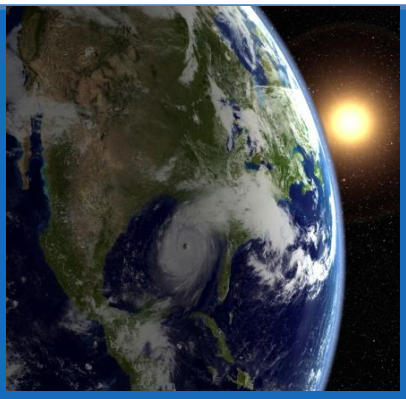
CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



2015

VCREA Local Government Member Agencies: Greenhouse Gas Inventories and Climate Action Plan Templates

VENTURA COUNTY
REGIONAL ENERGY ALLIANCE

PART I: 2010 THROUGH 2012 GREENHOUSE GAS INVENTORIES

DRAFT – October 15, 2015

Prepared with the assistance of:
Anacapa Consulting Services Inc.
Ventura, California

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Climate on the Move
Executive Summary

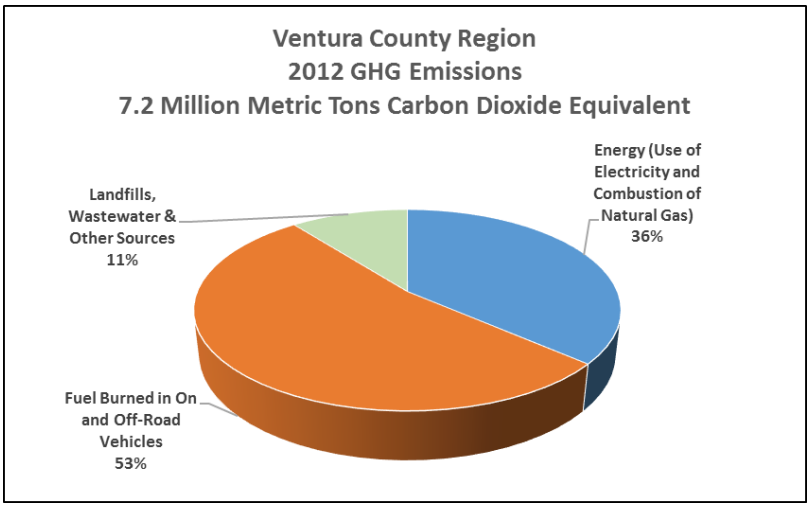
The State of California leads in the world in responding to the challenges we face in response to climate change. Among many significant legislative actions, in 2006, the State legislature passed Assembly Bill 32 (AB 32), the Global Warming Solutions Act. This and other regulations and policies that followed it are moving the State towards a smaller and smaller carbon footprint.

With funding from Southern California Edison, under the auspices of the California Public Utilities Commission, the Ventura County Regional Energy Alliance (VCREA) prepared this inventory of GHG emissions (2010 through 2012) for the region and for each of its local government member organizations. The inventory will assist with planning to mitigate and address changes that result from climate change including: rising temperatures, changing precipitation patterns, increased wildfire risk, public health impacts, water supply changes, increased demand for summertime cooling, sea level rise and less resilient agriculture.

Climate on the Move Parts I and II includes inventories, forecasts, and target options for the year 2020.

The VCREA inventory (or carbon footprint) is divided into three broad areas: energy (electricity and natural gas combustion), mobile sources (on and off road burning of diesel and gasoline) and other emission sources (including landfill gas, emissions from wastewater treatment plants, and others). Greenhouse gases are reported in units of carbon dioxide equivalent (CO2e). Different gases (like methane and nitrous oxide) have higher abilities to warm the atmosphere than others. These gases are assigned values equivalent to carbon dioxide, for accounting purposes.

In 2012, total County emissions in metric tons CO2e were:



2020 forecasts were developed for the major categories in the inventory: emissions from energy use (electricity and natural gas) and on-road mobile emissions. Forecasted emissions in Ventura County will be 8.2% lower in 2020 than in 2010, largely due to State requirements for renewable energy and clean fuels and vehicles. Within that total, emissions from the use of electricity will be reduced by 12% over 2010, from on-road vehicles by 9.5% while emissions from natural gas combustion will increase by 3.6%.

Section 4 of the report provides options for reduction targets for each of the three sectors, at 5%, 10% and 15%, either below 2010 levels or below 2020 adjusted business as usual levels.

Climate on the Move Part III outlines a climate action template with GHG reduction measures for local governments to consider, under the following areas:

- Green Building and Energy
- Water
- Transportation
- Solid Waste and Recycling
- Non-Traditional Measures

The template also provides direction on quantifying GHG reductions year to year and on a project by project basis. A recommendation is made for benchmarking GHG projects that are undertaken primarily for their mitigation potential.

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Parts I and II

1. Introduction

In 2006, the California State legislature passed Assembly Bill 32 (AB 32), the Global Warming Solutions Act. The law established a limit of greenhouse gas (GHG) emissions for the State of California, so that state-wide emissions would be reduced to 1990 levels by 2020. The law has been implemented through a scoping plan developed by the California Air Resources Board (ARB). That plan recommends that California cities and counties seek to reduce their GHG emissions to be consistent with statewide reductions. Two years later, in 2008, the California Senate passed SB 375, requiring regional transportation planning to promote reductions in vehicle GHG emissions.

In response to these initiatives, the Ventura County Regional Energy Alliance (VCREA) has prepared an inventory of GHG emissions, and climate action plan templates for each of its local government member organizations. VCREA was formed in 1998 and is in an ideal position to compile countywide information on energy use.

1.1 About Ventura County

Ventura County is the 12th largest of 58 California counties, with a population of 823,318 residents. It includes ten incorporated cities; Oxnard is the largest with 197,899 residents; and Ojai is the smallest with 7,461 residents. By 2030, the county's population is projected to reach 982,794.[1]

Geographically, Ventura offers a stunning 42 miles of coastline and the Los Padres National Forest, which accounts for 46% of the county's land mass in the northern portion of the county. Fertile valleys in the southern half of the county make Ventura a leading agricultural producer. Together, farming and the Los Padres National Forest occupy half of the county's 1.2 million acres.

[1] http://www.ventura.org/vcaaa/demographics

Ventura County has a strong economic base that includes major industries such as biotechnology, agriculture, advanced technologies, oil production, military testing and development, and tourism.

The United States military is the largest employer in the county with more than 16,000 employees working at two naval bases and the Air National Guard base. The County of Ventura (government) is the next largest employer with nearly 8,000 employees located throughout the county. Port Hueneme is California's smallest but only deep water port between Los Angeles and San Francisco which plays a major role in the local economy.

Home to two universities (California State University Channel Islands and California Lutheran University), and three Community Colleges (Oxnard, Ventura, and Moorpark), multiple university extensions, institutes, and adult schools, the county enjoys a strong structure for workforce development.

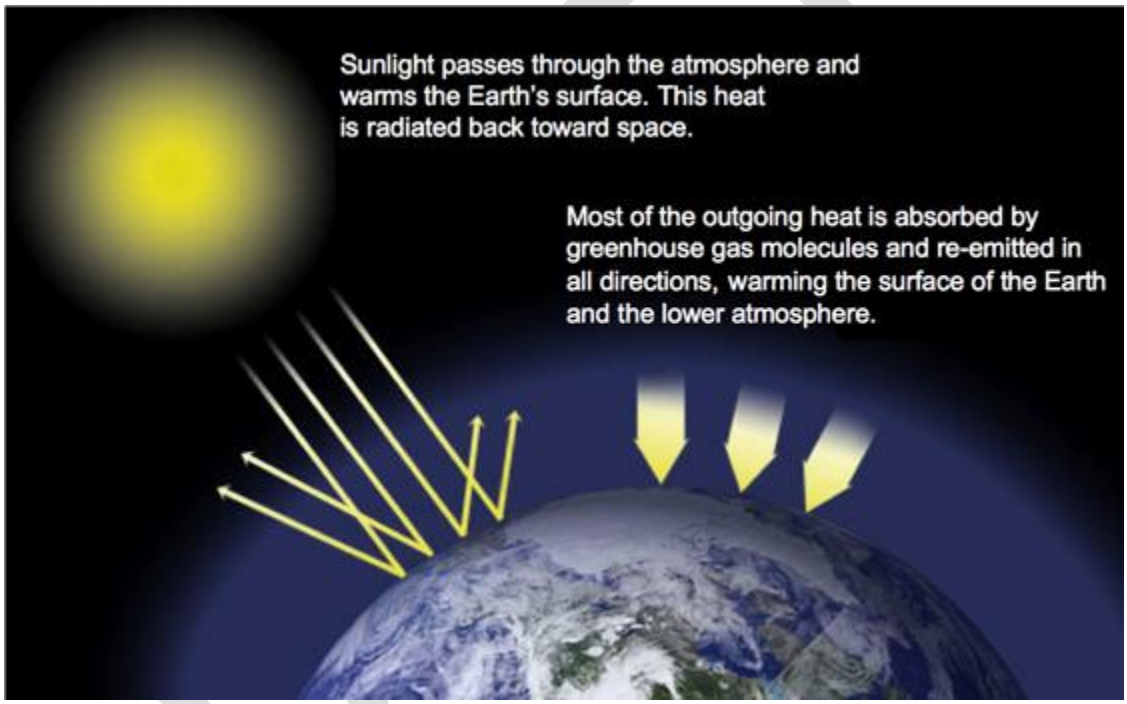
The Gross Domestic Product (GDP) of the county was estimated in 2011 at $70 billion, with more than 25% of this produced by manufacturing industries. Within manufacturing, leading industry clusters include pharmaceuticals ($7.9 billion), computers and electronics ($3.0 billion), machinery manufacturing ($1.1 billion) and bio-medical devices ($561 million). The second largest economic sector in the county is financial services, including insurance and real estate, with $13.7 billion in output. While this industry experienced corporate restructuring during the recession and following years, the county has retained its position as having nearly the largest concentration of jobs in this sector as compared to all other California counties. Agriculture is a powerful economic driver in Ventura County, with an estimated total output of $3.3 billion. The county enjoys some of the highest per-acre agricultural production values in California.[2]

[2] http://edc-vc.com/wp-content/uploads/CEDS-report_final.pdf

1.2 Global Climate Change[3]

A layer of greenhouse gases – primarily water vapor, and including much smaller amounts of carbon dioxide, methane and nitrous oxide – acts as a thermal blanket for the Earth, absorbing heat and warming the surface to a life-supporting average of 59 degrees Fahrenheit (15 degrees Celsius).

Most climate scientists agree the main cause of the current global warming trend is human expansion of the greenhouse gas effect — warming that results when the atmosphere traps heat radiating from Earth toward space.



Certain gases in the atmosphere block heat from escaping. Long-lived gases that remain semi-permanently in the atmosphere and do not respond physically or chemically to changes in temperature are described as "forcing" climate change. Gases, such as water vapor, which respond physically or chemically to changes in temperature are seen as "feedbacks."

[3] This description of the causes of global climate change is taken from NASA's Global Climate Change web portal: http://climate.nasa.gov/causes/

Gases that contribute to the greenhouse effect include:

- Water vapor. The most abundant greenhouse gas, but importantly, it acts as a feedback to the climate. Water vapor increases as the Earth's atmosphere warms, but so does the possibility of clouds and precipitation, making these some of the most important feedback mechanisms to the greenhouse effect.
- Carbon dioxide (CO_2). A minor but very important component of the atmosphere, carbon dioxide is released through natural processes such as respiration and volcano eruptions and through human activities such as deforestation, land use changes, and burning fossil fuels. Humans have increased atmospheric CO_2 concentration by a third since the Industrial Revolution began. This is the most important long-lived "forcing" of climate change.
- Methane (CH_4). A hydrocarbon gas produced both through natural sources and human activities, including the decomposition of wastes in landfills, agriculture, and especially rice cultivation, as well as ruminant digestion and manure management associated with domestic livestock. On a molecule-for-molecule basis, methane is a far more active greenhouse gas than carbon dioxide, but also one which is much less abundant in the atmosphere.
- Nitrous oxide (N_2O). A powerful greenhouse gas produced by soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.
- Chlorofluorocarbons. Synthetic compounds entirely of industrial origin used in a number of applications, but now largely regulated in production and release to the atmosphere by international agreement for their ability to contribute to destruction of the ozone layer. They are also greenhouse gases.

On earth, human activities are changing the natural greenhouse. Over the last century the burning of fossil fuels like coal and oil has increased the concentration of atmospheric CO_2. This happens because the coal or oil burning process combines carbon with oxygen in the air to make CO_2. To a lesser extent, the clearing of land for agriculture, industry, and other human activities have increased concentrations of greenhouse gases.

The consequences of changing the natural atmospheric greenhouse are difficult to predict, but certain effects seem likely:

- On average, earth will become warmer. Some regions may welcome warmer temperatures, but others may not.
- Warmer conditions will probably lead to more evaporation and precipitation overall, but individual regions will vary, some becoming wetter and others dryer.
- A stronger greenhouse effect will warm the oceans and partially melt glaciers and other ice, increasing sea level. Ocean water also will expand if it warms, contributing further to sea level rise.
- Meanwhile, some crops and other plants may respond favorably to increased atmospheric CO_2, growing more vigorously and using water more efficiently. At the same time, higher temperatures and shifting climate patterns may change the areas where crops grow best and affect the makeup of natural plant communities.

1.2.1 The Role of Human Activity

In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (the IPCC), a group of 1,300 independent scientific experts from countries all over the world under the auspices of the United Nations, concluded there's a more than 90 percent probability that human activities over the past 250 years have warmed our planet.

The industrial activities that our modern civilization depends upon have raised atmospheric carbon dioxide levels from 280 parts per million to 379 parts per million in the last 150 years. The IPCC also concluded there's a better than 90 percent probability that human-produced greenhouse gases such as carbon dioxide, methane and nitrous oxide have caused much of the observed increase in Earth's temperatures over the past 50 years.

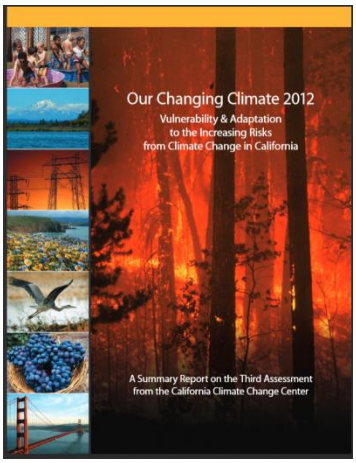
The Intergovernmental Panel concluded that the rate of increase in global warming due to these gases is very likely to be unprecedented within the past 10,000 years or more.[4]

[4] http://climate.nasa.gov/causes/

1.2.2 Local Climate Change and California

The State of California produces periodic scientific assessments on the potential impacts of climate change in California and reports potential adaptation responses. Required by Executive Order #S-03-05, these assessments influence legislation and inform policy makers.

- The First Climate Change Assessment, released in 2006, looked at the potential impacts of climate change on key state resources such as the water supply, public health, agriculture, coastal areas, forestry, and electricity production and demand. The assessment influenced the passage of Assembly Bill 32, the California Global Warming Solutions Act of 2006.



- The Second Climate Change Assessment, released in 2009, attempted to provide initial estimates of the economic impacts of climate change. It concluded that adaptation - as a complementary approach to mitigation - could substantially reduce the economic impacts of loss and damage that result from a changing climate. Findings from the Second Assessment were instrumental in preparing California's 2009 Statewide Adaptation Strategy.

- The Third Climate Change Assessment, released in 2012, was shaped by the request for more information on vulnerability and adaptation options discussed in the 2009 California Adaptation Strategy. It made significant progress in projecting climate change impacts, but also in better understanding the interactions of those potential impacts with on the ground exposure, sensitivity, and response capacity of natural and human systems.

The Assessment concluded that:

Temperatures in California will rise significantly during the 21st century.

- By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century.

- By 2100, average temperatures could increase by 4.1 to 8.6ºF, depending on emissions levels.
- Springtime warming – a critical influence on snowmelt – will be particularly pronounced.
- Summer temperatures are projected to rise more than winter temperatures, and increases are projected to be greater in inland California, compared to the coast.
- Heat waves are projected to be more frequent, hotter, and longer. There are projected to be fewer extremely cold nights.

Precipitation models continue to show a Mediterranean pattern of weather.

- Wet winters and dry summers with variability are projected to persist.
- Several climate models indicate drier conditions by the mid-to-late century, in Central and Southern California.

Wildfire risk in California will increase as a result of climate change.

- Earlier snowmelt, higher temperatures and longer dry periods over a longer fire season would directly increase wildfire risk.
- That risk is also projected to be influenced by changes in vegetation, lightning strikes, and human activities, particularly land use development patterns.

Climate change could have major impacts on public health and well-being.

- Sensitive segments of the human population are particularly vulnerable to extreme heat and ground-level ozone.

Climate change will impact the supply of water throughout the State.

- The State will be challenged to manage water under changing climate conditions, including responding to increased demand for water as temperatures rise, snowmelts and runoff occur earlier and faster than in the past, and historical sea level rise threatens aging coastal water infrastructure.

- Climate change effects on water supplies and stream flows are expected to increase competition among urban and agricultural users.
- Water districts with limited or no access to state water would need to rely on local sources for water, making sustainable groundwater management more critical than in the past.

Increases in average temperature and higher frequency of extreme heat events combined with new residential development across the state are projected to drive up the demand for cooling in summertime.

- The Third Assessment notes that climate change is leading to an increase in energy demand.
- Energy supply from hydropower, especially in higher elevations, is vulnerable to changes in snowpack and spring runoff.
- Transmission lines for electricity are not designed to carry the higher loads projected by the assessment, and are projected to be more vulnerable to destruction by fire as a result of higher temperatures and more wildfires.

Sea level rise is occurring more quickly than had been anticipated in earlier assessments and this impacts coastal flooding.

- Sea level along the state's coastline in 2050 could be 10-18 inches higher than in 2000, and 31-55 inches higher by the end of this century. This represents a four- to eightfold increase in the rate of sea-level rise over that observed in the last century.
- By 2050, coastal 100 year storm events could strike annually on average as a result of sea-level rise.
- Sea level rise and coastal flooding are expected to put critical infrastructure at risk, including ports, transportation routes, power plants, etc.

California's ecosystems are vulnerable to the effects of climate change.

- Climate conditions are changing so rapidly that some vegetation cannot keep pace and some species are unable to quickly adapt to changing temperatures, precipitation and sea level rise.

- Identifying and then providing migration corridors that will allow species to migrate to more suitable habitat will be critical to their survival as the climate changes.

California's agriculture is also vulnerable to climate change.

- Changes in temperature and water availability — annual and seasonal shifts as well as extreme highs and lows — affect both crop yield and quality, making the sector highly sensitive to climate change.[5]

[5] "Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California", CEC Publication # CEC-500-2012-007, July 31, 2012.

2. Greenhouse Gases, Policies and Inventories

2.1 Climate Change Legislation and Policy

In 2006, the State of California adopted landmark climate change legislation: the Global Warming Solutions Act of 2006, more commonly known as AB 32. The Act established the state's goal of reducing its GHG emissions to 1990 levels by 2020. AB 32 was implemented through the development of a Scoping Plan that identified specific actions to be taken to achieve the required reductions. The Plan was subsequently updated in 2014.

In 2008, the Sustainable Communities and Climate Protection Act (SB 375) required Metropolitan Planning Organizations, like the Southern California Association of Governments, to prepare Sustainable Communities Strategies, as part of their Regional Transportation Plans. The intent was for land use, transportation and housing policies to play a part in reducing regional GHG emissions.

A suite of executive orders, regulations and laws have been put in place to maintain momentum on GHG reductions and to expand the reduction goals. These included implementation of the "Pavley" regulations that reduce GHG emissions in new passenger vehicles and adoption of the 2009 Low Carbon Fuel Standards regulations, aimed at reducing the carbon intensity of transportation fuels used in California by at least 10% by 2020.

More recently, in April 2015, Governor Gerry Brown issued an executive order to establish a new GHG reduction target of 40% below 1990 levels by 2030. On October 7, 2105, Governor Brown signed SB 350. The law requires 50% of all energy used in the State to come from renewable sources, seeks to double energy efficiency in existing buildings and to develop cleaner heating fuels.

2.1 What is a Greenhouse Gas Inventory?

The US EPA describes a greenhouse gas inventory as follows:

> *"… an accounting of greenhouse gases (GHGs) emitted to or removed from the atmosphere over a period of time. Policy makers use inventories to establish a baseline for tracking emission trends, developing mitigation strategies and policies, and assessing progress. An inventory is usually the first step taken by entities that want to reduce their GHG emissions.*
>
> *An inventory can help local governments:*

- *Identify the sectors, sources, and activities within their jurisdiction that are responsible for greenhouse gas emissions*
- *Understand emission trends*
- *Quantify the benefits of activities that reduce emissions*
- *Establish a basis for developing a local action plan*
- *Track progress in reducing emissions*
- *Set goals and targets for future reductions"*

The State of California develops an annual statewide GHG inventory that includes emissions from a large number of sources, including transportation, electricity, stationary combustion and others. With the introduction of California's GHG cap-and-trade program, some large sources of GHG emissions are required to report their GHG emissions to the California Air Resources Board and to reduce their emissions over time or pay penalties. Local governments, unless they have large sources of GHGs like landfills or combustion sources, are not required to reduce their emissions. However, beginning in 2008 State agencies recommended that local governments make best efforts to reduce emissions by 15% below current levels by 2020. Many jurisdictions around the State developed inventories in the 2008-2012 time period and chose CY 2005 as the base year for their reductions.

As noted above, the Air Resources Board's AB 32 Scoping Plan[6] describes the approach California will take to reduce greenhouse gases to achieve the goal of reducing emissions to 1990 levels by 2020. The Scoping Plan was first considered by the Board in 2008 and was then updated in 2014. The Climate Action Plan templates developed in this project are locally based approaches to GHG reduction.

[6] http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm

2.2 Approach

VCREA, with the assistance of Anacapa Consulting Services Inc., has committed to the following actions with respect to GHG reductions:

1. Prepare three annual GHG **inventories** (2010, 2011 and 2012) for the region and for each of its ten local government members (Camarillo, Fillmore, Moorpark, Ojai, Oxnard, Port Hueneme, Santa Paula, Thousand Oaks, the City of Ventura and the County of Ventura).

2. Prepare GHG emissions forecasts and reduction targets for the year 2020 for the region as a whole and for each partner local government

   Part I of this report (Sections 1 through 3) provides a **regional** community-level summary of emissions for the three calendar years. Because these emissions are community-based, the decision was made to include those generated in the City of Simi Valley, even though that City is not part of the VCREA partnership. Including these emissions gives a more complete picture of Ventura County's regional carbon footprint. Appendices A-1 through A-10 summarizes emissions data for communities whose local governments are participants in VCREA, i.e., excluding Simi Valley.

3. Prepare climate action templates for the region and member governments that include:
   - a GHG emissions **forecast** for the year 2020 for the regional as a whole and for each partner local government.
   - regional and city-specific **reduction targets** for 2020.
   - recommendations for GHG **reduction measures and options** for each local government to consider in meeting its GHG reduction target.

Part II (Sections 4 and 5) of this report (and its local government appendices) forecasts total emissions, and separately, energy (electricity and natural gas) and on-road transportation emissions. The report provides options for reduction targets for the year 2020, including one that is consistent with the "15% from current levels" encouraged by the State, as noted above.

Part III provides a Climate Action Plan template, with a menu of GHG reduction measures for local governments to consider, and recommendations for tracking and quantifying those reductions.

3. VCREA's Greenhouse Gas Inventories – Our Regional Carbon Footprint

The County and city inventories presented in this report were developed using a geographic boundary approach (i.e., jurisdictional/city limits) to emissions reporting. These inventories are referred to as city-wide inventories. Local government inventories were developed for the areas of each government's operational control. Emissions for a particular source were included in this inventory if the government entity either wholly owns an operation, facility or source, or has full authority to introduce and implement operating policies at the operation. This typically includes government-owned facilities, vehicles, and operations. For some cities, data collection on government-owned vehicle emissions was considered onerous and these emissions were not included in the local government inventory. This tended to be the case for smaller cities where it is assumed that mobile source emissions are a small portion of their cities emission sources.

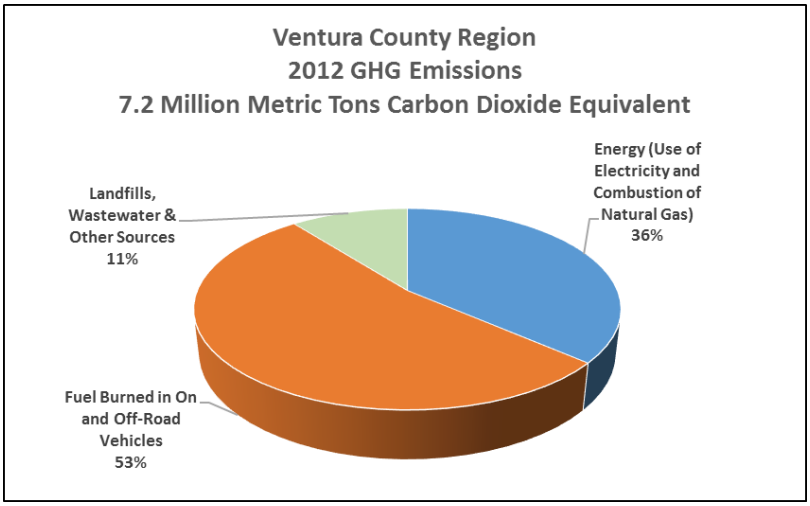
The categories reported include:

- Energy based emissions (electricity and natural gas)
- Mobile based emissions (on and off road vehicles)
- Other emissions sources (wastewater, landfills, water delivery)

3.1 Total County Emissions

Total County emissions did not change substantially between 2010 and 2012. In 2012, emission sources were as follows:

Figure 1: Ventura County Regional GHG Emissions



3.2 Energy-based Emissions

This inventory focuses on energy provided by Southern California Edison and the Southern California Gas Company. There are no other energy utilities/companies in the VCREA region.

Fossil fuel combustion is one of the most significant contributors to climate change, and the largest source of energy in the world. Combustion of that energy occurs either on site (an industrial boiler, a residential heater, a motor vehicle, etc.) or is combusted elsewhere for the benefit of a user (e.g., natural gas burned in a power plant that delivers electricity to end users). Direct combustion results in Scope 1 emissions, indirect use of outputs like electricity and steam results in Scope 2 emissions.[7]

[7] The World Resources Institute and the World Business Council for Sustainable Development (WRI/WBCSD) GHG Protocol Corporate Accounting and Reporting Standard (Revised Edition)

3.2.1 Scope 1 Emissions – Energy

Direct combustion of fossil fuels results in Scope 1 emissions. This includes both stationary and mobile sources. This section addresses stationary sources. This inventory focuses on the burning of natural gas, since the combustion of other fuels (including oil and wood products) results in minor emissions levels for Ventura County. Natural gas is measured and billed in therms. The combustion of therms of natural gas results in the release of carbon dioxide, methane and nitrous oxide, which are then used to calculate carbon dioxide equivalent (or CO_2e) units.

There are three major sources of data for natural gas combustion in Ventura County – two of which are "all in" and one of which reports on large emission sources only. The two "all-in" sources are data provided by the Southern California Gas Company in response to a VCREA request, and data reported to the California Energy Commission in the California Energy Almanac.[8] CEC data is available on a countywide basis only, while SCG provided VCREA with data on a city-by-city basis. Both report gas use in therms, and both categorize fuel use as residential or non-residential. In some cases, depending upon the size of the customer basis, SCG was able to provide additional data on separate commercial and industrial use of natural gas.

Table R-1
Therms of Natural Gas Consumed in Ventura County

	SCG			CEC – California Energy Consumption Database		
	Residential	Non-residential	**Total**	Residential	Non-residential	**Total**
2010	122.78	50.37	**173.16**	113.995	74.66	**188.66**
2011	124.37	55.53	**179.90**	124.34	77.58	**201.93**
2012	114.03	56.30	**170.34**	122.78	77.98	**200.76**

There is a notable difference between the two sources, primarily related to non-residential gas usage. The California Energy Commission's Energy Consumption

[8] http://www.ecdms.energy.ca.gov/

database[9] indicates that about 60% of natural gas usage is residential, while the SCG data is closer to 70%. This relates to SCG's compliance with the California Public Utility Commission's directive that utilities maintain customer confidentiality. The confidentiality requirement and the number of large natural gas customers in each city sometimes results in the removal of data for larger customers, thus reducing the overall reported gas use for the commercial and industrial sectors. Therefore, this Climate Action Plan assumes that CEC data for non-residential purposes are more valid. However, the CEC database does not provide data at the city level. [10] GHG emissions, based on the CEC's database, reported in metric tons of carbon dioxide equivalent are as follows:

Table 2: Emissions from Natural Gas Based on California Energy Commission Database

	Residential	Non-Residential	Total
	CO_2e (metric tons)	CO_2e (metric tons)	CO2e (metric tons)
2010	606,166	397,003	1,003,169
2011	661,175	412,530	1,073,706
2012	652,880	414,657	1,067,537

[10] Southern California Gas has provided data on natural gas combustion in stationary sources for commercial, industrial, single-family residential and multi-family residential categories. Under the California Public Utilities' Commission Rulemaking 08-12-009 and related guidance, utilities are required to protect the confidentiality of client data, either through aggregation or by redacting data related to energy usage for customers with large percentages of an area's market share. With respect to VCREA cities, this results in a situation where SCG removed non-residential data for some customers, in some years, and not in others. This situation renders GHG calculations based on that data invalid. As an alternate, the California Energy Almanac (California Energy Commission) provides Countywide non-residential data that is consistent from year to year, and has not be subject to the privacy rule. While data on residential use are consistent between the two sources, and can be used for identifying reduction measures, the large year to year discrepancies for commercial and industrial users makes use of this data source problematic for projections and targeting.

Total emissions based on SCG consumption data are:

Table 3: Emissions from Natural Gas Combustion based on Southern California Gas Company Data

Year	CO_2e (metric tons)
2010	920,778
2011	956,657
2012	905,807

3.2.1.1 California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. The following table includes the major sources in Ventura County reporting emissions that result from stationary combustion.

Table 4: Major Stationary Combustion Emission Sources in Ventura County

Facility	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
Amgen Inc., Thousand Oaks	26,624	26,098	23,211
California State University, Channel Islands, Cogeneration Unit, Unincorporated Area	106,568	106,194	106,985
E.F. Oxnard LLC, Oxnard	65,214	78,554	82,804
Houweling Nurseries, Cogeneration Unit, Unincorporated Area	n/a	n/a	24,412
Mandalay Generating Station Oxnard	53,994	49,774	135,517
Ormond Beach Generating Station, Oxnard	82,279	14,076	149,250
P&G Paper Products, Oxnard	327,674	334,676	330,803
Southern California Edison (SCE) – McGrath Peaker, Oxnard	--	--	904
Total	662,353	609,372	853,886

3.2.2 Scope 2 Emissions - Energy

The other major source of energy-based GHG emissions in Ventura County is the use of electricity. That use is indirect (i.e., the fuel is not burned directly on site, but is burned elsewhere, normally in power plants, to create electricity) and results in Scope 2 emissions.

In 2010, 2011 and 2012, the use of electricity in Ventura County resulted in the following emissions:

Table 5: GHG Emissions Associated with Electricity Use

Year	CO_2e (metric tons)
2010	1,668,979
2011	1,705,273
2012	1,721,038

Residential use of electricity accounted for 30% of total electricity in each year. The remaining 70% is a combination of commercial and industrial use. As was the case with SCG, SCE is also subject to data confidentiality rules established by the CPUC. The availability of separate data on industrial and commercial consumption of electricity depends upon the size of the community and the nature of its commercial and industrial sources. In some cases, industrial and commercial use is aggregated and reported as a combined category. Separate industrial and commercial data is available for the following local governments in Ventura County:

- Camarillo
- Oxnard
- Simi Valley
- City of Ventura
- Unincorporated Area

At the request of VCREA, SCE provided account level data on electricity use for all of the cities in Ventura County (excluding Simi Valley) and for the unincorporated area. Emissions from local government operations account for approximately 4% of community emissions and are listed below:

Table 6: Total and Local Government Emissions Associated with Electricity Use

Year	CO_2e (metric tons) Total	CO_2e (metric tons) Local Government Operations
2010	1,668,979	66,301
2011	1,705,273	67,570
2012	1,721,038	67,387

The emissions reported above are emissions associated with the use of electricity and not its production. The electricity is provided by Southern California Edison through the electricity grid. This power could have been produced anywhere in the western power grid. Power is traded like a commodity and is delivered to Southern California Edison to meet demand and to meet the expectations of the company's shareholders. The Ventura County region is a net importer of electricity: in 2012, County residents and businesses' electricity use resulted in 1,721,038 metric tons of CO_2e while grid electricity produced in the County by its three power plants (Mandalay, Ormond and McGrath) emitted 285,671 metric tons.

3.3 Mobile-Based Emissions (Vehicles and Off-Road Equipment)

Mobile-based emissions result from the burning of fossil fuels in on and off-road vehicles and are the largest single source of emissions in this inventory, accounting for approximately 53% of each year's total emissions. On-road vehicles alone account for 46% of those emissions. Emissions were calculated using the State's EMFAC model[11] and California Public Road data made available by the California Department of Transportation (CalTrans). EMFAC is based on gasoline and diesel use in a wide range of vehicles found on State roads and highways.

This report includes information on emissions that occur on all roads in Ventura County, including those maintained by the cities and the County, the Department of Defense, the National Park Service, State Highways, State Park Service, U.S. Navy or US Forest Service. The largest percentage of vehicle emissions (54%) are associated with travel on State highways like the 101, 118, and 123 freeways. Using EMFAC and CalTrans data is a geographic approach, incorporating emissions from travel that begins and ends inside Ventura County and emissions from vehicles that travel through the County on State highways. This approach does not take into account the realities of travel, where people often live, work and shop in different locations. It also aggregates all city-to-city travel within the County into a single "travel on State highways" category. In the absence of a local travel demand model with detailed information on land use data and roadway networks, aggregated State highway data will be reported separately under the regional section of this report and emissions related to travel on City roads only will be presented for each jurisdiction. While VCREA has commissioned this GHG inventory, in general, decisions about emissions from vehicles are the purview of the Ventura County Air Pollution Control District and the Ventura County Transportation Commission.

[11] The Emission FACtors (EMFAC) model is developed by the Air Resources Board and used to calculate emission rates from on-road motor vehicles from light-duty passenger vehicles to heavy-duty trucks that operate on highways, freeways, and local roads in California. EMFAC 2014 is the most recent version of this model.

Total emissions from on-road vehicles for CYs 2010 through 2012 are listed below.

Table 7: GHG Emissions from On-Road Vehicles (VCREA Member Communities)

Year	CO_2e Total On-Road Emissions (VCREA members)
2010	3,431,902
2011	3,365,498
2012	3,298,797

Off-road vehicles and equipment are another source of emissions in the County. The largest source of emissions is construction and mining equipment, agricultural equipment, oil drilling, and pleasure craft.

Emissions from these sources are:

Table 8: GHG Emissions from Off-Road Vehicles & Equipment (VCREA Member Communities)

Year	CO_2e Total Off-Road Emissions (VCREA members)
2010	544,774
2011	550,843
2012	528,023

3.4 Other Emissions

3.4.1 Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per

year, the total amount of landfill gases produced in California is tremendous.[12]

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the County's total emissions associated with landfilled solid waste are:

Table 9: GHG Emissions from Landfilled Solid Waste

Year	CO_2e Emissions from Landfilled Solid Waste
2010	325,204
2011	325,040
2012	327,106

CO_2e emitted in 2012 as a result of landfilling waste accounted for 4.5% of the County's 2012 emissions.

3.4.2 Wastewater Treatment Emissions

2012 GHG emissions from domestic wastewater treatment for the County totaled 51,317 metric tons of CO_2e, which represents approximately 0.7% of its total emissions. Emissions from wastewater treatment include purchased electricity to operate publicly owned treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California Air Resources Board.

[12] http://www.energy.ca.gov/biomass/landfill_gas.html

3.4.3 High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[13]

Emissions from high global warming potential (GWP) GHGs for the County of Ventura in 2012 amounted to 392,874 metric tons of CO_2e, 5.43% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

3.5 Water and Energy

The water-energy nexus has been in the news since the California Energy Commission's landmark finding in 2005, that water related energy uses account for about 19% of all electricity use and 30% of non-power plant natural gas use in the state.[14] The California Energy Commission has estimated the average electricity needed to convey, treat and distribute water in Southern California is 11,111 kWh/million gallons (or 3.924 MWh/acre foot) for outdoor uses and 13,022 kWh/million gallons (or 4.599 MWh/acre foot).[15] This estimate does not include emissions associated with wastewater treatment or electricity needed for end uses of water.

[13] http://www.epa.gov/climatechange/ghgemissions/gases.html

[14] http://epicenergyblog.com/2013/07/08/the-water-energy-nexus-in-california/

[15] http://www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html

3.6 Avoided Energy Emissions (2010 through 2012)

3.6.1 Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Ventura County. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 10: Avoided GHG Emissions (2010-2012)

Program	MWhs Avoided (2010 – 2012)	MT CO_2e Avoided	Investment
Business General	102,144	28,342	$17,020,867
Business Coin-Op	18	5	$17,329
Partnership Programs (excluding Simi Valley)	2,970	824	$435,439
Total Non-Residential	**105,132**	**29,171**	**$17,473,636**
Advanced Lighting – Torchiere	314	87	$120,914
Advanced Lighting – WT	4	1	$397
Appliance Recycling	8,849	2,455	$1,310,117
Business Consumer Electronics	4,421	1,226	$438,206
Customer Facing Outreach	3	.78	$36
Comprehensive Manufactured Homes	242	67	$102,284
Home Energy Efficiency Rebate	1,848	512	$800,697
Lighting	55,078	15,282	$2,591,387
Multifamily Rebate Program	1,179	327	$741,884
Workforce Education and Training	594	164	$37,043
Residential Total	**75,494**	**20,944**	**$6,192,796**
TOTAL	**180,617**	**50,115**	**$23,666,433**

Although emissions from electricity use increased by about 2% between 2010 and 2012 (from 1,723,065 metric tons of CO_2e to 1,757,596 metric tons), that increase would have been closer to 5% without the programs listed above.

3.6.2 Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the region, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in the VCREA region for CYs 2010 through 2012 as a result of solar energy production are:

Table 11: Avoided GHG Emissions through Solar/PV Installations

Year	MT CO2e
2010	938
2011	1,085
2012	1,808

VENTURA COUNTY REGIONAL ENERGY ALLIANCE

PART II: REGIONAL GREENHOUSE GAS FORECAST TO 2020, REDUCTION TARGET OPTIONS

DRAFT – October 15, 2015

Prepared by:

Anacapa Consulting Services Inc.

Ventura, California

4. Regional Greenhouse Gas Forecasts and Reduction Target Options

As part of funding for the Climate on the Move project, VCREA has committed to identifying emission reduction targets for 2020. 2020 was the original year established by AB 32, California's Global Warming Solutions Act of 2006. The Act established 1990 as a baseline year and committed to a 15% reduction over that baseline by 2020. A range of measures were identified in the State's Scoping Plan and subsequently implemented; the State is confident that the 15% reduction will be met and exceeded. The Scoping Plan was updated in May 2014 to reflect the 2030 target of 40% below 1990 levels, as established by Governor Brown's Executive Order B-30-15. This is considered an interim goal, with the longer term goal of 80% below 1990 by 2050, established by SB 32 in June 2015.

To achieve these aggressive targets, local governments and public partnerships like VCREA will be expected to play their part. Although there are no regulatory requirements imposed on local governments that are specific to reducing GHG emissions: the State encourages local leadership in reducing GHG emissions.

The forecast section of this report provides an estimate of 2020 emissions if growth continues at current rates and nothing more is done by local governments to reduce CO_2e emissions.

- For emissions from electricity use, the forecast takes into account the State's Renewable Portfolio Standard (RPS) requirement that the mix of State power must include 33% renewable energy by 2020. In 2012 Southern California's renewable energy percentage was published at 15%, and in 2013 at 22%.[16] A business as usual model would not take into account the emissions reductions associated with the RPS. An adjusted business-as-usual (BAU) forecast provides an estimate of CO_2e emissions

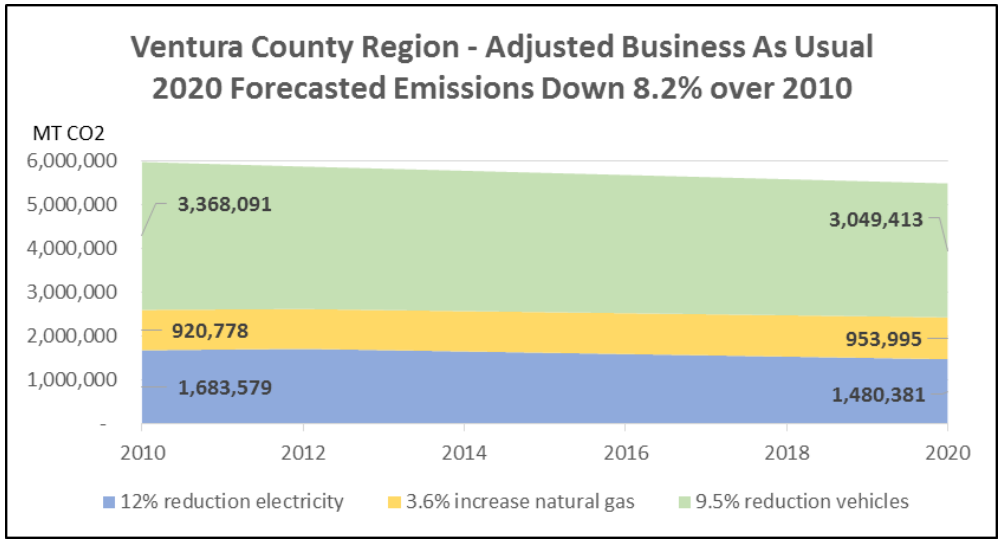
[16] http://www.energy.ca.gov/sb1305/labels/2013_labels/IOUs/Southern_California_Edison_2013.pdf

in 2020 as if no new local measures were implemented between 2012 and 2020, but in includes reductions associated with the power mix.[17]

- Emissions from natural gas combustion were based on the California Energy Commission's published data on anticipated demand for natural gas in Ventura County in 2020 and associated annual growth rates, a business as usual model.

- Vehicle emissions were projected using State modelling software that takes into account both clean fuel and clean car legislation, an adjusted business as usual model.

Forecasts were developed for the major categories in the inventory: emissions from energy use (electricity and natural gas) and on-road mobile emissions. The remaining emissions categories constitute a relatively small portion of the regional inventory. The result is that emissions in Ventura County will be 8.2% lower in 2020 than in 2010, because of the State's actions related to renewable energy and clean fuels and vehicles. Within that total, emissions from the use of electricity will be reduced by 12% over 2010, from on-road vehicles by 9.5% while emissions from natural gas combustion will increase by 3.6%.



[17] VCREA GHG inventories were developed for CYs 2010 through 2012. Forecasts were developed based on 2012; it is the most recent year for which data analysis was available.

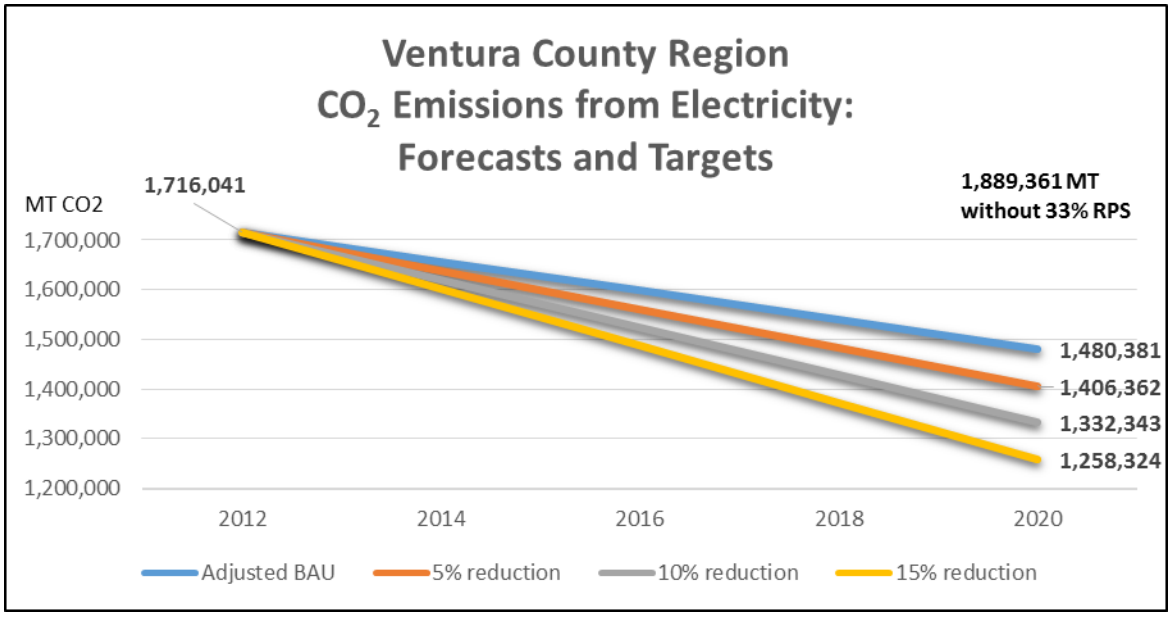
Based on these projections, three scenarios have been developed, to include potential emissions reduction targets of 5%, 10% and 15% below the adjusted business as usual 2020 levels.

This report also identifies reductions that would be required to achieve the same percentage reductions below 2010 levels, the earliest year for which data are available.

4.1 Emissions from Electricity Use

The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[18] For the VCREA region, a BAU scenario means that emissions would total 1,889,361 MT CO_2 in 2020, as compared to the 2012 levels of 1,716,041.[19] The adjusted BAU scenario projects 2020 emissions at 1,480,381 metric tons. Associated reduction targets are shown below:

Figure 2: Forecasts and Targets: Emissions from Electricity Use



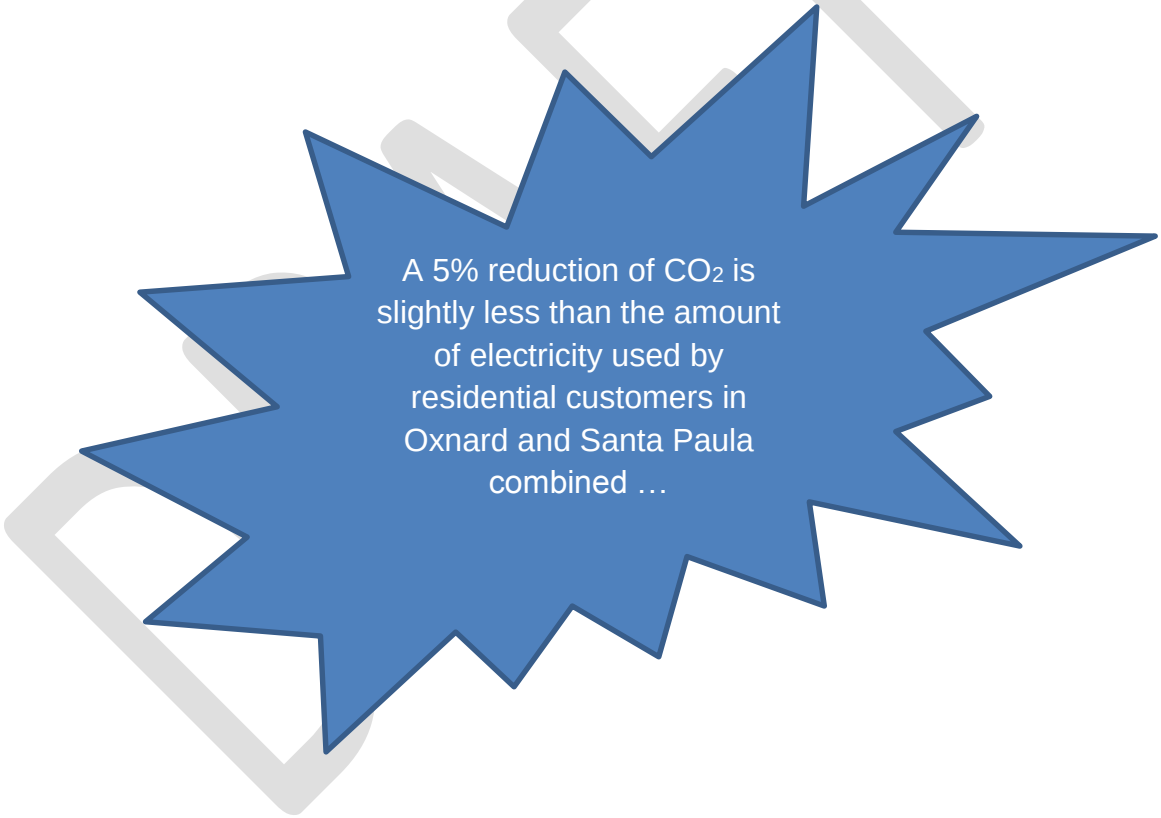
[18] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[19] Forecasts for electricity are calculated for CO2 only and do not include CH_4 and N_2O. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.

Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

Table 12: GHG Reductions Required to Meet Electricity Targets

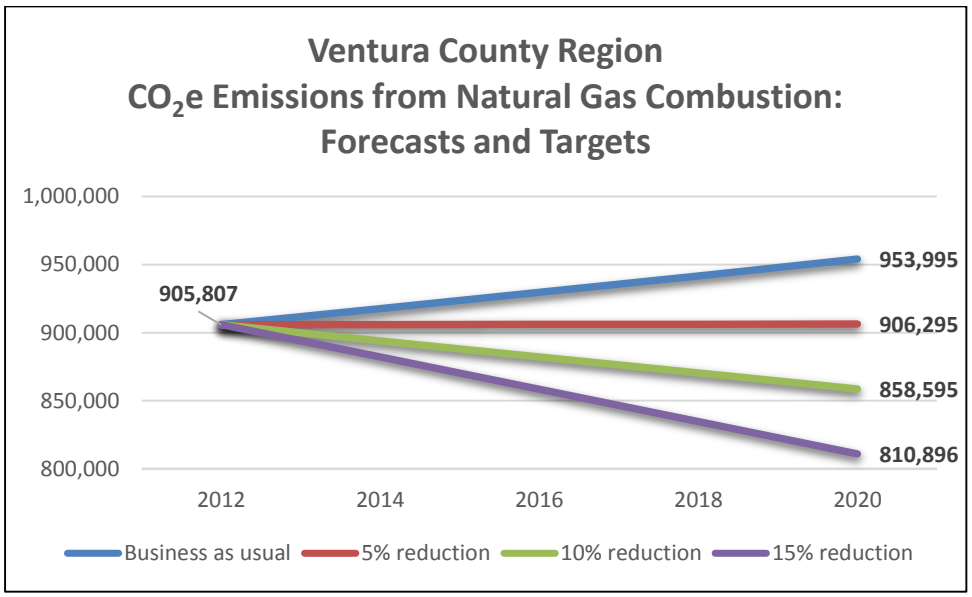
Reductions required 2010 to 2020	Below 2010 Levels ($MT CO_2$)	Below Adjusted BAU 2020 Levels ($MT CO_2$)
5% reduction	84,179	309,679
10% reduction	168,358	383,698
15% reduction	252,611	457,717



4.2 Emissions from Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[20] For the VCREA region, a BAU scenario means that emissions would total 953,995 MT CO_2e in 2020, as compared to the 2012 levels of 905,807. Associated reduction targets are shown below:

Figure 3: Forecasts and Targets: Emissions from Natural Gas Combustion



[20] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

Table 13: GHG Reductions Required to Meet Natural Gas Combustion Targets

Reductions required 2012 to 2020	Below 2012 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	45,290	-488[21]
10% reduction	90,581	47,212
15% reduction	135,871	94,912

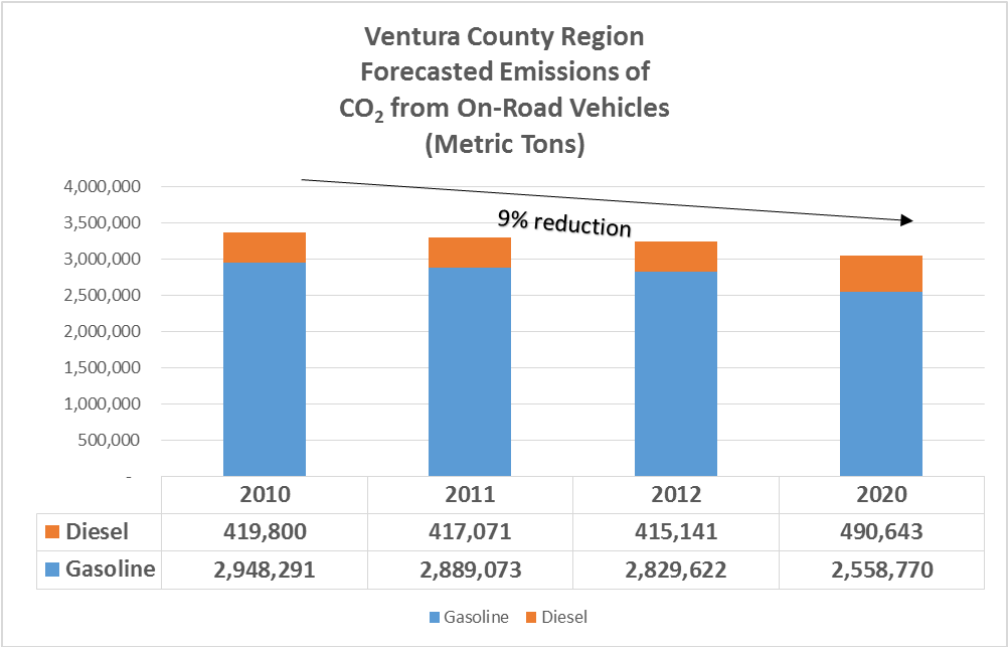
A 10% reduction of 172,104 MT of CO2e in natural gas combustion would be roughly equivalent to all natural gas used in Camarillo and Fillmore in 2012. This type of reduction would require dedicated effort to finding opportunities for reduction in the commercial and residential sectors throughout the VCREA region.

[21] Because growth in natural gas use is relatively low, a 5% reduction below 2020 levels would result in emissions that were higher than those in 2012.

4.3 Emissions from On-Road Transportation

The California ARB has developed a model to estimate emissions from on-road vehicles, including cars, trucks, and buses. This report uses that model (EMFAC) and data on maintained miles in the County to estimate the emissions generated by vehicles travelled on County roads, and to forecast those emissions for CY 2020. Because the State of California and the U.S Environmental Protection Agency and Department of Transportation have introduced regulations to improve fuel efficiency and vehicle mileage, Ventura County can expect to see a reduction in GHG emissions from vehicles, even if there is growth in number of vehicles and miles traveled. That reduction is substantial: the projected reduction is 9% between 2012 and 2020. EMFAC provides the region with the following estimate of current and forecasted emissions:

Figure 4: Forecasts and Targets: Emissions from On-Road Vehicles



To achieve a 15% reduction, emissions would need to be reduced an additional 205,900 metric tons of CO_2e by 2020.

5. Progress Since 2012

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for the VCREA member communities?

5.1 Reductions in Emissions from Electricity Use

Table 14: Reductions required in Electricity GHG Emissions to Meet 2020 Targets

Reductions required 2012 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below Adjusted BAU 2020 Levels (MT CO_2e)
5% reduction	**84,179**	95,695
10% reduction	168,358	181,747
15% reduction	252,611	267,799

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects and rooftop solar installations.

Cumulatively, these programs have resulted in emission reductions of 78,671 or approximately 4.5% below 2010 levels.

5.2 Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion remained relatively stable in Ventura County, with CO_2e MTs of 920,778, 956,657 and 905,807 in 2010, 2011 and 2012 respectively. However, those emissions will increase with the anticipated rise in demand by 2020. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emissions from the combustion of natural gas.

5.3 Reductions in Emissions from On-Road Vehicles

The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures.

VENTURA COUNTY REGIONAL ENERGY ALLIANCE

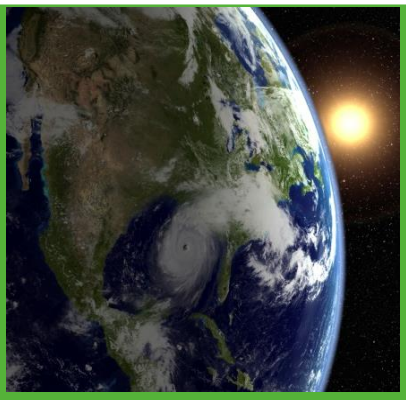
PART III: CLIMATE ACTION PLAN TEMPLATE

DRAFT – October 15, 2015

Prepared with the assistance of:
Anacapa Consulting Services Inc.
Ventura, California

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



2015

Climate Action Plan Template

1 Introduction

As noted in Part I, Climate on the Move, VCREA has committed to developing options for GHG reduction measures for consideration by local governments.

The options included in this template were developed using the following broad principles:

- Ongoing commitment to collaboration among stakeholders, including VCREA members, other local governments in the broader region, local utilities like Southern California Edison, the Southern California Gas Company, special districts, water agencies, state agencies, and others).
- Recognition of the importance of tracking and updating GHG emission inventories and carbon footprints to identify new sources and levels of GHGs and to measure progress towards reduction targets.
- Acknowledgement of the importance of community participation in mitigating GGH emissions.
- Prioritization of actions to leverage existing climate change-related programs investments and accomplishments.
- Focus on voluntary, incentive-based programs rather than ordinance-based measures.
- Understanding of the co-benefits of many climate change measures, including improved quality of life, improved public health, job creation, reduced air pollution, increased resource conservation, and increased cost savings.

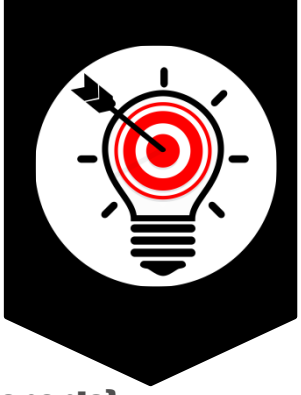
This template is organized as follows:

Section 2: Measures that target GHG reductions, under 5 broad strategic areas.

1. Green Building and Energy (Energy Action Plan components)
2. Water
3. Transportation
4. Solid Waste
5. Non-Traditional Measures

Section 3: Guidance for quantifying GHG reductions, year to year and on a project specific basis

Section 4: Options for Costing GHG reductions against benchmarks



2 Measures that Target GHG Reductions

Green Building and Energy (Energy Action Plan Components)

GB-1: Promote Tier 1 voluntary standards within CalGreen for all new residential and non-residential buildings, resulting in 15% energy savings and 30% indoor water savings.

As of 2011, the California Building Standards Commission began requiring all new buildings to comply with California Green Building Standards (CALGreen). These standards require new residential and commercial buildings to comply with mandatory measures under the topics of planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. CALGreen also provides voluntary tiers and measures that local governments may adopt to encourage additional action that ultimately support reductions in GHG emissions. Tier 1 of these voluntary tiers can be incorporated into local building codes as noted above.

GB-2: Work with utilities to conduct energy efficiency audits and retrofits for existing large commercial buildings. Promote SCE's Savings by Design program.

Understanding the current energy use and inefficiencies in a home or commercial building is the first step in identifying cost-effective measures to improve the energy efficiency of a building. Cities, the County and VCREA can cooperate with utilities, and through EmPower to maximize community knowledge about the impacts of energy inefficiency.

Savings By Design is a statewide program that encourages high-performance new building design and construction for commercial buildings. The program offers building owners and their design teams a wide range of services, such as Design Assistance, Design Team Incentives, Owner Incentives, and educational resources. Savings By Design offers these services for customized new construction projects that exceed California's Title 24 energy efficiency standards.

GB-3: Consider a low income weatherization program.

Weatherization services consist of cost-effective energy efficiency measures for existing residential and multifamily housing with low-income residents. Under this definition, it includes a wide variety of energy efficiency measures that encompass the building envelope, its heating and cooling systems, its electrical system, and electricity consuming appliances. Traditionally, low-income housing, particularly mobile homes, are less energy efficient and water efficient than other types of housing stock and their occupants' socio-economic status is generally lower.

GB-4: Install higher efficacy public street and area lighting.

"Lighting sources contribute to GHG emissions indirectly, via the production of the electricity that powers these lights. Public street and area lighting includes streetlights, pedestrian pathway lights, area lighting for parks and parking lots, and outdoor lighting around public buildings. Lighting design should consider the amount of light required for the area intended to be lit. Lumens are the measure of the amount of light perceived by the human eye. Different light fixtures have different efficacies or the amount of lumens produced per watt of power supplied. This is different than efficiency, and it is important that lighting improvements are based on maintaining the appropriate lumens per area when applying this measure. Installing more efficacious lamps will use less electricity while producing the same amount of light, and therefore reduces the associated indirect GHG emissions."[1]

[1] CAPCOA, Quantifying Greenhouse Gas Mitigation Measures, 2010

GB-5: Promote Demand Response programs among large energy users

Demand response is end-use electric customers reducing their electricity usage in a given time period, or shifting that usage to another time period, in response to a price signal, a financial incentive, an environmental condition or a reliability signal. The power plants that utilities turn on for electricity generation during peak load times, when electricity consumption is at its highest, are much less efficient than the baseload power plants that run throughout the day. Therefore, by reducing the need for "peaking" power plants, demand response can reduce the overall carbon intensity of the electric grid.

GB-6: Promote solar installation for new and existing homes and commercial facilities. Consider implementation of programs to promote solar water heating where solar electricity is not feasible or practical.

The California Solar Initiative was authorized in 2006 and allows the California Public Utilities Commission to provide incentives for the installation of solar technology on existing residential, commercial, nonprofit and government buildings. The current program is scheduled to expire in 2016; there is some anticipation that a new program will be established in its place.

GB-7: Continue facilitating energy efficiency financing, including programs like emPower, PACE and CHEEF.

emPower is a Central Coast program (Ventura, Santa Barbara and San Luis Obispo Counties) that helps homeowners make energy-saving improvements to their homes through incentives, financing and expert energy advice. The program partners with Energy Upgrade California and the California Solar Initiative to offer more utility rebates.

PACE (Property Assessed Clean Energy) is a voluntary State program (Assembly Bill 811) that allows on-site renewable energy generation and energy efficiency improvements to be financed through property taxes. Property owners are able to pay for energy efficiency, water efficiency and renewable energy retrofits over multiple years through a temporary increase in property taxes. Examples of these programs are Home Energy Retrofit Opportunity (HOME) and CaliforniaFIRST.

CHEEF (the California Hub for Energy Efficiency Financing) is a new State financing authority that works with independently owned utilities like SCE and SCG. Its purpose is to increase the availability of lower cost financing for energy investments throughout the State. The program is still in pilot phase, with programs being rolled out in 2015 and 2015.

Water

W-1: Establish permanent water consumption thresholds consistent with 2015 statewide water conservation restrictions.

Governor Brown's Executive Order B-29-15 directed the State Water Resources Control Board to impose restrictions to achieve a 25% reduction in potable urban water usage through February 28, 2016. It can reasonably be assumed that if California's drought extends into 2016, the Executive Order will be extended. In addition, there is nothing in the Order to prohibit regional and local governments from extending the restrictions, or modified ones. Doing so would result in ongoing water conservation and reduced GHG emissions associated with the transportation, distribution, treatment and heating of wasted water.

W-2: Maintain tiered water rate structures beyond drought years.

A similar rationale applies to maintaining tiered water rate structures.

W-3: Ongoing incentives for removal of turf and installation of water wise landscapes.

W-4: Increase the availability and use of recycled water in outdoor landscaping areas and encourage the use of greywater and rainwater harvesting.

W-5: Continue to work with utilities to incentivize low flow toilets, showers, and faucets.

Southern California Gas currently provides rebates on water heaters, tank less water heaters, clothes washers, and low flow showerheads and furnaces.

Transportation

Transportation measures fall more directly under the authority of city and county government and not under the mandate of VCREA. Below are the types of measures that could be included in General Plan updates and local government programs that would result in reduced GHG emissions.

T-1: Consider GHG implications in strategic growth strategies (e.g., infill, residential densities, pedestrian circulation, etc.)

T-2: Promote transit-oriented development where appropriate.

T-3: Improve access to community-wide pedestrian and bicycle networks.

T-4: Incorporate climate change considerations into decision making on minimum parking requirements.

T-5: Support voluntary commute trip reduction programs.

T-6: Expand the availability of electric vehicle charging stations.

Solid Waste and Recycling

SW-1: Provide additional opportunities for residents to recycle cardboard, glass, paper and plastic products.

SW-2: Encourage the development of biomass, green waste and food waste composting facilities.

SW-3: Encourage residents to install home composting equipment.

Non-Traditional Measures

NT-1: Purchase offset credits to achieve a portion of targeted reductions.

A carbon offset credit is purchased in order to offset emissions made elsewhere. There are two markets for carbon offsets. In the larger,

compliance market, companies, governments, or other entities buy carbon offsets in order to comply with caps on the total amount of carbon dioxide they are allowed to emit. This is how the California Cap-and-Trade Market operates. A smaller, voluntary market exists where individuals, companies or governments purchase carbon offsets to mitigate their own greenhouse gas emissions. Voluntary prices have begun to follow the price point for mandatory carbon.

NT-2: Promote and participate in Direct Access programs to allow for purchase of renewable electricity.

Direct Access Service allows customers to purchase electricity from electric service providers other than utilities. These providers contract directly with customers to provide electricity and guarantee an adequate supply to that customer. The power is then delivered across utility lines. Entities across the State (including the City of Thousand Oaks) have begun using this program to ensure price stability and to purchase green power.

NT-3: Consider participation in Community Choice Energy (CCE).

Community choice energy programs enable California cities and counties to become energy purveyors by aggregating the electric loads of residences, businesses and public facilities. CCE programs are then able to buy, develop and sell electrical energy independent of local utilities. Community choice aggregation is a model that works in partnership with those utilities, since the utilities continue to deliver power, maintain the grid and provide consolidated billing and other customer services. The approach has been adopted in California because it has the promise of providing competitive electricity rates and cleaner, more efficient energy supply, among other benefits.

3 Quantifying GHG Reductions

Tracking Progress

This Climate Action Plan provides information on GHG emissions through 2012. [An appendix will be developed in November 2015 with SCE data for CYs 2013 and 2014, and, if available, data from SCG.]

Regardless of the target option chosen, updated information will assist with program selection and focus. For example, if targets for emissions from electricity are being met and those for natural gas are not, additional focus could be placed on the latter.

For the time period 2016-2020, annual community inventories are recommended. Cities and County government may also wish to update their local government inventories as part of that exercise.

For 2020 forward, bi-annual inventories can be used to track progress towards future targets.

Project Specific

In 2007, the State of California enacted SB 97, requiring the analysis and mitigation of greenhouse gas emissions in the CEQA (California Environmental Quality Act) process. Among other elements, CEQA mandates analysis of a proposed project's potential energy use (including transportation-related energy), sources of energy supply, and ways to reduce energy demand, through the use of efficient transportation alternatives. These analyses will provide local governments with a better understanding of avoided emissions that result from GHG mitigation efforts.

Similarly, adoption of CalGreen Voluntary Tier 1 standards in local building codes and then tracking their use will provide another method of quantifying GHG reductions across a jurisdiction.

Early in a project process, if project options are being compared, or if two projects are being compared to each other with respect to GHG emissions and mitigation,

CalEEMod, a statewide land use emissions model, is available to provide early information associated with both construction and operational emissions.

4 Benchmarking GHG Reductions

GHG reductions occur through energy efficiency projects, small and commercial scale alternative energy supply and increases in the proportion of renewable energy delivered through the electrical grid. Energy efficiency projects are generally undertaken for a variety of reasons, including cost savings, regulatory requirements, equipment replacement, etc. In these cases, standard return on investment calculations assist with determining the best options.

In some situations, projects may be undertaken primarily for the purpose of reducing greenhouse gas emissions. For these reduction projects, decision makers can assess the carbon costs and benefits of the project against the price of carbon, as published on the California Carbon Dashboard.[2] On October 14, 2015, California carbon allowance futures were being traded at $12.86 per metric ton of CO_2e, down from a high of $23.75 in 2011. If the project cost per metric ton of mitigated carbon is higher than the price of carbon on the market, and the project is being undertaken only for GHG reduction purposes, decision makers could consider purchasing offset credits (Measure N-2) as an alternative.

[2] http://calcarbondash.org/

Appendix A.1:

City of Camarillo

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance

2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Target Options

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill 32 (AB 32), which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The City of Camarillo, incorporated in 1964, lies within Ventura County covering approximately 20 square miles, with a 2012 population of 65,201 according to the California Department of Finance[1]. Camarillo enjoys a reputation as a preferred location for high-tech, retail and specialty businesses. To support this, the City boasts a highly educated workforce, modern industrial buildings, strong relationships with local business leaders and other government agencies, and a streamlined permitting process.

The majority of Camarillo's GHG emissions are produced through the burning of fossil fuels. The City's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the City of Camarillo's geographical boundaries (i.e. city limits). The City's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the City of Camarillo were inventoried for the years 2010 through 2012. The City has not established a baseline year for its inventories.

[1] http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Camarillo's Community Inventory

The City of Camarillo's Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities within the city limits. Stationary combustion data was provided by Southern California Gas Company (SCG). Southern California Edison (SCE) provided electricity data.

Table 1 quantifies the contributions of each sector to total the community emissions generated during the period of 2010 through 2012.

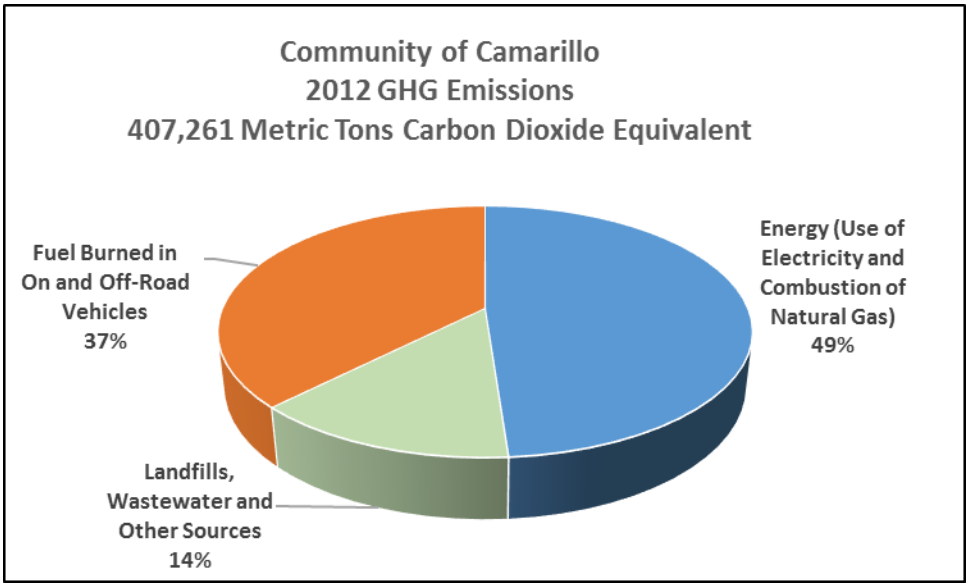
Figure 1 illustrates on average each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 31% of emissions each year.

Table 1. Community GHG Emissions by Sector for the City of Camarillo

Sector	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
On-Road Transportation	129,897	127,384	124,859
Non-Residential Electricity Use	81,106	80,470	80,562
Other Emissions*	49,563	50,713	55,398
Residential Natural Gas Use	52,347	54,517	49,273
Residential Electricity Use	47,556	47,843	47,556
Off-Road Vehicle Use	29,302	29,981	28,099
Non-Residential Natural Gas Use	22,087	22,389	21,513
Total	**411,859**	**413,298**	**407,261**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1. 2012 Community GHG Emissions for the City of Camarillo



As explained in the body of this report, emissions are categorized based on control of the processes from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the organization, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g., purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

The table below documents that both Scope 1 (direct) and Scope 2 (indirect) emissions source contributions remained relatively consistent through the three-year period.

Table 2. Direct and Indirect Emissions for the City of Camarillo

Scope	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
Scope 1 (Direct) emissions	281,447	283,158	277,218
Scope 2 (Indirect) emissions	130,411	130,140	130,042
Total	**411,859**	**413,298**	**407,261**

A detailed description of the calculation methodologies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

Residential and non-residential emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

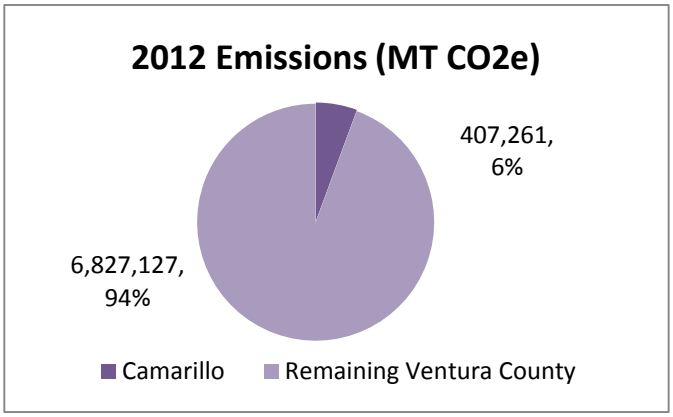
Total GHG emissions in 2012 for the City of Camarillo amounted to 407,261 metric tons of CO_2e. The City is the fifth-largest incorporated city in terms of total County emissions. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the City of Camarillo.

As shown in Figure 2, emissions from the City of Camarillo in 2012 accounted for about 6% of overall GHG emissions for Ventura County.

Camarillo's 2012 per capita GHG emissions are 6.16 metric tons of CO_2e, compared to countywide per capita emissions of 6.55 metric tons.

A discussion of City of Camarillo's GHG emissions for each major sector, focusing on CY 2012, is presented below.

Figure 2. Camarillo Portion of Ventura County Community Inventory



Emissions from the Residential Sector

Residential emissions in the City of Camarillo mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the City of Camarillo

Year	MT CO_2e
2010	52,347
2011	54,517
2012	49,273

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the City of Camarillo

Year	MT CO_2e
2010	47,556
2011	47,843
2012	47,556

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in the Regional Inventory. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-Residential Emissions from Natural Gas for the City of Camarillo

Year	MT CO_2e
2010	22,087
2011	22,389
2012	21,513

Non-residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 6. Non-residential Emissions from Electricity for the City of Camarillo

Year	MT CO_2e
2010	81,106
2011	80,470
2012	80,562

California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. There are no facilities in Camarillo subject to this reporting requirement.

On-Road Transportation Emissions

Vehicle miles travelled on Camarillo roads account for approximately 4% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 124,859 metric tons of CO_2e, which represents 30.7% of total Camarillo community emissions. These emissions resulted from vehicles burning gasoline and diesel fuel.[2]

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the City on those highways, particularly for commuting purposes.

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the City of Camarillo in 2012 resulted in 28,099 metric tons of CO_2e, which represents 6.9% of 2012 emissions.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous.[3]

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are:

Table 7. Emissions from Landfilled Solid Waste for the City of Camarillo

Year	MT CO_2e
2010	18,479
2011	18,267
2012	20,226

There is no municipal solid waste landfill in Camarillo. Waste generated in the City is transported to landfills outside the City boundaries.

CO_2e emitted in 2012 as a result of landfilling waste accounted for 4.9% of Camarillo's 2012 emissions.

[3] http://www.energy.ca.gov/biomass/landfill_gas.html

Water and Wastewater Treatment Emissions

GHG emissions from electricity consumption for water supply and irrigation infrastructure required for the City of Camarillo amounted to 1,031 metric tons of CO_2e for the period, which represents 0.2% of overall emissions.

2012 GHG emissions from domestic wastewater treatment for the City of Camarillo amounted to 2,822 metric tons of CO_2e, which represents 0.5% of Camarillo's total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California Air Resources Board.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the City of Camarillo in 2012 amounted to 31,320 metric tons of CO_2e, 5.6% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

[4] http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Camarillo. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 8. 2010-2012 Avoided Emissions from SCE Programs in the City of Camarillo

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	12,043	3,342	$1,990,537
Partnership Programs	518	144	$44,215
Total Non-Residential	**12,561**	**3,486**	**$2,036,743**
Advanced Lighting – Torchiere	159	43.99	$53,111
Advanced Lighting – WT	1	0	$86
Appliance Recycling	1,227	340	$192,051
Business Consumer Electronics	48	13	$7,032
Customer Facing Outreach	0	0.1	$6
Comprehensive Manufactured Homes	10	3	$4,072
Home Energy Efficiency Rebate	207	57	$108,078
Home Energy Efficiency Survey	608	169	$11,224
Lighting	2,524	700	$116,868
Multifamily Rebate Program	41	11	$20,663
Workforce Education and Training	35	10	$2,467
Residential Total	**4,860**	**1,348**	**$515,656**
TOTAL	**17,421**	**4,834**	**$2,552,398**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Incentive. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the City, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in Camarillo for CYs 2010 through 2012 as a result of solar energy production are:

Table 9. Avoided Emissions from Solar Production in the City of Camarillo

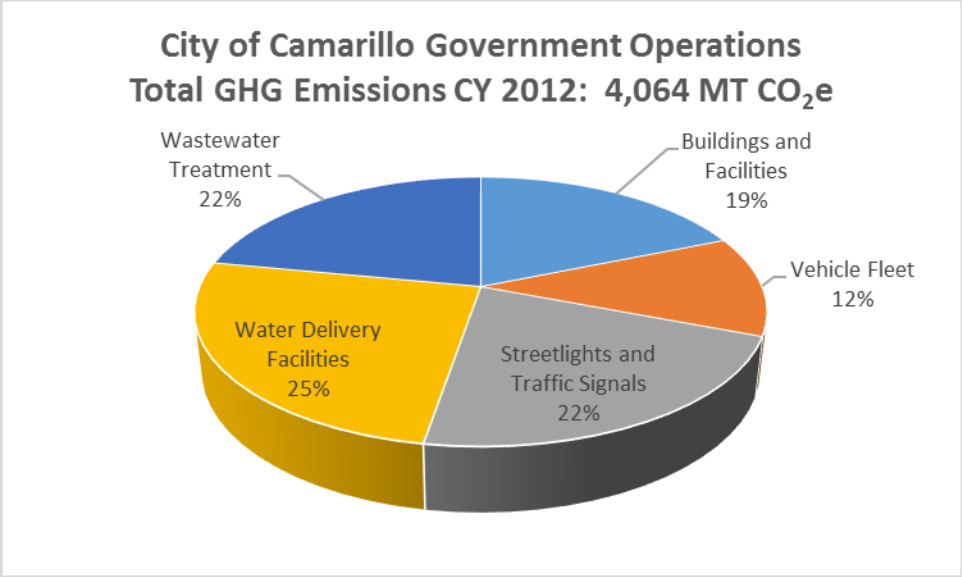
Year	MT CO_2e
2010	153
2011	186
2012	264

3 Camarillo City Government Operations Inventory

The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

Because there were no significant changes between 2010 and 2012, the following chart shows the relative contribution of various sources to GHG emissions from City government operations.

Figure 3. 2012 GHG Emissions from City of Camarillo Government Operations



Emissions from the Use of Electricity

Camarillo purchases its electricity from Southern California Edison. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 10. Emissions from the Use of Electricity for City of Camarillo Government Operations

	2010 MT CO_2e	2011 MT CO_2e	2012 MT CO_2e
Buildings and Facilities	714	693	729
Lighting and Traffic Control	851	892	887
Water and Pumping	949	974	1,031
Wastewater Treatment	800	853	893
Total	**3,315**	**3,412**	**3,541**

Emissions from the Combustion of Natural Gas

The City of Camarillo purchases natural gas from the Southern California Gas Company, primarily for heating its facilities and for operating boilers in its larger buildings. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Combustion of Natural Gas for City of Camarillo Government Operations

Year	MT CO_2e
2010	71
2011	70
2012	35

Emissions from City Owned and Operated Vehicles

The City of Camarillo owns and operates both gasoline and diesel fueled vehicles. Based on data provided by the City's Fleet manager (fuel usage and mileage), emissions from these vehicles is as follows:

Table 12. Emissions from City of Camarillo Vehicle Fleet

Year	MT CO_2e
2010	508
2011	496
2012	490

4 Camarillo Community Greenhouse Gas Forecasts and Reduction Targets

Part I of this report provides an overview of the approach to forecasting and reduction targets for the VCREA and its member local governments. Forecasts and reduction targets have been established for energy use (electricity and natural gas) and for on-road vehicles.

Forecasted Emissions from and Targets for Electricity Use

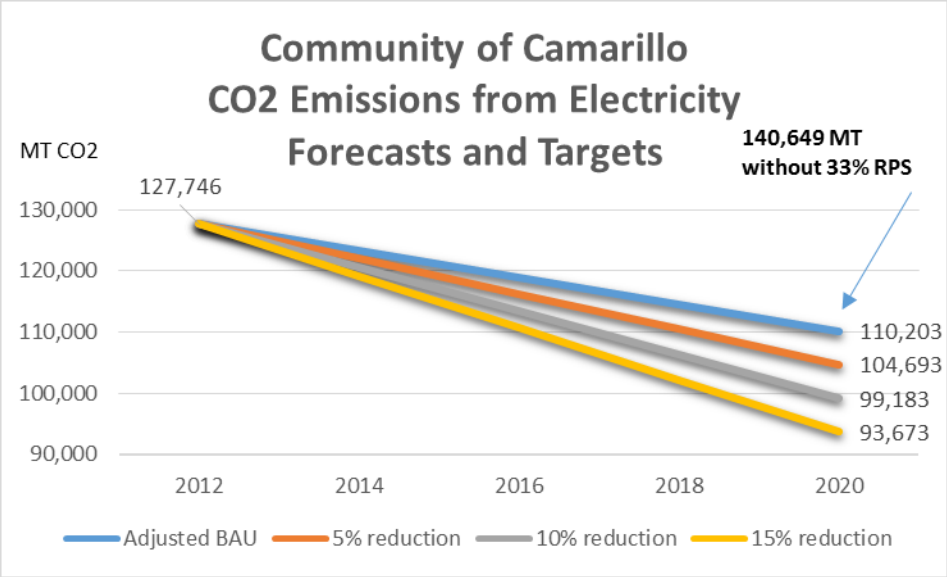
The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[5] For the City of Camarillo, a BAU scenario means that emissions would total 140,649 MT CO_2 in 2020, as compared to the 2012 levels of 127,746.[6] The adjusted BAU scenario projects 2020 emissions at 110,203 metric tons. Associated reduction targets are shown below:

:

Figure 4. Emissions from Electricity Forecasts and Targets for the City of Camarillo

[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[6] Forecasts for electricity are calculated for CO2 only and do not include CH_4 and N_2O. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.



Based on this Adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

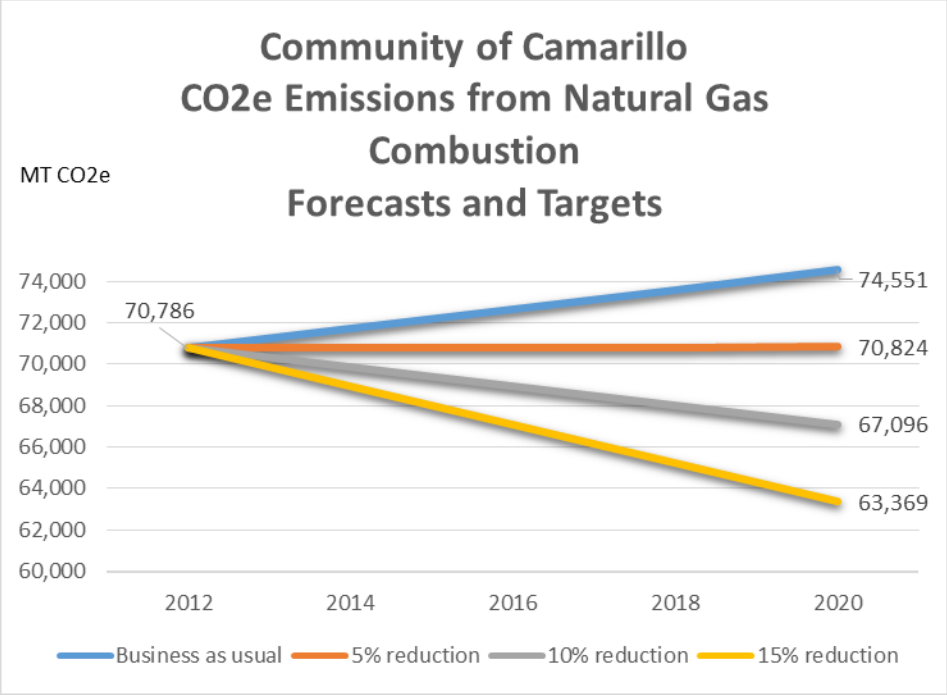
Table 13. Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the City of Camarillo

Reductions required 2010 to 2020	Below 2010Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	6,413	23,053
10% reduction	12,825	28,563
15% reduction	19,243	34,073

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[7] For the City, a BAU scenario means that emissions would total 74,551 MT CO_2e in 2020, as compared to the 2012 levels of 70,786. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the City of Camarillo



Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

[7] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

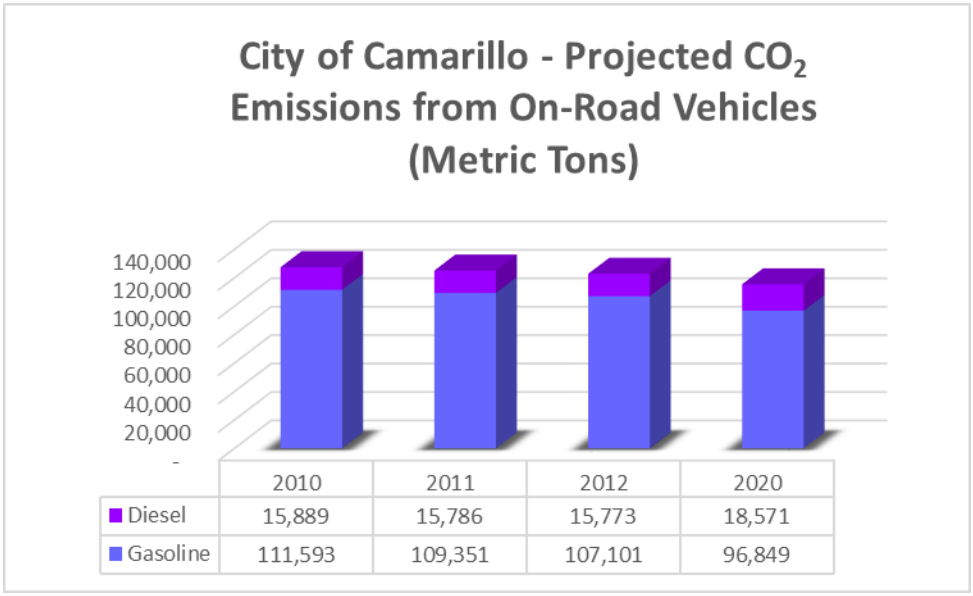
Table 14. Required Emissions Reductions from Natural Gas to Meet 5%, 10% and 15% Targets for the City of Camarillo

Reductions required 2012 to 2020	Below 2012 Levels ($MT CO_2e$)	Below BAU 2020 Levels ($MT CO_2e$)
5% reduction	3,722	-38
10% reduction	7,443	3,689
15% reduction	11,165	7,417

Forecasted Emissions from and Targets for On Road Transportation

As noted in Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010**. Any additional activities on the part of Camarillo, including support for alternative modes of transportation, behavioral change, regional cooperation, etc. could increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on State highways, which would include commuting and inter-city travel. Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the City of Camarillo



	2010	2011	2012	2020
Diesel	15,889	15,786	15,773	18,571
Gasoline	111,593	109,351	107,101	96,849

5 Camarillo City Government Greenhouse Gas Forecasts and Reduction Targets

Camarillo: Energy Action Plan

In 2014, the City of Camarillo, in collaboration with VCREA presented an energy action plan to Southern California Edison. The plan identified the City's highest energy users (2008) as its Sanitation Plant, Library, City Hall and Corporation Yard. The City committed to a 10% reduction in municipal energy use over the 2008 baseline by 2020.[8] The targeted kwhs are 11,037,294.

[8] Note that this commitment applied to electricity use only and did not address the use of natural gas.

6 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for Camarillo.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	6,413	23,053
10% reduction	12,825	28,563
15% reduction	19,243	34,073

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects and rooftop solar installations.

Cumulatively, these programs have resulted in emission reductions of 8,815 or approximately 4.5% below 2010 levels. If the region maintained this level of program effort (approximately 15,734 MTs of reductions per year), a 10% reduction goal over 2010 by 2020 could be reached.

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion remained relatively stable in Camarillo, totaling 74,434, 76,906 and 70,786 metric tons of CO_2e in 2010, 2011 and 2012 respectively. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emissions from the combustion of natural gas.

Reductions in Emissions from On-Road Vehicles

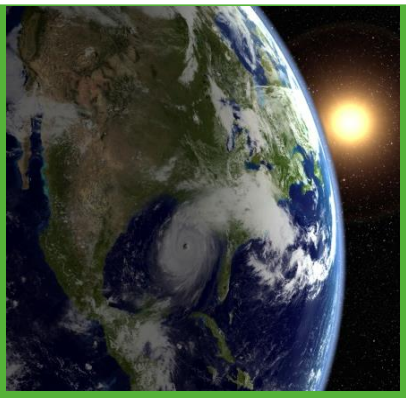
The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures. In order to meet a 10% target below 2010 levels, on-road emissions in Camarillo would need to be cut by an additional 686 metric tons of CO_2 and to meet the 15% target, an additional 7,060 metric tons.

Appendix A.2:

City of Fillmore

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Target Options

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill 32 (AB 32), which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The City of Fillmore, incorporated in 1914 (but originally founded in 1888) lies within northeastern Ventura County, and covers approximately 3.4 square miles, with a population of around 15,000 according to the California Department of Finance[1]. Fillmore is a small valley town largely driven by agriculture, primarily citrus.

The majority of Fillmore's GHG emissions are produced through the burning of fossil fuels. The City's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the City of Fillmore's geographical boundaries (i.e. city limits). The City's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the City of Fillmore were inventoried for the years 2010 through 2012. The City has not established a baseline year for its inventories.

1http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Fillmore's Community Inventory

The City of Fillmore's Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities within the city limits. Stationary combustion data was provided by Southern California Gas Company (SCG). Southern California Edison (SCE) provided electricity data.

Table 1 quantifies the contributions of each sector to total the community emissions generated during the period of 2010 through 2012.

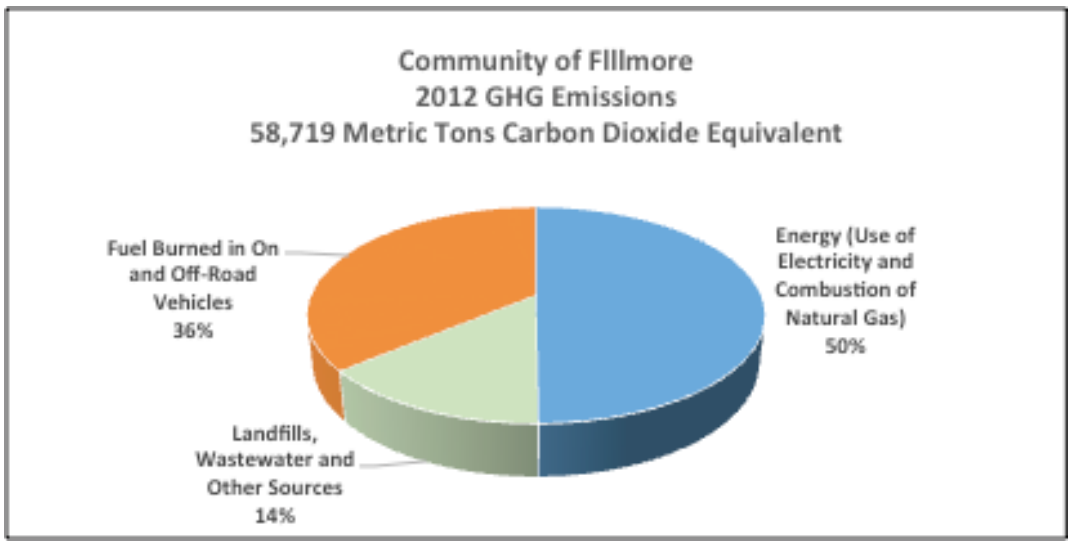
Error! Reference source not found. illustrates on average each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 25% of emissions each year.

Table 1. Community GHG Emissions by Sector for the City of Fillmore

Sector	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
On-Road Transportation	15,375	15,077	14,779
Other Emissions*	11,904	11,840	12,546
Residential Natural Gas Use	9,077	9,112	8,248
Non-Residential Electricity Use	7,515	7,481	7,664
Residential Electricity Use	7,071	7,022	7,471
Off-Road Vehicle Use	6,742	6,838	6,408
Non-Residential Natural Gas Use	1,739	1,661	1,603
Total	**59,423**	**59,031**	**58,719**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1 2012 Community GHG Emissions for the City of Fillmore



As explained in the body of this report, emissions are categorized based on control of the processes from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the organization, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g., purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

Table 2 below documents that both Scope 1 (direct) and Scope 2 (indirect) emissions source contributions remained relatively consistent through the three-year period.

Table 2. Direct and Indirect Emissions for the City of Fillmore

Scope	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
Scope 1 (Direct) emissions	44,511	44,182	43,208
Scope 2 (Indirect) emissions	14,913	14,848	15,511
Total	**59,423**	**59,031**	**58,719**

A detailed description of the calculation methodolgies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

Emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

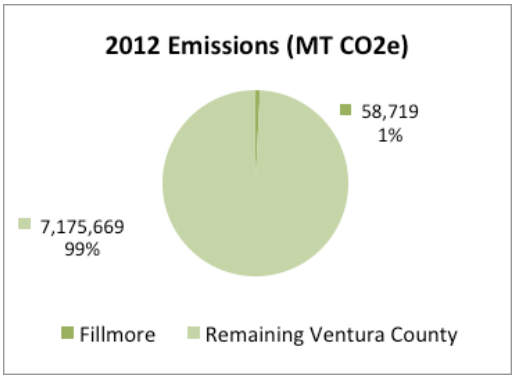
Total GHG emissions in 2012 for the City of Fillmore amounted to 58,719 metric tons of CO_2e. The City is the ninth-largest incorporated city in terms of total County emissions. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the City of Fillmore.

As shown in Figure 2, emissions from the City of Fillmore in 2012 accounted for about 1% of overall GHG emissions for Ventura County.

Fillmore's 2012 per capita GHG emissions are 3.90 metric tons of CO_2e, compared to countywide per capita emissions of 6.55 metric tons.

A discussion of City of Fillmore's GHG emissions for each major sector, focusing on CY 2012, is presented below.

Figure 2. Fillmore Portion of Ventura County Community Inventory



Emissions from the Residential Sector

Residential emissions for the City of Fillmore mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the City of Fillmore

Year	MT CO_2e
2010	9,077
2011	9,112
2012	8,248

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the City of Fillmore

Year	MT CO_2e
2010	7,071
2011	7,022
2012	7,471

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in Part I of this report. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-Residential Emissions from Natural Gas for the City of Fillmore

Year	MT CO_2e
2010	1,739
2011	1,661
2012	1,603

Non-residential use of electricity provided by Southern California Edison produced GHGs as follow:

Table 6. Non-Residential Emissions from Electricity for the City of Fillmore

Year	MT CO_2e
2010	7,515
2011	7,481
2012	7,664

California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. There are no facilities in Fillmore subject to this reporting requirement.

On-Road Transportation Emissions

Vehicle miles traveled on Fillmore roads account for approximately 0.45% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 14,779 metric tons of CO_2e, which represents 25.2% of total Fillmore community emissions. These emissions included vehicles burning gasoline and diesel fuel.[2]

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the City of Fillmore in 2012 resulted in 6,408 metric tons of CO_2e, which represents 10.9% of emissions.

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the City on those highways, particularly for commuting purposes.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuses in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane, but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous[3].

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are:

Table 7. Emissions from Landfilled Solid Waste for the City of Fillmore

Year	MT CO_2e
2010	4,828
2011	4,510
2012	4,586

There is no municipal solid waste landfill in Fillmore. Waste generated in the City is transported to landfills outside the City boundaries.

CO_2e emitted in 2012 as a result of landfilling of waste accounted for 7.8% of Fillmore's 2012 emissions.

[3]http://www.energy.ca.gov/biomass/landfill_gas.html

Water and Wastewater Treatment Emissions

GHG emissions from electricity consumption for water supply and irrigation infrastructure required for the City of Fillmore amounted to 337 metric tons of CO_2e for the period, which represents 0.4% of overall emissions.

2012 GHG emissions from domestic wastewater treatment for the City of Fillmore amounted to 440 metric tons of CO_2e, which represents 0.5% of Fillmore's total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the City of Fillmore in 2012 amounted to 7,143 metric tons of CO_2e, 7.4% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

4 http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Fillmore. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 8. 2010-2012 Avoided Emissions from SCE Programs in the City of Fillmore

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	1,936	537	$274,361
Partnership Programs	74	21	$10,771
Coin-Op	0	.02	$90
Total Non-Residential	**2,010**	**558**	**$285,220**
Appliance Recycling	182	51	$25,299
Comprehensive Manufactured Homes	1	0	$442
Home Energy Efficiency Rebate	13	4	$6,180
Home Energy Efficiency Survey	26	7	$535
Lighting	736	204	$42,764
Advanced Lighting-Torchiere	0	.1	$405
Multifamily Rebate Program	6	2	$2,202
Total Residential	**964**	**269**	**$77,827**
TOTAL	**2,974**	**827**	**$363,047**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the City, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in Fillmore for CYs 2010 through 2012 as a result of solar energy production are:

Table 9. Avoided Emissions from Solar Production in the City of Fillmore

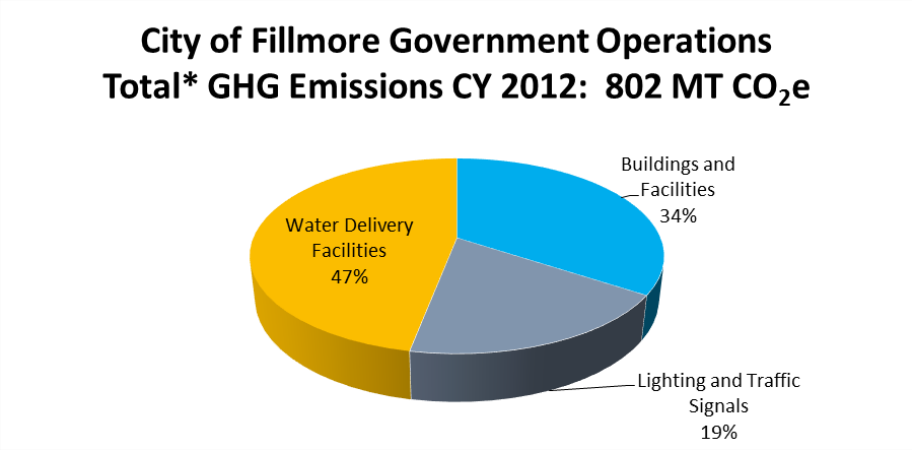
Year	MT CO_2e
2010	9
2011	6
2012	32

3 Fillmore City Government Operations Inventory

The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

Because there were no significant changes between 2010 and 2012, the following chart shows the relative contribution of various sources to GHG emissions from City government operations.

Figure 3. 2012 GHG Emissions from City of Fillmore Government Operations



* Note that the City of Fillmore's inventory does not include emissions from city-owned and operated vehicles. Emissions were calculated based on electricity and natural gas only.

Emissions from the Use of Electricity

Fillmore purchases its electricity from Southern California Edison. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 10. Emissions from the Use of Electricity for City of Fillmore Government Operations

	2010 MT CO_2e	2011 MT CO_2e	2012 MT CO_2e
Buildings and Facilities	240	233	176
Lighting and Traffic Control	163	157	151
Water and Pumping	326	346	377
Total	**729**	**736**	**703**

Emissions from the Combustion of Natural Gas

The City of Fillmore purchases natural gas from the Southern California Gas Company, primarily for heating its facilities and for operating boilers in its municipal buildings. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Combustion of Natural Gas for City of Fillmore Government Operations

Year	MT CO_2e
2010	124
2011	96
2012	99

Emissions from City Owned and Operated Vehicles

Data on emissions from city owned vehicles were not available.

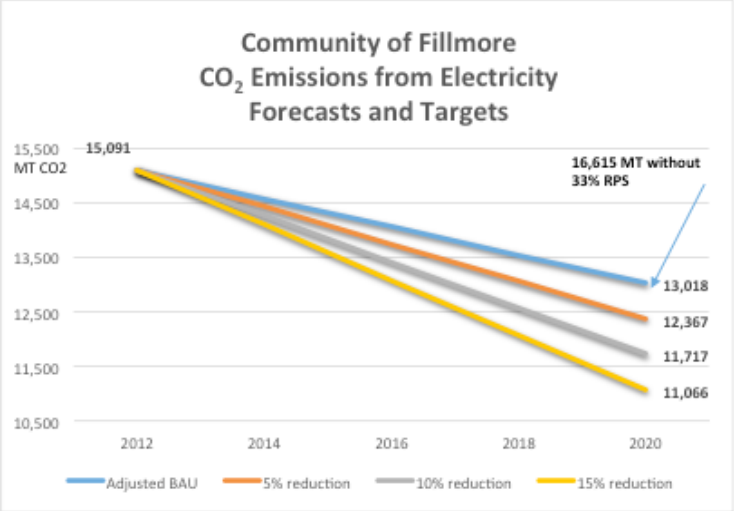
4 Fillmore Community Greenhouse Gas Forecasts and Reduction Target Options

Part I of this report provides an overview of the approach to forecasting and reduction targets for the VCREA and its member local governments. Forecasts and reduction targets have been established for energy use (electricity and natural gas) and for on-road vehicles.

Forecasted Emissions from and Targets for Electricity Use

The California Energy Commission has estimated a preliminary high-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[5] For Fillmore, a BAU scenario means that emissions would total 16,615 MT CO2e in 2020, as compared to the 2012 levels of 15.091. The adjusted BAU scenario projects 2020 emission at 13,018 metric tons. Associated reduction targets are shown below:

Figure 4. Emissions from Electricity Forecasts and Targets for the City of Fillmore



[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

Based on this Adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

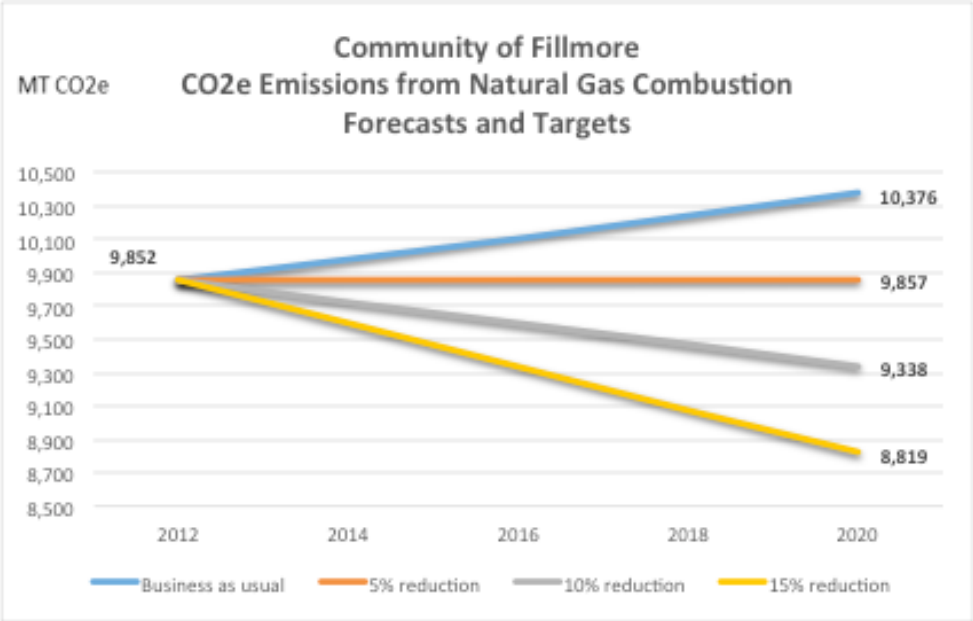
Table 12. Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the City of Fillmore

Reductions required 2010 to 2020	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	727	2,723
10% reduction	1,454	3,374
15% reduction	2,182	4,025

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[6] For Fillmore, a BAU scenario means that emissions would total 10,376 MT CO_2e in 2020 as compared to the 2012 levels of 9,852. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the City of Fillmore



Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

[6] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

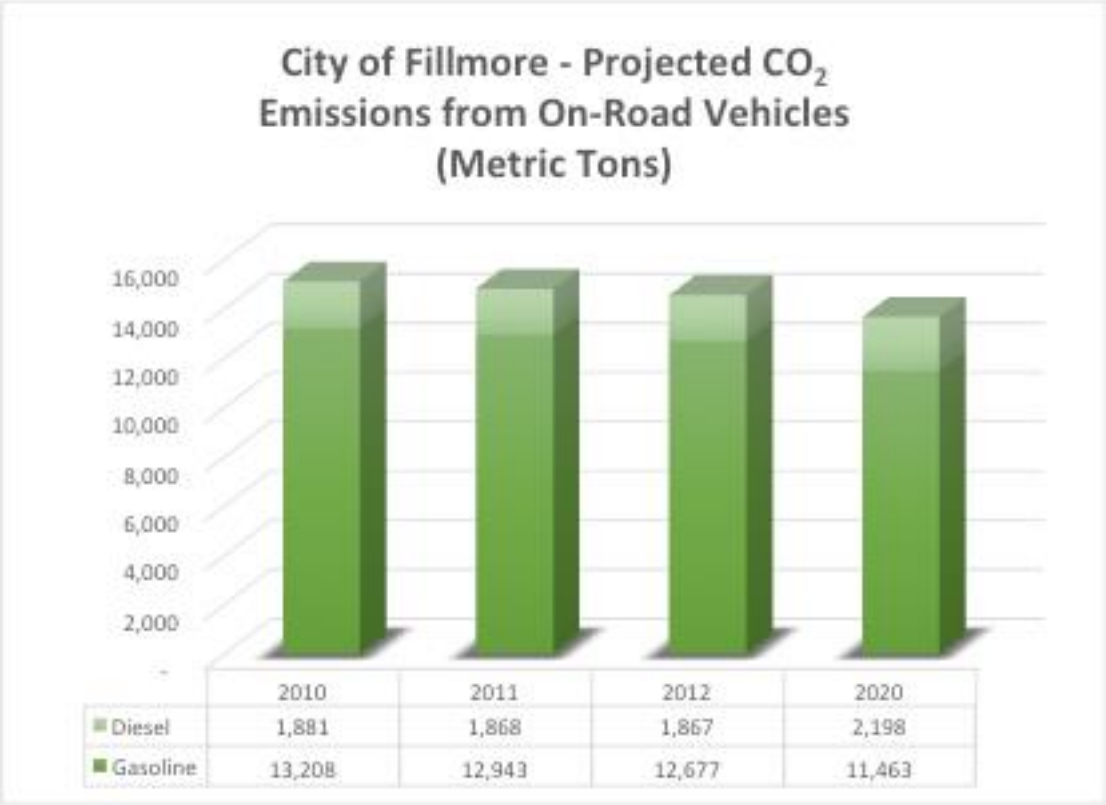
Table 13. Required Emissions Reductions from Natural Gas to Meet 5%, 10% and 15% Targets for the City of Fillmore

Reductions required 2012 to 2020	Below 2012 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	541	-5
10% reduction	1,082	513
15% reduction	1,622	1,032

Forecasted Emissions from and Targets for On Road Transportation

As noted in the Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010**. Any additional activities on the part of Fillmore, including support for alternative modes of transportation, behavioral change, regional cooperation, etc. could bring increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on State highways, which would include commuting and inter-city travel. Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the City of Fillmore[7]



[7] Note that there are small differences between 2010 through 2012 emissions reported here and those for the GHG inventory reported earlier. Inventory includes CH4 and N2O, forecasts are based on CO2 only.

5 Fillmore City Government Greenhouse Gas Forecasts and Reduction Targets

Fillmore: Energy Action Plan

In 2014, the City of Fillmore, in collaboration with VCREA presented an energy action plan to Southern California Edison. The plan identified the City's highest energy users (2006) as City Hall, the Policy Department, Fire Department, Parks and Recreation Theater Lighting, and the Community Center. The City committed to a 20% reduction in municipal energy use by 20% over the 2006 baseline by 2020.[8] The targeted kWhs are 2,386,198 kWhs.

[8] Note that this commitment applied to electricity use only and did not address the use of natural gas.

6 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for Fillmore.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	727	2,723
10% reduction	1,454	3,374
15% reduction	2,182	4,024

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects, and rooftop solar installations.

Cumulatively, these programs have resulted in emission reductions of 1,534 or approximately 10% below 2010 levels.

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion remained relatively stable in Fillmore, totaling 10,816, 10,773 and 9,852 metric tons of CO_2e in 2010, 2011 and 2012 respectively. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emissions from the combustion of natural gas.

Reductions in Emissions from On-Road Vehicles

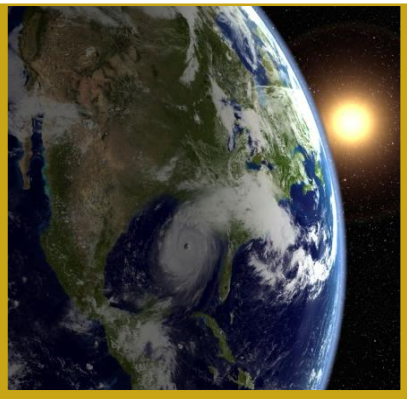
The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures.

Appendix A.3:

City of Moorpark

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Target Options

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill 32 (AB 32), which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The City of Moorpark, founded in 1900, lies within central Ventura County and has a population of roughly 35,000 residents according to the California Department of Finance[1].

The majority of Moorpark's GHG emissions are produced through the burning of fossil fuels. The City's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the City of Moorpark's geographical boundaries (i.e. city limits). The City's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the City of Moorpark were inventoried for the years 2010 through 2012. The City has not established a baseline year for its inventories.

[1] http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Moorpark's Community Inventory

The City of Moorpark's Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities within the city limits. Stationary combustion data was provided by Southern California Gas Company (SCG). Southern California Edison (SCE) provided electricity data.

Table 1 quantifies the contributions of each sector to total community emissions generated during the period of 2010 through 2012.

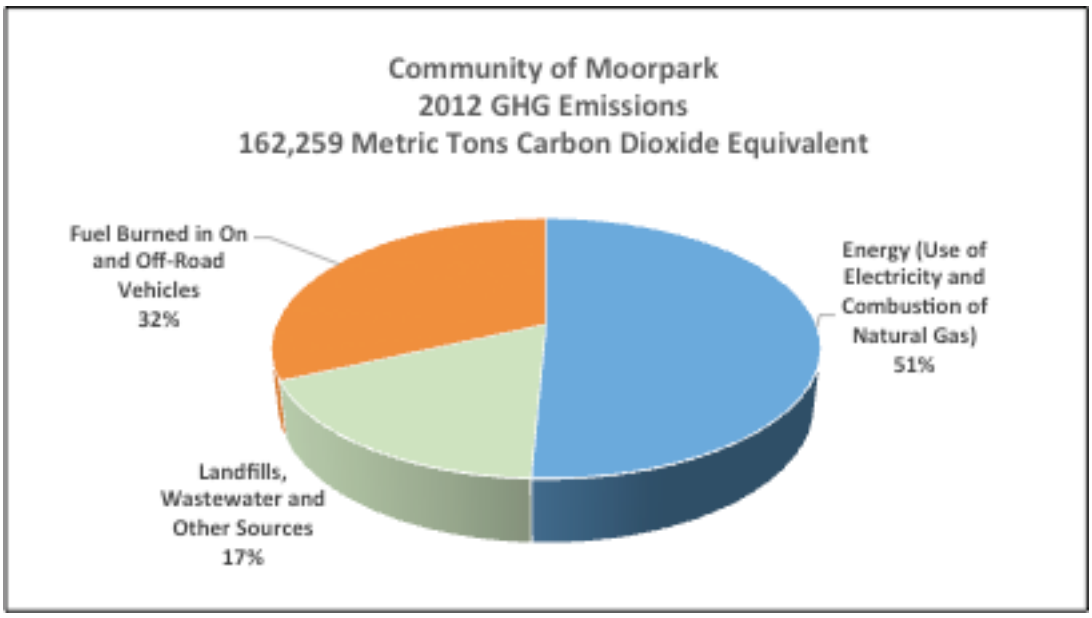
Error! Reference source not found. illustrates on average each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 24% of emissions each year.

Table 1. Community GHG Emissions by Sector for the City of Moorpark

Sector	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
On-Road Transportation	38,437	37,694	36,947
Other Emissions*	24,913	25,279	26,796
Non-Residential Electricity Use	27,666	27,452	28,286
Residential Natural Gas Use	27,071	27,398	25,219
Residential Electricity Use	24,138	24,109	24,704
Off-Road Vehicle Use	15,469	15,697	14,736
Non-Residential Natural Gas Use	6,205	6,253	5,573
Total	**163,901**	**163,882**	**162,259**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1 2012 Community GHG Emissions for the City of Moorpark



As explained in the body of this report, emissions are categorized based on control of the processes from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the organization, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g., purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

The table below document that both Scope 1 (direct) and Scope 2 (indirect) emissions source contributions remained relatively consistent through the three-year period.

Table 2. Direct and Indirect Emissions for the City of Moorpark

Scope	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
Scope 1 (Direct) emissions	112,085	112,306	109,256
Scope 2 (Indirect) emissions	51,816	51,577	53,004
Total	**163,901**	**163,882**	**162,259**

A detailed description of the calculation methodologies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

Residential and non-residential emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

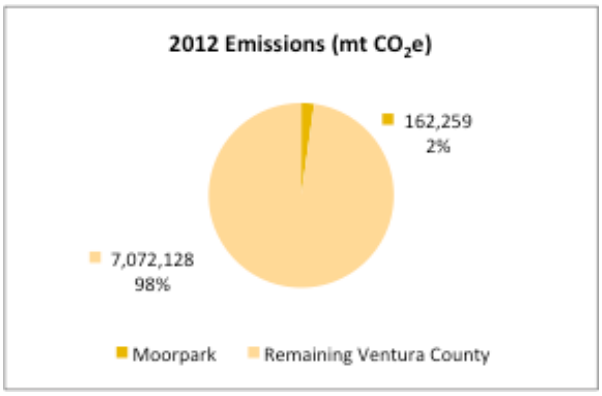
Total GHG emissions in 2012 for the City of Moorpark amounted to 162,259 metric tons of CO_2e. Moorpark is the sixth-largest incorporated city in terms of total County emissions. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the City of Moorpark.

As shown in Figure 2, emissions from the City of Moorpark in 2012 accounted for about 2% of overall GHG emissions for Ventura County.

Moorpark's 2012 per capita GHG emissions are 4.68 metric tons of CO_2e, compared to countywide per capita emissions of 6.55 metric tons.

A discussion of the City of Moorpark's GHG emissions for each major sector, focusing on CY 2012, is presented below.

Figure 2. Moorpark Portion of Ventura County Community Inventory



Emissions from the Residential Sector

Residential emissions for the City of Moorpark mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the City of Moorpark

Year	MT CO_2e
2010	27,071
2011	27,398
2012	25,219

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the City of Moorpark

Year	MT CO_2e
2010	24,138
2011	24,109
2012	24,704

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in Part I of this report. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-Residential Emissions from Natural Gas for the City of Moorpark

Year	MT CO_2e
2010	6,205
2011	6,253
2012	5,573

Non-residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 6. Non-Residential Emissions from Electricity for the City of Moorpark

Year	MT CO_2e
2010	27,666
2011	27,452
2012	28,286

California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. There are no facilities in Moorpark subject to this reporting requirement.

On-Road Transportation Emissions

Vehicle miles traveled on Moorpark roads account for approximately 1% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 36,947 metric tons of CO_2e, which represents 23.6% of total Moorpark community emissions. These emissions resulted from vehicles burning gasoline and diesel fuel.[2]

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the City of Moorpark in 2012 resulted in 14,736 metric tons of CO_2e, which represents 9.4% of emissions.

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the City on those highways, particularly for commuting purposes.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous.[3]

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are:

Table 7. Emissions from Solid Waste for the City of Moorpark

Year	MT CO_2e
2010	9,416
2011	9,232
2012	9,345

There is no municipal solid waste landfill in Moorpark. Waste generated in the City is transported to landfills outside the City boundaries.

CO_2e emitted as a result of landfilling of waste in 2012 accounted for 6% of Moorpark's 2012 community emissions.

[3] http://www.energy.ca.gov/biomass/landfill_gas.html

Water and Wastewater Treatment Emissions

GHG emissions from electricity consumption for water supply and irrigation infrastructure required for the City of Moorpark amounted to 15 metric tons of CO_2e for the period, which represents 0.01% of overall emissions.

2012 greenhouse gas emissions from domestic wastewater treatment for the City of Moorpark amounted to 1,011 metric tons of CO_2e, which represents 0.4% of Moorpark's total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the city of Moorpark in 2012 amounted to 16,425 metric tons of CO_2e, 6.6% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

[4] http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Moorpark. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 8. 2010-2012 Avoided Emissions from SCE Programs in the City of Moorpark

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	5,271	1,463	$716,817
Partnership Program	75	21	$7,913
Total Non-Residential	**5,346**	**1,484**	**$724,730**
Advanced Lighting – Torchiere	6	2	$2,149
Appliance Recycling	597	166	$81,607
Home Energy Efficiency Rebate	108	30	$50,015
Home Energy Efficiency Survey	176	49	$3,431
Lighting	3,597	998	$174,667
Multifamily Rebate Program	8	2	$2,236
Residential Total	**4,492**	**1,247**	**$314,106**
TOTAL	**9,838**	**2,731**	**$1,038,836**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the City, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in Moorpark for CYs 2010 through 2012 as a result of solar energy production are:

Table 9. Avoided Emissions from Solar Production in the City of Moorpark

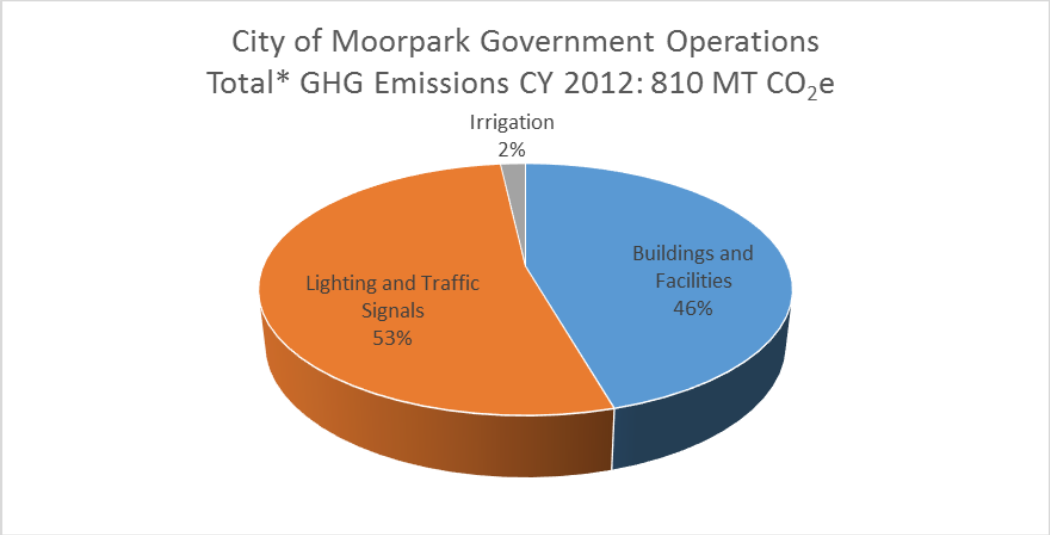
Year	MT CO_2e
2010	37
2011	98
2012	171

3 Moorpark City Government Operations Inventory

The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

Because there were no significant changes between 2010 and 2012, the following chart shows the relative contribution of various sources to GHG emissions from City government operations.

Figure 3. 2012 GHG Emissions from City of Moorpark Government Operations



* Note that the City of Moorpark's inventory does not include emissions from city-owned and operated vehicles. Emissions were calculated based on electricity and natural gas only.

Emissions from the Use of Electricity

Moorpark purchases its electricity from Southern California Edison. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 10. Emissions from the Use of Electricity for City of Moorpark Government Operations

	2010 MT CO_2e	2011 MT CO_2e	2012 MT CO_2e
Buildings and Facilities	361	358	342
Lighting and Traffic Control	441	445	427
Total	**813**	**818**	**784**

Emissions from the Combustion of Natural Gas

The City of Moorpark purchases natural gas from the Southern California Gas Company, primarily for heating its facilities and for operating boilers in its larger buildings. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Combustion of Natural Gas for City of Moorpark Government Operations

Year	MT CO_2e
2010	30
2011	29
2012	26

Emissions from City Owned and Operated Vehicles

Data on emissions from city owned vehicles were not available. While financial data on fuel purchases were available, the researchers considered them to be less reliable than needed for the purposes of estimating fuel use and GHG emissions.

4 Moorpark Community Greenhouse Gas Forecasts and Reduction Target Options

Part I of this report provides an overview of the approach to forecasting and reduction targets for the VCREA and its member local governments. Regional forecasts and reduction targets have been established for energy use (electricity and natural gas) and for on-road vehicles.

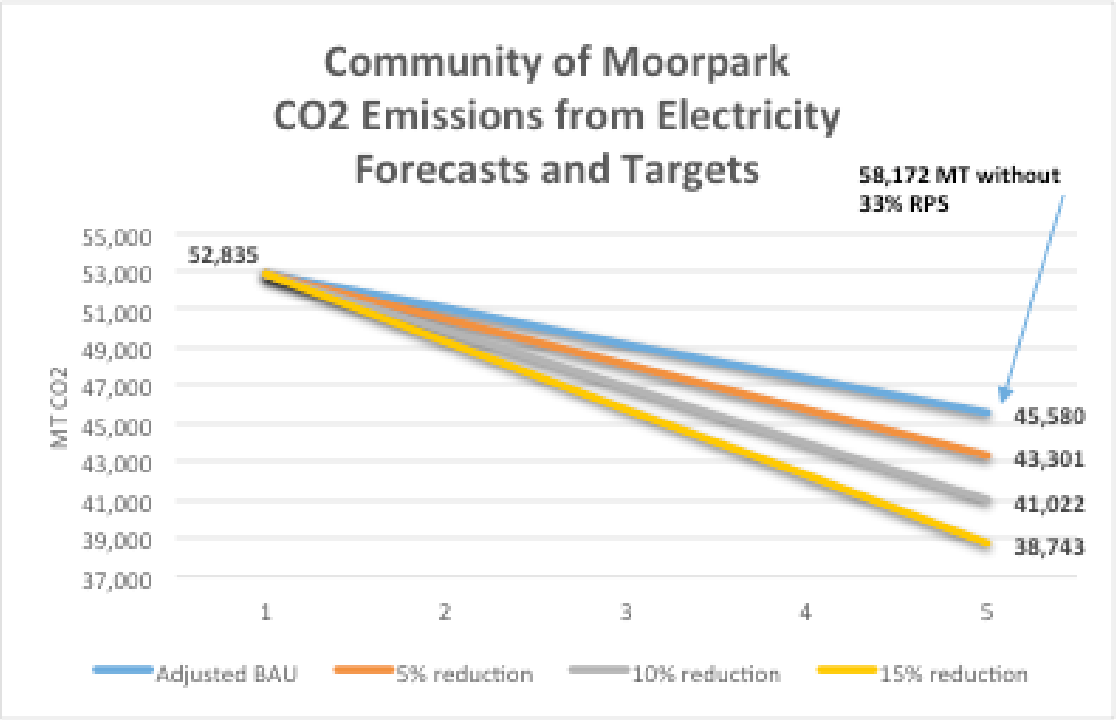
Forecasted Emissions from and Targets for Electricity Use

The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[5] For Moorpark, a BAU scenario means that emissions would total 58,172 metric tons CO2 in 2020, as compared to the 2012 levels of 52,835.[6] The adjusted BAU scenario projects 2020 emissions at 45,580 metric tons. Associated reduction targets are shown below:

[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[6] Forecasts for electricity are calclatedd for CO2 only and do not include CH4 and N2O. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.

Figure 4. Emissions from Electricity Forecasts and Targets for the City of Moorpark



Based on this Adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

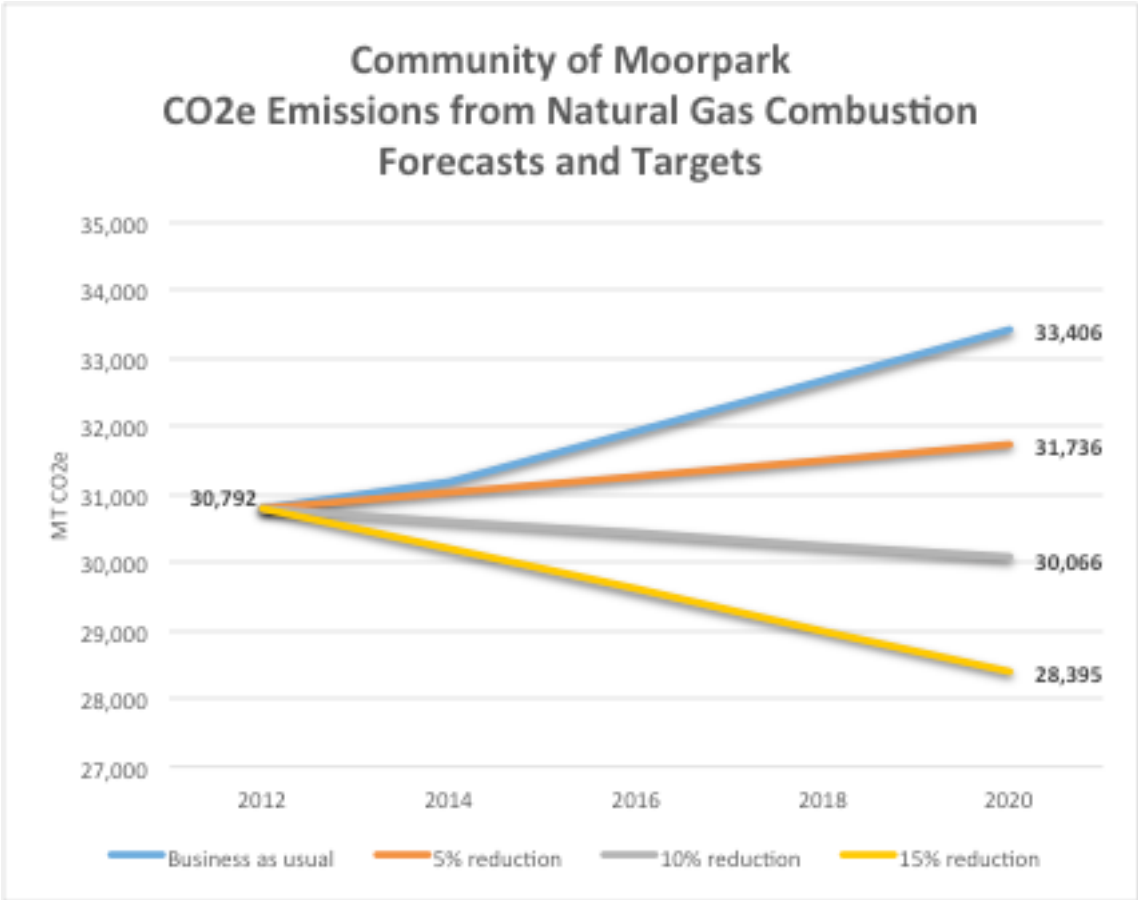
Table 12 Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the City of Moorpark

Reductions required 2010 to 2020	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	5,164	9,535
10% reduction	7,746	11,814
15% reduction	7,748	14,093

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[7] For Moorpark, a BAU scenario means that emissions would total 33,406 MT CO_2e in 2020, as compared to the 2010 levels of 30,792. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the City of Moorpark



[7] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

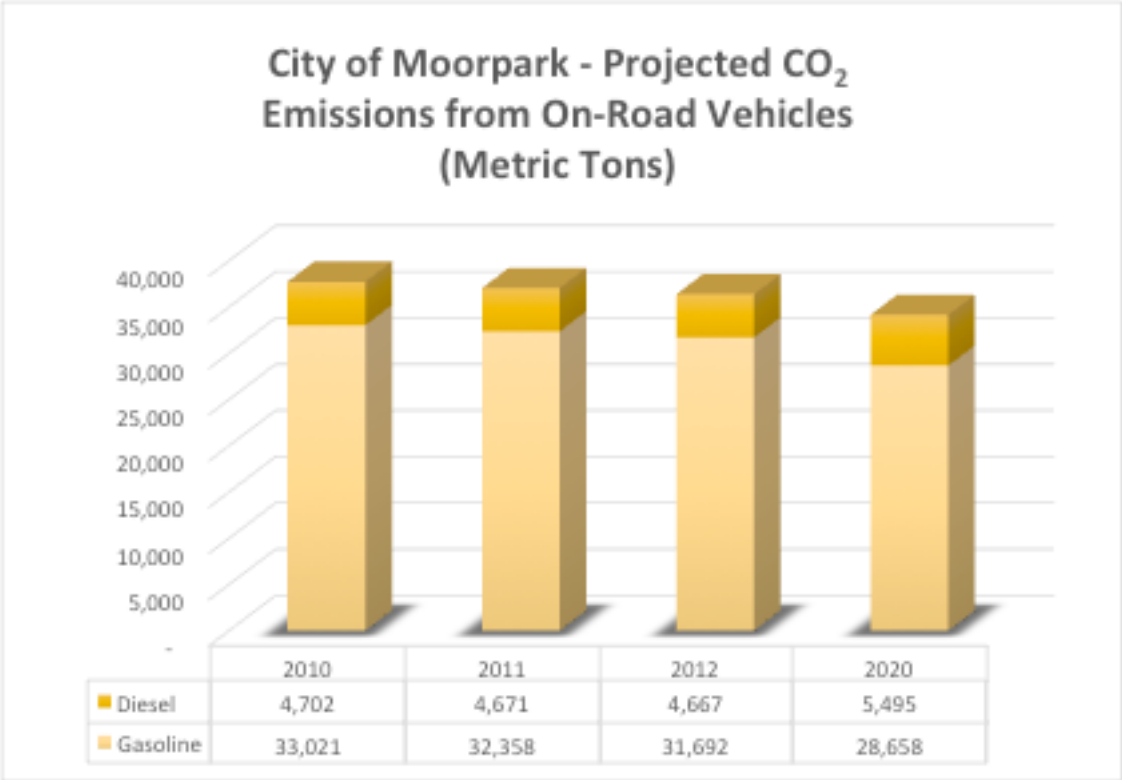
Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

Reductions required 2012 to 2020	Below 2012 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	1,664	-944
10% reduction	3,328	726
15% reduction	4,991	2,397

Forecasted Emissions from and Targets for On Road Transportation

As noted in Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010**. Any additional activities on the part of Moorpark, including support for alternative modes of transportation, behavioral change, regional cooperation, etc. could increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on State highways, which would include commuting and inter-city travel. Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the City of Moorpark



[8]

[8] Note that there are small differences between 2010 through 2012 emissions reported here and those for the GHG inventory reported earlier. Inventory includes CH4 and N2O, forecasts are based on CO2 only.

5 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for Moorpark.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	5,164	9,535
10% reduction	7,746	11,814
15% reduction	7,748	14,093

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects, and rooftop solar installations.

Cumulatively, these programs have resulted in emissions reductions of 3,849 metric tons, approximately 3% below 2010 levels.

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion remained relatively stable in Moorpark, totaling 33,277, 33,651 and 30,792 metric tons of CO_2e in 2010, 2011 and 2012 respectively. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emissions from the combustion of natural gas.

Reductions in Emissions from On-Road Vehicles

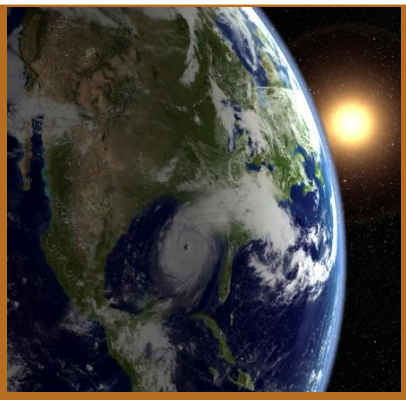
The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures.

Appendix A.4:

City of Ojai

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Target Options

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill 32 (AB 32), which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The city of Ojai boasts its title as the smallest city in Ventura County, with a population of only about 7,500 people according to the California Department of Finance[1]. This small tourist town is considered a haven for artists, musicians and health enthusiasts.

The majority of Ojai's GHG emissions are produced through the burning of fossil fuels. The City's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the City of Ojai's geographical boundaries (i.e. city limits). The City's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the City of Ojai were inventoried for the years 2010 through 2012. The City has not established a baseline year for its inventories.

[1] http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Ojai's Community Inventory

The City of Ojai's Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities within the city limits. Stationary combustion data was provided by Southern California Gas Company (SCG). Southern California Edison (SCE) provided electricity data.

Table 1 quantifies the contributions of each sector to total the community emissions generated during the period of 2010 through 2012.

Error! Reference source not found. illustrates on average each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 18% of emissions each year.

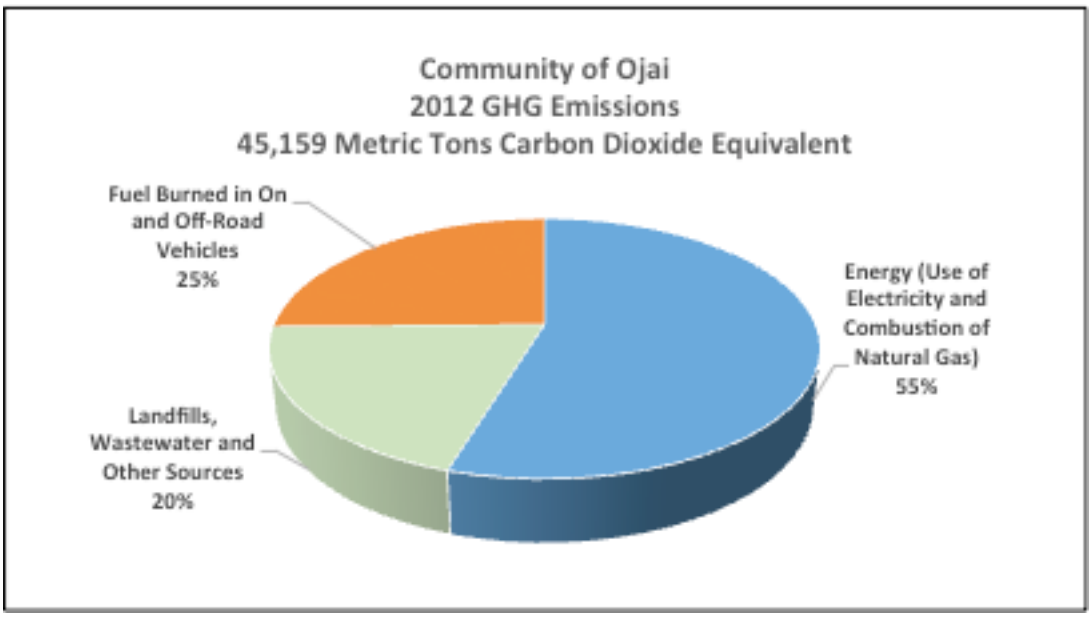
Table 1. Community GHG Emissions by Sector for the City of Ojai

Sector	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
On-Road Transportation	8,305	8,145	7,983
Residential Natural Gas Use	8,585	9,033	7,822
Non-Residential Electricity Use	8,075	8,231	9,043
Residential Electricity Use	6,992	7,105	6,311
Other Emissions*	7,291	7,246	7,409
Non-Residential Natural Gas Use	3,416	3,569	3,402
Off-Road Vehicle Use	3,353	3,397	3,188

Total	**46,018**	**46,725**	**45,159**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1. Community GHG Emissions for the City of Ojai



As explained in the body of this report, emissions are categorized based on control of the processes from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the organization, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g. purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

The table below documents that both Scope 1 (direct) and Scope 2 (indirect) emissions source contributions remained relatively consistent through the three-year period.

Table 2. Direct and Indirect Emissions for the City of Ojai

Scope	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
Scope 1 (Direct) emissions	30,951	31,389	29,805

Scope 2 (Indirect) emissions	15,068	15,336	15,354
Total	**46,018**	**46,725**	**45,159**

A detailed description of the calculation methodolgies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

Emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

Total GHG emissions in 2012 for the City of Ojai amounted to 41,971 metric tons of CO_2e. Ojai is the smallest incorporated city contributor in terms of total County emissions. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the City of Ojai.

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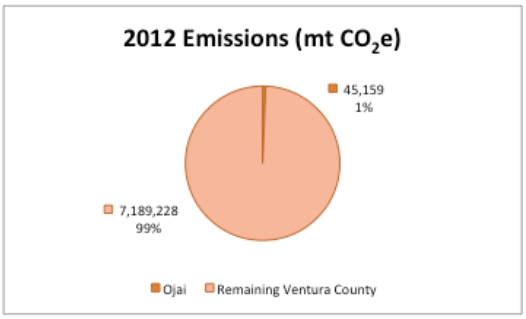
As shown in Figure 2, emissions from the City of Ojai in 2012 accounted for about 1% of overall GHG emissions for Ventura County.

Ojai's 2012 per capita GHG emissions are 6.02 metric tons of CO_2e, compared to countywide per capita emissions of 6.55 metric tons.

A discussion of the City of Ojai's GHG emissions for each major sector, focusing on CY 2012, is presented below.

Figure 2. Ojai Portion of Ventura County Community Inventory



Emissions from the Residential Sector

Residential emissions for the City of Ojai mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the City of Ojai

Year	MT CO_2e
2010	8,585
2011	9,033
2012	7,822

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the City of Ojai

Year	MT CO_2e
2010	6,922
2011	7,105
2012	6,311

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in Part I of this report. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-Residential Emissions from Natural Gas for the City of Ojai

Year	MT CO_2e
2010	3,416
2011	3,569
2012	3,402

Non-residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 6. Non-Residential Emissions from Electricity for the City of Ojai

Year	MT CO_2e
2010	8,075
2011	8,231
2012	9,043

California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. There are no facilities in Ojai subject to this reporting requirement.

On-Road Transportation Emissions

Vehicle miles traveled on Ojai roads account for approximately 0.2% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 7,983 metric tons of CO_2e, which represents 19.2% of total Ojai community emissions. These emissions resulted from vehicles burning gasoline and diesel fuel. [2]

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the City of Ojai in 2012 resulted in 3,188 metric tons of CO_2e, which represents 7.6% of emissions.

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the City on those highways, particularly for commuting purposes.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous.[3]

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are:

Table 7. Emissions from Landfilled Solid Waste for the City of Ojai

Year	MT CO_2e
2010	3,934
2011	3,777
2012	3,637

There is no municipal solid waste landfill in Ojai. Waste generated in the City is transported to landfills outside the City boundaries.

CO_2e emitted as a result of landfilling of waste in 2012 accounted for 8.7% of Ojai's 2012 emissions.

[3] http://www.energy.ca.gov/biomass/landfill_gas.html

Water and Wastewater Treatment Emissions

2012 greenhouse gas emissions from domestic wastewater treatment for the City of Ojai amounted to 219 metric tons of CO_2e, which represents 0.2% of Ojai's total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH4 and N2O as calculated by the State of California.

The City of Ojai does not have GHG emissions from electricity consumption for water supply and irrigation infrastructure.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the City of Ojai in 2012 amounted to 3,554 metric tons of CO_2e, 3.9% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

[4] http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Ojai. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 8. 2010-2012 Avoided Emissions from SCE Programs in the City of Ojai

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	2,000	555	$499,446
Partnership Programs	26	7	$4,935
Total Non-Residential	**2,026**	**562**	**$504,381**
Advanced Lighting-Torchiere	1	.2	$836
Appliance Recycling	436	121	$60,194
Advanced Lighting –WT	0	0	$1
Comprehensive Manufactured Homes	1	1	$917
Home Energy Efficiency Rebate	35	9	$17,530
Home Energy Efficiency Survey	116	32	$1,598
Lighting	708	197	$38,513
Workforce Education and Training	28	8	$1,485
Residential Total	**1,325**	**368**	**$121,080**
TOTAL	**3,351**	**930**	**$625,461**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the City, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in Ojai for CYs 2010 through 2012 as a result of solar energy production are:

Table 9. Avoided Emissions from Solar Production in the City of Ojai

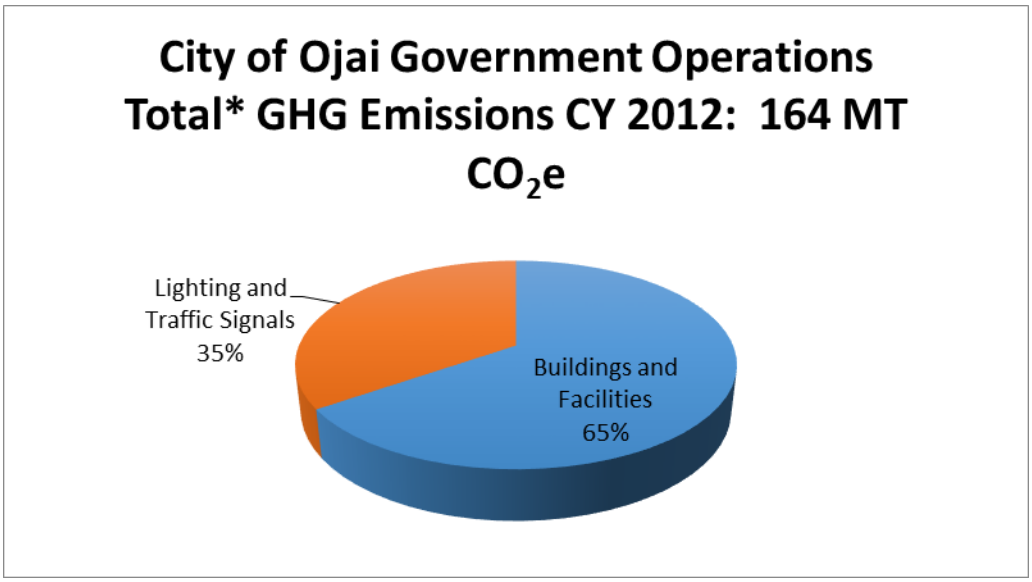
Year	MT CO_2e
2010	127
2011	92
2012	98

3 Ojai City Government Operations Inventory

The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

Because there were no significant changes between 2010 and 2012, the following chart shows the relative contribution of various sources to GHG emissions from City government operations.

Figure 3. 2012 GHG Emissions from City of Ojai Government Operations



* Note that the City of Ojai's inventory does not include emissions from city-owned and operated vehicles. Emissions were calculated based on electricity and natural gas only.

Emissions from the Use of Electricity

Ojai purchases its electricity from Southern California Edison. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 10. Emissions from the Use of Electricity for City of Ojai Government Operations

	2010 MT CO_2e	2011 MT CO_2e	2012 MT CO_2e
Buildings and Facilities	109	86	93
Lighting and Traffic Control	57	57	57
Total	**166**	**143**	**149**

Emissions from the Combustion of Natural Gas

The City of Ojai purchases natural gas from the Southern California Gas Company, primarily for heating its facilities and for operating boilers in its municipal buildings. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Combustion of Natural Gas for City of Ojai Government Operations

Year	MT CO_2e
2010	11
2011	12
2012	14

Emissions from City Owned and Operated Vehicles

Data on emissions from city owned vehicles were not available.

4 Ojai Community Greenhouse Gas Forecasts and Reduction Target Options

Part I of this report provides an overview of the approach to forecasting and reduction targets for the VCREA and its member local governments. Regional forecasts and reduction targets have been established for energy use (electricity and natural gas) and for on-road vehicles.

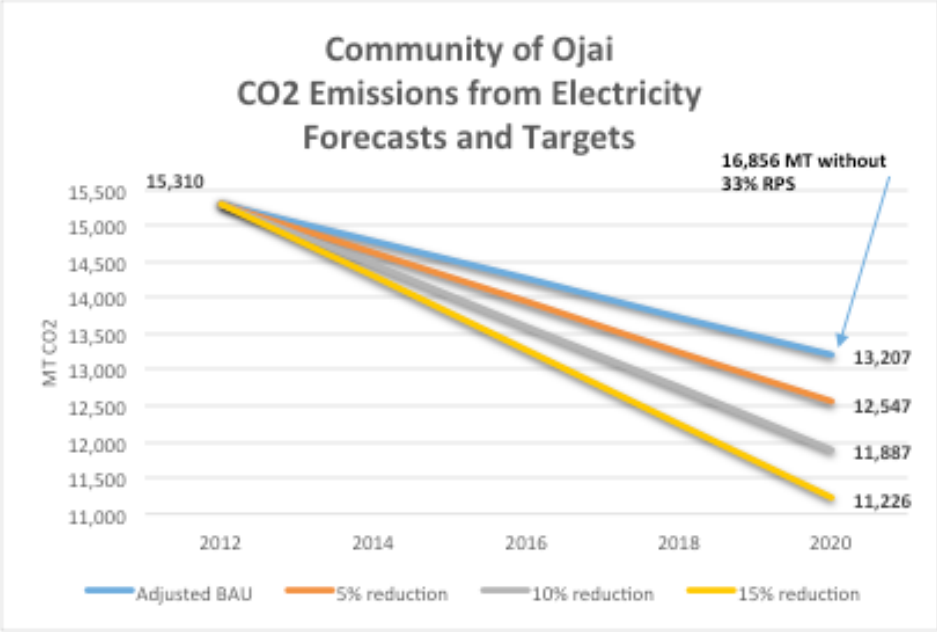
Forecasted Emissions from and Targets for Electricity Use

The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[5] For the City of Ojai, a BAU scenario means that emissions would total 16,856 MT CO_2e in 2020, as compared to the 2012 levels of 15,310.[6] The adjusted BAU scenario projects 2020 emissions at 13,207 metric tons. Associated reduction targets are shown below:

[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[6] Forecasts for electricity are calculated for CO2 only and do not include CH_4 and N_2O. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.

Figure 4. Emissions from Electricity Forecasts and Targets for the City of Ojai



Based on this adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

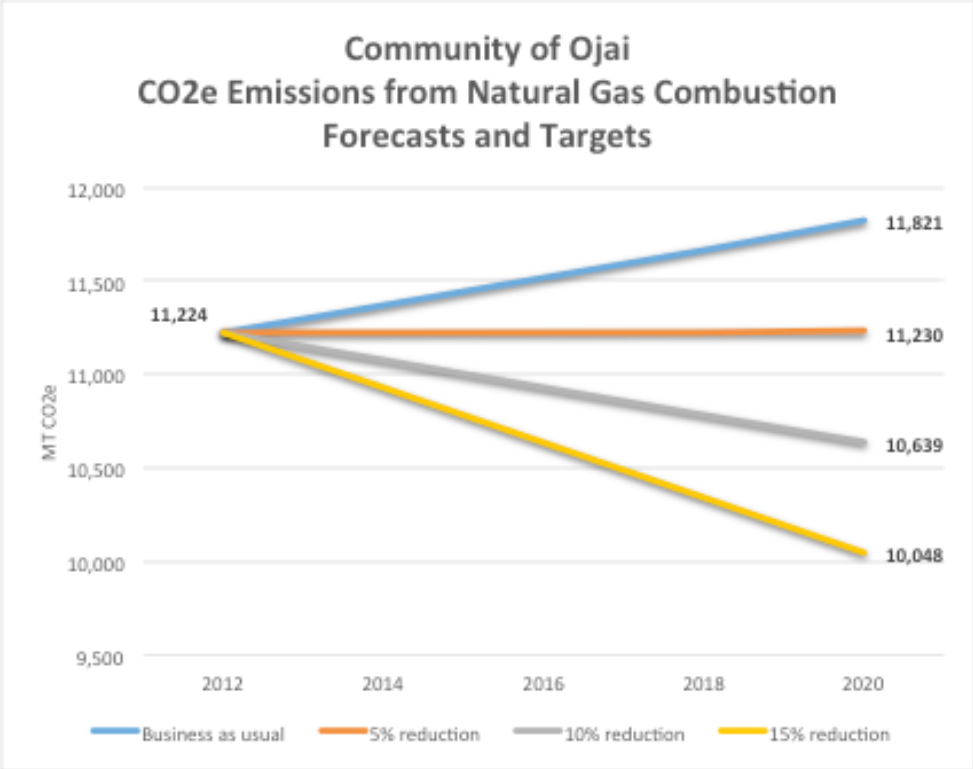
Table 12. Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the City of Ojai

Reductions required 2010 to 2020	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	751	2,763
10% reduction	1,502	3,423
15% reduction	2,254	4,084

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[7] For Ojai, a BAU scenario means that emissions would total 11,821 MT CO_2e in 2020, as compared to the 2012 levels of 11,224. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the City of Ojai



[7] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

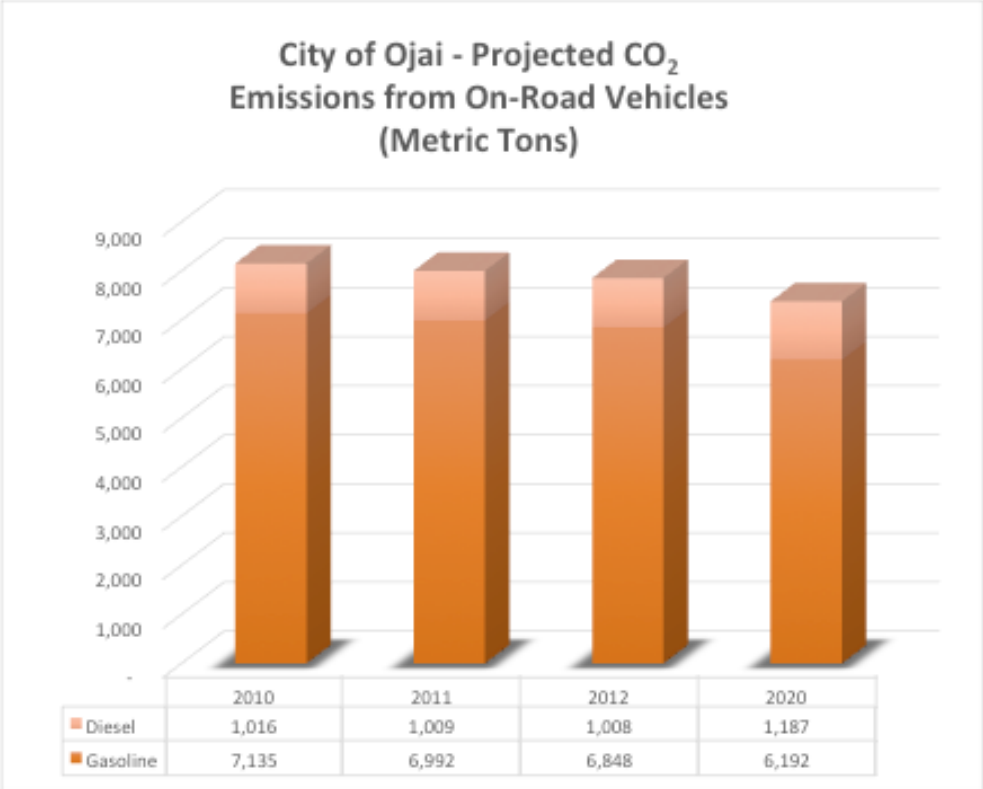
Table 13. Required Emissions Reductions from Natural Gas to Meet 5%, 10% and 15% Targets for the City of Ojai

Reductions required 2012 to 2020	Below 2012 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	600	-6
10% reduction	1,200	585
15% reduction	1,800	1,176

Forecasted Emissions from and Targets for On Road Transportation

As noted in Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010**. Any additional activities on the part of Ojai, including support for alternative modes of transportation, behavioral change, regional cooperation, etc. could increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on State highways, which would include commuting and inter-city travel. Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the City of Ojai



5 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for Ojai.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	751	2,763
10% reduction	1,502	3,423
15% reduction	2,254	4,084

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects, and rooftop solar installations.

Cumulatively, these programs have resulted in emission reductions of 1,710, approximately 11% below 2010 levels.

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion remained relatively stable in Ojai, totaling 12,002, 12,601 and 11,224 metric tons of CO_2e in 2010, 2011 and 2012 respectively. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emissions from the combustion of natural gas.

Reductions in Emissions from On-Road Vehicles

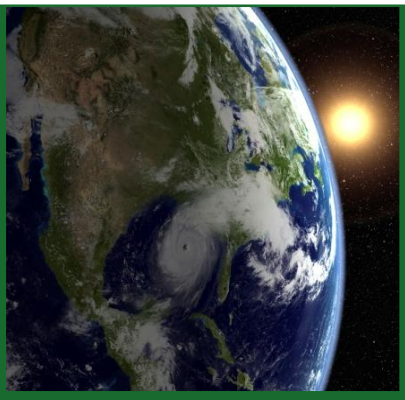
The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures.

Appendix A.5:

City of Oxnard

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Target Options

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill 32 (AB 32), which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The city of Oxnard is the most populous city in Ventura County, with a population of roughly 203,000 people according to the California Department of Finance[1].

The majority of Oxnard's GHG emissions are produced through the burning of fossil fuels. The City's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the City of Oxnard's geographical boundaries (i.e. city limits). The City's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the City of Oxnard were inventoried for the years 2010 through 2012. The City has not established a baseline year for its inventories.

[1] http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Oxnard's Community Inventory

The City of Oxnard's Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities within the city limits. Stationary combustion data was provided by Southern California Gas Company (SCG). Southern California Edison (SCE) provided electricity data.

Table 1 below quantifies the contributions of each sector to total the community emissions generated during the period of 2010 through 2012.

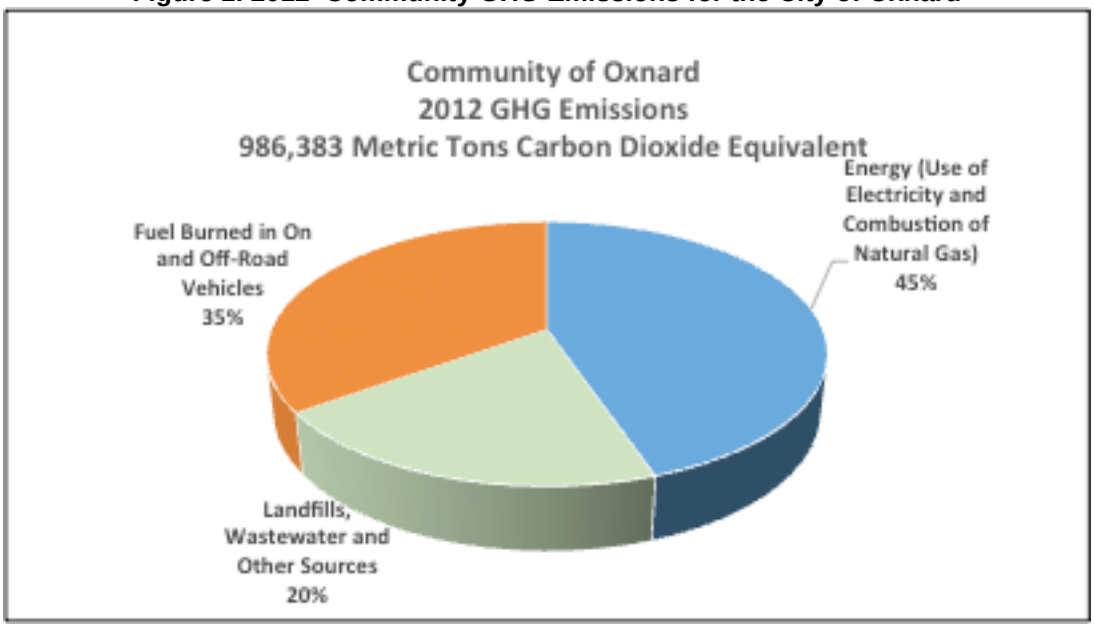
Figure 1 illustrates on average each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 28% of emissions each year.

Table 1. Community GHG Emissions by Sector for the City of Oxnard

Sector	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
On-Road Transportation	283,750	278,259	272,745
Non-Residential Electricity Use	178,365	175,740	180,614
Other Emissions*	189,152	196,936	200,154
Residential Natural Gas Use	107,263	105,799	101,849
Off-Road Vehicle Use	88,936	90,327	84,792
Residential Electricity Use	71,989	72,264	71,979
Non-Residential Natural Gas Use	68,894	68,458	74,251
Total	**988,349**	**987,783**	**986,383**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1. 2012 Community GHG Emissions for the City of Oxnard



As explained in the body of this report, emissions are categorized based on control of the process from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the reporter, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g. purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

The table below documents that both Scope 1 (direct) and Scope 2 (indirect) emissions source contributions remained relatively consistent through the three-year period.

Table 2. Direct and Indirect Emissions for the City of Oxnard

Scope	2010 ($MT CO_2e$)	2011 ($MT CO_2e$)	2012 ($MT CO_2e$)
Scope 1 (Direct) emissions	735,102	736,220	730,550
Scope 2 (Indirect) emissions	253,247	251,563	255,833
Total	**988,349**	**987,783**	**986,383**

A detailed description of the calculation methodologies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

Emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

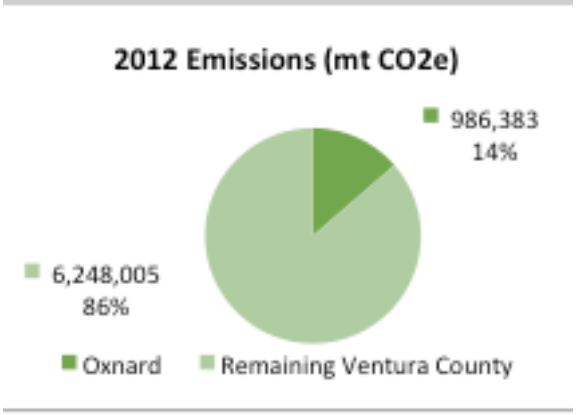
Total GHG emissions in 2012 for the City of Oxnard amounted to 986,383 metric tons of CO_2e. Oxnard is the largest incorporated city in terms of total County emissions. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the City of Oxnard.

As shown in **Error! Reference source not found.**, emissions from the City of Oxnard in 2012 accounted for about 14% of overall GHG emissions for Ventura County.

Oxnard's 2012 per capita GHG emissions are 4.84 metric tons of CO_2e, compared to countywide per capita emissions of 6.55 metric tons.

A discussion of City of Oxnard's GHG emissions for each major sector, focusing on CY 2012, is presented below.

Figure 2. Oxnard Portion of Ventura County Community Inventory



Emissions from the Residential Sector

Residential emissions for the City of Oxnard mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the City of Oxnard

Year	MT CO_2e
2010	107,263
2011	105,799
2012	101,849

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the City of Oxnard

Year	MT CO_2e
2010	71,989
2011	72,264
2012	71,979

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in Part I of this report. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-Residential Emissions from Natural Gas for the City of Oxnard

Year	MT CO_2e
2010	68,894
2011	68,458
2012	74,251

Non-residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 6. Non-Residential Emissions from Electricity for the City of Oxnard

Year	MT CO_2e
2010	178,365
2011	175,740
2012	180,614

California Air Resources Board – Mandatory Reporting

Following the adoption of Assembly Bill 32, the State of California's Air Resources Board mandated reporting of GHG emissions for all facilities emitting 10,000 metric tons or more of CO_2e.

The table below contains the facilities within the City of Oxnard subject to greenhouse gas emissions reporting during the period 2010-2012, and reported emissions values for each facility.

Table 7. Oxnard Industrial Facilities Subject to AB32 and their Reported Emissions

Facility Name	2010	2011	2012
PG&E Paper Produce	327,674	334,676	330,803
Ormond Beach Generating Station	82,279	14,076	149,250
Mandalay Generating Station	53,994	49,774	135,517
International Paper - Hueneme Mill	119,621	104,801	124,336
E.F. Oxnard LLC	65,214	78,554	82,804
Southern California Edison (SCE) - McGrath Peaker	n/a	n/a	904
Total	**648,783**	**581,881**	**823,614**

Facility emissions data was reported to, and obtained from the California Air Resources Board (CARB) mandatory reporting website.

On-Road Transportation Emissions

Vehicle miles traveled on Oxnard roads account for approximately 8% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 272,745 metric tons of CO_2e, which represents 27.7% of total Oxnard community emissions. These emissions resulted from vehicles burning gasoline and diesel fuel.[2]

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the City on those highways, particularly for commuting purposes.

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the City of Oxnard in 2012 resulted in 84,792 metric tons of CO_2e, which represents 8.6% of emissions.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous.[3]

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are:

Table 8. Emissions from Landfilled Solid Waste for the City of Oxnard

Year	MT CO_2e
2010	97,221
2011	101,128
2012	96,584

There is no active municipal solid waste landfill in Oxnard. Waste generated in the City is transported to landfills outside the City boundaries.

CO_2e emitted in 2012 as a result of landfilling waste accounted for 10% of Oxnard's 2012 emissions.

[3] http://www.energy.ca.gov/biomass/landfill_gas.html

Water and Wastewater Treatment Emissions

GHG emissions from electricity consumption for water supply and irrigation infrastructure required for the City of Oxnard amounted to 222 metric tons of CO_2e for the period, which represents 0.02% of overall emissions.

2012 Greenhouse gas emissions from domestic wastewater treatment required for the City of Oxnard amounted to 8,836 metric tons of CO_2e, which represents 0.7% of Oxnard's total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the City of Oxnard in 2012 amounted to 94,512 metric tons of CO_2e, 7.7% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

[4] http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Oxnard. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 9. 2010-2012 Avoided Emissions from SCE Programs in the City of Oxnard

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	31,839	8,834	$4,513,542
Coin-Op	6	2	$4,600
Partnership Programs	1,319	366	$210,485
Total Non-Residential	**33,164**	**9,202**	**$4,728,627**
Advanced Lighting – Torchiere	81	22	$30,894
Advanced Lighting – WT	1	0.3	$97
Appliance Recycling	1,527	424	$240,744
Business Consumer Electronics	2,024	562	$196,692
Comprehensive Manufactured Homes	216	60	$91,028
Customer Facing Outreach	0	0.1	$6
Home Energy Efficiency Rebate	303	84	$119,500
Home Energy Efficiency Survey	215	60	$4,688
Lighting	22,977	6,375	$1,020,073
Multifamily Rebate Program	254	70	$124,927
Workforce Education and Training	216	60	$14,611
Residential Total	**27,814**	**7,717**	**$1,843,260**
TOTAL	**60,978**	**16,919**	**$6,571,887**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the City, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in Oxnard for CYs 2010 through 2012 as a result of solar energy production are:

Table 10. Avoided Emissions from Solar Production in the City of Oxnard

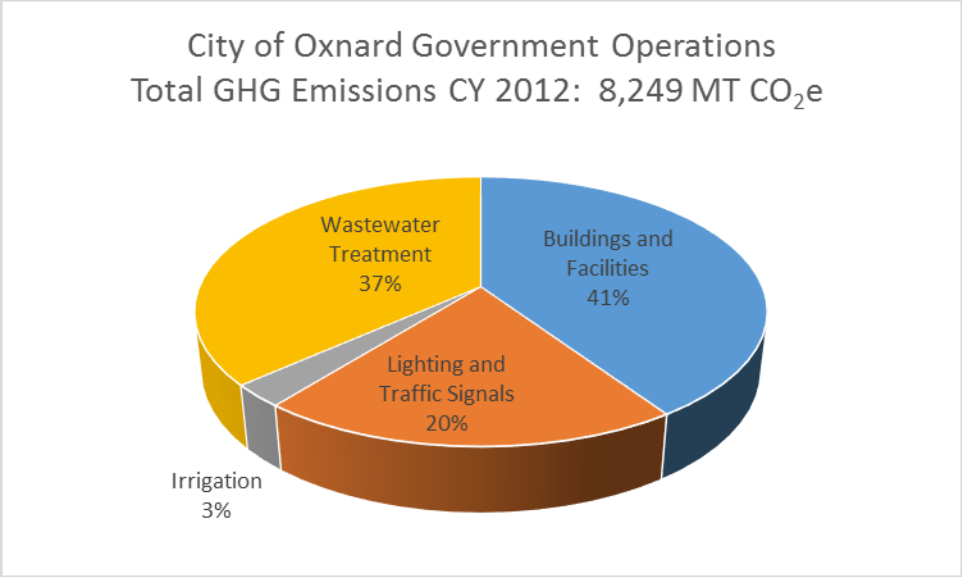
Year	MT CO_2e
2010	63
2011	54
2012	227

3 Oxnard City Government Operations Inventory

The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

Because there were no significant changes between 2010 and 2012, the following chart shows the relative contribution of various sources to GHG emissions from City government operations.

Figure 3. 2012 GHG Emissions from City of Oxnard Government Operations



Emissions from the Use of Electricity

Oxnard purchases its electricity from Southern California Edison. Because the researchers identified significant anomalies in kWhs delivered to the City's water treatment plant, no data on electricity is being reported at this time, since it is deemed unreliable.

Emissions from the Combustion of Natural Gas

The City of Oxnard purchases natural gas from the Southern California Gas Company, primarily for heating its facilities and for operating boilers in its municipal buildings. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Combustion of Natural Gas for City of Oxnard Government Operations

Year	MT CO_2e
2010	669
2011	711
2012	629

Emissions from City Owned and Operated Vehicles

Data on emissions from city owned vehicles were not available.

4 Oxnard Community Greenhouse Gas Forecasts and Reduction Target Options

Part I of this report provides an overview of the approach to forecasting and reduction targets for the VCREA and its member local governments. Regional forecasts and reduction targets have been established for energy use (electricity and natural gas) and for on-road vehicles.

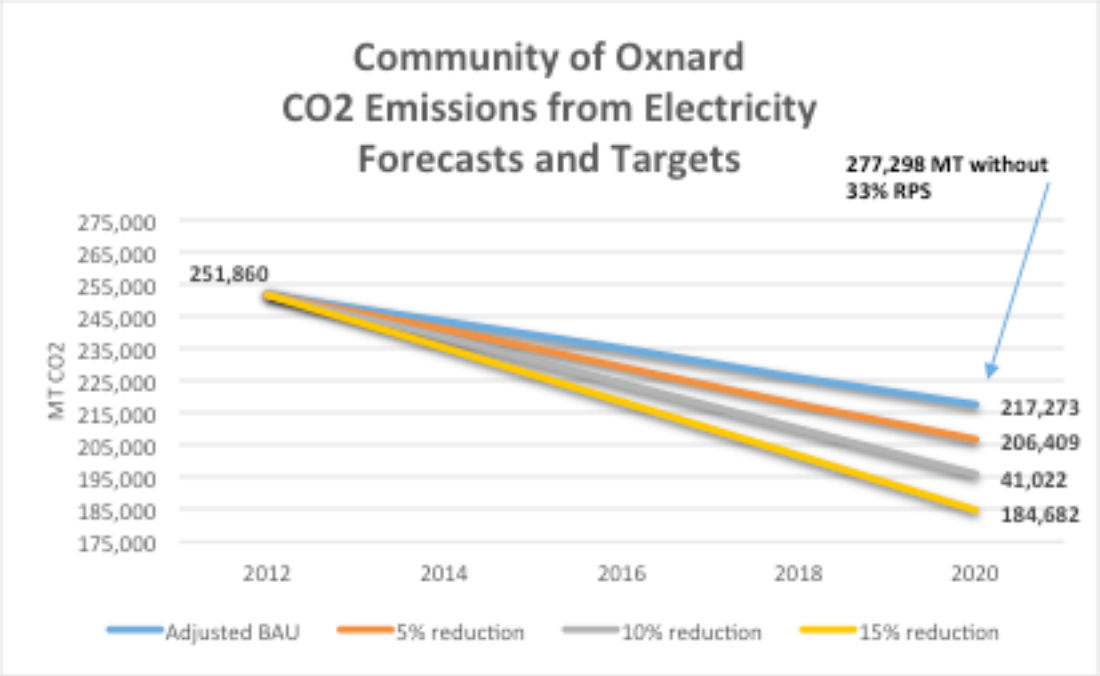
Forecasted Emissions from and Targets for Electricity Use

The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[5] For the City of Oxnard, a BAU scenario means that emissions would total 277,298 MT CO_2e in 2020, as compared to the 2012 levels of 251,860[6]. The adjusted BAU scenario projects 2020 emissions at 217,273 metric tons. Associated reduction targets are shown below:

[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[6] Forecasts for electricity are calculated for CO2 only and do not include CH4 and N20. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.

Figure 4. Emissions from Electricity Forecasts and Targets for the City of Oxnard



Based on this Adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

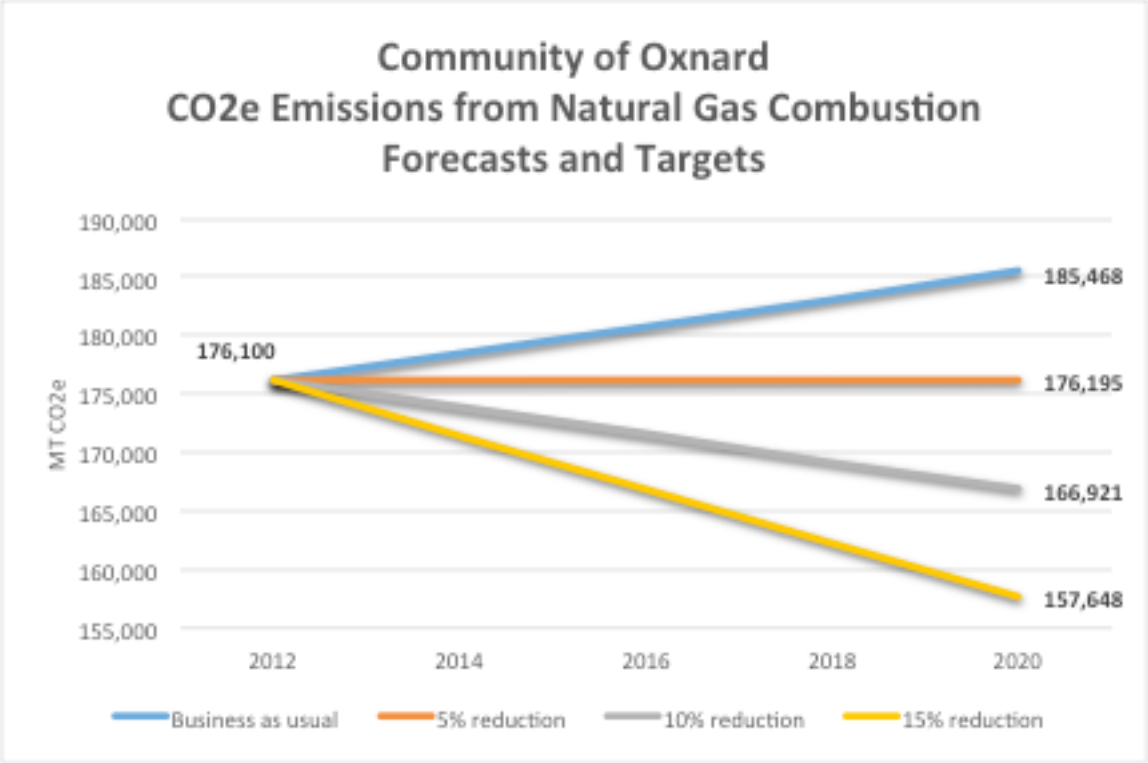
Table 12. Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the City of Oxnard

Reductions required 2010 to 2020	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	12,478	45,451
10% reduction	24,955	56,315
15% reduction	37,444	67,178

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[7] For Oxnard, a BAU scenario means that emissions would total 185,468 MT CO_2e in 2020 as compared to the 2012 levels of 176,100. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the City of Oxnard



[7] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

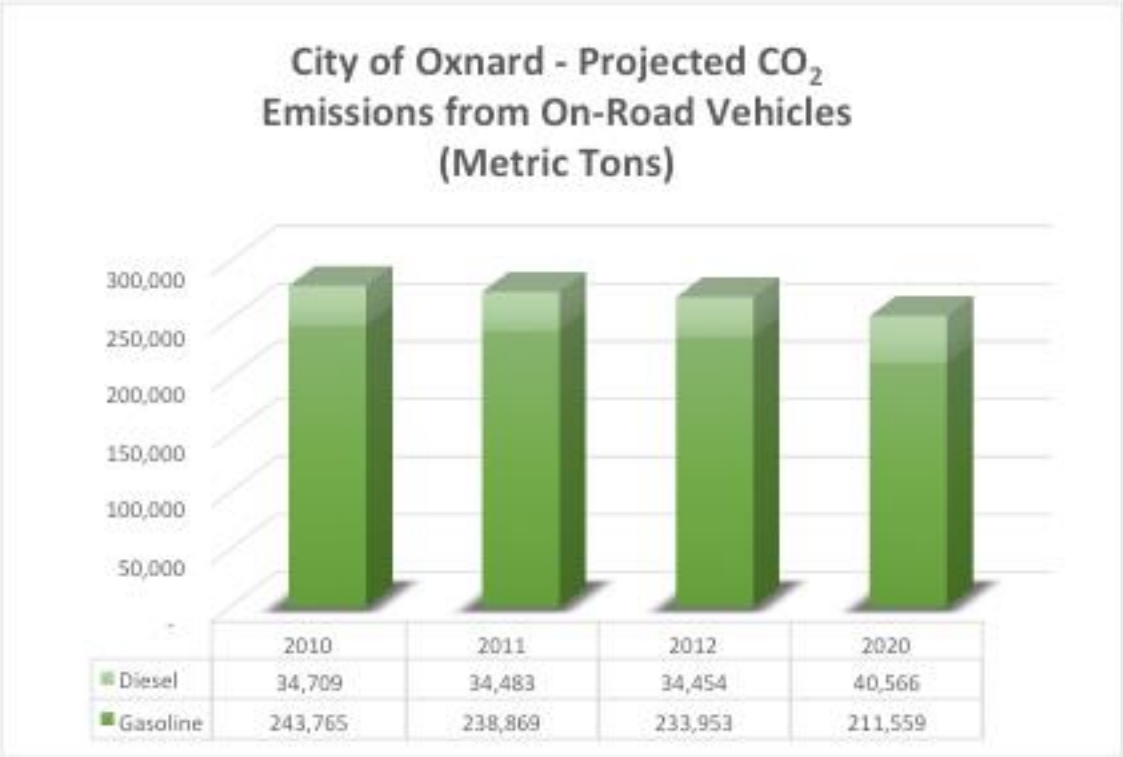
Table 13. Required Emissions Reductions from Natural Gas to Meet 5%, 10% and 15% Targets for the City of Oxnard

Reductions required 2012 to 2020	Below 2012 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	8,808	-95
10% reduction	17,616	9,179
15% reduction	26,424	18,452

Forecasted Emissions from and Targets for On Road Transportation

As noted in Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010**. Any additional activities on the part of Oxnard, including support for alternative modes of transportation, behavioral change, regional cooperation, etc. could increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on state highways, which would include commuter and inter-city travel Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the City of Oxnard[8]



[8] Note that there are small differences between 2010 through 2012 emissions reported here and those for the GHG inventory reported earlier. Inventory includes CH_4 and N_2O, forecasts are based on CO_2 only.

5 Oxnard City Government Greenhouse Gas Forecasts and Reduction Targets

City of Oxnard: Energy Action Plan

In 2013, the City of Oxnard adopted an Energy Action Plan[9] as a component of its Climate Action and Adaptation Plan. The plan identified the top 5 electricity using government facilities: the wastewater treatment plant, water yard, service center/fire administration, public safety building, and Oxnard public library. The top 10 natural gas using facilities were Palm Vista Housing Complex, Plaza Vista Housing Complex, Annex 1 (administrative services building), Oxnard Public Library and the Corporate Yard. The City has committed to an EAP target of 10% net of renewable energy production. This target applies to both City operations and the community as a whole.

[9] http://energyaction.oxnard.org/pdf/OxnardEAP4.2013.pdf

6 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for Oxnard.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	12,478	45,451
10% reduction	24,955	56,315
15% reduction	37,444	67,178

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects, and rooftop solar installations.

Cumulatively, these programs have resulted in emissions reductions of 21,315 metric tons, or approximately 7% below 2010 levels.

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion remained relatively stable in Oxnard, totaling 176,157, 174,257 and 176,100 metric tons of CO_2e in 2010, 2011 and 2012 respectively. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emission from the combustion of natural gas.

Reductions in Emissions from On-Road Vehicles

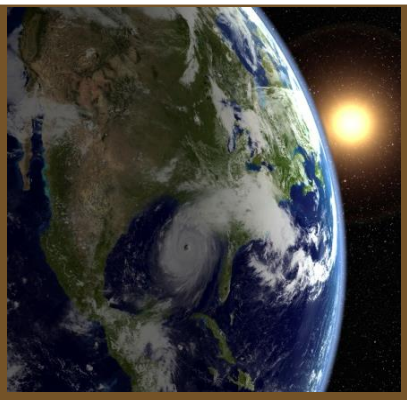
The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures.

Appendix A.6:

City of Port Hueneme

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Targets

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill 32 (AB 32), which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The small coastal city of Port Hueneme takes up only 4.6 square miles and is located just south of Oxnard. It has a population of roughly 22,000 according to the California Department of Finance[1] and was incorporated in 1948.

The majority of Port Hueneme's GHG emissions are produced through the burning of fossil fuels. The City's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the City of Port Hueneme's geographical boundaries (i.e. city limits). The City's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the City of Port Hueneme were inventoried for the years 2010 through 2012. The City has not established a baseline year for its inventories.

[1] http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Port Hueneme's Community Inventory

The City of Port Hueneme's Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities within the city limits. Stationary combustion data was provided by Southern California Gas Company (SCG). Southern California Edison (SCE) provided electricity data.

Table 1 below quantifies the contributions of each sector to total the community emissions generated during the period of 2010 through 2012 for the City of Port Hueneme.

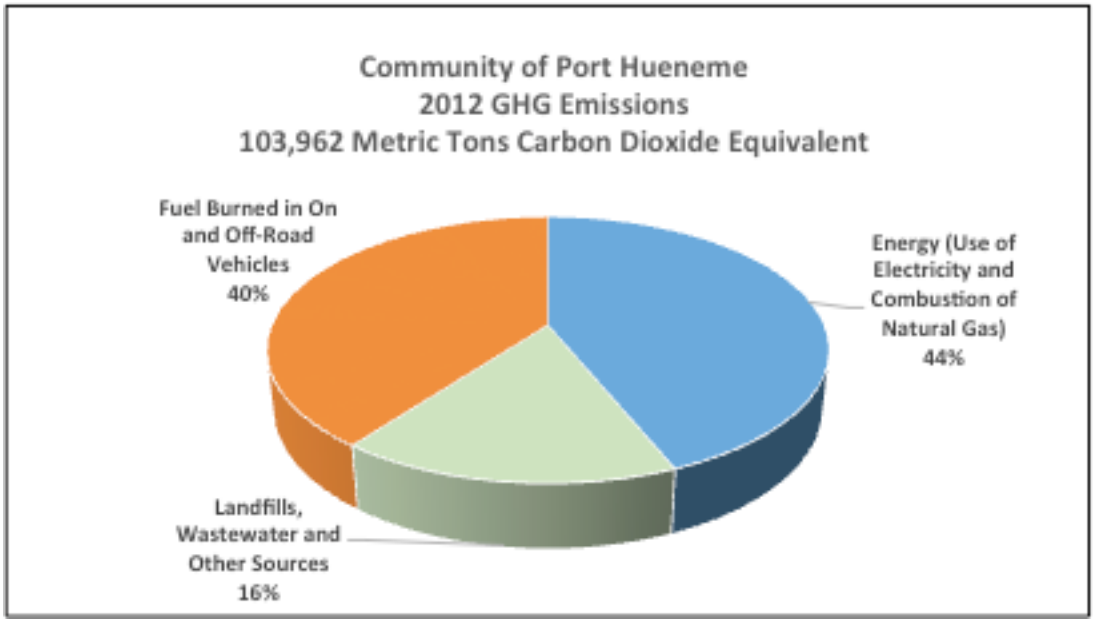
Figure 1 illustrates on average each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 32% of emissions each year.

Table 1. Community GHG Emissions by Sector for the City of Port Hueneme

Sector	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
On-Road Transportation	33,392	32,746	32,097
Non-Residential Electricity Use	23,161	22,614	21,007
Other Emissions*	16,232	16,110	17,168
Residential Natural Gas Use	13,219	13,109	12,405
Residential Electricity Use	9,575	9,644	9,672
Off-Road Vehicle Use	9,762	9,770	9,176
Non-Residential Natural Gas Use	2,612	2,530	2,436
Total	**107,954**	**106,524**	**103,962**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1. 2012 Community GHG Emissions for the City of Port Hueneme



As explained in the body of this report, emissions are categorized based on control of the process from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the reporter, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g. purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

The table below documents that both Scope 1 (direct) and Scope 2 (indirect) emissions source contributions remained relatively consistent through the three-year period.

Table 2. Direct and Indirect Emissions for the City of Port Hueneme

Scope	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
Scope 1 (Direct) emissions	75,153	74,227	73,257
Scope 2 (Indirect) emissions	32,801	32,297	30,705
Total	**107,954**	**106,524**	**103,962**

Figure 2. Port Hueneme Portion of Ventura County Community Inventory

A detailed description of the calculation methodolgies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

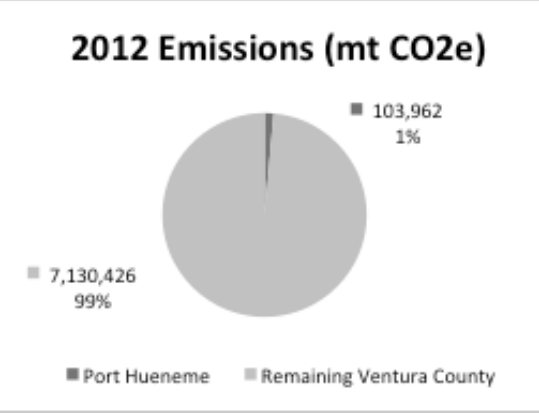
Emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

Total GHG emissions in 2012 for the City of Port Hueneme amounted to 103,962 metric tons of CO_2e. The City is the eight-largest incorporated city contributor in terms of total County emissions. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the City of Port Hueneme.

As shown in Figure 3, emissions from the City of Port Hueneme in 2012 accounted for about 1% of overall GHG emissions for Ventura County.

Port Hueneme's 2012 per capita GHG emissions are 4.82 metric tons of CO_2e, compared to countywide per capita emissions of 6.55 metric tons.

A discussion of City of Port Hueneme's GHG emissions for each major sector, focusing on CY 2012, is presented below.



Emissions from the Residential Sector

Residential emissions for the City of Port Hueneme mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the City of Port Hueneme

Year	MT CO_2e
2010	13,219
2011	13,109
2012	12,405

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the City of Port Hueneme

Year	MT CO_2e
2010	9,575
2011	9,644
2012	9,672

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in Part I of this report. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-Residential Emissions from Natural Gas for the City of Port Hueneme

Year	MT CO_2e
2010	2,612
2011	2,530
2012	2,436

Non-residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 6. Non-Residential Emissions from Electricity for the City of Port Hueneme

Year	MT CO_2e
2010	23,161
2011	22,614
2012	21,007

California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. There are no facilities in Port Hueneme subject to this reporting requirement.

On-Road Transportation Emissions

Vehicle miles traveled on Port Hueneme roads account for approximately 1% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 32,097 metric tons of CO_2e, which represents 31.61% of total Port Hueneme community emissions. These emissions resulted from vehicles burning gasoline and diesel fuel.[2]

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the City of Port Hueneme in 2012 resulted in 9,176 metric tons of CO_2e, which represents 9% of 2012 emissions.

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the City on those highways, particularly for commuting purposes.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous.[3]

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are::

Table 7. Emissions from Solid Waste for the City of Port Hueneme

Year	MT CO_2e
2010	6,394
2011	6,093
2012	6,285

There is no municipal solid waste landfill in Port Hueneme. Waste generated in the City is transported to landfills outside the City boundaries.

CO_2e emitted as a result of landfilling of waste in 2012 accounted for 6.1% of Port Hueneme's 2012 emissions

[3] http://www.energy.ca.gov/biomass/landfill_gas.html

Water and Wastewater Treatment Emissions

GHG emissions from electricity consumption for water supply and irrigation infrastructure required for the City of Port Hueneme amounted to 26 metric tons of CO_2e for the period, which represents 0.02% of overall emissions.

2012 GHG emissions from domestic wastewater treatment for the City of Port Hueneme amounted to 630 metric tons of CO_2e, which represents 0.5% of Port Hueneme's total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California Air Resources Board.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the City of Port Hueneme in 2012 amounted to 10,228 metric tons of CO_2e, 7.3% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

[4] http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Port Hueneme. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 8. 2010-2012 Avoided Emissions from SCE Programs in the City of Port Hueneme

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	1,739	482	309,559
Partnership Programs	375	104	$68,894
Total Non-Residential	**2,115**	**587**	**$378,454**
Business Consumer Electronics	0	0	$20
Advanced Lighting – Torchiere	6	2	$2,335
Appliance Recycling	229	64	$36,242
Home Energy Efficiency Rebate	14	4	$7,175
Home Energy Efficiency Survey	23	6	$550
Lighting	1,312	364	$64,460
Multifamily Rebate Program	12	3	$7,560
Residential Total	**1,596**	**443**	**$118,342**
TOTAL	**3,711**	**1,029**	**$496,896**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the City, for example, it does not include the installation of large capacity production or self-financed units, but in some cities it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move. It does not appear to have been a significant factor in the population's approach to its energy management.

Some of the avoided emissions in Port Hueneme for CYs 2010 through 2012 as a result of solar energy production are:

Table 9. Avoided Emissions from Solar Production in the City of Port Hueneme

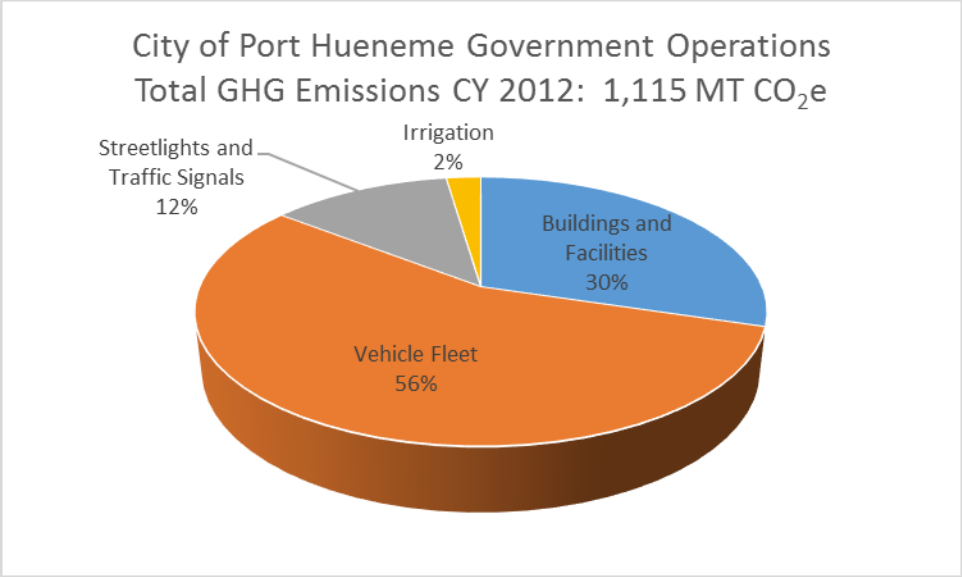
Year	MT CO_2e
2010	15
2011	0
2012	6

3 Port Hueneme City Government Operations Inventory

The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

Because there were no significant changes between 2010 and 2012, the following chart shows the relative contribution of various sources to GHG emissions from City government operations.

Figure 3. 2012 GHG Emissions from City of Port Hueneme Government Operations



Emissions from the Use of Electricity

Port Hueneme purchases its electricity from Southern California Edison. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 10. Emissions from the Use of Electricity for City of Port Hueneme Government Operations

	2010 MT CO_2e	2011 MT CO_2e	2012 MT CO_2e
Buildings and Facilities	294	293	306
Lighting and Traffic Control	202	201	136
Water and Pumping	65	39	26
Total	**560**	**533**	**468**

Emissions from the Combustion of Natural Gas

The City of Port Hueneme purchases natural gas from the Southern California Gas Company, primarily for heating its facilities and for operating boilers in its municipal buildings. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Combustion of Natural Gas for City of Port Hueneme Government Operations

Year	MT CO_2e
2010	25
2011	24
2012	25

Emissions from City Owned and Operated Vehicles

The City of Port Hueneme owns and operates both gasoline and diesel fueled vehicles. Based on data provided by the City's Fleet manager (fuel usage and mileage), emissions from these vehicles is as follows:

Table 12. Emissions from City of Port Hueneme Vehicle Fleet

Year	MT CO_2e
2010	655
2011	640
2012	622

4 Port Hueneme Community Greenhouse Gas Forecasts and Reduction Target Options

Part I of this report provides an overview of the approach to forecasting and reduction targets for the VCREA and its member local governments. Regional forecasts and reduction targets have been established for energy use (electricity and natural gas) and for on-road vehicles.

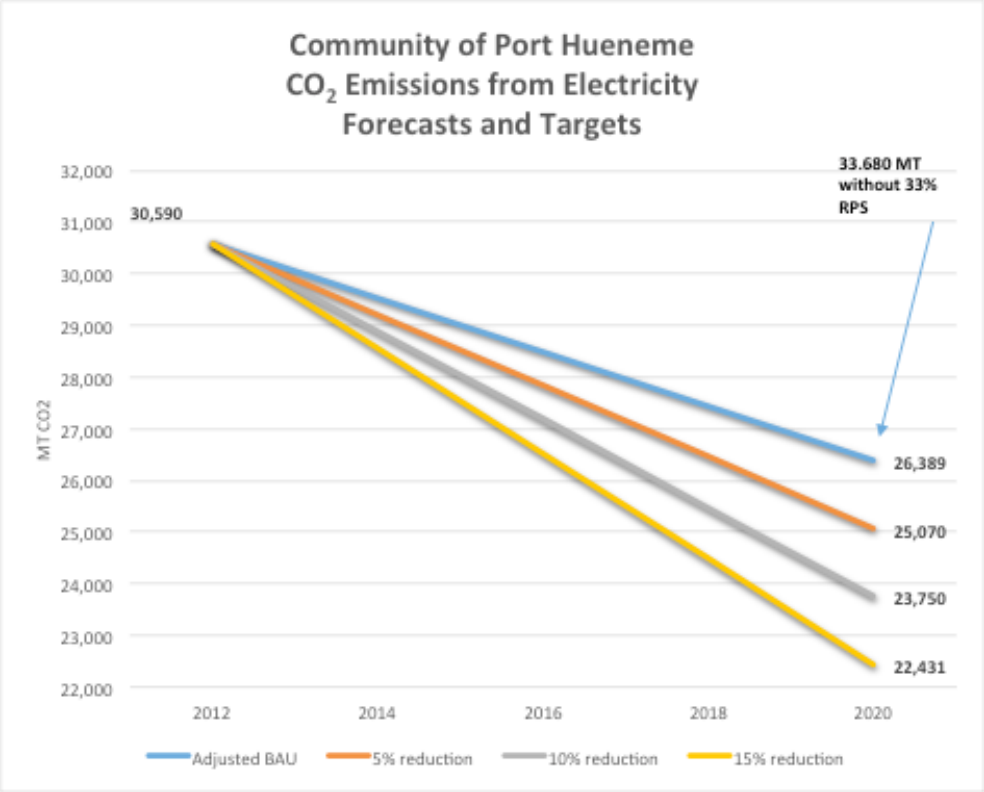
Forecasted Emissions from and Targets for Electricity Use

The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[5] For the City of Port Hueneme, a BAU scenario means that emissions would total 33,680 MT CO_2e in 2020, as compared to the 2012 levels of 30,590.[6] The adjusted BAU scenario projects 2020 emissions at 26,389 metric tons. Associated reduction targets are shown below:

[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[6] Forecasts for electricity are calculated for CO2 only and do not include CH_4 and N_2O. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.

Figure 4. Emissions from Electricity Forecasts and Targets for the City of Port Hueneme



Based on this adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

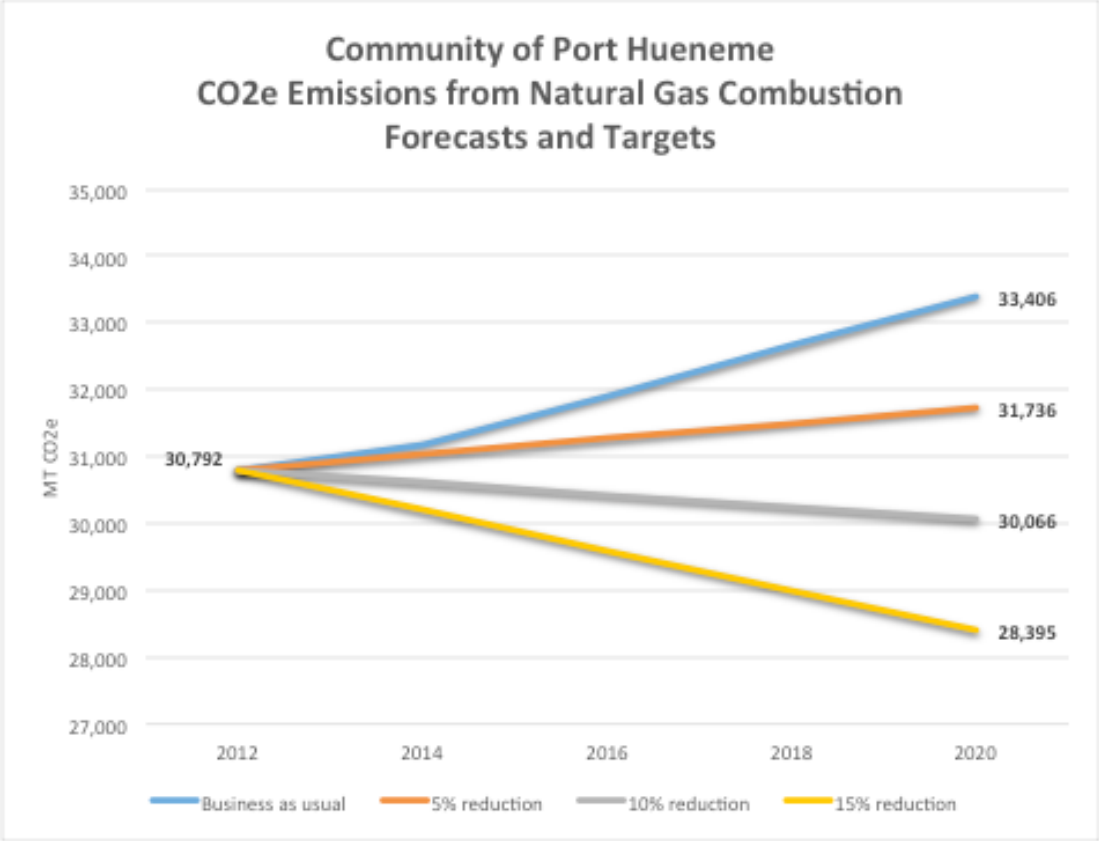
Table 13. Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the City of Port Hueneme

Reductions required 2010 to 2020	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	1,632	5,520
10% reduction	3,263	6,840
15% reduction	4,895	8,159

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[7] For Port Hueneme, a BAU scenario means that emissions would total 15,632 MT CO_2e in 2020 as compared to the 2012 levels of 14,842. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the City of Port Hueneme



[7] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

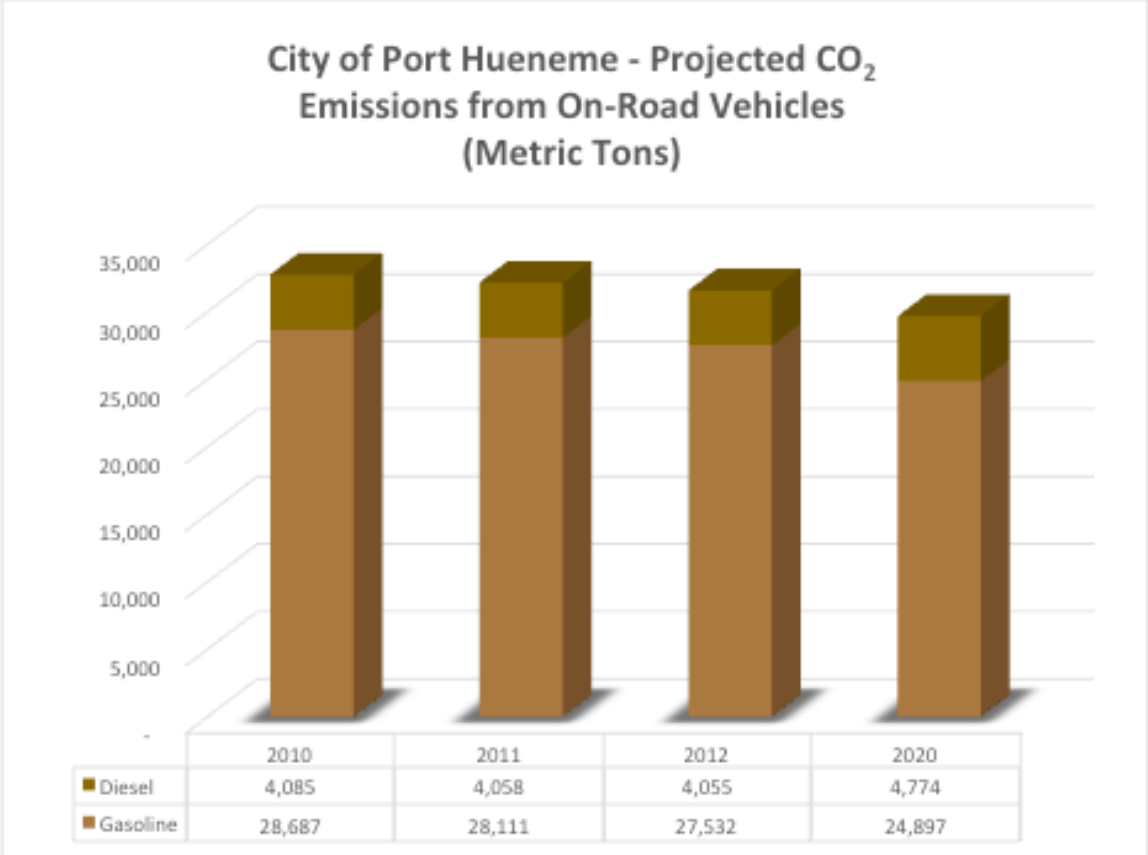
Table 14. Required Emissions Reductions from Natural Gas to Meet 5%, 10% and 15% Targets for the City of Port Hueneme

Reductions required 2012 to 2020	Below 2012 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	792	-8
10% reduction	1,583	774
15% reduction	2,375	1,555

Forecasted Emissions from and Targets for On Road Transportation

As noted in Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010.** Any additional activities on the part of Port Hueneme, including support for alternative modes of transportation, behavioral change, regional cooperation, etc. could increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on State highways, which would include commuting and inter-city travel. Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the City of Port Hueneme



	2010	2011	2012	2020
Diesel	4,085	4,058	4,055	4,774
Gasoline	28,687	28,111	27,532	24,897

5 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for Port Hueneme.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	1,632	5,520
10% reduction	3,263	6,840
15% reduction	4,895	8,159

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects, and rooftop solar installations.

Cumulatively, these programs have resulted in emission reductions of 1,633, 5% below 2010 levels.

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion remained relatively stable in Port Hueneme, totaling 15,831, 15,639 and 14,842 metric tons of CO_2e in 2010, 2011 and 2012 respectively. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emissions from the combustion of natural gas. .

Reductions in Emissions from On-Road Vehicles

The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures.

Appendix A.7:

City of Santa Paula

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance

2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Target Options

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill 32 (AB 32), which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The City of Santa Paula is a small agricultural town in northern Ventura County known for its citrus. Originally founded in 1872 and incorporated in 1902, it covers an area of 4.7 square miles and has a population of approximately 30,000 residents according to the California Department of Finance[1].

The majority of Santa Paula's GHG emissions are produced through the burning of fossil fuels. The City's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the City of Santa Paula's geographical boundaries (i.e. city limits). The City's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the City of Santa Paula were inventoried for the years 2010 through 2012. The City has not established a baseline year for its inventories.

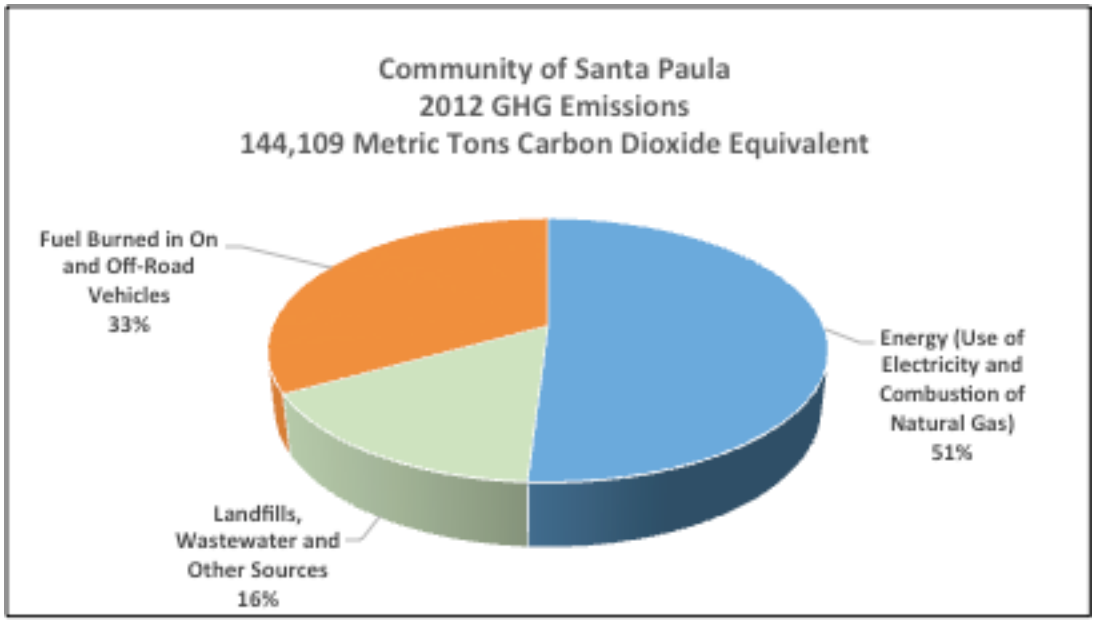
[1] http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Santa Paula's Community Inventory

The City of Santa Paula's Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities within the city limits. Stationary combustion data was provided by Southern California Gas Company (SCG) Southern California Edison (SCE) provided electricity data.

Table 1 below quantifies the contributions of each sector to total the community emissions generated during the period of 2010 through 2012 for the City of Santa Paula.

Figure 1. Community GHG Emissions for the City of Santa Paula



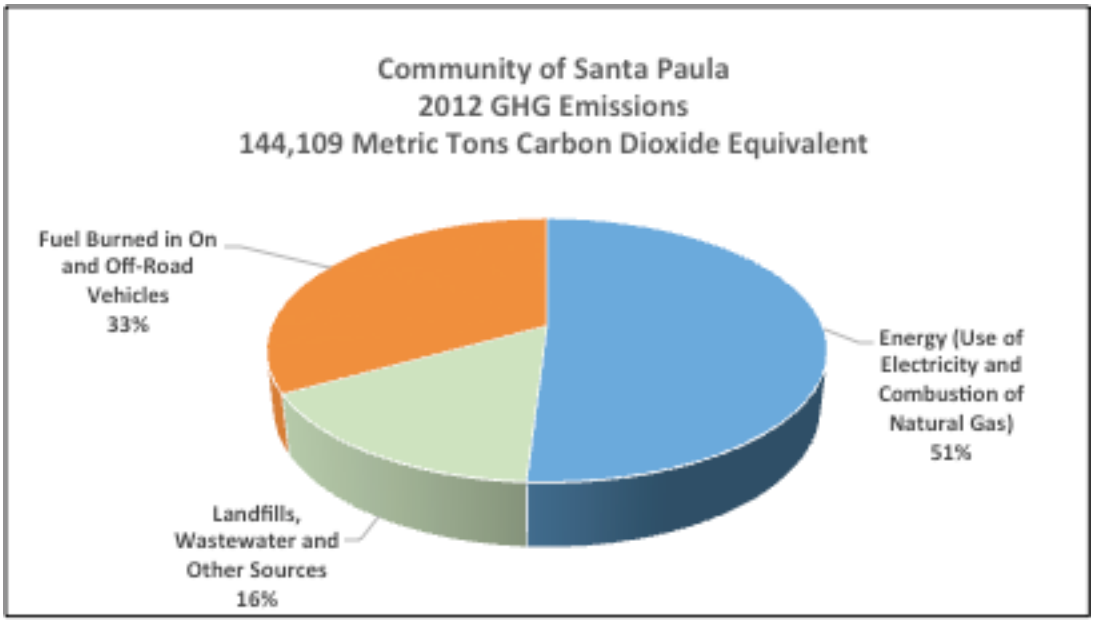
illustrates on average each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 22% of emissions each year, followed closely by emissions associated with the City's wastewater treatment plant

Table 1. Community GHG Emissions by Sector for the City of Santa Paula

Sector	2010 ($MT CO_2e$)	2011 ($MT CO_2e$)	2012 ($MT CO_2e$)
On-Road Transportation	26,426	25,914	25,401
Other Emissions*	22,892	23,632	24,848
Non-Residential Electricity Use	17,548	18,062	18,276
Residential Natural Gas Use	17,388	16,753	15,963
Residential Electricity Use	13,247	13,320	13,386
Off-Road Vehicle Use	13,177	13,356	12,644
Non-Residential Natural Gas Use	4,470	4,834	4,351
Total	**115,148**	**115,872**	**114,868**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1. Community GHG Emissions for the City of Santa Paula



As explained in the body of this report, emissions are categorized based on control of the processes from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the organization, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g. purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

The table below documents that both Scope 1 (direct) and Scope 2 (indirect) emissions source contributions remained relatively consistent through the three-year period, with a small peak in 2011.

Table 2. Direct and Indirect Emissions for the City of Santa Paula

Scope	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
Scope 1 (Direct) emissions	82,987	82,718	81,406
Scope 2 (Indirect) emissions	32,161	33,154	33,462
Total	**115,148**	**115,872**	**114,868**

A detailed description of the calculation methodologies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

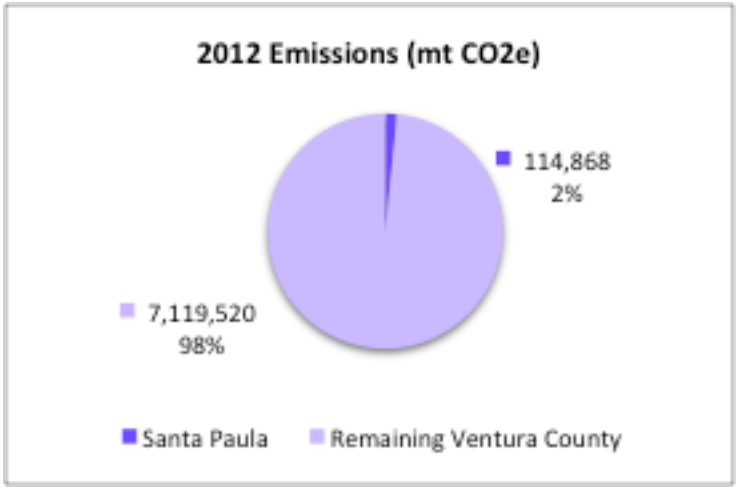
Residential and non-residential emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

Total GHG emissions in 2012 for the City of Santa Paula amounted to 114,868 metric tons of CO_2e. The City is the seventh-largest incorporated city in terms of total County emissions. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the City of Santa Paula.

As shown in Figure 3, emissions from the City of Santa Paula in 2012 accounted for about 2% of overall GHG emissions for Ventura County.

Santa Paula's 2012 per capita GHG emissions are 4.85 metric tons of CO_2e, compared to countywide per capita emissions of 6.55 metric tons.

Figure 2. Santa Paula Portion of Ventura County Community Inventory



A discussion of City of Santa Paula's GHG emissions for each major sector, focusing on CY 2012, is presented below.

Emissions from the Residential Sector

Residential emissions for the City of Santa mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the City of Santa Paula

Year	MT CO_2e
2010	17,388
2011	16,753
2012	15,963

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the City of Santa Paula

Year	MT CO_2e
2010	13,247
2011	13,320
2012	13,386

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in Part I of this report. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-Residential Emissions from Natural Gas for the City of Santa Paula

Year	MT CO_2e
2010	4,470
2011	4,834
2012	4,351

Non-residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 6. Non-Residential Emissions from Electricity for the City of Santa Paula

Year	MT CO_2e
2010	17,548
2011	18,062
2012	18,276

California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. There are no facilities in Santa Paula subject to this reporting requirement.

On-Road Transportation Emissions

Vehicle miles traveled on Santa Paula roads account for approximately 1% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 25,401 metric tons of CO_2e, which represents 22% of total Santa Paula community emissions. These emissions resulted from vehicles burning gasoline and diesel fuel. [2]

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the City of Santa Paula in 2012 resulted in 12,644 metric tons of CO_2e, which represents 11% of 2012 emissions.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous.[3]

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the City on those highways, particularly for commuting purposes.

[3] http://www.energy.ca.gov/biomass/landfill_gas.html

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are:

Table 7. Emissions from Landfilled Solid Waste for the City of Santa Paula

Year	MT CO_2e
2010	8,334
2011	8,219
2012	8,086

There is no municipal solid waste landfill in Santa Paula. Waste generated in the City is transported to landfills outside the City boundaries.

CO_2e emitted as a result of landfilling of waste in 2012 accounted for 7 % of Santa Paula's 2012 emissions.

Water and Wastewater Treatment Emissions

GHG emissions from electricity consumption for water supply and irrigation infrastructure required for the City of Santa Paula amounted to 785 metric tons of CO_2e for the period, which represents 0.5% of overall emissions.

2012 GHG emissions from domestic wastewater treatment for the City of Santa Paula amounted to 1,883 metric tons of CO_2e, which represents 1.1% of Santa Paula's total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California Air Resources Board.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the City of Santa Paula in 2012 amounted to 14,094 metric tons of CO_2e, 8.4% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

[4] http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Santa Paula. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 8. 2010-2012 Avoided Emissions from SCE Programs in the City of Santa Paula

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	9,329	2,589	$978,780
Business Coin-Op	7	2	$6,813
Partnership Program	197	55	$27,502
Total Non-Residential	**9,533**	**2,646**	**$1,013,095**
Comprehensive Manufactured Homes	0	0	$420
Advanced Lighting – Torchiere	6	2	$7,736
Appliance Recycling	336	93	$46,796
Business Consumer Electronics	36	10	$4,622
Home Energy Efficiency Rebate	18	5	$8,790
Lighting	1,346	373	$74,420
Multifamily Rebate Program	10	3	$5,593
Workforce Education and Training	39	11	$2,499
Home Energy Efficiency Survey	35	9	$666
Residential Total	**1,826**	**505**	**$151,542**
TOTAL	**11,359**	**3,151**	**$1,164,637**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the City, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in Santa Paula for CYs 2010 through 2012 as a result of solar energy production are:

Table 9. Avoided Emissions from Solar Production in the City of Santa Paula

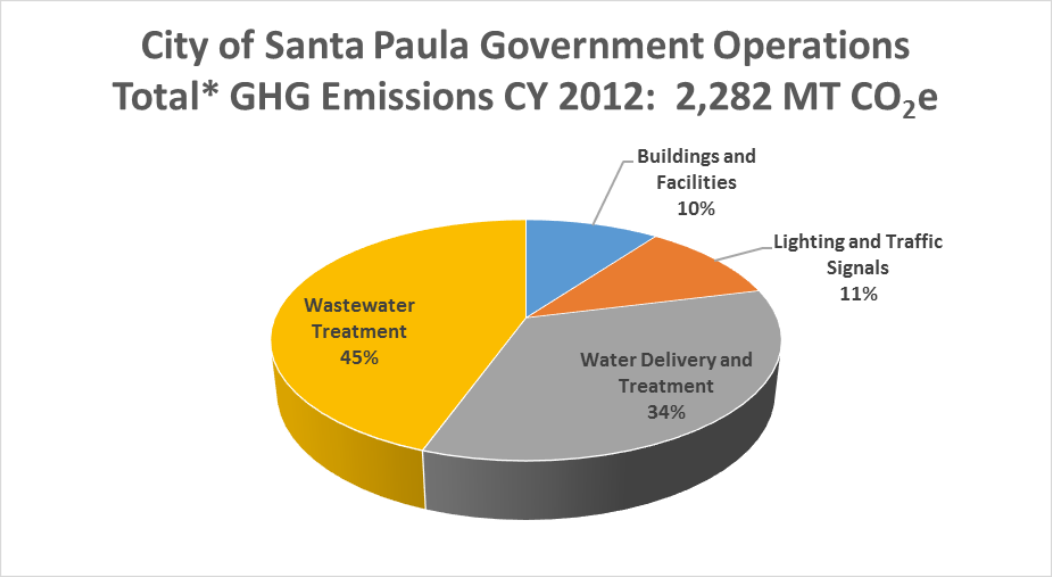
Year	MT CO_2e
2010	10
2011	12
2012	22

3 Santa Paula City Government Operations Inventory

The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

Because there were no significant changes between 2010 and 2012, the following chart shows the relative contribution of various sources to GHG emissions from City government operations.

Figure 3. 2012 GHG Emissions from City of Santa Paula Government Operations



*Note that the City of Santa Paula's inventory does not include emissions from city-owned and operated vehicles. Emissions were calculated based on electricity and natural gas only.

Emissions from the Use of Electricity

Santa Paula purchases its electricity from Southern California Edison. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 10. Emissions from the Use of Electricity for City of Santa Paula Government Operations

	2010 MT CO_2e	2011 MT CO_2e	2012 MT CO_2e
Buildings and Facilities	181	181	188
Lighting and Traffic Control	259	257	251
Water and Pumping	838	744	785
Wastewater Treatment	528	1,028	1,015
Total	**1,807**	**2,210**	**2,239**

Emissions from the Combustion of Natural Gas

The City of Santa Paula purchases natural gas from the Southern California Gas Company, primarily for heating its facilities and for operating boilers in its municipal buildings. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Combustion of Natural Gas for City of Santa Paula Government Operations

Year	MT CO_2e
2010	124
2011	96
2012	99

Emissions from City Owned and Operated Vehicles

No data was available on city owned vehicles.

4 Santa Paula Community Greenhouse Gas Forecasts and Reduction Target Options

Part I of this report provides an overview of the approach to forecasting and reduction targets for the VCREA and its member local governments. Regional forecasts and reduction targets have been established for energy use (electricity and natural gas) and for on-road vehicles.

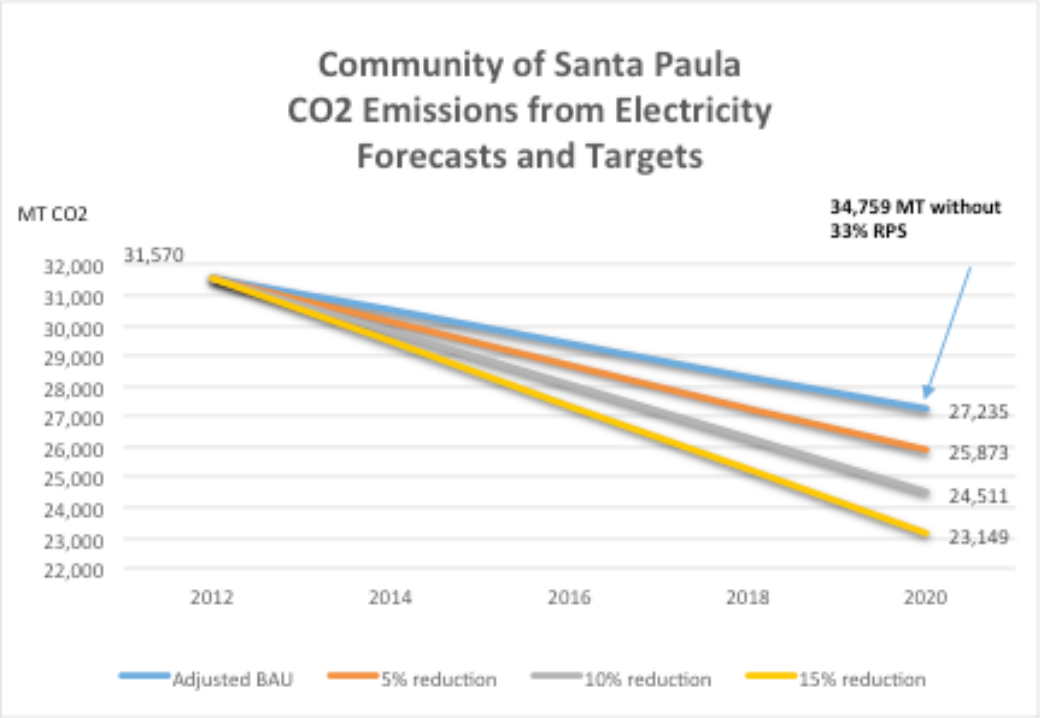
Forecasted Emissions from and Targets for Electricity Use

The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[5] For the City of Santa Paula, a BAU scenario means that emissions would total 34,759 MT CO_2e in 2020, as compared to the 2012 levels of 31,570.[6] The adjusted BAU scenario projects 2020 emissions at 27,235 metric tons. Associated reduction targets are shown below:

[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[6] Forecasts for electricity are calculated for CO2 only and do not include CH4 and N20. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.

Figure 4. Emissions from Electricity Forecasts and Targets for the City of Santa Paula



Based on this Adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

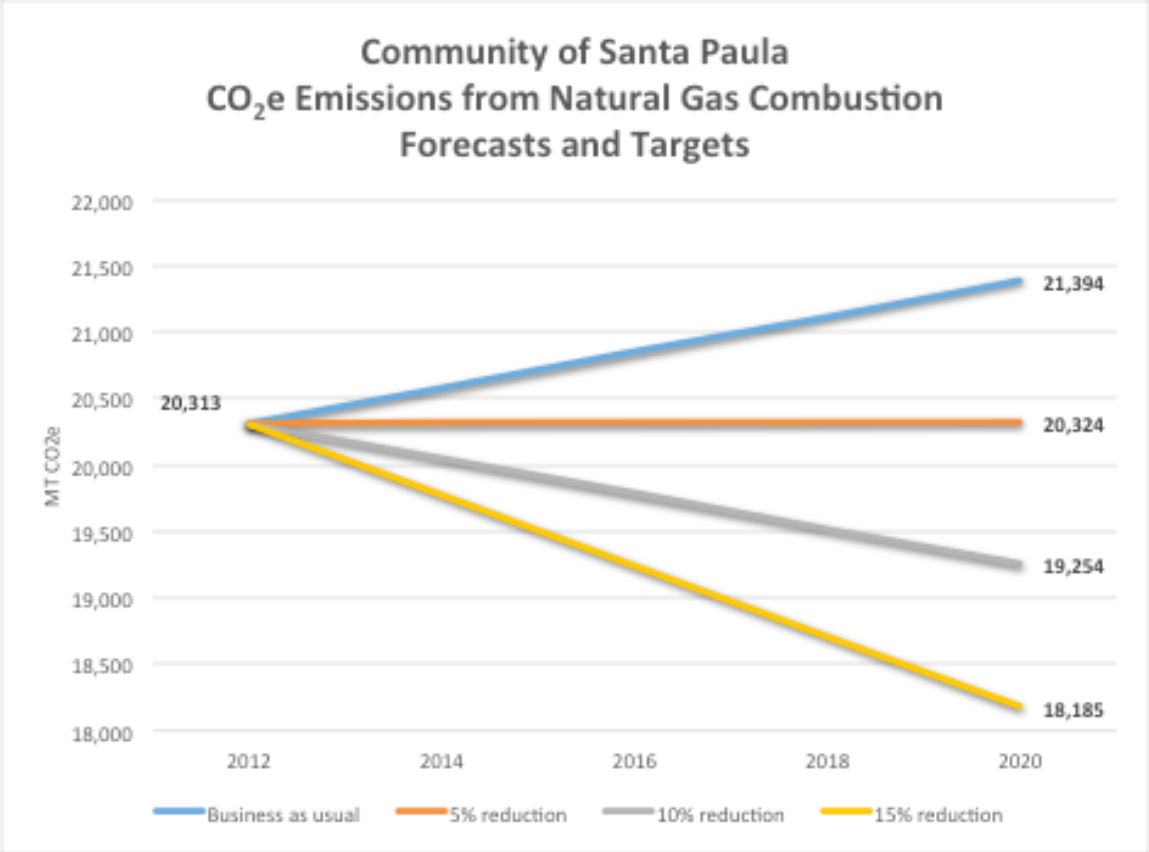
Table 12. Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the City of Santa Paula

Reductions required 2010 to 2020	Below 2010 Levels ($MT CO_2e$)	Below BAU 2020 Levels ($MT CO_2e$)
5% reduction	1,632	5,697
10% reduction	3,263	7,059
15% reduction	4,895	8,421

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[7] For the City, a BAU scenario means that emissions would total 21,394 MT CO_2e in 2020 as compared to the 2012 levels of 20,313. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the City of Santa Paula



[7] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

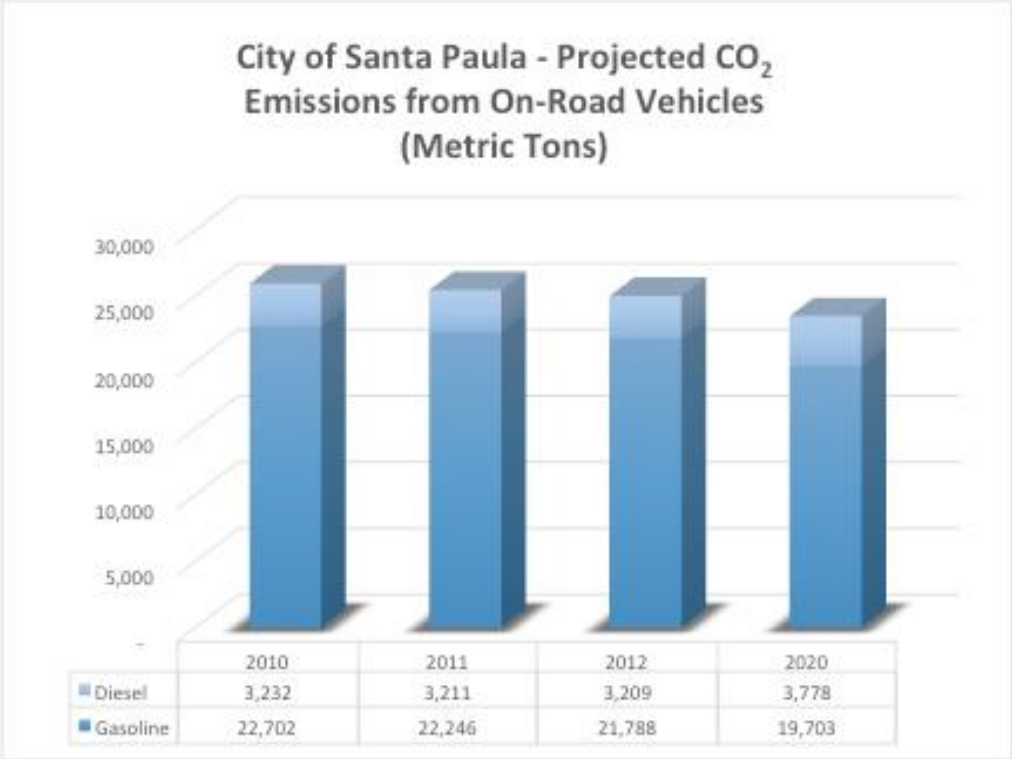
Table 13. Required Emissions Reductions from Natural Gas to Meet 5%, 10% and 15% Targets for the City of Santa Paula

Reductions required 2012 to 2020	Below 2012 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	1,093	-11
10% reduction	2,186	1,059
15% reduction	3,279	2,128

Forecasted Emissions from and Targets for On Road Transportation

As noted in Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010**. Any additional activities on the part of Santa Paula, including support for alternative modes of transportation, behavioral change, regional cooperation, etc. could increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on State highways, which would include commuting and inter-city travel.. Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the City of Santa Paula[8]



[8] Note that there are small differences between 2010 through 2012 emissions reported here and those for the GHG inventory reported earlier. Inventory includes CH_4 and N_2O, forecasts are based on CO_2 only.

5 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for Santa Paula.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	1,632	5,697
10% reduction	3,263	7,059
15% reduction	4,895	8,421

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects, and rooftop solar installations.

Cumulatively, these programs have resulted in emissions reductions of 4,380, approximately 11% below 2010 levels..

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion remained relatively stable in Santa Paula, totaling 21,858, 21,588 and 20,313 metric tons of CO_2e in 2010, 2011 and 2012 respectively. SB 350 specifically recognizes the importance of increasing energy efficiency in existing buildings one of the major sources of emissions from the combustion of natural gas.

Reductions in Emissions from On-Road Vehicles

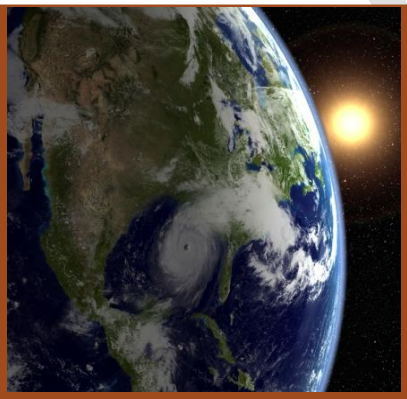
The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures. .

Appendix A.8:

City of Thousand Oaks

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Target Options

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill (AB) 32 which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The City of Thousand Oaks is nestled against the Santa Monica Mountains and boasts more than 15,000 acres of natural publicly owned open space located within the City's boundaries. The City is 56 square miles and has a population of approximately 129,000 residents according to the California Department of Finance[1].

The majority of Thousand Oaks' GHG emissions are produced through the burning of fossil fuels. The City's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the City of Thousand Oaks' geographical boundaries (i.e. city limits). The City's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the City of Thousand Oaks were inventoried for the years 2010 through 2012. The City has not established a baseline year for its inventories.

[1] http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Thousand Oaks' Community Inventory

The City of Thousand Oaks' Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities within the city limits. Stationary combustion data was provided by Southern California Gas Company (SCG). Southern California Edison (SCE) provided electricity data.

Table 1 below quantifies the contributions of each sector to total the community emissions generated during the period of 2010 through 2012

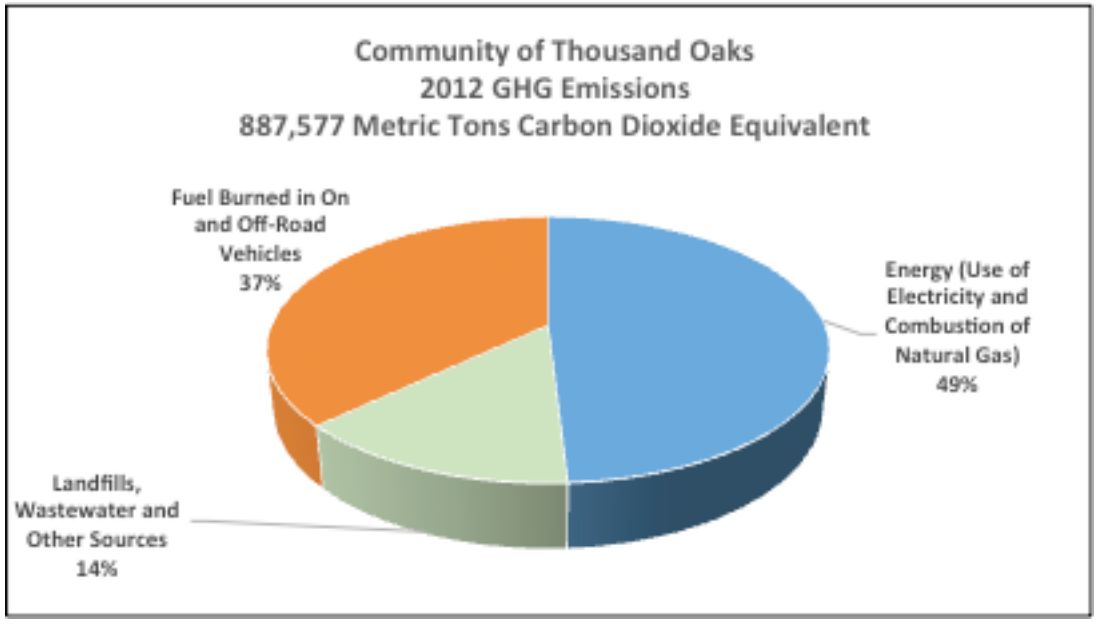
Figure 1 illustrates on average each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 31% of emissions each year.

Table 1. Community GHG Emissions by Sector for the City of Thousand Oaks

Sector	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
On-Road Transportation	285,274	279,754	274,210
Non-Residential Electricity Use	174,844	176,307	177,819
Residential Natural Gas Use	134,951	133,603	123,611
Other Emissions*	102,729	104,170	109,408
Residential Electricity Use	107,358	108,042	110,680
Off-Road Vehicle Use	56,932	57,689	54,176
Non-Residential Natural Gas Use	38,497	38,229	37,675
Total	**900,585**	**897,794**	**887,577**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1. 2012 Community GHG Emissions for the City of Thousand Oaks



As explained in the body of this report, emissions are categorized based on control of the process from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the reporter, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g. purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

The table below demonstrates that both Scope 1 (direct) and Scope 2 (indirect) emissions source contributions remained relatively consistant through the three-year period.

Table 2. Direct and Indirect Emissions for the City of Thousand Oaks

Scope	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
Scope 1 (Direct) emissions	616,847	611,783	597,869
Scope 2 (Indirect) emissions	283,737	286,011	289,708
Total	**900,585**	**897,794**	**887,577**

A detailed description of the calculation methodologies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

Emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

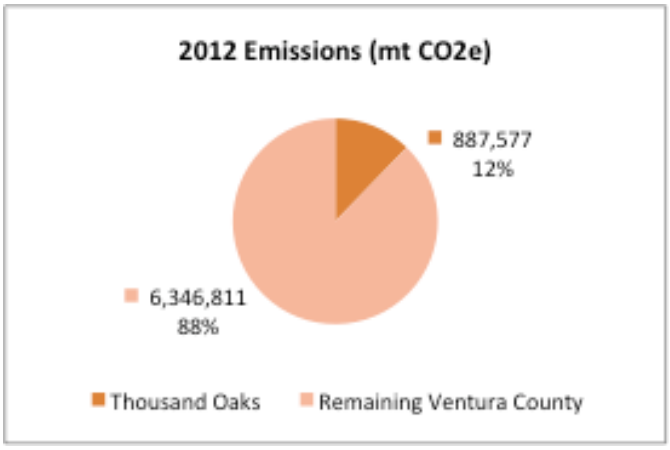
Total GHG emissions in 2012 for the City of Thousand Oaks totaled 887,577 metric tons of CO_2e. Thousand Oaks is the second-largest incorporated city contributor in terms of total County emissions. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the City of Thousand Oaks.

As shown in Figure 2, emissions from the City of Thousand Oaks in 2012 accounted for about 12% of overall GHG emissions for Ventura County.

Thousand Oaks' 2012 per capita GHG emissions are 6.99 metric tons of CO_2e, compared to countywide per capita emissions of 6.55 metric tons.

A discussion of City of Thousand Oaks' GHG emissions for each major sector, focusing on CY 2012, is presented below.

Figure 2. Thousand Oaks Portion of Ventura County Community Inventory



Emissions from the Residential Sector

Residential emissions for the City of Thousand Oaks mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the City of Thousand Oaks

Year	MT CO_2e
2010	134,951
2011	133,603
2012	123,611

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the City of Thousand Oaks

Year	MT CO_2e
2010	107,358
2011	108,042
2012	110,680

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in Part I of this report. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-Residential Emissions from Natural Gas for the City of Thousand Oaks

Year	MT CO_2e
2010	38,497
2011	38,229
2012	37,675

Non-residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 6. Non-Residential Emissions from Electricity for the City of Thousand Oaks

Year	MT CO_2e
2010	174,844
2011	176,307
2012	177,819

California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. One facility in Thousand Oaks is subject to this requirement: Amgen Inc.

Amgen reported the following emissions for CYs 2010 through 2012:

Year	MT CO_2e
2010	26,624
2011	26,098
2012	23,211

Facility emissions data was reported to, and obtained from the California Air Resources Board (CARB) mandatory reporting website.

On-Road Transportation Emissions

Vehicle miles traveled on Thousand Oaks roads accounted for approximately 8% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 274,210 metric tons of CO_2e, which represents 31% of total Thousand Oaks community emissions. These emissions resulted from vehicles burning gasoline and diesel fuel.[2]

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the City of Thousand Oaks in 2012 resulted in 54,176 metric tons of CO_2e, which represents 6 % of emissions.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous.[3]

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are:

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the City on those highways, particularly for commuting purposes.

[3] http://www.energy.ca.gov/biomass/landfill_gas.html

Table 7. Emissions from Landfilled Solid Waste for the City of Thousand Oaks

Year	MT CO_2e
2010	44,197
2011	43,592
2012	44,095

There is no municipal solid waste landfill in Thousand Oaks. Waste generated in the City is transported to landfills outside the City boundaries.

CO_2e emitted as a result of landfilling of waste in 2012 accounted for about 5% of Thousand Oaks' 2012 emissions.

Water and Wastewater Treatment Emissions

GHG emissions from electricity consumption for water supply and irrigation infrastructure required for the City of Thousand Oaks amounted to 813 metric tons of CO_2e for the period, which represents 0.1% of overall emissions.

2012 GHG from domestic wastewater treatment for the City of Thousand Oaks amounted to 4,114 metric tons of CO_2e, which represents 0.4% of Thousand Oaks' total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the City of Thousand Oaks in 2012 amounted to 60,386 metric tons of CO_2e, 5.3% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

[4] http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Thousand Oaks. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 8. 2010-2012 Avoided Emissions from SCE Programs in the City of Thousand Oaks

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	19,264	5,334	$4,221,681
Business Coin-Op	2	1	$2779
Partnership Programs	158	44	$24,885
Total Non-Residential	**19,425**	**5,390**	**$5,249,344**
Advanced Lighting – Torchiere	36	0.4	$11,695
Advanced Lighting – WT	0.3	0.3	$181
Appliance Recycling	2,590	719	$356,733
Business Consumer Electronics	1,894	526	$183,054
Comprehensive Manufactured Homes	2	0.5	$453
Home Energy Efficiency Rebate	878	244	$360,595
Home Energy Efficiency Survey	1,282	356	$17,901
Lighting	11,966	3,320	$557,531
Multifamily Rebate Program	613	170	$480,483
Workforce Education and Training	183	51	$9,687
Residential Total	**19,408**	**5,385**	**1,966,437**
TOTAL	**38,833**	**10,775**	**$6,215,781**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the City, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in Thousand Oaks for CYs 2010 through 2012 as a result of solar energy production are:

Table 9. Avoided Emissions from Solar Production in the City of Thousand Oaks

Year	MT CO_2e
2010	308
2011	393
2012	563

3 Thousand Oaks City Government Operations Inventory

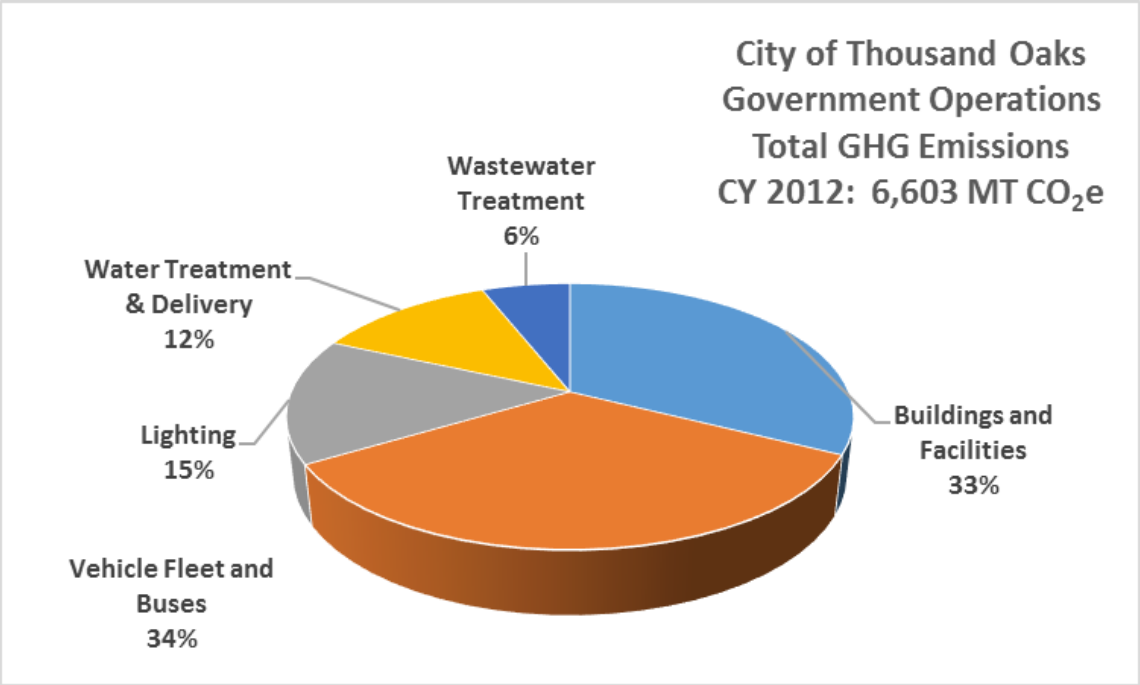
The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

The City of Thousand Oaks emissions varied significantly over the three years covered by this report, with significant reductions. Emissions from electricity from use of electricity in facilities were cut by 95%. In late 2010, the City Council made the commitment to purchase Green Power through a third party, which reduced emissions from the largest city facilities, beginning in 2011 The wastewater treatment plant has increased the production of solar power and constructed a second cogeneration power plant fueled by biofuels from the wastewater treatment process. The results with respect to emissions from electricity use are as follows:

Metric Tons CO_2e	2010	2011	2012
Buildings and Facilities	2,347	87	131
Hill Canyon WWT Plant	754	892	396

Emissions from combustion of natural gas increased significantly after 2010, primarily because the City reached an agreement with Waste Management Inc. to provide compressed natural gas to its fleet of waste haulers while WMI developed its own fueling station and because the city expanded its fleet of CNG buses during that time period. The City anticipates natural gas data for calendar years 2013 forward will demonstrate a return to historic levels.

Figure 3. 2012 GHG Emissions from City of Thousand Oaks Government Operations



Emissions from the Use of Electricity

Thousand Oaks purchases its electricity from Southern California Edison. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 10. Emissions from the Use of Electricity for City of Thousand Oaks Government Operations

	2010 MT CO_2e	2011 MT CO_2e	2012 MT CO_2e
Buildings and Facilities	2,347	87	131
Streetlights and Traffic Signals	1,004	1,005	1,007
Water and Pumping	782	770	813
Wastewater Treatment	754	892	396
Total	**4,887**	**2,754**	**2,347**

Emissions from the Combustion of Natural Gas

The City of Thousand Oaks purchases natural gas from the Southern California Gas Company, for heating its facilities and for operating boilers in its municipal buildings and for converting to compressed natural gas used in vehicles and in the municipal buses powered with the fuel. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Combustion of Natural Gas for City of Thousand Oaks Government Operations

Year	MT CO_2e
2010	924
2011	1,363
2012	2,011

Emissions from City Owned and Operated Vehicles

The City of Thousand Oaks owns and operates both gasoline and diesel fueled vehicles and runs a City-owned public transit system, primarily composed of CNG-fueled buses, as noted above. Based on data provided by the City's Fleet manager (fuel usage and mileage), emissions from gasoline and diesel used in these vehicles is as follows:

Table 12. Emissions from City of Thousand Oaks Vehicle Fleet

Year	MT CO_2e
2010	2,211
2011	2,187
2012	2,245

Avoided Energy Emissions (City Operations)

In 2007, the City of Thousand Oaks recognized the potential for renewable power generation at the Hill Canyon Wastewater Treatment Plant. Its anaerobic digester produces methane gas and there was ample space for solar panels. The first cogeneration project (a power production technology) and PV array began full year

operation in 2008. Mid-year 2011 another cogeneration unit came on line. The MWhs produced, and associated avoided emissions for CYs 2010 through 2012 are as follows:

Table 13. Avoided Emissions from City of Thousand Oaks Hill Canyon Wastewater Treatment Plant

	Cogeneration		Solar		Total
	MWhs	**MT CO_2e**	**MWhs**	**MT CO_2e**	**Total MT CO_2e**
2010	3,033	841	1,121	311	1,153
2011	2,667	740	1,129	313	1,053
2012	4,578	1,270	1,107	307	1,577

4 Thousand Oaks Community Greenhouse Gas Forecasts and Reduction Target Options

Part I of this report provides an overview of the approach to forecasting and reduction targets for the VCREA and its member local governments. Regional forecasts and reduction targets have been established for energy use (electricity and natural gas) and for on-road vehicles.

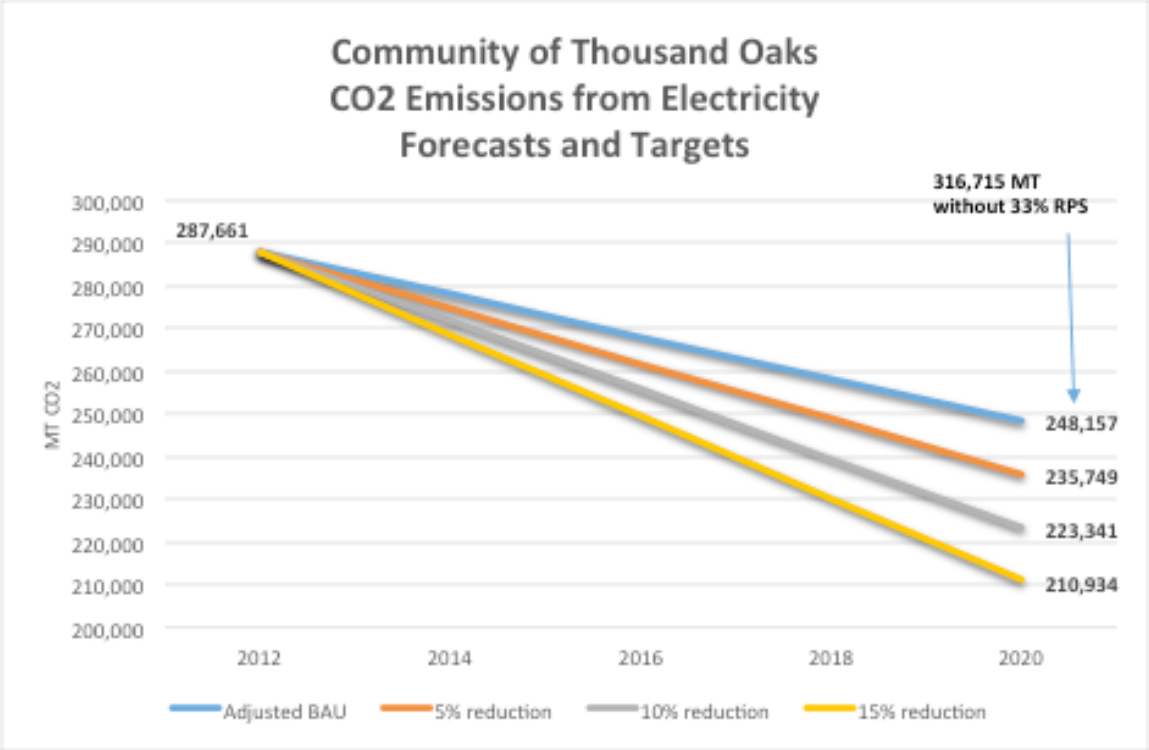
Forecasted Emissions from and Targets for Electricity Use

The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% over 2011 levels.[5] For Thousand Oaks, a BAU scenario means that emissions would total 316,715 MT CO_2e in 2020, as compared to the 2012 levels of 287,661.[6] The adjusted BAU scenario projects 2020 emissions at 248,157 metric tons. Associated reduction targets are shown below:

[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[6] Forecasts for electricity are calculated for CO2 only and do not include CH_4 and N_2O. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.

Figure 4. Emissions from Electricity Forecasts and Targets for the City of Thousand Oaks



Based on this adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

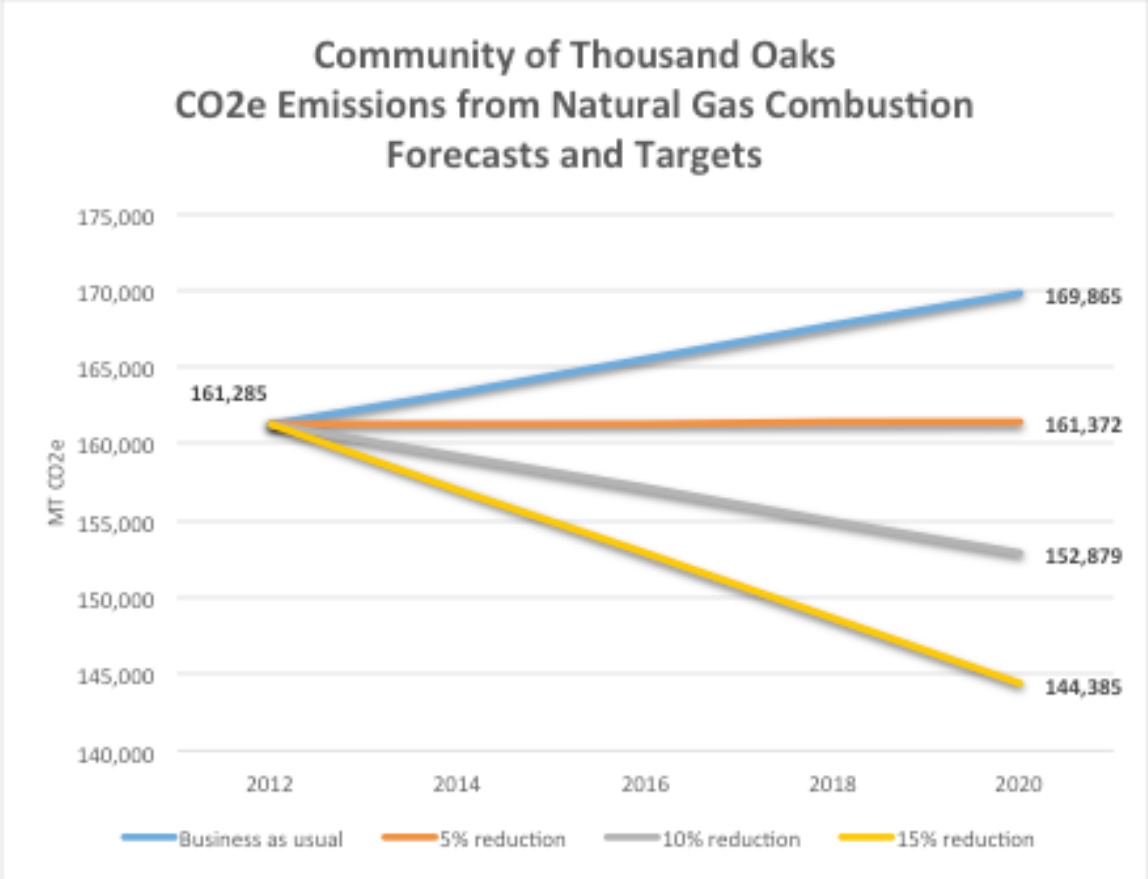
Table 14. Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the City of Thousand Oaks

Reductions required 2010 to 2020	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	14,065	51,912
10% reduction	28,130	64,319
15% reduction	42,195	76,727

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[7] For Thousand Oaks, a BAU scenario means that emissions would total 169,865 MT CO_2e in 2020, compared to the 2012 levels of 161,285. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the City of Thousand Oaks



[7] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

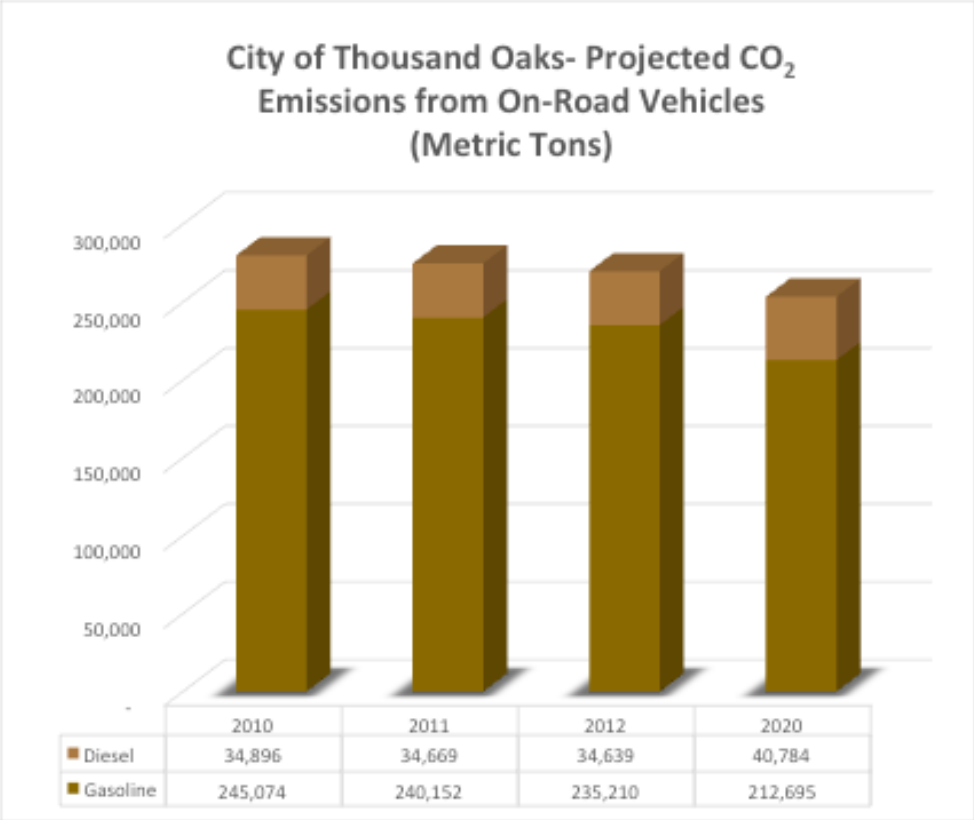
Table 15. Required Emissions Reductions from Natural Gas to Meet 5%, 10% and 15% Targets for the City of Thousand Oaks

Reductions required 2012 to 2020	Below 2012 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	8,672	-87
10% reduction	17,345	8,406
15% reduction	26,017	16,900

Forecasted Emissions from and Targets for On Road Transportation

As noted in Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010**. Any additional activities on the part of Thousand Oaks, including additional support for alternative modes of transportation and its public transit system, behavioral change, regional cooperation, etc. could increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on State highways, which would include commuting and inter-city travel. Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the City of Thousand Oaks[8]



[8] [8] Note that there are small differences between 2010 through 2012 emissions reported here and those for the GHG inventory reported earlier. Inventory includes CH_4 and N_2O, forecasts are based on CO_2 only.

5 Thousand Oaks City Government Greenhouse Gas Forecasts and Reduction Targets

City of Thousand Oaks: Energy Action Plan

In 2012, the City of Thousand Oaks adopted an Energy Action Plan[9] that assessed the current energy use in municipal facilities, established goals and objectives, and associated commitments. The plan identified the Municipal Service Center, the Transportation Center, Senior Center and City Hall/Civic Arts Plaza as the highest energy users, normalized by using carbon intensity per square foot. It then established an overall goal of achieving a 10% reduction in greenhouse gas emissions at City facilities by 2017. The plan committed to:

1. Establishing a centralized energy policy
2. Establishing an energy management team
3. Committing to exploring sustainable sources of funding
4. Tracking and monitoring progress
5. Engaging community through outreach and education

[9] http://www.toaks.org/civica/filebank/blobdload.asp?BlobID=23478

6 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for the VCREA members.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels ($MT CO_2e$)	Below BAU 2020 Levels ($MT CO_2e$)
5% reduction	14,065	51,912
10% reduction	28,130	64,319
15% reduction	42,195	76,727

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects, and rooftop solar installations.

Cumulatively, these programs have resulted in emission reductions of 18,139 or approximately 7% below 2010 levels.

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion appeared to reduce significantly in 2012, with 2010, 2011 and 2012 totals of 173,448, 171,832 and 161,285 MT CO2e respectively. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emissions from the combustion of natural gas.

Reductions in Emissions from On-Road Vehicles

The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures.

Appendix A.9:

City of Ventura

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance

2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Target Options

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill 32 (AB 32), which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The City of San Buenaventura (Ventura) was founded in 1782 by Father Junipero Serra, the ninth of the California missions. He named it after the Italian St. Bonaventure, hence the nickname that Ventura is the "city of good fortune." The City is the county seat of Ventura County and has a population of approximately 108,000 residents according to the California Department of Finance[1].

The majority of Ventura's GHG emissions are produced through the burning of fossil fuels. The City's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the City of Ventura's geographical boundaries (i.e. city limits). The City's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the City of Ventura were inventoried for the years 2010 through 2012. The City has not established a baseline year for its inventories.

[1] http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Ventura's Community Inventory

The City of Ventura's Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities within the city limits. Stationary combustion data was provided by Southern California Gas Company (SCG), for residential and non-residential sectors. Southern California Edison (SCE) provided electricity data for residential, commercial, and industrial sectors.

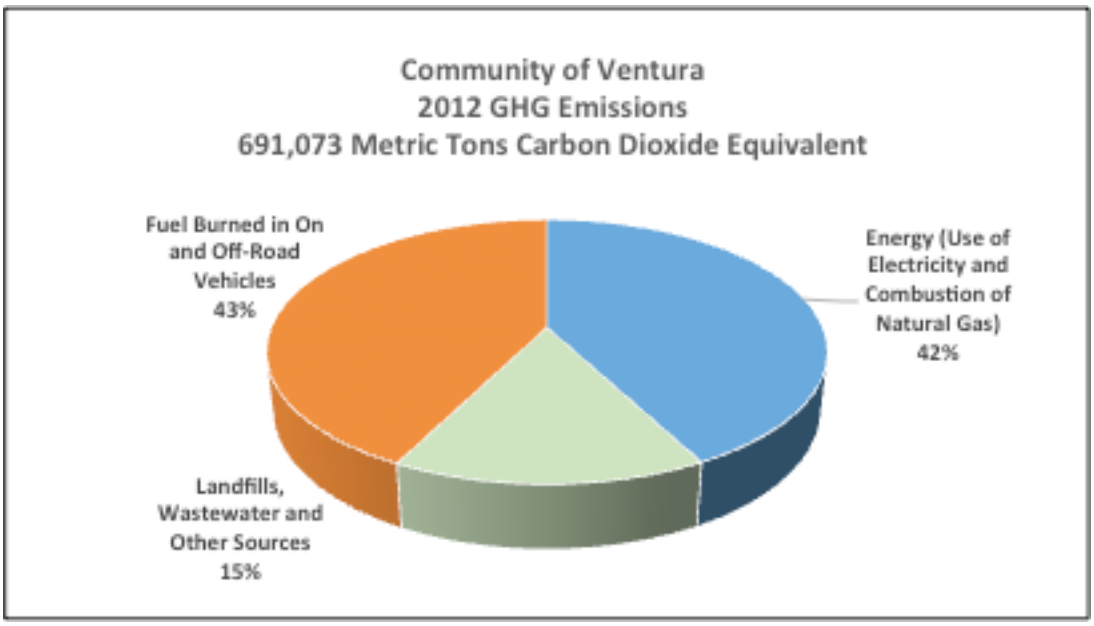
Table 1 quantifies the contributions of each sector to total the community emissions generated during the period of 2010 through 2012 for the City of Ventura. Figure 1 illustrates on average each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 34% of emissions each year.

Table 1. Community GHG Emissions by Sector for the City of Ventura

Sector	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
On-Road Transportation	243,674	238,959	234,223
Non-Residential Electricity Use	103,141	104,315	105,846
Other Emissions*	99,784	98,343	105,428
Residential Natural Gas Use	84,929	85,401	79,702
Off-Road Vehicle Use	64,716	65,504	63,180
Residential Electricity Use	60,919	61,060	59,483
Non-Residential Natural Gas Use	43,832	43,610	43,211
Total	**700,995**	**697,193**	**691,073**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1. 2010-2012 Average Community GHG Emissions by Sector for the City of Ventura



As explained in the body of this report, emissions are categorized based on control of the process from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the reporter, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g. purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

The table below demonstrates that both Scope 1 (direct) and Scope 2 (indirect) emissions source contributions remained relatively consistant through the three-year period.

Table 2. Direct and Indirect Emissions for the City of Ventura

Scope	2010 ($MT CO_2e$)	2011 ($MT CO_2e$)	2012 ($MT CO_2e$)
Scope 1 (Direct) emissions	532,715	527,594	521,197
Scope 2 (Indirect) emissions	168,280	169,599	169,876
Total	**700,995**	**697,193**	**691,073**

A detailed description of the calculation methodolgies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

Emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

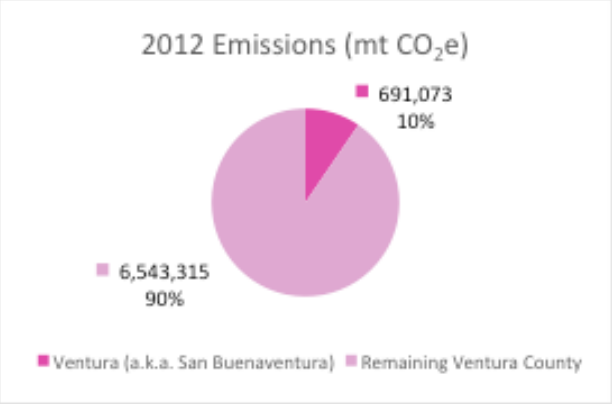
Total GHG emissions in 2012 for the City of Ventura amounted to 691,073 metric tons of CO_2e. Ventura is the fourth-largest incorporated city contributor in terms of total County emissions. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the City of Ventura.

As shown in **Error! Reference source not found.**, emissions from the City of Ventura in 2012 accounted for about 10% of overall GHG emissions for Ventura County.

Ventura's 2012 per capita GHG emissions are 6.11 metric tons of CO_2e, compared to countywide per capita emissions of 6.55 metric tons.

A discussion of City of Ventura's' GHG emissions for each major sector, focusing on CY 2012, is presented below.

Figure 2. City of Ventura portion of Ventura County Community Emissions



Emissions from the Residential Sector

Residential emissions for the City of Ventura mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the City of Ventura

Year	MT CO_2e
2010	84,929
2011	85,401
2012	79,702

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the City of Ventura

Year	MT CO_2e
2010	60,919
2011	61,060
2012	59,483

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in Part I of this report. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-residential Emissions from Natural Gas for the City of Ventura

Year	MT CO_2e
2010	43,832
2011	43,610
2012	43,211

Non-residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 6. Non-residential Emissions from Electricity for the City of Ventura

Year	MT CO_2e
2010	103,141
2011	104,315
2012	105,846

California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. There are no facilities in Ventura subject to this reporting requirement.

On-Road Transportation Emissions

Vehicle miles traveled on Ventura's roads accounted for approximately 7% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 234,223 metric tons of CO_2e, which represents 34% of total City of Ventura community emissions. These emissions resulted from vehicles burning gasoline and diesel fuel.[2]

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the City of Ventura in 2012 resulted in 63,180 metric tons of CO_2e, which represents 9% of emissions.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous.[3]

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the City on those highways, particularly for commuting purposes.

[3] http://www.energy.ca.gov/biomass/landfill_gas.html

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are:

Table 7. Emissions from Landfilled Solid Waste for the City of Ventura

Year	MT CO_2e
2010	47,678
2011	44,940
2012	47,224

There is no municipal solid waste landfill in Ventura. Waste generated in the City is transported to landfills outside the City boundaries.

CO_2e emitted as a result of landfilling of waste in 2012 accounted for 7% of the City of Ventura's 2012 emissions.

Water and Wastewater Treatment Emissions

GHG emissions from electricity consumption for water supply and irrigation infrastructure required for the City of Ventura amounted to 2,273 metric tons of CO_2e for the period, which represents 0.3% of overall emissions.

2012 GHG from domestic wastewater treatment for the City of Ventura amounted to 5,385 metric tons of CO_2e, which represents 0.6% of Ventura's' total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the City of Ventura in 2012 amounted to 50,546 metric tons of CO_2e, 5.8% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

[4] http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in Ventura. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 8. 2010-2012 Avoided Emissions from SCE Programs in the City of Ventura

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	18,087	5,019	$3,470,171
Coin-Op	2	--	$,3,048
Partnership Programs	227	63	$36,839
Total Non-Residential	**18,316**	**5,082**	**$3,509,058**
Advanced Lighting – Torchiere	19	5	$11,358
Advanced Lighting – WT	--	--	$27
Appliance Recycling	1,650	458	$260,429
Business Consumer Electronics	419	116	$46,786
Customer Facing Outreach	2	--	$24
Comprehensive Manufactured Homes	11	3	$4,953
Home Energy Efficiency Rebate	262	73	$118,450
Home Energy Efficiency Survey	445	124	$8,735
Lighting	9,797	2,718	$495,439
Multifamily Rebate Program	236	65	$98,221
Workforce Education and Training	89	25	$6,064
Residential Total	**12,931**	**3,588**	**$1,050,274**
TOTAL	**31,247**	**8,670**	**$4,559,332**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the City, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in Ventura for CYs 2010 through 2012 as a result of solar energy production are:

Table 9. Avoided Emissions from Solar Production in the City of Ventura

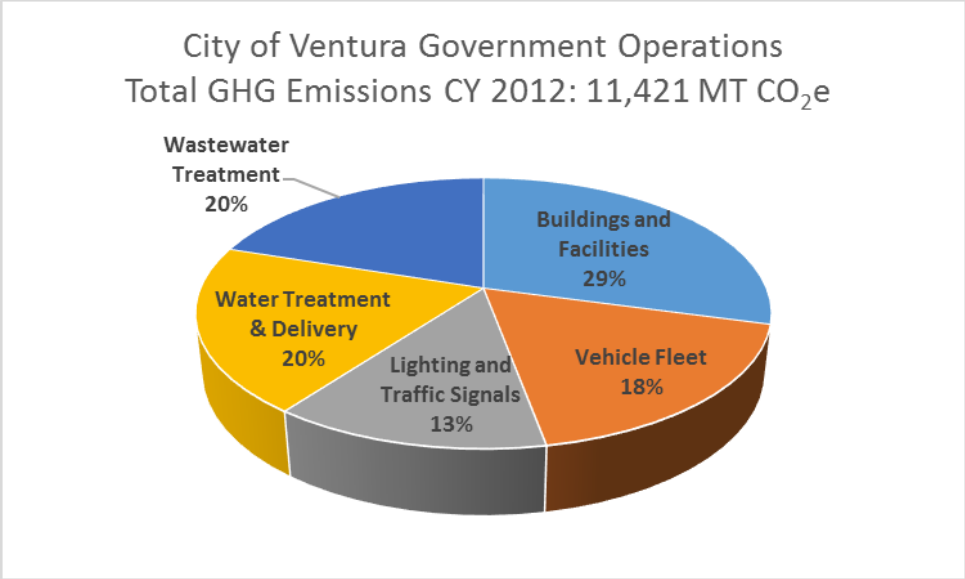
Year	MT CO_2e
2010	82
2011	132
2012	103

3 Ventura City Government Operations Inventory

The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

Because there were no significant changes between 2010 and 2012, the following chart shows the relative contribution of various sources to GHG emissions from City government operations.

Figure 3. 2012 GHG Emissions from City of Ventura Government Operations



Emissions from the Use of Electricity

Ventura purchases its electricity from Southern California Edison. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 10. Emissions from the Use of Electricity for City of Ventura Government Operations

	2010 MT CO_2e	2011 MT CO_2e	2012 MT CO_2e
Buildings and Facilities	2,478	2,398	2,595
Wastewater Treatment	2,123	2,087	2,273
Water Treatment and Delivery	2,098	2,137	2,237
Streetlights and Traffic Signals	1,481	1,485	1,497
Total	**8,180**	**8,106**	**8,638**

Emissions from the Combustion of Natural Gas

The City of Ventura purchases natural gas from the Southern California Gas Company, for heating its facilities and for operating boilers in its municipal buildings and for converting to compressed natural gas used in vehicles and in the municipal buses powered with the fuel. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Combustion of Natural Gas for City of Ventura Government Operations

Year	MT CO_2e
2010	689
2011	737
2012	746

Emissions from City Owned and Operated Vehicles

The City of Ventura owns and operates both gasoline and diesel fueled vehicles. Based on data provided by the City's Environmental manager (fuel usage and mileage), emissions from these vehicles is as follows:

Table 12. Emissions from City of Ventura Vehicle Fleet

Year	MT CO_2e
2010	2,137
2011	2,065
2012	2,037

4 Ventura Community Greenhouse Gas Forecasts and Reduction Target Options

Part I of this report provides an overview of the approach to forecasting and reduction targets for the VCREA and its member local governments. Forecasts and reduction targets have been established for energy use (electricity and natural gas) and for on-road vehicles.

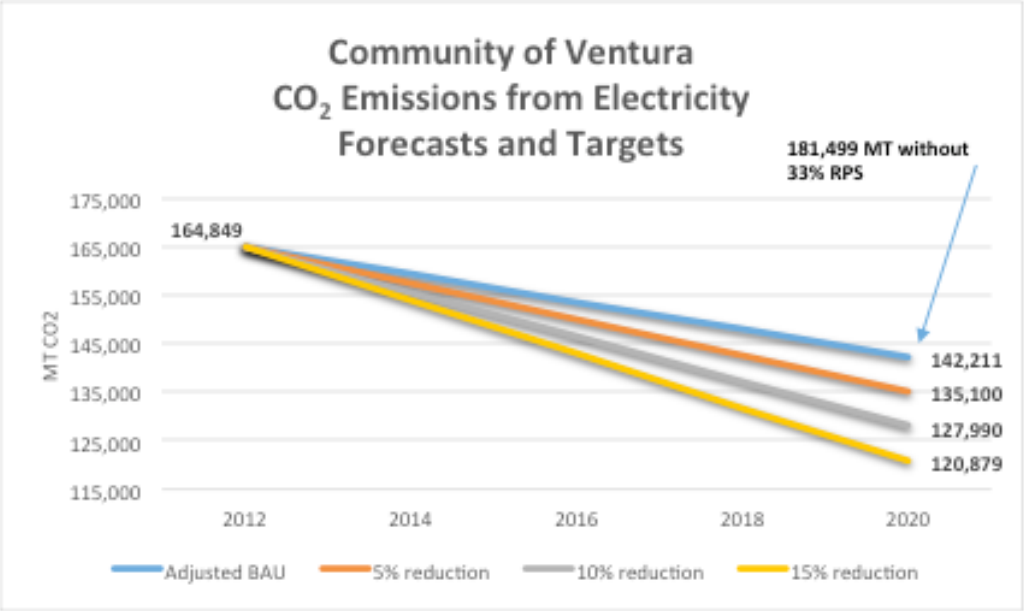
Forecasted Emissions from and Targets for Electricity Use

The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[5] For the City of Ventura, a BAU scenario means that emissions would total 181,499 MT CO_2e in 2020, as compared to the 2012 levels of 164,849.[6] The adjusted BAU scenario projects 2020 emissions at 142,211 metric tons. Associated reduction targets are shown below:

[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[6] Forecasts for electricity are calculated for CO2 only and do not include CH_4 and N_2O. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.

Figure 4. Emissions from Electricity Forecasts and Targets for the City of Ventura



Based on this adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

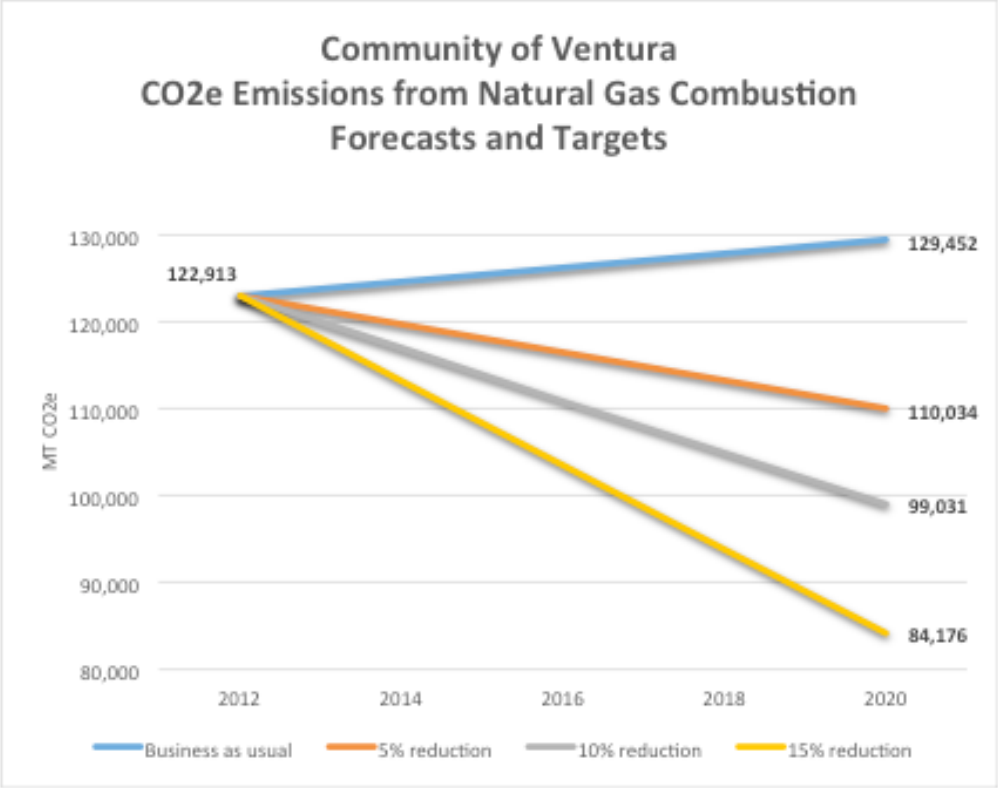
Table 13. Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the City of Ventura

Reductions required 2010 to 2020	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	8,177	29,749
10% reduction	16,354	36,859
15% reduction	24,530	43,970

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[7] For the City of Ventura, a BAU scenario means that emissions would total 129,452 MT CO2e in 2020, as compared to the 2012 levels of 122,913. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the City of Ventura



[7] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

Based on this BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

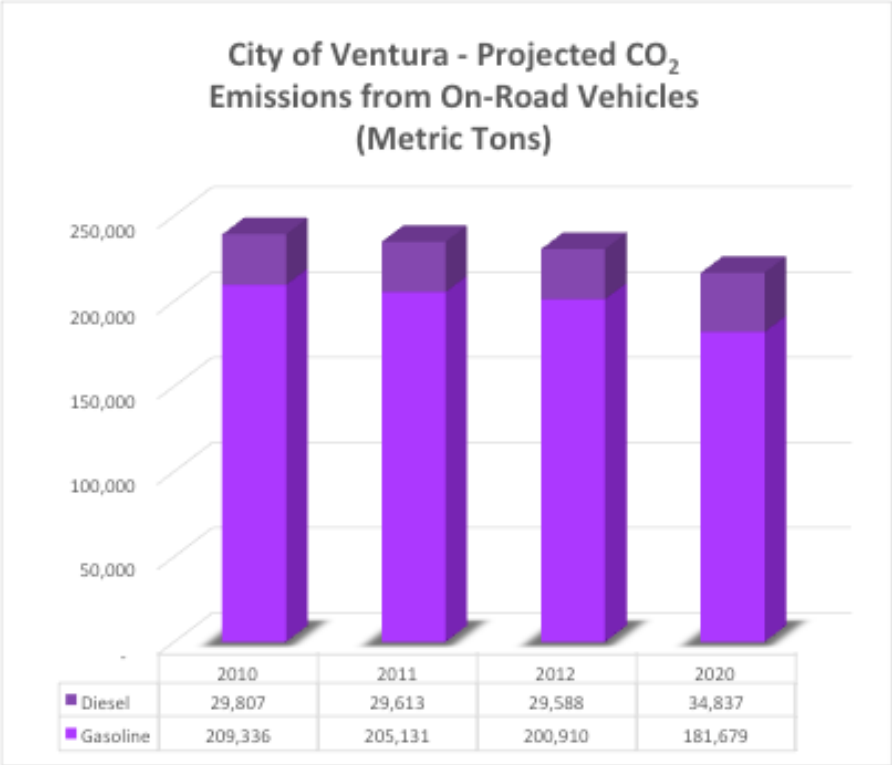
Table 14. Required Emissions Reductions from Natural Gas to Meet 5%, 10% and 15% Targets for the City of Ventura

Reductions required 2012 to 2020	Below 2012 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	6,438	12,879
10% reduction	12,876	23,882
15% reduction	19,314	38,737

Forecasted Emissions from and Targets for On Road Transportation

As noted in Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010**. Any additional activities on the part of Ventura, including support for alternative modes of transportation, behavioral change, regional cooperation, etc. could increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on State highways, which would include commuting and inter-city travel.. Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the City of Ventura



	2010	2011	2012	2020
Diesel	29,807	29,613	29,588	34,837
Gasoline	209,336	205,131	200,910	181,679

5 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for Ventura.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	8,177	29,749
10% reduction	16,354	36,859
15% reduction	24,530	43,970

There are two readily available sources of information on reductions in emissions from electricity use since 2010: avoided emissions as a result of Southern California Edison projects, and rooftop solar installations.

Cumulatively, these programs have resulted in emission reductions of 14,203, approximately 8% below 2010 levels.

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion decreased approximately 5% between 2011 and 2012, totaling 128,762, 129,011 and 122,913 metric tons of CO_2e in 2010, 2011 and 2012 respectively. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emissions from the combustion of natural gas.

Reductions in Emissions from On-Road Vehicles

The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures.

Appendix A.10:

Unincorporated Area of the County of Ventura

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance

2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Target Options

1 Introduction

The inventory described in detail in this chapter is the first step to reducing greenhouse gas (GHG) emissions. These efforts to reduce emissions are consistent with State policy as well as current regulation from Assembly Bill 32 (AB 32), which directs the State of California to reduce GHG emissions to 1990 levels by 2020. The Unincorporated Area of the County of Ventura has a population of approximately 97,000 residents according to the California Department of Finance[1].

The majority of the County of Ventura's Unincorporated Area GHG emissions are produced through the burning of fossil fuels. The Unincorporated Area's Community GHG Inventory includes GHG emissions from direct and indirect sources. A direct emission source is defined as an on-site source of emissions such as the combustion of fossil fuel in a vehicle engine or burning of natural gas for heating facilities. An indirect emission source is defined as an emissions source generated offsite, such as electricity generated by power plants that is used in facility operations.

GHG emissions were inventoried for sources within the Unincorporated Area's geographical boundaries (i.e. city limits). The Unincorporated Area's Community GHG Inventory includes GHG emissions from residential, commercial, industrial, transportation, and waste sectors. The government GHG inventory is described separately, and is a subset of the Community GHG Inventory. The government analysis divides emissions among buildings, vehicle fleet, streetlights, water deliveries, wastewater/sewage, and waste sectors. A description of the methodologies used to estimate GHG emissions is provided in Appendix B, Methodological Considerations.

Government GHG emissions for the County of Ventura were inventoried for the years 2010 through 2012.

[1] http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php

2 Unincorporated Area Community Inventory

The County of Ventura and its cities have followed a long standing policy, Guidelines for Orderly Development, which encourages development within city boundaries, maintaining green and agricultural spaces between them. There are exceptions, both in terms of residential and industrial development outside cities. This includes communities like Casa Conejo, Channel Islands Beach, El Rio, Meiners Oaks, Mira Monte, Oak Park, Oak View, Piru and smaller areas that are not large enough to meet the criteria for census defined places. As a whole, population in the unincorporated area totaled 51,022 in 2010, or approximately 6% of the County's total population.

The unincorporated area's Community GHG Inventory encompasses emissions from residential, commercial, and industrial activities outside city limits. Stationary combustion data was provided by Southern California Gas Company (SCG), for residential and non-residential sectors. Southern California Edison (SCE) provided electricity data for residential, commercial, and industrial sectors.

Table 1 quantifies the contributions of each sector to total the community emissions generated during the period of 2010 through 2012 for the unincorporated area.

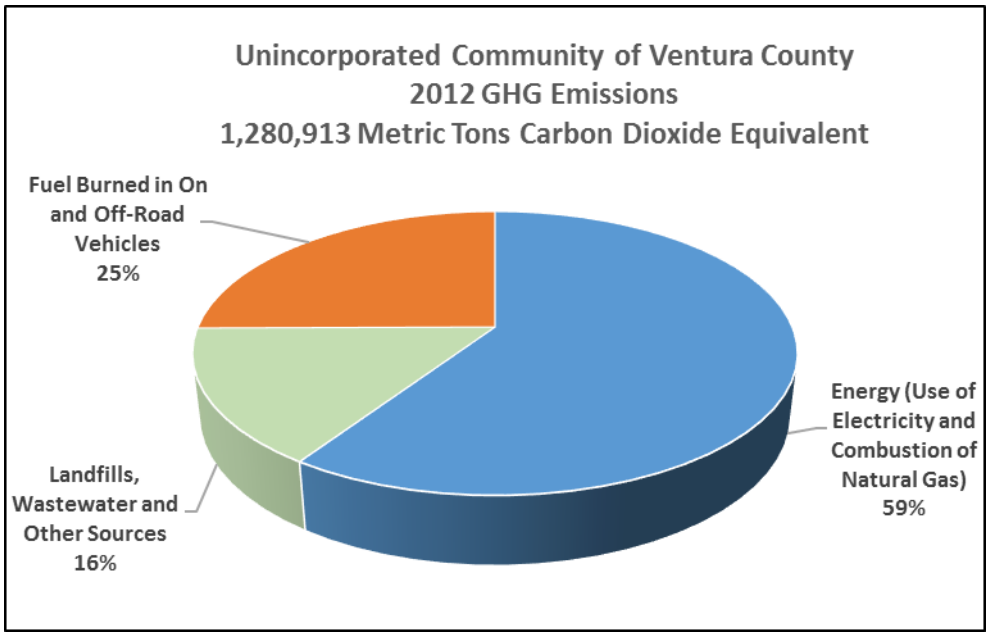
Figure 1 illustrates each sector's contribution to total community emissions for the three-year period. On-road transportation was the largest contributor to community emissions, accounting for about 20% of emissions each year.

Table 1. Community GHG Emissions by Sector for the Unincorporated Area

Sector	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
On-Road Transportation	253,109	248,212	243,293
Non-Residential Electricity Use	466,607	481,878	484,394
Off-Road Vehicle Use	200,553	201,742	198,599
Other Emissions*	110,901	114,695	121,498
Residential Natural Gas Use	96,255	96,468	89,763
Non-Residential Natural Gas Use	48,934	75,536	78,477
Residential Electricity Use	61,571	61,910	64,889
Total	**1,237,930**	**1,280,441**	**1,280,913**

*Sector contains both Direct (Scope 1) and Indirect (Scope 2) Emissions

Figure 1. 2012 Community GHG Emissions for the Unincorporated Area



As explained in the body of this report, emissions are categorized based on control of the process from which they were generated. Direct emissions (also referred to as Scope 1 emissions) are generated on-site or directly by the reporter, (e.g. using natural gas for heating, or burning gasoline in a vehicle), while indirect emissions (Scope 2 emissions) are generated off-site by a separate entity (e.g. purchased electricity or purchased heat). Purchased electricity is the most common form of Scope 2 emissions, and the only Scope 2 emissions type reported in the VCREA inventory.

While Scope 2 emissions (electricity use) increased about 4% between 2010 and 2012, natural gas emissions remained relatively stable.

Table 2. Direct and Indirect Emissions for the Unincorporated Area

Scope	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
Scope 1 (Direct) emissions	687,832	714,281	708,210
Scope 2 (Indirect) emissions	550,098	566,160	572,703
Total	**1,237,930**	**1,280,441**	**1,280,913**

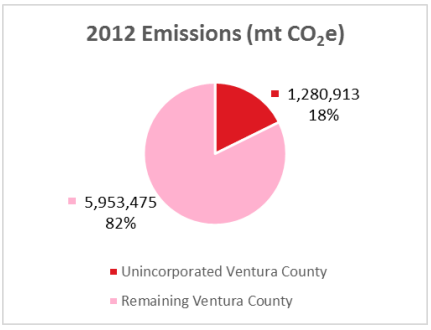
A detailed description of the calculation methodologies used to compile the community inventory can be found in Appendix B, Methodological Considerations.

Emissions sources are described in the following sections. As there is little variation between years, 2012 data is used for discussion purposes because it is the most recent.

Total GHG emissions in 2012 for the unincorporated area totaled 1,280,913 metric tons of CO_2e. Electricity, natural gas, gasoline, and diesel consumption are the largest overall contributors to GHG emissions in the unincorporated area.

As shown in Figure 3, emissions from the unincorporated area in 2012 accounted for about 18% of overall GHG emissions for Ventura County.

Figure 2. Unincorporated Area Portion of Ventura County Community Inventory



This relative contribution is disproportionate to the size of the population because of the relative miles of roads outside city boundaries and the methodology for calculation vehicle miles travelled. Emissions from on-road vehicles are allocated to the unincorporated area because of where they occur and not necessarily because of population size.

A discussion of the Unincorporated Area's GHG emissions for each major sector, focusing on CY 2012, is presented below.

Emissions from the Residential Sector

Residential emissions for the unincorporated area mainly result from household use of electricity and natural gas. Residential emissions were calculated from electricity and natural gas consumption data provided by SCE and SCG.

Residential combustion of natural gas, primarily in home heating, resulted in the following emissions:

Table 3. Residential Emissions from Natural Gas for the Unincorporated Area

Year	MT CO_2e
2010	96,255
2011	96,468
2012	89,763

Residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 4. Residential Emissions from Electricity for the Unincorporated Area

Year	MT CO_2e
2010	61,571
2011	61,910
2012	86,620

Residential use of self-generated energy through the consumption of wood, kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to lack of available data. It is expected that the GHG emissions from these sources are negligible. High GWP gases partially originate from the residential sector but are included in a separate category below.

Emissions from the Non-Residential Sector

The non-residential sector includes emissions from commercial, industrial and agricultural operations. Because utilities are required to maintain confidentiality when they provide data to the public, including partnerships, disaggregation into the individual sectors can result in skewed results. This is discussed in more detail in Part I of this report. For that reason, the three non-residential sectors are combined and reported as one. The reader should be aware that there may still be under-reporting of non-residential emissions because utilities are required to redact specific facility data to protect confidentiality. Additional information on the implications of confidentiality and data reporting should be directed to SCE or SCG.

Energy generated through the commercial and industrial consumption of kerosene, propane, fuel oil, individual diesel generators, and bottled natural gas could not be quantified due to the difficulty and expense of collecting valid data.

Non-residential emissions associated with the combustion of natural gas, based on therms reported by the Southern California Gas Company, are as follows:

Table 5. Non-Residential Emissions from Natural Gas for the Unincorporated Area

Year	MT CO_2e
2010	48,934
2011	75,536
2012	78,477

Non-residential use of electricity provided by Southern California Edison produced GHGs as follows:

Table 6. Non-Residential Emissions from Electricity for the Unincorporated Area

Year	MT CO_2e
2010	466,607
2011	481,878
2012	484,394

California Air Resources Board – Mandatory Reporting

The California Global Warming Act and associated Mandatory Reporting Regulation requires facilities with 10,000 metric tons or more of greenhouse gas emissions and/or all facilities in specific sectors to report those emissions to the California Air Resources Board. The following table includes the major sources in the unincorporated area of Ventura County reporting emissions that result from stationary combustion.

Table 7. Major Stationary Combustion Emission Sources in Ventura County

Facility	2010 (MT CO_2e)	2011 (MT CO_2e)	2012 (MT CO_2e)
California State University, Channel Islands, Cogeneration Unit, Unincorporated Area	106,568	106,194	106,985
Houweling Nurseries, Cogeneration Unit, Unincorporated Area	n/a	n/a	24,412
Total	**106,568**	**106,194**	**131,397**

Facility emissions data was reported to, and obtained from the California Air Resources Board (CARB) mandatory reporting website.

On-Road Transportation Emissions

Vehicle miles traveled on unincorporated area roads accounted for approximately 7% of all travel in the County of Ventura. 2012 GHG emissions from that travel totaled 243,293 metric tons of CO_2e, which represents 19% of total Unincorporated Area emissions. These emissions resulted from vehicles burning gasoline and diesel fuel.[2]

Off-Road Vehicle Emissions

Exhaust emissions from off-road vehicle use for the unincorporated area in 2012 resulted in 198,599 metric tons of CO_2e, which represents 15.2% of emissions.

Emissions from Solid Waste

"Landfilling" is the main method for disposal of municipal and household solid wastes or refuse in the United States. Although maintained in an oxygen-free environment and relatively dry conditions, landfill waste produces significant amounts of landfill gas (mostly methane but including carbon dioxide and nitrous oxide). With Californians disposing of more than 42 million tons of waste per year, the total amount of landfill gases produced in California is tremendous.[3]

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimate that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provides individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied. Based on these calculations, the City's total emissions associated with landfilled solid waste are:

[2] Note that 54% of all on-road emissions in Ventura County originate on State Highways, as discussed in Part 1, Section 3.3. A portion of those emissions would be attributable to vehicles used for travelling to and from the unincorporated area on those highways, particularly for commuting purposes.

[3] http://www.energy.ca.gov/biomass/landfill_gas.html

Table 8. Emissions from Landfilled Solid Waste for the Unincorporated Area

Year	MT CO_2e
2010	46,268
2011	47,874
2012	49,712

There is one landfill in the unincorporated area: Toland Road. A portion of the waste generated in the cities is taken to landfill under contracts with waste haulers and the Ventura County Regional Sanitation District.

CO_2e emitted as a result of landfilling of waste in 2012 accounted for 3.8% of the unincorporated area's 2012 emissions.

Water and Wastewater Treatment Emissions

GHG emissions from electricity consumption for water supply and irrigation infrastructure required for unincorporated Ventura County amounted to 3,885 metric tons of CO_2e for the period, which represents 0.2% of overall emissions.

2012 GHGs from domestic wastewater treatment required for unincorporated Ventura County amounted to 22,340 metric tons of CO_2e, which represents 1.3% of unincorporated Ventura County's total 2012 emissions.

Emissions from wastewater treatment include purchased electricity to operate treatment plants, and per capita emissions of CH_4 and N_2O as calculated by the State of California.

High GWP GHG Emissions

Hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").[4]

Emissions from high global warming potential (GWP) GHGs for the unincorporated area in 2012 amounted to 45,561 metric tons of CO_2e, 2.6% of community emissions. Emissions were calculated based on the California Air Resources Board per capita estimate for California.

[4] http://www.epa.gov/climatechange/ghgemissions/gases.html

Avoided Energy Emissions (2010 through 2012)

Southern California Edison

In addition to economic benefits of energy efficiency (using less electricity, burning less natural gas costs less), there are also GHG benefits from energy savings. These are the GHG "costs" that would have been incurred if the energy efficiency measures had not been put in place. Southern California Edison provided VCREA with a detailed list of MWh savings and related costs associated with residential and non-residential programs in the unincorporated area. Note that the costs do not represent return on investment since some projects have relatively short payback periods (lighting replacements while others like business improvements see returns more slowly).

Table 9. 2010-2012 Avoided Emissions from SCE Programs in the Unincorporated Area

Program	MWhs Avoided	MT CO_2e Avoided	Investment
Business General	674	187	$63,329
Partnership Programs	--	--	--
Total Non-Residential	**674**	**187**	**$63,329**
Advanced Lighting – Torchiere	4	1	$1,057
Advanced Lighting – WT	--	--	--
Appliance Recycling	80	22	$10,771
Business Consumer Electronics	--	--	--
Customer Facing Outreach	--	--	--
Comprehensive Manufactured Homes	--	--	--
Home Energy Efficiency Rebate	9	2	$4,435
Home Energy Efficiency Survey	26	7	$501
Lighting	115	32	$6,864
Multifamily Rebate Program	--	--	--
Workforce Education and Training	4	1	$229
Residential Total	**237**	**66**	**$23,857**
TOTAL	**911**	**253**	**87,096**

Program data for the Southern California Gas Company was not available at the time this report was written.

Rooftop Solar

Another way emissions are avoided is through the installation of rooftop solar panels on homes and businesses. Many of residents and small businesses who install these panels apply for incentives through the California Solar Initiative. When they do so, they provide data about their residence or business and about the solar system they are installing. That data is then made available to the public. It does not represent all of the photovoltaic installations in the unincorporated area, for example, it does not include the installation of large capacity production or self-financed units, but it provides a sense of the growing impact that this type of electricity generation can have on our carbon footprint and how our sense of energy production is on the move.

Some of the avoided emissions in the unincorporated area for CYs 2010 through 2012 as a result of solar energy production are:

Table 10. Avoided Emissions from Solar Production in the Unincorporated Area

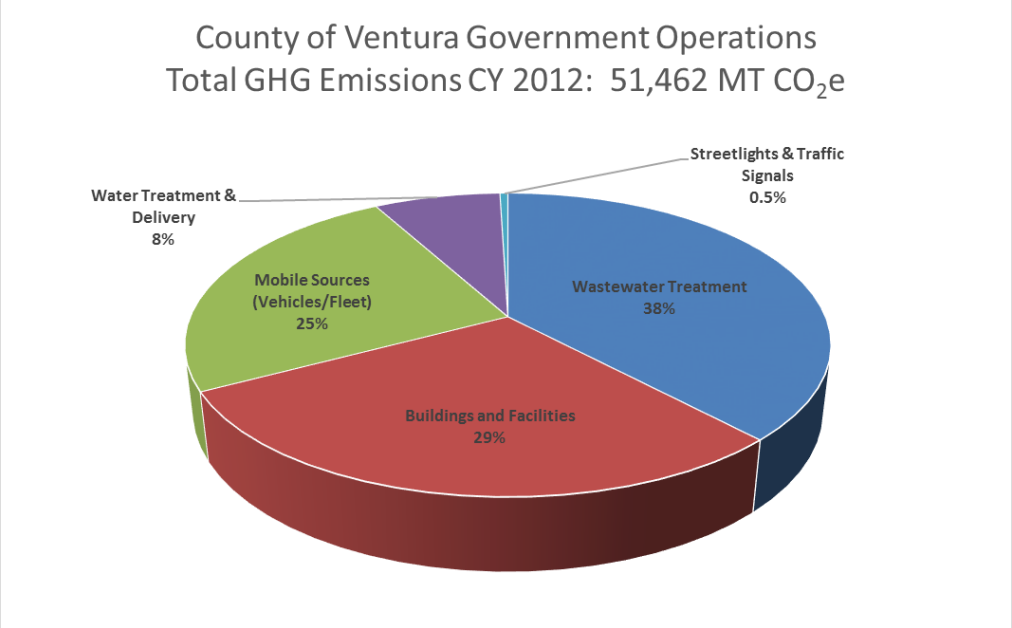
Year	MT CO_2e
2010	134
2011	111
2012	324

3 County of Ventura Government Operations Inventory

The State of California's Air Resources Board and The Climate Registry have adopted a Local Government Operations Protocol (LGOP) that guides the reporting of GHG emissions by local governments. The LGOP defines the categories under which government operations are categorized, including facilities, lighting and traffic control, water and pumping and waste water pumping.

Because there were no significant changes between 2010 and 2012, the following chart shows the relative contribution of various sources to GHG emissions from County government operations. More detailed information is available by contacting the County regarding its Climate Protection Plan and GHG Inventory.

Figure 3. 2012 GHG Emissions from County of Ventura Government Operations



Emissions from the Use of Electricity

The County of Ventura purchases its electricity from Southern California Edison. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 11. Emissions from the Use of Electricity for County of Ventura Government Operations

	2010 MT CO_2e	2011 MT CO_2e	2012 MT CO_2e
Buildings and Facilities	15,284	15,007	15,070
Wastewater Treatment	18,792	18,911	19,535
Water Treatment and Delivery	3,128	3,462	3,885
Streetlights and Traffic Signals	202	254	245
Total	**37,406**	**37,634**	**38,736**

Emissions from the Combustion of Natural Gas

The County of Ventura purchases natural gas from the Southern California Gas Company, primarily for heating its facilities and for operating boilers in its larger buildings. These purchases resulted in the following emissions for CYs 2010 through 2012.

Table 12. Emissions from the Combustion of Natural Gas for County of Ventura Government Operations

Year	MT CO_2e
2010	5,729
2011	5,424
2012	5,071

Emissions from County Owned and Operated Vehicles

The County of Ventura owns and operates both gasoline and diesel fueled vehicles. These vehicles include those used by the County Sheriff and Fire Department, Public Works heavy duty vehicles and off road equipment. Based on data in the County's Local Government GHG inventory, emissions from these vehicles is as follows:

Table 13. Emissions from County of Ventura Vehicle Fleet

Year	MT CO_2e
2010	12,928
2011	13,228
2012	12,727

4 Unincorporated Area Greenhouse Gas Forecasts and Reduction Target Options

Part I of this report provides an overview of the approach to forecasting and reduction target options for the VCREA and its member local governments. Forecasts and reduction targets have been identified for energy use (electricity and natural gas) and for on-road vehicles.

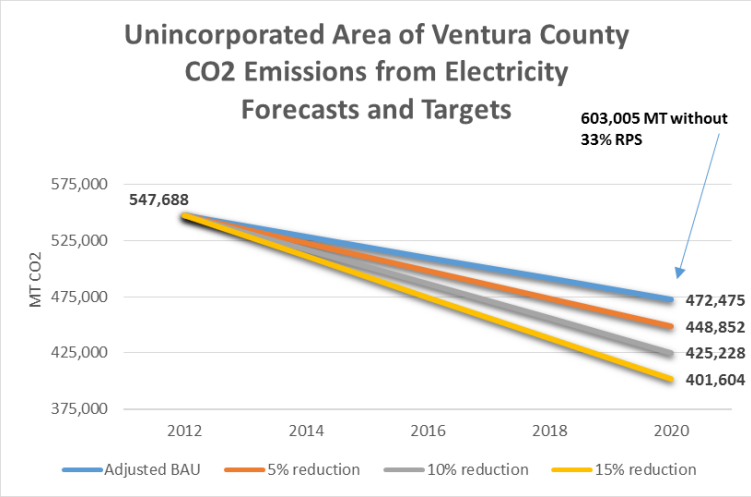
Forecasted Emissions from and Targets for Electricity Use

The California Energy Commission has estimated a preliminary mid-range business as usual scenario where electricity use in 2020 in the Southern California Edison territory will increase by 1.21% per year over 2011 levels.[5] For the unincorporated area, a BAU scenario means that emissions would total 603,005 MT CO_2 in 2020, as compared to the 2012 levels of 547,688.[6] The adjusted BAU scenario projects 2020 emissions at 472,475 metric tons. Associated reduction targets are shown below:

[5] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

[6] Forecasts for electricity are calculated for CO2 only and do not include CH_4 and N_2O. These gases are relatively small contributors to overall emissions and can change over time depending upon power production technology.

Figure 4. Emissions from Electricity Forecasts and Targets for the Unincorporated Area



Based on this Adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

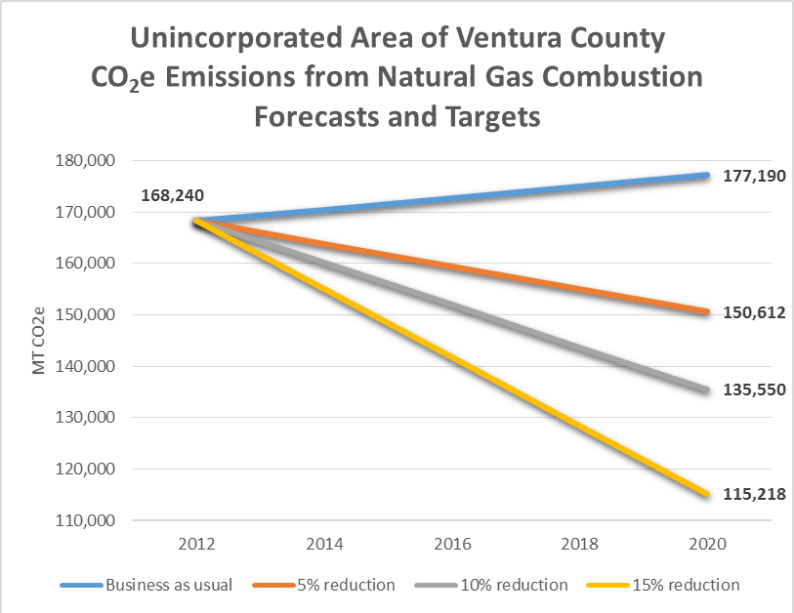
Table 14. Required Emissions Reductions from Electricity to Meet 5%, 10% and 15% Targets for the Unincorporated Area

Reductions required 2010 to 2020	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	26,324	98,836
10% reduction	52,649	122,460
15% reduction	78,973	146,084

Forecasted Emissions from and Targets for Combustion of Natural Gas

The California Energy Commission has also estimated a business as usual scenario where natural gas use in 2020 in the Southern California Gas Company territory will increase by 0.65% per year over 2011 levels.[7] For the unincorporated area, a BAU scenario means that emissions would total 177,190 MT CO_2e in 2020, as compared to the 2012 levels of 168,240. Associated reduction targets are shown below:

Figure 5. Emissions from the Combustion of Natural Gas Forecasts and Targets for the Unincorporated Area



[7] http://www.energy.ca.gov/2011publications/CEC-200-2011-011/CEC-200-2011-011-SD.pdf

Based on this Adjusted BAU model, 5%, 10% and 15% targets would require the following reductions in emissions:

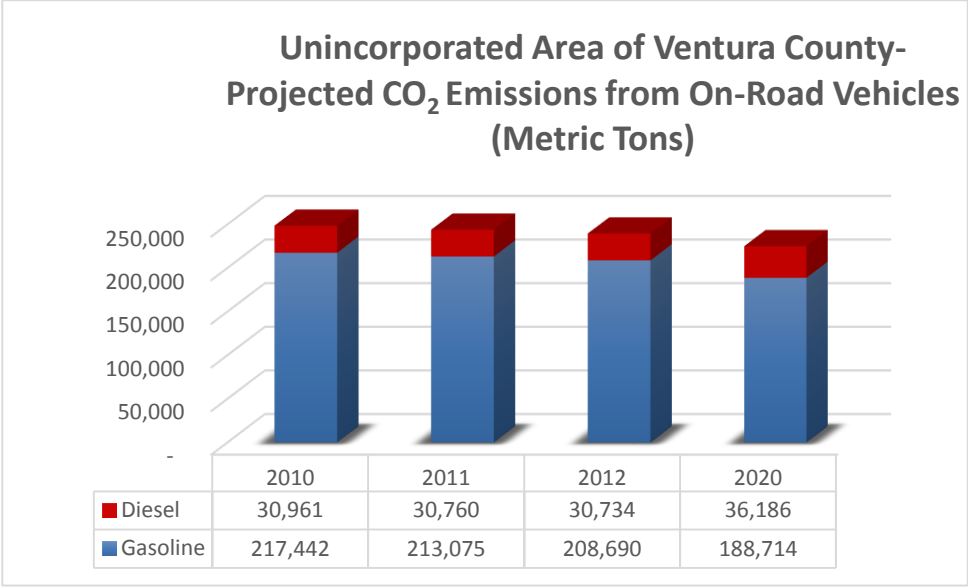
Table 15. Required Emissions Reductions from Natural Gas to Meet 5%, 10% and 15% Targets for the Unincorporated Area

Reductions required 2010 to 2020	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	7,259	17,628
10% reduction	14,519	32,690
15% reduction	21,778	53,022

Forecasted Emissions from and Targets for On Road Transportation

As noted in Part I of this report, State and federal regulations related to fuel and vehicle efficiency will lead to significant GHG reductions by the year 2020, by which time they will be **9% lower than in 2010**. Any additional activities on the part of the Board of Supervisors of the County of Ventura, including support for alternative modes of transportation, behavioral change, regional cooperation, etc. could increase the reductions resulting from State actions. Note that these emissions and projections do not include emissions from travel on State highways, which would include commuting and inter-city travel. Following is an estimate of forecasted emissions:

Figure 6. Projected Emissions from On-Road Vehicles for the Unincorporated Area



	2010	2011	2012	2020
Diesel	30,961	30,760	30,734	36,186
Gasoline	217,442	213,075	208,690	188,714

5 County of Ventura Government Greenhouse Gas Forecasts and Reduction Targets

County of Ventura: Climate Protection Plan

In 2011, the County Board of Supervisors established a GHG reduction target of 15% by 2020, with a 2005 baseline.

County of Ventura: Energy Efficiency Action Plan

In 2013, the County of Ventura's Board of Supervisors adopted an energy efficiency action plan. The plan identified the County's highest energy using facilities/buildings (2011) as the Government Center, Medical Center, Todd Road Jail, Juvenile Justice Complex and Santa Paula Hospital. The plan established a 10% reduction in building energy use over a 2006 baseline by 2020.[8]

[8] Note that this commitment applied to electricity use only and did not address the use of natural gas.

6 Progress Since 2012

Reductions in Emissions from Electricity Use

Below is a summary of the reductions required to meet the 5%, 10% and 15% targets proposed for the unincorporated area of the County of Ventura.

Reductions required 2010 to 2020 (electricity)	Below 2010 Levels (MT CO_2e)	Below BAU 2020 Levels (MT CO_2e)
5% reduction	26,324	98,836
10% reduction	52,649	122,460
15% reduction	78,973	146,084

There are two readily available sources of information on reductions in emissions from electricity use since 2012: avoided emissions as a result of Southern California Edison projects and rooftop solar installations.

Cumulatively, these programs have resulted in emission reductions of 3,093 MT.

Reductions in Emissions from Combustion of Natural Gas

Emissions from natural gas combustion increased significantly in the unincorporated area, with 145,188, 172,005 and 168,240 metric tons of CO_2e in 2010, 2011 and 2012 respectively. There is nothing in the data on mandatory reporting to the State of California to explain the significant increase between 2010 and 2011. SB 350 specifically recognized the importance of increasing energy efficiency in existing buildings, one of the major sources of emissions from the combustion of natural gas.

Reductions in Emissions from On-Road Vehicles

The State of California predicts a steady decrease in emissions from on-road vehicles (although as noted earlier, diesel emissions are expected to increase slightly between now and 2020 unless additional measures are introduced). With new, aggressive GHG reduction targets proposed by SB 32 and the Governor, the State will be looking to local governments to take a leading role in implementing that vision. New planning guidelines are expected in the near future with specific focus on climate change. These should be taken into consideration in considering ways of meeting reduction targets above those that passively occur through State measures.

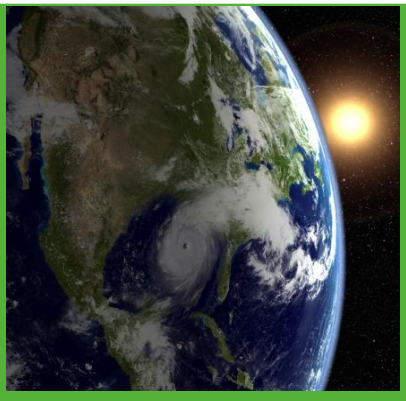
In order to meet a 10% target below 2010 levels, on-road emissions in the unincorporated area would need to be cut by an additional 1,337 metric tons of CO_2 and to meet the 15% target, an additional 13,757 metric tons.

Appendix B:

Methodological Considerations

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



2015

2010-2012 Greenhouse Gas Inventories

2020 Forecasts

And Reduction Targets

Introduction

This appendix describes the process of calculating greenhouse gas (GHG) emissions and their future forecasts for the Ventura County Regional Energy Alliance.

Stationary Combustion (Scope 1)

Emissions from stationary combustion were estimated based on natural gas use only. Other small stationary source fuels, like propane, oil, wood, and biofuels are considered to have very little impact on the overall carbon footprint for the region.

Natural gas is generally measured in therms or MMBTus. For this report, the emission factors for pipeline quality natural gas are:

- 53.02 kg CO_2/MMBTu
- 5 g CH_4/MMBTu
- 0.1 g N_2O/MMBTu

The global warming factor for CH_4 and N_2O are 25 and 298 respectively.

As noted in the body of this report, there are some discrepancies in the reporting of natural gas volumes in Ventura County. There are three major sources of data for natural gas combustion in Ventura County – two of which are "all in" and one of which reports on large emission sources only. The two "all-in" sources are data provided by the Southern California Gas Company in response to a VCREA request, and data reported to the California Energy Commission in the California Energy Almanac. CEC data is available on a countywide basis only, while SCG provided VCREA with data on a city-by-city basis. Both report gas use in therms, and both categorize fuel use as residential or non-residential. In some cases, depending upon the size of the customer basis, SCG was able to provide additional data on separate commercial and industrial use of natural gas.

Electricity Use (Scope 2)

All electricity use data was provided by Southern California Edison, by city and unincorporated area. The emission factors were those published by The Climate Registry, and the Emissions and Generation Resource Integrated Database (eGRID), a comprehensive inventory of environmental attributes of electric power systems. For the California region, the default emission factors for the time period covered by this report were:

- 610.82 lbs. CO_2/MWh
- 28.49 lbs. CH_4/GWh
- 6.03 lbs. N_2O/GWh

Mobile Emissions

On-Road

Emissions from on-road vehicle use, including heavy duty trucks and buses were quantified as follows:

- Average annual vehicle miles traveled (VMT) were determined for Ventura County, including all cities, the unincorporated area, and other jurisdictions like the Department of Defense, State Highways, National Park Service and U.S. Navy. VMT data for 2010, 2011 and 2012 was obtained from the California Department of Transportation (Caltrans) Highway Performance Monitoring System (HPMS) public road data. Each local government in the VCREA partnership was then assigned a percentage of VMTs. For projections, the percentages for 2012 were carried forward to 2020 and 2030.

- Total vehicle GHG emissions for Ventura County for all vehicle types for all model years were calculated for CYs 2010, 2011 and 2012, for gasoline and diesel fuels, using EMFAC 2014. The Emission FACtors (EMFAC) model is used to calculate emission rates from all motor vehicles, such as passenger cars to heavy duty trucks, operating on highways, freeways and local roads in California. It was also used to

project emissions into the future.

- This report includes information on emissions that occur on all roads in Ventura County, including those maintained by the cities and the County, the Department of Defense, the National Park Service, State Highways, State Park Service, U.S. Navy or US Forest Service. The largest percentage of vehicle emissions (54%) are associated with travel on State highways like the 101, 118, and 123 freeways. Using EMFAC and CalTrans data is a geographic approach, incorporating emissions from travel that begins and ends inside Ventura County and emissions from vehicles that travel through the County on State highways. This approach does not take into account the realities of travel, where people often live, work and shop in different locations. It also aggregates all city-to-city travel within the County into a single "travel on State highways" category. In the absence of a local travel demand model with detailed information on land use data and roadway networks, aggregated State highway data was reported separately under the regional section of this report and emissions related to travel on City roads only was presented for each jurisdiction.

Off-road

Emissions were calculated using the California Air Resources Board OFFROAD 2007 air quality model. OFFROAD 2007 considers emissions from off-road equipment including recreational boats, recreational vehicles, industrial equipment, construction equipment, and lawn and garden equipment, as well as equipment dealing with airport ground support, military, agriculture, rail operation, and more (California Air Resources Board 2006). County-wide emissions were apportioned by population to each of the local government areas using California Department of Finance data.

Emissions associated with solid waste and landfill gas

A 2008 California Integrated Waste Management Board Study identified the components of waste in California landfills. The authors applied that characterization to an EPA model for estimating GHG emissions from landfills (WARM), and estimated that there are approximately 0.4223 metric tons of CO_2e resulting from every short ton of landfilled waste in Ventura County. CalRecycle data provided individual city and unincorporated area diversion and disposal rates for solid waste against which the 0.4223 metric was applied.

	Short Tons Landfilled Waste		
	2010	2011	2012
Camarillo	43,760	43,260	47,898
Fillmore	11,435	10,681	10,861
Moorpark	22,299	21,864	22,131
Ojai	9,316	8,944	8,612
Oxnard	230,235	239,490	228,729
Port Hueneme	15,143	14,429	14,884
Santa Paula	19,736	19,465	19,149
Simi Valley	91,070	88,584	88,397
Thousand Oaks	104,666	103,234	104,424
Ventura	112,910	106,426	111,834
Unincorporated	109,571	113,374	117,727

Wastewater Emissions

To estimate the emissions associated with wastewater treatment, the authors used The State of California's documentation for its Greenhouse Gas Inventory.[1] The assumption is that the majority of wastewater treatment is centralized and anaerobic. An emission factor of 11.3 kg. of CO_2e per person was applied to Department of Finance population figures for VCREA local government population numbers.

High Global Warming Potential Gases

Emissions from high GWP (Global Warming Potential) GHGs are primarily in the form of hydrofluorocarbons (HFCs). They include refrigeration and space conditioning equipment, solvents, foams, etc. They also include sulfur hexafluoride (SF_6), an insulator used in high power transmission lines. The California Greenhouse Gas Emissions Inventory Summary provides annual data on high GWP emissions for the State as a whole. These emissions were then apportioned to the VCREA participants on a population percentage basis.

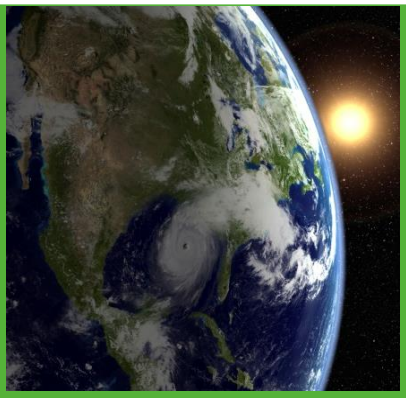
[1]http://www.arb.ca.gov/cc/inventory/doc/docs4/4d1_wastewatertreatment_domesticwastewater_centralizedanaerobic_californiapopulation_ch4_2011.htm

Appendix C:

Regional Data

CLIMATE ON THE MOVE

Ventura County Regional Energy Alliance



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This Appendix contains some of the data used to prepare this report. Full workbooks and additional data will be available upon completion of this project.

Data Summary – 2010 through 2012 Inventories

Sector	2010 CO_2e	2011 CO_2e	2012 CO_2e
On-Road Transportation	3,431,902	3,365,498	3,298,797
Non-Residential Electricity Use	1,180,013	1,193,681	1,203,290
Other Emissions*	729,713	744,116	780,723
Residential Natural Gas Use	652,908	661,374	606,383
Off-Road Vehicle Use	544,774	550,843	528,023
Residential Electricity Use	508,966	511,592	517,748
Non-Residential Natural Gas Use	267,870	295,282	299,424
Total	**7,316,146**	**7,322,386**	**7,234,388**
* Includes emissions from wastewater treatment, water deliveries, landfills and high GWP sources.			

Natural Gas Consumption & CO2e Emissions

VCREA Regional - Natural Gas Consumption and CO2e Emissions				
	Residential		Non-Residential	
	Therms	MT CO2e	Therms	MT CO2e
2010	122,785,222	652,908	50,375,361	267,870
2011	124,377,420	661,374	55,530,452	295,282
2012	114,035,800	606,383	56,309,388	299,424

Electricity Consumption & CO2e Emissions

VCREA Regional - Electricity Consumption and CO2e Emissions										
	Residential		Commercial		Industrial		Agricultural		Aggregated	
CY	kwhs	CO2e	kwhs	CO2e	kwhs	CO2e	kwhs	CO2e	kwhs	CO2e
2010	1,829,483,453	**508,966**	2,963,982,020	**824,585**	340,987,779	**94,863**	6,309,971	**1,755**	930,294,545	**258,810**
2011	1,838,924,810	**511,592**	2,970,615,359	**826,436**	329,693,546	**91,721**	55,291,306	**15,382**	935,078,898	**260,141**
2012	1861053365	**517,748**	2991199500	**832,157**	336172181	**93,524**	55768982	**15,515**	942099753	**262,094**

Emissions from On-Road Vehicles

VCREA On-Road Emissions

	2010		2011		2012	
	Vehicle Miles Travelled	MT CO2e	Vehicle Miles Travelled	MT CO2e	Vehicle Miles Travelled	MT CO2e
Camarillo	3.79%	129,897	3.79%	127,384	3.79%	124,859
Fillmore	0.45%	15,375	0.45%	15,077	0.45%	14,779
Moorpark	1.12%	38,437	1.12%	37,694	1.12%	36,947
Ojai	0.24%	8,305	0.24%	8,145	0.24%	7,983
Oxnard	8.27%	283,750	8.27%	278,259	8.27%	272,745
Port Hueneme	0.97%	33,392	0.97%	32,746	0.97%	32,097
Santa Paula	0.77%	26,426	0.77%	25,914	0.77%	25,401
Simi Valley	6.98%	239,546	6.98%	234,911	6.98%	230,256
Thousand Oaks	8.31%	285,274	8.31%	279,754	8.31%	274,210
San Buenaventura	7.10%	243,674	7.10%	238,959	7.10%	234,223
Unincorporated Ventura Cou	7.38%	253,109	7.38%	248,212	7.38%	243,293
State Highways	53.78%	1,845,677	53.80%	1,810,638	53.80%	1,774,753
Other	0.83%	28,485	0.83%	27,934	0.83%	27,380
Total		3,431,902		3,365,498		3,298,797

Emissions from Off-Road Vehicles & Equipment

VCREA Off-Road Equipment		
CY	Class	CO2e
2010	Recreational Equipment	8,352.68
2010	Construction and Mining Equipment	250,660.11
2010	Industrial Equipment	40,375.38
2010	Lawn and Garden Equipment	20,155.52
2010	Light Commercial Equipment	23,999.93
2010	Agricultural Equipment	76,400.27
2010	Airport Ground Support Equipment	209.31
2010	Transport Refrigeration Units	25,880.56
2010	Oil Drilling	56,339.90
2010	Military Tactical Support Equip	731.67
2010	Other Portable Equipment	154.11
2010	Entertainment Equipment	423.07
2010	Railyard Operations	5.70
2010	Pleasure Craft	41,085.73
	Total	**544,773.94**

VCREA Off-Road Equipment

CY	Class	CO2e
2011	Recreational Equipment	8,671.85
2011	Construction and Mining Equipment	254,524.01
2011	Industrial Equipment	40,144.73
2011	Lawn and Garden Equipment	20,307.71
2011	Light Commercial Equipment	23,884.25
2011	Agricultural Equipment	76,074.74
2011	Airport Ground Support Equipment	212.68
2011	Transport Refrigeration Units	27,164.96
2011	Oil Drilling	56,326.87
2011	Military Tactical Support Equip	731.52
2011	Other Portable Equipment	154.08
2011	Entertainment Equipment	423.00
2011	Railyard Operations	5.70
2011	Pleasure Craft	42,216.81
	Total	**550,842.92**

VCREA Off-Road Equipment		
CY	Class	CO2e
2012	Recreational Equipment	8,999.33
2012	Construction and Mining Equipment	258,354.42
2012	Industrial Equipment	39,922.91
2012	Lawn and Garden Equipment	20,488.36
2012	Light Commercial Equipment	23,764.59
2012	Agricultural Equipment	75,746.11
2012	Airport Ground Support Equipment	128.03
2012	Transport Refrigeration Units	360.63
2012	Oil Drilling	55,553.39
2012	Military Tactical Support Equip	731.38
2012	Other Portable Equipment	154.05
2012	Entertainment Equipment	422.94
2012	Railyard Operations	5.70
2012	Pleasure Craft	43,391.55
	Total	**528,023.42**