



CITY OF CALEXICO

DRAFT

CLIMATE ACTION PLAN

A Plan to Reduce Greenhouse Gas Emissions

August 2015

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City of Calexico
Draft Climate Action Plan

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A. INTRODUCTION

1. Sustainable Communities Planning Grant

 **The Strategic Growth Council** awarded the City of Calexico a Sustainable Communities Planning Grant in 2013. The Sustainable Communities Planning Grants fund climate action plans, infill development plans, sustainable community strategies, and other planning efforts, all specifically aimed at reducing greenhouse gas emissions consistent with State climate goals.

All awards are funded through Proposition 84 bond allocations which were approved by the voters in 2006.

Funded activities are intended to achieve the following Program Objectives:

-  Improve air and water quality
-  Promote public health
-  Promote equity
-  Increase housing affordability
-  Promote infill and compact development
-  Revitalize urban and community centers
-  Protect natural resources and agricultural lands
-  Reduce automobile usage and fuel consumption
-  Improve infrastructure systems
-  Promote water conservation
-  Promote energy efficiency and conservation
-  Strengthen the economy

For the City of Calexico, the funds from the Sustainable Communities Planning Grant are dedicated to the completion of three major Tasks:

- Task 1 Targeted General Plan Update
- Task 2 Climate Action Plan
- Task 3 Agricultural Element

Climate Action Planning involves five milestones:

-  *Milestone 1:* Conduct a baseline greenhouse gas (GHG) emissions inventory and forecast
-  *Milestone 2:* Adopt a GHG emissions reduction target
-  *Milestone 3:* Develop a Climate Action Plan for reducing GHG emissions

(Outlines the policies and measures in the transportation, energy efficiency, renewable energy, and solid waste management sectors that the City will implement and/or is already implementing to achieve its target)

-  *Milestone 4:* Implement policies and measures
-  *Milestone 5:* Monitor and verify results

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The Planning Grant enables the City to complete Milestones 1, 2 and 3. After the Climate Action Plan is completed, the City Departments and other public and private entities will implement the GHG emission reduction strategies. The City also will periodically monitor implementation progress.

The Agricultural Element is Section 10.0 of the *2015 General Plan Update*.

The City was awarded the Planning Grant because its planning efforts would contribute to achieving the Program Objectives listed on page 1 through a plan to reduce greenhouse gas emissions and initiatives, for example, to promote infill development, protect agricultural lands, and strengthen the economy.

The California Air Resources Board (CARB) encourages cities to be proactive:



There is a need for local government climate action planning to adopt mid-term and long-term reduction targets that are consistent with scientific assessments and the statewide goal of reducing emissions 80 percent below 1990 levels by 2050. Local government reduction targets should chart a reduction trajectory that is consistent with, or exceeds, the trajectory created by statewide goals.

2. Purpose

This Plan:

- ✚ Summarizes Calexico's 2005 and 2012 greenhouse gas emissions inventories
- ✚ Summarizes the GHG emissions forecasts for 2020 and 2030
- ✚ Estimates the GHG emissions reductions due to statewide measures
- ✚ Estimates the GHG emissions reductions due to City initiatives
- ✚ Provides a roadmap for the City to contribute to statewide and regional efforts to reduce greenhouse gas emissions
- ✚ Describes resources and procedures that contribute to monitoring implementation progress

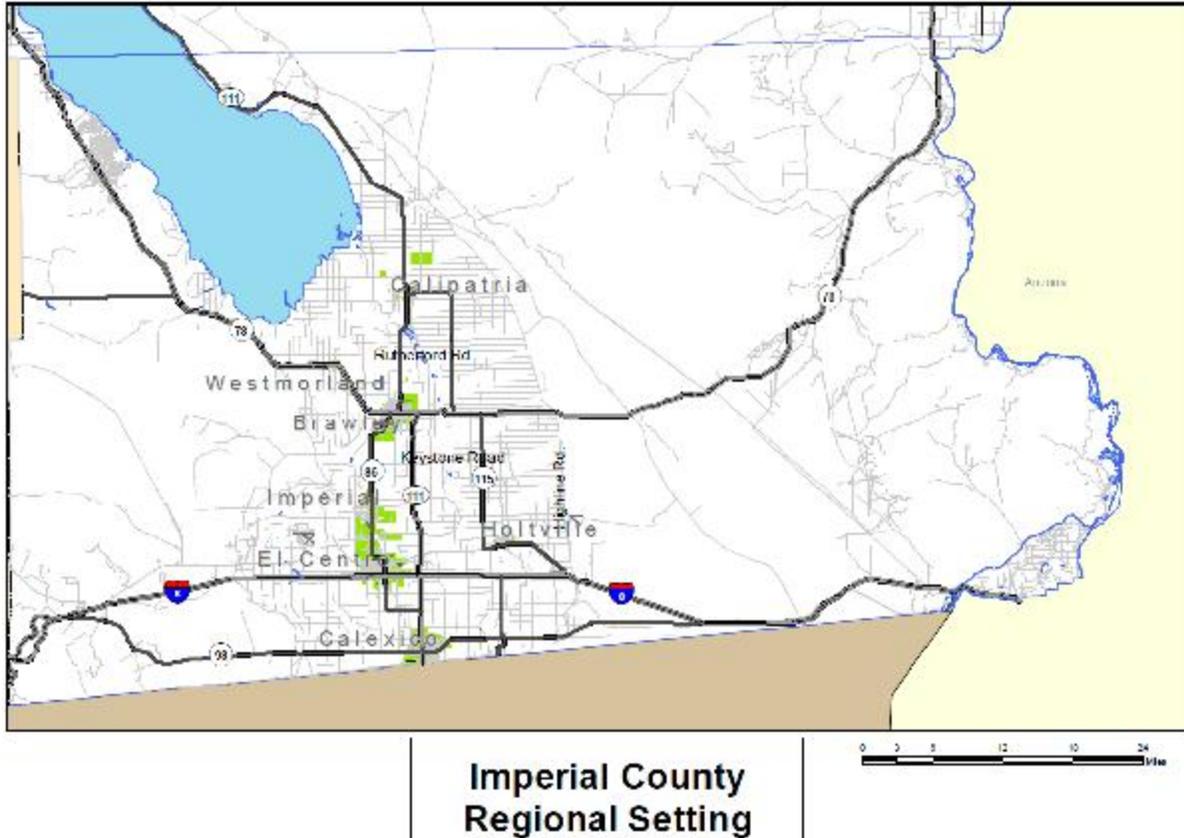
3. Regional Setting

Calexico is one of seven incorporated cities located in Imperial County and is:

- 198 miles southeast of Los Angeles
- 122 miles east of San Diego
- 62 miles west of Yuma

The City is situated directly along the U.S./Mexico International border, adjacent to the City of Mexicali, Baja California, Mexico.

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Calexico's port of entry is a major entrance point for thousands of persons as well as large amounts of goods traveling between the two countries. Its economy reflects its proximity to the Mexican border and its location in an agriculturally-oriented California county.

Calexico, in recent years, has also been providing alternative housing options for some commuters from Mexicali that choose to live in the U.S. and work across the border. As housing prices become unaffordable in other parts of Southern California, commuters from San Diego County may also be looking to Imperial County for affordable housing options. Calexico's location on Highway 98 and near Interstate 8 makes it a logical provider of housing and services for this new segment of future residents.

Calexico has grown from a population of 27,109 persons in 2000 to 41,033 in 2010, an increase of 51%. According to the Southern California Association of Governments (SCAG), Calexico is projected to have the largest population of all Imperial County cities by 2020 or soon thereafter.

The community of Calexico faces challenges ahead as it attempts to accommodate future growth, while protecting its agricultural heritage, international border community ties and quality of life.



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4. Historical Context

Calexico, which began as a tent city of the Imperial Land Company, was founded in 1899 and incorporated in 1908. The Imperial Land Company converted desert land into a fertile setting for year-round agriculture. The name Calexico was coined from a combination of the words California and Mexico.

To understand the history of Calexico, it is important to understand the history of the Imperial Valley.



Geological evidence indicates that hundreds of years ago a salt-water lake of approximately 4,500 square miles occupied the area that is now the Imperial Valley. This body of water, named Cahuilla after the area's Indian inhabitants, was fed by the Colorado River. The lake gradually evaporated over 600 years ago, leaving a vast depression covered with salt deposits.

Following the discovery of the Colorado River by Europeans in 1540, various expeditions led by Spanish explorers crossed the Imperial Valley. Soon after the initial expeditions, Lt. Juan Bautista de Anza established an overland route from Mexico to the California Pacific Coast for colonists and supplies. This overland route resulted in the first secular European settlements in California. Some of these settlements were founded in the Imperial Valley and served as the way stations for all overland travel from Mexico to California.

In 1892, the Colorado River Irrigation Company, under the direction of C.R. Rockwood, Chief Engineer, began planning to build a canal to bring fresh water into the Imperial Valley. The canal was to connect with the overflow channel of the Colorado River and extend several miles south into Mexico. The first water diversion project was completed in 1901. Construction on the main canal, however, was hampered by financial and legal difficulties as well as by natural disasters. In the period from 1902-1907, the flooding Colorado River changed its course, flowing northward into the Imperial Valley and remaining in the northern portion to create what is now the Salton Sea. In 1940, the All American Canal was completed, creating a means of irrigating land which has become one of the most productive agricultural areas in the nation.

On April 4, 2010 the El Mayor earthquake caused moderate to heavy damage throughout Calexico and across the border in Mexicali. Measuring 7.2 on the Richter scale, the quake was centered about 40 miles south of the U.S.-Mexico border near Mexicali. A state of emergency was declared and officials cordoned off First and Second streets between Paulin and Heber Avenues. Glass and debris littered the streets of downtown Calexico and two buildings partially collapsed. The Calexico water treatment plant sustained severe damage.

B. CALIFORNIA'S REGULATORY FRAMEWORK FOR REDUCING GHG EMISSIONS

California contributes significantly to human caused greenhouse gas emissions. As reported by the California Energy Commission (CEC), California contributes 1.4% of global and 6.2% of national GHG emissions. The transportation sector is the largest source of California's greenhouse gas emissions, responsible for 41% of the State's total emissions. California periodically adopts key regulations to reduce GHG emissions. The paragraphs below demonstrate the state's leadership in addressing the adverse impacts of climate change.

1. CA Executive Order S-03-05

An Executive Order was signed by Governor Swartznegger in 2005 to reduce statewide greenhouse gas (GHG) emissions as follows:

- ✦ Reduce emissions to 2000 levels by 2010
- ✦ Reduce emissions to 1990 levels by 2020 (1990 levels are roughly equivalent to a 25% reduction in GHG compared to current levels)
- ✦ Reduce emissions to 80% below 1990 levels by 2050

2. CA Executive Order B-30-15

Governor Brown on April 29, 2015 signed an Executive Order that establishes –

A new interim statewide greenhouse gas emissions reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030...to ensure that California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050.

3. Assembly Bill 32 – Global Warming Act of 2006

Assembly Bill (AB) 32, the Global Warming Act of 2006, requires statewide greenhouse gas reduction targets of 15% by 2020 in order to reach 1990 emissions levels and to reduce emissions to 80% below 1990 levels by 2050. Reporting of greenhouse gases by major sources is mandated by the Act, which went into effect January 2009.

AB 32 requires CARB to:

- ✦ Prepare and approve a Scoping Plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions from sources or categories of sources of GHGs by 2020, and update the Scoping Plan every five years.
- ✦ Maintain and continue reductions in emissions of GHG beyond 2020.
- ✦ Identify the statewide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020.
- ✦ Identify and adopt regulations for discrete early actions that could be enforceable on or before January 1, 2010.
- ✦ Adopt a regulation that establishes a system of market-based declining annual aggregate emission limits for sources or categories of sources that emit GHG emissions.

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- ✦ Convene an Environmental Justice Advisory Committee to advise the Board in developing and updating the Scoping Plan and any other pertinent matter in implementing AB 32.
- ✦ Appoint an Economic and Technology Advancement Advisory Committee to provide recommendations for technologies, research and GHG emission reduction measures.

4. Other Key Bills that Address Climate Change

According to CARB other key bills and policies include:

- ✦ [Assembly Bill 1493](#) (Pavley, Chapter 200, Statutes of 2002) – GHG Standards for Passenger Vehicles
- ✦ [Senate Bill 375](#) (Steinberg, Chapter 728, Statutes of 2008) – Sustainable Communities
- ✦ [Senate Bill X1-2](#) (Simitian, Chapter 1, Statutes of 2011) – Renewables Portfolio Standard
- ✦ [Assembly Bill 341](#) (Chesbro, Chapter 476, Statutes of 2011) – Commercial Recycling

a. Assembly Bill 1493 (Pavley Regulations)

AB 1493 (referred to as Pavley I) (2002) directed CARB to develop and adopt standards for vehicle manufacturers to reduce GHG emissions coming from passenger vehicles and light-duty trucks at a “maximum feasible and cost effective reduction” by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II covers 2017 to 2025. Fleet average emission standards reach a 22% and 30% reduction by 2012 and 2016, respectively.

b. Senate Bill 375

SB 375 (2008) supports implementation of AB 32 by aligning regional transportation planning efforts with land use and housing allocations in order to reduce transportation-related GHG emissions. Specifically, SB 375 directed CARB to set regional GHG emissions targets for passenger vehicles and light trucks for the years 2020 and 2035 for each Metropolitan Planning Organization (MPO) region, which were adopted in February 2011.



Each of California’s MPOs must prepare a “sustainable communities strategy” (SCS) as an integral part of its regional transportation plan (RTP). The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its GHG emission reduction targets.

Once adopted by the MPO, *the RTP/SCS guides the transportation policies and investments for the region.* ARB must review the adopted SCS to confirm and accept the MPO’s determination that the SCS, if implemented, would meet the regional GHG targets. If the combination of measures in the SCS would not meet the regional targets, the MPO must prepare a separate “alternative planning

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strategy" (APS) to meet the targets. The APS is not a part of the RTP.

The Sustainable Communities Act also establishes incentives to encourage local governments and developers to implement the SCS or the APS. Developers can get relief from certain environmental review requirements under the California Environmental Quality Act (CEQA) if their new residential and mixed-use projects are consistent with a region's SCS (or APS) that meets the targets (see Cal. Public Resources Code §§ 21155, 21155.1, 21155.2, 21159.28.).

On April 4, 2012, the Regional Council of the Southern California Association of Governments or (SCAG) adopted its *2012-2035 Regional Transportation Plan (RTP)* which contains the region's first SCS. Imperial County is a part of the SCAG Region. ARB staff reviewed the draft SCS published by SCAG on December 20, 2011. After that date, the SCAG Regional Council adopted the RTP/SCS and accepted minor modifications to the plan which strengthen the ability of the SCS to exceed the 2020 target. The ARB staff review affirmed that the adopted SCS demonstrates that, if implemented, the region will achieve a reduction of greenhouse gas emissions from passenger vehicles of 9% per capita by 2020, and a 16% reduction by 2035. These reductions exceed the 8% and 13% per capita reductions for 2020 and 2035, respectively, that the ARB established.

Other state government initiatives such as Title 24 Energy Efficiency Standards, Green Building Standards and mandatory commercial recycling are described in Parts C-G.

c. Senate Bill 1078, Senate Bill 107, and Senate Bill X1-2 (Renewables Portfolio Standard)

Established in 2002 under SB 1078, and accelerated in 2006 under SB 107, California's Renewables Portfolio Standard required investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources by at least 1% of their retail sales annually, until they achieved 20% by 2010. SB X1-2 raises the target from the current 20% to 33% of their electricity from renewable energy sources by 2020. In his inaugural address in January 2015, Governor Brown announced that within the next 15 years California will increase from one-third to 50% the electricity that is derived from renewable sources.

d. Assembly Bill 341

This bill directs CalRecycle to develop and adopt regulations for mandatory commercial recycling. AB 341 requires businesses to recycle and jurisdictions to implement education, outreach and monitoring. AB 341 requires jurisdictions to report in the 2012 Electronic Annual Report (which was due August 1, 2013) on their initial education, outreach, and monitoring efforts, and, if applicable, on any enforcement activities or exemptions implemented by the jurisdiction.



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C. GLOBAL WARMING

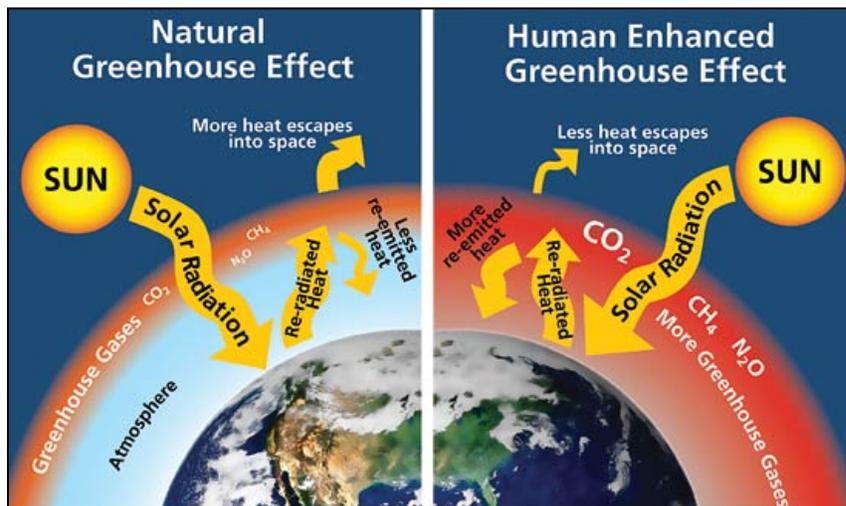
1. Greenhouse Gases and the Greenhouse Effect

If it were not for greenhouse gases trapping heat in the atmosphere, the Earth would be a very cold place. Greenhouse gases keep the Earth warm through the greenhouse effect. The greenhouse effect is a natural phenomenon that regulates the temperature of the lowest layer of the atmosphere, known as the troposphere. When stable, the greenhouse effect maintains Earth's average surface temperature at a life-sustaining 14 degrees C (57.2 degrees F).

Source: United States Environmental Protection Agency, *A Student's Guide to Global Climate Change*, The Greenhouse Effect

The term greenhouse effect likens the trapping of the heat by certain atmospheric gases to the glass panels of a greenhouse, which lets sunlight in, isolates warm air, and impedes the loss of heat. A greenhouse is a building made of glass that allows sunlight to enter but traps heat inside, so the building stays warm even when it's cold outside. Because gases in the Earth's atmosphere also let in light but trap heat, many people call this phenomenon the "greenhouse effect." The greenhouse effect works somewhat differently from an actual greenhouse, but the name stuck, so that's how we still refer to it today.

Source: University Corporation for Atmospheric Research, *Cycles of the Earth and Atmosphere*, *The Greenhouse Effect*



The "greenhouse effect," as explained above, is the trapping by certain atmospheric gases of heat that radiates from the Earth's surface after it has been heated by the Sun. Many chemical compounds found in the Earth's atmosphere act as "greenhouse gases." These gases allow sunlight to enter the atmosphere freely. When sunlight strikes the Earth's surface, some of it is reflected back

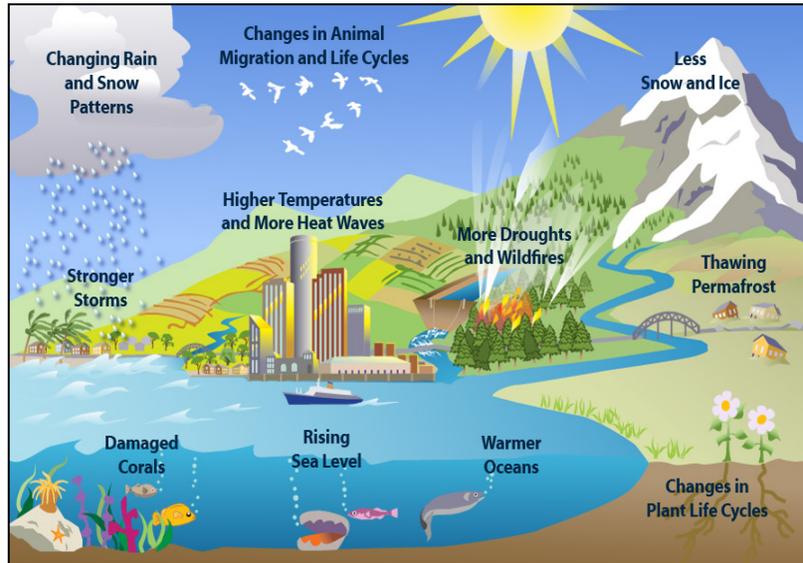
towards space as infrared radiation (long wave radiation). Greenhouse gases, which allow the shorter wave radiation to pass through, absorb this longer wave infrared radiation. The absorption of the radiation causes the molecules of the greenhouse gases to vibrate more than they were which then heats the atmosphere.



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2. What is Global Warming?

The Earth gets energy from the sun in the form of sunlight. The Earth's surface absorbs some of this energy and heats up. That's why the surface of a road can feel hot even after the sun has gone down – because it has absorbed a lot of energy from the sun. The Earth cools down by giving a different form of energy, called infrared radiation. But before all this radiation can escape to outer space, greenhouse gases in the atmosphere absorb some of it, which makes the atmosphere warmer. As the atmosphere gets warmer, it makes the Earth surface warmer, too.



Source: United States Environmental Protection Agency, *A Student's Guide to Global Climate Change*, The Greenhouse Effect

Global warming is the unusually rapid increase in Earth's average surface temperature over the past century primarily due to the greenhouse gases released as people burn fossil fuels. The global average surface temperature rose 0.6 to 0.9 degrees Celsius (1.1 to 1.6 degrees F) between 1906 and 2005, and the *rate* of temperature increase has nearly doubled in the last 50 years.

Source: National Aeronautics and Space Administration (NASA), Earth Observatory, *Global Warming*

3. What Causes Global Warming?

The causes of the increase are complex, but scientists believe that human activities have enhanced the greenhouse effect which has led to global warming and to climate change.

Scientists have spent decades figuring out what is causing global warming. They've looked at the natural cycles and events that are known to influence climate. But the amount and pattern of warming that's been measured can't be explained by these factors alone. The only way to explain the pattern is to include the effect of greenhouse gases (GHGs) emitted by humans.

To bring all this information together, the United Nations formed a group of scientists called the *Intergovernmental Panel on Climate Change* or IPCC. The IPCC meets every few years to review the latest scientific findings and write a report summarizing all that is known about global warming. Each report represents a consensus, or agreement, among hundreds of leading scientists.



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One of the first things scientists learned is that there are several greenhouse gases responsible for warming, and humans emit them in a variety of ways. Human activities that release heat-trapping gases into the atmosphere include burning petroleum (gasoline and diesel fuel) for transportation, industrialized agriculture (a major source of methane), burning household biofuels (wood and dung), and deforestation (to clear land for agricultural). Today and for the next decade or so cars, trucks and buses are the greatest contributors to atmospheric warming.

The gas responsible for the most warming is carbon dioxide. Other contributors include methane released from landfills and agriculture (especially from the digestive systems of grazing animals), nitrous oxide from fertilizers, gases used for refrigeration and industrial processes, and the loss of forests that would otherwise store CO₂.

Source: National Geographic, Environment, [Causes of Global Warming](#)

4. GHG Global Warming Potentials

Different greenhouse gases have very different heat-trapping abilities. Some of them can even trap more heat than CO₂. A molecule of methane produces more than 20 times the warming of a molecule of CO₂. Nitrous oxide is 300 times more powerful than CO₂. Other gases, such as chlorofluorocarbons (which have been banned in much of the world because they also degrade the ozone layer), have heat-trapping potential thousands of times greater than CO₂. But because their concentrations are much lower than CO₂, none of these gases adds as much warmth to the atmosphere as CO₂ does.

Source: National Geographic, Environment, [Causes of Global Warming](#)

Some gases, as noted above, are more effective than others at making the planet warmer and "thickening the Earth's blanket." Table 1 shows that for each greenhouse gas, a Global Warming Potential (GWP) has been calculated to reflect how long it remains in the atmosphere, on average, and how strongly it absorbs energy. Technically stated, GWP is a measure of the amount of warming a GHG may cause, measured against the amount of warming caused by carbon dioxide (CO₂). The GWP for both Methane and Nitrous Oxide are based on the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment. Gases with a higher GWP absorb more energy, per pound, than gases with a lower GWP, and thus contribute more to warming Earth.



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**Table 1
Greenhouse Gas Characteristics and Global Warming Potentials**

Greenhouse Gases	Chemical Formula	Combustion	Global Warming Potential (CO ₂ e)
Carbon dioxide	CO ₂	Combustion	1
Methane	CH ₄	Combustion, Anaerobic Decomposition of Organic Waste (Landfills, Wastewater), Fuel Handling	25
Nitrous oxide	N ₂ O	Combustion, Wastewater Treatment	298
Hydrofluorocarbons	Various	Leaking Refrigerants, Fire Suppressants	12-14,800
Perfluorocarbons	Various	Aluminum Production, Semiconductor Manufacturing, HVAC Equipment Manufacturing	7,390-12,200
Sulfur Hexafluoride	SF ₆	Transmission and Distribution of Power	22,800

Source: Intergovernmental Panel on Climate Change (IPCC), *Fourth Assessment Report – Climate Change 2007*

5. Climate Change Indicators

Global warming is causing climate patterns to change. The California Environmental Protection Agency, Office of Environmental Health Hazard Assessment tracks climate change in California. Attachment A describes global, California and Imperial Valley climate change indicators.

D. 2005 AND 2012 GHG EMISSIONS INVENTORIES

1. Methodology

a. Baseline Year (2005) and Interim Year (2012)

While the AB 32 emissions reduction goals establish a 1990 base year for the State, most local governments lack comprehensive data from that time period and would be unsuccessful in backcasting to that year. Calexico, as the majority of municipalities currently in the emissions inventory process, opted to use 2005 as the base year due to the availability of activity data. The City also chose to prepare an inventory for 2012, an interim year between the 2005 baseline year and the 2020 and 2030 forecast years.

Table 2 lists the primary data sources used to complete the Calexico GHG Emissions Inventory. The purpose of the baseline inventory is to estimate the quantities of emissions so that the City can establish a reduction target for 2020 and 2030.



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b. Greenhouse Gas Emissions Calculations

Greenhouse gas emissions were calculated using activity data and emission factors. The basic equation below is used:

$$\text{Activity Data} \times \text{Emission Factor} = \text{Emissions}$$

Activity data refer, for example, to electricity and natural gas consumption, vehicle miles traveled, solid waste tonnage, and water consumption. Emission factors are used to convert energy usage or other activity data into associated emissions quantities. They are usually expressed in terms of emissions per unit of activity data (e.g. lbs CO₂/kWh of electricity).

c. Carbon Dioxide Equivalent (MTCO₂e)

Standard practice quantifies GHG emissions in terms of metric tons of carbon dioxide equivalent (MTCO₂e) units. Carbon dioxide equivalent is a unit of measurement that allows the effect of different greenhouse gases to be compared using carbon dioxide as a standard unit of reference. In the context of emissions of greenhouse gases, carbon dioxide equivalent refers to the amount of carbon dioxide that would have the same warming effect as the effect of the greenhouse gas or greenhouse gases being emitted [e.g., methane (CH₄) and nitrous oxide (N₂O)].

These greenhouse gases are then converted to carbon dioxide equivalents (CO₂e), enabling the City to consider different greenhouse gases in comparable terms. The conversion of greenhouse gases is done by comparing the global warming potential (GWP) of each gas to CO₂. For example, methane (CH₄) is 25 times more powerful than CO₂ on a per weight basis in its capacity to trap heat, and therefore one metric ton of CH₄ would be calculated as 25 MTCO₂e. Nitrous oxide (N₂O) is 298 times more powerful than CO₂; therefore, one metric ton of N₂O would be calculated as 298 metric tons of carbon dioxide.



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**Table 2
City of Calexico
Greenhouse Gas Emissions Inventory
Community-wide and Municipal Data Sources**

Sector	Activity Data	Unit of Measurement	Data Source
Community-wide Inventory			
Residential	Electricity Consumption	MWh	CA Energy Commission
	Natural Gas Consumption	Therms	SoCalGas
Commercial/Industrial	Electricity Consumption	MWh	CA Energy Commission
	Natural Gas Consumption	Therms	SoCalGas
Transportation	Vehicle Miles Traveled (VMT)	VMT	SCAG CARB
Off-Road Vehicles and Equipment	Emissions by Equipment Type	CO ₂ Exhaust	US EPA NONROAD Model
Solid Waste	Solid Waste Tonnage	Tons	CalRecycle CARB
Municipal Inventory			
Buildings and Facilities	Electricity Consumption	MWh	CA Energy Commission
	Natural Gas Consumption	Therms	SoCalGas
Streetlights and Traffic Signals	Electricity Consumption	MWh	CA Energy Commission
Water Delivery Facilities	Electricity Consumption	MWh	CA Energy Commission
Solid Waste	Solid Waste Tonnage	Tons	CalRecycle CARB
Water	Water Consumption	Gallons Per Capita Per Day GPCD	City of Calexico 2010 Urban Water Management Plan
Wastewater	Wastewater Generated	Gallons Per Capita Per Day GPCD	ICLEI U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Appendix F: Wastewater and Water Emissions Activities and Sources



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2. Community Inventory

a. Purpose

A greenhouse gas inventory is an accounting of greenhouse gases (GHGs) emitted to or removed from the atmosphere over a period of time. The inventory establishes a baseline for tracking emission trends, developing mitigation strategies and policies, and assessing progress. Greenhouse gas emissions inventories have been completed by several California cities, the California Air Resources Board, and individual agencies such as the Imperial Irrigation District, and some individual businesses that are required to perform such inventories.

The Inventory measures three primary GHG emissions

- ✚ Carbon dioxide (CO₂)
- ✚ Methane (CH₄)
- ✚ Nitrous oxide (N₂O)

Attachment B describes these greenhouse gases.

Through the Statewide Energy Efficiency Collaborative (SEEC) program, ICLEI – Local Governments for Sustainability USA – provided some overview trainings for climate action planning in the Imperial Valley area. These trainings were introductory overviews to the process of conducting greenhouse gas inventories and introductory climate action planning. The City staff participated in these trainings. Calexico’s accounting of greenhouse gas emissions is based primarily on the ICLEI’s detailed and comprehensive protocol. ICLEI’s *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* (October 2012) describes the required activity data, emissions factors, and formulas for estimating greenhouse gas emissions.

b. 2005 and 2012 Emissions

The City of Calexico’s baseline year and interim year inventories are organized by sector: residential, commercial and industrial, transportation and solid waste.

The City obtained County-wide electricity consumption for the years 2005 and 2012 from the State Energy Commission. The County-wide residential electricity consumption then was allocated to Calexico on the basis of the City’s share of households residing in Imperial County. The County-wide non-residential electricity use was allocated on the basis of Calexico’s share of the jobs located within Imperial County.

Natural gas usage by residential and non-residential uses was obtained from the Southern California Gas Company.

Vehicle miles traveled (VMT) for Calexico was obtained from SCAG and the California Air Resources Board (ARB) EMFAC Model. The EMFAC Model produces estimates of Imperial County’s CO₂ emissions (tons per day) that are generated by gasoline and diesel powered vehicles. Calexico’s CO₂ emissions are estimated based on its DVMT as a percentage of Imperial County’s DVMT.



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Solid waste emissions are generated from decomposing organic waste in place and methane management activities. Solid waste generated within Calexico, as a result of community and municipal activities, is collected by Allied Waste Management and deposited at various landfills throughout the region. Annual tons of waste disposed at landfills was obtained from Cal Recycle. In addition, emissions are generated from the collection, transportation and processing of the solid waste.

Tables 3 and 4 present the community-wide GHG emissions by sector for 2005 and 2012, respectively.

Between 2005 and 2012 there was a decrease in the amount of community-wide greenhouse gas emissions. The likely reasons for the decrease may include:

- ✦ **Residential:** Energy consumption may have decreased because of the weak economy which leads to lower consumption overall and the energy conservation measures taken by residents.
- ✦ **Commercial & Industrial:** Energy consumption may have decreased because of the weak economy (less occupied business space in 2012) and the energy conservation measures taken by local businesses.
- ✦ **Transportation:** There was a decrease in the vehicle miles traveled which may have been due to fewer trips taken by residents and businesses because of the poor economy as well as better fuel economy leading to a reduction in emissions.
- ✦ **Solid Waste:** According to CalRecycle the decrease in solid waste tonnage is primarily related to both increased recycling efforts and the economic downturn.

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Table 3
City of Calexico
Community-Wide GHG Emissions by Sector: 2005

Sector	Emissions Source	GHG Emissions (MTCO _{2e})	Percentage of Total
Residential	Electricity and natural gas used in homes, apartments and other residences	49,090	23.4%
Commercial & Industrial	Electricity and natural gas used in commercial and industrial buildings	53,172	25.4%
Transportation	Vehicle miles traveled on-road by cars, trucks and other vehicles and off-road emissions from agriculture, construction, commercial and industrial equipment and lawn maintenance	64,914	31.0%
Solid Waste	Solid waste generated by residences and by commercial and industrial uses and transported to landfills	42,383	20.2%
Total		209,559	100.0%

Table 4
City of Calexico
Community-Wide GHG Emissions by Sector: 2012

Sector	Emissions Source	GHG Emissions (MTCO _{2e})	Percentage of Total
Residential	Electricity and natural gas used in homes, apartments and other residences	47,101	26.5%
Commercial & Industrial	Electricity and natural gas used in commercial and industrial buildings	45,081	25.3%
Transportation	Vehicle miles traveled on-road by cars, trucks and other vehicles and off-road emissions from agriculture, construction, commercial and industrial equipment and lawn maintenance	57,577	32.4%
Solid Waste	Solid waste generated by residences and by commercial and industrial uses and transported to landfills	28,091	15.8%
Total		177,850	100.0%



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3. Government Operations Inventory

a. Purpose

The government operations inventory identifies the sources and quantities of greenhouse gas emissions resulting from City operations in 2005 and 2012. The inventory is a necessary first step in addressing greenhouse gas emissions, serving two primary purposes:

- ✦ To create an emissions baseline against which the City can set emissions reduction targets and measure future progress.
- ✦ To provide insight into the scale of emissions from the various sources within their operations, underpinning informed and strategic emission reduction measures.



For the most part, emissions from the City of Calexico local government operations are quantified separately from the community inventory. Solid waste generated by municipal operations could not be reported separately and is included in the Community Inventory. The municipal or governmental operations inventory reports emissions for the following sectors:

- ✦ Buildings and Facilities (separate from Community Residential and Non-Residential)
- ✦ Streetlights (separate from Community Residential and Non-Residential)
- ✦ Calexico International Airport
- ✦ Distribution of Potable Water
- ✦ Wastewater Treatment

Water is included in the Governmental Operations Inventory because the City of Calexico owns and operates both the Water Treatment Plant and Wastewater Treatment Plant. The Public Works Department plans, constructs, and maintains the water system. The ICLEI *Local Government Operations Protocol* (May 2010) strongly encourages local governments to include water in the governmental operations inventory when it has operational control over the facilities.

b. 2005 and 2012 Emissions

Table 5 shows that the GHG emissions from the municipal operations were almost the same in 2012 as they were in 2005. There were decreases in building and street light use of electricity. The main reason for these declines probably is due to the fact there was a decline in electricity consumption throughout Imperial County in 2012 compared to 2005. The amount of fuel dispensed at the Calexico International Airport decreased significantly in 2012 from 2005. Reasons for the decrease are a decline in based aircraft and total operations. The per capita water consumption declined between 2005 and 2012.

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Table 5
City of Calexico
Government Operations Greenhouse Gas Emissions by Sector: 2005 and 2012

	2005 MT CO₂e	Percentage of Total	2012 MT CO₂e	Percentage of Total
Buildings: Electricity	781.31	7.3%	647.94	7.0%
Buildings: Natural Gas	11.46	0.1%	11.50	0.1%
Street Lights	689.26	6.5%	363.18	3.9%
Calexico International Airport	2,048.08	19.2%	744.23	8.0%
Distribution of Potable Water	967.18	9.1%	761.93	8.2%
Wastewater Treatment	6,153.32	57.8%	6,778.55	72.8%
Total	10,650.60	100.0%	9,307.33	100.0%

Total 2005 GHG emissions (220,209.60 MTCO₂e) is the sum of the Community (209,559 MTCO₂e) and Governmental Operations (10,650.60 MTCO₂e) Inventories.

E. Community GHG Emissions – 2020 and 2030 Forecasts

1. Methodology

The GHG emissions forecasts provide an idea of how emissions will grow based on the following factors:

- ✦ Population, household and employment growth forecasts
- ✦ Accounting for the energy savings due to Title 24 updates effective in 2014, 2017 and between 2020 and 2030
- ✦ Accounting for the energy savings due the 33% Renewable Portfolio Standard by 2020 and assumed 50% RSP by 2030
- ✦ Per capita water consumption rates will be the same in the two forecast periods as in 2005
- ✦ Per capital solid waste disposal rates will be the same in the two forecast periods as in 2005
- ✦ Forecasts of vehicle miles traveled are based on SCAG and EMFAC forecasts
- ✦ Off road emissions are based on EPA's Nonroad Model
- ✦ No additional federal, state or regional reduction measures are incorporated in the 2020 and 2030 forecasts

2. Growth Forecasts

In April 2012, SCAG adopted 2020 and 2035 forecasts of population, households and employment for all the cities and counties located in the southern California region. The cities located in Imperial County have not experienced growth at the rate envisioned by the forecasts. For example, between 2012 and 2015 Calexico gained a total of 76 households or a gain of 25 households on an annual basis. By comparison, SCAG projected a net increase of 3,930 households between 2012 and 2020 or almost 500 households on an annual basis.



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Because Calexico is unlikely to experience growth at this high level between 2015 and 2020, the use of SCAG forecasts to forecast GHG emissions would very probably overstate the emissions from electricity, natural gas and water consumption as well as the generation of solid waste and wastewater all of which are population and household driven.

The CAP household forecast assumes that growth in the last five years of this decade will resemble that which occurred over the long-run period between 2000 and 2015. During this 15-year period the City gained some 243 households annually. Therefore, the CAP forecast is an increase of 1,216 households between 2015 and 2020 (5 X 243). This household forecast added to the 10,246 households existing in 2012 yields a grand total of 11,462 households (11,500 rounded).

The population increase between 2015 and 2020 is estimated to reach 4,256 persons. An average household size of 3.5 persons per occupied housing unit is applied to the 1,216 households to estimate the population increase of 4,256 which, when added to the 2015 population of 41,033, results in a population total of 45,289 (45,300 rounded). The forecast assumes that the average household size of Calexico's new households (3.5) will be lower than the City's current persons per household and mirror that of Imperial County as a whole.

The CAP 2020-2030 household forecast assumes that growth will resemble the more rapid household growth that happened between 2000 and 2010. During the decade, the City gained 330 households per year. Thus, the CAP forecast is that Calexico will experience an increase of 3,300 households between 2020 and 2030.

By 2030, the total number of households would be 14,762 (14,800 rounded): 11,462 + 3,300.

The 2030 population forecast is 56,839 (56,800 rounded). The population is the sum of population growth between 2015 and 2030 – 15,806 - plus the 2015 population of 41,033. [4,516 households x 3.5 persons per household = 15,806]

The 2015 employment estimate is 12,300 local jobs. Employment growth between 2020 and 2030 was based on the completion of Gran Plaza Phase 2 Power Center. This development is scheduled to be completed in late 2017 and produce 3,200 jobs. The 2030 employment forecast was based on jobs growth in proportion to household growth.

The SCAG and EMFAC Model DVMT forecasts were adjusted based on the service area population (population + employment) based on figures mentioned in the preceding paragraphs.

Table 6 shows the numerical values of the growth factors which are applied to five sectors.



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Table 6
City of Calexico
Growth Projections: 2020 and 2030

Growth Factor	2020	2030	Growth Factor Applied to:
Population	45,300	56,800	Solid Waste, Water & Wastewater
Households	11,500	14,800	Electricity and Natural Gas-Residential
Employment	15,500	17,600	Electricity and Natural Gas-Non-Residential
Daily Vehicle Miles Traveled	295,893	362,566	Transportation

Source: Methodology as explain in the narrative, Southern California Association of Governments and California Air Resources Board, EMFAC Model

Based on the 2005 energy and water consumption rates, disposal rates, vehicle miles traveled, the following factors were developed for purposes of forecasting to 2020 and 2030:

- ✚ MWh per occupied housing unit
- ✚ Therms per occupied housing unit
- ✚ MWh per job
- ✚ Therms per job
- ✚ Daily vehicle miles traveled (DVMT) per service area population (population + jobs)
- ✚ Per capita solid waste disposal rate (lbs/resident/day)
- ✚ Gallons per capita per day (water)

3. Emissions Forecasts

The 2020 and 2030 emissions forecasts are shown in Tables 7 and 8.

Even though there is population and job growth between 2005 and 2020, the decrease in residential and non-residential energy GHG emissions reflects the energy savings due to Title 24 updates in 2014 and 2017 and a 33% RPS by 2020. The transportation sector increased because no fuel efficiency or land use measures were incorporated into the 2020 forecast. Solid waste tonnage increased because the disposal rate remained unchanged as the population grew.

Between 2020 and 2030, the assumed additional Title 24 updates and a 50% RPS lead to energy savings and a reduction in GHG emissions. There is an increase in transportation sector emissions which corresponds to a growth in vehicle miles traveled and no incorporation of reduction measures. Emissions due to solid waste also increase because the per capita disposal rate remains constant and the population growth is substantial during the decade.



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Table 7
City of Calexico
Community GHG Emissions Forecast by Sector: 2020

Sector	Emissions Source	GHG Emissions (MTCO _{2e})	Percentage of Total
Residential	Electricity and natural gas used in homes, apartments and other residences	39,084	18.2%
Commercial & Industrial	Electricity and natural gas used in commercial and industrial buildings	44,575	20.8%
Transportation	Vehicle miles traveled on-road by cars, trucks and other vehicles and off-road emissions from agriculture, construction, commercial and industrial equipment and lawn maintenance	70,039	32.6%
Solid Waste	Solid waste generated by residences and by commercial and industrial uses and transported to landfills	60,872	28.4%
Total		214,570	100.0%

Table 8
City of Calexico
Community GHG Emissions Forecast by Sector: 2030

Sector	Emissions Source	GHG Emissions (MTCO _{2e})	Percentage of Total
Residential	Electricity and natural gas used in homes, apartments and other residences	43,470	17.8%
Commercial & Industrial	Electricity and natural gas used in commercial and industrial buildings	43,757	17.9%
Transportation	Vehicle miles traveled on-road by cars, trucks and other vehicles and off-road emissions from agriculture, construction, commercial and industrial equipment and lawn maintenance	80,412	32.9%
Solid Waste	Solid waste generated by residences and by commercial and industrial uses and transported to landfills	76,459	31.3%
Total		244,097	100.0%



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F. GOVERNMENTAL SECTOR GHG EMISSIONS – 2020 AND 2030 FORECASTS

1. Methodology

Based on the 2012 energy consumption and the number of City employees, the following factors were developed for purposes of forecasting to 2020 and 2030.

- ✚ MWh per employee
- ✚ Therms per employee
- ✚ Number of employees remains constant in 2020 as in 2012 (177) but increases to 195 in 2030

The 2012 street light electricity usage and number of households were used to construct an MWh per occupied housing unit factor.

The 2020 and 2030 airport operations fuel consumption involved the following factors:

- ✚ The Calexico International Airport Master Plan forecast for fuel usage
- ✚ Assumed same percentage increase in gasoline and diesel consumption for airport ground support vehicles

The 2020 and 2030 forecasts for water distribution are based on the population projections and reductions in per capita daily water use to 179 gallons per day by 2020 and 143 by 2030.

Wastewater collection and treatment emissions forecasts are based on the population projections and a Protocol wastewater generation factor of 100 gallons per person per day.

2. Emissions Forecasts

Table 9 shows the 2020 and 2030 government operations forecasts, respectively. The 2020 emissions forecast is 1.08 times greater than the 2005 baseline. The 2030 emissions forecast is 1.36 times greater than the 2005 baseline.

Table 9
City of Calexico
Municipal Operations GHG Emissions Forecast by Sector: 2020 and 2030

Government Operation/Sector	2020	2030
Natural Gas	11.30	12.45
Electricity	646.94	712.73
Streetlights	408.97	526.33
Airport Operations	1,447.52	2,254.97
Wastewater	7,902.96	9,606.71
Water Distribution	1,076.10	1,351.66
Total Municipal Forecast Emissions MTCO _{2e}	11,493.80	14,464.85



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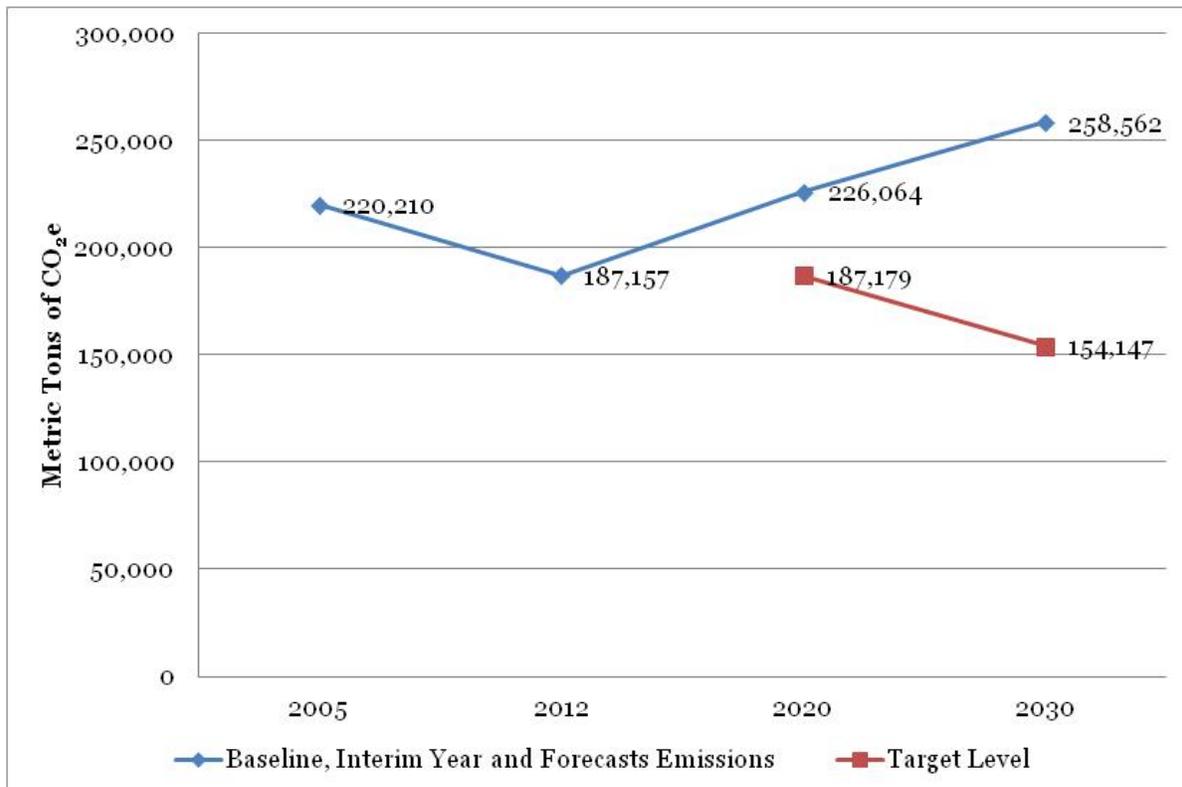
G. GHG EMISSIONS REDUCTION TARGET

Table 10 lists the reduction targets for the years 2020 and 2030. Chart 1 shows the same information in a graphic.

Table 10
City of Calexico
Baseline and Emissions Forecasts and
Emission Reduction Targets: 2020 and 2030

Baseline and BAU Forecast	GHG Emissions (MTCO ₂ e)
2005 Baseline Emissions	220,210
2020 Forecast Emissions	226,064
Target Level	187,179
Total Reduction Necessary	38,885
2030 Forecast Emissions	258,562
Target Level	154,147
Total Reduction Necessary	104,415

Chart 1
City of Calexico
Baseline, Interim Year, Forecast Emissions and Reduction Targets



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The 2020 target (187,179 MTCO_{2e}) is tied to the recommendation of the California Air Resources Board and the Climate Change Scoping Plan, which suggests that local governments work to reduce emissions by 15% below the 2005 baseline emissions. Calexico's 2020 target aligns with this state recommendation and places the City on a course towards California's long-term emissions reduction target, which is an ambitious goal to reduce greenhouse emissions by 80% below 1990 levels in 2050. The 2050 goal is the State's policy interpretation of the percent reduction necessary to stabilize global carbon dioxide levels, while still providing for economic growth.

The City recognizes the need to continue reducing emissions beyond 2020 and, therefore, has set a 2030 reduction target of 30% as well.

As previously noted, Governor Brown on April 29, 2015 signed an Executive Order that establishes a new interim emissions reduction target to reduce greenhouse gas emissions to 40% below 1990 levels by 2030. The City recognizes that additional state and federal actions and consumer behavior changes are needed to achieve the target reductions of 40% by 2030, 50% by 2035 and 80% by 2050.

H.STATEWIDE GHG EMISSIONS REDUCTION MEASURES

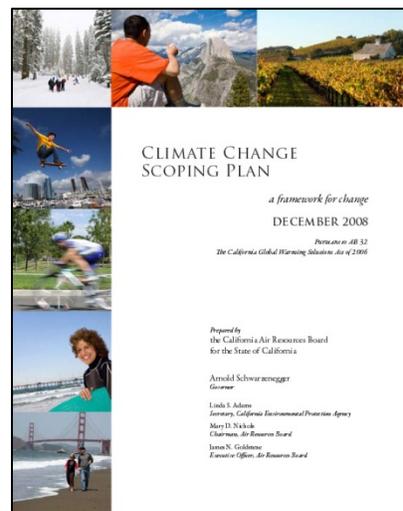
1. California Global Warming Solutions Act of 2006

The passage of AB 32, the California Global Warming Solutions Act of 2006, marked a watershed moment in California's history. By requiring in law a sharp reduction of greenhouse gas (GHG) emissions, California set the stage for its transition to a sustainable, low-carbon future. AB 32 was the first program in the country to take a comprehensive, long-term approach to addressing climate change, and does so in a way that aims to improve the environment and natural resources while maintaining a robust economy.

AB 32 requires ARB to develop a *Scoping Plan* which lays out California's strategy for meeting the goals. The Scoping Plan must be updated every five years.

The initial *Scoping Plan*, approved by the Air Resources Board (ARB) December 11, 2008, provides the outline for actions to reduce California's greenhouse gas (GHG) emissions. Under AB 32, ARB and several other state agencies are required to adopt regulations and other initiatives to reduce the state's GHG emissions. In addition to Cap and Trade Regulations, the *Initial Scoping Plan* recommended specific GHG emission reduction measures in California's major economic sectors:

- ✚ Transportation Sector
- ✚ Electricity and Natural Gas Sector
- ✚ Water Sector
- ✚ Green Buildings
- ✚ Industry Sector
- ✚ Recycling and Waste Management Sector
- ✚ Forests Sector
- ✚ High Global Warming Potential (High GWP) Gases Sector
- ✚ Agricultural Sector



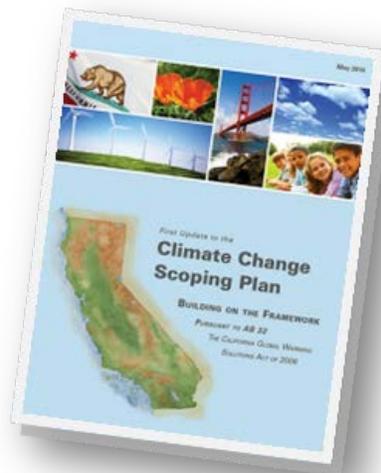
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The Path to 2020 and Beyond (graphic to the left) - shows where we are in the process of AB 32 implementation. ARB has already adopted a number of regulations outlined in the initial *Scoping Plan*, and is continuing to implement *Scoping Plan* measures. Under AB 32, the state must reduce GHG emissions to 1990 levels, or lower, by 2020. In the long term, California established the aggressive goal of reducing emissions by 80% below 1990 levels by 2050 pursuant to Governor's Executive Order S-3-05.

In March 2014 the California Air Resources Board (CARB) released a report describing the implementation status of the initial *Scoping Plan* measures. Some of these measures such as "sustainable forest" and "methane capture at large dairies" will have no effect on Calexico's GHG emissions. But some of these measures, as well as others that may be adopted by the State in the future, will reduce Calexico's GHG emissions below the 2020 and 2030 forecast levels.

The status of these efforts can be found in Technical Report #3 - *State of California Greenhouse Gas Emissions Reduction Measures*.



The *2014 Scoping Plan Update* identifies nine key focus areas (energy, transportation, agriculture, water, waste management, and natural and working lands), along with short-lived climate pollutants, green buildings, and the Cap-and-Trade Program. Reductions in GHG emissions will come from virtually all sectors of the economy and will be accomplished from a combination of policies, planning, direct regulations, market approaches, incentives and voluntary efforts. These efforts target GHG emission reductions from cars and trucks, electricity production, fuels, and other sources.

Although most State measures will help to reduce emissions from the forecasted levels, it is not possible to quantify the emissions reduction impacts of all measures. Table 11 shows the projected GHG emissions reductions due to the following three State measures:

- ✚ Pavley (AB 1493)
- ✚ Low Carbon Fuel Standard
- ✚ Vehicle Efficiency Measures



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Table 11
City of Calexico
GHG Emissions Reductions from State Measures: 2020 and 2030

State Measure	2020 Reduction (MT CO ₂ e)	2030 Reduction (MT CO ₂ e)
Pavley (AB 1493)1	9,610.97	17,565.70
Low Carbon Fuel Standard	3,577.42	13,011.63
Vehicle Efficiency Measures	1,067.89	1,301.16
Total	14,256.27	31,878.49

2. Description of State Government Efforts to Reduce GHG Emissions

A synopsis of some of the State government's GHG reduction and mitigation measures is provided in the following paragraphs.

a. Cap and Trade Program

Generally speaking, a cap-and-trade system sets an overall limit on emissions, requires entities subject to the system to hold sufficient allowances to cover their emissions, and provides broad flexibility in the means of compliance. Entities can comply by undertaking emission reduction projects at their covered facilities and/or by purchasing emission allowances (or credits) from the government or from other entities that have generated emission reductions in excess of their compliance obligations.

According to the Center for Climate Change and Energy Solutions:

In a cap-and-trade program, the government determines which facilities or emissions are covered by the program and sets an overall emission target, or "cap," for covered entities (firms held responsible for emissions). This cap is the sum of all allowed emissions from all included facilities. Once the cap has been set and covered entities specified, tradable emissions allowances (rights to emit) are distributed (either auctioned or freely allocated, or some combination of these). Each allowance authorizes the release of a specified amount of GHG emissions, generally one ton of carbon dioxide equivalent (CO₂e). The total number of allowances is equivalent to the overall emissions cap (e.g., if a cap of one million tons of emissions is set, one million one-ton allowances will be issued). Covered entities must submit allowances equivalent to the level of emissions for which they are responsible at the end of each of the program's compliance periods.

Source: Center for Climate Change and Energy Solutions (C2ES), *Climate Change 101: Cap and Trade*, pg. 1

A key component of the state's strategy to reduce total greenhouse gas emissions to 1990 levels by 2020 is the cap and trade program. The trading system will reduce GHG emissions from regulated entities by more than 16% between 2013 and 2020. The cap-and-trade rules came into effect on January 1, 2012 and apply to large power plants and large industrial plants that emit 25,000 metric tons of carbon dioxide equivalent (CO₂e) or more per year. In 2015, they will extend to fuel distributors (including distributors of heating and transportation fuels) that meet



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the 25,000 metric ton threshold. At that stage, the program will encompass approximately 360 businesses throughout the California and nearly 85% of the state's total GHG emissions. The program imposes a greenhouse gas emissions limit that will decrease by 2% each year through 2015 and 3% annually through 2020.

Sources:

Center for Climate and Energy Solutions, *California Cap-and-Trade Program Summary*, January 2014, pg 1

Center for Climate Change and Energy Solutions (C2ES), *Climate Change 101: Cap and Trade*, pg. 2

b. Pavley (AB 1493) (Fuel Economy)

Recognizing the increasing threat of climate change to the well-being of Californian's citizens and the environment, in 2002 the Legislature adopted and the Governor signed AB 1493 (Chapter 200, Statutes 2002, Pavley). AB 1493 directed ARB to adopt the maximum feasible and cost-effective reductions in GHG emissions from light-duty vehicles. Vehicle GHG emissions included carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) that are emitted from the tailpipe, as well as emissions of HFC134a, the refrigerant then used in most vehicle air conditioning systems.

As directed by AB 1493, ARB adopted what is commonly referred to as the Pavley regulations, the first in the nation to require significant reductions of GHGs from motor vehicles. These regulations, covering the 2009-2016 and later model years, call for a 17% overall reduction in climate change emissions from the light-duty fleet by 2020 and a 25% overall reduction by 2030. They also formed the foundation for the federal GHG and fuel economy programs for light-duty vehicles for 2012-2016 model years. For Calxico's forecasting purposes, factors of 18% and 27.0% were used for 2020 and 2030 respectively.

Table 12 on the next page shows the projected fuel economy standard for three different vehicle types.

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Table 12
Projected Fuel Economy Standard (mpg)

Year	Passenger Cars	Light Trucks	Combined Cars & Light Trucks
2012	33.6	25.0	29.8
2013	34.4	25.6	30.6
2014	35.2	26.2	31.4
2015	36.4	27.1	32.6
2016	38.2	28.9	34.3
2017	39.6	29.1	35.1
2018	41.1	29.6	36.1
2019	42.5	30.0	37.1
2020	44.2	30.6	38.3
2021	46.1	32.6	40.3
2022	48.2	34.2	42.3
2023	50.5	35.8	44.3
2024	52.9	37.5	46.5
2025	55.3	39.3	48.7

Source: Center for Climate and Energy Solutions, Federal Vehicle Standards

c. Low Carbon Fuel Standard (LCFS)

The Low Carbon Fuel Standard (LCFS) is a performance-based regulation adopted in California in 2009 that requires regulated parties (e.g., oil producers and importers to California) to reduce the carbon intensity (CI) of their fuel mix by at least 10% by 2020. It sets declining annual targets, starting slowly with a 0.25% reduction in 2011 and increasing to a 10% reduction by 2020. The LCFS is designed to reduce GHG emissions by encouraging the use of low carbon fuels in California and elsewhere. By doing so, this regulation contributes to California's overall GHG emission reduction goals under the Global Warming Solutions Act of 2006 (AB 32).

Carbon intensity (CI) is a measure of the GHG emissions associated with the various production, distribution, and consumption steps in the "life cycle" of a transportation fuel. Carbon intensity is measured in grams of carbon dioxide equivalents (gCO_{2e}) per unit energy (MJ) of fuel and is quantified on a lifecycle or well-to-wheels basis.

According to UC Davis:

The LCFS policy aims to reduce emissions of greenhouse gases (GHGs) by creating financial incentives for innovation and deployment of low carbon fuels. Regulated parties have several options to meet the standard. They can produce their own low carbon fuels, buy fuels from producers to sell on the market, purchase credits generated by others, or use some combination of these strategies. Potential low carbon fuel technologies include biofuels from waste and cellulosic materials, natural gas, electricity used in plug-in vehicles, and hydrogen used in fuel cell vehicles.



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According to the *2008 Scoping Plan*:

A 10 percent reduction in the intensity of transportation fuels is expected to equate to a reduction of 16.5 MMTCO_{2e} in 2020. However, in order to account for possible overlap of benefits between LCFS and the Pavley greenhouse gas standards, ARB has discounted the contribution of LCFS to 15 MMTCO_{2e}.

While the LCFS factor is projected to be 10% by 2020, no comparable projections were included in the *2014 Scoping Plan Update*, therefore a 6.7% factor was applied to Calxico's projected transportation GHG emissions in 2020.

ARB is considering extending the LCFS beyond 2020 with more aggressive long-term targets, such as a 15% to 20% reduction in average carbon intensity, below 2010 levels, by 2030. Thus, a 20% factor was used to project the 2030 emissions reductions shown in Table 11.

d. Vehicle Efficiency Measures

These measures were described in the *2008 Scoping Plan* and the Implementation Status of Initial Scoping Plan Measures. The Vehicle Efficiency Measures include:

- ✚ Tire Pressure
- ✚ Low Friction Oil
- ✚ Solar Reflective Automotive Paint and Window Glazing
- ✚ Heavy-Duty Vehicle GHG Emission Reduction Regulation

Tire Pressure: This program reduces GHG emissions by reducing the consumption of fuel from passenger vehicles operating with under inflated tires. Proper tire inflation decreases the tire rolling resistance and reduces fuel consumption.

Low Friction Oil: This measure would require the use of low friction oils in passenger cars to reduce engine load and fuel use. ARB staff expects engine manufacturers to design their engines to accommodate the use of low friction oil to meet the Advanced Clean Cars requirements.

Cooling Vehicle Interiors: A performance-based approach to cooling vehicle interiors was incorporated into the Advanced Clean Cars program.

Heavy-Duty Vehicle GHG Emission Reduction Regulation: The Heavy-Duty Vehicle GHG Emission Reduction Regulation (Tractor-Trailer GHG Regulation) was approved by the Board in December 2008. The purpose of the regulation is to reduce GHG emissions from certain long-haul tractor-trailer combinations that operate in California by requiring them to utilize technologies that result in improved fuel efficiency.

The regulation requires owners of long-haul tractors as well as 53-foot or long box-type trailers to replace or retrofit their affected vehicles with compliant aerodynamic technologies and low rolling resistance tires. These requirements pertain to all applicable tractors and box-type trailers that operate on California highways regardless of where the vehicles are registered, although there are provisions specific to large and small fleets. All aerodynamic and tire technologies must be verified by the United States Environmental Protection Agency's SmartWay Program.

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The *2008 Scoping Plan* projected that the vehicle efficiency measures would result in a GHG emissions reduction of 4.5 MMTCO₂e or approximately 2% of the transportation sector total of 225.4 MMTCO₂e. Thus, the 2% GHG reduction was applied to the transportation sector projected emissions for 2020 and 2030.

e. Title 24 Updates

The California Energy Commission on May 31, 2012 approved energy efficiency standards for new homes and commercial buildings. The Energy Commission's 2013 Building Energy Efficiency Standards are more efficient than previous standards, as follows:

- ✚ Single family homes 25%
- ✚ Multifamily homes 14%
- ✚ Nonresidential construction 30%



The Standards took effect on January 1, 2014. Some improved measures in the Standards include:

Residential:

- ✚ Solar-ready roofs to allow homeowners to add solar photovoltaic panels at a future date
- ✚ More efficient windows to allow increased sunlight, while decreasing heat gain
- ✚ Insulated hot water pipes, to save water and energy and reduce the time it takes to deliver hot water
- ✚ Whole house fans to cool homes and attics with evening air reducing the need for air conditioning load
- ✚ Air conditioner installation verification to insure efficient operation

Nonresidential:

- ✚ High performance windows, sensors and controls that allow buildings to use "daylighting"
- ✚ Efficient process equipment in supermarkets, computer data centers, commercial kitchens, laboratories, and parking garages
- ✚ Advanced lighting controls to synchronize light levels with daylight and building occupancy, and provide demand response capability
- ✚ Solar-ready roofs to allow businesses to add solar photovoltaic panels at a future date
- ✚ Cool roof technologies

On average, the Standards will increase the cost of constructing a new home by \$2,290 but will return more than \$6,200 in energy savings over 30 years. Based on a 30-year mortgage, the standards will add approximately \$11 per month for the average home, but save consumers \$27 on monthly heating, cooling, and lighting bills, according to the California Energy Commission.

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The California Energy Commission documented the energy savings due to the 2013 Title 24 updates in a report titled *Impact Analysis: California's 2013 Building Energy Efficiency Standards*, July 2013. The methodology used to calculate the energy savings is based on the *Impact Analysis* and technical assistance provided to the City by Javier Perez, Energy Analyst, California Energy Commission. The energy savings described in the *Impact Analysis* cover single-family, multi-family and non-residential construction as well as alterations and renovations to existing buildings.

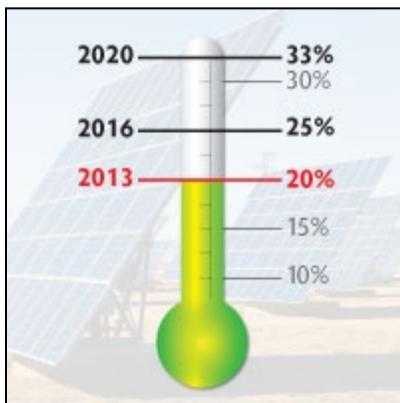
The 2020 and 2030 forecasts (Tables 7, 8 and 10) incorporate savings due to future Title 24 updates. California's Building Energy Standards are updated on an approximately three-year cycle. The 2016 Standards will continue to improve upon the current 2013 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The 2016 Standards will go into effect on January 1, 2017.

f. Renewable Energy Portfolio Standards

Established in 2002 under Senate Bill 1078, accelerated in 2006 under Senate Bill 107 and expanded in April 2011 under Senate Bill 2X1-2, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS applies to all electricity retailers including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities must increase procurement from eligible renewable energy resources to 33% of total procurement by 2020.

The California Public Utilities Commission (CPUC) and the California Energy Commission jointly implement the RPS program. The Energy Commission certifies facilities and energy deliveries as eligible for counting towards California's RPS goals.

In 2011, the Imperial Irrigation District (IID) Board of Directors adopted a resolution affirming its commitment to the RPS under Senate Bill 2.



This resolution outlines its adherence to state requirements, including the compliance targets for delivering renewable energy to its retail load within the state-defined compliance periods. California law stipulates utilities must work to meet renewable portfolio standards by year's end in three stages: 20% by 2013, 25% by 2016 and 33% by 2020. "Responsible progress" is required of utilities by the end of the first two compliance periods.

IID's resolution also commits that all RPS eligible resources will be assigned a procurement content category by the utility as set forth in the law that identifies the resource origin and path of transfer.

Since 2011, the Board has approved an RPS policy that includes a detailed enforcement program and procurement plan. It has also entered into power purchase agreements for solar, geothermal, small hydro and biogas energy which will increase its renewable energy resource level.



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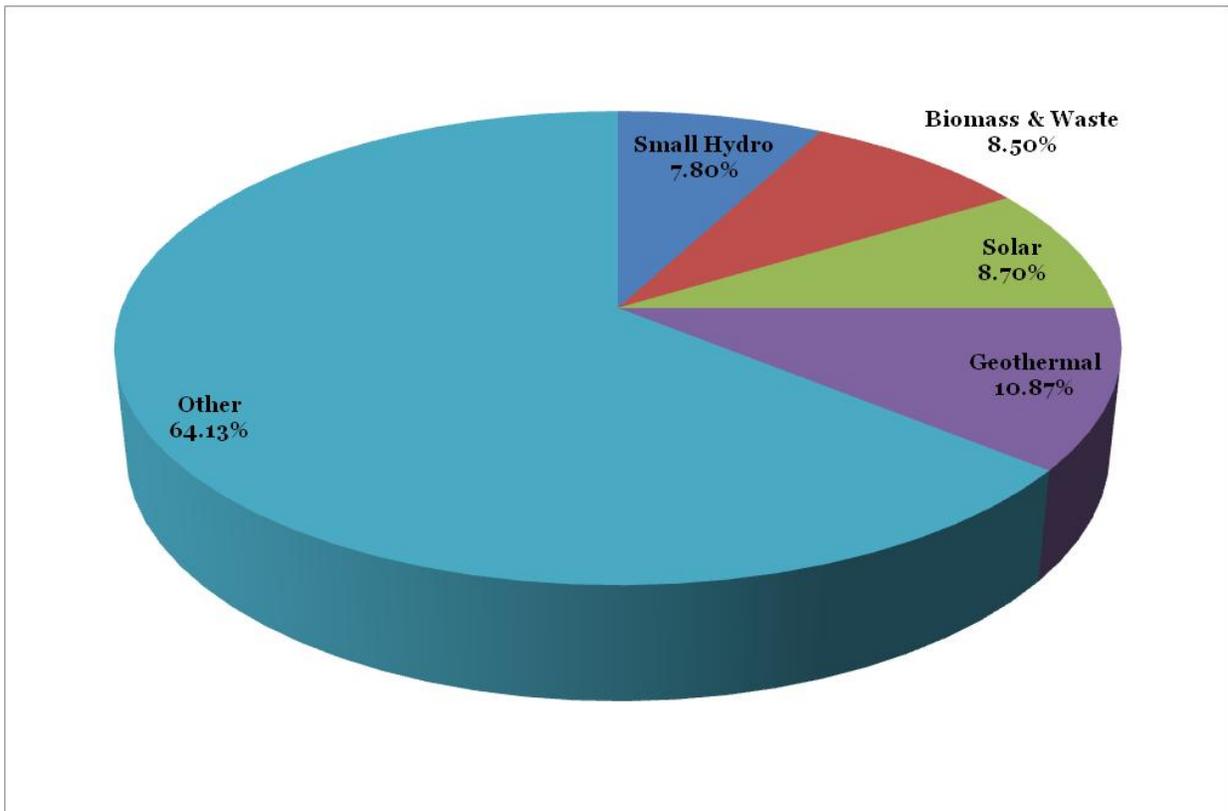
Table 13 and Chart 2 below show the breakdown of IID’s 2020 estimated renewable resources.

Table 13
IID 2020 Estimated Resource Breakdown

Renewable	Percentage
Small Hydro	7.80%
Biomass & Waste	8.50%
Solar	8.70%
Geothermal	10.87%
Subtotal	35.87%
Non-renewable	64.13%
Total	100.0%

Source: Imperial Irrigation District, Board Agenda Memorandum, Cal Energy Generation Portfolio – 50 MW Power Purchase Agreement, August 11, 2015

Chart 2
Imperial Irrigation District
2020 Estimated Resource Breakdown



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“Increased uses of renewables,” according to the *2008 Scoping Plan*, “will decrease California’s reliance on fossil fuels, thus reducing emissions of greenhouse gases from the electricity sector.”

According to data aggregated by the International Panel on Climate Change, life-cycle global warming emissions associated with renewable energy—including manufacturing, installation, operation and maintenance, and dismantling and decommissioning—are minimal.

Compared with natural gas, which emits between 0.6 and 2 pounds of carbon dioxide equivalent per kilowatt-hour (CO₂e/kWh), and coal, which emits between 1.4 and 3.6 pounds of CO₂e/kWh, the emissions from renewable energy as listed below are minimal:

- ✚ Wind emits only 0.02 to 0.04 pounds of CO₂e/kWh
- ✚ Solar 0.07 to 0.2, geothermal 0.1 to 0.2 pounds of CO₂e/kWh
- ✚ Hydroelectric between 0.1 and 0.5 pounds of CO₂e/kWh

Renewable electricity generation from biomass can have a wide range of global warming emissions depending on the resource and how it is harvested. Sustainably sourced biomass has a low emissions footprint, while unsustainable sources of biomass can generate significant global warming emissions.

In his inaugural address in January 2015, Governor Brown announced that within the next 15 years California will increase from one-third to 50% the electricity that is derived from renewable sources. The 2030 emissions forecast (Table 8) assume that a 50% RPS will be in effect within the next 15 years.

I. CALEXICO’S PLAN TO REDUCE GHG EMISSIONS

The City carefully evaluated measures adopted by other cities and measures recommended by several organizations. Among the sources that identified reduction and mitigation measures are:

- ✚ Review of measures described Climate Action Plans prepared by cities in Northern, Central and Southern California
- ✚ California Attorney General’s Office, *Sustainability and General Plans: Examples of Policies to Address Climate Change*, January 22, 2010, 9 pgs
- ✚ California Attorney General’s Office, *Addressing Climate Change at the Project Level*, January 6, 2010, 18 pgs
- ✚ California Air Pollution Control Officers (CAPCOA), *Model Policies for Greenhouse Gases in General Plans: A Resource for Local Government to Incorporate General Plan Policies to Reduce Greenhouse Gas Emissions*, June 2009, 250 pgs
- ✚ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010
- ✚ California Department of Housing and Community Development, *Housing, Climate Change and SB 375: Resources and Technical Assistance*
- ✚ Institute for Local Government, *Planning for Climate Change*
- ✚ Institute for Local Government, *Sustainability Best Practices Framework*



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The City GHG emissions reduction and mitigation measures are organized according to five sectors:

- ✦ Transportation Measures
- ✦ Land Use Measures
- ✦ Energy Conservation and Efficiency Measures
- ✦ Solid Waste Management
- ✦ Urban Water Management

Table 14 lists the measures for each of the five sectors as well as the Departments/Divisions with primary responsibility for implementation of the recommended actions. The Departments and Divisions with the primary responsibility for implementation include:

- ✦ Community Development Department – Planning Division and Building Division
- ✦ Public Works Department
- ✦ Utility Services Department
- ✦ Finance Department
- ✦ Office of the City Manager – Housing Division

Table 15 estimates the emissions reductions resulting from implementation of 32 specific City measures *and* the State reduction measures. In summary:

- ✦ The total reductions (45,943) exceed the target reductions need (38,885) for the year 2020.
- ✦ The total reductions (105,404.93) exceed the target reductions needed (104,415) for the year 2030.

However, the row “Other Measures” means that between 2020 and 2030 additional reduction measures will need to be implemented. These reduction measures may include:

- ✦ Energy audits of homes and businesses that lead to energy savings greater than currently experienced
- ✦ Rehabilitation of more homes through the HERO and CDBG programs
- ✦ Conversion of a greater number of streetlights to LED
- ✦ Water consumption at rates even lower than projected (e.g., 120 gallons per capita per day)
- ✦ Greater participation by the public in active transportation (walking and biking)
- ✦ Greater use of public transportation for work and other trips
- ✦ Higher purchase of plug-in, electric and hybrid vehicles

In addition, other measures likely will be in the form of mandates and incentives from the State government and technology breakthroughs. For instance, the State has been updating the minimum standards regarding gallons per minute flows for toilets and faucets.

It should be noted that it was not possible to quantify the emissions reductions of some measures such as “promote the installation of energy efficient appliances.”



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Table 14
City of Calexico
List of GHG Emissions Reduction and Mitigation Measures

TRANSPORTATION MEASURES	
Measure	Responsible Department/Division
1. Continue to Implement Policies that Encourage Walking and Biking	Public Works Department Community Development Department – Planning Division
2. Continue to Implement the Safe Routes to School Program	Public Works Department
3. Encourage and Facilitate Pedestrian Mobility and Use of Public Transportation	Public Works Department Community Development Department – Planning Division
4. Bus Transit and Carpooling	Public Works Department
5. Establish a Clean Vehicle Policy	All Departments
6. Off-Road Vehicle Measures	Public Works Department
LAND USE MEASURES	
Measure	Responsible Department/Division
1. Reduce VMT by Implementing the General Plan Land Use Element and Housing Element	Community Development Department – Planning Division
2. Complete Zoning for Electric Vehicle Infrastructure	Community Development Department – Planning Division
ENERGY CONSERVATION AND EFFICIENCY MEASURES	
Measure	Responsible Department/Division
1. Continue to Implement the General Plan Public Facilities/Services Element	Public Works Department Community Development Department – Building Division
2. Buildings Exceed Title 24 Energy Efficiency Standards	Community Development Department – Planning Division and Building Division
3. New Construction Energy Efficiency Program (NCEEP)	Community Development Department – Planning Division and Building Division
4. Buildings Exceed Minimum CALGreen Requirements	Community Development Department – Planning Division and Building Division
5. Promote Energy Audits of Existing Buildings	Community Development Department – Planning Division and Building Division Finance Department
6. Promote Participation in Utility Company Residential and Business Rebates	Community Development Department – Planning Division and Building Division
7. Weatherization	Office of the City Manager - Housing Division
8. HERO Program (Energy Efficiency)	Office of the City Manager - Housing Division
9. CDBG Housing Rehabilitation Program	Office of the City Manager - Housing Division
10. Promote the Installation of Energy Efficient Appliances	Community Development Department – Planning Division and Building Division



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Table 14 continued
City of Calexico
List of GHG Emissions Reduction and Mitigation Measures

ENERGY CONSERVATION AND EFFICIENCY MEASURES-continued	
Measure	Responsible Department/Division
11. Implement a Street Light LED Conversion Project	Utility Services Department
12. Encourage Project Applicants to Plant Shade Trees	Public Works Department Community Development Department – Planning Division and Building Division
SOLIDWASTE MANAGEMENT MEASURES	
Measure	Responsible Department/Division
1. Implement the 2007 General Plan Solid Waste Management Objectives and Policies	Public Work Department
2. Continue to Implement the Solid Waste Diversion and Per Capita Disposal Rate Programs	Public Works Department
3. Implement the City’s AB 939 Recycling Program	Public Works Department
4. Recycle Demolished Construction Material	Public Works Department
5. Increase Commercial Recycling	Public Works Department
6. Increase the Composting of Waste	Public Works Department
7. Implement a City Waste Prevention, Reduction and Recycle Program	All
8. Community Cleanup Program	Public Works Department
URBAN WATER MANAGEMENT	
Measure	Responsible Department/Division
1. Implement the 2007 General Plan Water Conservation Policies	Utility Services Department
2. Implement the 2010 and 2015 Urban Water Management Plan Demand Management Measures	Utility Services Department
3. Continue to Enforce the City’s Water Efficient Landscape Ordinance	Utility Services Department
4. Continue to Enforce the City Ordinance Prohibiting Wasteful of Water	Utility Services Department



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Table 15
City of Calexico
Total Emissions Reductions – State and City Measures: 2020 and 2030

State Measure	2020 Reduction (MT CO ₂ e)	2030 Reduction (MT CO ₂ e)
Pavley (AB 1493)1	9,610.97	17,565.70
Low Carbon Fuel Standard	3,577.42	13,011.63
Vehicle Efficiency Measures	1,067.89	1,301.16
Subtotal	14,256.27	31,878.49
City Measure	2020 Reduction (MT CO ₂ e)	2030 Reduction (MT CO ₂ e)
Transportation Reduction Measures		
Active Transportation	492.14	694.12
Transportation Measures to Reduce VMT	4,049.02	4,597.60
Increased IVT Use	535.50	605.60
Clean Vehicle Policy	6.59	13.17
Off Road Vehicle Reductions	1,664.40	1,535.40
Subtotal	6,747.64	7,445.90
Land Use Reduction Measures		
Land Use Measures in Support of SB 375	1,874.15	3,562.87
Electric Vehicle Infrastructure	107.35	237.30
Subtotal	1,981.50	3,800.17
Energy Efficiency Reduction Measures¹		
Energy Efficiency in City Buildings	64.81	178.49
Exceed Title 24 Standards	431.88	1,129.10
Promote Energy Audits	1,370.44	2,978.79
Home Weatherization	109.18	245.66
HERO Program	173.40	635.80
CDBG Housing Rehabilitation Loan Program	17.00	59.50
Conversion to LED	42.86	173.56
Subtotal	2,209.57	5,400.90
Solid Waste Reduction Measures		
Solid Waste Management	20,743.97	32,569.87
Urban Water Reduction Measures		
Urban Water Management	42.08	309.60
Total City Reduction Measures	31,724.77	49,526.44
Total City and State Reduction Measures	45,981.04	81,404.93
Other Reduction Measures	N/A	24,000.00
TOTAL REDUCTIONS	45,981.04	105,404.93

¹These reduction measures are cumulative in 2030. The reduction measures completed in 2020 for these measures would be carried forward into later years.



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J. DESCRIPTION OF TRANSPORTATION GHG REDUCTION MEASURES

Goal: Reduce vehicle miles traveled (VMT) by encouraging alternative modes of transportation such as walking, biking, bus transit and carpooling

Goal: Acquire fuel efficient or zero emission vehicles as the City replaces the older vehicles in its fleet.

Goal: Promote off-road vehicle and equipment upgrades, retrofits and replacements.

1. Continue to Implement Policies that Encourage Walking and Biking: The 2007 General Plan *Circulation Element* and 2003 *Bicycle Master Plan* contain policies that encourage alternative modes of transportation.



Responsible Department: Public Works Department; Community Development Department – Planning Division

a. Potential Reduction in GHG Emissions

Implementation of these policies will help to lower GHG emissions due to reduced vehicle use.

Due to emissions from “cold starts” (i.e., when a car hasn’t been driven in a few hours and the engine is cool), a one mile automobile trip emits up to 70% as much pollution as a 10-mile excursion. This means that when people decide to bicycle or walk even just for very short trips, they are still significantly reducing their environmental footprint. From reducing local levels of harmful pollutants that cause asthma and other respiratory illnesses to addressing global climate change, higher rates of bicycling and walking provide tangible, GHG emissions reductions.

The California Air Resources Board explains that -

Active transportation methods refer to a variety of modes of travel that are generally human powered, such as bicycling and walking. In most cases, when a person chooses to replace a car trip with a bike or walk trip to a destination, passenger VMT is reduced, along with GHG emissions. In reviews of the empirical literature related to the impacts of putting bicycling- and pedestrian-related strategies in place, Handy, Sciara, et.al. (2010, 2011) found that a variety of strategies have the potential to reduce vehicle trips and VMT. Increasing the number of miles of bikeways and sidewalks, making changes to

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existing bike/pedestrian infrastructure to improve the safety, security, or comfort of cyclists and pedestrians, or creating better bike/pedestrian links to transit stations are among the strategies that have been found to increase the likelihood of a shift in trips from cars to bicycles, walking, and/or transit.

As Calexico children, youth and adults increase their biking and walking trips and increase their use of public transit there will be a reduction in the number of vehicle trips and vehicle miles traveled (VMT). The reduction in VMT will reduce the amount of carbon dioxide (CO₂) emitted.

b. Circulation Element and Bicycle Master Plan Policies

The *Circulation Element* and *Bicycle Master Plan* include the following policies:

- ✦ Encourage new development to support transit ridership and reduce vehicle traffic on local and regional roads and highways.
- ✦ The City should require developers of new industrial, residential, or commercial projects to coordinate with the local transit provider(s) to best incorporate design features that increase the potential for public transit service and provide effective transit use as the City grows.
- ✦ Pedestrian facilities shall be developed throughout the City to encourage walking as an alternative to the automobile.
- ✦ All urban standard streets should have improved sidewalks on both sides of the road.
- ✦ The City shall implement the Bicycle Master Plan, September 30, 2003, and any amendments thereto, to promote bicycle travel as an alternate mode of transportation.
- ✦ Encourage cycling by planning accordingly and incorporating bike racks when developing new schools, parks, residential communities, and retail/employment centers.
- ✦ Integrate Master Plan bicycle facilities as part of the design and construction of new roadways and upgrade of existing roadways.

c. Transportation Access Study of the California/Baja California Border Crossings

In addition to City improvements to encourage more walking and biking, the Imperial County Transportation Commission is performing a Transportation Access Study of the California/Baja California Border Crossings. The goal of the project is to improve travel experiences for people walking or bicycling across the California/Baja California Border. The study will recommend ways to make walking and biking trips safer, easier and more comfortable around the six Border Crossings, two of which are located in Calexico.

Examples of improvements include lighting, signs, sidewalks, crosswalks, shade, seating, water and restrooms. Facilities such as sidewalks, safety issues, wait times, and transit services can all affect conditions for border crossers traveling on foot or by bicycle. The study will look at opportunities and challenges around each Border Crossing, and will draw from input to identify needs and potential improvements.

In order to calculate potential GHG emissions reductions from increased walking and biking, the following factors were used in the forecast:

- ✦ City population
- ✦ Number of workers



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- ✚ Numbers of bicycle commuters
- ✚ Number of pedestrian commuters
- ✚ Number of employees working at home
- ✚ Number of transit commuters
- ✚ Number of school children walking and bicycling to school
- ✚ Number of college students walking and bicycling to school

Calexico's existing mode-share for both bicycling and walking were based the American Community Survey with conservative projections of increases in the respective mode shares due to improvements in the active transportation system proposed by the Circulation Element and Bicycle Master Plan.

The list below shows that - based on the projected mode-share methodology and updated projections - active transportation produces significant reductions in vehicle miles traveled:

	2020	2030
✚ Vehicle Miles Reduced Due to Bicycling	1,032,837	1,453,513
✚ Vehicle Miles Reduced Due to Walking	300,853	427,548

Table 16 shows the GHG emissions reductions resulting from the reductions in VMT.

**Table 16
Greenhouse Gas Reductions
from Active Transportation**

Alternative Mode	Reduced MTCO ₂
2020	
Biking	381.12
Walking	111.02
Total	492.14
2030	
Biking	536.35
Walking	157.77
Total	694.12



Sources: 2011-2013 American Community Survey 3-Year Estimates, Table B08301 Means of Transportation to Work and active transportation calculation methodology



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2. Continue to Implement the Safe Routes to School Program:

Implementation of the program encourages children to walk and bicycle to school.

Responsible Department: Public Works Department

a. Potential Reduction in GHG Emissions

Walking and biking to school eliminates vehicle trips and vehicle miles traveled. By creating a safe environment through infrastructure improvements, children are encouraged to walk or bike to school instead of having their parents drive them to school. The physical activity and improvement of children's health is a co-benefit of the SRTS program.

b. Safe Routes to School Program

The aim of Safe Routes to School is to increase the number of children who walk or bicycle to school by funding projects that remove the barriers that currently prevent them from doing so. Those barriers include lack of infrastructure, unsafe infrastructure, lack of education/encouragement programs for children, parents, and the community that promote walking and bicycling through programs.



The Imperial County Transportation Commission (ICTC) and the Southern California Association of Governments (SCAG) are sponsoring the development of a countywide Safe Routes to School Regional Master Plan. The Master Plan will identify infrastructure improvements, programs and funding sources for projects that support students walking and bicycling to school. In addition to increased safety, expected results include increased mobility, improved air quality, and health and academic performance for Imperial County's students. Funding for these vital improvements can be accessed much more easily with a community-supported Master Plan in place.

The goals of the Safe Routes to Schools Program will be achieved through the cooperation of a broad spectrum of stakeholders including the superintendents and administrators from all of the local school districts and Imperial County Health Department. Program success will require the participation of principals, teachers, parents, students, school crossing guards, public health workers, public safety staff, and transportation managers from local jurisdictions. Other stakeholders include community members who care about the safety, health, and academic performance of the Valley's youth, as well as community based organizations that support the goals of the project

This program will augment Program #1 by encouraging school children to walk and bike to school. Potential GHG emission reductions may increase above those discussed in Program #1 and additional reductions would be classified as "Other Measures".

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3. Encourage and Facilitate Pedestrian Mobility and Use of Public

Transportation: Implement the Calexico Border Intermodal Transportation Center Feasibility Study.

Responsible Department: Public Works Department; Community Development Department – Planning Division

a. Potential Reduction in GHG Emissions

Completion of the Intermodal Transportation Center will help to reduce vehicle use and also lead to a higher occupancy per trip through use of public transportation such as taxis. Less gas will be consumed resulting in lower emissions of CO₂.

b. Intermodal Transportation Center Feasibility Study

The City in cooperation with the Imperial County Transportation Commission and the Southern California Association of Governments conducted an Intermodal Transportation Center Feasibility Study. The study objectives were to:

- ✚ Facilitate improved pedestrian mobility throughout Calexico and surrounding areas by providing a central location to access multiple alternative transportation options.
- ✚ Collaboratively and cooperatively determine the feasibility of locating and operating a new intermodal transportation center in Calexico, with proximity to the LPOE pedestrian crossing, and available to multiple transportation providers.
- ✚ Identify the multiple users of the potential ITC facility.



Potential GHG emission reductions from the construction of the ITC will augment those achieved under the implementation of the 2007 General Plan *Circulation Element* and 2003 *Bicycle Master Plan* (see number 1 above). Therefore, additional reductions would be classified as “Other Reduction Measures”

4. Bus Transit and Carpooling: Reduce vehicle miles traveled by encouraging increases in bus transit use and carpooling.

Responsible Department: Public Works Department; Community Development Department – Planning Division

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a. Potential Reduction in GHG Emissions

Implementation of this policy will help to lower GHG emissions due to reduced vehicle use and reduced vehicle miles traveled.

b. Increase IVT Ridership by Workers/Commuters/College Students

1. Increase Bus Ridership by Current Drive Alone Workers/Commuters and College Students

The relationship between jobs and housing is an issue in Calexico and the Imperial Valley. Most workers commute via an automobile and are isolated from their work and shopping/service areas. With available vacant parcels and increased allowable capacity/density in the Downtown, there are expanding opportunities for more housing and diverse business opportunities near the Intermodal Transportation Center.

This mitigation measures suggest that the City work with IVT to promote bus ridership by the Calexico's workers, even if it were only occasionally. If 5% of the City's current workers commuted to work by bus one day a week, it would result in an annual reduction of as much as 518 metric tons of CO_{2e}, as explained below.

According to 2013 American Community Survey (ACS) data some 8,662 (72%) Calexico workers drove alone to work. Other ACS data indicate that 17% of all commuters (nearly 2,000) had commute times between 30 and 34 minutes. Using Google Maps with the Calexico 3rd Street and Paulin stop as the starting point and the Brawley Transit Transfer Station stop as the end point, the distance is 23.7 miles with an estimated drive time of 32 minutes compared to a 40-minute bus ride. Exhibit 1 shows the bus route from Calexico to Brawley.

According to Census 2010 and using Circular Area Profiles (CAPS) software provided online by the Missouri Census Data Center, there are approximately 2,547 people 16 years or older within ½ mile of the 3rd and Paulin bus stop . Within one mile of the 3rd and Paulin stop there is about 8,365 persons 16 years or older. While walking a mile to the bus stop may not be practicable, a worker could ride a bike or get dropped off by a family member.

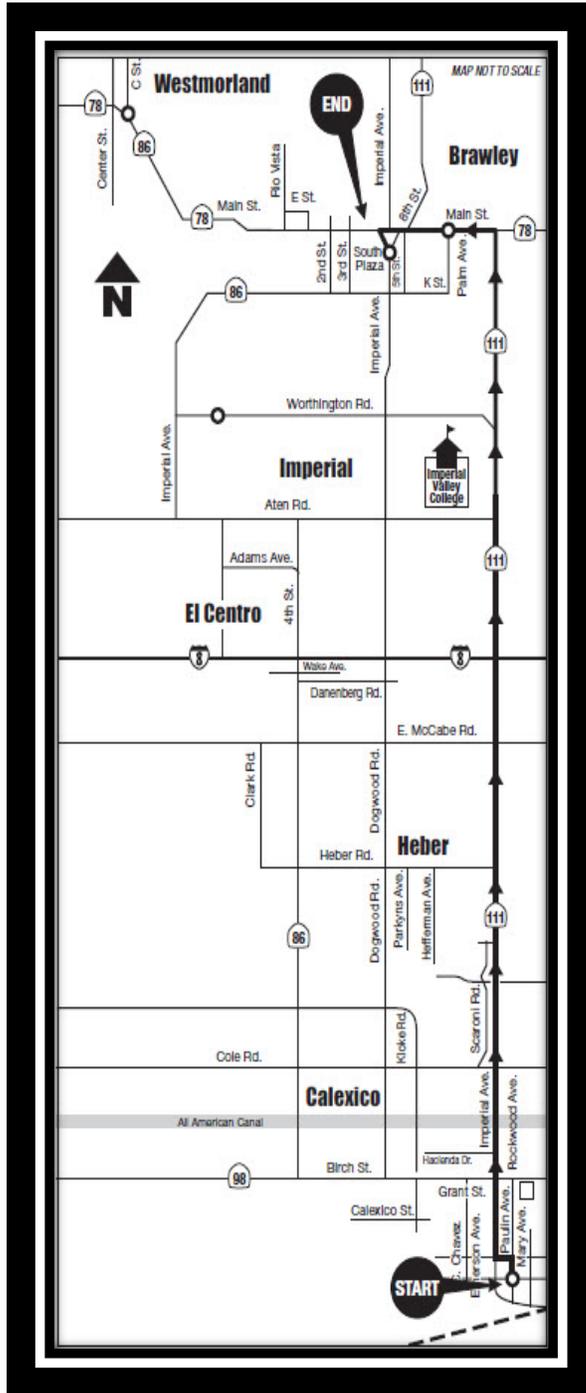
More than ten (10.36) tons of CO_{2e} would not be produced in a single week. With work weeks ranging from 48 to 50 weeks, the annual reduction would range from about 497.28 to 517.89 metric tons of CO_{2e}.

Using the employment projections for 2020 (15,500) and 2030 (17,600), the current drive-alone to work commuting pattern of 72%, and the methodology discussed above there is a potential reduction in GHG emissions of 517.89 metric tons in 2020 and 587.99 metric tons in 2030 by encouraging 5% of the current drive alone workers to take the bus once per week.



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Exhibit 1
Calexico to Brawley Bus Route



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student enrolment would be difficult to project, the same enrollment figure of 11,150 was used for both 2020 and 2030. The potential GHG emissions reduction would be 17.61 metric tons of CO₂e for both 2020 and 2030.

Encouraging just 5% of the current drive-alone commuters and college students to take IVT buses just one per week would reduce CO₂e emissions as shown below:

	2020	2030
5% Increased Usage by Drive-Alone Commuters	517.89 MT CO ₂ e	587.99 MTCO ₂ e
5% Increased Usage by College Commuters	<u>17.61 MTCO₂e</u>	<u>17.61 MTCO₂e</u>
Total	535.50 MTCO ₂ e	605.60 MTCO ₂ e

2. Increase Bus Ridership by Current Bus Riders

When residents take the bus work, there is a direct reduction in vehicle miles traveled and therefore a reduction in GHG emissions. According to the 2010-2013 American Community Survey, 3.3% of the employed residents currently take the bus to work. Setting a goal of increasing to 5% would reduce GHG emission. Using the 2020 and 2030 employment projections, GHG emissions would be reduced as follows:

- ✚ 2020: 764.82 MTCO₂e
- ✚ 2030: 868.44 MTCO₂e

3. Increase Carpooling

According to 2010-2013 ACS data, 12.7% of Calexico's workers already carpool. Setting a goal of encouraging 20% of workers to carpool would reduce GHG emissions. Using the 2020 and 2030 employment projections, GHG emissions would be reduced as follows:

- ✚ 2020: 3,284.21 MT CO₂e
- ✚ 2030: 3,729.17 MT CO₂e

Sources:

Imperial Valley Transit Authority
Imperial Valley College Fact Book 2011-2012
2010-2013 American Community 3-Year Estimates Tables B08310: Means of Transportation to Work; B08303: Travel Time to Work; B01001: Sex by Age
The Missouri Census Data Center: Census 2010 and Circular Area Profiles (CAPS) software
SCAG 2020 and 2030 employment projections for the City of Calexico

5. Establish a Clean Vehicle Policy: Implementation of the policy will increase the number of hybrid and AFV in the City and City-contracted fleets.

Responsible Department: All Departments

a. **Potential Reduction in GHG Emissions**

When vehicles are powered by grid electricity rather than fossil fuel, direct GHG emissions from fuel combustion are replaced with indirect GHG emissions associated with the electricity used to



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power the vehicles. When vehicles are powered by hybrid electric drives, GHG emissions from fuel combustion are reduced

The acquisition of hybrid, electric and alternative fuel vehicles will reduce the amount of gasoline consumed and carbon dioxide emitted.

b. Gradually Replace Vehicle Fleet with Hybrid, Electric and AFV Vehicles

The City could consider annually during the budget process that some of the replacement vehicles purchased for the municipal fleet be high efficiency (hybrid), electric or alternative fuel vehicles (AFVs). Factors that would need to be evaluated during the budget process include the appropriateness for the vehicle task, fueling infrastructure, petroleum displacement, and the overall cost and environmental benefit. An evaluation of these factors would be made prior to purchasing each new or replacement vehicle.

The City Council also could direct staff to work with fleets under City authority to influence their expanded use of alternative fuels and high efficiency/alternative fuel vehicles (AFV) including electric, biodiesel, ethanol, hybrid, hydrogen, and compressed natural gas (CNG) based on appropriateness for vehicle task, fueling infrastructure, petroleum displacement, overall cost, and environmental benefit.

Periodically replacing older fleet vehicles with hybrid vehicles would reduce municipal-generated GHG emissions. For example replacing one (1) gasoline powered passenger car with a hybrid would reduce emissions by 1.3 MT CO₂e. Were the City to undertake a replacement policy of replacing five vehicles by 2020 and an additional 10 by 2030, the cumulative reduction in CO₂e would be nearly 20 metric tons as show below.

	2020	2030	Total
# Replaced with Hybrid Vehicles	5	10	15
Total Reduced Fuel Consumption	750 gallons	1,500 gallons	2,250 gallons
Total Reduced GHG Emissions	6.59 MTCO ₂ e	13.17 MTCO ₂ e	19.76 MTCO ₂ e

The City of Calexico has already begun integrating more eco-friendly vehicles into its vehicle fleet. In May 2015 the City Council approved a cooperative purchase, with the City of Brawley, to acquire a 2015 compressed natural gas (CNG) street sweeper. As compared to petroleum or coal, natural gas causes less damage to the environment. In 2007, a study for the California Energy Commission (CEC) found that CNG reduces life cycle GHG emissions in both light- and heavy-duty vehicles compared to their gasoline and diesel counterparts. Again, this is primarily due to the low petroleum usage in the production phase and the low-carbon intensity of the fuel during use.



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6. Off-Road Vehicle Measures: The City will promote off-road vehicle and equipment upgrades, retrofits, and replacements

Responsible Department: Public Works Department; Community Development Department – Planning Division

a. Potential Reduction in GHG Emissions

Emissions in the off-road sector result from the combustion of fuel, primarily diesel, gasoline and compressed natural gas, which is used to power off-road equipment and vehicles. Off-road equipment and vehicles include those used in construction, agriculture, commercial, industrial, and landscaping operations as well as recreational vehicles.

GHG emissions reductions can be achieved by reducing off-road equipment and vehicle usage and idling or by using equipment that runs on electricity or alternative fuels. The South Coast Air Quality District (SCAQMD) has a program which allows residents to turn in working gas-powered lawn mower and purchase a new cordless rechargeable electric mower at a discounted price.

b. Encourage Participation and Provide Outreach

The City will conduct additional outreach and promotional activities to promote off-road vehicle and equipment upgrades, retrofits and replacements. The City also will direct interested individuals and organizations to existing websites such as the Imperial County Air Pollution Control District webpage describing the Carl Moyer Grant Program.

For purposes of calculations, these efforts are assumed to generate a GHG reduction potential of 10% below the 2020 and 2030 forecasted levels. In the future it is anticipated that the demand for some equipment will be lower due to water conservation measures (i.e., less planted lawn) and new and more efficient equipment replacing older and less efficiency models. Implementation of this program can result in the reduction in GHG emissions of 1,644.40 MT CO₂e in 2020 and 1,535.40 in 2030.

Source: Environmental Protection Agency (EPA) NONROAD Model

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K. DESCRIPTION OF LAND USE GHG REDUCTION MEASURES

Goal: Contribute to a reduction of vehicle miles traveled (VMT) through land use and zoning measures.

Goal: Complete zoning for electric vehicle infrastructure.

1. Facilitate Infill Development by Implementing the General Plan *Land Use Element* and *Housing Element*: Continue to implement the relevant policies and programs of the 2009 *Calexico Downtown Plan*, 2013-2021 *Housing Element* and 2015 *General Plan*.

Responsible Department: Planning Division

a. Potential Reduction in GHG Emissions

Infill as contrasted to leapfrog development contributes to a reduction in VMT, less gas consumption, and lower GHG emissions. Infill development also usually happens on sites zoned for higher densities. Density is usually measured in terms of persons, jobs or dwellings per unit. Increased densities affect the distance people travel and provide greater options for the mode of travel they choose. Also, transit ridership increases with density, which justifies enhanced transit service.

A *Land Use Element* objective is to:

...encourage infill and adjacent new development to provide for the efficient use of existing infrastructure (and) avoid “leap frog” new development

In order to not overburden the City’s circulation system, *Land Use Element* Policy 15 C states:

The land use pattern should encourage the use of public transportation by City residents and visitors.

Implementation of this objective and policy promotes new development closer to existing amenities and infrastructure resulting in fewer vehicle miles traveled.



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Program #2 of the 2014 *Housing Element* provides for Infill Housing Development Incentives. The 2013-2021 *Housing Element* and *Land Use Element Update* identify key infill development opportunities. These sites, which also are candidates for mixed use development, will be posted on the City's Aerials, maps, development regulations and assessor information will be posted on the City's website. Incentives to encourage infill development may include waiving utility, capacity and reducing infrastructure fees as well as density bonuses and permitting a 3-story height limit.

The reduction of infrastructure fees is consistent with the following *Land Use Element* policy:

The City should consider developing a policy to reduce certain development fees for infill projects consistent with the General Plan and Zoning Ordinance located on parcels that are surrounded by existing development.

According to SCAG:

California's Sustainable Communities and Climate Protection Act, or Senate Bill (SB) 375, calls for this RTP (Regional Transportation Plan) to include an SCS (Sustainable Communities Strategy) that reduces greenhouse gas (GHG) emissions from passenger vehicles by 8 percent per capita by 2020 and 13 percent per capita by 2035 compared to 2005, as set by the California Air Resources Board (ARB).

SCAG's SB 375 *Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)* exceeds the GHG emission-reduction target set by CARB for the SCAG region by achieving a 9% reduction by 2020 and 16% reduction by 2035.

SCAG also has explained that –

The SCS focuses the majority of new housing and job growth in high-quality transit areas and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development. This overall land use development pattern supports and complements the proposed transportation network that emphasizes system preservation, active transportation, and transportation demand management measures.

The following demonstrate Calexico's support of the of SCAG's *RTP/SCS*:

- ✚ 2003 Bicycle Master Plan
- ✚ 2009 Calexico Downtown Plan
- ✚ 2013-2021 Housing Element (infill sites)
- ✚ Calexico's Intermodal Transportation Center
- ✚ 2015 Land Use Element (higher density housing near major employment nodes)
- ✚ 2015 Circulation Element (complete streets)

Through the steps listed above and there will be a reduction in the vehicle miles that would otherwise be traveled by Calexico's population. In order to determine the level of GHG reductions, the EMFAC Imperial County CO₂ emissions forecasts for 2020 and 2030 for passenger cars and light trucks was used by applying Calexico's percentage share. Using the target reductions set by CARB of a 9% reduction by 2020 and 13% by 2030 the GHG emissions would be reduced by the following:



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- ✚ 2020: 1,874.15 MT CO₂e
- ✚ 2030: 3,562.87 MT CO₂e

Note: In order to avoid “double counting” the above numbers reflect reductions net of reductions already included by increased active transportation.

Source:

EMFAC 2020 and 2030 forecasts for Imperial County

2. Complete Zoning for Electric Vehicle Infrastructure: Zoning regulations should be in place to be in a state of readiness as the number of EVs increase.

Responsible Department: Community Development Department – Planning Division

a. Potential Reduction in GHG Emissions

Hybrid vehicles (HEVs), plug-in hybrid vehicles (PHEVs) and all electric vehicles typically produce lower emissions than conventional vehicles. EVs and PHEVs running only on electricity have zero tailpipe emissions, but emissions may be generated by the source of electrical power such as a power plant.

In March 2012, Governor Brown issued Executive Order B-16-2012, directing specific government agencies to establish benchmarks resulting in 1.5 million zero-emission vehicles (ZEVs) on California roadways by 2025. There are two major goals and milestones associated with this assessment. The first is supporting the 1.5 million ZEV goal, which is targeted at 2025. A second goal, which supports the first, is that California’s ZEV infrastructure will be able to support up to 1 million vehicles by 2020.

To widely accept the use of plug-in hybrid electric vehicles (PHEVs) and all-electric vehicles (EVs), consumers and fleets need a developed infrastructure of charging stations. Drivers need affordable, convenient, and compatible options for charging at home (or at fleet facilities, in the case of fleets). Charging stations at workplaces and public destinations may also bolster the market acceptance of PEVs.

Charging plug-in electric vehicles requires plugging into electric vehicle supply equipment (EVSE). Hybrid electric vehicles (HEVs) are charged using regenerative braking and the internal combustion engine and are not plugged into charging equipment.

Charging equipment for plug-in hybrid electric vehicles (PHEVs) and all-electric vehicles (EVs) is classified by the rate at which the batteries are charged. Charging times vary based on how depleted the battery is, how much energy it holds, the type of battery, and the type of EVSE. The charging time can range from 15 minutes to 20 hours or more, depending on these factors.

A May 2014 report entitled *California Statewide Plug-in Electric Vehicle Infrastructure Assessment* prepared for the California Energy Commission, projects more than 900,000 charging stations (both home dominate and high public access) by 2020 in southern California.



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b. Zoning Regulations

Zoning strategies to accommodate EV infrastructure include:

- ✚ Developing a City electric vehicle charging infrastructure ordinance
- ✚ Streamlining permitting processes
- ✚ Installing public charging infrastructure for electric vehicles
- ✚ Integrating electric vehicles in the City's fleet

Some cities encourage new developments to “rough in” in their garages or parking lots for future charging station installations. Other cities require accommodation of EV infrastructure by requiring EV charging spaces as a percentage of total parking.

Zoning for EV infrastructure includes, but is not limited, to:

- ✚ Providing opportunities for EV infrastructure in certain zoning districts
- ✚ Providing opportunities for the traveling public to have adequate and convenient electric vehicle charging stations
- ✚ Providing opportunities for Calexico residents to have safe and efficient personal electric vehicle charging station located at their place of residence
- ✚ Expediting the permit approval process on behalf of homeowners
- ✚ Working with apartment developments to find feasible ways of installing vehicle charging stations
- ✚ Providing the opportunity for commercial and industrial projects to supply electric vehicle charging services for their customers and employees
- ✚ Establishing definitions for battery exchange station, charging levels, electric vehicle charging station, and rapid charging station

SCAG has projected PEV growth in Imperial County. The SCAG PEV growth projections include plug-in hybrid electric vehicles (PHEVs) and all-battery electric vehicles (BEVs). Starting from a low of 5 vehicles in 2012, the projected number of PEVs is between 107 and 130 and 431 to 760 by 2017 and 2022, respectively. Using the SCAG figures, the following projections were made for 2020 and 2035:

- ✚ 2020 286 (equals mid-point of lower/upper bounds of growth between 2017-2022)
- ✚ 2035 760 (equals upper bound in 2022)

SCAG forecasts that Calexico's share of Imperial County's total households will be 20% and 21% in 2020 and 2030, respectively. Applying these percentages to the projected number of PEVs in Imperial County yields the following estimates for Calexico's PEVs:

- ✚ 2020 57 (20% of 286)
- ✚ 2030 126 (21% of 602)

Table 17 and Chart 3 compare CO₂e emissions by vehicle type. A plug-in hybrid vehicle generates 4,152 pounds of CO₂e less than a conventional gasoline vehicle (13,043-8,891).

Thus, in calendar year 2020 57 PEVs would generate about 236,668 fewer pounds (4,152 X 57) or 107.35 metric tons of CO₂ equivalent. In 2030, 126 PEVs would generate about 523,152 (4,152 X 126) fewer pounds or 237.30 metric tons of CO₂ equivalent.



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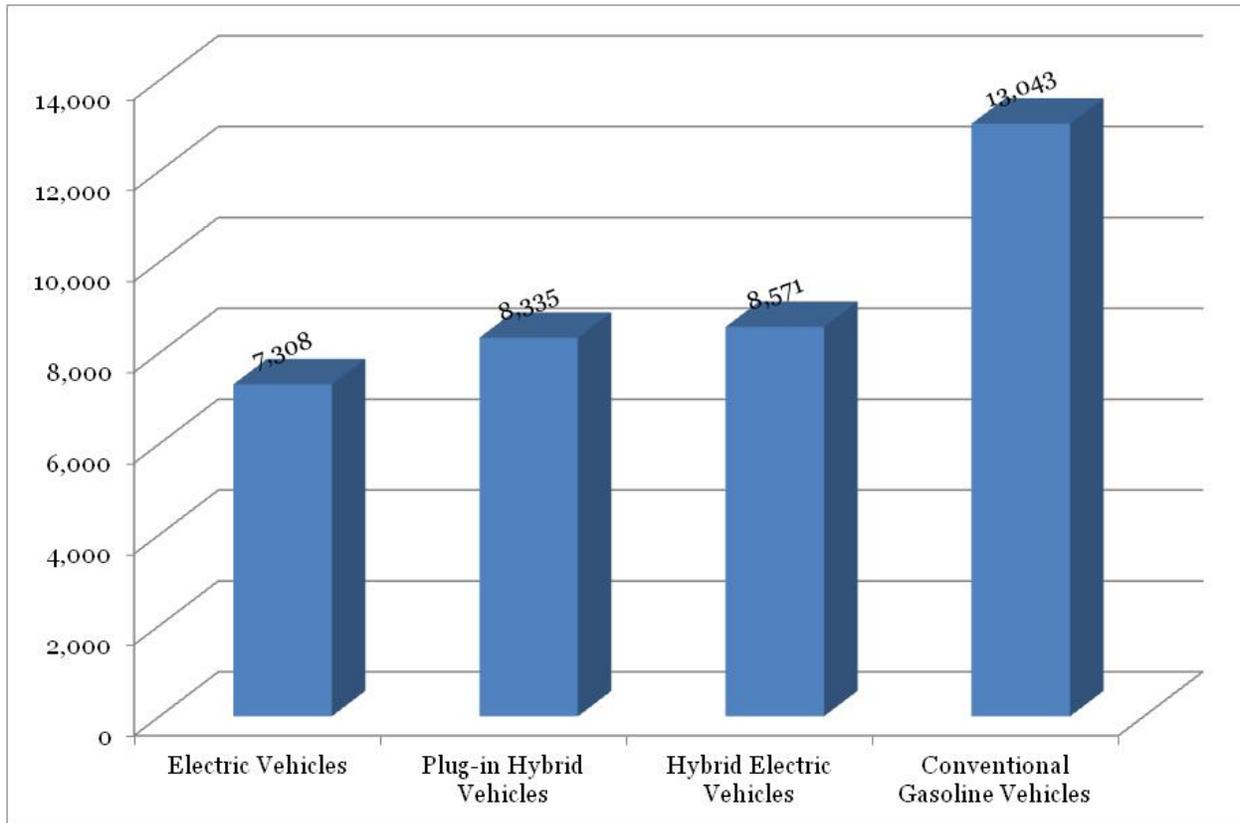
Table 17
Calculation of GHG Emissions by Vehicle Type

Conventional Gasoline Vehicle Emissions	
Average Annual New Car Mileage	15,000
Conventional Vehicle MPG (CAFÉ Standard)	27.6
Gallons of Gas Consumed	543
GHG Emissions Factor (lbs./gallon)	24
Annual lbs. of CO _{2e} Emitted	13,043
Plug-in Hybrid Vehicle Emissions	
Average Annual New Car Mileage	15,000
PHEV Miles Driven on Electricity (70%)	10,500
PHEV Miles Driven on Gasoline (30%)	4,500
PHEV kWh/mile	0.36
PHEV kWh Consumed	3,780
Plug-in Hybrid Vehicle MPG (Chevy Volt)	37
Gallons of Gas Consumed	122
GHG Emissions Factor (lbs./gallon)	24
Annual lbs. of CO _{2e} Emitted from Gasoline	2,919
National Average Electricity GHG/kWh	1.58
Annual lbs. of CO _{2e} Emitted from Electricity	5,972
Total Annual lbs. of CO _{2e} Emitted	8,891
Hybrid Electric Vehicle Emissions	
Average Annual New Car Mileage	15,000
Hybrid Electric Vehicle MPG (Weighted Average)	42
Gallons of Gas Consumed	357
GHG Emissions Factor (lbs./gallon)	24
Annual lbs. of CO _{2e} Emitted	8,571
Electric Vehicle Emissions	
Average Annual New Car Mileage	15,000
EV kWh/mile (Nissan Leaf)	0.34
Total kWh Consumed	5,100
National Average Electricity GHG/kWh	1.58
Annual lbs. of CO _{2e} Emitted	8,058



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Chart 3
City of Calexico-Zip Code 92231
Annual Vehicle Emissions Comparison



Sources:

American Public Transit Association's Public Transportation Fact Book Tables 6, 7 and 20

Federal Highway Administration Table VM-1

California Energy Commission, *California Statewide Plug-In Electric Vehicle Infrastructure Assessment*, May 2014

UCLA Luskin Center, *Southern California Plug-in Electric Vehicle Readiness Plan*, December 2012, page 36 (report prepared for the Southern California Association of Governments)

UCLA Luskin Center, *Early Plug-in Electric Vehicle Sales: Trends, Forecasts, and Determinants*, pg. 2 (report prepared for the Southern California Association of Governments)

U.S. Department of Energy – Energy Efficiency and Renewable Energy, Alternative Fuels Data Center – Emissions from Hybrid and Plug-in Electric Vehicles

U.S. Department of Transportation Bureau of Transportation Statistics Table 4-23 Average U.S. Light Duty vehicle Efficiency (MPG) for Light Duty Vehicle Short Wheel Base, 2013



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L. DESCRIPTION OF ENERGY CONSERVATION AND EFFICIENCY GHG REDUCTION MEASURES

Goal: *Reduce energy use in existing and new municipal, residential, non-residential buildings.*

1. Continue to Implement the General Plan Public Facilities/Services

Element: The Element objective is to encourage a responsible development pattern for any new public buildings, maximize the usefulness of existing buildings, and conserve energy whenever possible.

Responsible Department: Public Works Department
Community Development Department – Building Division



a. Potential Reduction in GHG Emissions

GHGs are emitted when electricity and natural gas are used as energy sources in municipal buildings. Implementation of the *Public Facilities/Services Element* objective will reduce energy consumption.

b. Public Facilities/Services Element

The following paragraphs describe the policies:

- ✦ **Building Energy Conservation:** The City shall annually assess the energy usage of each public building and develop plans to conserve energy, including retrofitting for energy conservation where feasible.
- ✦ **Building Energy Performance:** All new public buildings shall be designed to be as energy efficient as is financially feasible.

This reduction measure includes the following actions:

- ✦ Formalize a goal to cut City government energy use by 10% by 2020 and 25% by 2030.
- ✦ Complete energy audits and benchmarking of all City-owned or -operated facilities.
- ✦ Maintain a regular maintenance schedule for heating and cooling, ventilation and other building functions.
- ✦ Establish a prioritized list of energy efficiency upgrade projects and implement them as funding becomes available.

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This program would *reduce* electricity and natural gas consumption as listed below:

	<u>2020</u>	<u>2030</u>
⚡ Electricity (MWh)	194.7	536.3
⚡ Natural Gas (Therms)	212.40	585.00

The corresponding reductions in GHG emissions would be:

- ⚡ 64.81 MTCO₂e in 2020
- ⚡ 178.49 MTCO₂e in 2030

2. Buildings Exceed Title 24 Energy Efficiency Standards: Encourage residential and non-residential projects to exceed Title 24 standards and thereby reduce energy use and reduce GHG emissions.

Responsible Departments: Community Development Department – Planning Division and Building Division

a. Potential Reduction in GHG Emissions

GHGs are emitted when electricity and natural gas are used as energy sources in residential and non-residential buildings. Title 24, Part 6 regulates energy uses including space heating and cooling, hot water heating, and ventilation.

b. Energy Efficiency Standards

The California Energy Commission on May 31, 2012 approved energy efficiency standards for new homes and commercial buildings. The Energy Commission's 2013 Building Energy Efficiency Standards are 25% more efficient than previous standards for residential construction and 30% better for nonresidential construction. The Standards took effect on January 1, 2014. Some improved measures in the Standards include:

Residential:

- ⚡ Solar-ready roofs to allow homeowners to add solar photovoltaic panels at a future date
- ⚡ More efficient windows to allow increased sunlight, while decreasing heat gain
- ⚡ Insulated hot water pipes, to save water and energy and reduce the time it takes to deliver hot water
- ⚡ Whole house fans to cool homes and attics with evening air reducing the need for air conditioning load
- ⚡ Air conditioner installation verification to insure efficient operation

Nonresidential:

- ⚡ High performance windows, sensors and controls that allow buildings to use "daylighting"
- ⚡ Efficient process equipment in supermarkets, computer data centers, commercial kitchens, laboratories, and parking garages



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- ✚ Advanced lighting controls to synchronize light levels with daylight and building occupancy, and provide demand response capability
- ✚ Solar-ready roofs to allow businesses to add solar photovoltaic panels at a future date
- ✚ Cool roof technologies

On average, the Standards will increase the cost of constructing a new home by \$2,290 but will return more than \$6,200 in energy savings over 30 years. Based on a 30-year mortgage, the standards will add approximately \$11 per month for the average home, but save consumers \$27 on monthly heating, cooling, and lighting bills.

To implement the *Plan to Reduce Greenhouse Gas Emissions*, the Planning Division and Building Division will encourage residential and non-residential projects to exceed the Title 24 standards by 20%.

According to the U.S. Energy Information Administration, as square footage increases, the burden on heating and cooling equipment rises, lighting requirements increase, and the likelihood that the household uses more than one refrigerator increases. Square footage typically stays fixed over the life of a home and it is a characteristic that is expensive, even impractical to alter to reduce energy consumption.

When new residential development is proposed the City will explore whether reductions in house sizes and other strategies would reduce energy consumption.

Implementation of the 20% above Title 24 policy would result in the following GHG emissions reductions:

- ✚ 2020 431.88 MTCO_{2e}
- ✚ 2030 1,129.10 MTCO_{2e}

The City of Calexico has already taken steps to make the permitting process for energy saving projects. On July 21, 2015 the City Council passed an amendment to the Zoning Ordinance to create provisions for expedited permitting procedures for small residential rooftop solar systems.

Sources:

California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 85-90.

California Energy Commission, *2013 Building Energy Efficiency Standards*

California Energy Commission, *Impact Analysis: California's 2013 Building Energy Efficiency Standards*, July 2013



3. New Construction Energy Efficiency

Program (NCEEP): The NCEEP is an Imperial Irrigation District (IID) non-residential new construction and renovation program providing financial incentives for projects that have energy savings design 10% above the current Title 24 requirements.



Responsible Departments: Community Development Department – Planning Division and Building Division

a. Potential Reduction in GHG Emissions

GHGs are emitted when electricity and natural gas are used as energy sources in residential and non-residential buildings. Voluntary participation in the NCEEP will result in energy savings beyond the minimum Title 24 requirements.

b. NCEEP and Energy Savings

The NCEEP, as noted above, is a non-residential new construction and renovation energy efficiency program that combines an integrated design process with financial incentives for energy saving design at least 10% above the current Title 24 requirements. The program objectives are to:

- ✦ Achieve at least 10% energy savings over the current Title 24 requirements; and
- ✦ Financially reward energy efficient design and construction.

The program is designed for commercial, agricultural and industrial new construction and renovation/remodel projects.

Because the program is voluntary and funding is limited, it is not possible to quantify participation or GHG emission reductions.

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4. Buildings Exceed Minimum CALGreen Requirements:

Encourage new development projects to exceed the 2013 California Green Buildings Code Standards which took effect on January 1, 2014.



Responsible Departments: Community Development Department – Planning Division and Building Division

a. Potential Reduction in GHG Emissions

CALGreen creates uniform regulations for new residential and non-residential buildings that are intended to make buildings more efficient in the use of energy and materials and reduce construction waste. Reduction in electricity and natural gas use from new buildings is based on average energy reductions by building type and climate zone, according to the California Air Pollution Control Officers (CAPCOA).

According to the California Department of Housing and Community Development (HCD), there are “voluntary measures” found in the 2013 CALGreen Code which can be adopted by local government. The measures provide enhanced levels of green building construction and sustainability that are not mandatory statewide, but were developed as a consistent set of standards available for adoption by local government.

When lawfully adopted, the “voluntary measures” establish prerequisites that are mandatory to achieve compliance. Local enforcing agencies may adopt CALGreen “Residential and Nonresidential Voluntary Measures” in whole, in part, or not at all. Therefore, a local ordinance may require some or all of CALGreen enhanced measures or they may adopt other green building standards or other green programs altogether. Enhanced green building requirements, according to HCD, may vary from jurisdiction to jurisdiction based upon the goals of the local governing body.

b. CALGreen Standards

CALGreen creates uniform regulations for new residential and non-residential buildings that are intended to make buildings more efficient in the use of energy and materials and reduce construction waste.

The City of Calexico will consider adoption of residential and nonresidential voluntary measures. The City adopted by reference, the California Green Building Standards Code, 2013. However, at this time no estimate of a reduction in GHG emissions due to implementation of voluntary measures can be quantified.

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Sources:

California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 85-91.

California Building Standards Commission, *California's Green Building Code*

California Department of Housing and Community Development, *Guide to the 2013 California Green Building Standards Code Residential*, 134 pages

5. Promote Energy Audits of Existing Buildings: Encourage homeowners and businesses including the owners of multifamily properties to conduct energy audits.

Responsible Departments: Community Development Department – Planning Division and Building Division, Finance Department

a. Potential Reduction in GHG Emissions

The measure is intended to help property owners identify energy efficiency opportunities at their existing buildings and, if desired, take advantage of rebates and incentive programs for energy efficiency improvements.

b. Voluntary Participation in Energy Audits

Participation in energy audits and associated energy conservation programs will rely on voluntary participation. Homeowners can be regularly informed through announcements in the utility bills and postings on the City's website. Businesses can be encouraged to complete an energy audit through the business application procedure.

The Imperial Irrigation District (IID) offers free online and onsite energy audits. Upon the completed examination the energy audit representative issues a report that summarizes the existing conditions in a home or business, identifies potential energy saving measures and provides direction towards additional resources and energy saving improvements.

The Southern California Gas Company offers a personalized online energy savings tool for homeowners and energy-efficient assessments for business that consume 250,000 or more therms per year.

Residential Buildings

Home energy upgrades can include the following:

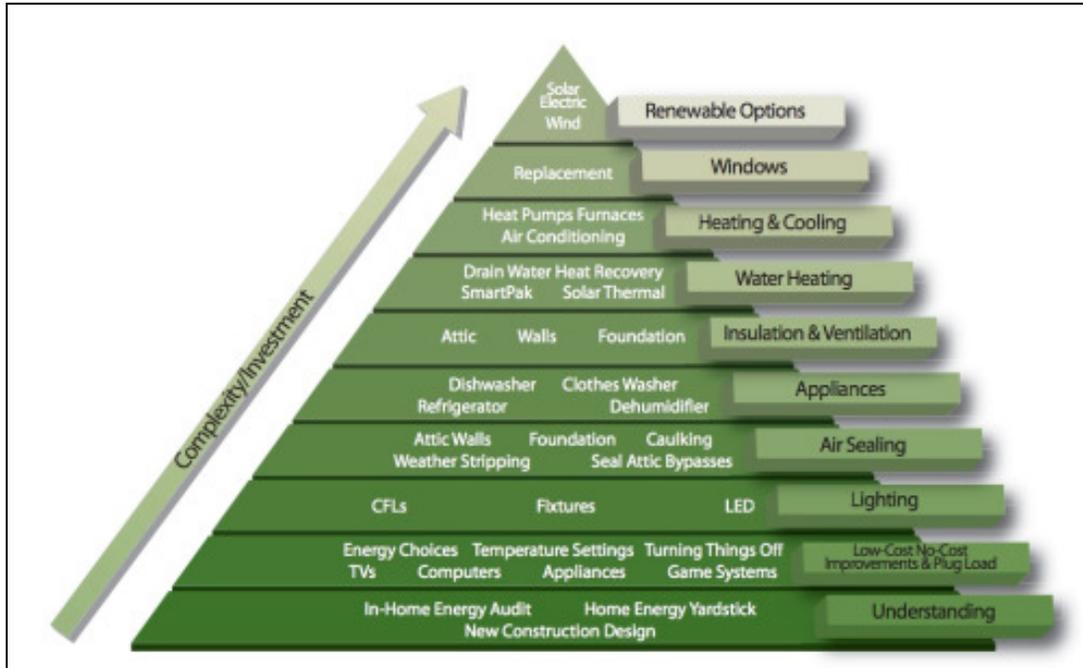
- ✚ Air sealing
- ✚ Attic insulation
- ✚ Duct sealing
- ✚ Hot water pipe insulation
- ✚ Thermostatic shower control
- ✚ Combustion safety testing
- ✚ Smoke detector/CO detector
- ✚ High efficiency furnace
- ✚ Energy efficient cooling



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- ✚ Energy efficient hot water heater
- ✚ Energy efficient windows
- ✚ Wall insulation
- ✚ Cool roof
- ✚ Solar panels/renewable energy
- ✚ Water efficient landscaping

Figure 1
Benefits of Home Energy Upgrades



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According to the U.S Environmental Protection Agency (EPA) website:

Energy audits assess how much energy a home consumes and evaluate measures to make the home more energy efficient. However, EPA has found that energy audits alone do not produce energy savings. A key strategy of (home energy audits) is to empower the homeowner with information (via an audit) and create a clear pathway for acting on recommendations. Some local governments have promoted free or discounted energy audits for homes, or have considered mandating audits at the time of sale.

For estimating purposes, it is assumed that between 2012 and 2020 250 homeowners would perform an energy audit and complete minor upgrades. An additional 500 homeowners would do the same between 2020 and 2030. Based on current consumptions rates, performing upgrades that achieve just a 5% energy savings would have the following effect:

	2020	2030
Reduced Electricity (MWh) Usage	146.91	293.81
Reductions in Natural Gas (Therms) Usage	2,262.50	4,525.00

The resulting reduction in GHG emissions would be:

- ✚ 2020: 57.73
- ✚ 2030: 173.18

Note: The 2030 estimate is cumulative based on reductions made in 2020 and continue through to 2030.

Commercial Buildings

Owners of existing commercial buildings can be encouraged to undertake a commercial building energy audit. In the past many companies have just considered utilities as “a cost of doing business.” However, by running an inefficient building, they are overpaying for energy. A commercial energy audit can include the following:

- ✚ Lighting systems
- ✚ HVAC Systems and Controls
- ✚ Compressed Air Systems
- ✚ Renewable Energy Applications
- ✚ Electric Motors and Drives
- ✚ Process Systems
- ✚ Steam Systems
- ✚ Heat Recovery
- ✚ Building Envelope Upgrades
- ✚ Switching Utility Providers or Utility Rates

When estimating possible energy savings in a facility from performing an energy audit, it's *impossible* to make a reasonable estimate without understanding how the building operates and uses energy. However, according to Abraxas Energy Consulting savings upwards of 40% are possible on some buildings, with the average savings being 10% to 20%. If the building has already had energy audits in the past, and the identified measures were implemented, it's possible that the facility is already efficient, and in that case, there may be less energy savings



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potential. If the facility has been in operation for many years without having had an energy audit, it's very possible that an energy audit can identify significant energy savings.

Abaraxas estimates that for a building that has not aggressively pursued energy efficiency in the past 10 years, assume a 20% savings potential. For a building that has been pursuing energy efficiency in the past five years, assume 10% savings potential.

Assuming a 10% business participation rate and 20% in energy savings, this program would *reduce* electricity and natural gas consumption as listed below:

	2020	2030
✚ Reduced Electricity (MWh) Usage	18,819	21,402
✚ Reduced Natural Gas (Therms) Usage	11,673	13,275

The corresponding reductions in GHG emissions would be:

- ✚ 2020: 1,312.71 MTCO_{2e}
- ✚ 2030: 2,978.79 MTCO_{2e}

Note: The 2030 estimate is cumulative based on reductions made in 2020 and continue through to 2030.

6. Promote Participation in Utility Company Residential and Business

Rebates: Inform homeowners and businesses of available rebates and incentives to complete energy efficiency improvements.

Responsible Departments: Community Development Department – Planning Division and Building Division

a. Potential Reduction in GHG Emissions

ENERGY STAR-certified products use less energy and create less pollution. The ENERGY STAR label provides assurance of energy-efficiency performance that exceeds federal standards.

b. Voluntary Participation in Residential and Business Rebates

The Southern California Gas Company provides rebates for improvements meeting the Energy Star standards including water heaters, tankless water heaters, clothes washers, low flow showerheads, attic or wall insulation, furnace, gravity wall furnaces. Equipment eligible for business rebates include, for instance, boilers, cooking equipment, water heaters and tankless water heaters.



The IID had rebate programs similar to those offered by Southern California Gas Company. Due to the tremendous customer response, the funds for the program had been fully reserved based on applications received as of September 2014. With the depletion of funds, the program is now closed for all measures except attic insulation. Rebates are still available for attic insulation at the \$0.30 per sq. ft. incentive level. The City will monitor to see if the program is renewed in 2015.



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Future reductions in GHG emissions cannot be quantified because the number of households that would purchase Energy Star appliances is unknown.

7. Weatherization Assistance Program (Energy Efficiency): Promote existing weatherization programs and coordinate with Campesinos Unidos in informing residents of available resources.

Responsible Department: Office of the City Manager - Housing Division

a. Potential Reduction in GHG Emissions

The Weatherization Assistance Program (WAP) is a federal program designed to increase the energy efficiency of homes which are owned or occupied by low-income persons. The WAP reduces their total residential expenditures such as heating and cooling bills and improves the health and safety of families. The process of making homes more energy efficient, thereby reducing energy usage and costs, is called *weatherization*. Weatherization services can help a family, struggling to make ends meet, reduce their energy consumption by up to 35%, and save them more than \$400 on their heating and cooling bills in the first year alone.

b. Implementation of Weatherization Assistance Program (WAP)

Common types of weatherization include, but are not limited, to:

- ✚ Sealing the holes and cracks around windows, doors and pipes
- ✚ Ensuring proper levels of insulation
- ✚ Fixing or replacing windows
- ✚ Putting an insulated blanket around a water heater
- ✚ Making sure heating and air conditioning systems are working properly



Locally, the WAP is administered Campesinos Unidos, Inc., a nonprofit 501(c)(3) organization with offices in Brawley, as a subgrantee to the State of California. The 2014 State Plan allocates \$191,370 to Campesinos Unidos, Inc. Based on the statewide average cost per dwelling unit of \$1,911; the allocated funds could support the weatherization of 100 homes.

Short- and long-term performance assumes that Federal funding will continue to be allocated to the State and that Campesino Unidos, Inc. or another local non-profit will administer the program so that 100 homes can be weatherized per year. Calexico's share of all weatherized homes is forecasted to be 10% of the annual total of 100. The number of weatherized homes for two time periods is listed below:

✚ 2012-2020	80
✚ 2020-2030	<u>100</u>
Total	180

The State Department of Community Services and Development's Weatherization Assistance Program (WAP) webpage states that weatherization services can reduce energy consumption by up to 35%. According to the *GHG 2012 Interim Year Inventory*, homes in Calexico annually consumed 191 therms of natural gas and 11 MWh of electricity. A 35% reduction results in

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decreases of 67 therms and 4 MWh of consumption. Assuming the above participation rates, the total reductions would be:

✚	2012-2020	80 X 67 = 5,360 Therms
✚	2012-2020	80 X 4 = 320 MWh
✚	2012-2030	100 X 67 = 6,700 Therms
✚	2012-2030	100 X 4 = 400 MWh

These levels of reduced consumption would result in a decrease by 2020 and 2030 of 109.18 and 136.48 metric tons of CO_{2e}, respectively. These reductions equate to 1.36 MTCO_{2e} per occupied home. The 2030 reductions are cumulative since homes that performed the upgrades in 2020 would still continue to have reduced energy consumption.

Source:

State of California, Department of Community Services and Development, *Weatherization Assistance Program for Low-Income Persons: 2014 State Plan and Application to the U.S. Department*, June 26, 2014

8. HERO Program (Energy Efficiency):

Promote energy efficiency improvements through the City's housing rehabilitation and HERO programs. The HERO Program allows homeowners to borrow money to fund an array of conservation and renewable energy projects including water efficiency projects as well as the installation of electric vehicle charging infrastructure.



Responsible Department: Office of the City Manager - Housing Division

a. Potential Reduction in GHG Emissions

On December 16, 2014 the City Council approved a resolution enabling the California Home Energy Retrofit Program (HERO) Program to be available to owners of property within Calexico to finance renewable energy efficiency and water efficiency improvements and vehicle charging infrastructure. Typical projects include: solar photovoltaic (PV) systems; energy efficient space heating, air cooling and ventilation (HVAC); cool roof systems; energy efficient windows, skylights, and doors; solar thermal water heating; air sealing and weatherization; insulation; water heating; indoor energy efficient light fixtures; and water efficiency measures.

b. Implementation of HERO Program

Homeowners have access to funds to improve the energy and water efficiency of their homes. The amount borrowed can be financed over a 5-, 10-, 15-, 20- or 25-year period and is paid through annual installments collected on their property tax bill. Installing energy efficiency improvements in older homes reduces a building's energy consumption and associated GHG emissions from natural gas combustion and electricity production.

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The U.S. Department of Energy online energy savings calculator estimates the cost savings and GHG reductions based on several typical home energy upgrades. The on-line calculator is specific to a zip code, year the home was built and the number of occupants.

Based on 2011-2013 American Community Survey data, the median year built for Calexico owner occupied housing was 1995 while the average household size was 4.37. This data was entered in to the on-line calculator. The results show that whole home upgrades have a potential for \$778 in yearly savings in addition to a reduction of 4,764 kWh of electricity and 53 therms. These energy savings result in a reduction of 3,751 pounds of CO₂ or nearly two (1.70) metric tons of CO₂ per dwelling unit.

Over the 16 year period (2015-2030), it is assumed that HERO Program would annually attract the same number (10) of homeowner participants as the weatherization program. Therefore, the GHG reductions are projected as follows:

- ✚ 2015-2020 60 X 1.70 MTCO_{2e} = 102.0
- ✚ 2021-2030 100 X 1.70 MTCO_{2e} = 170.0

The total reduction by 2030 would be 272 MTCO_{2e} since homes completing the upgrades in 2020 would continue to have reduced energy usage.

9. Housing Division Housing Rehabilitation Programs: Promote energy efficiency improvements through the City's CDBG Housing Rehabilitation Loan Program.

a. Potential Reductions In GHG Emissions

The Housing Division administers funding programs that provide assistance for the rehabilitation of the older housing stock. Among these programs are the Community Development Block Grant (CDBG) and the CalHome Program. The eligible rehabilitation activities of these programs include energy efficiency improvements. For example:

CDBG funds may be used for design features and improvements promoting energy efficiency, including new construction and rehabilitation. Activities may also include public energy conservation services, assistance to neighborhood-based organizations undertaking energy conservation projects, and the development of energy use strategies to achieve maximum energy efficiency.

b. Implementation of the CDBG Housing Rehabilitation Loan Program

Based on the objective stated in the City's *2013-2021 Housing Element* it is projected that 20 homes will be rehabilitated through this program by 2020 and another 50 between 2020 and 2030. During the two time periods, approximately 35 rehabilitated housing units will install energy efficiency improvements:



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Table 18
CDBG Housing Rehabilitation Loan Program

Time Period	All Rehabilitated Housing Units	With Energy Efficiency Improvements
2012-2020	20	10
2020-2030	50	25

Using the same GHG emissions reductions as the HERO Program above (1.7 MTCO₂e per home) and the number of homes to receive energy efficiency improvements, it is estimated that the energy efficiency improvements will reduce GHG emissions as follows:

+	2012-2020	Total MTCO ₂ e	17.00
+	2021-2030	Total MTCO ₂ e	42.50

The cumulative effect by 2030 would be 59.50 MTCO₂e since homes that completed upgrades in 2020 would continue to see benefits through 2030. The Housing Division will continue to encourage participating homeowners to complete energy efficiency improvements.

10. Promote the Installation of Energy Efficient Appliances: Encourage project applicants to install energy efficient appliances in new residential and non-residential developments.

Responsible Departments: Community Development Department –Planning Division and Building Division

a. Potential Reduction in GHG Emissions

Using energy-efficient appliances reduces a building's energy consumption and associated GHG emissions from natural gas combustion and electricity production.

b. Energy Efficient Appliances

The range of effectiveness of installing energy efficient appliances is:

- + Residential: 2-4% GHG emissions from electricity use
- + Grocery Stores: 17-22% of GHG emissions from electricity use



To take credit for this mitigation measure, the Project Applicant (or contracted builder) would need to ensure that energy efficient appliances are installed. For residential dwellings, typical builder-supplied appliances include refrigerators and dishwashers. Clothes washers and ceiling fans would be applicable if the builder supplied them. For commercial land uses, energy-efficient refrigerators have been evaluated for grocery stores.

As project developers would participate in this program on a voluntary basis, there are no data to quantify potential GHG emissions reductions.



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Source:

California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 103-110

11. Implement a Street Light LED Conversion Project: Replace existing streetlight fixtures with new LED fixtures to provide a better quality of light, enhance public safety and reduce energy costs.

Responsible Department: Utility Services Department

a. Potential Reduction in GHG Emissions

Light-emitting diode bulbs (LEDs) are thought to be brighter than traditional lights and many cities believe the increased brightness improves public safety. LEDs also are more efficient and reduce GHG emissions and produce energy cost savings.

Streetlights made up about 6.5% of the Calexico's 2005 municipal emissions generating nearly 690 metric tons of carbon dioxide equivalent emissions. In 2012 street lighting consumed 1,168 MWh which generated 363.18 metric tons of CO_{2e}.

b. Street Light LED Conversion

Hundreds of communities throughout North America have already installed some LED street lighting and there is considerable evidence now that at the very least LED street lights will provide the following benefits compared to HID:

- ✚ Improved nighttime visibility and safety through better color rendering, more uniform
- ✚ lighting distributions and the elimination of many dark areas between poles.
- ✚ Reduced direct and reflected uplight which are the primary causes of urban sky glow.
- ✚ 40-80% energy savings (depending on incumbent lighting source and lighting design criteria).
- ✚ 50-75% street lighting maintenance savings.



Street lighting LED conversion studies have shown that on average a 40% reduction in energy consumption can be expected. A street light inventory indicating the number, location, and type of street lighting has not been completed. Hypothetically, if the entire street lighting infrastructure were converted to LED, the electricity consumption would be reduced by 40% and, in turn, so would the GHG emissions. An entire conversion would result in a reduction of 135.97 MTCO_{2e} (339.93 X 40% = 135.97) from usage and additional 9.30 MTCO_{2e} from reductions in transmissions and distribution (T & D) loss for a total of about 145.27 MTCO_{2e}.

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The GHG emissions reductions are estimated below based on a 20% conversion by 2020 and 50% conversion by 2030.

✚ 20% conversion	42.86 MTCO ₂ e
✚ 50% conversion	130.70 MTCO ₂ e
✚ Cumulative 2015-2030	173.56 MTCO ₂ e

Sources:

American Public Works Association, Beaumont, California, *Begins Third Year of LED Streetlight Use*

City of Redlands, *Street Lighting Upgrade Program: Energy Efficient Light Emitting Diode (LED) Street Lighting Conversion Study*, July 2010, pages 8-9

Department of Energy Municipal Solid-State Street Lighting Consortium

LEOTEK Lite-On Group, *A Municipal Guide for Converting LED Street Lighting: A Step-by-Step Approach to Improving Outdoor Lighting, Saving Energy and Reducing Maintenance Costs*, 20 pages

12. Encourage Project Applicants to Plant Shade Trees: Provide incentives so that project applicants plant shade trees.

Responsible Departments: Public Works Department, Community Development Department-Planning Division and Building Division

a. Potential Reduction in GHG Emissions

Planting shade trees around buildings has been shown to effectively lower the electricity cooling demand of buildings by blocking incident sunlight and reducing heat gain through windows, walls, and roofs. By reducing cooling demand, shade trees help reduce electricity demand and therefore reduce GHG emissions which would otherwise be emitted during the production of that electricity.

b. Shade Tree Planting

Deciduous trees with large canopies are a desirable choice of shade tree because they provide shade in the warm months and shed their leaves in the winter months to allow sunlight to pass through and warm the building.

It takes several years for trees to grow to the height necessary to provide shade to a building. Furthermore, without deed restrictions, the presence of shade trees around a building may not be permanent, as a new owner may decide to remove the trees or not replace them if they die. It may be possible to remedy these issues through adoption of a Tree Ordinance.

The City staff will work with developers of residential and nonresidential projects to promote the planting of shade trees. Because of the drought conditions and an overwhelming need to conserve water, this program will be explored on a case-by-case basis. Therefore, there is at this time no estimate of the impact on reducing GHG emissions.

Source:



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California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 450-455.

M. DESCRIPTION OF SOLID WASTE MANAGEMENT GHG REDUCTION MEASURES

Goal: Contribute to achieving the States 75% recycling goal.

1. Implement the 2007 General Plan Solid Waste Management

Objective and Policies: The *Public Facilities/Services Element* contains one objective and six policies that guide the City's solid waste management measures.

Responsible Department: Public Works Department

a. Potential Reduction in GHG Emissions



The purposes of the General Plan policies is reduce the solid waste stream, meet solid waste diversion goals, and comply with existing and future State laws. Source reduction and recycling lessen the amount of solid waste that is landfilled and thereby reduces the amount of methane that is emitted. The transport and decomposition of landfill waste and the flaring of landfill gas all produce GHG emissions. Decomposition of waste produces methane, a GHG which has a global warming potential over 20 times that of CO₂. The transport of waste from the site of generation to the landfill produces GHG emissions from the combustion of the fuel used to power the vehicle. Choosing waste management practices which reduce the amount of waste sent to landfills will reduce GHG emissions.

Strategies to reduce landfill waste include increasing recycling, reuse, and composting, and encouraging lifestyle choices and office practices which reduce waste generation.

b. Public Facilities/Services Element Objective and Policies

Section 4.4.1.11 presents the General Plan *Public Facilities/Service Element* Solid Waste objective and policies:

Objective

To maintain solid waste collection and disposal services in accordance with the California Integrated Waste Management Act of 1989 and pursue funding sources so as to reduce the cost of said services in the City.

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Policies

- ✦ The City should monitor the operations of the solid waste collection contractor to ensure an adequate level of service.
- ✦ Encourage and support regional and statewide recycling programs that aim to reduce the solid waste stream.
- ✦ Continue to administer existing recycling programs and enact new ones as necessary to achieve current 50% solid waste diversion goal as set forth by the California Integrated Waste Management Board.
- ✦ Actively pursue methods of educating the public on solid waste recycling and reuse.
- ✦ The City should support regional efforts to expand and locate new landfills.
- ✦ Explore the possibility of the development of a Material Recovery Facility (MRF).

The *Public Facilities/Services Element* programs will contribute to GHG emissions reductions, enabling the City to reduce the City's per capita disposal rate.

All of the City's solid waste management efforts will contribute to lowering the per capita disposal rate. The impacts of the General Plan policies are embedded within the overall increases in recycling and reductions in solid waste per capita disposal rates. The estimated GHG reductions are discussed at the end of this section.

Source:

California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, page
City of Calexico, 2007 General Plan, Public Facilities/Services Element

2. Continue to Implement the Solid Waste Diversion and Per Capita Disposal Rate Programs: Continue to divert solid waste and reduce the per capita disposal rate. (Waste diversion and reduction refers to the combined efforts of waste prevention, reuse, recycling, and composting practices.)

Responsible Department: Public Works Department

a. Potential Reduction in GHG Emissions

Diversion and reduction lessens the amount of solid waste that is landfilled and thereby reduces the amount of methane that is emitted. For example, avoided GHG emissions from common waste management pathways include:

- ✦ Emissions from combustion - Waste incineration produces emissions of carbon dioxide (CO₂) and nitrous oxide (NO_x), a GHG that is 298 times as potent as CO₂.
- ✦ Emissions from transportation - Transporting waste to disposal sites produces GHG emissions from the combustion of the fuel used in the equipment.
- ✦ Emissions from landfills - Waste in landfills decomposes anaerobically and produces methane (CH₄), a GHG that is 25 times as potent as CO₂.



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b. City's Electronic Annual Report

Each year the City submits an Electronic Annual Report (EAR) to CalRecycle that describes the progress the City has made in achieving the requirements of the Integrated Waste Management Act particularly on implementing solid waste diversion programs and decreasing the per capita disposal rate. Prior to 2007 progress was measured by diversion rates. Under the old system, according to CalRecycle, calculating diversion rates was a time-consuming and lengthy process, and rates could not be finalized for several years after the fact. Diversion rates also were based on estimates of generation that often were inaccurate. The new system allows reporting jurisdictions to monitor their progress in a timely manner.

Beginning in 2007 diversion rates was no longer measured. Instead, a new goal measurement metric was established; namely, CalRecycle now compares reported disposal tons to population to calculate per capita disposal expressed in pounds/person/day. In 2012, California's statewide disposal rate was 4.3 pounds/resident/day.

The new goal is a 50% equivalent per capita disposal rate which is the amount of disposal a city would have had during the base period if it had been exactly at a 50% diversion rate. It is calculated using the average of 2003-2006 per capita generation for each community. It then divides this generation average in half to determine the 50% equivalent per capita disposal target.

Meeting the diversion goal contribute to lowering the per capita disposal rate. Estimated GHG reductions are discussed at the end of this section.

3. Implement the City's AB 939 Recycling Program: The goal of the programs is to increase solid waste recycling.

Responsible Department: Public Works Department

a. Potential Reduction in GHG Emissions

Source reduction and recycling lessen the amount of solid waste that is landfilled and thereby reduces the amount of methane that is emitted.

b. Recycling Program

The following paragraphs describe the programs:

- ✚ To comply with the State Integrated Waste Management Act of 1989, Assembly Bill 939 the City enacted Municipal Code Chapter 8.39 which states:

The purpose of this chapter is to establish requirements for recycling of recyclable materials generated from residential facilities (both single family and multi-family) and commercial facilities (including city buildings). These requirements are intended to increase the diversion of recyclable materials from landfill disposal, conserve the capacity and extend the useful life of the landfill, reduce greenhouse gas emissions, and avoid the potential financial and other consequences to the city of failing to meet AB 939 requirements.



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✚ Chapter 8.39.040 states:

Every person who is a tenant, lessee or occupant of any residential unit, the keeper of every apartment house, commercial premises and of every person having solid waste, green waste and/or recyclable material, shall recycle.

All of the City's solid waste management efforts will contribute to lowering the per capita disposal rate. The impacts of the recycling program are embedded within the overall increases in recycling and reductions in solid waste per capita disposal rates. The estimated GHG reductions are discussed at the end of this section.

4. Implement the City's Mandatory Construction and Demolition Debris Recycling Program: Continue to enforce Municipal Code Chapter 8.38 Mandatory Construction and Demolition Debris Recycling Program

Responsible Department: Public Works Department

a. Potential Reduction in GHG Emissions

According to the California Air Pollution Control Officers (CAPCOA):

Recycling demolished construction material can contribute to GHG reductions in multiple ways. First, it displaces new construction materials, thereby reducing the need for new raw material acquisition and manufacturing of those new construction materials. Harvesting of raw materials and manufacturing new materials requires energy in the form of fuel combustion and electricity, both of which are associated with GHG emissions. If the process of recycling construction materials is less carbon-intensive than the processes required to harvest and produce new construction materials, recycling these construction materials results in a net reduction in GHG emissions. Second, using local recycled construction material reduces the emissions associated with the transportation of new construction materials, which are typically manufactured farther away from a project site. Third, recycling construction material avoids sending this material to landfills. Wood-based materials decompose in landfills and contribute to methane emissions.

The California Integrated Waste Management Board (CIWMB) cites decreases in greenhouse gas emissions as a benefit of construction waste management and recycling in its document "Construction Waste Management" which is used as part of California Sustainable Design Training. The document is available online at:

www.calrecycle.ca.gov/greenbuilding/training/statemanual/waste.doc

b. Mandatory Construction and Demolition Debris Recycling Program

Municipal Code Chapter 8.38 Mandatory Construction and Demolition Debris Recycling Program requires all construction and renovation projects with a value of \$50,000 to comply with the Chapter requirements for the preparation of a C&D reuse/recycling plan. Demolition projects of more than 1,000 square feet also must comply with the requirements of Chapter 8.38. The plan must satisfy the requirement to divert at least 50% by weight of the total construction and demolition debris generated by a project via reuse or recycling.



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Included within the meaning of “construction and demolition debris” are discarded materials generally considered to be nonhazardous (e.g., steel, glass, brick, concrete, asphalt material, pipe, gypsum, wallboard, lumber); clean cardboard, paper, plastic, wood, and metal scraps; and non-construction and demolition debris wood scraps.

The City evaluates the plan as follows:

- ✚ Is the construction and demolition material that is generated recyclable?
- ✚ Will 50% of waste generated in the project be diverted from landfills?

All of the City’s solid waste management efforts will contribute to lowering the per capita disposal rate. Estimated GHG emissions reductions are discussed at the end of this section.

Sources:

California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, page 401

City of Calexico Municipal Code, Chapter 8.38 Mandatory Construction and Demolition Debris Recycling Program

Integrated Waste Management Board, California Sustainable Design Training, *Construction Waste Management*, 9 pages

5. Implement the City’s Commercial Recycling Program: Provide education, outreach and monitoring to increase the amount of commercial recycling.

Responsible Department: Public Works Department

a. Potential Reduction in GHG Emissions

Recycling reduces the amount of solid waste that needs to be landfilled and therefore reduces the amount of methane emitted. Recycling also leads to energy efficiency. When a recycled material, rather than a raw material, is used to make a new product, natural resources and energy are conserved. This is because recycled materials have already been refined and processed once; manufacturing the second time is much cleaner and less energy-intensive than the first. For example, manufacturing with recycled aluminum cans uses 95% less energy than creating the same amount of aluminum with bauxite.

b. AB341 and Commercial Recycling

AB 341 requires businesses that generate four or more cubic yards of commercial solid waste per week to recycle. The law also applies to multifamily complexes of five or more regardless of the amount of commercial solid waste generated. Businesses include commercial and industrial uses as well as public uses including schools.

AB 341 requires the City to implement education, outreach, and monitoring programs to inform businesses and multifamily complexes of the state requirement to recycle and how they can recycle in the jurisdiction. CalRecycle states:



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Jurisdictions should choose methods to provide education and outreach that maximize existing resources including using existing websites, brochures, on-site meetings, etc. For example, if the hauler already sends out a sales representative to work with businesses that are not recycling, then the hauler's sales representative could inform the business of the state requirement, and then assist the business in determining the best approach to recycle. Other options include using the jurisdiction's own staff, community groups, or independent recyclers to inform the businesses of the state requirement and how the businesses can recycle in the jurisdiction. If the jurisdiction already sends out letters to businesses regarding recycling opportunities, the letter could include information about the state requirement.

Materials from the "blue can" go to Republic's Materials Recovery Facility, where the recyclables are hand sorted by the different grades of plastics. Once all the plastic is bailed by grade, it is sold to companies looking to buy these materials.

There are also recycling drop-off centers located in Calexico such as SA Recycling, El Bote Recycling, and I V Recycling.

All of the City's solid waste management efforts will contribute to lowering the per capita disposal rate. Estimated GHG emissions reductions are discussed at the end of this section.

Sources:

California Department of Resources Recycling and Recovery (CalRecycle), *Mandatory Commercial Recycling: Frequently Asked Questions*, 17 pages
Institute for Local Government, *Sample Commercial Recycling Ordinance*, November 2009, 24 pages

6. Increase the Composting of Waste: Provide education, outreach and monitoring to increase the amount of composting.

Responsible Department: Public Works Department

a. Potential Reduction in GHG Emissions

Compostable organics make up 30% of California's overall waste stream, contributing over 12 million tons annually to our state's landfills. In landfills, this material undergoes anaerobic decomposition and produces significant quantities of methane, up to 80% of which is not captured by a landfill gas system. Composting, on the other hand, is a fundamentally aerobic process, and well managed compost facilities do not produce any methane. Composting offers an



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environmentally superior alternative to landfilling organics that eliminates methane production, provides a series of economic and environment co-benefits, and has a substantial impact on greenhouse gas reduction.

A compost process is either aerobic or anaerobic. Anaerobic composting is when organic materials—or compostables—break down by bacteria without the presence of oxygen. This process, which happens in landfills, produces methane, carbon dioxide, and trace amounts of other gases. Aerobic composting is when organic material breaks down by bacteria in the presence of oxygen. The end byproducts in aerobic composting are mainly carbon dioxide and water, and nutrient-packed soil of finished compost. By composting these materials, the generation of greenhouse gases, particularly methane, is avoided. Backyard composting and well-run industrial compost operations will produce negligible greenhouse gas emissions (mostly from the operation of tractors and other equipment).

b. Provide Education, Outreach and Monitoring to Increase the Amount of Composting

As with mandatory commercial recycling, the City could provide education, outreach and monitoring to encourage composting.

Imperial Compost, located in Brawley, is a composting operation that accepts green materials, agricultural and manure.

The Imperial Valley Integrated Waste Management Agency indicates that CR & R is hoping to start a composting program with its green waste.

All of the City's solid waste management efforts will contribute to lowering the per capita disposal rate. Estimated GHG emissions reductions are discussed at the end of this section.

Sources:

Californians Against Waste, *Composting: A Greenhouse Gas Mitigation Measure*, pg. 1
Eureka Recycling, *Recycling, Composting and Greenhouse Gas Reduction in Minnesota*, page 5

7. Implement the City's Waste Prevention, Recycling & Purchasing Recycled Products Policy: implement the City Council adopted Administrative Procedure.

Responsible Departments: All

a. GHG Emissions Reduction Potential

The largest source of human-generated methane, a potent greenhouse gas, comes from improperly managed landfills. Thus, waste reduction and recycling activities reduce the potential to generate methane at landfills, as well as reducing pollutants generated from transporting waste to disposal sites. Waste reduction and recycling activities also conserve natural resources.



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b. City Administrative Procedure

As required by AB 939, the City Council has established an Administrative Procedure to implement a Policy for Waste Prevention, Recycling & Purchasing Recycled Products. The Administrative Procedure assigns responsibilities, establishes policies and sets guidelines for:

- ✚ Reducing the amount of solid waste generated and going to the landfill by the City's day to day activities.
- ✚ Purchasing of reusable/non-disposable products and restricting purchases to durable and reusable/non-disposable equipment, materials and products whenever possible.
- ✚ Recycling of mixed paper and cardboard; proper disposal of fluorescent light bulbs, batteries, and other hazardous waste products.
- ✚ Promoting and encouraging the purchase of products made from recycled materials, including but not limited to paper products, desk accessories and other office products.

All of the City's solid waste management efforts will contribute to lowering the per capita disposal rate. Estimated GHG emissions reductions are discussed at the end of this section.

Sources:

Institute for Local Government, *Sustainability Best Practices Framework – 2013 Update*, Waste Reduction & Recycling

8. Calexico Community Cleanup Program: The City will continue provide community outreach for this program.

Responsible Departments: Public Works Department

a. GHG Emissions Reduction Potential

The Community Cleanup days collect MSW trash, recycle greenwaste and metal recycling. The waste collected also results savings on disposal fees.

b. Program Participants

Allied Waste Services, the provider of solid waste services to the City of Calexico, participates in two community cleanups per year.

All of the City's solid waste management efforts will contribute to lowering the per capita disposal rate. Estimated GHG emissions reductions are discussed in #9 below.



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9. Estimated GHG Emissions Reductions based on City Efforts to Increase Recycling, Prevent Waste and Reduce Landfilled Waste

a. Solid Waste Management Practices

The cumulative impact of the City's solid waste management practices is to increase "diversion" and "recycling" and to decrease the "disposal" going to landfills. Diversion includes but is not limited to source reduction, recycling, composting, alternative daily cover, alternative intermediate cover, beneficial reuse at landfills, transformation and used-tire derive fuel. Recycling is the practice of recovering used materials from the waste stream and then incorporating those same materials into the manufacturing process. Successful recycling also depends on manufacturers making products from recovered materials and, in turn, consumers purchasing products made of recycled materials.

CalRecycle has selected as the long-term average (1990 through 2010) per-resident generation of 10.7 lbs/person/day as the base rate. AB 939 establishes a State goal of 75% recycling. With a base per resident generation of 10.7 lbs/person/day, the 75% recycling goal will require California to recycle 75%, or 8.0 lbs/resident/day, and allow not more than 25%, or 2.7 lbs/resident/day, to be directed toward disposal-related activities. According to CalRecycle, 49% of the per-resident generation of 10.7 lbs/person/day is achieved by recycling. Chart 4 shows "where we need to go."

b. Reductions in GHG Emissions

In 2005, the City's disposal rate (solid waste going to the landfills) was 4.7 lbs/person/day. To calculate the GHG emissions reductions due to solid waste management practices the State target of 2.7 lbs/per person/per day was selected as the target for 2030 with the 2020 target set at 3.1 pounds. These lower disposal rates result in the following **decreases** from the forecasts:

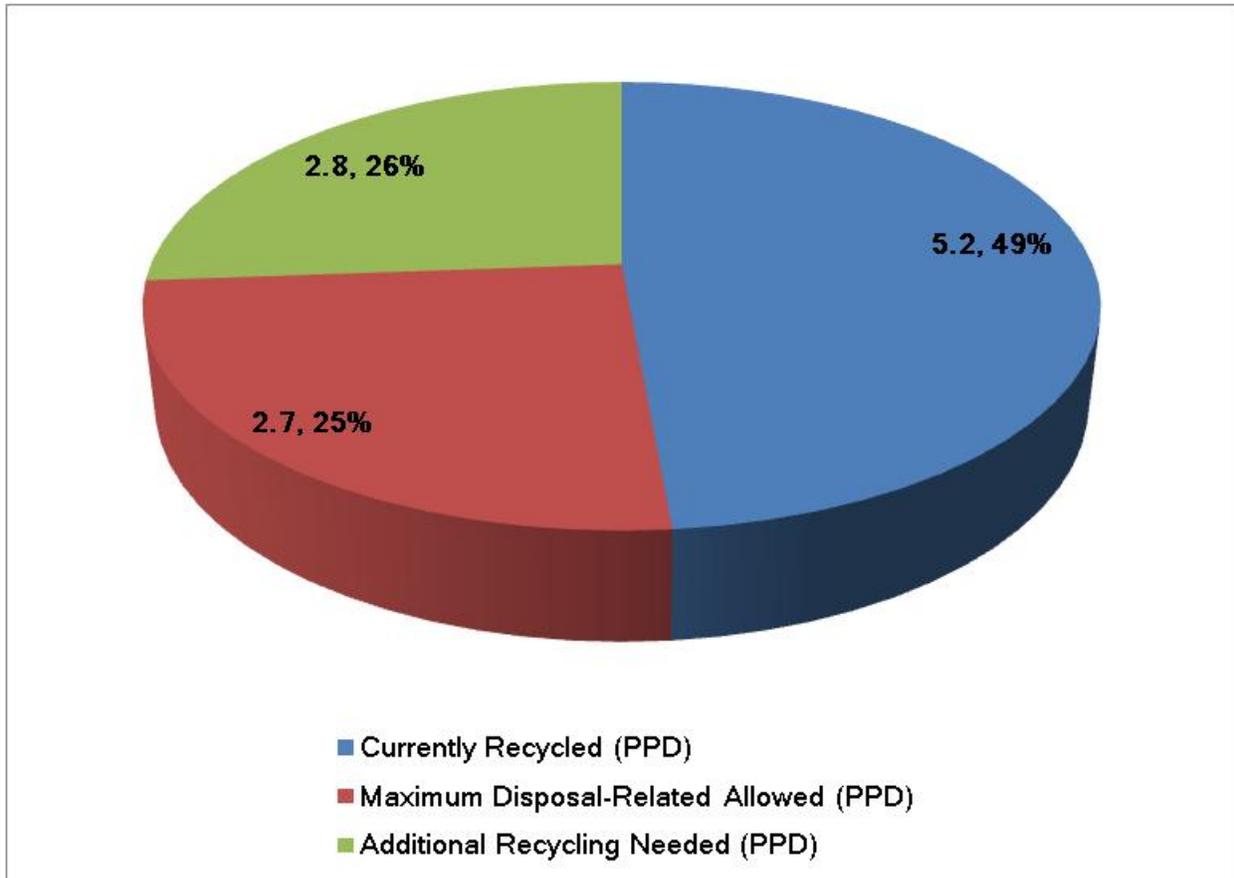
2020	13,227.60 tons
2030	20,768.50 tons

The associated MTCO_{2e} reductions are projected at:

2020:	20,743.97 MTCO _{2e}
2030:	32,569.87 MTCO _{2e}

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Chart 4
Where Do We Need to Go?



Source: CalRecycle

As noted, the 2020 and 2030 solid waste forecasts are based on the 2005 solid waste generation rate of 4.7 pound per person per day for a total 38,856 tons in 2020 and 48,806 tons in 2030. The City-implemented measures (increased recycling, composting, construction debris recycling, etc.) to reduce solid waste going into landfills result in the forecast pounds per person per day rates dropping to 3.1 and 2.7 in 2020 and 2030, respectively.

The lower solid waste generation rates result in reductions in solid waste of 13,227.6 and 20,768.5 TONS of waste from entering landfills in 2020 and 2030, respectively. Using the *Local Government Protocol* for estimating GHG emissions from solid waste, these reductions result in CO₂e reductions of 20,743.97 metric tons in 2020 and 32,569.87 metric tons in 2030.

Source:

CalRecycle, *California's New Goal: 75% Recycling*, May 9, 2012, page 7

N. DESCRIPTION OF URBAN WATER MANAGEMENT GHG REDUCTION MEASURES

Goal: Achieve a 20% reduction in water consumption.

1. Implement the 2007 General Plan Water Conservation Policies: The *Conservation/Open Space Element* contains one objective and 12 policies that guide the City's water conservation measures.

Responsible Department: Utility Services Department

a. Potential Reduction in GHG Emissions

Water use contributes to GHG emissions indirectly, via the production of the electricity that is used to pump, treat, and distribute the water. Reducing water demand also reduces electricity demand and associated indirect GHG emissions.

The water sector plays a significant role in California's energy consumption. In 2005, studies showed that 19% of the state's electricity was spent on water-related activities (California Energy Commission 2005). Because the water sector is such a large user of electricity, it must play an important role in reducing energy demand and GHG emissions.

b. Conservation/Open Space Element Policies

The *General Plan Conservation/Open Space Element* promotes water conservation in new residential, commercial and industrial developments and encourages the use of recycled and grey water.

Section 5.4 Goals, Objectives and Policies of the *Conservation/Open Space Element* contain one objective and the 12 policies as listed below:



Objective 1

Water supply and water quality should be maintained by implementing domestic conservation measures and protecting surface waters.

Policies

- ✚ All residential developments shall require low-volume toilets, showers, and faucets.
- ✚ New development projects should install water-conserving appliances (washing machines, dishwashers).
- ✚ The City shall continue to require the use of primarily drought-tolerant and/or native plants in new development through the review and approval process by City staff. The use of turf grass for lawns should be limited.

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- ✦ Residential projects having common green areas and all commercial, manufacturing, and public projects shall be required to install automatic irrigation systems. New commercial, industrial, and housing projects that contain common green belts should use reclaimed “grey” water for irrigation.
- ✦ Promote water conservation, reduce urban runoff, and prevent groundwater contamination within development projects, property maintenance, City operations, and all other related activities requiring City discretionary approval.
- ✦ Adopt and enforce regulations and engage in educational efforts to eliminate pollution from runoff.
- ✦ Participate in any pertinent local, regional, state, and federal programs to protect and enhance water quality.
- ✦ Support efforts to improve the water quality of the New River or other proposals aimed at improving the area surrounding the River, such as the development and implementation of an integrated regional water quality management plan that meets the goals and objectives of the Colorado River Basin Regional Water Quality Control Board (Region 7) for the New River.
- ✦ The usage of drip irrigation shall be required where feasible.
- ✦ Alternative water conservation systems such as grey water usage in residences shall be examined and initiated, if feasible.
- ✦ New residential construction shall be preplumbed for reclaimed water through a dual on-site distribution system. Anticipated non-potable uses include landscaping, lawn maintenance and crop irrigation. All reclaimed water systems will be in compliance with the State of California Regional Water Quality board guidelines and basin objectives as well as CEQA and NEPA guidelines.
- ✦ Residential units connected to the community sewage collection system shall not use salt-based water softeners.

All of the City’s efforts will contribute to lowering water consumption. Implementation of these policies is incorporated in the reduced gallons per capita per day. Estimated GHG emissions reductions are discussed at the end of this section.



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2. Implement the 2010 and 2015 Urban Water Management Plan

Demand Management Measures: The City Council approved the 2010 UWMP in June 2011. The 2015 UWMP is due to the State Department of Water Resources (DWR) by July 1, 2016

Responsible Department: Utility Services Department

a. Potential Reduction in GHG Emissions



Since GHG is emitted in most thermoelectric electricity generation, each unit of electricity used in a water-related activity contributes to GHG emissions. These emissions result from energy use in treatment and distribution of drinking water, treatment of wastewater, recycling of wastewater, desalination, pumping groundwater, conveyance and pumping of water.

The water sector plays a significant role in California's energy consumption. In 2005, studies showed that 19% of the state's electricity was spent on water-related activities (California Energy Commission, 2005). Because the water sector is such a large user of electricity, it must play an important role in reducing energy demand and GHG emissions.

b. Demand Management Measures

The State Department of Water and Power (DWR) has worked to update the UWMP Guidebook for the 2015 round of UWMPs. The release of the update to the 2015 Guidebook is targeted for September 2015. The 2015 Guidebook Outline requires a discussion of the service area climate and optional discussions of climate change.

Demand management measure (DMM) refer to practices, procedures and methods to reduce water demands, including but not limited to behavior change, installing high-efficiency water fixtures, and financial incentives or penalties to encourage wise water use and discourage water waste.

The demand management measure section of an UWMP specifies that water suppliers must describe the implementation or plans for implementation for each of the following 14 DMMs:

- ✦ Water survey programs for single-family residential and multi-family residential customers.
- ✦ Residential plumbing retrofit.
- ✦ System water audits, leak detection, and repair.
- ✦ Metering with commodity rates for all new connections and retrofit of existing customers.
- ✦ Large landscape conservation programs and incentives.
- ✦ High-efficiency washing machine rebate programs.
- ✦ Public information programs.

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- ✦ School education programs.
- ✦ Conservation programs for commercial, industrial, and institutional accounts.
- ✦ Wholesale assistance programs.
- ✦ Conservation pricing.
- ✦ Water conservation coordinator.
- ✦ Water waste prohibition.
- ✦ Residential high efficiency toilet (HET) replacement programs.

Attachment D describes the City's 2010 UWMP DMM.

All of the City's efforts will contribute to lowering water consumption. Implementation of these policies is incorporated in the reduced gallons per capita per day. Estimated GHG emissions reductions are discussed at the end of this section.

Sources:

City of Calexico, *2010 Urban Water Management Plan*, June 2011

3. Continue to Enforce the City's Water Efficient Landscape Ordinance: Pursuant to State law the City has adopted the required ordinance.

Responsible Department: Utility Services Department

a. Potential Reduction in GHG Emissions

Water efficient practices reduce consumption and therefore energy use.

b. Model Water Efficient Landscape Ordinance

The City has enacted the Model Water Efficient Landscape Ordinance to meet the AB 1881 requirements that apply to commercial, industrial and tenant occupied residential property that require landscaping greater than 2,500 square feet and homeowner landscaping greater than 5,000 square feet. While for the most part water conservation guidelines only apply to large landscaping projects, the City encourages its application to smaller scale projects in order to conserve water.

All of the City's efforts will contribute to lowering water consumption. Implementation of these policies is incorporated in the reduced gallons per capita per day. Estimated GHG emissions reductions are discussed at the end of this section.

Source:

City of Calexico Ordinance Ord. No. 1155, § 2, adopted August 19, 2014 and Municipal Code Chapter 13.40-Restrictions on Outdoor Use of Water During Drought Conditions



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4. Continue to Enforce the City Ordinance Prohibiting Wasteful of Water: Ordinance Ord. No. 1155, § 2 was adopted on August 19, 2014 and created Municipal Code Chapter 13.40-Restrictions on Outdoor Use of Water During Drought Conditions

Responsible Department: Utility Services Department

a. Potential Reduction in GHG Emissions

Restricting water use reduce consumption and therefore electricity use.

b. Water Conservation and Supply Shortage Program

The Ordinance states:

The purpose of this chapter is to establish a water conservation and supply shortage program that will reduce water consumption within the city and its service territory through conservation, enable effective water supply planning, assure reasonable and beneficial use of water, prevent waste of water, and maximize the efficient use of water within the city and its service territory to avoid and minimize the effect and hardship of water shortage to the greatest possible extent.

This chapter establishes permanent water waste and conservation standards intended to alter behavior related to water use efficiency at all times and further establishes two levels of water supply shortage response actions to be implemented during times of declared water shortage or declared water shortage emergency, with increasing restrictions on water use in response to worsening drought or emergency conditions and decreasing supplies.

Ordinance No. 1157 Water Service, approved in October 2014, contains an important water conservation measure. Section 13.01.350 of that Ordinance states:

All property owners, or their agents and tenants, shall be held responsible as customers for loss of water due to leakage in the pipe or plumbing beyond the discharge side of the meter or on the property.

All of the City's efforts will contribute to lowering water consumption. Implementation of Ordinance Ord. No. 1155 is incorporated in the reduced gallons per capita per day. Estimated GHG emissions reductions are discussed at the end of this section.

Source:

City of Calexico Ordinance Ord. No. 1155, § 2, adopted August 19, 2014 and Municipal Code Chapter 13.40-Restrictions on Outdoor Use of Water During Drought Conditions



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5. Urban Water Management Practices and Greenhouse Gas Emissions Reductions

With the adoption of the Water Conservation Act of 2009, also known as SBX7-7, the State is required to reduce urban water use by 20% by the year 2020. Each retail urban water supplier must determine the baseline water use during the baseline water use during their baseline period and also target water use for the years 2015 and 2020 in order to help the state achieve the 20% target.

The 2010 Urban Water Management Plan elected to use 172 GPCD to determine the Urban Water Use Target and remain eligible for State funding. GPCD per day refers to “Gallons per Capita per Day.” GPCD is the total water use within a service area (residential, commercial, etc.) minus allowable exclusions divided by the population. This measure is used in UWMPs for purposes of the Water Conservation Act of 2009. It is different from R-GPCD that is used in drought reporting to the State Water Resources Control Board. R-GPCD is solely the estimated residential water use in a service area divided by the population. As of August 2015, Calexico’s conservation standard was 20%.

In 2005, water consumption was 179 gallons per capita per day, according to the City’s *2010 Urban Water Management Plan*. The 2020 GHG emissions reductions were calculated using the target of 172 gpcd which was slightly lower than the 2005 actual consumption of 179 gpcd.

Implementation of the water conservation policies, ordinances and programs will contribute to further reductions in water consumption. By 2030, it is believe that the combined effect of the several measures will reduce consumption by 20% or to 138 gpcd from the 2020 Water Use Target of 172 gpcd.

Based on the reductions of 7 and then 41 gpcd, and the forecasted populations for 2020 and 2030, the reductions in annual water consumption would be as follows:

- ✚ 2020: 115,820,775 Gallons (45,300 population X 7 gpd reduction X 365.25 days/year)
- ✚ 2030: 852,091,725 Gallons (56,900 population X 41 gpd reduction X 365.25 days/year)

The reduction in GHG emissions for 2020 and 2030 would be as follows:

- ✚ 2020: 42.08 MTCO₂e
- ✚ 2030: 309.60 MTCO₂e



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ATTACHMENT A CLIMATE CHANGE INDICATORS

Global warming is causing climate patterns to change. *According to the United States Environmental Protection Agency:*

- ✚ **Weather** is a specific event or condition that happens over a period of hours or days. For example, a thunderstorm, a snowstorm, and today's temperature all describe the weather.
- ✚ **Climate** refers to the average weather conditions in a place over many years (usually at least 30 years). For example, the climate in Minneapolis is cold and snowy in the winter, while Miami's climate is hot and humid. The average climate around the world is called global climate.

According to the United States Environmental Protection Agency:

- ✚ **Global warming** refers to the recent and ongoing rise in global average temperature near Earth's surface. It is caused mostly by increasing concentrations of greenhouse gases in the atmosphere. Global warming is causing climate patterns to change. However, global warming itself represents only one aspect of climate change.
- ✚ **Climate change** refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer.

The Earth's climate is getting warmer, and the signs are everywhere. Rain patterns are changing, sea level is rising, and snow and ice are melting sooner in the spring. As global temperatures continue to rise, more changes will be seen in our climate and our environment.

These changes will affect people, animals, and ecosystems in many ways. Less rain can mean less water for some places, while too much rain can cause terrible flooding. More hot days can dry up crops and make people and animals sick. In some places, people will struggle to cope with a changing environment. In other places, people may be able to successfully prepare for these changes. The negative impacts of global climate change will be less severe overall if people reduce the amount of greenhouse gases they are putting into the atmosphere and worse if we continue producing these gases at current or faster rates.

The planet is warming, from North Pole to South Pole, and everywhere in between. Globally, the mercury is already up more than 1 degree Fahrenheit (0.8 degree Celsius), and even more in sensitive Polar Regions. Signs are appearing all over, and some of them are surprising. The heat is not only melting glaciers and sea ice; it's also shifting precipitation patterns and setting animals on the move.

The IPCC reports that some impacts from increasing temperatures that are inducing climate change include:

- ✚ Ice is melting worldwide, especially at the Earth's poles. This includes mountain glaciers, ice sheets covering West Antarctica and Greenland, and Arctic sea ice.
- ✚ Researcher Bill Fraser has tracked the decline of the Adélie penguins on Antarctica, where their numbers have fallen from 32,000 breeding pairs to 11,000 in 30 years.

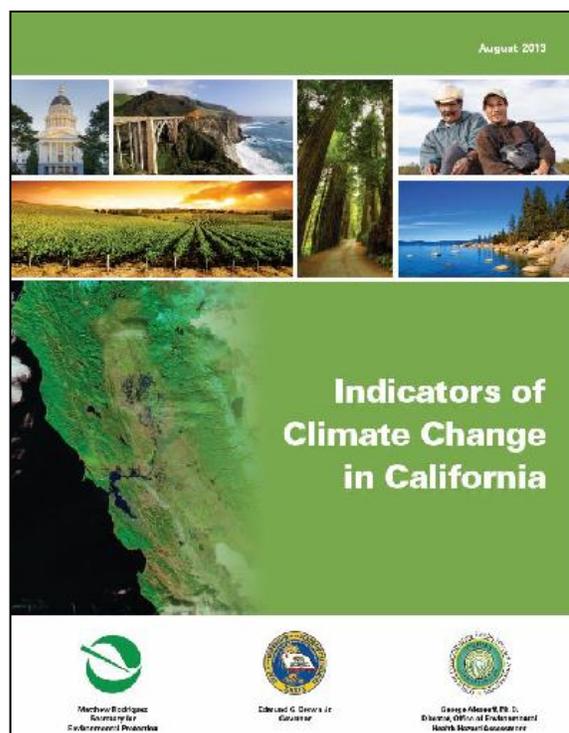


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- ✦ Some butterflies, foxes, and alpine plants have moved farther north or to higher, cooler areas.
- ✦ Precipitation (rain and snowfall) has increased across the globe, on average.
- ✦ Spruce bark beetles have boomed in Alaska thanks to 20 years of warm summers. The insects have chewed up 4 million acres of spruce trees.
- ✦ Sea levels are expected to rise between 7 and 23 inches (18 and 59 centimeters) by the end of the century, and continued melting at the poles could add between 4 and 8 inches (10 to 20 centimeters).
- ✦ Hurricanes and other storms are likely to become stronger.
- ✦ Species that depend on one another may become out of sync. For example, plants could bloom earlier than their pollinating insects become active.
- ✦ Floods and droughts will become more common. Rainfall in Ethiopia, where droughts are already common, could decline by 10 percent over the next 50 years.
- ✦ Less fresh water will be available. If the Quelccaya ice cap in Peru continues to melt at its current rate, it will be gone by 2100, leaving thousands of people who rely on it for drinking water and electricity without a source of either.
- ✦ Some diseases will spread such as malaria carried by mosquitoes.
- ✦ Ecosystems will change—some species will move farther north or become more successful; others won't be able to move and could become extinct. Wildlife research scientist Martyn Obbard has found that since the mid-1980s, with less ice on which to live and fish for food, polar bears have gotten considerably skinnier. Polar bear biologist Ian Stirling has found a similar pattern in Hudson Bay. He fears that if sea ice disappears, the polar bears will as well.

The California Environmental Protection Agency, Office of Environmental Health Hazard Assessment tracks climate change in California. The recent *Indicators of Climate Change* report found the following:

- ✦ **Temperatures:** California's high, low and average temperatures are all rising, and extreme heat events also have increased in duration and frequency. The rate of warming has accelerated since the mid-1970s, and night time (minimum) temperatures have increased almost twice as fast as maximum (daytime) temperatures.
- ✦ **Wildfires:** The number of acres burned by wildfires has been increasing since 1950. The size, severity, duration and frequency of wildfires are greatly influenced by climate. The three largest fire years on record in California occurred in the last decade, and annual acreage burned since 2000 is almost twice that for the 1950-2000 period.
- ✦ **Water:** Spring snowmelt runoff has decreased, indicating warmer winter temperatures and more precipitation falling as rain rather than snow. Earlier and decreased runoff can reduce water



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supplies, even when overall rainfall remains the same. This trend could mean less water available for agriculture, the environment and a growing population.

- ✦ **Coast and Ocean:** A number of indicators reflect physical and biological changes in the ocean, impacting a range of marine species, including sea lions, seabirds and salmon. And data for Monterey Bay shows increased carbon dioxide levels in coastal waters, which can harm shell-forming organisms and have impacts throughout the marine food chain.
- ✦ **Species Migration:** Certain plants and animals have responded to habitat changes influenced by warming. For example, conifer forests in the Sierra Nevada have been moving upslope and certain small mammals in Yosemite National Park have moved to higher elevations compared to the early 1900s.

Source: California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Indicators of Climate Change in California*, August 2013

Climate change impacts have been analyzed locally. A study completed for the Imperial Irrigation District found that by 2050 some likely climate changes for the Imperial Regional Water Management Plan (IRWMP) region include milder winters, warmer maximum temperatures for spring and fall, and hotter summers.

Source: Imperial Regional Water Management Plan, *Appendix O – Imperial Region Vulnerability to Climate Change and Evaluation of Greenhouse Gas Emissions*, page O-12

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ATTACHMENT B DESCRIPTION OF GREENHOUSE GASES

A. Carbon Dioxide (CO₂)

1. What is Carbon Dioxide?

At room temperature, carbon dioxide (CO₂) is a colorless, odorless, faintly acidic-tasting, non-flammable gas. CO₂ is the fourth most abundant gas in the earth's atmosphere. Depending on the temperature and pressure, carbon dioxide can also exist as a liquid or a solid. In its solid form, carbon dioxide is called dry ice because it slowly changes from a cold solid directly into a gas.

CO₂ is a byproduct of normal cell function. It is removed from the body via the lungs in the exhaled air. CO₂ is also produced when fossil fuels are burned. Decaying vegetation can also produce CO₂. Surface soils can sometimes contain high concentrations of this gas, from decaying vegetation or chemical changes in the bedrock. In its solid form, CO₂ is used in fire extinguishers, in laboratories, and in theater and stage productions as dry ice to make fog.

There are three major forms of fossil fuels: coal, oil and natural gas. All three were formed many hundreds of millions of years ago before the time of the dinosaurs – hence the name fossil fuels. The age they were formed is called the Carboniferous Period. It was part of the Paleozoic Era. "Carboniferous" gets its name from carbon, the basic element in coal and other fossil fuels.

Carbon dioxide is a colorless, odorless, non-flammable and slightly acidic liquefied gas. CO₂ is heavier than air and soluble in water.

CO₂ is produced industrially by using sources of CO₂ obtained through processes in the petrochemical industry, or by burning natural gas in cogeneration processes. Air Products supplies CO₂ to customers worldwide as a liquefied gas. It is delivered under pressure in steel cylinders and refrigerated in thermally insulated containers.

Carbon dioxide is the primary greenhouse gas emitted through human activities. In 2012, CO₂ accounted for about 82% of all U.S. greenhouse gas emissions from human activities. Carbon dioxide is naturally present in the atmosphere as part of the Earth's carbon cycle (the natural circulation of carbon among the atmosphere, oceans, soil, plants, and animals). Human activities are altering the carbon cycle—both by adding more CO₂ to the atmosphere and by influencing the ability of natural sinks, like forests, to remove CO₂ from the atmosphere. While CO₂ emissions come from a variety of natural sources, human-related emissions are responsible for the increase that has occurred in the atmosphere since the industrial revolution.

The main human activity that emits CO₂ is the combustion of fossil fuels (coal, natural gas, and oil) for energy and transportation, although certain industrial processes and land-use changes also emit CO₂. The main sources of CO₂ emissions in the United States are described below.

- ✦ **Electricity.** Electricity is a significant source of energy in the United States and is used to power homes, business, and industry. The combustion of fossil fuels to generate electricity is the largest single source of CO₂ emissions in the nation,

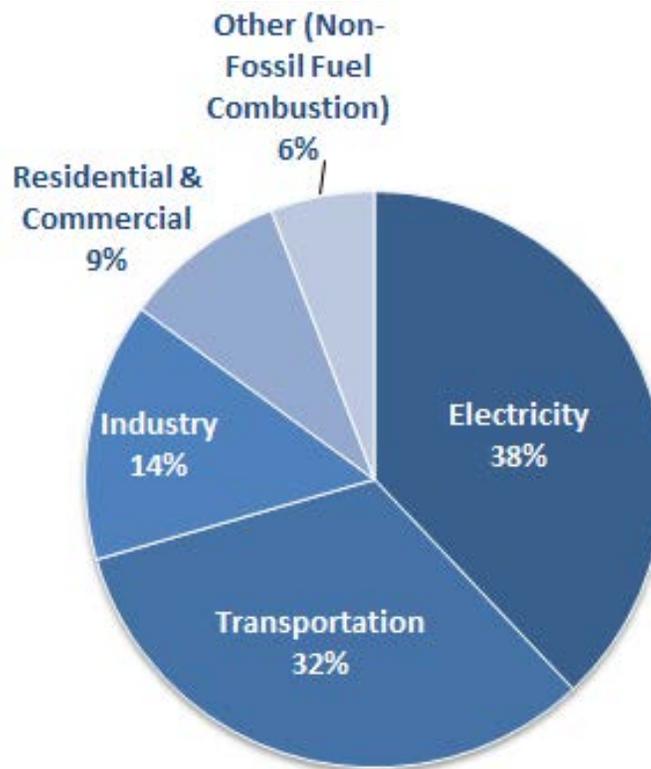


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accounting for about 38% of total U.S. CO₂ emissions and 31% of total U.S. greenhouse gas emissions in 2012. The type of fossil fuel used to generate electricity will emit different amounts of CO₂. To produce a given amount of electricity, burning coal will produce more CO₂ than oil or natural gas.

- ✦ **Transportation.** The combustion of fossil fuels such as gasoline and diesel to transport people and goods is the second largest source of CO₂ emissions, accounting for about 32% of total U.S. CO₂ emissions and 27% of total U.S. greenhouse gas emissions in 2012. This category includes transportation sources such as highway vehicles, air travel, marine transportation, and rail.
- ✦ **Industry.** Many industrial processes emit CO₂ through fossil fuel combustion. Several processes also produce CO₂ emissions through chemical reactions that do not involve combustion, for example, the production and consumption of mineral products such as cement, the production of metals such as iron and steel, and the production of chemicals. Fossil fuel combustion from various industrial processes accounted for about 14% of total U.S. CO₂ emissions and 12% of total U.S. greenhouse gas emissions in 2012. Note that many industrial processes also use electricity and, therefore, indirectly cause the emissions from the electricity production.

U.S. Carbon Dioxide Emissions, By Source



Note: All emission estimates from the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012*



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B. Methane (CH₄)

1. What is Methane?

Methane is an odorless, colorless flammable gas. It is used primarily as fuel to make heat and light. It is also used to manufacture organic chemicals. Methane can be formed by the decay of natural materials and is common in landfills, marshes, septic systems and sewers.

Methane can form an *explosive* mixture in air at levels as low as 5%. You can smell leaking methane only when commercial gas utility companies add a chemical smell to it or when it mixes naturally with hydrogen sulfide, causing a "rotten egg" smell. If you can smell it, the level may be too high to be safe.

Methane can also be found in coal gas. Pockets of methane exist naturally underground. In homes, methane may be used to fuel a water heater, stove and clothes dryer.

Methane evaporates quickly. Therefore, most of the methane that ends up in lakes, streams, or soil is eventually released into the air. However, methane that is formed underground and moves through soil can remain unchanged for many years.

2. How are People Exposed to Methane?

- ✦ **Breathing:** Most exposures occur when people inhale methane. Methane can go into homes through sewer traps or foundation cracks. People can be exposed by inhaling the chemical at work, cooking on a gas stove, or entering confined spaces such as manholes, silos, animal waste pits, septic tanks and sewers.
- ✦ **Drinking/Eating:** Because methane evaporates quickly, it is usually not found in food or drinking water. Very low level exposure can occur when contaminated water is used for drinking and/or for food preparation or when children eat contaminated soil.
- ✦ **Touching:** Methane gas does not pass readily through intact skin. Methane in its extremely cold liquefied form can, however, cause burns to the skin and eyes.

Methane (CH₄) is the second most prevalent greenhouse gas emitted in the United States from human activities. In 2012, CH₄ accounted for about 9% of all U.S. greenhouse gas emissions from human activities. Methane is emitted by natural sources such as wetlands, as well as human activities such as leakage from natural gas systems and the raising of livestock. Natural processes in soil and chemical reactions in the atmosphere help remove CH₄ from the atmosphere. Methane's lifetime in the atmosphere is much shorter than carbon dioxide (CO₂), but CH₄ is more efficient at trapping radiation than CO₂. Pound for pound, the comparative impact of CH₄ on climate change is over 20 times greater than CO₂ over a 100-year period.

Globally, over 60% of total CH₄ emissions come from human activities. Methane is emitted from industry, agriculture, and waste management activities, described below.

- ✦ **Industry.** Natural gas and petroleum systems are the largest source of CH₄ emissions from industry in the United States. Methane is the primary component of natural gas. Some CH₄ is emitted to the atmosphere during the production,



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processing, storage, transmission, and distribution of natural gas. Because gas is often found alongside petroleum, the production, refinement, transportation, and storage of crude oil is also a source of CH₄ emissions. For more information, see the *Inventories of U.S. Greenhouse Gas Emissions and Sinks* sections on Natural Gas Systems and Petroleum Systems.

- ✦ **Agriculture.** Domestic livestock such as cattle, buffalo, sheep, goats, and camels produce large amounts of CH₄ as part of their normal digestive process. Also, when animals' manure is stored or managed in lagoons or holding tanks, CH₄ is produced. Because humans raise these animals for food, the emissions are considered human-related. Globally, the Agriculture sector is the primary source of CH₄ emissions. For more information, see the *Inventories of U.S. Greenhouse Gas Emissions and Sinks*.
- ✦ **Waste from Homes and Businesses.** Methane is generated in landfills as waste decomposes and in the treatment of wastewater. Landfills are the third largest source of CH₄ emissions in the United States

Methane is also emitted from a number of natural sources. Wetlands are the largest source, emitting CH₄ from bacteria that decompose organic materials in the absence of oxygen. Smaller sources include termites, oceans, sediments, volcanoes, and wildfires.

C. Nitrous Oxide (N₂O)

Nitrous oxide is a clear, colorless gas with powerful greenhouse properties. It has a long atmospheric lifetime (approximately 120 years) and is about 310 times more powerful than carbon dioxide at trapping heat.

In 2012, nitrous oxide (N₂O) accounted for about 6% of all U.S. greenhouse gas emissions from human activities. Nitrous oxide is naturally present in the atmosphere as part of the Earth's nitrogen cycle, and has a variety of natural sources. The main natural source of nitrous oxide is the activity of microbes in swamps, soil, rainforests and the ocean surface. Human sources of this greenhouse gas include fertilizers, industrial production of nylon and nitric acid, the burning of fossil fuels, and solid waste.

However, human activities such as agriculture, fossil fuel combustion, wastewater management, and industrial processes are increasing the amount of N₂O in the atmosphere. Nitrous oxide molecules stay in the atmosphere for an average of 120 years before being removed by a sink or destroyed through chemical reactions. The impact of 1 pound of N₂O on warming the atmosphere is over 300 times that of 1 pound of carbon dioxide.

Globally, about 40% of total N₂O emissions come from human activities. [11](#) Nitrous oxide is emitted from agriculture, transportation, and industry activities, described below.

- ✦ **Agriculture.** Nitrous oxide is emitted when people add nitrogen to the soil through the use of synthetic fertilizers. Agricultural soil management is the largest source of N₂O emissions in the United States, accounting for about 75% of total U.S. N₂O emissions in 2012. Nitrous oxide is also emitted during the breakdown of nitrogen in livestock manure and urine, which contributed to 4% of N₂O emissions in 2012.

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- ✦ **Transportation.** Nitrous oxide is emitted when transportation fuels are burned. Motor vehicles, including passenger cars and trucks, are the primary source of N₂O emissions from transportation. The amount of N₂O emitted from transportation depends on the type of fuel and vehicle technology, maintenance, and operating practices.
- ✦ **Industry.** Nitrous oxide is generated as a byproduct during the production of nitric acid, which is used to make synthetic commercial fertilizer, and in the production of adipic acid, which is used to make fibers, like nylon, and other synthetic products.

Nitrous oxide emissions occur naturally through many sources associated with the nitrogen cycle, which is the natural circulation of nitrogen among the atmosphere, plants, animals, and microorganisms that live in soil and water. Nitrogen takes on a variety of chemical forms throughout the nitrogen cycle, including N₂O. Natural emissions of N₂O are mainly from bacteria breaking down nitrogen in soils and the oceans. Nitrous oxide is removed from the atmosphere when it is absorbed by certain types of bacteria or destroyed by ultraviolet radiation or chemical reactions.

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ATTACHMENT C LIST OF DATA SOURCES BY SECTOR

Transportation Measures

1. Continue to implement policies that encourage public transit ridership, walking and biking:

- ✚ 2007 General Plan *Circulation Element*, pages 3-21, 3-22 and 3-23
- ✚ 2003 *Bicycle Master Plan*

2. Continue to Implement the Safe Routes to School Program

- ✚ Safe Routes to School National Partnership – Southern California Safe Routes to School Regional Network, *2012-13 Active Transportation Platform*

3. Encourage and facilitate pedestrian mobility and use of public transportation and higher vehicle occupancy per trip

- ✚ Imperial County Transportation Commission and Southern California Association of Governments, *Calexico Border Intermodal Transportation Center Feasibility Study*, page 2
- ✚ California Air Resources Board, *Active Transportation*

4. Encourage Bus Transit and Carpooling

- ✚ Imperial Valley Transit Authority
- ✚ Imperial Valley College Fact Book 2011-2012
- ✚ 2010-2013 American Community 3-Year Estimates Tables B08310: Means of Transportation to Work; B08303: Travel Time to Work; B01001: Sex by Age
- ✚ The Missouri Census Data Center: Census 2010 and Circular Area Profiles (CAPS) software SCAG 2020 and 2030 employment projections for the City of Calexico

5. Establish a Clean Vehicle Policy

- ✚ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 309-312

6. Implement Off-Road Vehicle Measures

- ✚ Environmental Protection Agency (EPA) NONROAD Model



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Land Use Measures

1. Facilitate Infill Development by Implementing the General Plan Land Use Element and Housing Element

- ✚ City of Calexico 2007 General Plan, *Land Use Element*, pg. 2-37
- ✚ City of Calexico 2014 *Housing Element*, pg. 3-4

2. Complete Zoning for Electric Vehicle Infrastructure

- ✚ UCLA Luskin Center, *Southern California Plug-in Electric Vehicle Readiness Plan*, December 2012, page 36 (report prepared for the Southern California Association of Governments)
- ✚ UCLA Luskin Center, *Early Plug-in Electric Vehicle Sales: Trends, Forecasts, and Determinants*, pg. 2 (report prepared for the Southern California Association of Governments)
- ✚ U.S. Department of Energy – Energy Efficiency and Renewable Energy, Alternative Fuels Data Center – Emissions from Hybrid and Plug-in Electric Vehicles

Energy Conservation and Efficiency Measures

1. Continue to Implement the General Plan Public Facilities/Services Element

- ✚ City of Calexico 2007 General Plan, *Public Facilities/Services*, page 4-13.

2. Buildings Exceed Title 24 Energy Efficiency Standards

- ✚ California Energy Commission, *2013 Building Energy Efficiency Standards*
- ✚ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 85-90.

3. New Construction Energy Efficiency Program (NCEEP)

- ✚ Imperial Irrigation District Office of Energy Management and Strategic Marketing, *New Construction Energy Efficiency Program (NCEEP) Guidelines*, July 2014, 17 pgs

4. Buildings Exceed Minimum CALGreen Requirements

- ✚ California Building Standards Commission, *California's Green Building Code*
- ✚ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 85-91.

5. Promote Voluntary Energy Audits of Existing Buildings

- ✚ Imperial Irrigation District (IID)
- ✚ Southern California Gas Company



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6. Promote Voluntary Participation in Utility Company Residential and Business Rebates

- ✚ Southern California Gas Company, *Energy-Efficiency Rebates for Business, 2013-2014 Policies and Procedures, Customer Handbook*, Effective January 2013, 14 pages
- ✚ Southern California Gas Company, *Rebate Guide and Application 2013-2014*, 12 pages

7. Weatherization

- ✚ State of California, Department of Community Services and Development, *Weatherization Assistance Program for Low-Income Persons: 2014 State Plan and Application to the U.S. Department*, June 26, 2014

8. HERO Program (Energy Efficiency)

- ✚ Office of the City Manager, Housing Division

9. CDBG Housing Rehabilitation Program

- ✚ Office of the City Manager, Housing Division

10. Promote the Installation of Energy Efficient Appliances

- ✚ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 103-110

11. Implement a Street Light LED Conversion Project

- ✚ LEOTEK Lite-On Group, *A Municipal Guide for Converting LED Street Lighting: A Step-by-Step Approach to Improving Outdoor Lighting, Saving Energy and Reducing Maintenance Costs*, 20 pages
- ✚ Department of Energy Municipal Solid-State Street Lighting Consortium
- ✚ American Public Works Association, *Beaumont, California, Begins Third Year of LED Streetlight Use*

12. Encourage Project Applicants to Plant Shade Trees

- ✚ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 450-455.



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Solid Waste Management

1. Implement the 2007 General Plan Solid Waste Management Policies

- ✦ City of Calexico, 2007 General Plan, *Public Facilities/Services Element*, pg. 4-17

2. Continue to Implement the Solid Waste Diversion and Per Capita Disposal Rate Programs

- ✦ California Department of Resources Recycling and Recovery (CalRecycle), Local Government Central, *Annual Reporting Requirements*, 2 pgs
- ✦ California Department of Resources Recycling and Recovery (CalRecycle), Local Government Central, *Goal Measurement FAQs*, 8 pgs
- ✦ California Department of Resources Recycling and Recovery (CalRecycle), Local Government Central, Goal Measurement, *California's Statewide Per Resident, Per Employee, and Total Disposal Since 1989*, 2 pgs
- ✦ California Department of Resources Recycling and Recovery (Cal Recycle), Local Government Central, *California's 2012 Per Capital Disposal Rate*, 1 pg
- ✦ California Department of Resources Recycling and Recovery (Cal Recycle), Local Government Central, *California's Estimated Statewide Diversion Rates Since 1989*, 2 pgs
- ✦ City of Calexico Electronic Annual Report

3. Continue to Implement Chapter 8.39 Recycling of the City's Municipal Code

- ✦ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010
- ✦ City of Calexico Municipal Code Chapter 8.39 Recycling

4. Recycle Demolished Construction Material

- ✦ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, page 401
- ✦ City of Calexico Municipal Code, Chapter 8.38 *Mandatory Construction and Demolition Debris Recycling Program*
- ✦ Integrated Waste Management Board, California Sustainable Design Training, *Construction Waste Management*, 9 pages

5. Increase Commercial Recycling

- ✦ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 392-395
- ✦ California Department of Resources Recycling and Recovery (CalRecycle), *Mandatory Commercial Recycling: Frequently Asked Questions*, 17 pages
- ✦ Institute for Local Government, *Sample Commercial Recycling Ordinance*, November 2009, 24 pages



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6. Increase the Composting of Waste

- ✦ California Air Pollution Control Officers (CAPCOA), *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Address Emission Reductions from Greenhouse Gas Mitigation Measures*, August, 2010, pages 392-395
- ✦ Californians Against Waste, *Composting: A Greenhouse Gas Mitigation Measure*, pg. 1
- ✦ Eureka Recycling: *Recycling, Composting and Greenhouse Gas Reduction in Minnesota*, page 5

7. Implement a City Waste Prevention, Reduction and Recycle Program

- ✦ Institute for Local Government, *Sustainability Best Practices Framework – 2013 Update*, Waste Reduction & Recycling

8. Community Clean Up Program

- ✦ Public Works Department

Urban Water Management

1. Implement the 2007 General Plan Water Conservation Policies

- ✦ City of Calexico, 2007 General Plan, *Conservation/Open Space Element*, pages 5-6 and 5-7.
- ✦ California Department of Water Resources (DWR), *Climate Change Handbook for Regional Water Planning*, Section 3: Evaluating the Energy-Water Connection and Greenhouse Gas Emissions, page 3-1

2. Implement the 2010 and 2015 Urban Water Management Plan Demand Management Measures

- ✦ City of Calexico, *2010 Urban Water Management Plan*, Section 6 – Water Demand Management Measures, pages 111-120
- ✦ California Department of Water Resources (DWR), *Guidebook to Assist Urban Water Suppliers Prepare a 2015 Urban Water Management Plan*, October 2, 2014, 3 pgs
- ✦ Imperial Water Forum, *Appendix O – Imperial Region Vulnerability to Climate Change and Evaluation of Greenhouse Gas Emissions*, October 2012, pages O-20 and O-21

3. Continue to Enforce the City's Water Efficient Landscape Ordinance

- ✦ City of Calexico Municipal Code

4. Continue to Enforce the City Ordinance Prohibiting Wasteful of Water

- ✦ City of Calexico Municipal Code, Chapter 13.40



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ATTACHMENT D CITY OF CALEXICO 2010 URBAN WATER MANAGEMENT PLAN WATER DEMAND MANAGEMENT MEASURES

1. Residential Surveys

- ✚ Develop Residential Assistance Checklist (for customers who report high water bills)
- ✚ Provide site-specific leak detection assistance
- ✚ Perform site-specific landscape water surveys
- ✚ Provide reports on the number of residential assistance/leak detection survey visits

2. Residential Plumbing Retrofit

- ✚ Replace noncompliant with water-conserving plumbing fixtures when a permit is taken out for building additions, alterations – required as of January 1, 2014
- ✚ Replace noncompliant with water-conserving fixtures in single-family residential property and verify – required by January 1, 2017

3. System Water Audits, Leak Detection and Repair

- ✚ Quantify the current volume of apparent and real water loss
- ✚ Repair all reported leaks and breaks to the extent cost effective
- ✚ Establish and maintain a record-keeping system for the repair of reported leaks

4. Metering with Commodity Rates for New Connections and Retrofit of Existing Customers

- ✚ Continue the City's metering programs for all service connections

5. Large Landscape Conservation Programs and Incentives

- ✚ Require new development projects to use water efficient landscaping, such as Xeriscape
- ✚ Preserve water use records and budgets for customers with dedicated landscape irrigation accounts for at least four years
- ✚ Require a water efficient irrigation system in commercial, industrial and multifamily residential developments

6. High Efficiency Washing Machine Rebate Program

- ✚ Implement a rebate program for incentives to purchase high-efficiency clothes washing machine when it becomes cost effective

7. Public Information Programs

- ✚ Implement a public information program to promote water conservation and water-conservation-related benefits



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8. School Education Programs

- ✚ Implement a school education program to promote water conservation and water conservation-related benefits
- ✚ Maintain and active school education program to educate students in the agency's service area about water conservation and efficient water use

9. Commercial, Industrial and Institutional Programs

- ✚ Continue to focus on landscaping water savings for commercial, industrial and institutional (CII) accounts

10. Wholesale Assistance

- ✚ Continue to work with the Imperial Irrigation District to participate in regional DMM efforts through the Integrated Regional Water Management Plan (IRWMP)

11. Conservation Pricing

- ✚ Review the water rate structure and complete a water rate study to implement conservation pricing because the City's water rates are not conducive to conservation pricing.

12. Conservation Coordinator

- ✚ Designate a person as the City's responsible conservation coordinator for program management, tracking, planning, and reporting on DMM implementation. This may be a regional position.

13. Water Waste Prohibition

- ✚ Continue to implement the City's No Waste Resolution.

14. Residential High Efficiency Toilet (HET) Replacement Programs

- ✚ Continue to require compliance with state regulations for water efficient devices in new construction, per the Uniform Building Code.
- ✚ Continue to support state legislation that requires retrofit for houses for sale or during rehabilitation.