$ense program, which include programs for turf removal, low-flow fixtures, and smart irrigation systems. In addition to promoting this program, the City proposes that new construction will meet the low-flow fixture requirements of CalGreen. These programs are expected to reduce emissions by 107 MT CO_2e in 2020.

DIVERT MORE WASTE

Between 2000 and 2010, the amount of solid waste generated by Bellflower businesses and residents fell by 38%, declining from over 59,646 tons of solid waste in 2000 to 36,776 tons of waste in 2010. To further reduce waste, the City proposes continued solid waste reductions and higher waste diversion rates. Increasing the commercial and residential recycling rate from 50% to 65% would reduce greenhouse gas emissions by nearly 60 MT CO_2e.

TABLE 10: STRATEGY 1 – BUILDINGS

ACTION	DESCRIPTION	POTENTIAL GHG REDUCTION IN 2020, 2030[1]	POTENTIAL CO-BENEFITS IN 2020[1]
State Action 1: Title 24 Updates	California's Title 24 Building Energy Code is updated every three years, continually increasing energy standards	740 MT CO_2e, 2,264 MT CO_2e	1.6 million kWh reduced; 52,000 therms reduced
State/Regional Action 2: Renewables Portfolio Standard	Requires investor-owned utilities, such as Southern California Edison, to increase procurement from renewable energy resources to 33% of total procurement by 2020	22,804 MT CO_2e, 28,800 MT CO_2e	
State/Regional Action 3: Solar Rebate Programs	Incentivize residents and businesses with solar rebates, examples include the California Solar Initiative	619 MT CO_2e, 1,563 MT CO_2e	2.9 million kWh reduced
Promote and expand residential energy efficiency and weatherization programs	Facilitate voluntary energy efficiency improvements and upgrades in existing residential buildings by expanding participation in and promotion of existing programs. Explore the development of an in-lieu fee for energy efficiency.	95 MT CO_2e, 506 MT CO_2e	1.7 thousand kWh reduced; 10 thousand therms reduced; $30,000 savings on energy; adaptive
Develop an energy efficient appliance upgrade program	Promote and expand existing energy efficient appliance upgrade programs that encourages homeownwers to exchange old appliances for newer, more efficient models	9 MT CO_2e, 93 MT CO_2e	41,370 kWh reduced; $5,000 savings on energy; adaptive
Increase recycled water use	Accelerate the use of recycled water for irrigation and landscaping	23 MT CO_2e, 65 MT CO_2e	17 million gallons water saved; $13,000 savings; adpative
Accelerate and expand low-flow water fixture programs	Accelerate the installation of low-flow water fixtures in residential homes and expand the program to commercial businesses	107 MT CO_2e, 214 MT CO_2e,	9 million gallons water saved; $8,000 savings; adaptive
Increase recycling rates	Increase residential, commercial, and construction recycling above California minimuims	19 MT CO_2e, 58 MT CO_2e	121 tons of waste diverted

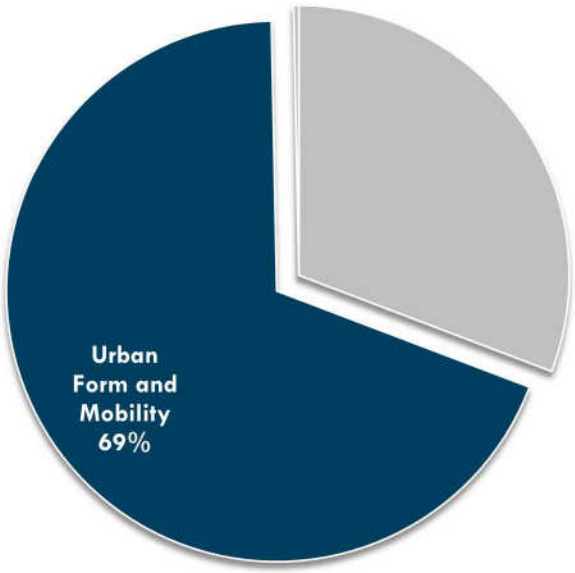
[1]Greenhouse gas emissions reduction and co-benefits represent annual estimates for 2020. For more information on the calculation of greenhouse gases and co-benefits, see Appendix E.

STRATEGY 2: URBAN FORM AND MOBILITY

Bellflower residents make trips to a variety of places each day. They commute to work, make a shopping trip, visit the doctor, or meet a friend for dinner. Each trip adds up, with over one million vehicle miles traveled (VMT) in the City each day, producing 196,721 MT CO_2e from transportation-related emissions in 2010. As a percentage, this was 58% of the City's greenhouse gas emissions.

Lowering transportation emissions requires making vehicles and their fuels cleaner, reducing the length of driving trips, managing the demand for travel, and providing alternatives such as walking, biking, and transit for travel. Addressing transportation emissions will have the added benefits of increasing walking and bicycing and improving the health of Bellflower residents. Strategy 2 builds on the planning policy and capital improvements already underway within the City to reduce VMT and improve the quality of life for residents and workers.

69% of Bellflower's emissions reduction in 2020
= 54,453 MT CO2e



PAVLEY CLEAN CARS STANDARD AND THE LOW CARBON FUEL STANDARD

AB 1493 directed the ARB to set more stringent vehicle fuel economy standards for cars and light trucks that reduce greenhouse gas emissions. The standards would reduce emissions from passenger vehicles by approximately 30% in 2016. It is expected that the clean cars standards will reduce greenhouse emissions from transportation sources by 31,980 MT CO_2e in 2020 and 45,858 MT CO_2e in 2030. The Low Carbon Fuel Standard requires that the carbon intensity of California's transportation fuels are reduced at least 10% by 2020. As a result of this standard, greenhouse gas emissions from transportation fuels are expected to decline by 14,892 MT CO_2e in 2020.

MAKE ROADWAYS MORE EFFICIENT

The City of Bellflower is already employing Intelligent Transportation Systems (ITS) to use information technology to better management roadway performance and efficiency. ITS projects will smooth traffic flow, reduce idling, eliminate bottlenecks, and management speed. Strategies may include signalization improvements to reduce delay, incident management to increase response time to breakdowns and collisions, real-time information regarding road conditions and directions, and management to reduce high free-flow speeds. These upgrades are expected into reduce greenhouse gas emissions by 1,584 MT CO_2e.

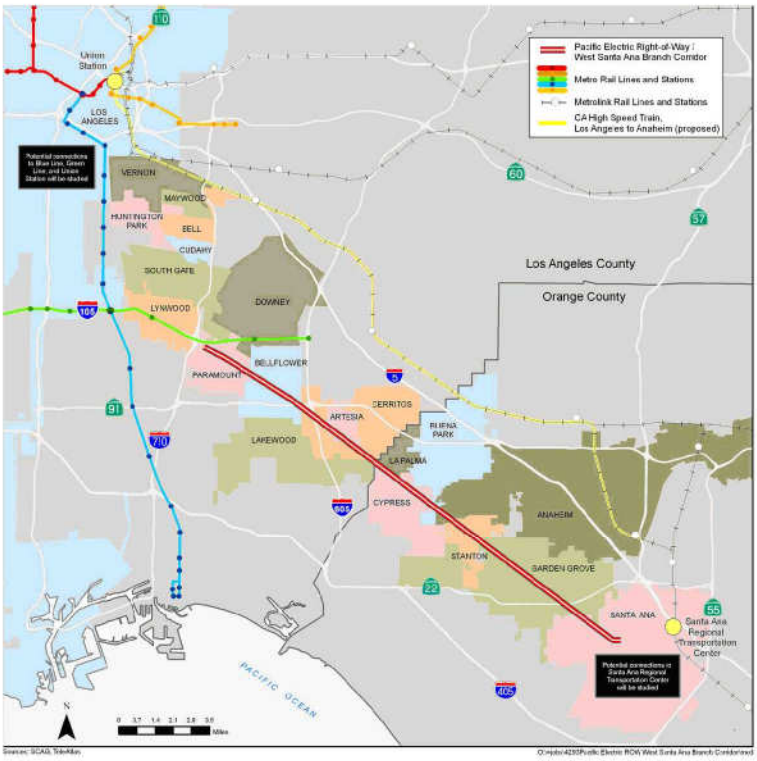
PROVIDE SAFE MOBILITY FOR ALL USERS

Complete streets ensure more convenient options for people to travel from one place to another, and can increase physical activity, reduce congestion and greenhouse gas emissions, and enhance the

safety of travelers. The City of Bellflower will continue to support multi-modal transportation by reconstructing streets for pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities as it is currently doing through its Capital Improvement Program. These include focusing on pedestrian visibility, improving the connections between neighborhoods and commercial areas, providing places to sit or gather, and including amenities that attract people of all ages and abilities. In 2020, pedestrian network improvements and traffic calming are expected to increase walk trips by 55,000, lower VMT by 4.5 million, and reduce greenhouse gas emissions by 2,000 MT CO_2e.

IMPROVE TRANSIT

By 2027, the 20-mile West Santa Ana Transit Corridor Project will connect Paramount to Santa Ana, including several stops in Bellflower. Funded through Measure R, the project is currently undergoing an Alternatives Analysis to explore different types of transit service within the congested corridor. The City proposes to prioritize transportation funding around the transit stations such as the Bellflower Transit Center to encourage walking and bicycling and to install park-and-ride lots. Transit and transit access improvements are estimated to reduce VMT by over 8 million annually in 2030, while increasing walking trips by over 1.5 million. As a result, greenhouses gas emissions are expected to decline by 400 MT CO_2e in 2020 and 3,893 MT CO_2e in 2030.



Along with the Santa Ana transit project and transit access improvements, the City proposes to expand local shuttle service to the Green Line. These measures will encourage non-automobile travel and reduce VMT and greenhouse gas emissions by 400 MT CO_2e.

CONTINUE TO PLAN FOR ELECTRIC VEHICLE INFRASTRUCTURE

Bellflower is continuing to pursue electric vehicle infrastructure, such as charging stations at locations around the City. In particular, the City is working to bring charging infrastructure to City lots through an Air Quality Management District grant. This measure is expected to reduce emissions by 389 MT CO_2e in 2020.

ENCOURAGE LAND USE INTENSIFICATION AND DIVERSITY

Increasing density and mixing land use types can decrease VMT since trips between uses are shorter and can be accomplished by walking, biking, or taking transit. The City of Bellflower proposes targeting future development in areas around transit stations. This will increase the number of potential transit riders and lower VMT. Together, these measures are estimated to reduce greenhouse gas emissions by 3,200 MT CO_2e in 2020 and 6,230 MT CO_2e in 2030.

TABLE 11: STRATEGY 2 – URBAN FORM AND MOBILITY

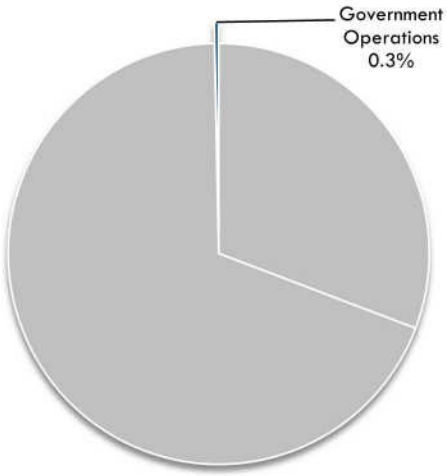
ACTION	DESCRIPTION	POTENTIAL GHG REDUCTION IN 2020, 2030[1]	KEY CO-BENEFITS IN 2020[1]
State Action 1: Clean Cars Standards (Pavley)	Sets more stringent vehicle fuel economy standards for cars and light trucks that reduce greenhouse gas emissions	31,980 MT CO_2e, 45,858 MT CO_2e	Reduced fuel consumption; fewer criteria pollutants
State Action 2: Low Carbon Fuel Standard	Requires the carbon intensity California's transportation fuels are reduced by 2020	14,892 MT CO_2e, 15,641 MT CO_2e	Reduced fuel consumption; fewer criteria pollutants
Continue implementation of Intelligent Transportation System improvements	Improve traffic flow by using Intelligent Transportation System elements to reduce delay, increase incident response time, and provide real-time information	1,584 MT CO_2e, 4,672 MT CO_2e	Reduced fuel consumption; fewer criteria pollutants
Continue making street and sidewalk improvements to ensure a safe and convenient system for pedestrian	Use the Capital Improvement Program to improve pedestrian safety and access through City-wide corridor improvements	1,600 MT CO_2e, 1,557 MT CO_2e	3.6 million fewer VMT; 55,000 additional walk trips; reduced fuel consumption; fewer criteria pollutants
Provide traffic calming measures	Use the Capital Improvement Program to improve pedestrian safety and access through City-wide corridor improvements	400 MT CO_2e, 389 MT CO_2e	891,347 fewer VMT; 1,250 additional walk trips; reduced fuel consumption; fewer criteria pollutants
Santa Ana Branch Transit Corridor	Work with Metro to develop station areas in Bellflower for the Santa Ana Transit Corridor	0 MT CO_2e, 3,115 MT CO_2e	Benefits accrued after 2020
Provide and expand local shuttle service	Provide and expand local shuttle services including to Green Line stations	400 MT CO_2e, 389 MT CO_2e	891,347 fewer VMT; 25 additional transit trips; reduced fuel consumption; fewer criteria pollutants
Improve transit access	Prioritize transportation funding around transit stations to encourage walking and bicycling and to calm traffic	400 MT CO_2e, 389 MT CO_2e	891,347 fewer VMT; 25 additional transit trips; reduced fuel consumption; fewer criteria pollutants
Install park-and-ride lots	Work with Metro and Caltrans to install new park-and-ride facilities near transit	0 MT CO_2e, 389 MT CO_2e	Benefits after 2020
Provide electric vehicle parking	Pursue electric vehicle infrastructure, such as charging stations at locations around the City, including City-owned lots	0 MT CO_2e, 389 MT CO_2e	Benefits accrued after 2020
Increase land use density	Target future development in areas around Downtown Bellflower, major transit nodes, and the Santa Ana Transit Corridor stations	1,600 MT CO_2e, 3,115 MT CO_2e,	3.6 million fewer VMT; 17,350 additional walk trips; 17,350 additional bike trips; 86,750 new transit trips; reduced fuel consumption; fewer criteria pollutants
Increase the diversity land use in urban developments	Mix land uses to encourage people to park once and walk and travel by non-automobile modes	1,600 MT CO_2e, 3,115 MT CO_2e,	3.6 million fewer VMT; 17,350 additional walk trips; 17,350 additional bike trips; 86,750 new transit trips; reduced fuel consumption; fewer criteria pollutants

[1]Greenhouse gas emissions reduction and co-benefits represent annual estimates for 2020. For more information on the calculation of greenhouse gases and co-benefits, see Appendix E.

STRATEGY 3: GOVERNMENT OPERATIONS

During the last decade, the City of Bellflower has taken steps to reduce energy and water use, lower vehicle fuel consumption, minimize employee commuting, and divert solid waste from landfills. City Hall lighting retrofits and energy efficiency installation have helped the City lower municipal energy use and costs. The City has also purchased 25 CNG vehicles, which reduces fossil fuel consumption and vehicle emissions. Taken together, these actions highlight the leadership of Bellflower on making municipal operations more efficient and effective. This strategy and its associated actions builds on previous projects by continuing energy and water conservation efforts and increasing open space and tree planting.

0.3% of Bellflower's emissions reduction in 2020
= 252 MT CO_2e



DEPARTMENT AND AGENCY WORK PLANS

To demonstrate the City's commitment to lead by example, each Department and Agency should develop and carry out an integrated Work Plan that includes specific actions to reduce energy use and costs, conserve water, divert waste, and lower fleet petroleum fuel consumption. Each Work Plan will define three to five actions that the agency will implement by 2015. Each agency will idenitify a senior official who will oversee the work plan, coordinating activities with other City agencies through participation in quarterly, interagency meetings. As part of the interagency coordination, the City should define numeric goals for reductions in fuel consumption, energy and water use, and solid waste generation for municipal operations and set non-numeric goals for renewable energy generation.

CONTINUAL BUILDING AND FACILITY ENERGY CONSERVATION

Over the past several years, the City has worked to reduce energy use and cost across municipal operations, while planning for additional energy conservation projects in the future. Bellflower proposes to continue to implement energy efficiency projects such as those at City Hall, Sims Park, Thompson Park Community Center, and other buildings and facilities. These recent projects are expected to reduce electricity use by 158,984 kWh and save the City $22,021.[51] It is estimated that additional energy efficiency projects at City Hall and Sims Park would reduce building energy use by over 200,000 kWh of electricity annually by 2020,[52] lowering greenhouse gas emissions from municipal operations by 76 MT CO_2e.

As part of efforts of the City to lead by example, the City may continue to improve building and facility efficiency by monitoring building performance and identifying cost-effective actions to reduce energy use. These actions may be continually updated and incorporated into the department work plans. Along with energy efficiency upgrades, Bellflower may reduce energy use and cost by improving operating standards

[51] City of Bellflower. 2009. *Bellflower Recovery Act Energy Efficiency and Conservation Block Grant Application*. Retrieved from http://www.energy.ca.gov/recovery/large_cities-counties/applications/bellflower/BELLFLOWER.pdf
[52] kW Engineering. 2012. *Bellflower Energy Audit: City Hall and Sims Park*.

in order to conserve energy and water use. Programs such as Energy Star provide guidelines for facility management, while LEED for O&M provides a checklist to assess the operation and maintenance of a building.

ACCELERATE MUNICIPAL VEHICLE FLEET REPLACEMENT

By 2012, the City of Bellflower had already purchased twenty-five compressed natural gas (CNG) vehicles. These vehicles have already been driven over 142,000 miles and used over 10,000 gallons of CNG. On average, CNG produces 6% to 11% fewer greenhouse gas emissions than gasoline.[53] The City may continue this pathway towards more efficient, alternative fuel vehicles by prioritizing vehicle purchases that lower petroluem use and curb greenhouse gas emission from fuel combustion.

INCREASE OPEN SPACE AND TREE PLANTINGS IN BELLFLOWER

Not only do parks and trees enhance the appearance of a community, they raise property values for an entire neighborhood, lower home energy use and cost, reduce air and water pollution, minimize the heat island effect, and absorb greenhouse gases like carbon dioxide. Bellflower proposes to plant approximately 559 trees during the next several years along the West Branch Greenway. By planting 559 trees, Bellflower expects to sequester 135 MT CO_2e.

REDUCE WATER USE

The water sector uses energy to collect, convey, treat, and deliver water to users, and then it uses additional energy to collect, treat, and dispose of the resulting wastewater. This energy use yields both direct and indirect greenhouse gas emissions. In 2010, Bellflower used recycled water for municipal irrigation and expects to increase the amount of recycled water used by 2020. Along with recycled water, Bellflower is working to plant more native and drought-resistant vegetation. Taken together, these measures are likely to lower municipal greenhouse gas emissions by over 7 MT CO_2e and save the City approximately 1.2 million gallons of potable water.

[53] 2012. U.S. Department of Energy. Alternative Fuels Database: Natural Gas Vehicle Emissions. http://www.afdc.energy.gov/vehicles/natural_gas_emissions.html.

TABLE 12: STRATEGY 3 – GOVERNMENT OPERATIONS

ACTION	DESCRIPTION	POTENTIAL GHG REDUCTION IN 2020, 2030[1]	KEY CO-BENEFITS IN 2020[1]
Identify a Senior Official	Identify a Senior Official from each City department and agency to carry out energy conservation and greenhouse gas reduction actions	Supportive measure, not quantified	
Develop department energy reduction and climate action work programs	By 2014, require all City departments and agencies to develop their own energy reduction and climate action work programs that define three to five actions that the agency will implement by 2015	Supportive measure, not quantified	Energy and water savings; cost savings
Coordinate interagency actions	Coordinate energy conservation and greenhouse gas conservation efforts through participation in quarterly, interagency meetings	Supportive measure, not quantified	Cost savings
Define City and department goals	Define numeric goals for reductions in fuel consumption, energy and water use, and solid waste generation for municipal operations and set non-numeric goals for renewable energy generation	Supportive measure, not quantified	
Continue building and facility energy upgrades	Continually monitor building performance and identify cost effective actions to reduce energy use.	110 MT CO_2e, 105 MT CO_2e	366,350 kWh reduced; $60,568 savings; adaptive
Accelerate City vehicle fleet replacement	Accelerate City vehicle fleet replacement by adding new vehicles	No commitment	Reduced petroleum consumption; fewer criteria pollutants; lower costs
Increase recycled water use	Increase the amount of recycled water used to irrigate municipal parks and landscaping	100 MT CO_2e, 100 MT CO_2e	8 million gallons water savings; adaptive
Accelerate water-efficient irrigation system deployment and native and drought-resistent vegitation planning	Replace all conventional irrigation and sprinkler systems with water-efficient irrigation systems by 2025 and transition to native and drought-tolerate vegitation	~ 100 MT CO_2e, 100 MT CO_2e	14 million gallons water savings; adaptive
Increase open space and tree plantings	Increase the amount of open space and number of shade tree plantings in Bellflower	135 MT CO_2e, 135 MT CO_2e	Reduced heat island; adaptive

[1]Greenhouse gas emissions reduction and co-benefits represent annual estimates for 2020. For more information on the calculation of greenhouse gases and co-benefits, see Appendix E.

STRATEGY 4: PREPARING FOR CLIMATE CHANGE

While many governments like Bellflower are taking steps to reduce greenhouse gas emissions, there is recognition that mitigation efforts will not reduce emissions levels in the atmosphere quickly enough to avoid some of the projected impacts of climate change. With this understanding, many state, regional, and local governments have initiated efforts to reduce the impacts of climate change. Climate change and variability will aggravate existing vulnerabilities and add to the complexity of improving planning outcomes. Many states and communities have recognized this fact and undertaken steps to incorporate climate change and associated impacts into planning initiatives. This strategy begins to outline steps that the City can take now to reduce the potential impacts of climate change on the people of Bellflower.

INCORPORATE CLIMATE CHANGE INTO EXISTING PLANNING AND DECISION-MAKING FRAMEWORKS

The City proposes to explore incorporating increases in extreme heat days, heat waves, and other climate-related events into existing planning documents and decision-making frameworks. The City should incorporate increases in extreme events into the Bellflower Local Hazard Mitigation Plan, and begin to define strategies to reduce climate vulnerability into all elements of the General Plan. The City should also consider integrating historic drought and future climate scenarios into the water supply planning to understand the impacts of climate change on surface and ground water supply.

For each project, program, infrastructure investment, and land use decision, City staff and leaders should also "ask the climate question" to incorporate a climate dimension into planning and decision-making: *What climate change impacts could affect the project and what steps can be taken to minimize these impacts?*

INCREASE THE RESILIENCY OF NEIGHBORHOODS, POPULATIONS, AND INDIVIDUALS TO THE POTENTIAL IMPACTS CLIMATE CHANGE

The impacts of climate change will not be evenly distributed across Bellflower's population as infants and children, the elderly, outdoor workers, asthmatics, individuals with limited English proficiency, special needs residents, and others will be more sensitive to climatic changes. The City proposes a series of actions that identifies populations vulnerable to climate change, monitors changes in the population over time, and establishes communication networks and an outreach program for these groups. Since neighborhoods and populations that already experience social, economic, and environmental injustice will likely bear a larger proportion of the public health impacts of climate change, Bellflower may explore directing resources to these communities to address current inequities and build adaptive capacity of these groups.

ADDRESS THE POTENTIAL HEALTH IMPACTS OF EXTREME TEMPERATURES AND HEAT WAVES BY EXPANDING ACCESS TO COOLING CENTERS AND AIR CONDITIONING AND IMPLEMENTING A HEAT ISLAND PROGRAM

Bellflower will likely experience a larger number of extreme heat days, warm nights, and more prolonged periods of hot weather. Periods of increased high temperatures or extended high temperatures can lead to increased heat-related mortality, cardiovascular-cause mortality, respiratory mortality, heart attacks, and other causes of mortality. Bellflower should work with Los Angeles County to expand access to the

drop-in, Cooling Centers for people vulnerable to high heat days. This set of actions includes working with regional and county agencies to organize a transportation-assistance program and disseminate information about the health effects of heat. Similarly, the City may explore starting a heat island program to reduce the heat threats of higher temperatures in urbanized areas of Bellflower. This strategy could include street and neighborhood-scale measures, such as tree planting and park expansion, and building-specific actions, like cool roofs and light-colored paving.

INCREASE BUSINESSES' AND WORKERS' RESILIENCY TO CLIMATE CHANGE

Storms and heat waves can disrupt the supply of and increase the demand for energy in California, and climate change is expected to increase the frequency, intensity, and duration of these extreme events. The City proposes to reduce electricity use by commercial and municipal accounts, particularly during peak periods, to avoid electricity disruptions. This includes deployment of energy efficiency measures and working with Southern California Edison to distribute information to business about Demand Response Programs in order to reduce energy use during peak demand.

Extreme heat events and worsening air quality will also disproportionately affect low-income residents, particularly those that labor outside. To help protect these workers, Bellflower will explore ways to work with employers to educate outdoor workers about how to stay cool during extreme heat events. Along with heat-related illness, exhaust from transportation and industrial sources causes ground-level ozone which accumulates at high concentrations in the atmosphere during warm days. Unhealthy concentrations of pollutants can trigger and worsen public health problems such as asthma, chest pain, coughing, and other respiratory diseases. Bellflower will explore working with the Air Quality Management District and County Public Health Department to establish a process (and expand the number of platforms e.g., social media) to notify schools, community organizations, residents, and businesses.

TABLE 13: STRATEGY 4 – PREPARING FOR CLIMATE CHANGE

ACTION	DESCRIPTION
4.1 Incorporate climate change into existing planning and decision-making frameworks	
Ask the Climate Question	For each project, program, infrastructure investment, and land use decision, City staff and leaders should "ask the climate question" to incorporate climate adaption strategies into planning and decision-making
Local Hazard Mitigation	Incorporate increases in extreme heat days, prolonged heat waves, and higher intensity precipitation events into the Local Hazard Mitigation Plan
General Plan	During the next General Plan update, begin to incorporate strategies to reduce climate vulnerability into all elements of the plan
4.2 Increase the resiliency of neighborhoods, populations, and individuals to the potential impacts climate change	
Community vulnerability assessment	Collaborate with state and/or county public health officials to conduct a community-wide assessment of the potential health impacts of climate change on Bellflower residents, identifying the neighborhoods, groups, and individuals most vulnerable to climate change and specific opportunities for the City to reduce vulnerability among specific groups
City website and social media	Make emergency preparedness information more visible on the Bellflower website and use social media to make information more readily available
Energy efficiency and water conservation	Leverage existing programs that promote energy efficiency and water conservation to retrofit the homes of Bellflower's most-vulnerable residents
Heat island	Target urban heat island programs to increase resilience to climate change
Food security	Improve access to healthy foods in low-income communities increase food security and promote sustainable local food systems to reduce food miles
4.3 Address the potential health impacts of extreme temperatures and heat waves by expand access to Cooling Centers and air conditioning and implementing a heat island program	
Transportation to Cooling Centers	Coordinate with regional and county agencies to organize a transportation-assistance program for individuals without access to vehicles
Heat warning systems	Work state and local organizations to develop a robust heat warning systems
High heat day information	Coordinate with the County Health Department to provide up-to-date information to residents about the health effects of heat and Cooling Center locations throughout the County
Air conditioning	Seek to reduce exposure to extreme heat by targeting the distribution of energy-efficient air conditioning in vulnerable populations
Light-colored, cool roofs	Explore a cool roofs policy for new residential development with air conditioning that applies the voluntary standards established by CalGreen
Light-colored paving	Evaluate on-going pilot programs for cool paving materials (examples include Chula Vista, Chicago) to determine whether the City should establish a cool paving policy
Vegetative cover and planting	Promote the increase in vegetative cover and green roofs to cool the environment through shading and evapotranspiration
South and west side tree planting	Require the planting of shade trees on the south and west facings sides of new residential and commercial development
4.4 Make businesses and workers more resilent to climate change	
Commercial energy demand	Work with Southern California Edison to distribute information to businesses about De-mand Response Programs in order to reduce energy use during peak demand
Municipal energy demand	Enroll Bellflower in the SCE Demand Response Program to reduce energy use
Protect workers	Work with employers to educate outdoor workers about how to stay cool during extreme heat events
Air quality notifications	Work with the Air Quality Management District and County Public Health Department to establish a process (and expand the number of platforms e.g., social media) to notify schools, community organizations, residents, and businesses

4 | IMPLEMENTATION

In order for the City to meet its low carbon goals, concerted efforts by many different parties will be necessary. For one, the City will need to continue to enact projects to directly improve the City's infrastructure and municipal buildings. The City will also need to revise or create new incentives for resource conservation, retrofits to existing buildings, and other aspects of the built environment controlled by private citizens and corporations. Finally, the City will need to revise or create new regulations that require buildings and development projects to achieve higher levels of environmental performance. With these new and revised regulations and incentives, the private sector will implement the physical changes to the non-publically-owned components of the built environment. In short, the City's climate change goals will be achieved through three broad efforts:

- City actions and programs;
- Upgrades and retrofits to existing buildings; and
- More stringent standards for new development projects.

This chapter of the CAP provides the framework for addressing these broad efforts. The Development Review section provides a process for evaluating individual projects, helping to assure compliance with specific land use and transportation strategies and assigning project specific mitigation and adaption measures.

The Community-wide Actions section provides an implementation program for City actions and programs that will help mitigate municipal and community greenhouse gas emissions and prepare for adaptation to a changing climate. Additionally, this section includes those measures the City will undertake in order to help facilitate upgrades and retrofits to existing buildings.

DEVELOPMENT REVIEW

One of the benefits of having a local CAP is the ability to streamline the environmental review of projects. By providing an emissions inventory, emissions targets, and strategies for reducing greenhouse gas emissions, the City has established a framework evaluating and mitigating greenhouse gas emissions. Part of these emissions reductions will need to be achieved through energy efficiency and emissions reducing features of new development. The following discussion and review processes (Figure 177) explains the steps the City will take to evaluate and streamline new development proposals under this Climate Action Plan. This review process has three primary compliance paths, which are described below:

1) Ministerial and exempt projects;
2) Projects that apply a combination City's Climate-Ready Development Standards; and
3) Projects that apply a set of custom GHG mitigation measures.

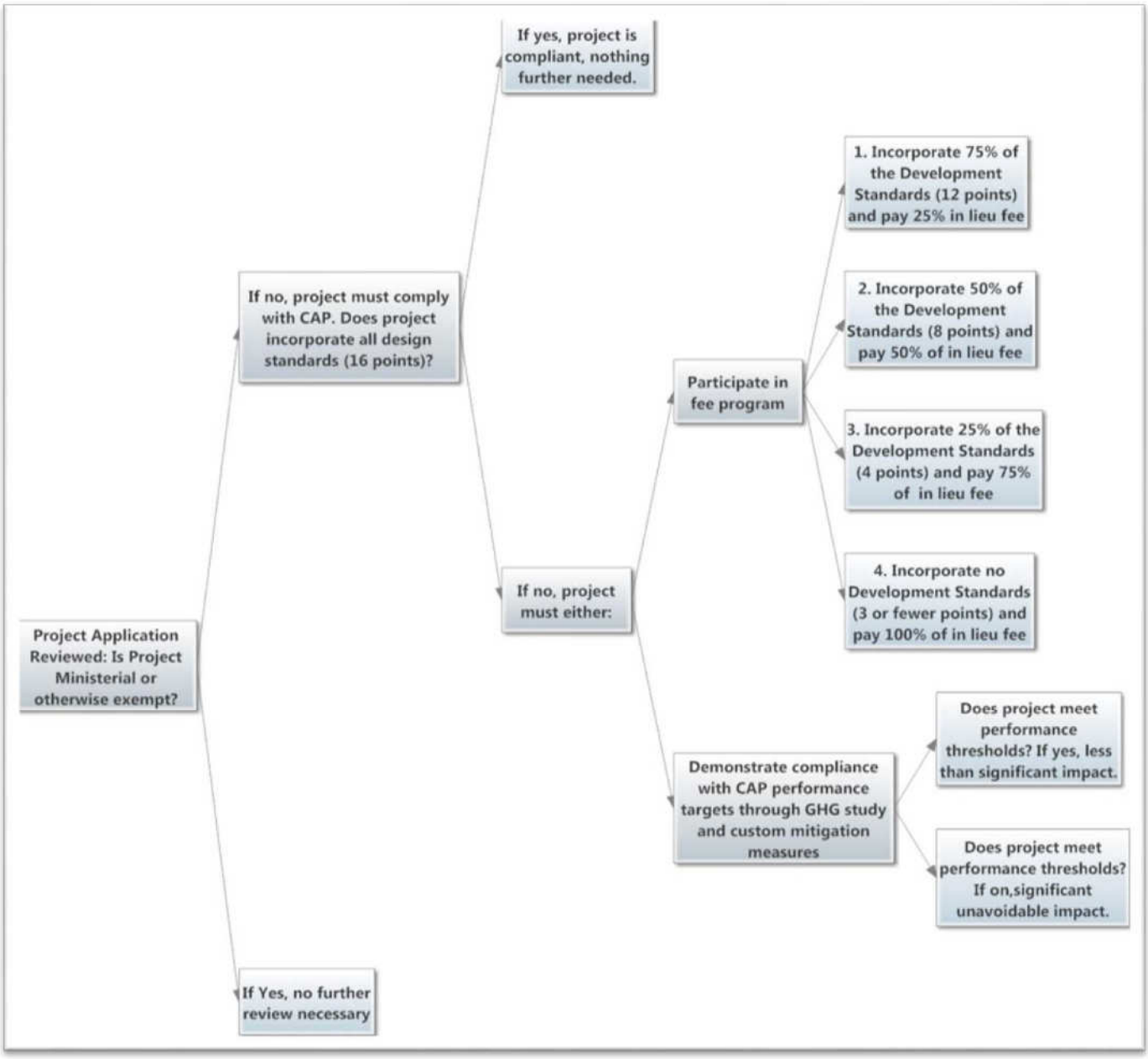


FIGURE 17: DEVELOPMENT REVIEW PROCESS

1. MINISTERIAL AND EXEMPT PROJECTS

Many of the land use and building permit applications that come before the City are ministerial permits, or permits that can be approved without input from the Planning Commission or City Council. Similarly, many projects, such as building tenant improvements, are exempt from CEQA review because of the scale and nature of the projects. These projects must be compliant with applicable state regulations, such as Title 24 and CALGreen, and City regulations, and compliance determination does not require any discretionary input. As such, these projects are assumed to be compliant with the goals of the CAP or so small that the increased GHG emissions would be miniscule.

2. APPLY CLIMATE-READY DEVELOPMENT STANDARDS

If a project is not a ministerial approval, then it must integrate some combination of the City's Climate-Ready Development Standards. Like many environmental enhancement and green design programs, the City's Climate-Ready Developent Standards have been established as a point-based menu system. Each standard has a point value assigned to it that reflects its general effectiveness at reducing GHG emissions and each standard has a qualifier that identifies which type of projects the standards apply to. New project applicants will have the discretion of choosing which measures they want to integrate into their project. For a project to be fully compliant with the goals of the CAP, an applicant must select measures that that have an associated point total of 16 points. In this way, the City hopes to provide project applicants with additional flexibility in determining their own approach to creating a Climate-Ready project.

To provide applicants with additional flexibility, the City may then establish an in lieu fee program that could allow applicants to pay into a fee program that would be used to offset GHG emissions through energy efficiency retrofits of the City's existing building stock.

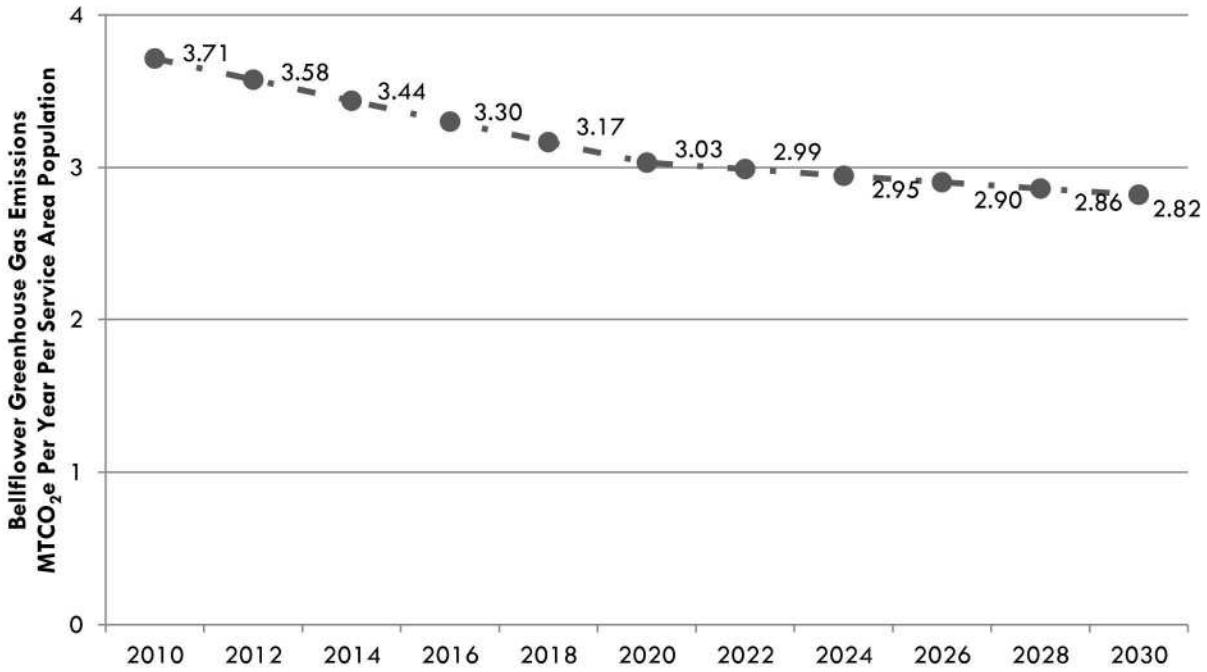
The following table identifies a possible City hybrid approach to incorporating Climate-Ready Developent Standards into a project with payment into an in lieu fee program. As the City studies and more fully develops the fee program, this structure may be refined, redesigned, or entirely removed from the CAP.

Points Achieved	Percent In Lieu Fee Due
16 or more points	0%
12 – 15 points	25%
8 – 11 points	50%
4 – 7 points	75%
Less than 4 points	100%

3. PERFORMANCE-BASED COMPLIANCE

In some cases, a project applicant may seek approval for a unique project type to which the Climate-Ready Development Standards are not readily applied. To provide additional flexibility in evaluate projects, the CAP provides performance targets that allow each project to be evaluated based on its actual greenhouse gas emissions. The CAP establishes an annual per service area population (which is comprised of new residents *and* new jobs) greenhouse gas emissions schedule that maps out the City's per service area population emissions. When evaluating a non-standard project, the City will require the project applicant to commission the preparation of a Greenhouse Gas Emissions Study that estimates the project's per service area population greenhouse gas emissions. If the operational year per service area population emissions are less than or equal to the City's per service area population target as shown in Figure 18, the project is assumed to be compliant with the CAP.

FIGURE 18: GREENHOUSE GAS EMISSIONS PER SERVICE AREA POPULATION



If the project is non-compliant, mitigatation actions will be required to the extent feasible. If a project's per service area population emissions are greater than the City's per service area target for it's operational year, the project will be required to apply all feasible mitigation measures in order to bring projected emissions in line with this schedule. If there are no feasible mitigation measures available, and if the emissions are greater than the target, the project is assumed to be non-compliant with the CAP and it will likely result in a significant environmental impact.

CLIMATE-READY DEVELOPMENT STANDARDS

Projects must achieve points from the following list of development standards.

Standard	Applicable Use				Applicable Scale	Points
	SFR	MFR	Com	MU		
1. Demonstrate the building will perform at least 15% better than the current Title 24. Three additional points can be achieved if the building will perform at least 30% better than the current Title 24.	✓	✓	✓	✓	All projects	3 - 6
2. Provide preferred parking for low-emitting and fuel efficient vehicles for 5% of the total vehicle parking capacity OR provide electric vehicle recharging stations for 3% of the total vehicle parking capacity.		✓	✓	✓	All projects	3
3. Hire a third-party commissioning agent to conduct a commissioning audit of the building and verify the building mechanical systems were installed and operate correctly.	✓	✓	✓	✓	All projects	3
4. Design and orient 75% or more new buildings such that one axis of each building is at least 1.5 times longer than the other, and such that the longer axis is within 15 degrees of the geographical east/west axis. The length to width ratio shall be applied only to the length of walls enclosing conditioned spaces; walls enclosing unconditioned spaces such as garages, arcades, or porches cannot contribute to standard achievement. South-facing vertical surfaces of buildings counting towards standard achievement must not be more than 25% shaded at time of initial occupancy (measured at noon on December 21st).	✓	✓	✓	✓	All projects	3
5. Implement a commute trip reduction program if the project generates more than 50 new permanent jobs.			✓	✓	All projects	3
6. Install solar energy generation to meet 35% of the project's energy demand. The solar panels should be onsite, but can be located offsite and within the City Limits, at the approval of the Planning Director. Two additional points can be achieved for meeting 50% of the project's energy demand through installed solar energy generation.	✓	✓	✓	✓	All projects	3 - 5
7. Use porous materials on all paved areas except fire lanes or specified fire access as required by the Fire Department.	✓	✓	✓	✓	All projects	2
8. All non-permeable paving materials shall be high albedo materials with a Solar Reflectance Index of at least 29.	✓	✓	✓	✓	All projects	2

Standard	Applicable Use				Applicable Scale	Points
	SFR	MFR	Com	MU		
9. If a new development is within ½ mile of a transit stop and requires off-street parking, parking must be unbundled from the rental or for-sale cost.		✓	✓	✓	All projects	2
10. Provide continuous rows of appropriately spaced trees (every 25 feet) along all streets (or an equivalent number of trees placed offsite at the discretion of the Planning Director). Trees shall be of a type and nature that have broad canopies and provide ample shade. Evergreen trees are preferred. Palm trees shall be prohibited from consideration towards achieving this standard.	✓	✓	✓	✓	All projects	2
11. If a facade faces a street or sidewalk, 30% or greater of its continuous length shall not be blank (without windows and doors). Walls with public art installations such as murals may be exempted.		✓	✓	✓	All projects	2
12. It is prohibited for more than 25% of the linear street frontage of new buildings to be garages and service bay openings.	✓	✓	✓	✓	All projects	2
13. New multi-unit developments must install electricity, gas, and water meters for each unit.		✓	✓	✓	All projects	2
14. Design and install landscaping to minimize summer heat gain through: (1) the placement of evergreen trees along the west façade of buildings, (2) the placement of trees so as to shade 50% of the site's hardscape with 5 years of construction, and (3) a covenant recorded that provides for the ongoing maintenance so as to maintain the trees' shade. Trees shall be of a type and nature that have broad canopies and provide ample shade. Evergreen trees are preferred. Palm trees shall be prohibited from consideration towards achieving this standard.	✓	✓	✓	✓	All projects	2
15. Provide at least one secure, enclosed bicycle storage space, separate and independent from the required automobile parking areas, per occupant for a percentage of the planned occupancy and no less than one space per unit. Points shall be achieved as follows: a. For provision of spaces for 15% of planned occupancy, 1 point; b. For provision of spaces for 30% of planned occupancy, a total of two points; c. For provision of spaces for 45% of planned occupancy, a total of three points;		✓		✓	All projects	1-4

Standard	Applicable Use				Applicable Scale	Points
	SFR	MFR	Com	MU		
d. For provision of spaces for 50% or more of planned occupancy, a total of four points.						
16. Provide visitor bicycle racks on-site with at least one bicycle space per 10,000 square feet of new-non-retail space or 5,000 square feet of retail space but not fewer than four bicycle spaces per building or 1 space per business (whichever is greater).			✓	✓	All projects	2
17. Provide secure visitor bicycle racks on-site, with at least one bicycle space per 10 new dwelling units and not less than four space per project site.		✓		✓	All projects	2
18. Provide at least one on-site shower with changing facility for any development with 100 or more new workers and at least one additional on-site shower with changing facility for every 150 new workers thereafter.			✓	✓	All projects	2
19. Provide at least one additional tree per unit above what is required by code. Trees shall be of a type and nature that have broad canopies and provide ample shade. Evergreen trees are preferred. Palm trees shall be prohibited from consideration towards achieving this standard.	✓	✓		✓	All projects	2
20. Provide at least one tree per 500 square feet of building area. Trees shall be of a type and nature that have broad canopies and provide ample shade. Evergreen trees are preferred. Palm trees shall be prohibited from consideration towards achieving this standard.			✓	✓	All projects	2
21. Incorporate appropriate traffic calming features such as curb extensions, mini-circles, parking chicanes, roundabouts, medians, raised street crossings or similar features.	✓	✓	✓	✓	Projects greater than 5 acres	1
22. Minimize the number of driveway cuts that intersect with sidewalks and other pedestrian walkways.		✓	✓	✓	All projects	1
23. Delineate crosswalks at every intersection within ½ mile of the project site.	✓	✓	✓	✓	Projects greater than 5 acres	1
24. Construct sidewalks on both sides of streets (except where the Bellflower Municipal Code exempts such) for frontage controlled by the project applicant that is contiguous to the project site.	✓	✓	✓	✓	All projects	1
25. Create external pedestrian and bicycle connections every 800 feet along the project perimeter.	✓	✓	✓	✓	Projects greater than	1

Standard	Applicable Use				Applicable Scale	Points
	SFR	MFR	Com	MU		
					5 acres	
26. Continue to divert 100% of all non-hazardous inert construction and demolition debris for recycling and salvage and divert 75% of all remaining construction and demolition debris.	✓	✓	✓	✓	All projects	1
27. Locate the majority entry points to new buildings within a ¼ mile of a transit stop.		✓	✓	✓	All projects	1
28. Use salvaged, refurbished, or recycled materials such that the sum of these materials constitutes at least 5%, based on cost, of the total value of materials on the project. On additional point can be achieved if the use of these materials constitutes at least 10% of the total value of materials.	✓	✓	✓	✓	All projects	1-2
29. Provide designated space, facilities, and services for users to recycle and compost waste.		✓	✓	✓	All projects	1
30. Use only high efficiency lighting.	✓	✓	✓	✓	All projects	1
31. Meet at least 5% of a project's indoor water use through a combination of reclaimed water and gray water. Providing plumbing for future reclaimed water availability will meet the requirements of this standard if reclaimed water is not yet available at the site.	✓	✓	✓	✓	All projects	1
32. Design landscaping for very-low water use.	✓	✓	✓	✓	All projects	1
33. Utilize artificial turf in place of grass.	✓	✓	✓	✓	All projects	1
34. Use of efficient irrigation systems and weather-based irrigation controllers.	✓	✓	✓	✓	All projects	1
35. Provide at least one of the following sidewalk amenities like benches, trash receptacles, drinking fountains, and/or public art in new mixed-use and multifamily, for every 50 feet of sidewalk frontage.		✓		✓	All projects	1
36. New transit stops must provide seating, shade, and trash receptacles, if a project results in rebuilding, relocating, or new construction of a transit stop.	✓	✓	✓	✓	All projects	1
37. Locate all new off-street surface parking lots at the side or rear of buildings, leaving building frontages facing streets free of surface parking lots. Side lot parking shall be limited to double stacked drive aisles.		✓	✓	✓	All projects	1

COMMUNITY-WIDE ACTIONS

As discussed above, the community-wide actions section provides an implementation program for City actions and programs that will help mitigate municipal and community wide greenhouse gas emissions and prepare for adaptation to a changing climate. The actions are all organized under the four strategies presented in the CAP. The implementation actions are organized into a matrix which will provide the City, community groups, individuals, and partner government agencies with a work plan to realize Bellflower's low carbon future. Note, while the CAP analyzes the benefits of state and federal programs, the following list of actions is limited to local actions and responsibilities.

MATRIX ORGANIZATION

In the matrix that follows, each implementation action includes the following information:

- **Current/Future** – Under each goal, the actions are classified as either a current (on-going) project that the City expects will continue and/or expand, or a future project that the City wants to pursue.
- **Implementation Action** – A short phrase to describe the action (almost like a title).
- **Description** – An actionable description of the implementation action. Some actions include endnote references to supportive background material or example projects.
- **Timeframe** – A broad timeframe that refers to when the action should be implemented. The timeframes are as follows:
- Ongoing – Current/ongoing projects
- Immediate – Within one year of CAP adoption.
- Short – Within 2 to 4 years of CAP adoption.
- Medium – Between approximately 5 and 7 years of CAP adoption.
- Long –10+ years after CAP adoption.
- **Relative Cost** – The relative cost of each action. Please note that these cost estimates are qualitative and that no quantitative, statistically valid cost estimating was completed for the project. This information is based on the best professional judgment of City staff and the consultant team. The following are the symbols representing relative cost:
- $ = low cost compared to other implementation actions. Examples include actions that completed with internal staff resources.
- $$ = medium cost relative to other implementation actions. Examples include detailed studies and reports.
- $$$ = high cost relative to other implementation actions. Examples included projects that require infrastructure changes.
- **Responsible Party** – An identification of the agency or department responsible for implementing the action.

TABLE 14: BELLFLOWER CLIMATE ACTION PLAN IMPLEMENTATION ACTIONS

	IMPLEMENTATION ACTION	DESCRIPTION	TIMEFRAME	RELATIVE COST	RESPONSIBLE PARTY
Strategy 1 – Buildings					
Current	Promote existing energy efficient appliance upgrade programs	Promote existing energy efficient appliance upgrade programs that encourage homeownwers to exchange old appliances for newer, more efficient models	Short	$$	Community Development
Future	Promote and expand residential energy efficiency and weatherization programs	Facilitate voluntary energy efficiency improvements and upgrades in existing residential buildings by expanding participation in and promotion of existing programs. Explore the development of an in-lieu fee for energy efficiency.	Short	$	Community Development
Future	Increase recycled water use	Accelerate the use of recycled water for irrigation and landscaping	Short	$$	Public Works, Municipal Water System
Future	Accelerate and expand low-flow water fixture programs	Accelerate the installation of low-flow water fixtures in residential homes and expand the program to commercial businesses	Short	$$	Community Development
Curre	Increase recycling rates	Increase residential, commercial, and construction recycling above California minimuims	Short	$	Public Works
Strategy 2: Urban Form and Mobility					
Current	Continue implementation of Intelligent Transportation System Plan	Improve traffic flow by using Intelligent Transportation System elements to reduce delay, increase incident response time, and provide real-time information	Ongoing	$$$	Public Woks, Parks and Recreation
Current	Continue making street and sidewalk improvements to ensure a safe and convenient system for pedestrian	Use the Capital Improvement Program to improve pedestrian safety and access through City-wide corridor improvements	Ongoing	$$	Community Development, Public Works
Curr	Provide traffic calming measures	Use the Capital Improvement Program to improve pedestrian safety and access through City-wide corridor improvements	Ongoing	$$	Community Development, Public Works
Futur	Santa Ana Branch Transit Corridor	Work with Metro to develop station areas in Bellflower for the Santa Ana Transit Corridor	Long	$	Community Development
Future	Provide and expand local shuttle service	Provide and expand local shuttle services including to Green Line stations	Medium	$$$	Parks and Recreation, Community Development

Futur	Improve transit access	Prioritize transportation funding around transit stations to encourage walking and bicycling and to calm traffic	Medium	$$	Community Development
Future	Install park-and-ride lots	Work with Metro and Caltrans to install new park-and-ride facilities near transit	Long	$$$	Community Development, Public Works
Future	Provide electric vehicle parking	Pursue electric vehicle infrastructure, such as charging stations at locations around the City, including City-owned lots	Long	$	Public Works, Community Development
Future	Increase land use density	Target future development in areas around Downtown Bellflower, major transit nodes, and the Santa Ana Transit Corridor stations	Long	$	Community Development
Futur	Increase the diversity land use in urban developments	Mix land uses to encourage people to park once and walk and travel by non-automobile modes	Long	$	Community Development
Strategy 3 – Government Operations					
Future	Identify a Senior Official	Identify a Senior Official from each City department and agency to carry out energy conservation and greenhouse gas reduction actions	Immediate	$	All
Future	Develop department energy reduction and climate action work programs	By 2014, require all City departments and agencies to develop their own energy reduction and climate action work programs that define three to five actions that the agency will implement by 2015	Short	$	All
Future	Coordinate interagency actions	Coordinate energy conservation and greenhouse gas conservation efforts through participation in quarterly, interagency meetings	Immediate	$	Community Development
Future	Define City and department goals	Define numeric goals for reductions in fuel consumption, energy and water use, and solid waste generation for municipal operations and set non-numeric goals for renewable energy generation	Short	$	All
Curr	Continue building and facility energy upgrades	Continually monitor building performance and identify cost effective actions to reduce energy use.	Ongoing	$$$	Public Works
Future	Accelerate City vehicle fleet replacement	Accelerate City vehicle fleet replacement by adding greenhouse gas and criteria pollutent emissions rates to the factors used to determine replacment of City vehicles	Short	$$$	Public Works
Curr	Increase recycled water use	Increase the amount of recycled water used to irrigate municipal parks and landscaping	Ongoing	$$	Public Works, Municipal Water System
Current	Accelerate native and drought-resistent vegitation planning	Transition to native and drought-tolerate vegitation	Ongoing	$$	Parks and Recreation, Public Works
Current	Increase open space and tree plantings	Increase the amount of open space and number of shade tree plantings in Bellflower	Ongoing	$$	Parks and Recreation, Public Works, Community Development

Strategy 4: Preparing for Climate Change					
Future	Ask the Climate Question	For each project, program, infrastructure investment, and land use decision, City staff and leaders should "ask the climate question" to incorporate a climate dimension into planning and decision-making	Short	$	All
Future	Local Hazard Mitigation	Incorporate increases in extreme heat days, prolonged heat waves, and higher intensity precipitation events into the Bellflower Local Hazard Mitigation Plan	Short	$	Public Safety, Community Development
Future	General Plan	During the next General Plan update, begin to incorporate strategies to reduce climate vulnerability into all elements of the plan	Short	$	Community Development, Public Safety, Public Works
Future	Community vulnerability assessment	Collaborate with state and/or county public health officials to conduct a community-wide assessment of the potential health impacts of climate change on Bellflower residents, identifying the neighborhoods, groups, and individuals most vulnerable to climate change and specific opportunities for the City to reduce vulnerability among specific groups	Short	$$	Community Development
Future	City website and social media	Make emergency preparedness information more visible on the Bellflower website and use social media to make information more readily available.	Short	$	Public Affairs
Future	Energy efficiency and water conservation	Leverage existing programs that promote energy efficiency and water conservation to retrofit the homes of Bellflower's most-vulnerable residents.	Medium	$	Public Works
Future	Heat island	Target urban heat island programs to increase resilience to climate change.	Short	$$	Community Development, Public Safety
Future	Food security	Improve access to healthy foods in low-income communities increase food security and promote sustainable local food systems to reduce food miles.	Short	$	Community Development, Parks and Recreation
Future	Transportation to Cooling Centers	Organize a transportation-assistance program for individuals without access to vehicles.	Medium	$$	Parks and Recreation, Community Development
Futur	Heat warning systems	Work state and local organizations to develop a robust heat warning systems.	Medium	$$	Community Development
Future	High heat day information	Coordinate with the County Health Department to provide up-to-date information to residents about the health effects of heat and Cooling Center locations throughout the County.	Long	$	Community Development

Future	Air conditioning	Seek to reduce exposure to extreme heat by targeting the distribution of energy-efficient, air conditioning in vulnerable populations.	Medium	$$$	Community Development, Public Safety
Future	Light-colored, cool roofs	Explore a cool roofs policy for new residential development with air conditioning that applies the voluntary standards established by CalGreen.	Medium	$	Public Works, Community Development
Future	Light-colored paving	Evaluate on-going pilot programs for cool paving materials (examples include Chula Vista, Chicago) to determine whether the City should establish a cool paving policy.	Medium	$	Public Works, Community Development
Futur	Vegetative cover and planting	Promote the increase in vegetative cover and green roofs to cool the environment through shading and evapotranspiration.	Short	$$	Public Works, Community Development
Future	South and west side tree planting	Require the planting of shade trees on the south and west facings sides of new residential and commercial development.	Short	$	Community Development, Public Works
Future	Commercial energy demand	Work with Southern California Edison to distribute information to business about Demand Response Programs in order to reduce energy use during peak demand.	Short	$	Community Development, Public Work

APPENDICES

APPENDIX A: GLOSSARY

APPENDIX B: REGULATORY FRAMEWORK

APPENDIX C: ASSUMPTIONS IN GREENHOUSE GAS EMISSIONS ANALYSIS

APPENDIX D: GREENHOUSE GAS EMISSIONS INVENTORY

APPENDIX A: GLOSSARY

AB – Assembly Bill

Absolute Emissions – The total quantity of emissions, not expressed in relative terms or as a ratio – in contrast to measures such as Emissions Intensity and CO_2e.

Air Resources Board (ARB) – California's Legislature established the Air Resources Board (ARB) in 1967 to attain and maintain healthy air quality, conduct research into the causes of and solutions to air pollution, and to systematically attack the serious problems caused by motor vehicles.

Alternative Planning Strategies (APS) – If California's ARB determines that a region's Sustainable Communities Strategy will not achieve the GHG emission reduction targets (related to SB 375), a Metropolitan Planning Organization (MPO) must prepare an Alternative Planning Strategy (APS), separate from the RTP, identifying alternative development patterns, transportation projects or transportation policies needed to achieve the targets.

Baseline – An imaginary line or standard by which things are measured or compared, e.g., "the established baseline for the budget."

Business-as-usual (BAU) – The scenario in which policies to reduce emissions are not enacted. The business-as-usual scenario assumes growth will occur following existing policies and regulations.

Break from BAU – The difference between the business-as-usual and the outcome of a proposed development scenario.

California Climate Action Registry (CCAR) - A private non-profit organization originally formed by the State of California. The California Registry serves as a voluntary greenhouse gas (GHG) registry to protect and promote early actions to reduce GHG emissions by organizations.

California Energy Commission (CEC) – The CEC is California's primary energy policy and planning agency. It is responsible for promoting energy efficiency and renewable energy.

California Environmental Quality Act (CEQA) – Adopted in 1970 and incorporated in the Public Resources Code §§21000-21177. Its basic purposes are to: inform governmental decision makers and the public about the potential significant environmental effects of proposed activities; identify ways that environmental damage can be avoided or significantly reduced; require changes in projects through the use of alternatives or mitigation measures when feasible; and disclose to the public the reasons why a project was approved if significant environmental effects are involved.

Climate Action Plan (CAP) – A planning document developed for or by a governmental body aimed to reduce greenhouse gas emissions within its jurisdiction. A CAP typically provides an inventory, sets benchmark goals, and provides policymakers with a set of recommendations.

Corporate Average Fuel Economy (CAFE) – CAFE are a set of federal regulations intended to improve the fuel economy of cars and light trucks in the US. It sets a minimum sales-weighted average fuel

economy, in miles-per-gallon, of cars and trucks with a gross vehicle weight rating of 8,500 pounds or less.

Carbon Budget – Is the sum of the total quantity of GHGs that can be emitted by a sector or organization

Carbon Intensity – Carbon intensity of a given activity sector (or energy supply) defined as the amount of carbon emitted per unit.

CH_4 - Methane, a greenhouse gas.

City – "City" refers to buildings, land, and other such items within the geographic boundary of the City of Bellflower. City is comprised of the "community" and "municipal" portions.

CO_2 – Carbon Dioxide, a greenhouse gas.

CO_2e – The universal unit of measurement used to indicate the global warming potential (GWP) of each, or a combination of greenhouse gases. It is used to evaluate the impacts of releasing (or avoiding the release of) different greenhouse gases.

CO_2e per-capita – The ratio of carbon-equivalent emissions to population.

Community –"Community" refers to buildings, land, or other such items not owned or operated by the City of Bellflower.

DU – Dwelling Unit

EIR – Environmental Impact Report

Embodied Energy – The amount of energy consumed over the lifecycle of a material – including energy used in the manufacturing or extraction, delivery, and the disposal or recycling of the material.

Emissions Intensity – The ratio of greenhouse gas emissions to a unit of relevant measurement. It measures the polluting level of a given activity.

Environmental Protection Agency (EPA) – An agency of the federal government with the mission to protect human health and the environment by writing and enforcing regulations.

General Reporting Protocol (GRP) – A collection of procedures and guidelines for calculating and reporting GHG emissions from a number of general and industry-specific categories. It was developed and is maintained by CCAR.

GHG – Greenhouse gas.

GHG Intensity – See "Emissions Intensity."

Greenhouse Gas Inventory – An accounting of the amount of greenhouse gases discharged into that atmosphere, usually within a given jurisdiction.

Global Warming Potential (GWP) – The index used to translate the level of emissions of various gases into a common measure in order to compare the relative radiative forcing of different gases without directly calculating the changes in atmospheric concentrations. GWPs are calculated as the ratio of the

radiative forcing that would result from the emissions of one kilogram of a greenhouse gas to that from emission of one kilogram of carbon dioxide over a period of time (usually 100 years).

ICLEI (Local Governments for Sustainability) – An international association of local governments and local government organizations that have made a commitment to sustainable development.

IPCC – Intergovernmental Panel on Climate Change

Kilowatt (kW) – One thousand watts.

Kilowatt-hour (kWh) – One thousand watt-hours.

Leadership in Energy and Environmental Design (LEED) – a family of green building rating systems maintained by the US Green Building Council (USGBC). This includes (among others) LEED-NC, or LEED for New Construction; LEED-EB, LEED for Existing Buildings; and LEED-CS, LEED for Core and Shell.

Low Carbon Fuel Standard (LCFS) – The LCFS is a rule enacted by California in 2007 to reduce the carbon intensity of transportation fuels, as compared with traditional gasoline and diesel. Criteria were set by the Air Resources Board in April 2009, but the rule will not take effect until 2011.

Megawatt-hour (MWh) – One million watt-hours.

Metropolitan Planning Organization (MPO) – The body that carries out and puts forth Regional Transportation Plans. They were created by the 1962 Federal-Aid Highway Act and are required for any urban area with a population greater than 50,000.

MT CO_2e – Metric Tons Carbon Dioxide Equivalent

MMT CO_2e – Million Metric Tons Carbon Dioxide Equivalent

Municipal – "Municipal" refers to buildings, land, or other such items owned and operated by the City of Bellflower

N_20 – Nitrous Oxide, a greenhouse gas.

Office of Planning and Research (OPR) – Encompassing five main units, (The State Clearinghouse, The Legislative Unit, The Policy and Research Unit, The Office of Small Business Advocate, Advisory for Military Affairs, the OPR is tasked to develop draft CEQA guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions. The OPR plays a critical role in the Governor's Administration, providing legislative and policy research support for the Governor's office.

PV – A photovoltaic is an array of cells containing material that converts solar radiation into electricity.

Reclaimed/Recycled Water – Wastewater that has been treated to remove impurities, and then allowed to recharge an aquifer. This is typically done by using the reclaimed water for irrigation. Typically, reclaimed water is intended only for non-potable uses such as landscaping maintenance.

Regional Transportation Plan (RTP) – A Regional Transportation Plan is a long-term blueprint of a region's transportation system (related to SB 375).

Renewable Portfolio Standard (RPS) – State of California regulation requiring that publicly-owned utilities produce 33% of their electricity using renewable energy sources. Three California publicly-owned

utilities are Southern California Edison (SCE), San Diego Gas & Electric (SDG&E), and Pacific Gas & Electric (PG&E)

SB – Senate Bill

Southern California Edison (SCE) – California publicly-owned utility providing electricity large areas of Southern California, including the city of Bellflower.

SF – Square feet.

Sustainable Communities Strategy (SCS) – As part of their Regional Transportation Plans (RTPs), Metropolitan Planning Organizations (MPOs) will have to prepare an SCS that demonstrates how regional GHG targets will be met (related to SB 375).

TCRP – Transportation Cooperative Research Program

TDM – Transportation Demand Management

Title-24 – Title-24 is the portion of the California Energy Code that regulates building envelopes and building energy efficiency.

TMA – Transportation Management Agency

TOD – Transit Oriented Development

TRB – Transportation Research Board

ULI – Urban Land Institute

United States Green Building Council (USGBC) – A non-profit trade organization headquartered in Washington, DC, dedicated to promoting green building practices.

VMT – Vehicle Miles Traveled

Watt – A unit of power, or a rate of electrical flow; it is equal to one joule of energy per second. It is used typically to describe electricity capacity or peak consumption. When expressed over a length of time (as in a watt-hour), it is a unit of energy.

Zero Net Energy (ZNE) – An entity that produces as much energy as it consumes. This often refers to a building, or group of buildings.

APPENDIX B: REGULATORY FRAMEWORK

During the past decade, the State of California made great strides in developing a regulatory framework to curb future greenhouse gas emissions and to adapt to the consequence of climate change. California adopted a series of policies, programs, and regulations that set targets for greenhouse emission reductions and outlined strategic actions that enable government agencies, public institutions, and businesses to collaborate to achieve these reduction targets. The following section describes a number of the key state-level initiatives.

GLOBAL WARMING SOLUTIONS ACT – AB 32 (2006)

In 2005 the governor signed Executive Order S-3-05, which set targets for the state to reduce its greenhouse gas emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050. The state assembly followed by passing Assembly Bill 32 (AB 32), the Global Warming Solutions Act. AB 32 directs the California Air Resources Board (ARB) to develop the rules and regulations necessary to achieve the greenhouse gas emissions reduction targets. In 2008, the ARB approved the California Climate Change Scoping Plan (Scoping Plan), which contains the primary strategies California will use to reduce the greenhouse gas emissions that cause climate change. The Scoping Plan outlines a combination of policies, programs, and practices needed to reduce statewide emissions by 15 percent below current levels (the equivalent of 1990 levels) by 2020. Given projected trends, this would be approximately 30 percent below business-as-usual levels anticipated for 2020. Effectively, the Scoping Plan establishes a statewide carbon budget that will allow the State to grow while still meeting its emissions reduction targets. The Scoping Plan strategies include energy efficiency measures, regional transportation-related greenhouse gas emissions targets, a renewable portfolio standard, a cap-and-trade program, a light duty vehicle greenhouse gas standard, and a low carbon fuel standard.

The Scoping Plan recognizes the essential partnership between state, regional, and local governments to reduce greenhouse gas emissions. Local governments have authority over activities that produce both direct and indirect greenhouse gas emissions through land use planning and zoning, general permitting, local ordinances, and municipal operations. Therefore, many of the strategies outlined in the Scoping Plan need local governments to take action. The Scoping Plan also encourages local governments to inventory greenhouse gas emissions, adopt greenhouse gas emissions reduction targets, and develop local action plans to lower emissions. The continued re-inventory of Bellflower's greenhouse gas emissions will continue to serve these purposes.

SUSTAINABLE COMMUNITIES STRATEGY – SB 375 (2008)

In California, the transportation sector produces between 35% and 40% of the state's greenhouse gas emissions, and the Scoping Plan includes a number of measures for the sector. In 2008 California adopted Senate Bill 375 (SB 375), the Sustainable Communities Strategy. SB 375 attempts to integrate regional land use, transportation, and housing planning in order to reduce greenhouse gas emissions from cars and trucks. SB 375 directs the ARB to set regional greenhouse gas reductions targets for cars and trucks, to assign each metropolitan planning organization (MPO) a target, and to require each

MPO to create a plan (a Sustainable Community Strategy) to achieve that target. The law provides relief from specific California Environmental Quality Act (CEQA) requirements for infill development projects that are consistent with the Sustainable Community Strategy. SB 375 provides one method for local governments to achieve regional transportation-related greenhouse gas emissions targets described in the Scoping Plan.

The Southern California Association of Governments (SCAG) is the largest MPO in California, representing six counties and over 180 cities, including Bellflower. The SCAG region comprises 15 subregions, and Bellflower is located within the Gateway Cities Council of Governments (COG) planning area. The Gateway Cities COG consists of 16 cities. Unique to Southern California, SB 375 allows each subregion to develop a Sustainable Communities Strategy (SCS), which SCAG will then incorporate into the regional SCS. The Gateway Cities are one of only two COGs in Southern California to exercise this option and develop their own SCS.

The Gateway COG completed its SCS in 2011, tailoring the strategies to meet the needs of individual communities. The Gateway SCS builds on local strategies that Gateway communities have pursued over the past decade. This portfolio of strategies was combined with regional and subregional transportation projects to provide a roadmap for local governments to reduce emissions. If implemented, the SCS estimates that strategies and transportation projects would reduce greenhouse gas emissions per capita from the 2005 benchmark by 8.4% in 2020 and 15% in 2035, exceeding the regional targets set by the ARB.[54]

SCAG completed their SCS in 2012. The regional SCS incorporates the work of the Gateway Cities and describes the goals and benefits of the SCS, the processes used to create the SCS, SCS requirements, and next steps. SCS strategies are organized into land use strategies, transportation supply management, transportation demand management, vehicle technology, and other areas.

PAVLEY VEHICULAR EMISSIONS CODES – AB 1493 (2002)

AB 1493 directed the ARB to set more stringent vehicle fuel economy standards for cars and light trucks that reduce greenhouse gas emissions. The Pavley bill required approval from the federal government, and in 2009, the U.S. Environmental Protection Agency granted California a waiver that enabled the state to enforce stricter tailpipe emissions on new passenger vehicles. In 2010, the U.S. EPA and the Department of Transportation's National Highway Safety Administration announced new vehicle greenhouse gas emissions standards and corporate average fuel economy standards that reinforced California's standard. The standards would reduce emissions from passenger vehicles by approximately 30% in 2016, aiding local government efforts to reduce greenhouse gas emissions.

CALIFORNIA RENEWABLE PORTFOLIO STANDARD – SENATE BILLS 1078 (2002) AND 107 (2006) AND EXECUTIVE ORDER S-21-09

EO S-21-09 directed the ARB to adopt regulations increasing California's Renewable Portfolio Standard (RPS) to 33% by 2020. These rules apply to investor-owned utilities, such as Southern California Edison. These standards will reduce greenhouse gas emissions from electricity purchased by local governments.[55] The California Air Resources Board's (CARB) Adopted Scoping Plan makes it clear that implementation of the Renewable Portfolio Standard (RPS) is a foundational element of the California's

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[54] Gateway Cities Council of Governments, 2011. *Subregional Sustainable Communities Strategy*. http://gatewaycog.org/publications/FR1_GCCOG_SCS_SectionsFinal%5B5%5D.pdf.
[55] SCE Renewable Energy. http://www.sce.com/PowerandEnvironment/renewables/

emissions reduction plan. In 2002, Senate Bill 1078 established the California RPS program, requiring 20% renewable energy by 2017. In 2006, Senate Bill 107 advanced the 20% deadline to 2010, a goal which was expanded to 33% by 2020 in the 2005 Energy Action Plan II. On September 15, 2009, Governor Arnold Schwarzenegger signed Executive Order S-21-09 directing the California Air Resources Board (CARB) to adopt regulations increasing California's Renewable Portfolio Standard (RPS) to 33 percent by 2020.

EMISSION PERFORMANCE STANDARDS – SENATE BILL 1368 (2006)

Signed in 2006, SB 1368 limits the ability of California's utilities to make long-term investments in carbon-intensive electricity generation. The bill enables utilities to make capital investments in baseload power plants if their emissions are as low as or lower than emissions from a new, combined-cycle natural gas power plant. The bill makes certain that the standards will not degrade the reliability of California's energy services.

CALIFORNIA GREEN BUILDING CODE – (2007)

The California Building Standards Commission and other state agencies developed green building standards for residential, commercial, and public building construction. The "CALGreen Code" is the first statewide green building standards code in the United States. The code attempts to achieve reductions in greenhouse gas emissions and water and energy use.[56]

LOW CARBON FUEL STANDARD – EXECUTIVE ORDER S-1-07 (2007)

EO S-1-07 established a Low Carbon Fuel Standard (LCFS) for transportation fuels in California, which the ARB included in the Scoping Plan. The EO requires that the carbon intensity of California's transportation fuels be reduced at least 10% by 2020.[57] ARB expects the LCFS to achieve the minimum 10% reduction goal; however, many of the early action items outlined in the Scoping Plan work in tandem with one another. To avoid the potential for double-counting emission reductions associated with AB 1493, the Scoping Plan has modified the aggregate transportation sector reduction expected from the LCFS to 6.7% for 2020.[58]

CEQA AND GREENHOUSE GAS EMISSIONS – SB 97 (2007)

SB 97 provides that greenhouse gas emissions and their effects are subject to CEQA. Local governments are required to determine whether a project's climate-related impacts are significant, and if so, to mitigate those effects. The Office of Planning and Research (OPR) created CEQA guidelines to help local governments reduce greenhouse gas emissions and address their impacts.

PROPOERTY ASSESSED CLEAN ENERGY – AB 811

AB 811 allows local governments to define areas where property owners can receive long-term, low-interest loans for energy and water efficiency improvements. Improvements financed through AB 811 are

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[56] California Building Standards Commission. "CALGreen." Retrieved on May 21, 2010 from http://www.bsc.ca.gov/CALGreen/default.htm.

[57] California Low Carbon Fuel Standard. Retrieved from http://www.arb.ca.gov/fuels/lcfs/lcfs.htm.

[58] Scoping Plan. http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm

fixed to the property and repaid through property tax bills. Local governments can participate in a statewide program called CaliforniaFIRST, or they can establish their own AB 811 programs, called Property Assessed Clean Energy (PACE) programs.

CALIFORNIA CLIMATE ADAPTATION STRATEGY – EXECUTIVE ORDER S-13-08 (2008)

The EO directed the California Natural Resources Agency to lead a statewide effort to develop a climate adaptation strategy. Published in 2009, the statewide plan describes climate trends and the potential impacts of climate change on key sectors, and it outlines short- and long-term actions that state and local governments can take to address future climate impacts.[59]

[59] California Department of Natural Resources, 2009. *California Climate Adaptation Strategy.* http://resources.ca.gov/climate_adaptation/statewide_adaptation/californias_adaptation_strategy.html

APPENDIX C: ASSUMPTIONS IN GREENHOUSE GAS EMISSIONS ANALYSIS

The following section describes the assumptions used to calculate greenhouse gas emissions reductions. When feasible, the potential reduction value of each measure has been quantified using industry standard methods developed by the California Air Pollution Control Officers Association (CAPCOA) and outlined in the report Quantifying Greenhouse Gas Mitigation Measures.[60] The report describes approaches for quantifying greenhouse gas emission reductions from a specified list of mitigation measures.

STRATEGY 1: BUILDINGS

USE RECYCLED WATER

Description: Accelerate the City-wide use of recycled water for irrigation and landscaping. The measure estimates that recycled water will increase from approximately 1.22% in 2010 to 3% in 2020 and 5% in 2030.

Sector & Subsector	Water – total water supply				
Reduction Percent	81%	Source: CAPCOA WSW-1			
Currently Implemented by the Sector in 2010	1.22%	Source: City of Bellflower			
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Water Savings (gallons)**	**Electricity Savings (kWh)**
3%	5%	-23	-65	-16,787,621	-136,164

[60] For additional information about CAPCOA's Quantifying Greenhouse Gas Mitigation Measures report, please visit http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

INSTALL LOW-FLOW WATER FIXTURES

Description: Accelerate the installation of low-flow water fixtures in new residential homes and expand the program to commercial businesses.

Sector & Subsector	Water – new domestic water supply				
Reduction Percent	20%	Source: CAPCOA WUW-1			
Currently Implemented by the Sector in 2010	0%	Source: N/A			
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Water Savings (gallons)**	**Electricity Savings (kWh)**
100%	100%	-107	-214	-9,931,427	-80,554

INCREASE RECYCLING RATES

Description: Increase residential and commercial recycling above California minimuims

Sector & Subsector	Solid waste – total residential				
Reduction Percent	4%	Source: EPA Warm Model			
Currently Implemented by the Sector in 2010	50%	Source: State requirement			
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Waste Diversion (tons)**	
55%	65%	-7	-22	-46	

Sector & Subsector	Solid waste – total commercial				
Reduction Percent	4%	Source: EPA Warm Model			
Currently Implemented by the Sector in 2010	50%	Source: State requirement			
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Waste Diversion (tons)**	
55%	65%	-12	-36	-75	

PROMOTE AND EXPAND RESIDENTIAL ENERGY EFFICIENCY AND WEATHERIZATION PROGRAMS

Description: Facilitate voluntary energy efficiency improvements and upgrades in existing residential buildings by expanding participation in and promotion of existing programs. Explore the development of an in-lieu fee for energy efficiency.

Sector & Subsector	Residential buildings – total electricity	
Reduction Percent	32% per unit	Source: DOE Weatherization Meta-Analysis, McKinsey
Currently Implemented by the Sector in 2010	0%	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Electricity Savings (kWh)	Natural Gas Savings (therms)
0.4%, 100 units	2%, 500 units	-95	-506	-171,864	-10,984

DEVELOP AN ENERGY EFFICIENT APPLIANCE UPGRADE PROGRAM

Description: Promote and expand existing energy efficient appliance upgrade programs that encourages homeownwers to exchange old appliances for newer, more efficient models.

Sector & Subsector	Residential buildings – total electricity	
Reduction Percent	3%	Source: CAPCOA BE-4
Currently Implemented by the Sector in 2010	0%	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Electricity Savings (kWh)	
1%	10%	-9	-93	-41,370	

STRATEGY 2: URBAN FORM AND MOBILITY

CONTINUE IMPLEMENTATION OF INTELLIGENT TRANSPORTATION SYSTEM PLAN

Description: Improve traffic flow by using Intelligent Transportation System elements to reduce delay, increase incident response time, and provide real-time information.

Sector & Subsector		Transportation – all vehicles			
Reduction Percent		3%	Source: Fehr & Peers		
Currently Implemented by the Sector in 2010		N/A	Source: N/A		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**		
33%	100%	-1,584	-4,672		

CONTINUE MAKING STREET AND SIDEWALK IMPROVEMENTS TO ENSURE A SAFE AND CONVENIENT SYSTEM FOR PEDESTRIANS

Description: Use the Capital Improvement Program to improve pedestrian safety and access through City-wide corridor improvements.

Sector & Subsector		Transportation – all vehicles miles			
Reduction Percent		1%	Source: Fehr & Peers		
Currently Implemented by the Sector in 2010		N/A	Source: N/A		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Annual Vehicle Miles Traveled**	**Walk Trips**
100%	100%	-1,600	-1,557	-3,565,388	+55,000

PROVIDE TRAFFIC CALMING MEASURES

Description: Use the Capital Improvement Program to improve pedestrian safety and access through City-wide corridor improvements

Sector & Subsector		Transportation – all vehicles miles			
Reduction Percent		0.25%	Source: Fehr & Peers		
Currently Implemented by the Sector in 2010		N/A	Source: N/A		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Annual Vehicle Miles Traveled**	**Daily Walk Trips**
100%	100%	-400	-389	-891,347	+1,250

SANTA ANA BRANCH TRANSIT CORRIDOR

Description: Work with Metro to develop station areas in Bellflower for the Santa Ana Transit Corridor. The corridor is assumed to be rail and open in 2027.

Sector & Subsector		Transportation – all vehicles miles			
Reduction Percent		2%	Source: Fehr & Peers		
Currently Implemented by the Sector in 2010		N/A	Source: N/A		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Annual Vehicle Miles Traveled**	**Daily Transit Trips**
0%	100%	N/A	-3,115	-7,245,509	+400

PROVIDE AND EXPAND LOCAL SHUTTLE SERVICE

Description: Provide and expand local shuttle services including to Green Line stations

Sector & Subsector		Transportation – all vehicles miles			
Reduction Percent		0.25%	Source: Fehr & Peers		
Currently Implemented by the Sector in 2010		N/A	Source: N/A		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Annual Vehicle Miles Traveled**	**Daily Transit Trips**
100%	100%	-400	-389	-891,347	+25

IMPROVE TRANSIT ACCESS

Description: Prioritize transportation funding around transit stations to encourage walking and bicycling and to calm traffic

Sector & Subsector		Transportation – all vehicles miles			
Reduction Percent		0.25%	Source: Fehr & Peers		
Currently Implemented by the Sector in 2010		N/A	Source: N/A		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Annual Vehicle Miles Traveled**	**Daily Transit Trips**
100%	100%	-400	-389	-891,347	+25

INSTALL PARK-AND-RIDE LOTS

Description: Work with Metro and Caltrans to install new park-and-ride facilities near transit

Sector & Subsector	Transportation – all vehicles miles	
Reduction Percent	0.25%	Source: Fehr & Peers
Currently Implemented by the Sector in 2010	N/A	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Annual Vehicle Miles Traveled	
0%	100%	N/A	-389	-905,689	

PROVIDE ELECTRIC VEHICLE PARKING

Description: Pursue electric vehicle infrastructure, such as charging stations at locations around the City, including City-owned lots

Sector & Subsector	Transportation – all vehicles miles	
Reduction Percent	0.25%	Source: Fehr & Peers
Currently Implemented by the Sector in 2010	N/A	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)		
0%	100%	N/A	-389		

INCREASE LAND USE DENSITY

Description: Target future development in areas around Downtown Bellflower, major transit nodes, and the Santa Ana Branch Transit Corridor stations

Sector & Subsector	Transportation – all vehicles miles	
Reduction Percent	2%	Source: Fehr & Peers
Currently Implemented by the Sector in 2010	N/A	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Annual Vehicle Miles Traveled	Annual Walk, Bike, Transit Trips
50%	100%	-1,600	-3,115	-3,565,388	+121,450

INCREASE THE DIVERSITY LAND USE IN URBAN DEVELOPMENTS

Description: Mix land uses to encourage people to park once and walk and travel by non-automobile modes

Sector & Subsector	Transportation – all vehicles miles	
Reduction Percent	2%	Source: Fehr & Peers
Currently Implemented by the Sector in 2010	N/A	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Annual Vehicle Miles Traveled	Annual Walk, Bike, Transit Trips
50%	100%	-1,600	-3,115	-3,565,388	+121,450

STRATEGY 3: GOVERNMENT OPERATIONS

CONTINUE BUILDING AND FACILITY ENERGY UPGRADES

Description: Continually monitor building performance and identify cost effective actions to reduce energy use. This measure includes EECBG projects and upgrades identified in the energy audits for City Hall and Sims Park.

Sector & Subsector	Municipal operations: buildings and lighting energy use	
Reduction Percent	N/A	Source: CAPCOA BE
Currently Implemented by the Sector in 2010	0%	Source: City of Bellflower EECBG Application

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Electricity Savings (kWh)	Cost Savings
100%	100%	-33	-31	-158,984	-$22,021

Sector & Subsector	Municipal operations: buildings and facility energy use	
Reduction Percent	-42%	Source: City of Bellflower Sims Park Energy Audit
Currently Implemented by the Sector in 2010	0%	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Electricity Savings (kWh)	Cost Savings
100%	100%	-28	-27	-89,109	-$16,894

Sector & Subsector	Municipal operations: buildings and facility energy use	
Reduction Percent	-21%	Source: City of Bellflower City Hall Energy Audit
Currently Implemented by the Sector in 2010	0%	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Electricity Savings (kWh)	Cost Savings
100%	100%	-48	-47	-118,257	-$21,653

INCREASE RECYCLED WATER USE

Description: Increase the amount of recycled water used to irrigate municipal parks and landscaping

Sector & Subsector		Water – all municipal landscaping water			
Reduction Percent		81%	Source: CAPCOA WSW-1		
Currently Implemented by the Sector in 2010		33%	Source: City of Bellflower		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Water Savings (gallons)**	
50%	75%	-4	-12	-790,893	

ACCELERATE NATIVE AND DROUGHT-RESISTENT VEGITATION PLANNING

Description: Transition to native and drought-tolerate vegetation

Sector & Subsector		Water – all municipal landscaping water			
Reduction Percent		29%	Source: CAPCOA WUW-6		
Currently Implemented by the Sector in 2010		25%	Source: City of Bellflower		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**	**Water Savings (gallons)**	
50%	100%	-2	-8	-422,154	

INCREASE OPEN SPACE AND TREE PLANTINGS

Description: Increase the amount of open space and number of shade tree plantings in Bellflower. This measure quantifies the trees planted for the West Branch Greenway.

Sector & Subsector	Vegetation	
Reduction (per tree)	0.0121	Source: CAPCOA V-1
Currently Implemented by the Sector in 2010	N/A	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Number of Trees	
100%	100%	-135	--135	559	

STATE MEASURES

STATE ACTION 1: TITLE 24 UPDATES

Description: California's Title 24 Building Energy Code is updated every three years, continually increasing energy standards

Sector & Subsector	Residential – new residential energy use	
Reduction Percent	Varies by year	Source: California Energy Commission
Currently Implemented by the Sector in 2010	0%	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Electricity Savings (kWh)	Natural Gas Savings (therms)
N/A	N/A	-152	-494	277,985	13,149

Sector & Subsector	Non-residential – new non-residential energy use	
Reduction Percent	Varies by year	Source: California Energy Commission
Currently Implemented by the Sector in 2010	0%	Source: N/A

Implementation Goal by 2020	Implementation Goal by 2030	GHG Reduction in 2020 (MT CO2e)	GHG Reduction in 2030 (MT CO2e)	Electricity Savings (kWh)	Natural Gas Savings (therms)
N/A	N/A	-588	-1,769	1,291,448	39,104

STATE ACTION 2: RENEWABLES PORTFOLIO STANDARD

Description: Requires investor-owned utilities, such as Southern California Edison, to increase procurement from renewable energy resources to 33% of total procurement by 2020. This action also includes assumptions about the transition from more carbon intense fossil fuels like coal to less-carbon intense natural gas. These assumptions are reflected in the E3 calculator.

Sector & Subsector		Residential and non-residential – all electricity			
Reduction Percent		31.5%	Source: E3 RES Calculator		
Currently Implemented by the Sector in 2010		N/A	Source: N/A		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**		
85%	100%	22,804	28,800		

STATE ACTION 3: SOLAR INSTALLATION

Description: Incentivize residents and businesses with solar rebates, examples include the California Solar Initiative. Bellflower residents are generating 81 KW of electricity from solar installations, and businesses contributed an additional 771 kW of electricity. This local generation of electricity already results in approximately 466 MT CO_2e fewer greenhouse gas emissions.

Sector & Subsector		Residential and non-residential – all electricity			
Reduction Percent		100%	Source: CAPCOA AE-2		
Currently Implemented by the Sector in 2012		852 kW	Source: California Solar Initiative		
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**		
Residential - 0.5% Non-res - 2%	Residential - 1% Non-res - 5%	-619	-1,563		

STATE ACTION 4: PAVLEY CLEAN CARS STANDARDS

Description: Sets more stringent vehicle fuel economy standards for cars and light trucks that reduce greenhouse gas emissions

Sector & Subsector	Transportation				
Reduction Percent	15%, 21%	Source: 2011 EMFAC Pavley + LCFS Post-Processor Tool			
Currently Implemented by the Sector in 2010	N/A	Source: N/A			
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**		
100%	100%	-31,980	-45,858		

STATE ACTION 5: LOW CARBON FUEL STANDARD

Description: Requires the carbon intensity California's transportation fuels are reduced by 2020

Sector & Subsector	Transportation				
Reduction Percent	7.2%	Source: Bay Area Air Quality Management District			
Currently Implemented by the Sector in 2010	N/A	Source: N/A			
Implementation Goal by 2020	**Implementation Goal by 2030**	**GHG Reduction in 2020 (MT CO2e)**	**GHG Reduction in 2030 (MT CO2e)**		
100%	100%	-14,892	-15,641		

APPENDIX D: GREENHOUSE GAS EMISSIONS INVENTORY

City of Bellflower
Greenhouse Gas Emissions Inventory

Bellflower, California

raimi+ associates
the nature of community

Raimi + Associates
2000 Hearst Avenue, Suite 306
Berkeley, CA 94709
510.666.1010

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Executive Summary

The Bellflower Greenhouse Gas Emissions Inventory provides a snapshot of emissions for 2010. It quantifies the main sources of emissions from municipal operations and the community as a whole. The purpose of the greenhouse gas inventory is to:

- Identify and understand the sources and quantities of emissions within a local government's jurisdictional boundary;
- Create an emissions baseline that can be used by the city to set emission reductions targets and measure future progress;
- Use the baseline to prioritize and evaluate potential government actions; and
- Make informed policy decisions related to greenhouse gas emissions reduction.

The tables below summarize Bellflower's community and government operations emissions by sector for 2010 in terms of carbon dioxide equivalent (CO_2e), the common unit for reporting greenhouse gas emissions.

Table E.1: Community Emissions Summary by Sector

Sector	CO_2e Emitted in 2010 (metric tons)	Share of 2010 Total
Residential	77,493	23%
Commercial and Industrial	40,925	12%
Transportation	196,721	58%
Infrastructure	9,253	3%
Solid Waste	9,498	3%
Water	6,094	2%
Total	**339,985**	**100%**

Table E.2: Government Operations Emissions Summary by Sector

Sector	CO_2e Emitted in 2010 (metric tons)	Share of 2010 Total
Municipal Buildings	528	32%
Infrastructure	760	46%
Transportation	276	17%
Solid Waste	67	4%
Water	38	2%
Total	**1,669**	**100%**

The key findings from the community inventory and the government operations inventory are:

- **The transportation sector produced the largest proportion of community-wide greenhouse gas emissions in 2010.** Transportation sources generated 196,721 metric tons of CO_2e or 58% of the total emissions. During the next several decades, emissions from cars and trucks will be heavily influenced by state regulations that set more stringent fuel standards to reduce

greenhouse gas emissions (AB 1493), lower the carbon intensity of vehicle fuels (EO S-1-07), and monitor regional transportation-related greenhouse gas emissions targets (SB 375). These regulations and programs will help local governments lower vehicle miles traveled and lower emissions.

- **Purchased electricity accounted for 22% of the greenhouse emissions for the community as a whole.** In 2010, Bellflower used 262 million kilowatt-hours (kWh) of electricity to power homes, businesses, government buildings, and public infrastructure, resulting in 75,394 metric tons of CO_2e emissions. As with the transportation sector, these emissions will be influenced by state regulations. Higher renewable portfolio standards for investor-owned utilities like Southern California Edison (EO S-21-09) and regulations that limit investment in carbon-intensive power generation (SB 1368) will reduce greenhouse gas emissions from purchased electricity. Further, energy efficiency measures are often the most cost-effective actions to lower energy use and reduce emissions.
- **Annual per capita emissions were 4.44 metric tons of CO_2e emissions in 2010, which equates to 26.8 pounds of CO_2e emissions per day.** According to the California Climate Change Scoping Plan, California's 2010 per capita emissions were approximately 13.3 metric tons and the 2020 target is 9.6 metric tons per person.
- **Electricity use generated 76% of the government operations emissions.** Bellflower purchased 4.4 million kWh of electricity from Southern California Edison at a cost of $850,000, resulting in 1,276 metric tons of CO_2e emissions. Electricity used to power street lights and traffic signals contributed 760 metric tons of CO_2e emissions, and power for municipal operations produced 528 of CO_2e emissions. As described in the community inventory results, the carbon intensity of the electricity is expected to decline as state regulations for renewable energy and carbon-intensive power generation take effect. Along with state regulations, increasing the energy efficiency of buildings and public lighting could be a cost-effective approach to lowering energy use, energy costs, and greenhouse gas emissions. An energy audit of Bellflower City Hall found nine potential energy saving measures, seven with favorable internal rates of return. These measures included lighting upgrades and sensors, wireless thermostats, and replacing the chiller. The audit found that the suite of measures would emissions by 56.5 metric tons of CO_2e emissions and yield an estimated $21,653 in savings per year.[1]
- **Greenhouse gas emission from the Bellflower vehicle fleet and employee commuting produced 276 metric tons of CO_2e emissions.** This represented 17% of the municipal emissions inventory. The City owns and operates dozens of vehicles, which, over time, can be phased out in favor of more efficient vehicles. The City could also develop programs to influence the how employees travel. Commuter transit passes, parking cash out, accommodating electric vehicles, and ride share programs will incentivize employees to drive less and use non-automobile modes.

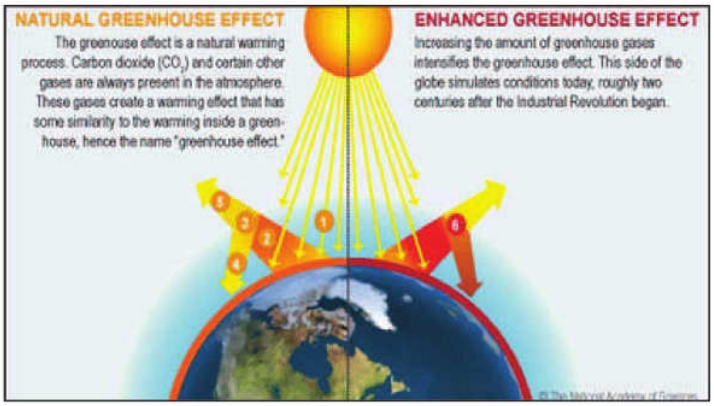
[1] Bellflower Energy Audit: City Hall. 2012.

Chapter 1: Greenhouse Gas Emissions and Climate Change

During the last several decades, an overwhelming body of scientific evidence has demonstrated that human activity is altering the Earth's climate by increasing the concentration of greenhouse gases in the atmosphere. Climate change poses significant risks for, and may already be affecting, human and natural systems, including coastal infrastructure, human health, energy sources, agriculture, and freshwater resources.[2]

Greenhouse gases, such as carbon dioxide, ozone, methane, and nitrous oxide, have always been present in the Earth's atmosphere, keeping surface temperatures warm enough to sustain human, plant, and animal life. Greenhouse gases absorb heat radiated from the Earth's surface and then radiate the energy back toward the surface, a process called the "greenhouse effect", which is shown in Figure 1.1. Without the greenhouse effect, it is estimated that the Earth's average surface temperature would be approximately 60°F colder.

Figure 1.1: The Greenhouse Effect



"Visible sunlight passes through the atmosphere without being absorbed. Some of the sunlight striking the earth (1) is absorbed and converted to heat, which warms the surface. The surface (2) emits heat to the atmosphere, where some of it (3) is absorbed by greenhouse gases and (4) re-emitted toward the surface; some of the heat is not trapped by greenhouse gases and (5) escapes into space. Human activities that emit additional greenhouse gases to the atmosphere (6) increase the amount of heat that gets absorbed before escaping to space, thus enhancing the greenhouse effect and amplifying the warming of the earth." Adapted by the Pew Center on Global Climate Change from The National Academy of Sciences).[3]

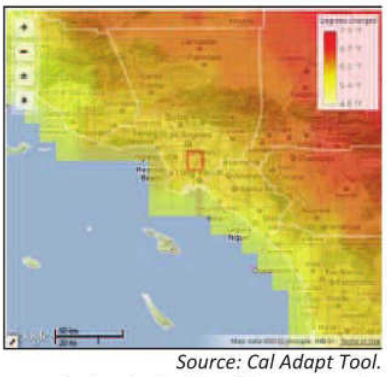
Human activities, such as the combustion of fossil fuels, industrial processes, and land use changes, have increased the amount of greenhouse gases in the atmosphere, intensified the greenhouse effect, and caused changes to the Earth's climate. Since the Industrial Revolution, greenhouse gas concentrations have risen 40% in the Earth's atmosphere and are at a level unequaled during the last 800,000 years. Higher concentrations of greenhouse gases trap additional energy in the atmosphere, resulting in more rapid warming. During the last century, the global average temperature rose 1.4°F with significant variation across the planet.[4] In California, average temperatures rose 2.1°F between 1915 and 2000.

Climate change will continue to increase temperatures across the globe and within California. Scientists predict that over the next century, global temperatures will increase between 2.5°F and 10.4°F,

[2] National Research Council, 2010. *Advancing the Science of Climate Change*. Washington, DC: The National Academies Press.
[3] Pew Center on Global Climate Change, 2011. *Climate Change 101: Science and Impacts.*
[4] Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson (eds.), 2009. *Global Climate Change Impacts in the United States*. Cambridge University Press.

depending upon the amount of future emissions and how the earth responds to those emissions.[5] For California, the average annual temperature is expected to rise 1.8°F to 5.4°F by 2050, and 3.6°F to 9°F by the end of the century.[6] For the Bellflower area, Scientists expect average temperatures to increase more during the summer than in the winter.

Although climate change and global warming are often used interchangeably, warmer temperatures are only one component of climate change. Climate is an average of weather over time, and weather includes temperature, rainfall, snow storms, winds, flooding, heat waves, and other seasonal patterns. A simple way to remember the difference between weather and climate is: weather affects whether you bring an umbrella today, and climate influences whether you own an umbrella.



Source: Cal Adapt Tool. Scripps Institution of Oceanography, California Nevada Applications Program (CNAP), Projected Temperatures

Climate change refers to the long-term shift in regional and global weather patterns, making it is crucial to understand more than just average annual temperature trends. Higher atmospheric greenhouse gas concentrations will alter the timing and amount of local precipitation, intensify extreme weather events, and drive sea level rise. These climatic changes may result in significant social, economic, and environmental consequences for residents and businesses in Southern California, including:

- **Public human health threats**: Southern California will experience longer, more frequent, and more severe heat waves, increasing the risk of heat-related morbidity in vulnerable populations. Higher temperatures will aid the formation of ozone and increase the frequency and duration of air stagnation, resulting in declining air quality. An increase in regional wildfires will further worsen air quality. Insects that carry diseases will survive winters more easily, produce larger populations, and increase the risk of diseases such as West Nile Virus.
- **Destruction and damage to coastal infrastructure:** Rising sea levels will require costly upgrades to coastal infrastructure, such as the Ports of Long Beach and Los Angeles;
- **Water storages**: Changes to the amount of timing of rainfall, as well as the decline in Sierra snowpack, will threaten limited regional water supply;

Tackling climate change at the global and local level will involve both mitigation and adaptation measures. Mitigation addresses the need to reduce greenhouse gas emissions, such as reducing energy consumed by buildings and transportation. These strategic actions will form the backbone of the Bellflower Climate Action Plan. Adaptation focuses on understanding the potential impacts of climate change on specific sectors, such as infrastructure, human health, and water resources, and devising actions to minimize those impacts. An example of an adaptive action is reducing the heat island effect in urban neighborhoods.

[5] Intergovernmental Panel on Climate Change, 2007. *Climate Change 2007: Mitigation of Climate Change*.
[6] California Natural Resources Agency, 2009. *California Climate Adaptation Strategy*.

Chapter 2: Regulatory Setting

During the last decade, the State of California made great strides in developing a regulatory framework to curb future greenhouse gas emissions and to adapt to the consequence of climate change. California adopted a series of policies, programs, and regulations that set targets for greenhouse emission reductions and outlined strategic actions that enable government agencies, public institutions, and businesses to collaborate to achieve these reduction targets.

In 2005, the Governor signed Executive Order S-3-05, which set targets for the state to reduce its greenhouse gas emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050. The State Assembly followed by passing Assembly Bill 32 (AB 32), the Global Warming Solutions Act. AB 32 directs the California Air Resources Board (ARB) to develop the rules and regulations necessary to achieve the greenhouse gas emissions reductions targets. In 2008, the ARB approved the California Climate Change Scoping Plan (Scoping Plan), which contains the primary strategies California will use to reduce the greenhouse gas emissions that cause climate change. A sample of the Scoping Plan strategies include: energy efficiency measures, regional transportation-related greenhouse gas emissions targets, a renewable portfolio standard, a cap-and-trade program, light duty vehicle greenhouse gas standard, and a low carbon fuel standard.

The Scoping Plan recognizes the essential partnership between state, regional, and local governments to reduce greenhouse gas emissions. Local governments have authority over activities that produce both direct and indirect greenhouse gas emissions through land use planning and zoning, general permitting, local ordinances, and municipal operations. Therefore, many of the strategies outlined in the Scoping Plan require local governments to take action. The Scoping Plan also encourages local governments to inventory greenhouse gas emissions, adopt greenhouse gas emissions reduction targets, and develop local action plans to lower emissions. The Bellflower Climate Action Plan will serve these purposes.

In California, the transportation sector produces between 35% and 40% of the State's greenhouse gas emissions, and the Scoping Plan includes a number of measures for the sector. In 2008, California adopted Senate Bill 375 (SB 375), the Sustainable Communities Strategy. SB 375 attempts to integrate regional land use, transportation, and housing planning in order to reduce greenhouse gas emissions from cars and trucks. SB 375 directs the ARB to set regional greenhouse gas reductions targets for cars and trucks, to assign each Metropolitan Planning Organizations (MPO) a target, and to require each MPO to create a plan (a Sustainable Community Strategy) to achieve that target. The law provides relief from specific California Environmental Quality Act (CEQA) requirements for infill development projects that are consistent with the Sustainable Community Strategy. SB 375 provides one method for local governments to achieve regional transportation-related greenhouse gas emissions targets described in the Scoping Plan.

The Southern California Association of Governments (SCAG) is the largest MPO in California, representing six counties and over 180 cities, including Bellflower. The SCAG region is composed of 15 subregions, and Bellflower is located within the Gateway Cities Council of Governments (COG). The Gateway Cities COG includes 27 cities and over 2.1 million people. Unique to Southern California, SB 375

allows each subregion to develop an SCS, which SCAG will then incorporate into the regional SCS. The Gateway Cities are one of only two COGs in Southern California to exercise this option and develop their own SCS.

The Gateway COG completed their SCS in 2011, tailoring the strategies to meet the needs of individual communities. The Gateway SCS builds on local strategies that Gateway communities have pursued over the past decade. This portfolio of strategies was combined with regional and subregional transportation projects to provide a roadmap for local governments to reduce emissions. If implemented, the SCS estimates that strategies and transportation projects would reduce greenhouse gas emissions per capita from the 2005 benchmark by 8.4% in 2020 and 15% in 2035, exceeding the regional targets set by the ARB.[7]

As of February 2012, SCAG is currently accepting comments on the draft 2012 Regional Transportation Plan and Sustainable Communities Strategy. The regional SCS, which includes the Gateway Cities SCS, describes the goals and benefits of the SCS, the processed used to create the SCS, SCS requirements, and next steps. SCS strategies are organized into land use strategies, transportation supply management, transportation demand management, vehicle technology, and other areas.

Along with AB 32, the Scoping Plan, and SB 375, there are several other California regulations and laws that directly affect local government efforts to reduce greenhouse gas emission and to response to the potential impacts of climate change. The following describes several, but not all, of these measures.

- **AB 1493 - Pavley Vehicular Emissions Codes (2002)**: AB 1493 directed the ARB to set more stringent vehicle fuel economy standards for cars and light trucks that reduce greenhouse gas emissions. The Pavley bill required approval from the federal government, and in 2009, the U.S. Environmental Protection Agency granted California a waiver that enabled the State to enforce stricter tailpipe emissions on new passenger vehicles. In 2010, the U.S. EPA and the Department of Transportation's National Highway Safety Administration announced new vehicle greenhouse gas emissions standards and corporate average fuel economy standards that reinforced California's standard. The standards would reduce emissions from passenger vehicles by approximately 30% in 2016, aiding local government efforts to reduce greenhouse gas emissions.
- **EO S-21-09 - California Renewable Portfolio Standard (2009)**: EO S-21-09 directed the ARB to adopt regulations increasing California's Renewable Portfolio Standard (RPS) to 33% by 2020. These rules apply to investor-owned utilities, such as Southern California Edison (SCE). These standards will reduce greenhouse gas emissions from electricity purchased by local governments.[8]
- **SB 1368 - Emissions Performance Standards (2006):** Signed in 2006, SB 1368 limits the ability of California's utilities to make long-term investments in carbon-intensive electricity generation. The bill enables utilities to make capital investments in baseload power plants if

[7] Gateway Cities Council of Governments. 2011. *Subregional Sustainable Communities Strategy*. http://gatewaycog.org/publications/FR1_GCCOG_SCS_SectionsFinal%5B5%5D.pdf
[8] SCE Renewable Energy. http://www.sce.com/PowerandEnvironment/renewables/

their emissions are as low or lower than emissions from a new, combined-cycle natural gas power plant. The bill makes certain that the standards will not impact the reliability of California's energy services.

- **California Green Building Code (2011):** The California Building Standards Commission and other state agencies developed green building standards for residential, commercial, and public building construction. The "CALGreen Code" is the first statewide green building standards code in the U.S. The code attempts to achieve reductions in greenhouse gas emissions and water and energy use.[9]
- **EO S-1-07 - Low Carbon Fuel Standard (2007):** EO S-1-07 established a Low Carbon Fuel Standard (LCFS) for transportation fuels in California, which the ARB included in the Scoping Plan. The EO requires that California's transportation fuels reduce their carbon intensity by at least 10% by 2020.[10] ARB expects the LCFS to achieve the minimum 10% reduction goal; however, many of the early action items outlined in the Scoping Plan work in tandem with one another. To avoid the potential for double-counting emission reductions associated with AB 1493, the Scoping Plan has modified the aggregate transportation sector reduction expected from the LCFS to 6.7% from 2020 BAU.[11]
- **SB 97 - CEQA and GHG Emissions (2007):** SB 97 provides that greenhouse gas emissions and their effects are subject to CEQA. Local governments are required to determine whether a project's climate-related impacts are significant, and if so, mitigate those effects. The Governor's Office of Planning and Research (OPR) created CEQA guidelines to help local governments reduce greenhouse gas emissions and address their impacts.
- **AB 811**: AB 811 allows local governments to define areas where property-owners can receive long-term, low-interest loans for energy and water efficiency improvements. Improvements financed through AB 811 are fixed to the property and repaid through property tax bills. Local governments can participate in a state-wide program called CaliforniaFIRST, or they can establish their own AB 811 programs, called Property Assessed Clean Energy (PACE).
- **EO S-13-08 - California Climate Adaptation Strategy (2008)**: The EO directed the California Natural Resources Agency to lead a statewide effort to develop a climate adaptation strategy. Published in 2009, the statewide plan describes climate trends and the potential impacts of climate change on key sectors, and it outlines short- and long-term actions that state and local governments can take to address future climate impacts.[12]

[9] California Building Standards Commission. "CALGreen." Retrieved on May 21, 2010 from http://www.bsc.ca.gov/CALGreen/default.htm.
[10] California Low Carbon Fuel Standard. Retrieved from http://www.arb.ca.gov/fuels/lcfs/lcfs.htm.
[11] Scoping Plan. http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm
[12] California Climate Adaptation Strategy. http://resources.ca.gov/climate_adaptation/statewide_adaptation/californias_adaptation_strategy.html

Chapter 3: Methodology

The Bellflower Greenhouse Gas Emissions Inventory provides a snapshot of emissions for 2010. It quantifies the main sources of emissions from municipal operations and the community as a whole. The purpose of the greenhouse gas inventory is to:

- Identify and understand the sources and quantities of emissions within a local government's jurisdictional boundary;
- Create an emissions baseline that can be used by the city to set emission reductions targets and measure future progress;
- Use the baseline to prioritize and evaluate potential government actions; and
- Make informed policy decisions related to greenhouse gas emissions reduction.

This greenhouse gas inventory uses different standards to measure and report emissions for government operations and the community as a whole. The municipal operations inventory follows the standard methodology outlined in the Local Government Operations Protocol (LGOP), which was adopted by the ARB in 2008. The LGOP serves as the national standard for quantifying and reporting emissions from government operations. The community inventory draws upon the approach outlined in the LGOP and incorporates recommendations from the California Community-Wide Greenhouse Gas Inventory Protocol White Paper, which was developed by the Association of Environmental Professionals. The AEP protocol provides local governments with additional information on the contents of a community-wide inventory and the geographic boundary for the analysis.

Along with a snapshot of 2010 emissions, the Bellflower Greenhouse Gas Emissions Inventory includes an estimate of future community-wide emissions based on a business as usual (BAU) forecast. The BAU forecast projects future greenhouse gas emissions under existing conditions and without future mitigation efforts.

This inventory first catalogues community-wide emissions, followed by emissions from government operations. Appendix A includes describes the methodology and data sources for each emissions category in the inventory. Appendix B describes the results of the employee commute survey.

What is a Greenhouse Gas?

The LGOP recommends that local governments assess emissions of six globally important greenhouse gases carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). These gases are regulated under the Kyoto Protocol. Since carbon dioxide is the most abundant greenhouse gas, greenhouse gas emissions are converted to metric tons of carbon dioxide equivalent (CO_2e) units. Each greenhouse gas has a different potential for trapping heat in the Earth's atmosphere, which is called the global warming potential or GWP (Table 3.1). For instance, methane has twenty-one times more heat trapping potential than one pound of carbon dioxide.

Table 3.1: Greenhouse Gases[13]

Gas	Formula	Activity	Global Warming Potential (CO2e)
Carbon dioxide	CO_2	Combustion	1
Methane	CH_4	Combustion, Anaerobic Decomposition of Organic Waste (Landfills, Wastewater), Fuel Handling	21
Nitrous Oxide	N_2O	Combustion, Wastewater Treatment	310
Hydrofluorocarbons	Various	Leaked Refrigerants, Fire Suppressants	12-11,700
Perfluorocarbons	Various	Aluminum Production, Semiconductor Manufacturing, HVAC equipment,	6,500-9,200
Sulfur Hexafluoride	SF_6	Transmission and Distribution of Power	23,900

This inventory focuses on the four greenhouse gases most relevant for local governments. This group includes CO_2, CH_4, N_2O, and hydrofluorocarbons.

Calculating Emissions

The Bellflower Greenhouse Gas Emissions Inventory uses a calculation-based methodology to estimate most of the community's emissions. These calculations combine activity data with emission factors to determine greenhouse gas emissions for a particular sector or activity. The following equation illustrates the general relationship:

- "Activity Data" x "Emission Factor" = "Greenhouse Gas Emissions"

Activity data includes a range of information, including annual metered electricity use, fuel consumption by type, solid waste production, and vehicle miles travelled. Emissions factors are used to convert activity data into greenhouse gas emissions quantities. These factors are expressed in terms of emissions per unit of activity, e.g. lbs CO_2 per kWh or CH_4 per ton of waste. Appendix A includes a list of activity data and emissions factors utilized in the Bellflower inventory.

Reporting Emissions

This section describes two types of reporting frameworks, scopes and sectors, used in the Bellflower Greenhouse Gas Emissions Inventory. It also explains rolling up emissions into a single number and double counting.

The Scopes Framework

Greenhouse gas inventories are reported according to a three-tiered classification system of scopes. Classification relates to the degree of control over the emissions source and location of the source. Emissions sources are categorized as direct (Scope 1) or indirect (Scope 2 or Scope 3).

For local government operations, Scope 1 emissions include direct emissions from municipal activities. These encompass stationary combustion to produce electricity and heat, and to power equipment. These emissions also include mobile combustion of fuels; emissions that result from the production, processing, transmission, storage, and use of fuels; and other sources. Scope 2 emissions are composed

[13] Local Government Operations Protocol, Version 1.0, Appendix E.

of indirect emissions from the consumption of energy generated outside the jurisdiction, such as electricity purchased from a regional utility. Scope 3 emissions contain all other emissions sources relevant for local governments and not included in Scope 2. This includes emissions from employee commutes, employee business travel, and the decomposition of solid waste.

Similar to the local government inventory, community-wide emissions are reported according to the three-tiered classification system. Scope 1 emissions are comprised of all direct emissions from sources located within the boundary of a jurisdiction. These emissions sources include fuels combusted in the community and direct emissions from landfills in the community. Scope 2 contains indirect emissions from energy generated outside the jurisdictional boundary of the community. Scope 3 emissions are all other indirect emissions that occur within the jurisdictional boundaries or due to specific activities occurring within the jurisdictional boundaries.

For community-wide inventories, Scope 1 and Scope 2 emissions sources represent the most important components of the greenhouse gas inventory. Typically, these scopes include the largest contributions of emissions for a community. At the same time, local governments have a broad influence within their jurisdictional boundaries, and a jurisdiction's authority over land use, permitting, local ordinances, and environmental education can impact emissions.

Rolling Up Scopes and Double Counting

To aid policy-making and public understanding, local governments often use a single number to describe greenhouse gas emissions within a climate action plan. Rolling up emissions makes it easier for a local government to understand the relative proportion of emissions from various sources and use this information to focus policy decisions. The Bellflower Greenhouse Gas Inventory includes rolled up numbers for both the community-wide and government operations inventories. These rolled up figures include direct emissions (Scope 1) and indirect emissions (Scope 2 and Scope 3).

Despite rolling up these numbers, they should be used with caution. The roll-up number only includes the data available at the time of the inventory and the best available estimation methods. By producing one single figure, the roll-up number is often viewed as comprehensive and inclusive of all emissions within a jurisdiction.

Roll-up numbers may also double count emissions, especially across sectors and jurisdictions. For example, a municipal government may operate a utility that provides electricity to city-owned buildings. These emissions would be accounted for in building use and power generation, inadvertently resulting in the double counting of emissions. The roll-up number in this report avoids double counting within the City of Bellflower.

Finally, roll-up numbers are often used to compare emissions between local governments. While protocols, like the LGOP, exist for inventorying and reporting emissions, no protocol exists for rolling up emissions into a single figure. Each jurisdiction has a unique set of circumstances and provides a different set of services.

The Bellflower Greenhouse Gas Inventory includes both community-wide and municipal operations inventories. These two inventories, however, are not rolled up into a single number, because local government operations are already accounted for in the community inventory.

Emissions Sectors

Along with summarizing greenhouse gas emissions by scope, the Bellflower inventory classifies emissions by the sector responsible for the emissions. This approach allows local governments to develop emission reduction strategies and actions for specific sectors within the climate action plan.

The community inventory includes the following sectors:

- Residential;
- Commercial and industrial;
- Transportation;
- Infrastructure;
- Solid waste; and
- Water.

The government operations inventory includes the following sectors:

- Municipal buildings and other facilities;
- Infrastructure, including streetlights and traffic signals;
- Transportation, including vehicle fleet and employee commute;
- Government-generated solid waste; and
- Water.

Chapter 4: Community Greenhouse Gas Inventory Results

The City of Bellflower released approximately 339,985 metric tons of CO_2e of emissions in 2010, approximately 4.4 metric tons of CO_2e per person. This aggregate number accounts for Scope 1 direct emissions from the on-site combustion of fuels in the residential and commercial and industrial sectors, and the combustion of fuel in vehicles on local roads. This figure also includes all emissions associated with community electricity consumption (Scope 2), and emissions from solid waste and water generated by Bellflower (Scope 3).

Along with 2010 emissions, the Bellflower Greenhouse Gas Emissions Inventory includes an estimate of future emissions based on a business as usual forecast. Bellflower emissions are projected to grow from 339,985 metric tons of CO_2e in 2010 to approximately 362,446 metric tons of CO_2e in 2030, a 7% increase.

Summary by Sector

By understanding the relative scale of emissions within each sector, Bellflower can develop strategic actions that will achieve the largest greenhouse gas emissions. The Bellflower community-wide greenhouse gas inventory consists of six main sectors:

- Residential;
- Commercial and industrial;
- Transportation;
- Infrastructure;
- Solid waste; and
- Water.

How Are Emissions from Government Operations Counted in the Community Inventory?

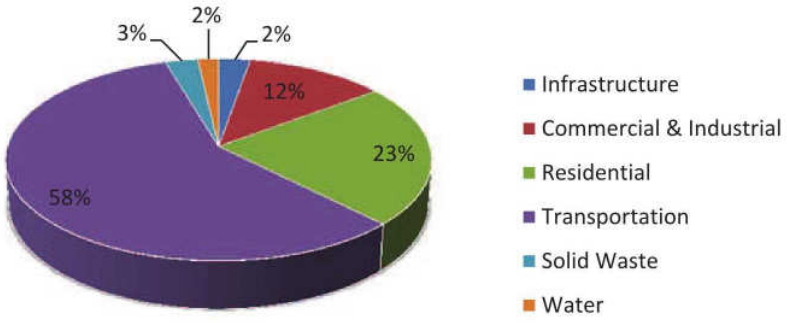
The Bellflower Greenhouse Gas Emissions Inventory includes separate inventories for government operations and the community as a whole. Although emissions data is summarized separately within this report, government operations emissions are a subset of the community inventory and included within the community inventory totals. For example, Bellflower employees produce greenhouse gas emissions during their daily commute to work, and these emissions are summarized within the transportation sector of the government operations inventory. These emissions are also captured by the transportation sector of the community inventory, which estimates the total annual vehicle miles traveled for the community and the resulting greenhouse gas emissions. This is the case for other sectors as well. Municipal building and facility energy use are accounted for in the commercial and industrial sector emissions of the community inventory, and streetlights and traffic signals are included in the infrastructure sector of the community inventory. In general, these emissions usually account for a small percentage of the community total, in most cases no more than 1-2%.

Table 4.1 and Figure 4.1 summarize Bellflower's community emissions by sector for 2010. The transportation sector emitted the largest quantity of greenhouse gases emissions, 196,721 metric tons of CO_2e or 58%. The residential sector, which consumes electricity and combusts natural gas fuel, was the second largest emitter of greenhouse gas, resulting in 23% of the emissions or 77,493 metric tons of CO_2e. The remainder of the emissions came from the commercial and industrial sector (12%), solid waste (3%), water and wastewater (2%), and infrastructure (3%).

Table 4.1: Community Emissions Summary by Sector

Sector	$C0_2e$ Emitted in 2010 (metric tons)	Share of 2010 Total
Residential	77,493	23%
Commercial and Industrial	40,925	12%
Transportation	196,721	58%
Infrastructure	9,253	3%
Solid Waste	9,498	3%
Water	6,094	2%
Total	**339,985**	**100%**

Figure 4.1: Community Emissions Summary by Sector (Metric Tons of CO_2e)



Summary by Scope

Table 4.2 shows Bellflower's community emissions categorized by scope for 2010.[14] Scope 1 activities accounted for the largest proportion of greenhouse gas emissions, approximately 249,808 metric tons of CO_2e. Scope 2 emissions from purchased electricity were the second largest category of emissions, totaling 75,394 metric tons of CO_2e. Other indirect emissions from solid waste, water, and wastewater (Scope 3) account for 14,783 metric tons of CO_2e.

Table 4.2: Community Emissions Summary by Scope

Scope and Activity	CO_2e Emitted in 2010 (metric tons)
Scope 1 Total	**249,808**
Natural Gas	53,087
Transportation Fuels	196,721
Scope 2 Total	**75,394**
Purchased Electricity	75,394
Scope 3 Total	**14,783**
Community-Generated Solid Waste	9,498
Water and Wastewater	5,285

In 2010, the combustion of transportation fuels produced the largest portion of Scope 1 emissions. Of the approximately 249,808 metric tons of CO_2e, transportation fuels accounted for 196,721 metric tons of CO_2e or 79%. Residential, commercial, and industrial natural gas combustion resulted in 21% of the total Scope 1 emissions.

Per Capita Emissions

Focusing only on absolute emissions numbers provides a limited understanding of the greenhouse gas emissions picture. Per capita emissions can be a useful indicator to measure progress towards city-wide greenhouse gas emissions goals. It can also provide a simple metric to compare one jurisdiction to another; however, as discussed in the Rolling Up Scopes and Double Counting (Chapter 3), caution must be used when comparing per capita emissions from Bellflower to other cities, since there could be methodological differences between jurisdictions.

What's the Difference Between Sector and Scope?

Greenhouse gas emissions are classified by scope and sector. Global emissions are commonly categorized by scope to attribute ownership over the emissions. Scope 1 includes emissions sources directly controlled by the entity, while Source 2 and 3 encompass indirect emissions from sources beyond an entity's boundary. Source 2 includes electricity purchased by an entity, and Source 3 includes other indirect emissions, such as energy used to transport water or landfill emissions.

Although many local governments report greenhouse gas emissions by scope, community inventories often focus on sector-specific emissions. Typical sectors include residential, commercial, transportation, solid waste, and water. Calculating emissions by sector allows local decision-makers to employ their broad regulatory powers for land use planning and permitting, transportation, water, and solid waste to take strategic actions to reduce greenhouse gas emissions.

Table 4.3 shows the per capita emissions for Bellflower, 4.4 metric tons of CO_2e. The per capita figure is obtained by dividing the total community greenhouse gas emissions by the total Bellflower population.

[14] For more information on Scopes, please see Chapter 3: Methodology

This number is not the carbon footprint of residents living within Bellflower, which would include emissions from other activities such as air travel.

Table 4.3: Per Capita Emissions (Metric Tons of CO_2e)

Community Greenhouse Gas Emissions	**339,985**
2010 Bellflower Population	76,616
Per Capita Greenhouse Gas Emissions	**4.44**

Community Inventory Detail by Sector

This section explores greenhouse gas emission by sector in greater detail. It includes six main sectors: residential; commercial and industrial, transportation, infrastructure, solid waste, and water.

Residential Sector

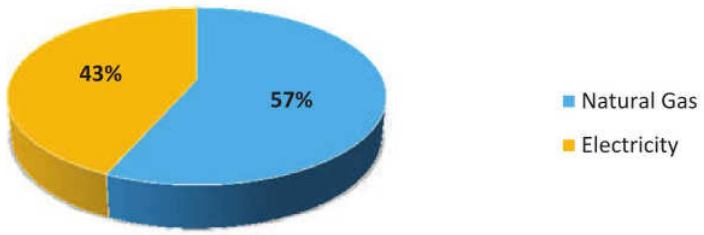
In 2010, the residential sector accounted for 77,493 metric tons of CO_2e or 23% of Bellflower's emissions. Table 4.4 depicts these residential emissions, which are the result of on-site natural gas combustion and electricity consumption.

Table 4.4: Residential Emission Sources

Residential	CO_2e Emitted in 2010 (metric tons)	Share of 2010 Total
Natural Gas Total	**43,863**	**100%**
Multifamily Natural Gas Emissions	9,131	21%
Single Family Natural Gas Emissions	34,731	79%
Electricity Total	**33,631**	**100%**
Total Emissions	**77,493**	-

The residential sector consumed approximately 8.3 million therms[15] of natural gas and 116.8 million kWh of electricity. Natural gas combustion resulted in 43,863 metric tons of CO_2e of the greenhouse gases emissions, and an additional 33,631 metric tons of CO_2e were the result of the electricity use. Figure 4.2 highlights the proportion of residential emissions by source.

Figure 4.2: Residential Emission by Source



[15] Therm is a measurement unit of heat equivalent to 100,000 British thermal units that is commonly used for describing quantities of natural gas.

As shown in Table 4.4, the natural gas emissions are split into multifamily and single family residential types. Single family homes accounted for 34,731 metric tons of CO_2e (79% of the residential natural gas total), and multifamily natural gas use resulted in 9,131 metric tons of CO_2e.

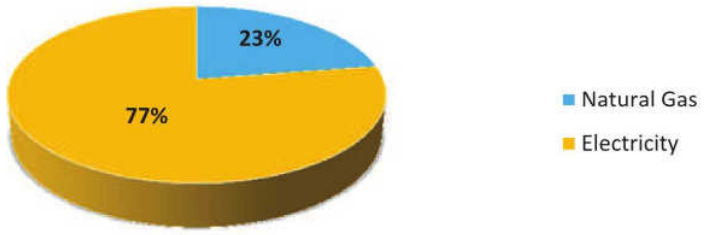
Commercial and Industrial Sector

The commercial and industrial sector includes emissions from the operation of offices and retail shops as well as public facilities. In 2010, the commercial and industrial sector produced 40,925 metric tons of CO_2e. This represented approximately 13% of the community-wide greenhouse gas emissions. Table 4.5 and Figure 4.3 depicts these emissions, which are the result of on-site natural gas combustion and electricity consumption. These figures do not include transportation, waste generation, or other industrial processes that may produce greenhouse gases.

Table 4.5: Commercial and Industrial Emission Sources

Commercial and Industrial Sector	$C0_2e$ Emitted in 2010 (metric tons)
Natural Gas	9,224
Electricity	31,701
Total	**40,925**

Figure 4.3: Commercial and Industrial Emission Sources



Transportation Sector

In 2010, the transportation sector emitted the largest proportion of community-wide greenhouse gas emissions in Bellflower. The sector produced 196,721 metric tons of CO_2e, or 58% of the community-wide total. Transportation sector emissions were estimated by applying conversion factors to daily vehicle miles traveled (VMT). VMT was obtained from the Southern California Association of Government's regional transportation model, which is based on the trip production and attraction of land uses within Bellflower.

This greenhouse gas inventory does not account for off-road transportation activities, such as lawn and garden care and construction, as data on these activities in Bellflower are not readily available. For cities like Bellflower, these activities typically represent a very small portion of the total transportation emissions.

Infrastructure Sector

Streetlights and traffic signals and controllers consumed approximately 32 million kWh of electricity in 2010, resulting in 9,253 metric tons of CO_2e of greenhouse gas emissions or 3% of the community-wide total. Table 4.6 shows the breakdown of infrastructure emissions by sources.

Table 4.6: Infrastructure Emissions Sources

Source	$C0_2e$ Emitted in 2010 (metric tons)	Share of 2010 Total
Street Lighting	9,150	99%
Traffic Control Service	103	1%
Total	**9,253**	**100%**

Solid Waste Sector

The solid waste sector produced 9,498 metric tons of CO_2e in 2010, accounting for approximately 3% of the Bellflower community-wide greenhouse gas emissions. Solid waste emissions are an estimate of the decomposition of municipal solid waste and alternative daily cover (ADC). Organic materials found in solid waste, such as paper, food scraps, plant debris, textiles, and wood waste, decompose in a landfill. As these materials decay, methane gas is generated and released into the atmosphere. Since organic materials decay over a long-time period (100+ years), the Bellflower inventory accounts for the future decomposition of the waste in the base year. Because of the long-time period, these emissions are considered Scope 3.

An estimated 75% of the methane emissions are collected by landfills.[16] The captured methane can be flared off to negate the global warming potential of the gas, or increasingly, it can be used to power gas-fired turbines that generate energy. Twenty-five percent of the methane emissions escape into the atmosphere as a significant contributor to global warming.

Water Sector

The water sector uses energy to collect, convey, treat, and deliver water to users, and then it uses additional energy to collect, treat, and dispose of the resulting wastewater. This energy use yields both direct and indirect greenhouse gas emissions. For Bellflower, the water sector contributed 6,094 metric tons of CO_2e of Scope 2 and 3 emissions in 2010, making up 2% of the community-wide greenhouse gas emissions.

In 2010, the City maintained infrastructure to deliver water to end users, contributing approximately 810 $MTCO_2e$ from purchased electricity. These emissions were calculated by combining metered electricity accounts with emissions factors. This emissions inventory also accounted for the embedded energy per gallon of water used by Bellflower businesses and residents. These Scope 3 emissions contributed 5,285 $MTCO_2e$ in 2010, and were calculated by combining the amount of water used and the amount of wastewater produced with emissions factors. These results are shown in Table 4.7.

[16] Local Government Operations Protocol, 2010.

Table 4.7: Water Emission Sources

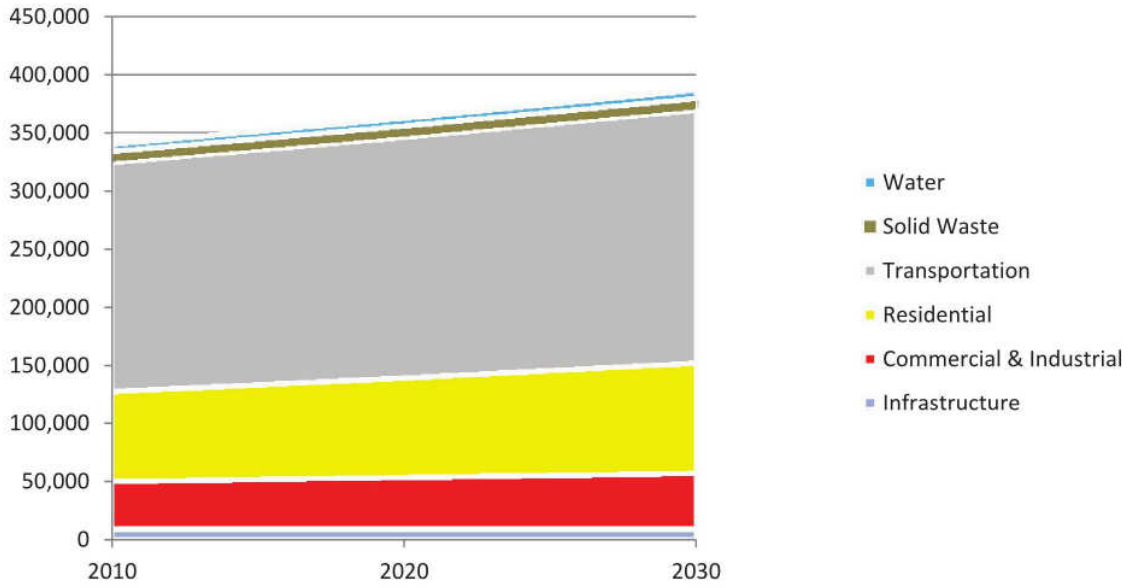
Source	CO_2e Emitted in 2010 (metric tons)	Share of 2010 Total
Water Infrastructure - Scope 1	810	13%
Water - Scope 3	4,030	66%
Recycled Water - Scope 3	28	0.5%
Wastewater - Scope 3	1,227	20%
Total	**6,094**	**100%**

Community Emissions Forecast

How will projected trends in energy use, driving habits, population growth, and employment expansion affect future greenhouse gas emissions in Bellflower? To answer this question, a business-as-usual (BAU) forecast was developed for Bellflower that estimates future emissions in two year intervals from 2010 until 2030. The BAU projects emissions under existing conditions, and it does not include the effects of California regulatory efforts, such as AB 1493, SB 1368, and EO S-1-07, on future greenhouse gas emissions.[17] The forecast assumes that emissions for electricity use, natural gas consumption, solid waste, and water and wastewater will increase over time in proportion to the number of people, households, and jobs in Bellflower. Transportation emissions are based on VMT growth projected by the SCAG for the regional transportation model.

Under a BAU forecast, Bellflower emissions are projected to increase from 339,985 metric tons of CO_2e in 2010 to 3362,446 metric tons of CO_2e in 2020, a 7% increase. By 2030, Bellflower's emissions are forecast to grow to approximately 386,674 metric tons of CO_2e, a 14% increase from 2010. Figure 4.4 and Table 4.8 show the results of the forecast.

Figure 4.4: Community Emissions Forecast by Sector



[17] For more information on California's climate change policies, programs, and regulations, see Chapter 2: Regulatory Setting.

In terms of total emissions, the transportation sector is projected to increase by 10,109 metric tons of CO_2e by 2030, the most of any sector analyzed. The residential sector is also expected to increase by 8,273 metric tons of CO_2e. The commercial industrial sector is projected to emit 3,237 metric tons of CO_2e more than in 2010.

Table 4.8: Community Emissions Forecast by Sector

Sector	CO_2e Emissions 2010 (metric tons)	CO_2e Emissions 2020 (metric tons)	CO_2e Emissions 2030 (metric tons)	Percent Change from 2010 to 2030	Annual Growth Rate 2010 to 2030
Residential	77,493	85,767	95,158	23%	1.03%
Commercial/ Industrial	40,925	44,162	47,660	16%	0.76%
Transportation	196,721	206,830	217,237	10%	0.50%
Infrastructure	9,253	9,290	9,290	0.4%	0.02%
Solid Waste	9,498	9,697	10,076	6%	0.30%
Water	6,094	6,701	7,253	19%	0.87%
Total	**339,985**	**362,446**	**386,674**	**14%**	-

As a percentage of 2010 emissions, the water sector is projected to increase by 19% between 2010 and 2030, the largest percentage increase of any sector measured. In part, this is a result of a small baseline number in 2010 and a high annual growth rate for water use. Greenhouse gas emissions in the residential, commercial and industrial, and transportation sectors are all projected to grow more than 10% by 2030.

Residential Sector

Between 2010 and 2030, greenhouse gas emissions in the residential sector are expected to increase from approximately 77,493 metric tons of CO_2e to 95,158 metric tons of CO_2e for Bellflower. The increase reflects an increase in residential population and increased annual energy demand.[18]

Commercial and Industrial Sector

Under the BAU forecast, commercial and industrial sector emissions are expected to rise to 46,983 metric tons of CO_2e, an increase of approximately 3,237 metric tons of CO_2e. This is a 16% increase in emissions over 2010. The commercial and industrial sector estimate uses job growth projections and changes in annual energy demand.[19]

Transportation Sector

Growth in transportation emissions for Bellflower is the result of an increase in vehicle miles traveled (VMT). Between 2010 and 2030, annual VMT is expected to increase 19 million miles to 388 million miles, according to SCAG's regional transportation model. The rise in VMT is projected to increase greenhouse gas emissions in the transportation sector from 196,721 metric tons of CO_2e to 217,237 metric tons of CO_2e. This is an overall increase of approximately 10,109 metric tons of CO_2e or a 5% increase.

[18] California Energy Commission. 2012. *California Energy Demand Forecast 2012-2022.*
[19] California Energy Commission. 2012. *California Energy Demand Forecast 2012-2022.*

Infrastructure Sector

Between 2010 and 2030, emissions from the infrastructure sector in Bellflower are forecast to increase from 9,253 metric tons of CO_2e to 9,290 metric tons of CO_2e. The increase of 37 metric tons of CO_2e is a 0.4% rise.

Solid Waste Sector

Population is the primary driver of future greenhouse gas emissions from the solid waste sector. Between 2010 and 2030, greenhouse gas emissions in the solid waste sector emissions are projected to grow from 9,498 metric tons of CO_2e to 10,076 metric tons of CO_2e, a 6% increase.

Water Sector

According to the BAU, Bellflower's water sector emissions are expected to grow from 6,094 metric tons of CO_2e in 2010 to 7,253 metric tons of CO_2e in 2030. The projected 19% increase is the second largest proportional increase for all the sectors. Population growth and increased water demand are the primary drivers of additional emissions from the water and wastewater sector.

Chapter 5: Government Operations Inventory Results

In 2010, government operations in Bellflower produced approximately 1,500 metric tons of CO_2e. This roll-up figure includes emissions for the following sectors:

- Municipal buildings and other facilities;
- Infrastructure, including streetlights and traffic signals;
- Transportation, including vehicle fleet and employee commute;
- Government-generated solid waste; and
- Water.

This section provides a detailed inventory of Bellflower's greenhouse gas emissions from government operations in 2010. It includes detailed information about emissions for each sector, providing additional information about specific sources of greenhouse gas emissions to aid planning and policymaking.

Summary by Sector

In 2010, Bellflower government operations produced 1,669 metric tons of CO_2e. Emissions from infrastructure contributed 46% of the government operations emissions, 760 metric tons of CO_2e. Energy consumption for municipal buildings resulted in approximately 528 metric tons of CO_2e, 32% of emissions. Transportation sector emissions produced 276 metric tons of CO_2e, which is 17% of the emissions from government operations. The remainder of the emissions came from solid waste and water. Table 5.1 and Figure 5.1 show these results.

Figure 5.1: Government Operations Emissions Summary by Sector (Metric Tons of CO_2e)

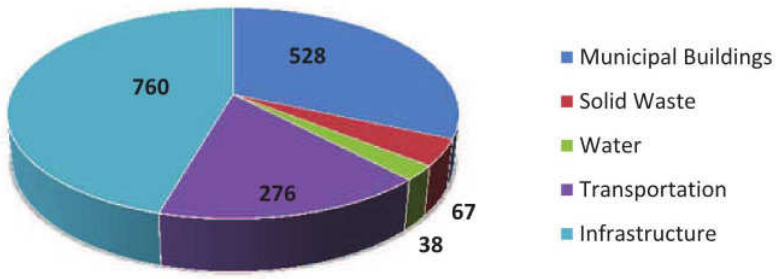


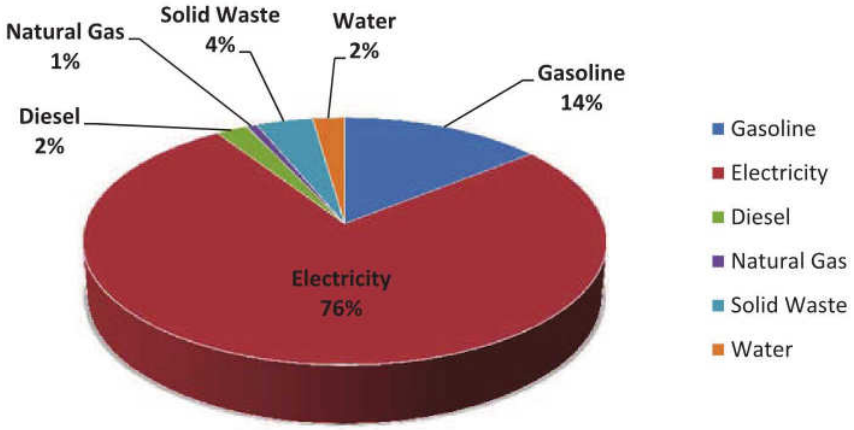
Table 5.1: Government Operations Emissions Summary by Sector

Sector	$C0_2e$ Emitted in 2010 (metric tons)	Share of 2010 Total
Municipal Buildings	528	32%
Infrastructure	760	46%
Transportation	276	17%
Solid Waste	67	4%
Water	38	2%
Total	**1,669**	**100%**

Summary by Source

In addition to understanding which sectors are generating greenhouse gas emissions, it is useful to know the fuels, such as gasoline, diesel, natural gas, and electricity, and other materials, such as solid waste and water, whose consumption results in the release of greenhouse gas emissions. This information will allow Bellflower to target management actions towards specific fuels and materials to reduce emissions. Figure 5.2 and Table 5.2 summarize the government operations greenhouse gas emissions by fuel type and materials.

Figure 5.2: Government Operations Emissions by Fuel Type or Material (Metric Tons of CO_2e)



In 2010, 76% of Bellflower's emissions from government operations were the result of electricity use. Bellflower purchases this electricity from outside the jurisdiction, and it is considered a Scope 2 emission. Gasoline consumption generated 14% of the emissions from government operations, while solid waste, diesel, water, and natural gas produced small amounts of greenhouse gases.

Table 5.2: Government Operations Emissions Summary by Fuel Type or Material

Sector	CO_2e Emitted in 2010 (metric tons)	Share of 2010 Total
Electricity	1,276	76%
Gasoline	238	14%
Diesel	38	2%
Natural Gas	12	1%
Solid Waste	67	4%
Water	38	2%
Total	**1,669**	**100%**

Energy-Related Costs

Along with generating greenhouse gas emissions, energy use results in significant expenditures for the City of Bellflower each year. Actions the City of Bellflower takes to reduce greenhouse gas emissions will also reduce total energy expenditures and resources, allowing the city to use these funds for other activities.

As shown in Table 5.3, Bellflower spent an estimated $954,000 on energy for government operations and water in 2010. Sixty percent of these expenditures ($575,000) were used to buy electricity to power streetlights and traffic signals. Twenty-nine percent of the expenditures were used to provide electricity and natural gas for municipal buildings and facilities. Bellflower also spent an estimated $72,000 on gasoline, diesel, and natural gas to fuel the city-owned vehicle fleet, and an estimated $30,000 on water.

Table 5.3: Bellflower Energy Cost by Activity

Activity	Estimated Costs in 2010
Municipal Buildings	$ 277,750
Streetlights and Traffic Signals	$ 574,871
Vehicle Fleet	$ 71,944
Water and Wastewater	$ 30,424
Total	**$ 954,989**

Government Operations Inventory Detail by Sector

This section explores greenhouse gas emission by sector in greater detail. It includes five main sectors for government operations: municipal buildings, solid waste, water, transportation, and infrastructure.

Municipal Buildings and Facilities Sector

In 2010, the operation of Bellflower's municipal facilities resulted in 528 metric tons of CO_2e of greenhouse gas emissions as shown in Table 5.4. This represented 32% of the emissions from governmental operations. Municipal building emissions include both the on-site combustion of natural gas and electricity purchased from outside the jurisdiction. Ninety-six percent of the emissions from Bellflower's buildings came from purchased electricity. Operation of municipal buildings cost the City approximately $278,000 in 2010.

Table 5.4: Municipal Building and Facilities Emissions by Source

Source	$C0_2e$ Emitted in 2010 (metric tons)	Share of 2010 Total
Electricity	516	98%
Natural Gas	12	2%
Total	**528**	**100%**

Infrastructure Sector

Streetlights and traffic signals and controllers required over 2.6 million kWh of electricity in 2010. The electricity used to power this infrastructure contributed 760 metric tons of CO_2e of greenhouse gas emissions. This figure was 46% of the government operations total in 2010, making it the largest

contributor to greenhouse gas emissions included in the government operations inventory. Table 5.5 shows the breakdown of infrastructure emissions by sources.

Table 5.5: Infrastructure Emissions Sources

Source	$C0_2e$ Emitted in 2010 (metric tons)	Share of 2010 Total
Street Lighting	688	91%
Traffic Control Service	72	9%
Total	**760**	**100%**

Transportation Sector

The transportation sector generated 276 metric tons of CO_2e in 2010, 17% of the government operations inventory. The Bellflower Greenhouse Gas Inventory includes transportation sector emissions from two sources: city-owned vehicle fuel and employment commute. Vehicle fleet emissions accounted for 139 metric tons of CO_2e and employee commuting emitted 137 metric tons of CO_2e. Table 5.6 shows municipal greenhouse gas emissions.

Table 5.6: Transportation Emissions Sources

Source	$C0_2e$ Emitted in 2010 (metric tons)	Share of 2010 Total
Vehicle Fleet	**139**	**100%**
Gasoline	101	73%
Diesel	38	27%
Natural Gas	0.1	0%
Employee Commute	**137**	**100%**
Total	**276**	**-**

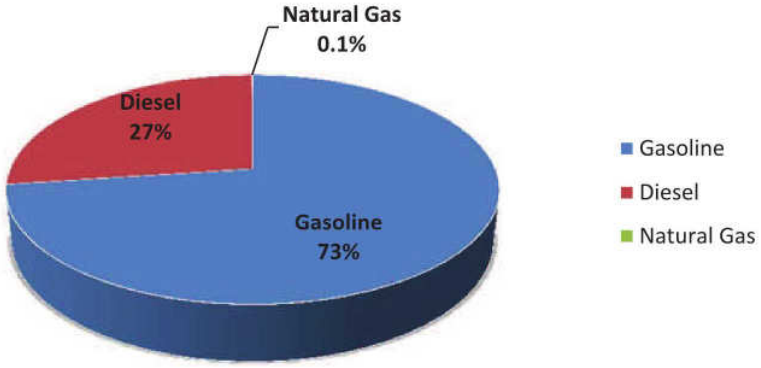
Vehicle Fleet

The City of Bellflower maintains a vehicle fleet used by employees for a variety of activities, including maintenance vehicles for parks and recreation, street sweeping vehicles, and police cars. These vehicles use gasoline, diesel, and natural gas, which contribute a significant portion of the greenhouse gas emissions from government operations.

In 2010, the Bellflower municipal fleet contributed 139 metric tons of CO_2e, or 50% of the total municipal transportation sector greenhouse gas emissions. Of the municipal vehicle fleet emissions, gasoline use resulted in 73% of the emissions and diesel consumptions produced 27% of the emissions. Figure 5.3 highlights the transportation sector emissions by source.

Bellflower spent an estimated $72,000 on fuel for the municipal vehicle fleet in 2010. Fifty percent of these expenditures were used on gasoline ($35,700), 34% were used on natural gas ($24,500), and 16% were spent on diesel ($11,700).

Figure 5.3: Transportation Sector Emissions by Source (Metric Tons of CO_2e)



Employee Commute

Along with greenhouse gas emissions generated by the city-owned vehicle fleet, employees produce emissions during their daily commute. Although the LGOP maintains that emissions from employee commuting are option, it also recognizes that local governments can influence how employees travel through the provision of incentives.

To estimate emissions from Bellflower employees, a survey was administered to understand the commuting habitats and preferences of all employees. Forty-one employees responded to the survey, and these results were extrapolated to all city employees. Appendix B includes a description of the survey and the full results.

In 2010, Bellflower employees produced approximately 137 metric tons of CO_2e during their commutes. According to the survey respondents, the average daily commute for an individual employee was 12.5 miles, resulting in an estimated 310,000 annual vehicle miles traveled by city employees.

Solid Waste

Bellflower sent an estimated 300 tons of waste to the landfill in 2010, resulting in the 67 metric tons of CO_2e. The solid waste included glass, food scraps, mixed paper, mixed metals, and mixed plastics. The organic materials within the solid waste, such as food scraps and paper, generate methane gas as they decay in the landfill over a long-time period (100+ years).

Water

In 2010, the water sector contributed 38 metric tons of CO_2e, or 4% of the government operations inventory. The inventory includes separate calculations for water and wastewater, and these results are shown in Table 5.7. Emission source data are an estimate of the greenhouse gas emissions generated by the average electricity use associated with each type of water.

Table 5.7: Water and Wastewater Emission Sources

Source	$C0_2e$ Emitted in 2010 (metric tons)	Share of 2010 Total
Wastewater	5	13%
Water	33	87%
Total	**38**	**100%**

Chapter 6: Conclusion

By completing a community-wide and government operations inventories, the City of Bellflower is taking an important first step towards reducing greenhouse gas emissions. The Bellflower Greenhouse Gas Emissions Inventory provides the baseline of information necessary to set greenhouse gas emissions reduction targets, identify and implement key mitigation measures, and monitor the effectiveness of the City's actions to reduce greenhouse gas emissions.

This conclusion summarizes the key findings from the greenhouse gas inventory and begins to outline the next steps for Bellflower, which include setting an emissions reduction target, creating a climate action plan, and monitoring emissions and policies.

Key Findings

The following section includes key findings from the community inventory and the government operations inventory.

Community Inventory

The transportation sector produced the largest proportion of community-wide greenhouse gas emissions in 2010. Transportation sources generated 196,721 metric tons of CO_2e or 58% of the total emissions. During the next several decades, emissions from cars and trucks will be heavily influenced by state regulations that set more stringent fuel standards to reduce greenhouse gas emissions (AB 1493), lower the carbon intensity of vehicle fuels (EO S-1-07), and monitor regional transportation-related greenhouse gas emissions targets (SB 375). These regulations and programs will help local governments lower vehicle miles traveled and lower emissions.

Purchased electricity accounted for 22% of the greenhouse emissions for the community as a whole. In 2010, Bellflower used 262 million kilowatt-hours (kWh) of electricity to power homes, businesses, government buildings, and public infrastructure, resulting in 75,394 metric tons of CO_2e emissions. As with the transportation sector, these emissions will be influenced by state regulations. Higher renewable portfolio standards for investor-owned utilities like Southern California Edison (EO S-21-09) and regulations that limit investment in carbon-intensive power generation (SB 1368) will reduce greenhouse gas emissions from purchased electricity. Further, energy efficiency measures are often the most cost-effective actions to lower energy use and reduce emissions.

Annual per capita emissions were 4.44 metric tons of CO_2e emissions in 2010, which equates to 26.8 pounds of CO_2e emissions per day. According to the California Climate Change Scoping Plan, California's 2010 per capita emissions were approximately 13.3 metric tons and the 2020 target is 9.6 metric tons per person.

Government Operations Inventory

Electricity use generated 76% of the government operations emissions. Bellflower purchased 4.4 million kWh of electricity from Southern California Edison at a cost of $850,000, resulting in 1,276 metric tons of CO_2e emissions. Electricity used to power street lights and traffic signals contributed 760 metric tons of CO_2e emissions, and power for municipal produced 528 of CO_2e emissions. As described in the

community inventory results, the carbon intensity of the electricity is expected to decline as state regulations for renewable energy and carbon-intensive power generation take effect.

Along with state regulations, increasing the energy efficiency of buildings and public lighting could be a cost-effective approach to lowering energy use, energy costs, and greenhouse gas emissions. An energy audit of Bellflower City Hall found nine potential energy saving measures, seven with favorable internal rates of return. These measures included lighting upgrades and sensors, wireless thermostats, and replacing the chiller. The audit found that the suite of measures would reduce emissions by 56.5 metric tons of CO_2e and yield an estimated $21,653 in savings per year at a net cost of $77,073 to implement.[20]

Greenhouse gas emission from the Bellflower vehicle fleet and employee commuting produced 276 metric tons of CO_2e emissions. This represented 17% of the municipal emissions inventory. The City owns and operates dozens of vehicles, which, over time, can be phased out in favor of more efficient vehicles. The City could also develop programs to influence the how employees travel. Commuter transit passes, parking cash out, accommodating electric vehicles, and ride share programs will incentivize employees to drive less and use non-automobile modes.

Setting Emissions Reduction Targets

The Bellflower Greenhouse Gas Emissions Inventory provides a baseline of emissions the city can use to develop emissions reduction targets. Typically, an emissions target specifies that the local government will lower emissions by a certain percentage below base year levels within a specific timeframe. For example, the City of Santa Monica set a goal of reducing greenhouse gas emission 15% below 1990 levels by 2015. Pasadena set a long-range goal of reducing emissions to 80% below 1990 levels by 2050. The target provides a benchmark the city can use to measure the progress and effectiveness of greenhouse gas reduction strategies.

When developing a target, Bellflower should establish a strong commitment to reduce greenhouse gas emissions. The target, however, must balance local commitment and ambition with what is realistically achievable. Bellflower will need enough time to develop and implement selected actions. If the city selects a longer the timeframe, a more aggressive the target should be selected. In the near-term, Bellflower should set emission reduction targets every two years to ensure continued momentum around the City's climate action efforts.

Creating a Climate Action Plan

The Bellflower Greenhouse Gas Emission Inventory identifies the major sources of emissions within the City, and provides the necessary information to develop actions that reduce greenhouse gas emissions. The Bellflower Climate Action Plan should include a unique set of policies and measures designed to enable the City to meet its emissions reduction targets. The Plan should include a timeline, a set of reduction strategies and estimated benefits of each compared to the baseline, a description of financing mechanisms, and an assignment of responsibility to departments and staff.

[20] Bellflower Energy Audit: City Hall. 2012.

Maintaining the Inventory Over Time

To make sure the climate mitigation measures are effective, Bellflower should conduct routine inventories of emissions and monitor emissions reduction targets. The City of Bellflower should determine how frequently to re-inventory emissions. Annual re-inventory provides the most information to local governments and would be ideal; however, many cities inventory emissions every two years. Depending on resources, Bellflower could choose to update the government operations inventory more frequently, as it has more influence over these emissions.

Bellflower should also consider establishing internal policies and procedures for staff to collect updated data for the inventory. These data include fuel use by the municipal vehicles and maintenance equipment and energy consumption for buildings and public infrastructure. The City may choose to track of these records in a software program or within a database to allow more efficient update to the greenhouse gas inventory.

The City of Bellflower should continue using the recommended protocol methods outlined in the LGOP and the AEP white paper. These protocols continue to evolve as methodologies and conversion factors improve over time. Using these improved emission reporting methods will produce more accurate emission results, but it will require the City to adjust previous inventories in order to compare the results.

Appendix A: Activity Data, Methodology, and Emission Factors

Listed below are the data, data sources, and emissions factors for the community-wide and government operations greenhouse gas emissions inventories. The table includes activity data, such as electricity used to power homes, and the emissions factors used to convert activity data to greenhouse gas emissions.[21] To make the data easier to use, the information is grouped by sector. This data will be crucial for re-inventorying emissions.

Community Greenhouse Gas Inventory

Sector	Emissions Source	Data Used	Data Source	Greenhouse Gas	Emissions Factors	Emission Factor Source	Pertinent Assumption
Residential	Electricity	116,834,565 kWh	Southern California Edison	CO_2	630.89 lbs/MWh	LGOP Table G.6	
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	
Residential	Natural Gas	8,251,677 Therms	SoCalGas	CO_2	53.02 kg CO2/MMBTU	LGOP Table G.1	
				CH_4	0.005 kg CO2/MMBTU	LGOP Table G.3	
				N_2O	0.0001 kg CO2/MMBTU	LGOP Table G.3	
Commercial and Industrial	Electricity	110,130,560 kWh	Southern California Edison	CO_2	630.89 lbs/MWh	LGOP Table G.6	
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	
Commercial and Industrial	Natural Gas	1,735,288 Therms	SoCalGas	CO_2	53.02 kg CO2/MMBTU	LGOP Table G.1	
				CH_4	0.005 kg CO2/MMBTU	LGOP Table G.3	
				N_2O	0.0001 kg CO2/MMBTU	LGOP Table G.3	
Infrastructure	Electricity	34,957,339 kWh	Southern California Edison	CO_2	630.89 lbs/MWh	LGOP Table G.6	
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	
Water	Electricity - Water	7,984 Acre-Ft	City of Bellflower	CO_2	630.89 lbs/MWh	LGOP Table G.6	
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	

[21] For more information on calculating greenhouse gas emissions, see Chapter 3: Methodology.

Sector	Emissions Source	Data Used	Data Source	Greenhouse Gas	Emissions Factors	Emission Factor Source	Pertinent Assumption
Water	Electricity - Recycled water	99 Acre-Ft	City of Bellflower	CO_2	630.89 lbs/MWh	LGOP Table G.6	
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	
Water	Electricity - Wastewater	2,230,000,000 Gallons	City of Bellflower	CO_2	630.89 lbs/MWh	LGOP Table G.6	
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	
Transportation	Gasoline	1,066,354 Daily Vehicle Miles Traveled	Southern California Association of Governments Regional Transportation Model	CO_2	8.81 kg /gallon	California Climate Action Registry's General Protocol Version 3.0 April 2008 Appendix Table C4 pg. 94	Estimated gasoline use = annual vehicle miles of travel / average VMT per gallon of gasoline Average VMT per gallon of gasoline is from USEPA's "Light-Duty Automotive Technology and Fuel Economy Trend: 1975 Through 2006" pg. 10
				CH_4	0.0647g /mile	LGOP Table G.10	Assumes vehicles are gasoline passenger cars with model years 1984-1993 (emits the highest concentration of CH4 and N2O among other vehicle model years based on LGO Protocol) to produce conservative estimations.
				N_2O	0.0704 g/mile	LGOP Table G.10	

Government Operations Greenhouse Gas Inventory

Sector	Emissions Source	Data Used	Data Source	Greenhouse Gas	Emissions Factors	Emission Factor Source	Pertinent Assumption
Residential	Electricity	1,791,494 kWh	Southern California Edison	CO_2	630.89 lbs/MWh	LGOP Table G.6	
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	
Residential	Natural Gas	5,086 Therms	SoCalGas	CO_2	53.02 kg CO2/MMBTU	LGOP Table G.1	
				CH_4	0.005 kg CO2/MMBTU	LGOP Table G.3	
				N_2O	0.0001 kg CO2/MMBTU	LGOP Table G.3	

Sector	Emissions Source	Data Used	Data Source	Greenhouse Gas	Emissions Factors	Emission Factor Source	Pertinent Assumption
Infrastructure	Electricity	2,639,807 kWh	Southern California Edison	CO_2	630.89 lbs/MWh	LGOP Table G.6	
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	
Water	Electricity - Water	10.31 million gallons	City of Bellflower	CO_2	630.89 lbs/MWh	LGOP Table G.6	Millions of Gallons derived from wastewater data. Wastewater Gallons X 87.4% = gallons of water
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	
Water	Electricity - Wastewater	9,007,926 Gallons	City of Bellflower	CO_2	630.89 lbs/MWh	LGOP Table G.6	
				CH_4	0.029 lbs/MWh	LGOP Table G.7	
				N_2O	0.010 lbs/MWh	LGOP Table G.7	
Transportation	Gasoline	1,410 Daily Vehicle Miles Traveled	Bellflower Employee Commute Survey	CO_2	8.81 kg /gallon	California Climate Action Registry's General Protocol Version 3.0 April 2008 Appendix Table C4 pg. 94	Estimated gasoline use = annual vehicle miles of travel / average VMT per gallon of gasoline Average VMT per gallon of gasoline is from USEPA's "Light-Duty Automotive Technology and Fuel Economy Trend: 1975 Through 2006" pg. 10
				CH_4	0.0647g /mile	LGOP Table G.10	Assumes vehicles are gasoline passenger cars with model years 1984-1993 (emits the highest concentration of CH4 and N2O among other vehicle model years based on LGO Protocol) to produce conservative estimations.
				N_2O	0.0704 g/mile	LGOP Table G.10	

Sector	Emissions Source	Data Used	Data Source	Greenhouse Gas	Emissions Factors	Emission Factor Source	Pertinent Assumption
Transportation - Vehicle Fleet	Gasoline	11,494 Gallons	City of Bellflower	CO_2	8.78 kg /gallon	Emissions Factor Model	Average cost per gallon of gasoline data ($3.11) obtained from the Energy Information Administration. http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_y05la_a.htm
Transportation - Vehicle Fleet	Diesel	3,716 Gallons	City of Bellflower	CO_2	10.1 kg /gallon	Emissions Factor Model	Average cost per gallon of diesel data ($3.16) obtained from the Energy Information Administration. http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_sca_a.htm
Transportation - Vehicle Fleet	Natural Gas	9,870 Gallons	City of Bellflower	CO_2	0.0545 kg /gallon	Emissions Factor Model	Average cost per gge of natural gas ($2.48).

Appendix B: Employee Commute Survey

FEHR PEERS

City of Bellflower Climate Action Plan
Transportation Survey Results

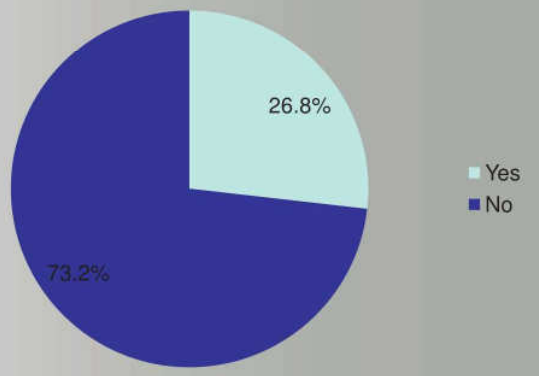
FEHR PEERS

Question #1

Is your primary residence located within the City of Bellflower?

FEHR PEERS

Question #1



FEHR PEERS

Question #1 Results

- Findings
  - The majority of employees surveyed live outside the city.
- Strategy Considerations
  - There are still enough residents to warrant considering strategies targeting short-distance commuters and Bellflower residents as well as medium to long-distance commutes of residences from other cities

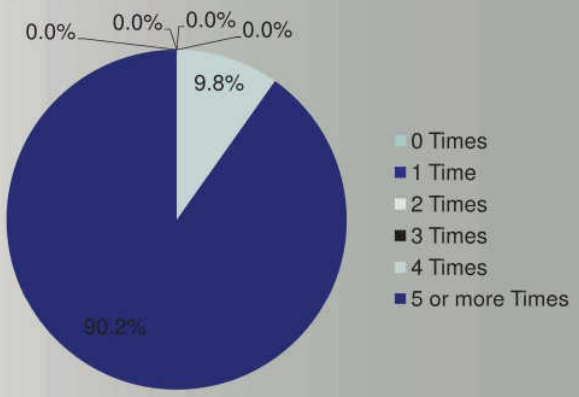
FEHR PEERS

Question #2

How many times per week do you travel from your home to city offices for work?

FEHR PEERS

Question #2



FEHR PEERS

Question #2 Results

- Findings
  - 100% of employees travel to work at least four times a week.
  - 90% of employees travel to work five days a week
- Strategy Considerations
  - Flexible scheduling to reduce the number of commute days may prove effective given the high number of employees commuting every day

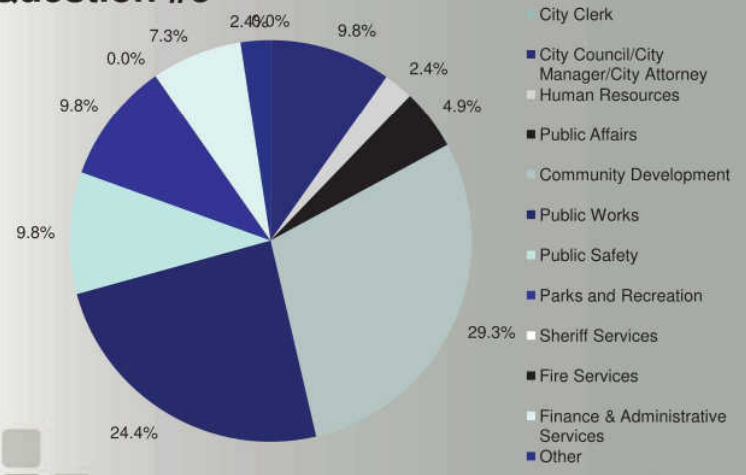
FEHR PEERS

Question #3

Which department do you work in?

FEHR PEERS

Question #3



FEHR PEERS

Question #3 Results

- Findings
  - Over half of responses came from Community Development and Public Works
  - There were no respondents from Sheriff and Fire services
  - Similar level of response from Public Safety, Finance and Administration, Parks and Recreation, and City Council/Manager/Attorney offices.
- Strategy Considerations
  - Strategies should target departments above who constitute a large proportion of total city staff

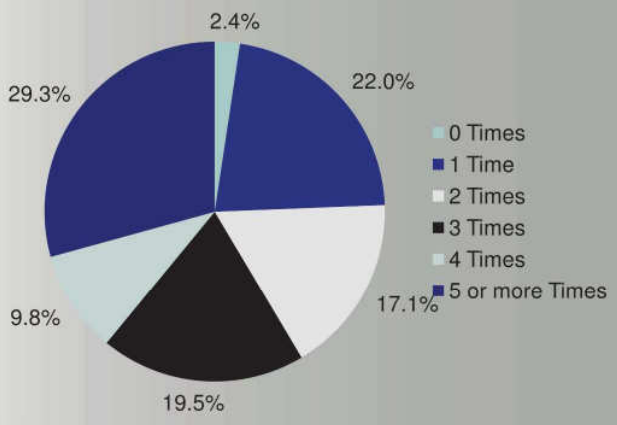
FEHR PEERS

Question #4

Once you arrive at work, how many times during a typical weekday do you leave City offices for purposes other than leaving to go home after work? These trips might include meetings, eating, shopping, and other similar types of trips.

FEHR PEERS

Question #4



FEHR PEERS

Question #4 Results

- Findings
  - Over one quarter of respondents leave the office 5 times a day or more, the highest single response
  - More than half of respondents leave the office at least 3 times a day
- Strategy Considerations
  - Strategies should recognize amount daily travel to/from city offices
  - Given high level of daily trips, measures could be implemented to reduce
  - This would not apply to Police and Fire services

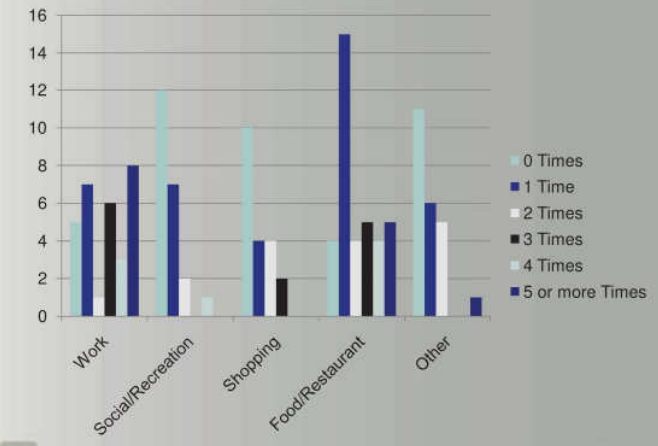
FEHR PEERS

Question #5

Based on your response to question 4, please check the frequency of trips for each purpose, per typical weekday.

FEHR PEERS

Question #5



FEHR PEERS

Question #5 Results

- Findings
  - For staff leaving once, most common trip taken is for food/eating
  - Majority of persons that left the their office for work did so at least 3 times per day
- Strategy Considerations
  - Should consider ways to draw more dining options near staff offices and reduce need to leave offices for work-related reasons

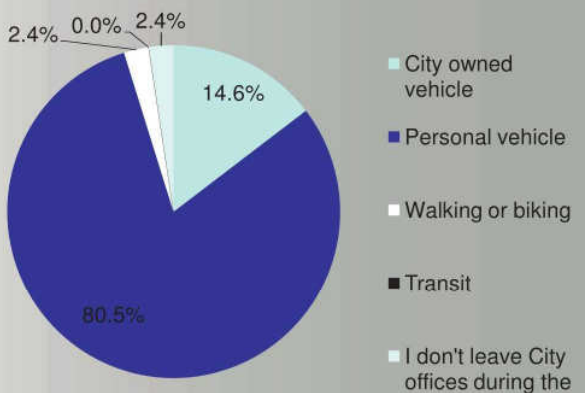
FEHR PEERS

Question #6

If you leave City offices during the day for any of the reasons above, what is the most common mode of travel which you use?

FEHR PEERS

Question #6



FEHR PEERS

Question #6 Results

- Findings
  - 15% of respondents use city-owned vehicle
  - 80% of respondents use personal vehicle
  - 5% walk or bike with 0 respondents utilizing transit
- Strategy Considerations
  - City-owned alternative fuel vehicles could provide travel option with reduced GHG
  - Development of amenities such as restaurants in close proximity to offices could lead to more walking or biking for some trips.

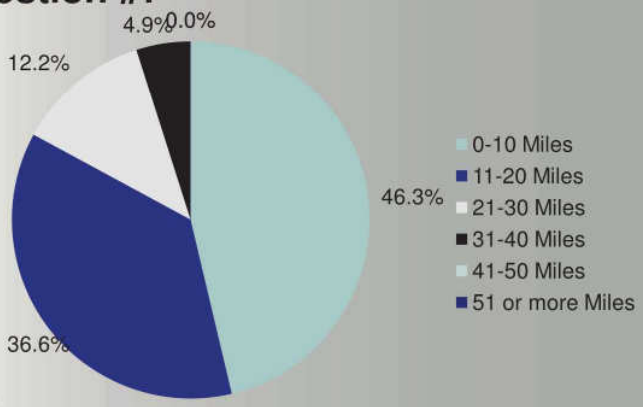
FEHR PEERS

Question #7

What is your estimated round trip commute (travel from home to work) on a typical day?

FEHR PEERS

Question #7



FEHR PEERS

Question #7 Results

- Findings
  - 46% drive 0-10 miles
  - 83% travel 20 miles or less
  - 0% travel 41 or more miles
- Strategy Considerations
  - Consider varying trip lengths when developing strategies
  - Improvements to transit could draw the large percent of employees living within 10 miles of work

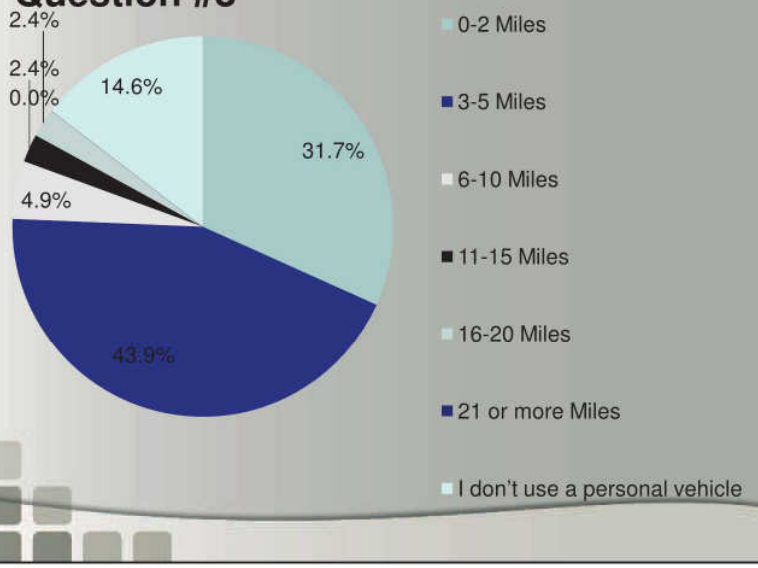
FEHR PEERS

Question #8

If you use your personal vehicle to drive from City offices to other locations during the day, what is the typical number of miles you drive during a typical day (excluding travel between home and work)?

FEHR PEERS

Question #8



FEHR PEERS

Question #8 Results

- Findings
  - 76% of respondents traveled less than 5 miles
  - 15% stated they do not use their personal vehicle to drive to other locations during the day
- Strategy Considerations
  - Consider providing alternative modes for short trips to major destinations near city offices
  - City-owned alternative fuel vehicles could provide travel option with reduced GHG

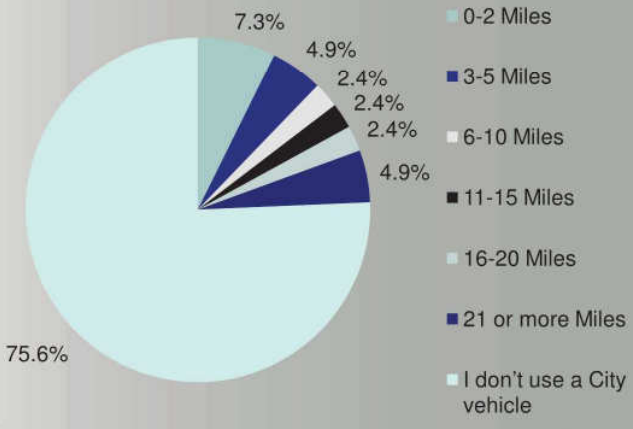
FEHR PEERS

Question #9

If you use a city-owned vehicle to drive from City offices to other locations during the day, what is the typical number of miles you drive during a typical day (excluding travel between home and work)?

FEHR PEERS

Question #9



FEHR PEERS

Question #9 Results

- Findings
  - Approximately 13% of respondents travel less than 5 miles
  - The remaining distance categories were evenly distributed
  - Length of trips more evenly distributed for city-owned cars than for personal vehicles
  - 76% stated they do not use a City-owned vehicle
- Strategy Considerations
  - Consider providing alternative modes for short trips to major destinations near city offices
  - City-owned alternative fuel vehicles could reduce GHG emissions given existing trip lengths

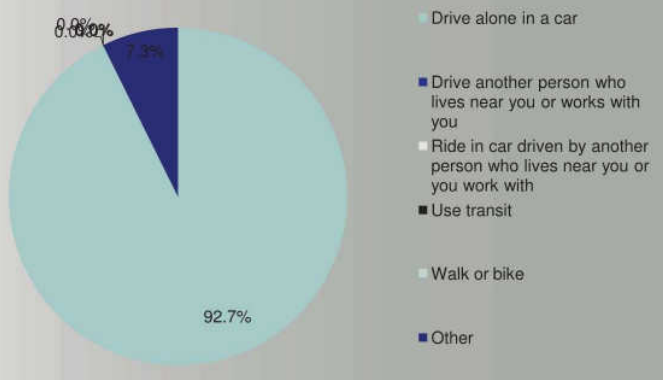
FEHR PEERS

Question #10

How do you travel to your work location on a typical day?

FEHR PEERS

Question #10



FEHR PEERS

Question #10 Results

- Findings
  - 93% drive alone
  - 0 respondents reported carpooling, walking, bicycling or transit
  - Write-ins included partial carpooling and motorcycle
- Strategy Considerations
  - Will want to consider methods to shift single-occupant autos to other modes
  - Will want to also consider ways to reduce need to travel to offices

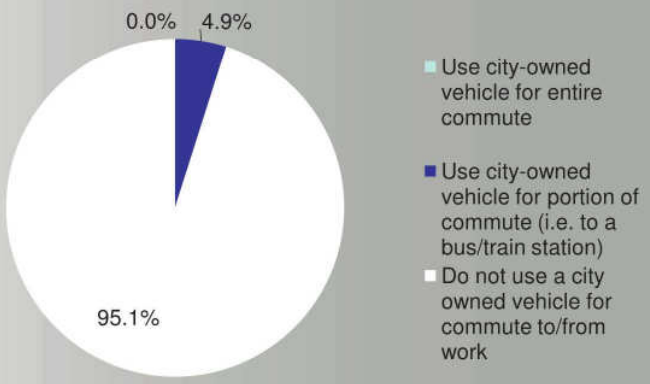
FEHR PEERS

Question #11

Do you use a city-owned vehicle for your commute to/from work, or a portion of your commute to/from work?

FEHR PEERS

Question #11



FEHR PEERS

Question #11 Results

- Findings
  - 95% of respondents do not utilize city-owned vehicle for any part of their commute
  - 0% utilize city-owned vehicle for entire commute
  - 5% utilize city-owned vehicle for portion of commute

FEHR PEERS

Question #12

What is the zip code of your home location?

FEHR PEERS

Question #12

FEHR PEERS

Question #12 Results

- Findings
  - 24% of respondents in 90706
- Strategy Considerations
  - May want to consider strategies for those located in proximity to offices
  - Working remotely may also serve as a strategy

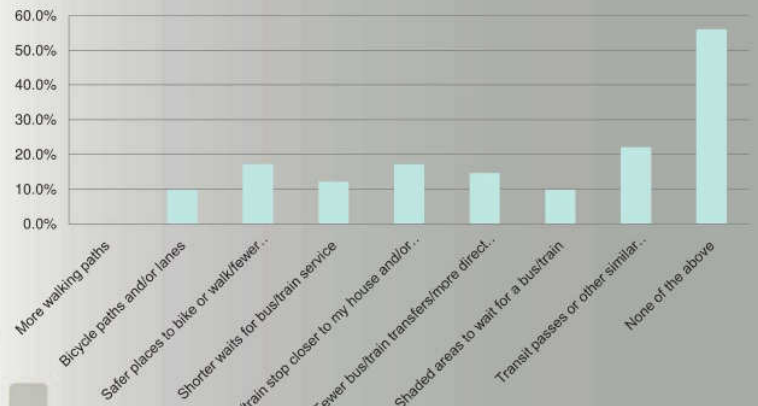
FEHR PEERS

Question #13

- I would walk, bicycle, or take a bus/train more often if there were (please check all that apply)…

FEHR PEERS

Question #13



FEHR PEERS

Question #13 Results

- Findings
  - No expressed interest is additional walking paths
  - Similar levels of interest in all other options
  - Over half of respondents stated "None of the above"
- Strategy Considerations
  - Focus on bicycles and pedestrians to the extent possible for internal transportation
  - Explore options to improve transit accessibility
  - Explore incentives for transit use

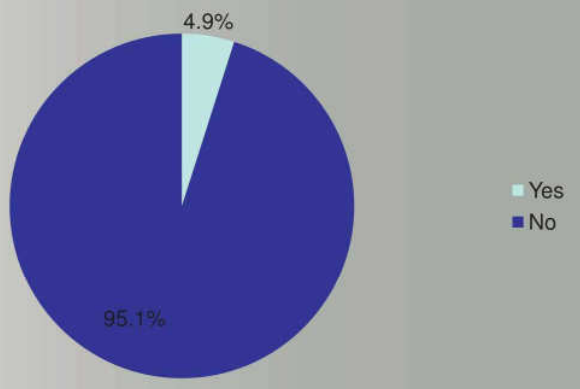
FEHR PEERS

Question #14

Do you own an alternative fuel vehicle (compressed natural gas, liquefied natural gas, electric, etc.) or hybrid?

FEHR PEERS

Question #14



FEHR PEERS

Question #14 Results

- Findings
  - 5% of respondents own alternative fuel vehicle

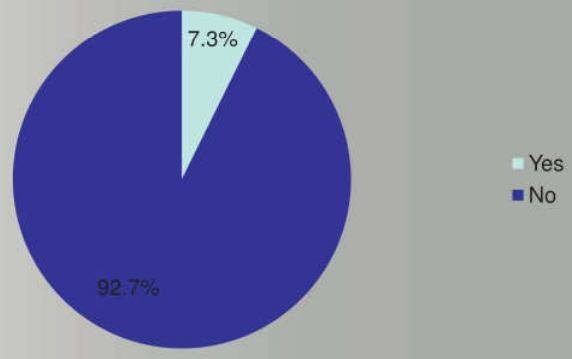
FEHR PEERS

Question #15

Do you plan on purchasing an alternative fuel vehicle or hybrid in the next year?

FEHR PEERS

Question #15



FEHR PEERS

Question #15 Results

- Findings
  - 93% of respondents do not plan on acquiring an alternative fuel vehicle in the next year
- Strategy Considerations
  - Incentives for alternative fuel vehicles may have limited success

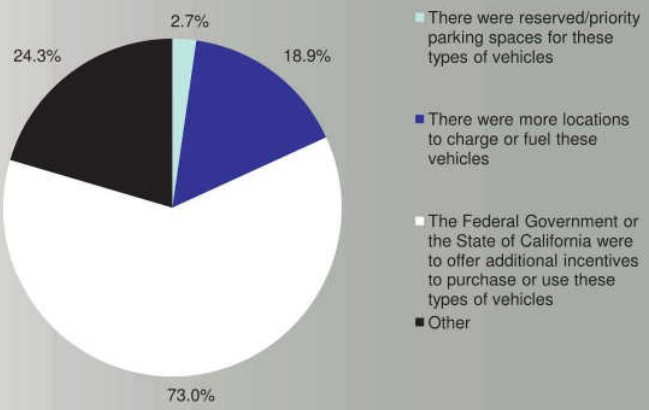
FEHR PEERS

Question #16

If the answer to question #15 is no, would you reconsider your decision under the following scenarios (check all that apply):

FEHR PEERS

Question #16



FEHR PEERS

Question #16 Results

- Findings
  - 73% would reconsider if there were additional incentives provided by the federal and state governments
  - 19% would reconsider if fueling locations were more common
  - 3% would reconsider with preferential parking for these vehicles
  - Write-ins indicate cost as the highest factor
- Strategy Considerations
  - Preferential parking is a relatively inexpensive incentive that could achieve modest results

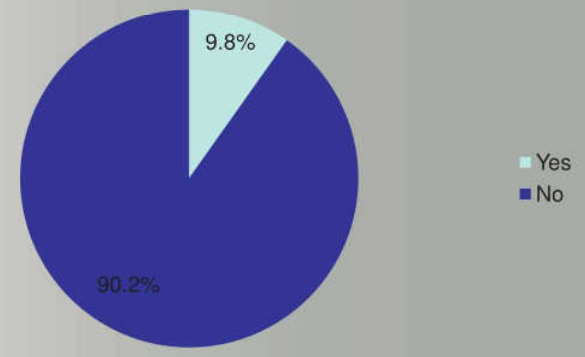
FEHR PEERS

Question #17

Would you consider relocating your residence to shorten your commute or allow you to walk, bike, or take transit?

FEHR PEERS

Question #17



FEHR PEERS

Question #17 Results

- Findings
  - 90% would not consider relocating residence to shorten commute or make other modes more viable
- Strategy Considerations
  - Without relocation, transit is a more viable alternative mode than biking/walking

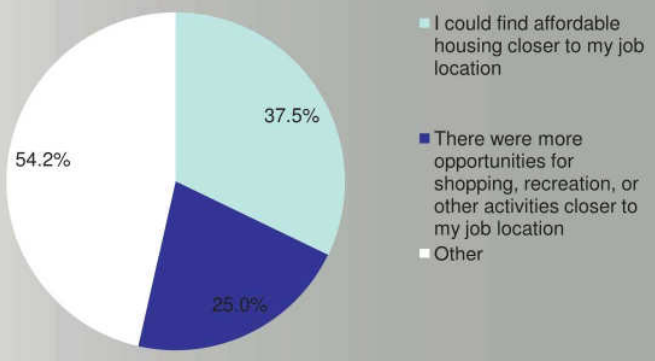
FEHR PEERS

Question #18

If the answer to question #17 is no, would you reconsider your decision under the following scenarios (check all that apply):

FEHR PEERS

Question #18



FEHR PEERS

Question #18 Results

- Findings
  - 36% of respondents would reconsider if housing were more affordable near job location
  - 25% of respondents would reconsider with more shopping, recreation, and activities near job location
  - Write-ins typically indicate that respondents feel they live close enough. So expressed a desire for better schools.
- Strategy Considerations
  - Development of shopping, recreation and activities will have minimal impact

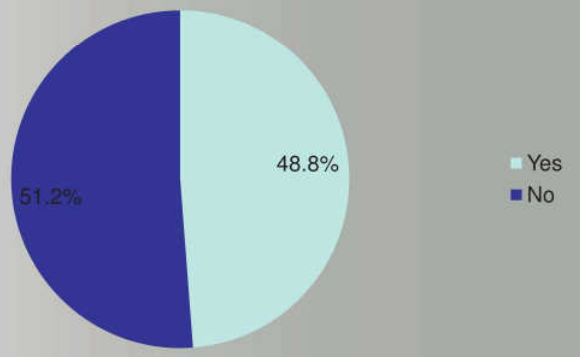
FEHR PEERS

Question #19

Do you believe that there are sufficient eating and drinking opportunities located within walking distance of your office?

FEHR PEERS

Question #19



FEHR PEERS

Question #19 Results

- Findings
  - 49% yes responses
  - 51% no responses
- Strategy Considerations
  - Since respondents are split on the availability of good eating and drinking options, expanding those options could potentially produce some effect

City of Bellflower Employee Travel Survey

SurveyMonkey

1. Is your primary residence located within the City of Bellflower?

	Response Percent	Response Count
Yes	26.8%	11
No	**73.2%**	**30**
	answered question	**41**
	skipped question	**0**

2. How many times per week do you travel from your home to city offices for work?

	Response Percent	Response Count
0 Times	0.0%	0
1 Time	0.0%	0
2 Times	0.0%	0
3 Times	0.0%	0
4 Times	9.8%	4
5 or more Times	**90.2%**	**37**
	answered question	**41**
	skipped question	**0**

3. What Department do you work In?

	Response Percent	Response Count
City Clerk	0.0%	0
City Council/City Manager/City Attorney	9.8%	4
Human Resources	2.4%	1
Public Affairs	4.9%	2
Community Development	**29.3%**	**12**
Public Works	24.4%	10
Public Safety	9.8%	4
Parks and Recreation	9.8%	4
Sheriff Services	0.0%	0
Fire Services	0.0%	0
Finance & Administrative Services	7.3%	3
Other	2.4%	1
	If you answered other, please specify	0
	answered question	**41**
	skipped question	**0**

4. Once you arrive at work, how many times during a typical weekday do you leave City offices for purposes other than leaving to go home after work? These trips might include meetings, eating, shopping, and other similar types of trips.

		Response Percent	Response Count
0 Times		2.4%	1
1 Time		22.0%	9
2 Times		17.1%	7
3 Times		19.5%	8
4 Times		9.8%	4
5 or more Times		**29.3%**	**12**
		answered question	**41**
		skipped question	**0**

5. Based on your response to question 4 above, please check the frequency of trips for each purpose, per typical weekday.

	0 Times	1 Time	2 Times	3 Times	4 Times	5 or more Times	Response Count
Work	16.7% (5)	23.3% (7)	3.3% (1)	20.0% (6)	10.0% (3)	**26.7% (8)**	30
Social/Recreation	**54.5% (12)**	31.8% (7)	9.1% (2)	0.0% (0)	4.5% (1)	0.0% (0)	22
Shopping	**50.0% (10)**	20.0% (4)	20.0% (4)	10.0% (2)	0.0% (0)	0.0% (0)	20
Food/Restaurant	10.8% (4)	**40.5% (15)**	10.8% (4)	13.5% (5)	10.8% (4)	13.5% (5)	37
Other	**47.8% (11)**	26.1% (6)	21.7% (5)	0.0% (0)	0.0% (0)	4.3% (1)	23
						answered question	**41**
						skipped question	**0**

6. If you leave City offices during the day for any of the reasons above, what is the most common mode of travel which you use?

	Response Percent	Response Count
City owned vehicle	14.6%	6
Personal vehicle	**80.5%**	**33**
Walking or biking	2.4%	1
Transit	0.0%	0
I don't leave City offices during the day	2.4%	1
	answered question	**41**
	skipped question	**0**

7. What is your estimated round trip commute (travel from home to work) on a typical day?

	Response Percent	Response Count
0-10 Miles	**46.3%**	**19**
11-20 Miles	36.6%	15
21-30 Miles	12.2%	5
31-40 Miles	4.9%	2
41-50 Miles	0.0%	0
51 or more Miles	0.0%	0
	answered question	**41**
	skipped question	**0**

8. If you use your personal vehicle to drive from City offices to other locations during the day, what is the typical number of miles you drive during a typical day excluding travel between home and work)?

	Response Percent	Response Count
0-2 Miles	31.7%	13
3-5 Miles	**43.9%**	**18**
6-10 Miles	4.9%	2
11-15 Miles	2.4%	1
16-20 Miles	2.4%	1
21 or more Miles	0.0%	0
I don't use a personal vehicle	14.6%	6
	answered question	**41**
	skipped question	**0**

9. If you use a city-owned vehicle to drive from City offices to other locations during the day, what is the typical number of miles you drive during a typical day (excluding travel between home and work)?

	Response Percent	Response Count
0-2 Miles	7.3%	3
3-5 Miles	4.9%	2
6-10 Miles	2.4%	1
11-15 Miles	2.4%	1
16-20 Miles	2.4%	1
21 or more Miles	4.9%	2
I don't use a City vehicle	**75.6%**	**31**
	answered question	**41**
	skipped question	**0**

10. How do you travel to your work location on a typical day? If your mode of travel varies, please report the most common. If, for example, you drive 4 days a week by yourself and carpool with a family member one day a week, please report "Drive Alone" as it is the most common.

	Response Percent	Response Count
Drive alone in a car	**92.7%**	**38**
Drive another person who lives near you or works with you	0.0%	0
Ride in car driven by another person who lives near you or you work with	0.0%	0
Use transit	0.0%	0
Walk or bike	0.0%	0
Other	7.3%	3
If you answered other, please specify		3

answered question	**41**
skipped question	**0**

11. Do you use a city-owned vehicle for your commute to/from work, or a portion of your commute to/from work?

	Response Percent	Response Count
Use city-owned vehicle for entire commute	0.0%	0
Use city-owned vehicle for portion of commute (i.e. to a bus/train station)	4.9%	2
Do not use a city owned vehicle for commute to/from work	**95.1%**	**39**
	answered question	**41**
	skipped question	**0**

12. What is the zip code of your home location?

	Response Count
	41
	answered question **41**
	skipped question **0**

13. I would walk, bicycle, or take a bus/train more often if there were (please check all that apply):

	Response Percent	Response Count
More walking paths	0.0%	0
Bicycle paths and/or lanes	9.8%	4
Safer places to bike or walk/fewer congested streets or intersections to cross	17.1%	7
Shorter waits for bus/train service	12.2%	5
Bus/train stop closer to my house and/or work	17.1%	7
Fewer bus/train transfers/more direct bus/train routes	14.6%	6
Shaded areas to wait for a bus/train	9.8%	4
Transit passes or other similar incentives such as reduced bus/train fare	22.0%	9
None of the above	**56.1%**	**23**
	answered question	**41**
	skipped question	**0**

14. Do you own an alternative fuel vehicle (compressed natural gas, liquefied natural gas, electric, etc.) or hybrid?

	Response Percent	Response Count
Yes	4.9%	2
No	**95.1%**	**39**
	answered question	**41**
	skipped question	**0**

15. Do you plan on purchasing an alternative fuel vehicle or hybrid in the next year?

	Response Percent	Response Count
Yes	7.3%	3
No	**92.7%**	**38**
	answered question	**41**
	skipped question	**0**

16. If the answer to question #15 is no, would you reconsider your decision under the following scenarios (check all that apply):

	Response Percent	Response Count
There were reserved/priority parking spaces for these types of vehicles	2.7%	1
There were more locations to charge or fuel these vehicles	18.9%	7
The Federal Government or the State of California were to offer additional incentives to purchase or use these types of vehicles	**73.0%**	**27**
Other	24.3%	9
	If you answered other, please specify	9
	answered question	**37**
	skipped question	**4**

17. Would you consider relocating your residence to shorten your commute or allow you to walk, bike, or take transit?

	Response Percent	Response Count
Yes	9.8%	4
No	**90.2%**	**37**
	answered question	**41**
	skipped question	**0**

18. If the answer to question #17 is no, would you reconsider your decision under the following scenarios (check all that apply):

	Response Percent	Response Count
I could find affordable housing closer to my job location	37.5%	9
There were more opportunities for shopping, recreation, or other activities closer to my job location	25.0%	6
Other	**54.2%**	**13**
	If you answered other, please specify	15
	answered question	**24**
	skipped question	**17**

19. Do you believe that there are sufficient eating and drinking opportunities located within walking distance of your office?

	Response Percent	Response Count
Yes	48.8%	20
No	51.2%	21
answered question		41
skipped question		0

20. Do you have any comments that you would like to add related to either existing transportation conditions or transportation improvements that you would like to see implemented related to your commute or other daily travel?

	Response Count
	7
answered question	7
skipped question	34

Q10. How do you travel to your work location on a typical day? If your mode of travel varies, please report the most common. If, for example, you drive 4 days a week by yourself and carpool with a family member one day a week, please report "Drive Alone" as it is the most common.

1	Motorcycle	Nov 2, 2011 10:23 AM
2	when I'm on call, I use the city truck for my commute	Oct 31, 2011 5:27 AM
3	somedays travel alone in a car and also commute with spouse	Oct 27, 2011 4:23 PM

Q12. What is the zip code of your home location?		
1	90810	Nov 2, 2011 10:23 AM
2	90638	Nov 1, 2011 12:53 PM
3	90712	Oct 31, 2011 11:30 AM
4	90601	Oct 31, 2011 8:28 AM
5	90706	Oct 31, 2011 8:19 AM
6	90706	Oct 31, 2011 7:19 AM
7	90706	Oct 31, 2011 5:27 AM
8	90706	Oct 29, 2011 2:06 PM
9	90723	Oct 27, 2011 4:48 PM
10	90814	Oct 27, 2011 4:23 PM
11	90706	Oct 27, 2011 3:25 PM
12	90631	Oct 27, 2011 2:44 PM
13	90623	Oct 27, 2011 2:17 PM
14	92833	Oct 27, 2011 2:14 PM
15	90620	Oct 27, 2011 2:03 PM
16	90814	Oct 27, 2011 1:56 PM
17	90706	Oct 27, 2011 12:58 PM
18	90806	Oct 27, 2011 12:52 PM
19	90630	Oct 27, 2011 12:46 PM
20	90706	Oct 27, 2011 12:39 PM
21	90706	Oct 27, 2011 12:31 PM
22	90706	Oct 27, 2011 12:23 PM
23	90242	Oct 27, 2011 12:18 PM
24	90807	Oct 27, 2011 12:12 PM
25	90262	Oct 27, 2011 12:06 PM
26	90715	Oct 27, 2011 11:58 AM
27	92807	Oct 27, 2011 11:51 AM

Q12. What is the zip code of your home location?		
28	91745	Oct 27, 2011 11:50 AM
29	90755	Oct 27, 2011 11:45 AM
30	92845	Oct 27, 2011 11:43 AM
31	92833	Oct 27, 2011 11:40 AM
32	90706	Oct 27, 2011 11:39 AM
33	90713	Oct 27, 2011 11:39 AM
34	92870	Oct 27, 2011 11:37 AM
35	90069	Oct 27, 2011 11:34 AM
36	90241	Oct 27, 2011 11:31 AM
37	90713	Oct 27, 2011 11:30 AM
38	90620	Oct 27, 2011 11:18 AM
39	92509	Oct 13, 2011 9:36 AM
40	92883	Oct 11, 2011 3:34 PM
41	96965	Oct 11, 2011 3:28 PM

Q16. If the answer to question #15 is no, would you reconsider your decision under the following scenarios (check all that apply):		
1	I would if I had the money to purchase the vehicle	Oct 31, 2011 8:19 AM
2	no	Oct 27, 2011 4:23 PM
3	if it was free, not enough money right now	Oct 27, 2011 12:46 PM
4	No	Oct 27, 2011 12:23 PM
5	the cars are unsafe in an accident. Batteries are extremely expensive.	Oct 27, 2011 11:58 AM
6	No	Oct 27, 2011 11:43 AM
7	Can not afford another car	Oct 27, 2011 11:31 AM
8	Taken off furlough	Oct 27, 2011 11:30 AM
9	don't	Oct 11, 2011 3:28 PM

Q18. If the answer to question #17 is no, would you reconsider your decision under the following scenarios (check all that apply):		
1	I already live within a mile of my work place	Oct 31, 2011 8:19 AM
2	I only live about 2 miles from the yard	Oct 31, 2011 5:27 AM
3	Already live close by	Oct 29, 2011 2:06 PM
4	I already live within 1 mile of work.	Oct 27, 2011 3:25 PM
5	I like where I live.	Oct 27, 2011 2:44 PM
6	I would not consider relocating my residence; my commute is reasonable as is.	Oct 27, 2011 2:03 PM
7	Already live close to work	Oct 27, 2011 12:58 PM
8	not an option, children in the home attend local school	Oct 27, 2011 12:46 PM
9	Already live in Bellflower	Oct 27, 2011 12:31 PM
10	No	Oct 27, 2011 12:23 PM
11	only if the city would give me a forgivable loan	Oct 27, 2011 11:58 AM
12	Better school district	Oct 27, 2011 11:45 AM
13	Better schools	Oct 27, 2011 11:40 AM
14	prefer not to live to close to work	Oct 27, 2011 11:31 AM
15	I'm happy living where I'm at	Oct 27, 2011 11:30 AM

Q20. Do you have any comments that you would like to add related to either existing transportation conditions or transportation improvements that you would like to see implemented related to your commute or other daily travel?		
1	n/a	Oct 31, 2011 7:19 AM
2	For numbers 13 & 18, I don't have an answer to the questions	Oct 27, 2011 4:23 PM
3	No comments.	Oct 27, 2011 2:03 PM
4	None	Oct 27, 2011 12:23 PM
5	Shortening the work schedule to 4 days a week would alliviate the commute to/from work.	Oct 27, 2011 11:50 AM
6	No	Oct 27, 2011 11:30 AM
7	no	Oct 11, 2011 3:28 PM

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