City of La Habra

GENERAL PLAN

City Of La Habra
Climate Action Plan

Adopted, January 21, 2014

CITY OF LA HABRA

Climate Action Plan

Adopted, January 21, 2014

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ACRONYMS

AB 32	Assembly Bill 32, The California Climate Change Solutions Act of 2006
ATMS	Advanced Transportation Management Systems
ADWF	Average Daily Wastewater Flow
BAU	Business-As-Usual Scenario
BTU	British Thermal Unit
CARB	California Air Resources Board
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal EPA	California Environmental Protection Agency
CAS	California Climate Adaption Strategy
CAT	Climate Action Team
CAP	Climate Action Plan
CCAT	California Climate Action Team
CCAR	California Climate Action Registry
CCR	California Code of Regulations
CCTP	Climate Change Technology Program
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFC	Chlorofluorocarbons
C_2F_6	Hexafluoroethane
CF_4	Carbon Tetrafluoride
CH_4	Methane
CIWMB	California Integrated Waste Management Board
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DPM	Diesel Particulate Matter
EMFAC2007	On-Road Emission Factors published by the CARB in 2007
GCC	Global Climate Change
GHG	Greenhouse Gas
GWh	Gigawatt Hours
GWP	Global Warming Potential
HFC	Hydrofluorocarbons

ACRONYMS

HFC-23	Trifluoromethane
HFC-134	Hydrofluorocarbon 134
HFC-152a	Difluoroethane
HVAC	Heating, Ventilation, Air Conditioning
IPCC	Intergovernmental Panel on Climate Change
Lbs/year	Pounds per Year
LEED	Leadership in Energy and Environmental Design
MMBTU	Million British Thermal Units
MT	Metric Tons
$MTCO_2e$	Metric Tons of Carbon Dioxide Equivalent
$MMTCO_2e$	Million Metric Tons of Carbon Dioxide Equivalent
MWD	Metropolitan Water District of Southern California
MHh/year	Megawatt hours per year
MWh	Megawatt hours
N_2O	Nitrous Oxide
O_3	Ozone
OCMWD	Orange County Metropolitan Water District
OCSD	Orange County Sanitation District
OPR	California Office of Planning and Research
PSD	Prevention of Significant Deterioration
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCG	Southern California Gas Company
SIP	State Implementation Plan
SF_6	Sulfur Hexafluoride
SRI	Solar Reflective Index
UNFCCC	United Nations Framework Convention on Climate Change
URBEMIS 2007	Urban Emissions Model, version 9.2 published in June 2007
USEPA	United States Environmental Protection Agency
VMT	Vehicle miles traveled

EXECUTIVE SUMMARY

The City of La Habra is committed to providing a more livable, equitable, and economically vibrant community through the incorporation of sustainability features and reduction of greenhouse gas (GHG) emissions. By using energy more efficiently, harnessing renewable energy to power buildings, recycling waste, conserving water, and enhancing access to sustainable transportation modes, La Habra will keep dollars in the local economy, create new green jobs, and improve the community's quality of life. The efforts toward reducing GHG emissions described in this Climate Action Plan must be done in coordination with the City's land use decisions, and the foundation for planning and land use decisions is the City's 2035 General Plan goals, policies, and implementation programs. Through the Climate Action Plan, La Habra has established goals and policies that incorporate environmental responsibility into its daily management of transportation, energy, water, and solid waste to further the City's commitment.

The first step in completing the La Habra Climate Action Plan was to inventory the City's GHG emissions. Sources of emissions include transportation, electricity, and natural gas use; landscaping, water and wastewater pumping and treatment; and treatment and decomposition of solid waste. La Habra's community-wide GHG emissions for 2010, the base year, amounted to 284,089 metric tons of Carbon Dioxide Equivalent (CO_2e).

The projected business-as-usual emissions for the year 2020, based on population and housing growth estimates, are 316,935 metric tons of CO_2e. In order to reach the GHG reduction target, La Habra must offset this growth in emissions and reduce community-wide emissions to 241,476 metric tons of CO_2e by the year 2020. This 2020 reduction target is a 15% decrease from 2010 levels.

At the General Plan's horizon year of 2035, the projected business-as-usual emissions, based on population and housing growth estimates, are 333,694 metric tons of CO_2e. In order to continue reductions toward the ultimate 2050 statewide goal, and achieve within La Habra the regional 2035 reduction target set by the Southern California Association of Governments in the Sustainable Communities Strategy of the 2012 Regional Transportation Plan, La Habra must continue to offset the growth in emissions and reduce community-wide emissions to 198,862 metric tons of CO_2e by the year 2035. This 2035 reduction target is a 30% decrease from 2010 levels.

In order to reach the reduction target laid out in this Climate Action Plan, La Habra will need to implement the additional reduction measures described in this report. These measures encourage such strategies as energy efficient retrofits, land use and transportation coordination, water conservation, increased efficiency of the waste-to-energy process, and expanding tree planting.

Table ES-1 (Net Total Emissions Comparison) summarizes the community wide emissions for the 2010 base year, 2020 business-as-usual, and the reduced 2020 inventory with the inclusion of the reduction measures. In this CAP, business-as-usual (BAU) refers to continued operations and development of the City without the inclusion of recently-adopted or proposed sustainability initiatives. The BAU scenario describes how emissions would be in year 2020, if the emissions inventory continued to grow strictly based upon the land use growth projections for the City and the naturally occurring events that might change the character of emissions. Therefore, BAU follows a predominantly linear growth pattern.

Table ES-1 Net Total Emissions Comparison

	Metric tons of CO_2e				
Source Category	**2010**	**BAU 2020**	**Reduced 2020**	**BAU 2035**	**Reduced 2035**
Transportation	106,146	124,054	80,826	128,104	83,268
Energy	126,532	137,161	89,732	145,449	87,270
Area Sources	30,249	32,790	25,664	35,391	10,910
Water	5,312	5,758	3,739	6,215	3,729
Solid Waste	15,850	17,172	11,262	18,534	11,120
Total	**284,089**	**316,935**	**211,223**	**333,694**	**196,297**
Emission Reduction Target	**N/A**	**241,476**	**241,476**	**198,862**	**198,862**

SOURCE: Atkins (2013).
NOTE: Mass emissions of CO_2e shown in the table are rounded to the nearest whole number. Totals shown may not add up due to rounding.
BAU: business-as-usual.

La Habra has elected to be a green and sustainable community. To accomplish this, La Habra's community of residents, neighbors, workers, and visitors strive together, through a variety of methods, to balance ecological, economic, and social needs to ensure a clean, healthy, and safe environment for current members of society and for generations to come. The City of La Habra demonstrates its commitment to sustainability, air quality improvements, and the reduction of GHG emissions through a variety of programs and policies. The City's 2035 General Plan presents multiple tables summarizing, by Chapter and Section, applicable General Plan goals and policies that address climate change and the reduction of GHG emissions (Appendix A [General Plan 2035: Addressing Climate Change]).

Various federal and State policies have enacted programs that will also contribute to reduced GHG emissions in La Habra by the year 2020. Some of these policies include updated California building codes for energy efficiency, statewide recycling goals, renewable fuel standard, and federal Corporate Average Fuel Economy (CAFE) standards for cars and light trucks. By supporting the implementation of these measures, La Habra will experience substantial emissions reductions.

In addition to the emission reductions, this Climate Action Plan describes the cost savings associated with each of the reduction measures. The financing opportunities and strategies for implementing the reduction measures are described in Chapter 7 (Implementation).

Chapter 1 Introduction

The City of La Habra is committed to providing a more livable, equitable, and economically vibrant community through the reduction of greenhouse gas (GHG) emissions. By using energy more efficiently, harnessing renewable energy to power buildings, recycling waste, conserving water, and enhancing access to sustainable transportation modes, La Habra will keep dollars in the local economy, create new green jobs, and improve the community's quality of life. These efforts toward reducing GHG emissions must be done in coordination with the City's land use decisions, and the foundation for planning and land use decisions in La Habra is the City's 2035 General Plan goals, policies, and implementation programs.

The La Habra General Plan is a long-range policy document that sets forth broad goals and objectives for the growth and development of the City. As required by State law, the General Plan takes a long-term view and is designed to guide growth and development. It serves as the "constitution" for decisions of the City and provides guidance regarding the allocation of resources and the future physical form and character of development. The General Plan is the official statement of La Habra regarding the extent and types of development needed to achieve the community's physical, economic, social, and environmental goals. It addresses a wide variety of subject areas including housing, traffic, natural resources, land use, economic development, noise, and public safety.

In order to fulfill the 2035 General Plan goals, policies, and implementation programs; provide a more livable, equitable, and economically vibrant community; and preserve the attributes of its unique valley location and quality lifestyle, the City has committed to prepare and implement the La Habra Climate Action Plan (CAP). Further, the plan will ensure that the impact of development on air quality is minimized, energy is conserved, and that land use decisions made by the City and all internal operations within the City are consistent with adopted State legislation.

The Introduction to the CAP describes the purpose and goals of the CAP; the relationship of the CAP to the General Plan; background information on GHG emissions; and summarizes the regulatory framework surrounding GHG emissions and climate change.

1.1 Purpose

The CAP was designed under the premise that the City and the community it represents are uniquely capable of addressing emissions associated with sources under the City's jurisdiction. The City's emission reduction efforts should coordinate with the State strategies in order to accomplish emission reductions in an efficient and cost effective manner. The City developed this document with the following purposes in mind:

- create a GHG baseline from which to benchmark GHG reductions;
- provide a plan that is consistent with and complementary to: the GHG emissions reduction efforts being conducted by the State of California through the Global Warming Solutions Act (AB 32); the Federal Government through the actions of the Environmental Protection Agency; and the global community through the Kyoto Protocol;

- guide the development, enhancement, and implementation of actions that aggressively reduce GHG emissions; and
- provide a policy document with specific implementation measures meant to be considered as part of the planning process for future development projects.

1.2 Goals

To fulfill the purposes of the CAP, the City identified the following achievement goals:

- provide a list of specific General Plan policies and goals that will reduce GHG emissions;
- reduce emissions attributable to La Habra to levels at or below 1990* GHG emissions by year 2020 consistent with the target reductions of AB 32; and
- reduce emissions attributable to La Habra to levels 30% below 2010 GHG emissions by year 2035.

*Following the AB 32 Scoping Plan recommendation, 1990 levels of GHG emissions are approximated at 15% below baseline year, 2010, GHG emissions.

1.3 Relationship to the City's General Plan

The La Habra 2035 General Plan discusses the City's vision over the next 25 years to assure the retention of the community character that has developed over the past decades (i.e., a caring community, population diversity, historic heritage, and secure neighborhoods), while placing significant focus and prioritization on the future reinvestment and revitalization of our commercial corridors, community facilities and parks, infrastructure, residential neighborhoods, and schools. La Habra will strive to establish development patterns consistent with the existing community character, provide multiple modes of transportation, and construct infrastructure that is more sustainable and environmentally friendly through improvements that achieve reduction of such elements as energy use, water consumption, and greenhouse gas emissions.

The City's 2035 General Plan is composed of an Introduction and six additional chapters that constitute the Plan's goals and policies organized by the following major topic groupings:

- Community Development
- Mobility/Circulation
- Infrastructure
- Community Services
- Conservation/Natural Resource
- Community Safety

The last chapter of the 2035 General Plan includes the Implementation Manual, which is a set of the principal measures necessary to achieve the goals and policies set forth in the La Habra 2035 General Plan. The CAP is another implementation tool of the General Plan that can be used to guide development in the City by focusing on attaining the various goals and policies of the General Plan as well as the GHG reduction goals outlined in Section 1.2 (Goals) above. Table 1-1 (GHG-Related La Habra 2035 General Plan Policies) summarizes the policies of the 2035 General Plan that have been developed in coordination with the CAP to better facilitate the implementation of the reduction measures.

Transportation and electricity and natural gas use in buildings are the two primary sources of GHG emissions in the City. Based on the State Attorney General's interpretation of AB 32, local GHG reduction targets and strategies to achieve these must be addressed by the General Plan. The Community Development and Mobility/Circulation chapters of the 2035 General Plan address land use and transportation within the City that are managed for preferred patterns of growth and development. Additionally, the Infrastructure and Conservation/Natural Resources chapters of the 2035 General Plan address a number of different resources within the City that must be managed properly. These four chapters specifically speak to energy conservation, air quality improvements, solid waste management and recycling, water systems and water quality conservation, and the reduction of GHG emissions in helping to achieve the City's GHG reduction goals.

Table 1-1 GHG-Related La Habra 2035 General Plan Policies

General Plan Element	General Plan Policies	CAP Reduction Measures
Transportation		
Ch. 2: Community Development Land Use (LU) **Ch. 3: Mobility/Circulation** Non-Motor/Alternative Transportation System (AT) Transportation Demand Management (TDM) **Chapter 6: Conservation/Natural Resources** Air Quality and Climate (AQ)	LU 2.4, LU 3.1, LU 3.2, LU 3.3, LU 3.4, LU 5.4, LU 6.5, LU 7.5, LU 7.6, LU 12.1, LU 13.1, LU 16.3 AT 1.3, AT 1.4, AT 1.8, AT 1.9, AT 1.12, AT 1.13, AT 2.1, AT 2.4, AT 2.6, AT 2.9, AT 2.10, AT 3.1, AT 3.2, AT 3.6, TDM 1.1 – TDM 1.4, TDM 2.1, TDM 2.2 AQ 2.1, AQ 2.2, AQ 4.1	R2-T1: Land Use Based Trips and VMT Reduction Policies
Ch. 2: Community Development Land Use (LU) **Ch. 3: Mobility/Circulation** Non-Motor/Alternative Transportation System (AT)	LU 11.11, LU 16.6 AT 2.1 – AT 2.10	R2-T2: Bicycle Infrastructure
Ch. 3: Mobility/Circulation Transportation Demand Management (TDM) **Chapter 6: Conservation/Natural Resources** Air Quality and Climate (AQ)	TDM 2.5 AQ 4.5	R2-T3: Electric Vehicle Incentives Program
Ch. 3: Mobility/Circulation Transportation Demand Management (TDM) **Chapter 6: Conservation/Natural Resources** Air Quality and Climate (AQ)	TDM 2.4 AQ 4.4, AQ 4.5	R3-T1: Municipal Fleet Alternatives Vehicles

Table 1-1 GHG-Related La Habra 2035 General Plan Policies		
General Plan Element	**General Plan Policies**	**CAP Reduction Measures**
Energy		
Ch. 2: Community Development Land Use (LU) **Ch.4: Infrastructure** Energy (E) **Chapter 6: Conservation/Natural Resources** Air Quality and Climate (AQ)	LU 5.1, LU 5.2, LU 5.4 E 2.2, E 2.3, E 2.5 AQ 2.1, AQ 2.7	R2-E1: New Construction Residential Energy Efficiency Requirements
Ch.4: Infrastructure Energy (E)	E 2.8, E 2.9	R2-E2: New Construction Residential Renewable Energy
Ch.4: Infrastructure Energy (E)	E 2.8	R2-E3: Residential Energy Efficiency Retrofits
Ch.4: Infrastructure Energy (E)	E 2.8	R2-E4: Residential Renewable Energy Retrofits
Ch. 2: Community Development Land Use (LU) **Ch.4: Infrastructure** Energy (E) **Chapter 6: Conservation/Natural Resources** Air Quality and Climate (AQ)	LU 5.1, LU 5.2, LU 5.4 E 2.2, E 2.3 AQ 2.1, AQ 2.7	R2-E5: New Commercial Energy Efficiency Requirements
Ch.4: Infrastructure Energy (E)	E 2.8, E 2.9	R2-E6: New Commercial/Industrial Renewable Energy
Ch.4: Infrastructure Energy (E)	E 2.8	R2-E7: Commercial/Industrial Energy Efficiency and Renewable Energy Retrofits

Table 1-1 GHG-Related La Habra 2035 General Plan Policies

General Plan Element	General Plan Policies	CAP Reduction Measures
Ch.4: Infrastructure Energy (E)	E 2.5, E 2.8	R2-E8: Municipal Energy Efficiency Retrofit Projects
Ch.4: Infrastructure Energy (E) **Chapter 6: Conservation/Natural Resources** Air Quality and Climate (AQ)	E 2.7, E 2.8, E 2.9 AQ 3.6	R3-E1: Energy Efficient Development, and Renewable Energy Deployment Facilitation and Streamlining
Ch.4: Infrastructure Energy (E)	E 2.12, E 2.13	R3-E2: Energy Efficiency Training and Public Education
Ch.4: Infrastructure Energy (E)	E 2.8, E 2.9	R3-E3: Energy Efficiency and Solar Energy Financing
Ch.4: Infrastructure Energy (E)	E 1.1, E 2.11	R3-E4: Cross-Jurisdictional Coordination
Ch.4: Infrastructure Energy (E)	E 2.1, E 2.8	R3-E5: Alternative Energy Development Plan
Area Source		
Ch.4: Infrastructure Energy (E)	E 2.12, E 2.13	R2-A1: Electric Landscape Equipment Program

Table 1-1 GHG-Related La Habra 2035 General Plan Policies

General Plan Element	General Plan Policies	CAP Reduction Measures
Chapter 6: Conservation/Natural Resources Biological Resources/Habitat (BR)	BR 1.8, BR 1.9, BR 1.13	R3-A1: Expand City Tree Planting
Ch. 2: Community Development Land Use (LU) **Ch.4: Infrastructure** Energy (E)	LU 14.2 E 2.7	R3-L2: Heat Island Plan
Water		
Ch.4: Infrastructure Water Systems (WS) Water Quality Systems (WQ)	WS 1.6, WS 2.1 – WS 2.8, WQ 1.3, WQ 1.5	R2-W1: Water Use Reduction Initiative
Ch.4: Infrastructure Water Systems (WS) Water Quality Systems (WQ)	WS 2.1, WQ 1.9	R3-W1: Water Efficiency Training and Education
Solid Waste		
Ch.4: Infrastructure Solid Waste Management and Recycling (WR)	WR 1.2-1.7, WR 2.1 – WR 2.9, WR 4.1, WR 5.2	R2-S1: City Diversion Program
Ch.4: Infrastructure Solid Waste Management and Recycling (WR)	WR 1.2, WR 2.1	R3-S1: Encourage Increased Efficiency of the Gas to Energy System at Landfills
Ch.4: Infrastructure Solid Waste Management and Recycling (WR)	WR 5.1 – WR 5.5	R3-S2: Waste Education Programs

SOURCE: Atkins (2013).
NOTE: R1 reduction measures are obligations of the State. The City has no authority over R1 measures and therefore R1 measures are not included in this table.
See Chapter 4 (GHG Emissions Reduction Programs and Regulations) for more detailed descriptions of all CAP reduction measures.

1.4 Background

The CAP achieves the purpose and goals described above by providing:

- an analysis of GHG emissions and sources attributable to the City of La Habra;
- estimates on how those emissions are expected to increase to 2020 and 2035 General Plan; and
- recommended policies and actions that can reduce GHG emissions to meet State, federal and international targets.

In order to understand this process, the reader needs to understand a few facts about GHG emissions; climate change impacts anticipated within the City of La Habra; and the international, federal, State, and local regulatory framework designed to address climate change. The following provides a brief background on these topics. For a more complete description of the greenhouse effect, GHG emissions, and general climate change impacts, see Appendix A (The Greenhouse Effect, Greenhouse Gases, and Climate Change Impacts).

1.5 Greenhouse Gases

Parts of the Earth's atmosphere act as an insulating blanket, trapping sufficient solar energy to keep the global average temperature within a range suitable for human habitation. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' or GHGs because they trap heat similar to the effect of glass walls in a greenhouse. These gases, as defined by the United States Environmental Protection Agency (EPA), are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride , and chlorofluorocarbons (CFCs) all act as effective global insulators, reflecting infrared radiation back to earth. Human activities, such as producing electricity and driving internal combustion vehicles, emit these gases in the atmosphere.

Due to the successful global bans on chlorofluorocarbons—primarily used as refrigerants, aerosol propellants and cleaning solvents—La Habra does not generate significant emissions of these GHGs and therefore, they are not considered any further in this analysis. Other synthesized gases such as Hydrofluorocarbons and Carbon Tetrafluoride have been banned and are no longer available on the market. Because of the ban, the City of La Habra will not generate emissions of these GHGs and therefore, they are not considered any further in this analysis.

Another potent GHG is sulfur hexafluoride, which is mainly used as a gaseous dielectric medium in electric switchgear of high voltage electric transmission lines and medical use in retinal detachment surgery and ultrasound imaging. In both uses, sulfur hexafluoride is not released to the atmosphere and therefore, it is not considered further in this analysis. Because GHGs have variable heat-trapping properties, a common unit of measurement, the carbon dioxide equivalent, is used to normalize the GHG emission capacity from the different GHGs. Each GHG is compared to carbon dioxide with respect to its ability to trap infrared radiation, its atmospheric lifetime, and its chemical structure. For example,

methane is a GHG that is 21 times more potent than carbon dioxide; therefore, one metric ton of methane is equal to 21 metric tons of CO_2e (carbon dioxide equivalent).

1.6 Regulatory Setting

In an effort to stabilize GHG emissions and reduce impacts associated with climate change, international agreements, as well as federal and State actions were implemented beginning as early as 1988. The international, federal, State, regional, and local government agencies discussed below work jointly, as well as individually, to address GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

International and Federal

GLOBAL EFFORTS

The United States participated in the United Nations Framework Convention on Climate Change (UNFCCC) (signed on March 21, 1994). The Kyoto Protocol, a treaty made under the UNFCCC was the first international agreement to regulate GHG emissions. The United States is a signatory to the Kyoto Protocol; however, Congress has not ratified the Protocol and the United States is not bound by the Protocol's commitments.

CLIMATE CHANGE TECHNOLOGY PROGRAM

The United States has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. The Climate Change Technology Program (CCTP) is a multi-agency research and development coordination effort (led by the Secretaries of Energy and Commerce) that is charged with carrying out the President's National Climate Change Technology Initiative.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

The United States Environmental Protection Agency (USEPA) is responsible for implementing federal policy to address global climate change. The Federal government administers a wide array of public-private partnerships to reduce GHG intensity generated by the United States. These programs focus on energy efficiency, renewable energy, methane and other non-carbon dioxide gases, agricultural practices, and implementation of technologies to achieve GHG reductions. The USEPA implements several voluntary programs that substantially contribute to the reduction of GHG emissions.

In Massachusetts v. Environmental Protection Agency (Docket No. 05–1120), argued November 29, 2006 and decided April 2, 2007, the U.S. Supreme Court held that the USEPA has authority to regulate GHGs, and the USEPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the USEPA should be required to regulate carbon dioxide and other GHGs as pollutants under Section 202(a) (1) of the federal Clean Air Act (CAA).

The USEPA issued a Final Rule for mandatory reporting of GHG emissions in October of 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufactures of heavy-duty and off-road vehicles and vehicle engines, and requires annual reporting of emissions. The Final Rule became effective December 29th 2009 with data collection to begin on January 1, 2010 and the first annual reports due in March of 2011.[1] This rule does not regulate the emission of GHGs it only requires the monitoring and reporting of GHG emissions for those sources above certain thresholds. USEPA adopted a Final Endangerment Finding for the six defined GHGs on December 7, 2009. The Endangerment Finding is required before USEPA can regulate GHG emissions under Section 202(a) (1) of the CAA in fulfillment of the U.S. Supreme Court decision.

On May 13, 2010, the USEPA issued a final rule that establishes a common sense approach to addressing GHG emissions from stationary sources under the CAA permitting programs. This final rule sets a threshold of 75,000 tons per year for GHG emissions. New and existing industrial facilities that meet or exceed that threshold will require a permit under the New Source Review Prevention of Significant Deterioration and title V Operating Permit programs. This rule took effect on January 2, 2011.

State

CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board (CARB), a part of the California EPA (CalEPA) is responsible for the coordination and administration of both federal and State air pollution control programs within California. In this capacity, CARB conducts research, sets State ambient air quality standards (California Ambient Air Quality Standards [CAAQS]), compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (e.g., hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions. CARB has primary responsibility for the development of California's State Implementation Plan, for which it works closely with the federal government and the local air districts.

EXECUTIVE ORDER S-3-05

California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets:

- By 2010, California shall reduce GHG emissions to 2000 levels;
- By 2020, California shall reduce GHG emissions to 1990 levels; and
- By 2050, California shall reduce GHG emissions to 80% below 1990 levels.

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[1] U.S. Environmental Protection Agency, Final Rule for Mandatory reporting of GHG emissions, http://www.epa.gov/climatechange/emissions/downloads09/GHG-MRR-FinalRule.pdf (October 2009).

The first California Climate Action Team (CCAT) Report to the Governor in 2006 contained recommendations and strategies to help meet the targets in Executive Order S-3-05. In April 2010, the Draft California Action Team (CAT) Biennial Report expanded on the policy oriented 2006 assessment. The new information detailed in the CAT Assessment Report includes development of revised climate and sea-level projections using new information and tools that have become available in the last two years; and an evaluation of climate change within the context of broader social changes, such as land-use changes and demographic shifts.[2] The action items in the report focus on the preparation of the Climate Change Adaptation Strategy, required by Executive Order S-13-08, described later in this chapter.

ASSEMBLY BILL 1493, CLEAN CAR STANDARDS

AB 1493 (also known as the Pavley Bill, in reference to its author Fran Pavley) was enacted in 2002 and requires the "maximum feasible and cost effective reduction" of GHGs from automobiles and light-duty trucks. Subsequently, in 2004, CARB approved the "Pavley I" regulations limiting the amount of GHGs that may be released from new passenger automobiles beginning with model year 2009 through 2016; these regulations would reduce emissions by 30% from 2002 levels by 2016. The second set of regulations ("Pavley II") is currently in development and will cover model years 2017 through 2025 in order to reduce emissions by 45% by the year 2020. The automotive industry legally challenged the bill claiming that the federal gas mileage standards preempted these State regulations. In 2005, California filed a waiver request to the USEPA in order to implement the GHG standards and in March of 2008, the USEPA denied the request. However, in June 2009, the decision was reversed and the USEPA granted California the authority to implement the GHG reduction standards for passenger cars, pickup trucks, and sport utility vehicles.

In September 2009, CARB adopted amendments to the "Pavley I" regulations that cemented California's enforcement of the Pavley rule starting in 2009 while providing vehicle manufacturers with new compliance flexibility. The amendments also coordinated California's rules with the federal rules for passenger vehicles.

ASSEMBLY BILL 32, THE CALIFORNIA GLOBAL WARMING SOLUTIONS ACT OF 2006

In 2006, the California State Legislature adopted AB 32, the California *Global Warming Solutions Act of 2006*. AB 32 focuses on reducing GHG in California. GHGs as defined under AB 32 include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. AB 32 required CARB to adopt rules and regulations that would achieve GHG emissions equivalent to 1990 statewide levels by 2020. On or before June 30, 2007, CARB was required to publish a list of discrete early action GHG emission reduction measures that would be implemented by 2010. The law further required that

[2] California Environmental Protection Agency, "Climate Action Team Report to Governor Schwarzenegger and the Legislature," http://www.climatechange.ca.gov/climate_action_team/reports/2006report/2006-04-03_FINAL_CAT_REPORT.PDF (March 2006).

such measures achieve the maximum technologically feasible and cost effective reductions in GHGs from sources or categories of sources to achieve the statewide GHG emissions limit for 2020.

CARB published its final report titled, *Proposed Early Actions to Mitigate Climate Change*, in California in October 2007. The measures included are part of California's strategy for achieving GHG reductions under AB 32. Three new regulations were proposed to meet the definition of "discrete early action GHG reduction measures"…a low carbon fuel standard; reduction of hydrofluorocarbon 134a emissions from non-professional servicing of motor vehicle air conditioning systems; and improved landfill methane capture[3]. CARB estimates that by 2020, the reductions from those three measures would be approximately 13-26 million metric tons of CO_2e.

Under AB 32, CARB has the primary responsibility for reducing GHG emissions. CARB published a staff report titled *California 1990 GHG Emissions Level and 2020 Emissions Limit*[4] that determined the statewide levels of GHG emissions in 1990 to be 427 million metric tons of CO_2e. Additionally, in December 2008, CARB adopted the Climate Change Scoping Plan, which outlines the State's strategy to achieve the 2020 GHG limit. The Scoping Plan proposes a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify energy sources, save energy, create new jobs, and enhance public health. The plan emphasizes a cap-and-trade program, and also includes the discrete early actions.

SENATE BILL 97 (SB 97)

SB 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. It directed the California Office of Planning and Research (OPR) to develop draft CEQA Guidelines "for the mitigation of GHG emissions or the effects of GHG emissions" and directed the Resources Agency to certify and adopt the State CEQA Guidelines.

On April 13, 2009, OPR submitted the proposed amendments to the Secretary for Natural Resources. The Natural Resources Agency conducted formal rulemaking in 2009, certified, and adopted the amendments in December 2009. The California Office of Administrative Law codified into law the amendments in March 2010. The amendments became effective in June 2010 and provide regulatory guidance with respect to the analysis and mitigation of the potential effects of GHG emissions.

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[3] California Environmental Protection Agency, California Air Resources Board, "Proposed Early Actions to Mitigate Climate Change in California," http://www.climatechange.ca.gov/climate_action_team/reports/2007-04-20_ARB_early_action_report.pdf (October 2007).

[4] California Environmental Protection Agency, California Air Resources Board, "California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit," http://www.arb.ca.gov/cc/inventory/pubs/reports/staff_report_1990_level.pdf (November 16, 2007).

CEQA Guidelines Section 15183.5, Tiering and Streamlining the Analysis of GHG Emissions, was added as part of the CEQA Guideline amendments that became effective in 2010 and describes the criteria needed in a Climate Action Plan that would allow for the tiering and streamlining of CEQA analysis for subsequent development projects:

Section 15183.5. Tiering and Streamlining the Analysis of Greenhouse Gas Emissions.

(a) Lead agencies may analyze and mitigate the significant effects of greenhouse gas emissions at a programmatic level, such as in a general plan, a long range development plan, or a separate plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review. Project-specific environmental documents may rely on an EIR containing a programmatic analysis of greenhouse gas emissions as provided in section 15152 (tiering), 15167 (staged EIRs) 15168 (program EIRs), 15175-15179.5 (Master EIRs), 15182 (EIRs Prepared for Specific Plans), and 15183 (EIRs Prepared for General Plans, Community Plans, or Zoning).

(b) Plans for the Reduction of Greenhouse Gas Emissions. Public agencies may choose to analyze and mitigate significant greenhouse gas emissions in a plan for the reduction of greenhouse gas emissions or similar document. A plan to reduce greenhouse gas emissions may be used in a cumulative impacts analysis as set forth below. Pursuant to sections 15064(h)(3) and 15130(d), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously adopted plan or mitigation program under specified circumstances.

(1) Plan Elements. A plan for the reduction of greenhouse gas emissions should:

(A) Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;

(B) Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable;

(C) Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area;

(D) Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;

(E) Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels;

(F) Be adopted in a public process following environmental review.

(2) *Use with Later Activities. A plan for the reduction of greenhouse gas emissions, once adopted following certification of an EIR or adoption of an environmental document, may be used in the cumulative impacts analysis of later projects. An environmental document that relies on a greenhouse gas reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project. If there is substantial evidence that the effects of a particular project may be cumulatively considerable notwithstanding the project's compliance with the specified requirements in the plan for the reduction of greenhouse gas emissions, an EIR must be prepared for the project.*

One of the goals of the CAP is to allow programmatic level review and mitigation of GHG emissions that allows streamlining of CEQA review for subsequent development projects. To accomplish this, the CAP framework is designed to fulfill the requirements identified in CEQA Guidelines Section 15183.5, above.

EXECUTIVE ORDER S-1-07

Executive Order S-1-07, the Low Carbon Fuel Standard (LCFS) (issued on January 18, 2007), calls for a reduction of at least 10% in the carbon intensity of California's transportation fuels by 2020. It instructed the California Environmental Protection Agency to coordinate activities between the University of California, the California Energy Commission and other State agencies to develop and propose a draft compliance schedule to meet the 2020 target. Furthermore, it directed ARB to consider initiating regulatory proceedings to establish and implement the LCFS. In response, ARB identified the LCFS as an early action item and the regulation was adopted and implemented in 2010. As such gasoline sold in California now has at least 10% less carbon intensity than previous blends of gasoline.

EXECUTIVE ORDER S-13-08

On November 14, 2008, Governor Schwarzenegger issued Executive Order S-13-08, the Climate Adaptation and Sea Level Rise Planning Directive, which provides clear direction for how the State should plan for future climate impacts. Executive Order S-13-08 calls for the implementation of four key actions to reduce the vulnerability of California to climate change:

- Initiate California's first statewide Climate Change Adaptation Strategy (CAS) that will assess the State's expected climate change impacts, identify where California is most vulnerable, and recommend climate adaptation policies;
- Request that the National Academy of Sciences establish an expert panel to report on sea level rise impacts in California in order to inform State planning and development efforts;
- Issue interim guidance to State agencies for how to plan for sea level rise in designated coastal and floodplain areas for new and existing projects; and
- Initiate studies on critical infrastructure and land-use policies vulnerable to sea level rise.

The 2009 CAS report summarizes the best known science on climate change impacts in the State to assess vulnerability, and outlines possible solutions that can be implemented within and across State agencies to promote resiliency. This is the first step in an ongoing, evolving process to reduce California's vulnerability to climate impacts.[5]

CALIFORNIA CODE OF REGULATIONS (CCR) TITLE 24, PART 6

CCR Title 24, Part 6: *California's Energy Efficiency Standards for Residential and Nonresidential Buildings* (Title 24) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels results in GHG emissions and energy efficient buildings require less electricity. Therefore, increased energy efficiency results in decreased GHG emissions.

The Energy Commission adopted 2008 Standards on April 23, 2008 and the Building Standards Commission approved them for publication on September 11, 2008. These updates became effective on August 1, 2009. The Energy Commission adopted the 2008 changes to the Building Energy Efficiency Standards for several reasons:

- To provide California with an adequate, reasonably priced, and environmentally sound supply of energy;
- To respond to AB 32, the Global Warming Solutions Act of 2006, which mandates that California must reduce its GHG emissions to 1990 levels by 2020;
- To pursue California energy policy, which states that energy efficiency is the resource of first choice for meeting California's energy needs;
- To act on the findings of California's Integrated Energy Policy Report (IEPR) that concludes that the Standards are the most cost effective means to achieve energy efficiency, expects the Building Energy Efficiency Standards to continue to be upgraded over time to reduce electricity and peak demand, and recognizes the role of the Standards in reducing energy related to meeting California's water needs and in reducing GHG emissions;
- To meet the West Coast Governors' Global Warming Initiative commitment to include aggressive energy efficiency measures into updates of State building codes; and
- To meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards.

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[5] California Natural Resources Agency, "2009 California Climate Adaptation Strategy- A Report to the Governor in Response to Executive Order S-13-2008," http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF (September 2009).

SENATE BILL 375

Senate Bill 375 (SB 375), which establishes mechanisms for the development of regional targets for reducing passenger vehicle greenhouse gas emissions, was adopted by the State on September 30, 2008. On September 23, 2010, CARB adopted the vehicular greenhouse gas emissions reduction targets that had been developed in consultation with the metropolitan planning organizations (MPOs); the targets require a 7% to 8% reduction by 2020 and between 13% to 16% reduction by 2035 for each MPO. SB 375 recognizes the importance of achieving significant greenhouse gas reductions by working with cities and counties to change land use patterns and improve transportation alternatives. Through the SB 375 process, MPOs will work with local jurisdictions in the development of sustainable communities strategies (SCS) designed to integrate development patterns and the transportation network in a way that reduces greenhouse gas emissions while meeting housing needs and other regional planning objectives.

The Southern California Association of Governments (SCAG) is the MPO serving the area including La Habra. On April 4, 2012, the Regional Council of the Southern California Association of Governments (SCAG) adopted the "*2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS): Towards a Sustainable Future.*" The RTP/SCS is the culmination of a multi-year effort involving stakeholders from across the SCAG Region. Many of the transportation-related reduction measures included in this CAP will coordinate with efforts in SCAG's SCS.

CAL GREEN BUILDING CODE

CCR Title 24, Part 11: California's Green Building Standard Code (CALGreen) was adopted in 2010 and went into effect January 1, 2011. CALGreen is the first statewide mandatory green building code and significantly raises the minimum environmental standards for construction of new buildings in California. The mandatory provisions in CALGreen will reduce the use of volatile organic compounds emitting materials, strengthen water conservation, and require construction waste recycling.

ASSEMBLY BILL 811

AB 811 (2008) authorizes California cities and counties to designate districts within which willing property owners may enter into contractual assessments to finance the installation of renewable energy generation and energy efficiency improvements that are permanently fixed to the property. These financing arrangements would allow property owners to finance renewable energy generation and energy efficiency improvements through low interest financing that would be repaid as an item on the property owner's property tax bill.

ASSEMBLY BILL 474

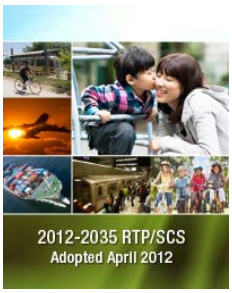
AB 474 is designed to encourage and facilitate the installation of permanent water conservation and efficiency improvements on private property through a voluntary financing program between public entities and property owners. The bill creates financing opportunities for residential, commercial, industrial, and agricultural property owners to improve water efficiency

Regional

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT AIR QUALITY MANAGEMENT PLAN

The South Coast Air Quality Management District (SCAQMD) attains and maintains air quality conditions in Orange County through air quality planning, regulation, enforcement, technical innovation, and promoting understanding of air quality issues. SCAQMD also inspects stationary sources, responds to complaints, monitors ambient air quality and meteorological conditions, and implements other Clean Air Acts and amendments programs and regulations. SCAQMD's clean-air strategy involves the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. The final 2012 Air Quality Management Plan (AQMP) was adopted by the AQMD Governing Board on December 7, 2012.

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS REGIONAL TRANSPORTATION PLAN



The Southern California Association of Governments (SCAG) is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial counties, and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. SCAG serves as the federally designated metropolitan planning organization for the Southern California region and is the largest in the United States.

With respect to air quality planning, SCAG has prepared the *2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS): Towards a Sustainable Future,* to fulfill federal planning requirements contained in the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which calls for regions to consider urban form and natural resources as part of the transportation planning process. The RTP is a long-range transportation plan that is developed and updated by SCAG every four years. The RTP provides a vision for the development of transportation facilities throughout the region based on growth forecasts and economic trends that project over a 20-year period.

Chapter 2 Methodology Overview

The methodology to prepare the GHG inventories in the CAP incorporates the protocols, methods and emission factors found in the California Climate Action Registry (CCAR) General Reporting Protocol,[6] and the Local Government Protocol.[7] The Local Government Protocol categorizes GHG emissions into three distinct scopes that provide a way of organizing the CAP's development.

Definition of Scopes from Local Government Protocol:

- **Scope 1 Emissions** includes all "direct" sources of GHG emissions from sources that are owned or controlled by the City including (but not limited to): production of electricity, heat, or steam in owned or controlled boilers, furnaces, etc; transportation (using corporate or fleet vehicles) of materials, products, waste, and community members; and fugitive emissions (from unintentional leaks of GHGs directly into the atmosphere).
- **Scope 2 Emissions** account for "indirect" sources of GHG emissions from the generation of purchased utilities consumed by the City. A purchased utility is defined as one that is bought or otherwise brought into the jurisdictional authority of the local government, but not physically generated in power plants owned and/or operated by the local government. Scope 2 emissions physically occur at locations outside of the jurisdictional boundaries and direct control of the local government and thus are separated from direct emissions reported by the utility company or local government in order to avoid double counting.
- **Scope 3 Emissions** is considered an optional reporting category that allows for the treatment of all other "indirect emissions." Scope 3 emissions are a consequence of the activities of the local government, but occur from sources not owned or controlled by the local government.

Because Scope 3 emissions are indirect emissions that are attributable to emissions sources that are not owned or controlled by the City of La Habra they are not considered in this CAP. Scope 1 emissions are characterized in this report as "direct emissions" While Scope 2 emissions are characterized as "indirect source emissions."

The analysis relative to the CAP employs both quantitative and qualitative components. The quantitative analysis contains an inventory of the City's GHG emissions, while the qualitative component involves compliance with the emission reduction strategies contained in federal, State, and local legislation.

The analysis herein is tailored to include all historic, existing, and projected emission sources within the City while providing a comprehensive analysis of GHG impacts and measures available to reduce impacts to the fullest extent feasible. AB 32 establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gas emissions and mandates the reduction of CO_2e emissions in California to 1990 levels by 2020.

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[6] California Climate Action Registry, General Reporting Protocol, Version 3.1 (January 2009).
[7] California Climate Action Registry, Local Government Protocol, Version 1.1 (May 2010).

2.1 GHG Emissions in La Habra

The first step in developing the CAP was to establish an existing inventory of La Habra's GHG emissions. The purpose of this inventory is to identify and categorize the major sources and quantities of GHG emissions currently being produced by the City's residents, businesses and municipal operations. The CAP established 2010 as the year on which to base the existing inventory; this is the most recent year for which reliable data is available. This inventory provides a framework on which to design programs and actions that specifically target reductions by emissions sources. Programs and actions already in place within the City are described in Chapter 4. The existing inventory serves as a reference against which to measure the City's progress towards reducing GHG emissions over time, and documentation for potential emission trading opportunities.

In estimating La Habra's total greenhouse gas emissions, data sources from the City, regional, and State agencies were used. For community energy statistics, the following agencies and City departments were consulted: Southern California Edison (SCE); The Southern California Gas Company (SCG); and the City of La Habra, Community and Economic Development and Public Works departments. The following agencies and departments provided transportation information: City of La Habra, Community and Economic Development, Traffic and Transportation Division; Orange County Transportation Authority (OCTA); and the California Department of Transportation (Caltrans). City of La Habra, Public Works Department, Refuse and Recycling Division; California Integrated Waste Board (CIWB); CalRecycle; and Waste Management California provided information on waste generation. The California Air Resources Board (CARB) and South Coast Air Quality Management District (SCAQMD) provided relevant policy information.

In cases where specific data for the 2010 base year was not available, estimates were made by extrapolating from existing data. General estimate calculations and assumptions are compiled in Appendices B through E. All of the contributors to greenhouse gas emissions (kilowatt-hours of electricity generated by fossil fuel combustion in power plants, natural gas in therms, vehicle travel in vehicle miles traveled, and solid waste in tons) are expressed in the common unit of metric tons of carbon dioxide equivalent (CO_2e) released into the atmosphere in a given year.

La Habra's main contribution to GHGs is carbon dioxide (CO_2). The City will directly generate emissions of CO_2 primarily in the form of vehicle exhaust and consumption of natural gas for heating. La Habra will also generate methane (CH_4) and nitrous oxide (N_2O) emissions. Methane is directly generated from natural gas and petroleum systems and wastewater treatment while nitrous oxide results predominantly from motor vehicle use.

2.2 Calculation of GHGs

The following summarizes the basis of the GHG calculations by emission source. The emissions calculations follow the California Climate Action Registry (CCAR) General Reporting Protocol, version 3.1,[8] Local Government Protocol, version 1.1,[9] the Urban Forestry Protocol, version 1.1[10] and CARB's Mandatory GHG Reporting Regulations (Title 17, California Code of Regulations, Sections 95100 et seq.). These protocols are consistent with the methodology and emission factors endorsed by SCAQMD, CARB and USEPA. In cases where these protocols do not contain specific source emission factors, current industry standards or the USEPA's AP 42 Compilation of Air Pollution Emission Factors were used.

Coefficients and modeling assumptions used in the calculations of GHGs are included in Appendix B (Modeling Coefficients and Data Assumptions). Calculations of GHGs for 2010, 2020, and 2035 are included in Appendix D (GHG Inventory Calculations). Since data was not available for 1990, estimations for this inventory were based on the base year 2010 emission inventory, given a 15% reduction from 2010 levels. This estimation follows CARB recommendation to local governments in the AB 32 Scoping Plan.[11] 2020 emissions were estimated from 2010 data using anticipated growth in number of housing units and commercial and industrial building square footage.

In this CAP, business-as-usual (BAU) refers to continued operations and development of the City without the inclusion of recently-adopted or proposed sustainability initiatives. The BAU scenario describes how emissions would be in year 2020, if the emissions inventory continued to grow strictly based upon the land use growth projections for the City and the naturally occurring events that might change the character of emissions. Therefore, BAU follows a predominantly linear growth pattern.

GHG emissions are typically segregated into direct and indirect sources as discussed above. However, direct and indirect sources are not completely independent of each other and are often combined into other more encompassing categories. For example, although natural gas combustion is a direct source and electricity generation is an indirect source, they both are typically discussed under a heading of "Energy" when policies are put in place to reduce emissions. Therefore, this CAP discusses emissions with respect to the general source categories of Transportation, Energy, Area Source, Water, and Solid Waste.

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8 California Climate Action Registry, General Reporting Protocol, Version 3.1 (January 2009).

9 California Climate Action Registry, "Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories," http://www.arb.ca.gov/cc/protocols/localgov/archive/final_lgo_protocol_2008-09-25.pdf (September 25, 2008).

10 Climate Action Reserve, Urban Forest Project Protocol, Version 1.1 (March 2010).

11 California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

Transportation

ON-ROAD VEHICLES

Carbon dioxide emissions from vehicles were calculated utilizing EMFAC2007 emission factors for the existing (2010), 2020, and 2035 inventories. The Emission Factors (EMFAC) model was developed by CARB 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. Motor vehicle emissions of CH_4, and N_2O were also calculated using USEPA emission factors for on-road vehicles based on the total annual mileage driven multiplied by their respective emission factors by year.

Vehicle miles traveled (VMT) were determined by the City through a Citywide analysis using data from the regional Orange County Transportation Agency Model (OCTAM) for the City of La Habra. Data from this model was calibrated to estimate VMT for all trips that begin and/or end within the City limits. This accounts for traffic entering or exiting La Habra and traffic within the City, but excludes pass-through traffic. La Habra's VMT includes miles from all trips within La Habra and half of the miles from trips that begin or end in La Habra; La Habra is held accountable for all trips within the city limits while the City shares accountability with other jurisdictions for trips that have only one end point in La Habra. Each trip was assigned to a land use class (residential, commercial, or industrial) based upon the origin of the trip.

It should be noted that the estimates do not account for electrical, biodiesel (a blend of diesel and vegetable oil), or hydrogen powered systems. Any electrically powered vehicle which draws power from a residence, commercial or industrial land use will be accounted for in the electrical usage for the City. Predicted 2020 BAU vehicle trips were estimated by using predicted land use changes and growth.

Energy

ELECTRICITY

The City emits CO_2, CH_4, and N_2O indirectly through the use of electricity provided by Southern California Edison (SCE). SCE provided annual energy usage for 2010.[12] 2020 and 2035 BAU electricity use was estimated based on anticipated growth in the residential and commercial/industrial areas.

[12] Southern California Edison, "Electricity Use Report for City of La Habra Year 2010, Version 5.0" (September, 2011).

SCE provides electricity from a variety of sources including natural gas and large hydroelectric systems. Each of these sources of electricity emits different levels of GHGs. The annual usage in megawatt hours per year (MWh/year) was multiplied by the emission factors appropriate to the inventory year for CO_2, CH_4, and N_2O to determine emissions from these sources.

Electricity rates fluctuate throughout the year, so average values were used. Table 2-1 (2010 Community-wide Electricity Usage) summarizes the City's baseline electricity usage in 2010. See Appendix C (Data Inputs) for more detailed calculations.

Table 2-1 2010 Community-wide Electricity Usage

Category	Electricity (kWh)	Percent of Total Usage
Residential	110.80 million	42%
Commercial/Industrial	152.36 million	58%
TOTAL	**263.16 million**	**100%**

SOURCES: Electricity Use Report for City of La Habra (SCE 2011) and Atkins (2013).
NOTE: Totals may be off due to rounding.

NATURAL GAS COMBUSTION

The City emits GHGs from the combustion of natural gas. The annual natural gas usage for the City in thousand cubic feet (Mcf) was converted to million British Thermal Units (MMBTUs) and multiplied by the respective emissions factors for CO_2, CH_4, and N_2O to determine the emissions from natural gas combustion, typically used for heating. Natural gas usage for 2010 was obtained from The Southern California Gas Company. Anticipated 2020 natural gas data was based on the, per unit, usage in 2010 and the anticipated unit growth by 2020. Table 2-2 (2010 Community-wide Natural Gas Usage) summarizes the City's baseline natural gas usage in 2010. See Appendix C (Data Inputs) for more detailed calculations.

Table 2-2 2010 Community-wide Natural Gas Usage

Category	Natural Gas (therms)	Percent of Total Usage
Residential	1.39 million	15%
Commercial/Industrial	8.18 million	85%
TOTAL	**9.58 million**	**100%**

SOURCES: La Habra Natural Gas Consumption Summary (SCG 2011) and Atkins (2013).
NOTE: Totals may be off due to rounding.

Area Source

LANDSCAPING

Emissions of CO_2, CH_4, and N_2O are generated by the use of landscape equipment through the combustion of gasoline. CO_2 emissions were determined from the approximate number of gallons of gasoline consumed through landscape equipment. This number was then multiplied by emission factors presented in the General Reporting Protocol, version 3.1[13] to determine both CH_4 and N_2O emissions.

WOOD BURNING

Direct CO_2 emissions are produced from the burning of wood in wood stoves, fireplaces, and natural gas fired stoves. The emissions from natural gas fired stoves are included in the Energy source category. CO_2, CH_4, and N_2O emissions from wood stoves and fireplaces are calculated based on the percentage of residential units using each type of hearth and the estimated annual amount of wood burned. The emission coefficients used are taken from the USEPA's AP-42 document.

Water and Wastewater

POTABLE WATER

Electricity is needed to move and treat water. La Habra residents and businesses use approximately 3 billion gallons of potable water annually. Approximately 43% of that water comes from local wells in La Habra; the remaining 57% of water is purchased from the Metropolitan Water District and California Domestic Water Company. A portion of the Metropolitan Water District of Southern California's (MWD) water comes from the Colorado River and the remaining water is State Project water from Northern California, which is delivered to Southern California via the California aqueduct.

The emissions associated with the energy used to pump the local water are included in the Electricity section described above. There are additional emissions associated with the purchased water from the Colorado River and the State Water Project due to the electricity used to transport the water over a long distance. Table 2-3 (2010 Community-wide Water Usage) summarizes the City's baseline water consumption in 2010. See Appendix C (Data Inputs) for more detailed calculations.

[13] California Climate Action Registry, General Reporting Protocol, Version 3.1 (January 2009).

Table 2-3 2010 Community-wide Water Usage		
Category	**Water (acre-feet)**	**Percent of Total Usage**
Residential	7,319	75%
Commercial/Industrial	2,485	25%
TOTAL	**9,804**	**100%**
SOURCES: City of La Habra 2010 Urban Water Management Plan (La Habra 2011) and Atkins (2013). NOTE: Totals may be off due to rounding.		

WASTEWATER TREATMENT

The Orange County Sanitation District (OCSD) is the provider of wastewater and sewer treatment for the central and northwest areas of Orange County, including the City of La Habra. Wastewater-related GHG emissions arise from the electricity used to pump and treat the water, the transportation fuel used to truck the biosolids to an off-site disposal area, and the direct methane emissions from the anaerobic digesters used in the treatment process.

Because the wastewater treatment plants are located outside of the City, direct methane emissions have been excluded from the City's emissions inventory and from further discussions of water emissions calculations. The electricity and transportation emissions, however, are associated with the indirect wastewater treatment processes and are included in the respective energy and transportation categories in Chapter 3 (Greenhouse Gas Emissions Inventory).

Solid Waste

Emissions from solid waste are determined as the sum of emissions generated by transportation from its source to the landfill, the equipment used in its disposal at the landfill, fugitive emissions from decomposition in landfills, and the anthropogenic carbon sink generated by the incomplete decomposition of materials in the landfill.

Emissions from the transportation of solid waste is determined based on the annual lbs/year (pounds per year) of total waste disposed in landfills including biosolids waste from wastewater treatment plants, the density of the waste, the capacity of the hauling trucks, the average number of miles traveled by each truck; and the CO_2, CH_4, and N_2O emissions generated per mile traveled.

Emissions from the equipment used at the landfills is calculated by determining the average hours of operation per day, the number of days of operation, and the emission factors for disposal equipment for CO_2, CH_4, and N_2O as determined from USEPA off-road mobile source emission factors. Landfill equipment emissions are only included in the inventory if the landfill is under the direct control of the City or County of interest. As the Olinda Alpha Landfill, the solid waste landfill used for the disposal of most of the waste for La Habra, is not under the City's direct control, emissions from onsite equipment are not included in this inventory. Other landfills and transfer stations used by the City include the El Sobrante Landfill, and Frank R. Bowerman Sanitary Landfill.

Fugitive emissions of methane from the decomposition of solid waste are calculated based on the annual waste generation multiplied by the USEPA emission factor for waste production for CH_4. The emission factor to determine CH_4 generation varies if the landfill operations are known to operate a methane flare or to generate electricity from methane capture. Carbon dioxide generated by decomposition of waste in landfills is not considered anthropogenic because it would be produced through the natural decomposition process regardless of its disposition in the landfill. Nitrous Oxide is not a bi-product of decomposition and therefore no fugitive emissions of nitrous oxide are anticipated from this source.

Anthropogenic carbon sinks are generated by the incomplete decomposition of waste in the landfill setting which results in the storage of carbon in the landfill.[14] Under natural conditions virtually all organic material degrades to CO_2. Therefore, carbon stored in the landfill results in a reduction of CO_2 released as a bi-product of decomposition. The anthropogenic carbon sink is determined by the amount of waste generated multiplied by the USEPA emission factor.

[14] California Environmental Protection Agency, "Solid Waste Management and Greenhouse Gases: A Lifecycle Assessment of Emissions and Sinks, 3rd edition" (September 2006).

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Chapter 3 Greenhouse Gas Emissions Inventory

The emissions inventory identifies and categorizes the major sources and quantities of GHGs being produced by City residents, businesses, and municipal operations using the best available data. Using historic emissions and BAU practices as a basis, this CAP includes GHG emissions from the 2010 base year, as predicted for 2020, and the General Plan horizon year of 2035. 1990 emissions are estimated as a 15% reduction from 2010 levels in order to establish a reduction target for 2020. The Emissions Inventories are organized by the following categories:

- Transportation
- Energy
- Area Sources
- Water
- Solid Waste

3.1 2010 Emissions Inventory

The City of La Habra emitted approximately 284,089 $MTCO_2e$ in 2010. The emissions were calculated based on traffic modeling, data from utilities, and land use. The largest portion of the City's 2010 emissions were from transportation (37%), followed by emissions from electricity and natural gas use in buildings (44%).

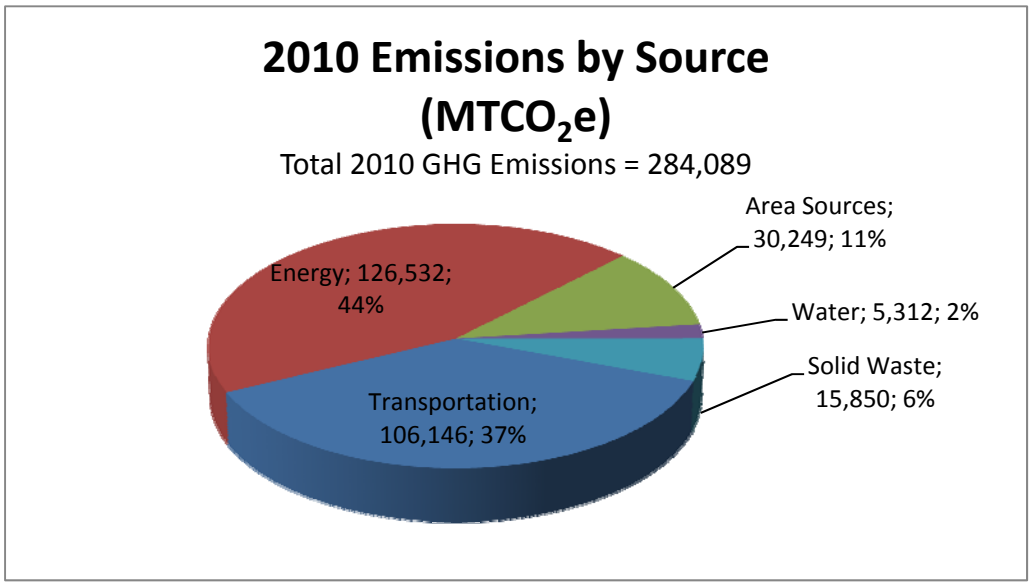
Table 3-1 (2010 Net Total Emissions) summarizes the City's net 2010 emissions of CO_2e as broken down by emissions category. Figure 3-1 (2010 Emissions Generated by Source) is a graphical representation of Table 3-1. A detailed breakdown of 2010 emissions by category is available in Appendix D (GHG Inventory Calculations).

Table 3-1 2010 Net Total Emissions

Category	Metric tons of CO_2e
Transportation	106,146
Energy	126,532
Area Sources	30,249
Water	5,312
Solid Waste	15,850
Total	**284,089**

SOURCE: Atkins (2013).

Figure 3-1 2010 Emissions Generated by Source



SOURCE: Atkins (2013).

Reduction Target

AB 32 requires California to return to 1990 emissions levels by the year 2020, and CARB has estimated this to be equivalent to a 15% reduction from existing emissions levels.[15] For the purposes of this CAP, the reduction target for La Habra is determined based on a 15% reduction from the 2010 level. While Executive Order S-3-05 outlines that by 2050 California has to reduce its GHG emissions to 80% below 1990 levels, current State and federal strategies, as well as technologies do not exist to achieve such reduction percentages. For this reason, the City has adopted an interim reduction target for the year 2035, which is estimated at 30% below the 2010 base year. The year 2035 aligns with the City's General Plan horizon as well as the regional transportation target in the SCS. This target is considered an interim goal to be reviewed prior to 2020 for post 2020 use. Because State and federal strategies for post-2020 are speculative, it is recommended that the City reevaluates the 2035 target as it reaches its 2020 milestone. By that time, the City will have a better understanding of the effectiveness and efficiency of the reduction strategies and approaches. Table 3-2 (2020 Reduction Target) summarizes the City's 2010 emissions total and GHG emission reduction targets for the years 2020 and 2035.

[15] California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

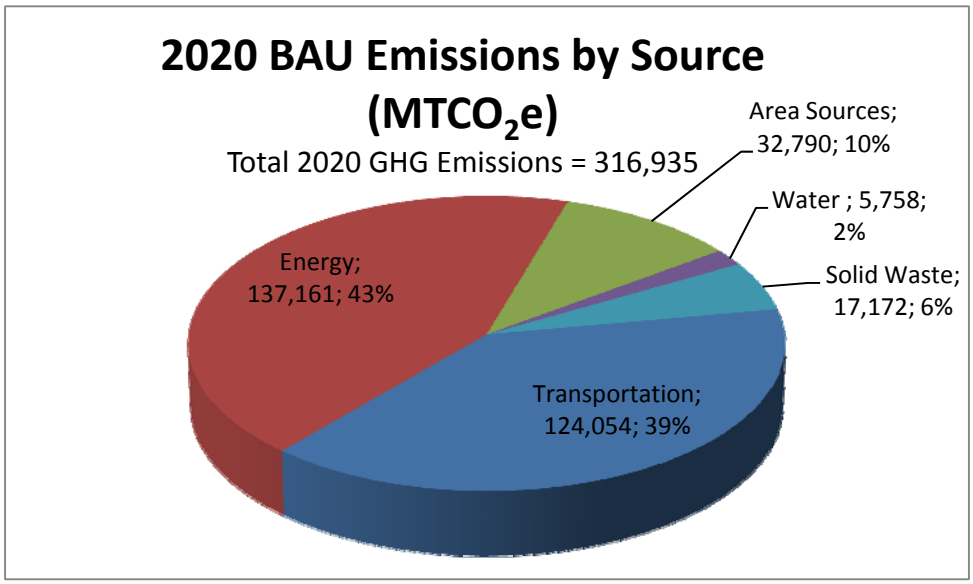
Table 3-2 2020 and 2035 Reduction Targets	
Category	**Metric Tons of CO_2e**
2010 Emissions	284,089
2020 Reduction Target (15% below 2010)	241,476
2035 Reduction Target (30% below 2010)	198,862
SOURCE: Atkins (2013).	

3.2 2020 Business as Usual Emissions Inventory

In 2020, La Habra is projected to emit a total of 316,935 $MTCO_2e$ from a BAU standpoint. BAU refers to continued 'business-as-usual' operations and development of the City according to 2010 policies, without the inclusion of proposed or recently-adopted sustainability initiatives described in Chapter 4. The 2020 BAU emissions are estimated based on the projected growth in La Habra from 2010 to 2020. Table 3-3 (2020 BAU Net Total Emissions) summarizes the net 2020 City emissions of CO_2e as broken down by emissions category. Figure 3-2 (2020 BAU Emissions Generated by Source) is a graphical representation of Table 3-3. A detailed breakdown of 2020 emissions by category is available in Appendix D (GHG Inventory Calculations).

Table 3-3 2020 BAU Net Total Emissions	
Category	**Metric tons of CO_2e**
Transportation	124,054
Energy	137,161
Area Sources	32,790
Water	5,758
Solid Waste	17,172
Total	**316,935**
SOURCE: Atkins (2013). NOTE: Mass emissions of CO_2e shown in the table are rounded to the nearest whole number. Totals shown may not add up due to rounding. BAU: business-as-usual.	

Figure 3-2 2020 BAU Emissions Generated by Source



SOURCE: Atkins (2013).

3.3 2035 General Plan Emissions Inventory

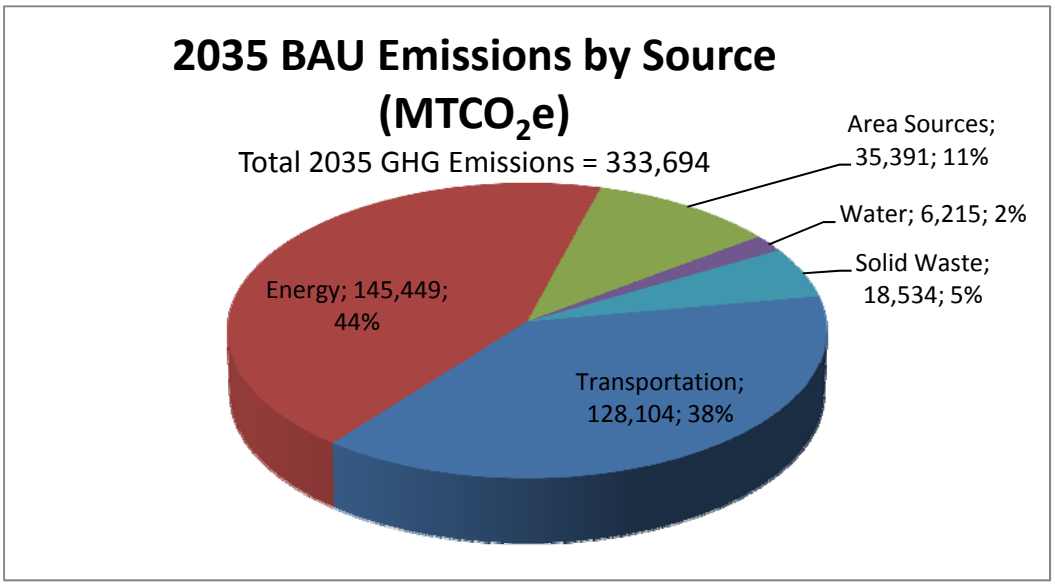
In 2035, La Habra is projected to emit a total of 333,694 $MTCO_2e$ following projections for the City's General Plan horizon year. The 2035 emissions are estimated based on the projected growth in La Habra from 2010 to 2035. Table 3-4 (2035 BAU Total Emissions) summarizes the net 2035 City emissions of CO_2e as broken down by emissions category. Figure 3-3 (2035 BAU Emissions by Source) is a graphical representation of Table 3-4. A detailed breakdown of 2035 emissions by category is available in Appendix D (GHG Inventory Calculations).

Table 3-4 2035 BAU Net Total Emissions

Category	Metric tons of CO_2e
Transportation	128,104
Energy	145,449
Area Sources	35,391
Water	6,215
Solid Waste	18,534
Total	**333,694**

SOURCE: Atkins (2013).

Figure 3-3 2035 BAU Emissions Generated by Source



SOURCE: Atkins (2013).

Net Emissions Comparison by Year

The 316,935 $MTCO_2e$ of GHG emissions for 2020 and 333,694 $MTCO_2e$ for 2035 are estimated to increase by 32,846 $MTCO_2e$ and 49,605 $MTCO_2e$ respectively above 2010 levels following BAU projections. The growth from 2010 to 2020 is 8.4% and 2010 to 2035 is 17%.

Table 3-5 (Net Total Emissions by Year) shows a comparison of net total emissions for 2010 base year, 2020 BAU, and 2035 BAU emissions and the reduction targets. Having one overall reduction target for each target year, as opposed to targets for each sector, allows La Habra to have the flexibility to reduce emissions from the sector with the most cost-effective reduction strategies (i.e., the greatest reduction in emissions at the least cost).

Table 3-5 Net Total Emissions by Year

Source	Metric Tons CO_2e 2010	2020 BAU	BAU 2035
Transportation	106,146	124,054	128,104
Energy	126,532	137,161	145,449
Area Sources	30,249	32,790	35,391
Water	5,312	5,758	6,215
Solid Waste	15,850	17,172	18,534
Total	**284,089**	**316,935**	**333,694**
Emissions Reduction Target	**--**	**241,476**	**198,862**

SOURCE: Atkins (2013).
NOTE: Mass emissions of CO_2e shown in the table are rounded to the nearest whole number. Totals shown may not add up due to rounding.
BAU: business-as-usual.

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Chapter 4 GHG Emissions Reduction Programs and Regulations

The State of California has set specific targets for reducing greenhouse gas emissions from the burning of fossil fuels in both power plants and vehicles by adopting various regulations. In addition, State energy efficiency and renewable requirements provide another level of reductions. In order to provide credit to La Habra for regulatory actions already taken or planned by the State of California, this CAP first evaluates the greenhouse gas reductions that will occur within the City as a result of these State actions.

The State actions are identified in the CAP as "R1 reduction measures." The R1 measures are included here to show all of the anticipated reduction strategies identified in the AB 32 Scoping Plan for implementation at the State level that will ultimately result in a reduction of greenhouse gas emissions at the City level. The R1 measures are not administered or enforced by the City, but the City—by describing them herein—substantiates the reductions associated with these State measures.

"R2 reduction measures" and "R3 reduction measures" will be incorporated at the City level to provide additional reductions in greenhouse gas emissions. R2 measures can be quantified to show the value of the reduction from the incorporation of those measures. Although R3 measures provide a vehicle through which reductions in emissions will occur, they cannot be qualified at this time because they are supportive measures or methods of implementation for the R2 measures. For example, R3-E2: Energy Efficiency Training & Public Education, is a measure that provides education to inform people of the programs, technology, and potential funding available to them to be more energy efficient, and provides the incentives to participate in the voluntary programs shown in R2-E1 through R2-E7. R3-E2 is supportive of measures R2-E1 through R2-E7 because it will provide more publicity, reduce the perceived challenge of being energy efficient, and provide information on potential rebates and other funding programs which will make retrofits more accessible to everyone. Therefore, although by itself R3-E2 cannot be quantified, its implementation provides a level of assurance that the reduction goals specified in the R2 measures will be achieved. A complete list of assumptions, reductions, and calculations for each of the R1 and R2 measures is included in Appendix E (Reduction Measures, Assumptions, and Attributed Reductions).

Also included in the R3 measures are reduction measures that reduce La Habra's government operation emissions. Government operations make up less than 5% of the City's total emissions, but the City can set an example for residents by implementing reduction measures at the municipal level.

Over the last few years La Habra has implemented several programs that have already begun to reduce the City's GHG emissions and will continue to provide reductions throughout the implementation of this CAP. Programs that were in place prior to 2010 are accounted for in the existing inventory while programs implemented since 2010 are included below as reduction measures used to reach the 2020 target.

The following discussion summarizes the existing La Habra programs and the proposed reduction measures to be implemented by the City to further reduce GHG emissions. The reduction measures are organized herein by source category (Transportation, Energy, Area Source, Water, and Solid Waste) then by R1, R2, and R3 measure.

The convention to be used for numbering the reduction measures will be to list the R designation (R1, R2, or R3) then an abbreviation of the source category, followed by the order number. So, R1-E1 is the first R1 measure within the energy category, R1-E2 is the second measure within the energy category, and so on. The source category abbreviations are as follows: T – transportation; E – energy; L – area source; W – water; and S - solid waste.

4.1 Existing La Habra Programs

Sustainable Development Program

The City of La Habra recognizes the importance of protecting the environment and conserving natural resources. As part of the City's effort to promote building practices that have minimal impacts on the environment, on October 20, 2008, the City Council adopted a resolution establishing a voluntary Sustainable Development Program, which provides incentives for eligible new construction projects.

SUSTAINABLE DEVELOPMENT

Sustainable Development within the construction industry and in the building process is generally defined as measures that increase and enhance recycling and resource conservation. Five major areas of sustainable development standards are typically cited, including: (1) energy efficiency standards for new construction; (2) water conservation standards in and around buildings; (3) standards for the reduction of construction waste and diversion of construction waste from landfills; (4) wood conservation requirements and, (5) indoor air quality requirements. Strengthening our regulations in these areas serves to help conserve and improve both the local and global environments, including the improvement of air quality standards in buildings, and enhancing the use of recycled products in the construction process.

LOCAL STANDARDS

Title 15 (Building and Construction Code) of the City of La Habra Municipal Code includes Chapter 15.06 (Green Building Code), wherein the City has adopted the California Green Building Code (CALGreen), 2010 Edition, as the green building code of the City for reducing the negative impact and encouraging sustainable construction practices in the planning and design, energy efficiency, water efficiency and conservation, and environmental quality of all newly constructed buildings or structures in the City of La Habra. The California Building Code requires all local governments to adopt and enforce its energy efficiency regulations. La Habra has consistently followed and adopted each edition of these regulations since they were first developed in 1978.

Chapter 15.68 (Energy Requirements) adopts the California Energy Code, 2010 Edition, as developed by the California Energy Commission, as the energy code for the City, regulating and controlling the energy efficiency of buildings in the City of La Habra.

Chapter 15.78 (Waste Management Plan for Certain Construction and Demolition Projects within the City of La Habra) currently requires recycling and diversion of waste generated by both demolition and construction by at least 50%.

La Habra Municipal Code Chapter 13.40 (Water Conservation and Water Supply Shortage Program) also has a comprehensive water conservation ordinance. This ordinance states that "at no time shall water be wasted or used unreasonably." The Code also provides for restrictions and regulations in four progressive stages.

NEW SUSTAINABLE DEVELOPMENT PROGRAM

The voluntary Sustainable Development Program is based on LEED, California Green Building and Energy Star programs. The specific requirements of these programs include: (1) building to exceed current State energy efficiency standards by at least 15%; (2) diverting at least 50% of construction and job site waste; (3) reducing water use by at least 20,000 gallons each year for a typical single family dwelling; (4) guidelines for efficient lumber and wood usage; and (5) improved indoor air quality through mechanical filtration and reduced use of volatile organic chemicals in paint and other construction materials.

Builders (including owner-builders) and developers who voluntarily obtain certification of their projects under the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Program, the California Building Industry Association's California Green Builder Program (CGB), the United States Environmental Protection Agency's Energy Star Program, or other approved, nationally recognized sustainable development standards will be eligible to receive incentives such as priority plan check service, guaranteed plan check timelines, priority field inspection service, release of electrical meters prior to final inspection.

4.2 Transportation

R1 Transportation Measures

The following list of R1 transportation related measures are those measures that California has identified in the AB 32 Scoping Plan[16] that will result in emission reductions within the City. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R1 measures.

R1-T1: ASSEMBLY BILL 1493: PAVLEY I

Assembly Bill (AB) 1493 (Pavley) required the California Air Resources Board (CARB) to adopt regulations that will reduce GHG from automobiles and light-duty trucks by 30% below 2002 levels by the year 2016, effective with 2009 models. By 2020, this requirement will reduce emissions in California by approximately 16.4 $MMTCO_2e$, representing 17.3% of emissions from passenger/light-duty vehicles in the State. Implementation of Pavley I was delayed by the USEPA's denial of California's waiver request to set State standards that are more stringent than the federal standards, but in June 2009 the denial of the waiver was reversed and California was able to begin enforcing the Pavley requirements.

R1-T2: ASSEMBLY BILL 1493: PAVLEY II

California committed to further strengthening the AB1493 standards beginning in 2017 to obtain a 45% GHG reduction from 2020 model year vehicles. This requirement will reduce emissions in California by approximately 4.0 $MMTCO_2e$, representing 2.5% of emissions from passenger/light-duty vehicles in the State beyond the reductions from the Pavley I regulations described above.

R1-T3: EXECUTIVE ORDER S-1-07 (LOW CARBON FUEL STANDARD)

The Low Carbon Fuel Standard (LCFS) will require a reduction of at least 10% in the carbon intensity of California's transportation fuels by 2020. By 2020, this requirement will reduce emissions in California by approximately 15 $MMTCO_2e$, representing 6.9% of emissions from passenger/light-duty vehicles in the State. The emissions reduced by this strategy overlap with emissions as a result of the Pavley legislation; adding the emissions reductions would be an overestimate of the actual emissions reductions. This is accounted for in the emission reduction calculations following the methodology used by CARB to calculate emissions reductions in the AB 32 Scoping Plan.

R1-T4: TIRE PRESSURE PROGRAM

The AB 32 early action measure involves actions to ensure that vehicle tire pressure is maintained to manufacturer specifications. The State's plan for implementing this measure is directed at automotive service providers. CARB is requiring automotive service providers to check and inflate each vehicle's tires to the recommended tire pressure rating at the time of performing any automotive maintenance or

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[16] California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

repair service, indicate on the vehicle service invoice that a tire inflation service was completed and the tire pressure measurements after the services were performed, and keep a copy of the service invoice for a minimum of three years, and make the vehicle service invoice available to the ARB, or its authorized representative upon request. By 2020, CARB estimates that this requirement will reduce emissions in California by approximately 0.55 $MMTCO_2e$, representing 0.3% of emissions from passenger/light-duty vehicles in the State.

R1-T5: LOW ROLLING RESISTANCE TIRES

This AB 32 early action measure would increase vehicle efficiency by creating an energy efficiency standard for automobile tires to reduce rolling resistance. By 2020, this requirement will reduce emissions in California by approximately 0.3 $MMTCO_2e$, representing 0.2% of emissions from passenger/light-duty vehicles in the State.

R1-T6: LOW FRICTION ENGINE OILS

This AB 32 early action measure would increase vehicle efficiency by mandating the use of engine oils that meet certain low friction specifications. By 2020, this requirement will reduce emissions in California by approximately 2.8 $MMTCO_2e$, representing 1.7% of emissions from passenger light-duty vehicles in the State.

R1-T7: GOODS MOVEMENT EFFICIENCY MEASURES

This AB 32 early action measure targets system wide efficiency improvements in goods movement to achieve GHG reductions from reduced diesel combustion. By 2020, this requirement will reduce emissions in California by approximately 3.5 $MMTCO_2e$, representing 1.6% of emissions from all mobile sources (on-road and off-road) in the State.

R1-T8: HEAVY-DUTY VEHICLE GHG EMISSION REDUCTION (AERODYNAMIC EFFICIENCY)

This AB 32 early action measure would increase heavy-duty vehicle (long-haul trucks) efficiency by requiring installation of best available technology and/or CARB approved technology to reduce aerodynamic drag and rolling resistance. By 2020, this requirement will reduce emissions in California by approximately 0.93 $MMTCO_2e$, representing 1.9% of emissions from heavy-duty vehicles in the State.

R1-T9: MEDIUM AND HEAVY-DUTY VEHICLE HYBRIDIZATION

The implementation approach for this AB 32 measure is to adopt a regulation and/or incentive program that reduce the GHG emissions of new trucks (parcel delivery trucks and vans, utility trucks, garbage trucks, transit buses, and other vocational work trucks) sold in California by replacing them with hybrids. By 2020, this requirement will reduce emissions in California by approximately 0.5 $MMTCO_2e$, representing 0.2% of emissions from all on-road mobile sources in the State. This reduction is also equivalent to a 1.0% reduction of emissions from all heavy-duty trucks in the State.

R2 Transportation Measures

The following list of R2 measures are candidate measures the City can implement to achieve an AB 32-compliant reduction target. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R2 measures.

R2-T1: LAND USE BASED TRIPS AND VMT REDUCTION POLICIES

The demand for transportation is influenced by the density and geographic distribution of people and places. Whether neighborhoods have sidewalks or bike paths, whether homes are within walking distance of shops or transit stops will influence the type and amount of transportation that is utilized. By changing the focus of land use from automobile centered transportation, a reduction in vehicle miles traveled will occur. Opportunities include mixed-use development in the Civic Center area along La Habra Boulevard (Chapter 2 Community Development, Land Use, General Plan Policy LU 3.3 [A Vigorous and Active Downtown]) and infill development within existing commercial centers and along commercial corridors that are vacant or underutilized along Whittier Boulevard and La Habra Boulevard (Chapter 2 Community Development, Land Use, General Plan Policy LU 3.4 [Concentrated Nodes on Arterial Corridors]).

Chapter 2 Community Development, Land Use, General Plan Policy LU 3.2 (Uses to Meet Daily Needs) encourages uses that meet daily needs such as grocery stores, local-serving restaurants, and other businesses and activities within walking distance of residences to reduce the frequency and length of vehicle trips. Mixed-use development is intended to provide opportunities for an individual to participate in multiple daily activities at one location, thereby reducing automobile trips, air pollution, greenhouse gas emissions, energy consumption, and noise.

R2-T2: BICYCLE INFRASTRUCTURE

The City's goal and policies for improving the City's bicycle facilities will help achieve the City's non-motorized/alternative transportation system objectives. Chapter 3 Mobility/Circulation General Plan Policy AT 2.2 (Regional Bikeways) supports maintaining and extending where and when feasible the City's bikeway network to make bicycling an attractive option and Policy AT 2.4 (Bike Trail Linkages) provides for planning of additional Class I, Class II, or innovative bicycle trail linkages between residential areas, employment areas, schools, parks, commercial areas, and transit stations. Policy AT 2.8 (Bicycle Parking) requires that a percentage of parking spaces in new non-residential developments and additions to existing facilities be set aside for secure bicycle parking, to encourage use of bicycles for commuting, shopping, and recreational purposes. Through Policy AT 2.9 (Facilities Supporting Bicycle Riders), La Habra encourages developers of offices and other businesses with a large number of employees to provide showers and lockers as conveniences for bicycle riders. The City also supports programs which encourage more people to bicycle for transportation and

recreation, to provide an attractive and healthy transportation option, which will reduce traffic congestion, air pollution, and noise pollution under Policy AT 2.10 (Health Through Bicycling).

The City of La Habra currently has 19 miles of existing bikeways, including 1.2 miles of Class I bikeways, 3 miles of Class II bike lanes, and 15 miles of Class III bike routes. Bicycle infrastructure anticipated through general plan circulation improvements includes construction of an additional 4 miles of Class I and 7 miles of Class II bikeways to build upon the current infrastructure. This measure accounts for the reduction in VMT and GHG emissions associated with implementation of the bicycle infrastructure in order to continue to divert local commutes away from vehicles. The reduction associated with bicycle infrastructure was calculated following CAPCOA's methodology[17] and is based on the increased miles of bike paths and bikeways.

R2-T3: ELECTRIC VEHICLE INCENTIVES PROGRAM

Implementation of the SCAG's Southern California Plug-in Electric Vehicle Readiness (PEV) Plan has the potential to decrease VMT from traditional passenger vehicles by encouraging the replacements of trips in passenger vehicles with trips in electric vehicles. PEV replaces, on average, 12.7% of traditional passenger vehicle trips with electric vehicle trips.[18] This would equate to a 12.7% reduction in VMT in La Habra community-wide by 2020. Continued transition to electric vehicles is anticipated to provide a 30% reduction in VMT by 2035.

Chapter 6 Conservation/Natural Resources General Plan Policy AQ 4.5 (Zero-Emission and Low-Emission Vehicle Use) encourages the use of zero-emission vehicles, low-emission vehicles, bicycles, and other non-motorized vehicles and car-sharing programs by requiring sufficient and convenient infrastructure and parking facilities in multifamily, mixed-use, and high density centers and corridors to accommodate these vehicles. Chapter 3 Mobility/Circulation General Plan Policy TDM 2.4 (Alternative Fuels) promotes alternative fuel support facilities such as hydrogen and CNG fueling stations and electric vehicle charging stations for these emerging technologies.

R3 Transportation Measures

The following R3 measures enhance and/or ensure the reductions accounted for within the R2 measures through education programs or are measures that will reduce emissions but cannot be quantified. Also, reduction measures implemented at the municipal level are described.

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17 California Air Pollution Control Officers Association (CAPCOA), "Quantifying Greenhouse Gas Mitigation Measures," http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf (August 2010).

18 California Air Pollution Control Officers Association (CAPCOA), "White Paper: CEQA and Climate Change," http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf (January 2008).

R3-T1: MUNICIPAL FLEET ALTERNATIVE VEHICLES

La Habra's municipal fleet ranges from small passenger cars to dump trucks and fire engines. In an effort to save on fuel costs and reduce air pollution and greenhouse gas emissions, the City is replacing a number of the older vehicles within the fleet to electric hybrid vehicles and vehicles that are powered on compressed natural gas (CNG). As older vehicles retire, the new replacement vehicles will continue to increase the fuel efficiency of the municipal fleet. The City's use of fuel efficient and alternative fuel vehicles helps to promote the use of these vehicles by local residents.

Chapter 3 Mobility/Circulation General Plan Policy TDM 2.4 (Alternative Fuels) promotes alternative fuel support facilities such as hydrogen and CNG fueling stations and electric vehicle charging stations for these emerging technologies.

4.3 Energy

R1 Energy Reduction Measures

The following list of R1 building energy efficiency related measures are those measures that California has identified in the AB 32 Scoping Plan that will result in emission reductions within the City. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R1 measures.

R1-E1: RENEWABLE PORTFOLIO STANDARD FOR BUILDING ENERGY USE

Senate Bills (SBs) 1075 (2002) and 107 (2006) created the State's Renewable Portfolio Standard (RPS), with an initial goal of 20% renewable energy production by 2010. Executive Order (EO) S-14-08 establishes a RPS target of 33% by the year 2020 and requires State agencies to take all appropriate actions to ensure the target is met. In April 2011, Governor Jerry Brown signed Senate Bill 2 (2011), which codified the Executive Order and requires the State to reach the 2020 goal.[19]

R1-E2 AND R1-E3: AB 1109 ENERGY EFFICIENCY STANDARDS FOR LIGHTING (RESIDENTIAL AND COMMERCIAL INDOOR AND OUTDOOR LIGHTING)

Assembly Bill (AB 1109) mandated that the California Energy Commission (CEC) on or before December 31, 2008, adopt energy efficiency standards for general purpose lighting. These regulations, combined with other State efforts, shall be structured to reduce State-wide electricity consumption in the following ways:

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[19] California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

- R1-E2: At least 50% reduction from 2007 levels for indoor residential lighting by 2018; and
- R1-E3: At least 25% reduction from 2007 levels for indoor commercial and outdoor lighting by 2018.[20]

R1-E4: ELECTRICITY ENERGY EFFICIENCY (AB32)

This measure captures the emission reductions associated with electricity energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in California's Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6 of the California Code of Regulations; hereinafter referred to as, "Title 24 Energy Efficiency Standards") of California's Green Building Standards Code (Title 24, Part 11 of the California Code of Regulations; hereinafter referred to as "CALGreen").

By 2020, this requirement will reduce emissions in California by approximately 21.3 $MMTCO_2e$, representing 17.5% of emissions from all electricity in the State.[21] This measure includes the following strategies:

- "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);
- broader standards for new types of appliances and for water efficiency;
- improved compliance and enforcement of existing standards;
- voluntary efficiency and green building targets beyond mandatory codes;
- voluntary and mandatory whole-building retrofits for existing buildings;
- innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- more aggressive utility programs to achieve long-term savings;
- water system and water use efficiency and conservation measures;
- additional industrial and agricultural efficiency initiatives; and
- providing real time energy information technologies to help consumers conserve and optimize energy performance.

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[20] California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

[21] California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

R1-E5: NATURAL GAS ENERGY EFFICIENCY (AB32)

This measure captures the emission reductions associated with natural gas energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in the Title 24 Energy Efficiency Standards or CALGreen. By 2020, this requirement will reduce emissions in California by approximately 4.3 $MMTCO_2e$, representing 6.2% of emissions from all natural gas combustion in the State.[22] This measure includes the same 10 strategies bulleted in R1-E4 above.

R1-E6: INCREASED COMBINED HEAT AND POWER (AB32)

This measure captures the reduction in building electricity emissions associated with the increase of combined heat and power activities, as outlined in CARB's AB 32 Scoping Plan. The Scoping Plan suggests that increased combined heat and power systems, which capture "waste heat" produced during power generation for local use, will offset 30,000 GWh state-wide in 2020. Approaches to lowering market barriers include utility-provided incentive payments, a possible CHP portfolio standard, transmission and distribution support systems, or the use of feed-in tariffs. By 2020, this requirement will reduce emissions in California by approximately 6.7 $MMTCO_2e$, representing 7.6% of emissions from all electricity in the State.[23]

R1-E7: INDUSTRIAL EFFICIENCY MEASURES (AB32)

This measure captures the reduction in industrial building energy emissions associated with the energy efficiency measures for industrial sources included in CARB's AB 32 Scoping Plan. By 2020, this requirement will reduce emissions in California by approximately 1.0 $MMTCO_2e$, representing 3.9% of emissions from all industrial natural gas combustion in the State.[24] CARB proposes the following possible State-wide measures:

- oil and gas extraction regulations and programs to reduce fugitive CH_4 emissions;
- GHG leak reduction from oil and gas transmission;
- refinery flare recovery process improvements; and
- removal of methane exemption from existing refinery regulations.

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22 California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

23 California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

24 California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

R2 Energy Reduction Measures

The following list of R2 measures are candidate measures related to building energy efficiency the City can implement to achieve an AB 32 compliant reduction target. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R2 measures.

R2-E1: NEW CONSTRUCTION RESIDENTIAL ENERGY EFFICIENCY REQUIREMENTS

The 2008 Title 24 Energy Standards were adopted by the Energy Commission on April 23, 2008, with the 2008 Residential Compliance Manual adopted by the Commission on December 17, 2008. Compliance with the 2008 standards went into effect January 1, 2010. In an effort to meet the overall goal of the California Energy Efficiency Strategic Plan of reaching zero net energy for residential buildings by 2020, the stringency of the Title 24 Energy Standards as regulated and required by the State will continue to increase every three years. As energy efficiency standards increase La Habra may want to periodically re-evaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal. Chapter 4 Infrastructure General Plan Policy E 2.7 (Energy Efficient Design) encourages energy efficient design and building orientation of new buildings to reduce energy demand.

This measure facilitates the implementation of energy efficient design for all new residential buildings to be 20% beyond the current Title 24 Standards. This energy efficiency requirement is equal to that of the LEED for Homes and ENERGY STAR programs. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc ;
- install solar water heaters;
- install top quality windows and insulation;
- install energy efficient lighting;
- optimize conditions for natural heating, cooling and lighting by building siting and orientation;
- use features that incorporate natural ventilation;
- install light-colored “cool” pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- incorporate skylights; reflective surfaces, and natural shading in building design and layouts.

R2-E2: NEW CONSTRUCTION RESIDENTIAL RENEWABLE ENERGY

Chapter 4 Infrastructure General Plan Policy E 2.8 (Renewable Energy) encourages the installation and construction of solar (photovoltaic) panel systems in private and public projects as a viable renewable energy source within the City. General Plan Policy E 2.9 (Solar Access) ensures to the extent feasible

that sites, subdivisions, landscaping, and buildings are configured and designed to maximize solar access.

This measure facilitates the voluntary incorporation of renewable energy (such as photovoltaic panels) into new residential developments. For participating developments, renewable energy applications should be such that the new home's projected energy use from the grid is reduced by 50%. The California Energy Commissions' New Solar Homes Partnership is a component of the California Solar Initiative and provides rebates to developers of 6 or more units where 50% of the units include solar power. In addition, this measure would encourage that all residents be equipped with "solar ready" features where feasible to encourage future installation of solar energy systems. These features include proper solar orientation (south facing roof sloped at 20O to 55O from the horizontal), clear access on south sloped roofs, electrical conduits installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank. The incentive program should provide enough funding and other incentives as shown in the R3 measures to result in approximately 50% of new residential development participation in this program, thereby resulting in a 25% reduction in electrical consumption from new residential developments.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into a purchased energy offset program that will allow for the purchase of electricity generated from renewable energy resources offsite. Purchased energy offsets (or a combination of incorporated renewables and purchased offsets) must be equal to 25% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

R2-E3: RESIDENTIAL ENERGY EFFICIENCY RETROFITS

This reduction measure sets a goal for the City to increase energy efficiency in existing homes. The reductions calculated assume that 20% of homes will participate and each home will be able to reduce energy consumption by 15%. There are a variety of financial incentives and programs to assist homeowners that make implementation of these goals feasible (see Chapter 7, Implementation for more information). One key program ensuring the achievement of this reduction measure is La Habra's partnership with Southern California Edison (SCE) surrounding their Local Government Partnership Energy Efficiency Program.[25] The program would provide residences with low-interest loans that can be used to implement energy efficient improvements on their homes. This program has the potential to reduce energy consumption in retrofitted homes by a minimum of 15%. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- replace inefficient air conditioning and heating units with new energy efficient models;
- replace older, inefficient appliances with new energy efficient models;
- replace old windows and insulation with top-quality windows and insulation;

[25] Southern California Edison (SCE), Energy Leadership Program, https://www.sce.com/wps/portal/home/partners/partnerships (July 2013).

- install solar water heaters;
- replace inefficient and incandescent lighting with energy efficient lighting; and
- weatherize the existing building to increase energy efficiency.

Chapter 4 Infrastructure General Plan Policy E 2.6 (Energy Efficiency Audits) encourages energy efficiency audits and retrofits of existing buildings to determine and implement repairs/retrofits needed in the heating, ventilation, air conditioning (HVAC), and lighting systems of existing buildings within the City. This reduction measure implements General Plan Policy E 2.6 (Energy Efficiency Audits) and includes review and retrofits of the building envelope (i.e., windows, doors, insulation and weatherization), as appropriate, to maximize the efficiency of HVAC systems.

R2-E4: RESIDENTIAL RENEWABLE ENERGY RETROFITS

This measure sets a goal for City residents to retrofit their homes with photovoltaic panels such that 50% of a home's electrical usage is offset. The emissions reductions calculated for this measure assumes that 20% of existing homes in La Habra will participate. The 20% participation depends on the financial incentives and programs described in Chapter 7 (Implementation). In particular, the California Energy Commission's Solar Initiative has incentives available to home owners in La Habra. Chapter 4 Infrastructure General Plan Policy E 2.8 (Renewable Energy) encourages the installation and construction of solar (photovoltaic) panel systems in private and public projects as a viable renewable energy source within the City.

R2-E5: NEW COMMERCIAL ENERGY EFFICIENCY REQUIREMENTS

This measure facilitates the implementation of energy efficient design for all new commercial buildings to be 20% beyond the current Title 24 Standards. This energy efficiency requirement is 10% greater than the minimum requirements of the LEED and ENERGY STAR programs. As energy efficiency standards increase the City may want to periodically re-evaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal.

Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc.;
- install solar water heaters;
- install top quality windows and insulation;
- install energy efficient lighting;
- optimize conditions for natural heating, cooling and lighting by building siting and orientation;

- use features that incorporate natural ventilation;
- install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- incorporate skylights; reflective surfaces, and natural shading in building design and layouts.

Chapter 4 Infrastructure General Plan Policy E 2.7 (Energy Efficient Design) encourages energy efficient design and building orientation of new buildings to reduce energy demand.

R2-E6: NEW COMMERCIAL/INDUSTRIAL RENEWABLE ENERGY

This measure would facilitate the voluntary incorporation of renewable (solar or other renewable) energy generation into the design and construction of new commercial, office, and industrial developments. Renewable energy generation will be incorporated such that a minimum of 20% of the project's total energy needs are offset. In addition this measure would encourage all facilities be equipped with "solar ready" features where feasible, to facilitate future installation of solar energy systems. These features should include the proper solar orientation (south facing roof sloped at 20° to 55° from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into an offset program that will allow for the purchase of renewable energy resources offsite. Purchased energy offsets (or a combination of incorporated renewables and purchased offsets) must be equal 20% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

Chapter 4 Infrastructure General Plan Policy E 2.8 (Renewable Energy) encourages the installation and construction of solar (photovoltaic) panel systems in private and public projects as a viable renewable energy source within the City. General Plan Policy E 2.9 (Solar Access) ensures to the extent feasible that sites, subdivisions, landscaping, and buildings are configured and designed to maximize solar access.

R2-E7: COMMERCIAL/INDUSTRIAL ENERGY EFFICIENCY AND RENEWABLE ENERGY RETROFITS

This measure sets a goal for all commercial or industrial buildings undergoing major renovations to reduce energy consumption by a minimum of 20%. The emissions calculations assume that by 2020, 25% of commercial or industrial buildings will have reduced their energy consumption by 20% through energy efficiency and renewable energy retrofits.

The State offers incentives and programs that contribute toward the implementation of this goal (See Chapter 7, Implementation). Similar to the residential goals described above, SCE's Local Government Partnership Energy Efficiency Program could help finance energy efficiency and renewable energy projects for commercial buildings. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- replace inefficient air conditioning and heating units with new energy efficient models;
- replace older, inefficient appliances with new energy efficient models;
- replace old windows and insulation with top-quality windows and insulation;
- install solar water heaters;
- replace inefficient and incandescent lighting with energy efficient lighting; and
- weatherize the existing building to increase energy efficiency.

Chapter 4 Infrastructure General Plan Policy E 2.6 (Energy Efficiency Audits) encourages energy efficiency audits and retrofits of existing buildings to determine and implement repairs/retrofits needed within existing buildings in the City. This reduction measure implements General Plan Policy E 2.6 (Energy Efficiency Audits) and includes review and retrofits of the building envelope (i.e., windows, doors, insulation and weatherization), as appropriate, to maximize the efficiency of HVAC systems. General Plan Policy E 2.8 (Renewable Energy) encourages the installation and construction of solar (photovoltaic) panel systems in private and public projects as a viable renewable energy source within the City.

R2-E8: MUNICIPAL ENERGY EFFICIENCY RETROFIT PROJECTS

With the aid of the Energy Efficiency and Conservation Block Grant (EECBG) funds, the City is working on energy efficiency retrofit projects for the following existing buildings and facilities:

- Improvements to the cooling systems and installation of energy management controls at La Habra's City Hall, Police Department, and Community Center buildings, resulting in an estimated savings of 180,040 kWh annually.
- Retrofit of fluorescent street traffic intersection identification signs with LED replacement lighting, resulting in an estimated savings of 51,060 kWh annually.
- Integration of remote program lighting controls for the ballfields at Esteli Park, resulting in an estimated savings of 80,968 kWh annually.
- Retrofit of City owned buildings including the Veterans Hall, Scout Hut, and the Woman's Club House with energy efficient windows, resulting in an estimated savings of 2,141 kWh annually.

The City's current list of municipal projects will achieve approximately 315,000 annual kWh savings. City staff will continue to identify and find funding mechanisms to implement additional energy saving retrofit projects over the coming years.

Chapter 4 Infrastructure General Plan Policy E 2.5 (City Operations) promotes City operations as a model for energy efficiency and green building and installs, as feasible, energy-efficient lighting, appliances, and alternative-energy infrastructure within City facilities.

R3 Energy Reduction Measures

The following R3 measures enhance and/or ensure the reductions accounted for within the R2 measures through education programs or are measures that will reduce emissions but cannot be quantified.

R3-E1: ENERGY EFFICIENT DEVELOPMENT AND RENEWABLE ENERGY DEPLOYMENT FACILITATION AND STREAMLINING

This measure would encourage the City to identify and remove any regulatory and procedural barriers to the implementation of green building practices and the incorporation of renewable energy systems. This could include the updating of codes and zoning requirements and guidelines. This measure could be further enhanced by providing incentives for energy efficient projects such as priority in the reviewing, permitting, and inspection process. Additional incentives could include flexibility in building requirements such as height limits or set-backs in exchange for incorporating green building practices or renewable energy systems. Measure R3-E1 streamlines the application process within the City for energy efficient design of buildings and installation of renewable energy within a project.

Chapter 4 Infrastructure General Plan Policy E 2.7 (Energy Efficient Design) encourages energy efficient design of new buildings to reduce energy demand. General Plan Policy E 2.8 (Renewable Energy) encourages the installation and construction of solar (photovoltaic) panel systems in private and public projects as a viable renewable energy source within the City.

R3-E2: ENERGY EFFICIENCY TRAINING AND PUBLIC EDUCATION

This measure would strengthen Infrastructure General Plan Policies E 2.12 (Public Awareness) and 2.13 (Sustainable Development and Energy Conservation Education), which provides public education and awareness about energy efficiency measures and reduction programs available within the City through a variety of methods including newsletters, brochures, and the City's Website. This measure would enhance this existing program by including rebates and incentives available for residences and businesses as well as providing training in green building materials, techniques, and practices for all plan review and building inspection staff. Chapter 4 Infrastructure General Plan Policy E 2.7 (Energy Efficient Design) encourages energy efficient design of new buildings to reduce energy demand. R3-E2 helps facilitate this General Plan Policy by educating the public on the value of energy efficiency and energy conservation.

R3-E3: ENERGY EFFICIENCY AND SOLAR ENERGY FINANCING

This measure would facilitate the incorporation of innovative, grant funded or low-interest financing programs for energy efficiency and renewable energy projects for both existing and new developments. This would include financing for heating, ventilation, air conditioning, lighting, water heating equipment, insulation, weatherization, and residential and commercial renewable energy. The City is a member of a partnership with SCE surrounding their Local Government Partnership Energy Efficiency Program. The program would provide property owners with low-interest loans that would be repaid over time through annual property tax payments.

Chapter 4 Infrastructure General Plan Policy E 2.7 (Energy Efficient Design) encourages energy efficient design of new buildings and General Plan Policy E 2.8 (Renewable Energy) encourages the installation and construction of solar (photovoltaic) panel systems in private and public projects as a viable renewable energy source within the City. Measure R3-E3 promotes existing financial mechanizes, grants, and incentive programs administered by SCE.

R3-E4: CROSS-JURISDICTIONAL COORDINATION

Under this reduction measure the City would coordinate with other local governments, special districts, nonprofit, and other organizations in order to optimize energy efficiency and renewable resource development and usage. This would allow for economies of scale and shared resources to more effectively implement these environmental enhancements.

Chapter 4 Infrastructure General Plan Policy E 2.11 (Cross-jurisdictional Coordination) commits the City to cooperate with other jurisdictions and groups such as SCAG to maximize energy efficiency and renewable energy usage within the City and the Region.

R3-E5: ALTERNATIVE ENERGY DEVELOPMENT PLAN

The accomplishment of this measure would encourage the City to work with SCE to explore the possibilities for producing energy by renewable means within the built environment. This would be developed to identify appropriate alternative energy facilities (i.e., photovoltaic) for use within residential and commercial developments. The Alternative Energy Development Plan will encourage the establishment of City policies and ordinances to address how alternative energy production would be conducted. This measure would identify the most optimal locations and the best means by which to avoid noise, aesthetics and other land use compatibility conflicts. Another provision of this Plan could be to identify possible sites for the production of renewable energy using local renewable sources such as solar, wind, small hydro, and/or biogas. This would encourage adopting measures to protect these resources and providing right-of-way easements, utility easements, or by setting aside land for future development of these potential production sites.

Chapter 4 Infrastructure General Plan Policy E 2.8 (Renewable Energy) encourages the installation and construction of solar (photovoltaic) panel systems in private and public projects as a viable renewable energy source within the City. Measure R3-E5 encourages the City to work with SCE to explore the potential within the City to produce renewable energy.

4.4 Area Source

R1 Area Source Reduction Measures

The following R1 area source related reduction measure has been identified by California in the AB 32 Scoping Plan and will result in emission reductions within the City. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R1 measures.

R1-A1: SCAQMD HEALTHY HEARTHS PROGRAM

AQMD's Rule 445-Wood Burning Devices, adopted on March 7, 2008, applies to residents in the South Coast Air Basin and includes the following key components:

- no permanently installed indoor or outdoor wood burning devices in new developments; and
- establishes a mandatory wood burning curtailment program on high pollution days during November through February, beginning November 1, 2011. Based on current air quality conditions, there may be 10 to 25 mandatory curtailment days in specific areas.[26]

See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R1 measures.

R2 Area Source Reduction Measures

The following R2 measure is a candidate measure related to area source that the City can implement to achieve an AB 32 compliant reduction target. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R2 measures.

R2-A1: ELECTRIC LANDSCAPE EQUIPMENT PROGRAM

This measure reduces GHG emissions by substituting electric landscaping equipment for the traditional gas-powered equipment. Electric lawn equipment including lawn mowers, leaf blowers and vacuums, shredders, trimmers, and chain saws are available. When electric landscaping equipment is used in place of conventional equipment, direct GHG emissions from gasoline combustion are replaced with lower indirect GHG emissions associated with the electricity used to power the equipment. The City can implement this measure by requiring new development to install outdoor electric outlets and require landscape maintenance of large mixed use and commercial development to use electric landscape equipment. This measure can also be implemented by coordinating with the South Coast Air Quality Management District (SCAQMD) lawnmower exchange program, which will exchange gasoline powered lawn mowers with electric lawn mowers. This tactic aligns with chapter 4 Infrastructure General Plan Policy E 2.12 (Public Awareness), which encourages city cooperation with energy service providers to increase public awareness of available energy conservation programs to increase energy efficiency in older neighborhoods and developments. This measure assumes that 30 percent of new development would use electric landscape equipment and 5 percent of existing gasoline powered lawn mowers within the city would be exchanged for electric lawn mowers through the SCAQMD program by year 2020.

R3 Area Source Reduction Measures

The following R3 measures enhance and/or ensure the reductions accounted for within the R2 measures through landscape strategies that will help reduce greenhouse gas emissions and can be incorporated into development projects without additional cost. These measures strategically place trees and other

[26] South Coast Air Quality Management District (AQMD), Rule 445 Wood Burning Devices (March 7, 2008).

landscape mechanisms that create shade to reduce the heat island effect within parking lots and adjacent to buildings, which in turn, reduces the temperature of buildings and cars during the summer.

R3-A1: EXPAND CITY TREE PLANTING

This program evaluates the feasibility of expanding tree planting within the City. This includes the evaluation of potential carbon sequestration from different tree species, potential reductions of building energy use from shading, and GHG emissions associated with pumping water used for irrigation. Commercial and retail development should be encouraged to exceed shading requirements by a minimum of 10% and to plant low emission trees. Chapter 6 Conservation/Natural Resources General Plan Policy BR 1.8 (Tree Preservation) encourages the preservation of existing trees in existing and new developments and BR 1.9 (Enhanced Development Landscape) encourage owners of lots with expansive surface parking lots to plant trees and landscapes.

R3-A2: HEAT ISLAND PLAN

The implementation of this measure would include promoting the use of cool roofs, cool pavements, and parking lot shading to the entire City and expanding upon La Habra's General Plan Infrastructure Policy E 2.7 (Energy Efficient Design) by increasing the number of strategically placed shade trees and encouraging site, building, and landscape design that reduces exterior heat gain and heat island effects to reduce energy demands. Further, as La Habra amends the City-adopted specific plans' design guidelines and elects to prepare additional design guidelines for areas not covered by a specific plan, the City should include that all new developments and major renovations (additions of 25,000 square feet or more) would be encouraged to incorporate the following strategies such that heat gain would be reduced for 50% of the non-roof impervious site landscape (including parking, roads, sidewalks, courtyards, and driveways). The strategies include:

- strategically placed shade trees;
- paving materials with a Solar Reflective Index (SRI) of at least 29;
- open grid pavement system; or
- covered parking (with shade or cover having an SRI of at least 29).

4.5 Water

R1 Water Reduction Measure

The following R1 water related reduction measure has been identified in the AB 32 Scoping Plan and will result in emission reductions within the City. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R1 measures.

R1-W1: RENEWABLE PORTFOLIO STANDARD (33% BY 2020) RELATED TO WATER SUPPLY AND CONVEYANCE

This measure would increase electricity production from eligible renewable power sources to 33% by 2020. A reduction in GHG emissions results from replacing natural gas-fired electricity production with zero GHG-emitting renewable sources of power. By 2020, this requirement will reduce emissions from electricity used for water supply and conveyance in California by approximately 21.3 $MMTCO_2e$, representing 15.2% of emissions from electricity generation (in-State and imports).[27]

R2 Water Reduction Measure

The following R2 measure is a candidate measure related to water that the City can implement to achieve an AB 32 compliant reduction target. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R2 measures.

R2-W1: WATER USE REDUCTION INITIATIVE

This initiative would reduce emissions associated with electricity consumption for water treatment and conveyance. This measure encourages the City to adopt a per capita water use reduction goal in support of the Governors Executive Order S-14-08 which mandates the reduction of water use of 20% per capita. The City's adoption of a water use reduction goal would introduce requirements for new development and would provide cooperative support for water purveyors that are required to implement these reductions for existing developments. The City would also provide internal reduction measures such that City facilities will support this reduction requirement. The following represent potential programs that can be implemented to attain this reduction goal.

WATER CONSERVATION PROGRAM

Under this program excessive watering of landscaping, excessive fountain operation, watering during peak daylight hours, water of non-permeable surfaces, excessive water use for noncommercial washing, and water use resulting in flooding or runoff would be prohibited. In addition the program would encourage efficient water use for construction activities, the installation of low-flow toilets and showerheads for all new developments, use of drought-tolerant plants with efficient landscape watering systems for all new developments, recycling of water used for cooling systems, use of pool covers, and the posting of water conservation signage at all hotels.

NEW DEVELOPMENT INCENTIVES

Provide incentives for developers to comply with the California Green Building Standards Code as requirements for all new development. Under this Code, new developments are required to reduce indoor potable water use by 20% beyond the Energy Policy Act of 1992 fixture performance requirements, and to reduce outdoor potable water use by 50% from a mid-summer baseline average

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[27] California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

consumption through irrigation efficiency, native plant selection, the use of recycled water and/or captured rainwater for example.

WATER EFFICIENCY RETROFIT PROGRAM

This program would encourage upgrades in water efficiency for renovations or additions of residential, commercial, office, and industrial properties equivalent to that of new developments. The City would work with local water purveyors to achieve consistent standards, and to develop, approve, and review procedures for implementation.

Several Water Conservation Policies provide various ways of water conservation within the City that align with measure R2-W1. Chapter 4 Infrastructure General Plan Policy WS 2.1 (Water Conservation Standards and Programs) supports implementing water conservation standards and programs during non-shortage conditions that reduce water consumption through conservation, reasonable and beneficial use of water, and prevention of water waste. Policy WS 2.2 (Recycled Water) encourages the investigation of alternative sources of water such as reclaimed water, stored rainwater, or grey water for irrigation of landscaped and/or park areas. Policy WS 2.4 (Water Conservation Irrigation) requires water conservation irrigation methods (i.e., drip irrigation, soil moisture sensors and automatic irrigation systems) in all new and major renovated structures, while Policy WS 2.5 (Water Conservation Devices) requires compliance with state laws for water conservation devices (i.e., low flush toilets, self closing faucets, and pressure reducing valves) in all new and major renovated structures.

R3 Water Reduction Measure

The following R3 measure enhances and/or ensures the reductions accounted for within the R2 measure identified above.

R3-W1: WATER EFFICIENCY TRAINING AND EDUCATION

Under this measure the City, in coordination with local water purveyors would implement a public information and education program that promotes water conservation. The program could include certification programs for irrigation designers, installers, and managers, as well as classes to promote the use of drought tolerant, native species and xeriscaping. This measure supports measure R2-W1 discussed above.

Chapter 4 Infrastructure General Plan Policy WS 2.1 (Water Conservation Standards and Programs) supports implementing water conservation standards and programs during non-shortage conditions that reduce water consumption through conservation, reasonable and beneficial use of water, and prevention of water waste. Policy WQ 1.9 supports water pollution awareness and water quality educational programs to educate the public about practices and programs to minimize water pollution. Measure R3-W1 helps implement these General Plan Policies by providing public education on water conservation techniques and programs.

4.6 Solid Waste

R1 Solid Waste Measure

The following R1 solid waste related measure is a measure that California has identified in the AB 32 Scoping Plan that will result in emission reductions within the City. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R1 measures.

R1-S1: WASTE MEASURES

The CARB AB32 Scoping Plan recommends three measures for reducing emissions from Municipal Solid Waste at the State level, including: 1) landfill methane control; 2) increase the efficiency of landfill methane capture; and 3) high recycling/zero waste. CARB approved a regulation implementing the discrete early action program for methane recovery (1), which became effective June 17, 2010. This measure is expected to result in a 1.0 $MMTCO_2e$ reduction by 2020.[28] Other measures proposed by CARB include increasing efficiency of landfill methane capture (2) and instituting high recycling/zero waste policies (3). Potential reductions associated with these measures are still to be determined.

R2 Solid Waste Measures

The following R2 measure reduces emissions related to solid waste and helps La Habra to achieve an AB 32 compliant reduction target. See Appendix E (Reduction Measures, Assumptions, and Attributed Reductions) for detailed emissions reduction calculations for the R2 measures.

R2-S1: CITY DIVERSION PROGRAM

This measure would implement a Citywide waste diversion goal of diverting 75% of all waste from landfills by 2020, which is outlined in Chapter 4 Infrastructure General Plan Policy WR 2.1 (AB 341 and 75 Percent Recycling).

The following is a potential list of waste reduction measures that will further strengthen existing waste reduction/diversion programs along with coordination with Waste Management and local landfills.

- Provide outreach and education programs for residential, commercial, and industrial land uses in order to further promote existing City diversion programs.
- Increase disposal fees and/or reduce residential pick-up frequency.
- Encourage businesses to adopt a voluntary procurement standard and prioritize those products that have less packaging, are reusable, recyclable, or compostable.

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[28] California Air Resources Board, "Climate Change Scoping Plan," http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf (December 2008).

- Support State level policies that provide incentives for efficient and reduced packaging waste for commercial products.
- Provide waste audits.
- Make recycling and composting mandatory at all public events.
- Establish an appliance end-of-life requirement.
- For new developments, require the use of recycled-content materials, or recycled materials.
- Require a minimum of 15% of materials used in construction be sourced locally, as feasible.
- Encourage the use of recycled building materials and cement substitutes for new developments.
- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, rubber, and cardboard).
- Provide interior and exterior storage areas for recyclables and green waste at all buildings.
- Provide adequate recycling containers in public areas, including parks, school grounds, golf courses, and pedestrian zones in areas of mixed-use development.
- Provide education and publicity about reducing waste and available recycling services.

Chapter 4 Infrastructure General Plan Policy WR 1.4 (Waste Diversion) requires recycling within the City, Policy WR 1.5 (Waste Collection Performance) provides periodic review of recycling within the City, Policy WR 1.6 (New Construction and Recycled Materials Use) encourages the use of recycled materials during construction, Policy WR 2.2 (City Role) increases the City's role in recycling management, and Policy WR 2.5 (Recycling Collection Centers) continues to support recycling participation through permitted drop off and certified recycling collection centers in commercial and industrial areas with the City.

R3 Solid Waste Measures

The following R3 measures enhance and/or ensure the reductions accounted for within the R2 measure identified above.

R3-S1: ENCOURAGE INCREASED EFFICIENCY OF THE GAS TO ENERGY SYSTEM AT LANDFILLS

Under the American Recovery and Reinvestment Act of 2009, the Olinda Alpha Landfill was equipped with gas-to-energy system which reduces 1.2 million tons of CO_2 equivalents by capturing methane emitted from the landfill (US DOE 2013). This measure would encourage Olinda Alpha Landfill to keep current with upgrades in efficiencies to waste to energy systems and to upgrade as feasible when significant increases in conversion efficiencies are available. The majority of La Habra's waste (over 85%) is deposited in the Olinda Alpha

Landfill, so the emissions from La Habra's solid waste are dependent on the waste management and methane capture systems in place at Olinda Alpha. Other landfills that serve the City include El Sobrante Landfill and Frank R. Bowerman Sanitary Landfill which are also equipped with gas-to-energy systems. Any reductions in emissions from these landfills will, in turn, reduce La Habra's emissions from solid waste generation.

Measure R3-S1 provides coordination between the City and the landfill operators to encourage additional GHG emission reductions associated with landfill offgassing and improvements in the existing methane collection systems. Chapter 4 Infrastructure General Plan Policy WR 1.2 (AB 939 and 50 Percent Diversion) and Policy WR 2.1 (AB 341 and 75 Percent Recycling) support the continued partnering, planning and compliance documentation with AB 939 that requires a 50% diversion of solid waste from landfills and AB 341's source reduction, recycling, and composting requirement of 75%.

R3-S2: WASTE EDUCATION PROGRAM

This measure would build on La Habra's existing waste education program to provide public education and increased publicity about commercial and residential recycling. This measure would educate the public about waste reduction options available at both residential and commercial levels, including composting, grass recycling, and waste prevention, and available recycling services. Chapter 4 Infrastructure General Plan Policy WR 5.2 (Public Education) has the City preparing and disseminating, as appropriate, informational brochures, newsletters, pamphlets, door hangers, and fact sheets at City Hall, communitywide events, and on the City's website to educate the public on source reduction, solid waste diversion, recycling, infections waste management, and composting resources and educational programs.

4.7 R2 and R3 Reduction Measures Summary

The R2 and R3 measures outlined in this CAP are implemented at the local level through a variety of ways, including applicable 2035 General Plan polices (see Table 1-1, GHG-Related La Habra 2035 General Plan Policies). Many of the reduction measures are targeted toward new development and will be implemented during development review and entitlement. Others are implemented through improvements to City services and operations, increasing efficiencies. Some reduction measures are accomplished through intergovernmental coordination with local, regional, State, and federal agencies. Still other reduction measures target programs for private businesses and residents. Table 4-1 (La Habra R2 and R3 GHG Reduction Measures) summarizes the R2 and R3 reduction measures for the City of La Habra, outlining the implementation as well as including potential example projects to achieve the reduction goals of each measure.

Table 4-1 La Habra R2 and R3 GHG Reduction Measures			
Reduction Measures	**General Plan Policy Implementation**	**Example Project**	**More Information**
Transportation			
R2-T1: Land Use Based Trips and VMT Reduction Policies	LU 2.4, LU 3.1, LU 3.2, LU 3.3, LU 3.4, LU 5.4, LU 6.5, LU 7.5, LU 7.6, LU 12.1, LU 13.1, LU 16.3, AT 1.3, AT 1.4, AT 1.8, AT 1.9, AT 1.12, AT 1.13, AT 2.1, AT 2.4, AT 2.6, AT 2.9, AT 2.10, AT 3.1, AT 3.2, AT 3.6, TDM 1.1 – TDM 1.4, TDM 2.1, TDM 2.2, AQ 2.1, AQ 2.2, AQ 4.1	City of La Habra 2035 General Plan Ventura County VMT Reduction Report	http://www.lahabracity.com/ http://www.ventura.org/rma/planning/pdf/studies/vmt_reduction.pdf
R2-T2: Bicycle Infrastructure	LU 11.11, LU 16.6, AT 2.1 – AT 2.10	City of La Habra 2035 General Plan	http://www.lahabracity.com/
R2-T3: Electric Vehicle Incentives Program	TDM 2.5, AQ 4.5	City of La Habra 2035 General Plan NEV Plan for City of Lincoln, CA	http://www.lahabracity.com/ http://www.ci.lincoln.ca.us/index.cfm?page=965064
R3-T1: Municipal Fleet Alternative Vehicles	TDM 2.4, AQ 4.4, AQ 4.5	City of La Habra 2035 General Plan	http://www.lahabracity.com/
Energy			
R2-E1: New Construction Residential Energy Efficiency Requirements	LU 5.1, LU 5.2, LU 5.4, E 2.2, E 2.3, E 2.5, AQ 2.1, AQ 2.7	City of La Habra 2035 General Plan Energy Star New Homes City of Berkeley, CA Energy Efficiency for Homes	http://www.lahabracity.com/ http://www.energystar.gov/index.cfm?c=new_homes.hm_index http://www.ci.berkeley.ca.us/ContentDisplay.aspx?id=19376

Table 4-1 La Habra R2 and R3 GHG Reduction Measures

Reduction Measures	General Plan Policy Implementation	Example Project	More Information
R2-E2: New Construction Residential Renewable Energy	E 2.8, E 2.9	City of La Habra 2035 General Plan CA Energy Commission's New Solar Homes Partnership City of Riverside, Residential PV System Rebate	http://www.lahabracity.com/ http://www.gosolarcalifornia.org/about/nshp.php http://www.riversideca.gov/utilities/resi-pv-incentive.asp
R2-E3: Residential Energy Efficiency Retrofits	E 2.8	City of La Habra 2035 General Plan SCE Energy Efficiency Program, Existing City of La Habra Program	http://www.lahabracity.com/ http://www.gosolarcalifornia.ca.gov/csi/index.php
R2-E4: Residential Renewable Energy Retrofits	E 2.8	City of La Habra 2035 General Plan CA Energy Commission's Solar Initiative SCE Energy Efficiency Program City of Riverside, Residential PV System Rebate	http://www.lahabracity.com/ http://www.gosolarcalifornia.ca.gov/csi/index.php http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA223F http://www.riversideca.gov/utilities/resi-pv-incentive.asp
R2-E5: New Commercial Energy Efficiency Requirements	LU 5.1, LU 5.2, LU 5.4, E 2.2, E 2.3, AQ 2.1, AQ 2.7	City of La Habra 2035 General Plan CalRecycle Sustainable Building Guidelines Imperial Irrigation District New Construction Energy Efficiency Program	http://www.lahabracity.com/ http://www.calrecycle.ca.gov/Greenbuilding/Design/Guidelines.htm http://www.iid.com/index.aspx?page=296

Table 4-1 La Habra R2 and R3 GHG Reduction Measures

Reduction Measures	General Plan Policy Implementation	Example Project	More Information
R2-E6: New Commercial/ Industrial Renewable Energy	E 2.8, E 2.9	City of La Habra 2035 General Plan CalRecycle Sustainable Building Guidelines City of Riverside, Non-Residential PV System Rebate	http://www.lahabracity.com/ http://www.calrecycle.ca.gov/Greenbuilding/Design/Guidelines.htm http://www.riversideca.gov/utilities/busi-solar.asp
R2-E7: Commercial/ Industrial Energy Efficiency and Renewable Energy Retrofits	E 2.8	City of La Habra 2035 General Plan CA Energy Commission's Solar Initiative SCE Energy Efficiency Program City of Riverside, Non-Residential PV System Rebate	http://www.lahabracity.com/ http://www.gosolarcalifornia.ca.gov/csi/index.php http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=CA64F http://www.riversideca.gov/utilities/busi-solar.asp
R2-E8: Municipal Energy Efficiency Retrofit Projects	E 2.5, E 2.8	City of La Habra 2035 General Plan EECBG funded projects and Community Energy Partnership Existing City of La Habra projects and partnerships	http://www.lahabracity.com/ http://www.communityenergypartnership.org/ http://www.lahabracity.com/section.cfm?id=70
R3-E1: Energy Efficient Development, and Renewable Energy Deployment Facilitation and Streamlining	E 2.7, E 2.8, E 2.9, AQ 3.6	City of La Habra 2035 General Plan	http://www.lahabracity.com/
R3-E2: Energy Efficiency Training and Public Education	E 2.12, E 2.13	City of La Habra 2035 General Plan	http://www.lahabracity.com/
R3-E3: Energy Efficiency and Solar Energy Financing	E 2.8, E 2.9	City of La Habra 2035 General Plan	http://www.lahabracity.com/
R3-E4: Cross-Jurisdictional Coordination	E 1.1, E 2.11	City of La Habra 2035 General Plan	http://www.lahabracity.com/

Table 4-1 La Habra R2 and R3 GHG Reduction Measures

Reduction Measures	General Plan Policy Implementation	Example Project	More Information
R3-E5: Alternative Energy Development Plan	E 2.1, E 2.8	City of La Habra 2035 General Plan	http://www.lahabracity.com/
Area Source			
R2-A1 Electric Landscape Equipment Program	E.2.12, E 2.13	City of La Habra 2035 General Plan SCAQMD landscape equipment exchange program	http://www.lahabracity.com/ http://www.aqmd.gov/tao/lawnmower.html
R3-A1: Expand City Tree Planting	BR 1.8, BR 1.9, BR 1.13	City of La Habra 2035 General Plan	http://www.lahabracity.com/
R3-A2: Heat Island Plan	LU 14.2, E 2.7	City of La Habra 2035 General Plan	http://www.lahabracity.com/
Water			
R2-W1: Water Use Reduction Initiative	WS 1.6, WS 2.1 – WS 2.8, WQ 1.3, WQ 1.5	City of La Habra 2035 General Plan Existing City of La Habra Project, continue and expand existing water programs	http://www.lahabracity.com/ http://www.lahabracity.com/page.cfm?name=conserve
R3-W1: Water Efficiency Training and Education	WS 2.1, WQ 1.9	City of La Habra 2035 General Plan	http://www.lahabracity.com/
Solid Waste			
R2-S1: City Diversion Program	WR 1.2-1.7, WR 2.1 – WR 2.9, WR 4.1, WR 5.2	City of La Habra 2035 General Plan CA Integrated Waste Management Board Resources, coordination with Waste Management and Orange County	http://www.lahabracity.com/ http://www.calrecycle.ca.gov/LGCentral/Library/Innovations/Incentives/HaulIncen.htm
R3-S1: Encourage Increased Efficiency of the Gas to Energy System at Landfills	WR 1.2, WR 2.1	City of La Habra 2035 General Plan	http://www.lahabracity.com/
R3-S2: Waste Education Programs	WR 5.1 – WR 5.5	City of La Habra 2035 General Plan	http://www.lahabracity.com/
SOURCE: Atkins (2013).			

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Chapter 5 Total Estimated Reductions

In 2020, the City of La Habra is projected to emit a total of 316,935 $MTCO_2e$ without the incorporation of reduction measures. The City emissions for 2020 are estimated to be reduced to 213,949 $MTCO_2e$.

In 2035, the City of La Habra is projected to emit a total of 333,694 $MTCO_2e$ without the incorporation of reduction measures. The City emissions for 2035 are estimated to be reduced to 196,297 $MTCO_2e$.

Emission reductions estimated for years 2020 and 2035 were based on the accomplishments likely to be achieved as indicated in the measures detailed in Chapter 4. A detailed description of the reduction calculations is included in Appendix E (Reduction Measures, Assumptions, and Attributed Reductions).

5.1 Reduced 2020 Net Total Emissions

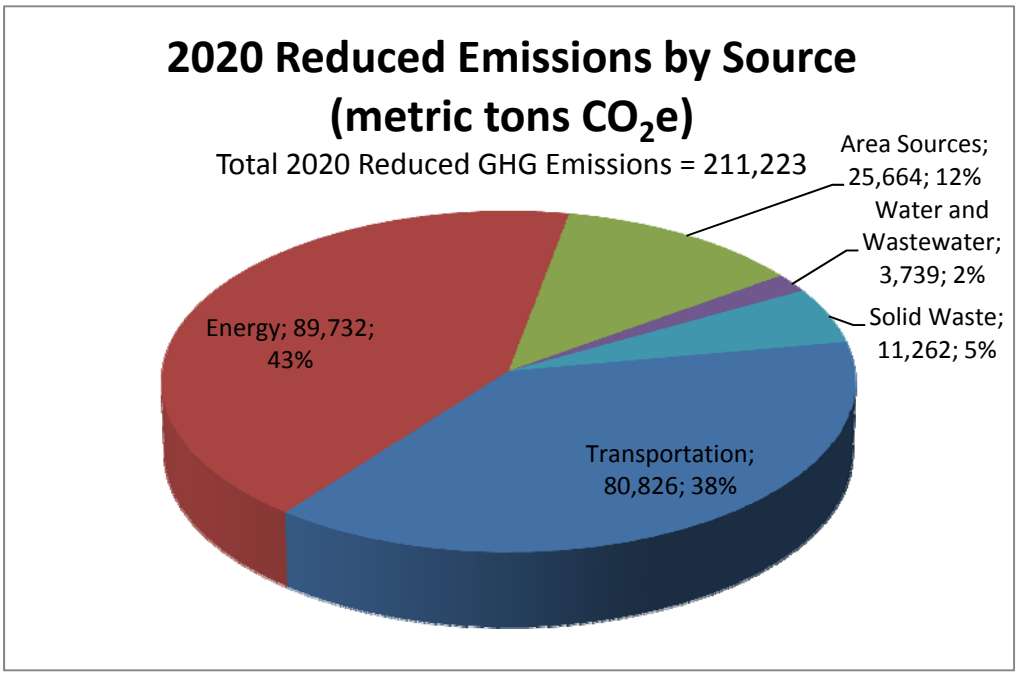
Table 5-1 (Reduced 2020 Net Total Emissions) summarizes the net reduced 2020 City emissions of metric tons of CO_2e as broken down by Emissions category. Figure 5-1 (Reduced 2020 Emissions by Source) is a graphical representation of Table 5-1. A detailed breakdown of reduced 2020 emissions by category is available in Appendix D (GHG Inventory Calculations).

Table 5-1 Reduced 2020 Net Total Emissions

Category	Metric tons of CO_2e
Transportation	80,826
Energy	89,732
Area Sources	25,664
Water	3,739
Solid Waste	11,262
Total	**211,223**

SOURCE: Atkins (2013).

Figure 5-1 Reduced 2020 Emissions by Source



SOURCE: Atkins (2013).

5.2 Reduced 2035 Net Total Emissions

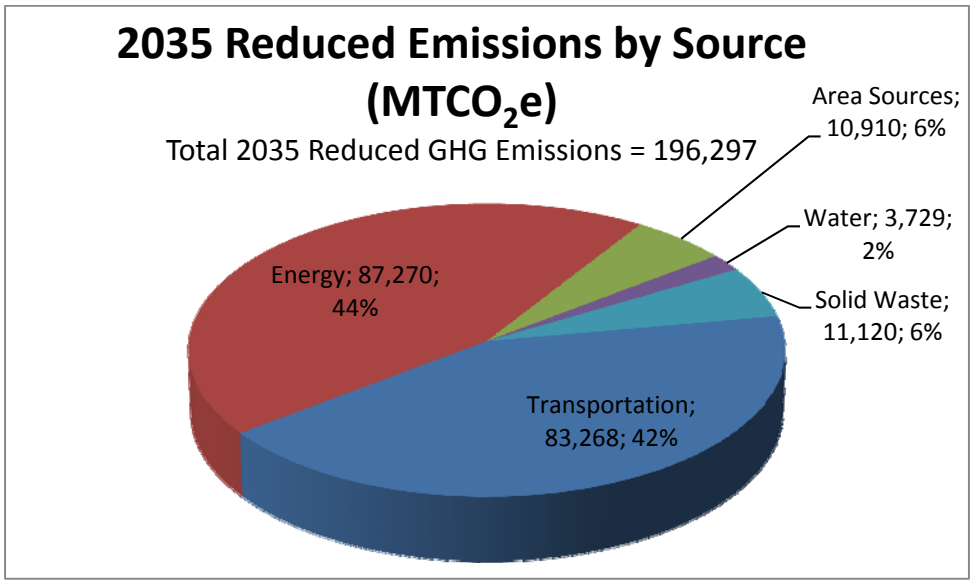
Table 5-2 (Reduced 2035 Net Total Emissions) summarizes the net reduced 2035 City emissions of CO_2e as broken down by Emissions category. Figure 5-2 (Reduced 2035 Emissions by Source) is a graphical representation of Table 5-2. A detailed breakdown of reduced 2035 emissions by category is available in Appendix D (GHG Inventory Calculations).

Table 5-2 Reduced 2035 Net Total Emissions

Category	Metric tons of CO_2e
Transportation	83,268
Energy	87,270
Area Sources	10,910
Water	3,729
Solid Waste	11,120
Total	**196,297**

SOURCE: Atkins (2013).

Figure 5-2 Reduced 2035 Emissions by Source



SOURCE: Atkins (2013).

5.3 Net Emissions Comparison by Year

With the reduction measures outlined in Chapter 4 (GHG Emissions Reduction Programs and Regulations), La Habra's total emissions are estimated to decrease to 213,949 metric tons of CO_2e by 2020, which is below the reduction target of 241,476 metric tons of CO_2e for 2020. The reduced 2020 total emissions are an estimated 102,986 metric tons of CO_2e below 2020 BAU emissions and 70,140 metric tons of CO_2e below 2010 emissions.

Table 5-3 (Net Total Emissions by Year) shows a comparison between the 2010, 2020, and 2035 levels, including what the 2020 and 2035 BAU emissions would have been and what 2020 and 2035 emissions are anticipated to be with the inclusion of these reduction measures.

Table 5-3 Net Total Emissions by Year

	Metric tons of CO_2e				
Source Category	**2010**	**BAU 2020**	**Reduced 2020**	**BAU 2035**	**Reduced 2035**
Transportation	106,146	124,054	80,826	128,104	83,268
Energy	126,532	137,161	89,732	145,449	87,270
Area Sources	30,249	32,790	25,664	35,391	10,910

Table 5-3 Net Total Emissions by Year

	Metric tons of CO_2e				
Source Category	**2010**	**BAU 2020**	**Reduced 2020**	**BAU 2035**	**Reduced 2035**
Water	5,312	5,758	3,739	6,215	3,729
Solid Waste	15,850	17,172	11,262	18,534	11,120
Total	**284,089**	**316,935**	**211,223**	**333,694**	**196,297**
Reduction Target	**N/A**	**241,476**	**241,476**	**198,862**	**198,862**
Below Reduction Target	**N/A**	**No**	**Yes**	**No**	**Yes**

SOURCE: Atkins (2013).
NOTE: Mass emissions of CO_2e shown in the table are rounded to the nearest whole number. Totals shown may not add up due to rounding.
BAU: business-as-usual.

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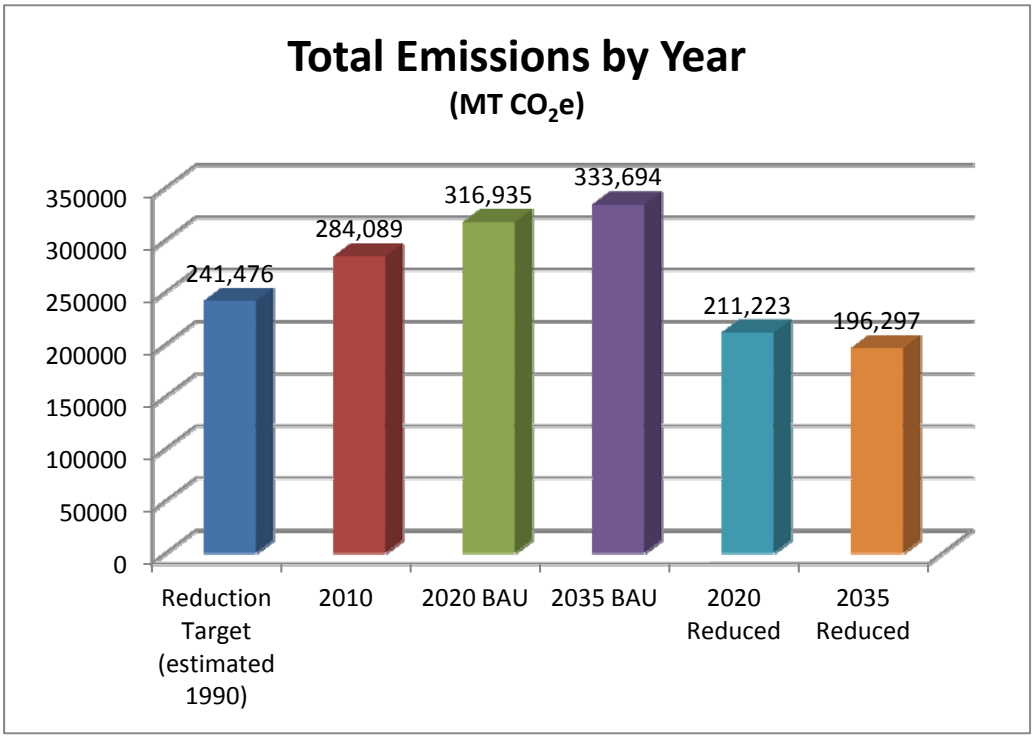
Chapter 6 Conclusion

This La Habra Climate Action Plan serves as a guide to help the City pursue work plans with the objectives of conserving resources and reducing GHG emissions. This document also serves as a technical resource for the update of the City's current General Plan and other land use related documents that may require evaluation and documentation of GHG emissions. Figure 6-1 (Total Emissions by Year) shows a comparison between the emission inventories and the reduction target.

Figure 6-1 Total Emissions by Year



SOURCE: Atkins (2013).

Consistent with the State reduction goals in AB 32, a target has been set to reduce Citywide GHG emissions by 15% from 2010 levels by 2020. The CARB Scoping Plan provides the State with reduction strategies designed to meet the reduction goals of AB 32. The City has a reduction strategy as described in Chapter 4 that is predicted to meet the State reduction goal. Reduction measures provided herein will ensure that La Habra meets the AB 32 reduction target of reducing to 15% below 2010 levels. Such programs include strengthening the City's ordinances as well as implementing energy efficiency programs, solar rebates, conservation programs, incentives and ordinances. In some cases, implementation will require the cooperation of other agencies, private businesses, and residents. The success of these measures will be tracked using indicators and targets such as those described in this CAP.

Continued implementation of this CAP post-2020 is discussed in Chapter 7, Step 7 below.

Chapter 7 Implementation

This chapter describes implementation steps for the CAP to support achievement of the GHG reduction goals for the community at large. Success in meeting the City's GHG emission reduction goal will depend on cooperation, innovation, and participation by City offices and residences, businesses, and government entities in the City's land use jurisdiction with regards to implementing the CAP. Key steps that the City will follow for the implementation of this CAP are outlined.

7.1 STEP 1—Administration and Staffing

The City will implement key internal administration and staffing actions to create a GHG Reduction Team (GRT), which will include an Implementation Coordinator, to support and guide the City's efforts to reduce emissions and implement the CAP.

The City GRT will be responsible for implementing this CAP, coordinating among all involved City departments, and recommending modifications and changes to the CAP over time. The GRT will, at a minimum, include the following departments, but will be expanded as needed to ensure coordinated leadership in plan implementation: Community Development, Community Services, and Public Works.

7.2 STEP 2—Financing and Budgeting

The CAP will require creative, continuing, and committed financing in order for its implementation to work. Local, regional, State, and federal public sources of funding will be needed along with the substantial involvement of the private sector. As one of the first priorities for implementation of the plan, the City will consider how to fund its implementation. Fortunately, the City currently has programs with finance strategies that complement the CAP. These programs include continued improvements and extensions of bike paths, energy efficient retrofits, water conservation and more. These same existing City finance strategies may be used to implement the reduction measures and monitoring program in the CAP. Throughout implementation of the plan, these finance strategies will take into account the costs and staff resources as well as the financial benefits and cost savings. The following different financing options are used in the finance strategies, for example:

- State and Federal Grants and Low-interest Loans—As described below there are a variety of grant and loan programs that exist in various areas.
- Support from Local Businesses (e.g., Waste Management of Orange County and Davis Construction Company), Non-Profits (e.g., California Renewable Energy Initiative partnerships), and Agencies (e.g., SCE, CEC, and OCTA programs)—Opportunities for public/private partnerships exist to provide cooperation on many aspects of the CAP including energy efficiency retrofits, waste minimization, transit promotion, and education.
- Agreements with Private Investors—Energy service companies (ESCOs) and other private companies can finance up-front investments in energy efficiency and then be reimbursed through revenues from energy savings.

Given that financing is critical to implementing many measures, a review of current and potential funding sources was completed for the different sectors covered in this CAP and is presented below to help early phase implementation of the CAP. Whether at the federal, regional or State level, it appears likely that there will be some form of a cap and trade system in place within several years. This system, depending on its particular character, is likely to influence energy prices for electricity, natural gas, and vehicle fuels, and may make currently cost-ineffective measures more economically feasible in the medium term and allow the financing of a broader range of plan measures.

Energy Efficiency and Renewable Energy Financing

FEDERAL ENERGY EFFICIENCY CONSERVATION BLOCK GRANTS

As part of the stimulus package (the "American Recovery and Reinvestment Act" or ARRA), signed into law by President Obama in the spring of 2009, block grants are available for energy efficiency planning and improvements in building, transportation, and other sectors. The purpose of the federal Energy Efficiency Conservation Block Grant (EECBG) Program is to assist eligible entities in creating and implementing strategies to: reduce fossil fuel emissions in a manner that is environmentally sustainable and that maximizes, to the greatest extent practicable, benefits for local and regional communities; reduce the total energy use of the eligible entities; and improve energy efficiency in the building sector, the transportation sector, and other appropriate sectors. Eligible activities include: development of an energy efficiency and conservation strategy; technical consultant services; residential and commercial building energy audits; financial incentive programs; energy efficiency retrofits; energy efficiency and conservation programs for buildings and facilities; development and implementation of certain transportation programs; building codes and inspections; certain distributed energy projects; material conservation programs; reduction and capture of methane and greenhouse gases from landfills and dairies; efficiency traffic signals and street lighting; renewable energy technologies on government buildings; and other appropriate activity.

La Habra received $528,500 in funds from the EECBG in September 2009. Projects include energy efficiency retrofits of windows and cooling systems, ballfield lighting controls, and the conversion of fluorescent street sign lamps to energy efficient LED lighting.

See: http://www1.eere.energy.gov/wip/project_map/project_details_new.aspx?pid=2243

FEDERAL TAX CREDITS FOR ENERGY EFFICIENCY

On October 3, 2008, President Bush signed into law the "Emergency Economic Stabilization Act of 2008." This bill extended tax credits for energy efficient home improvements (windows, doors, roofs, insulation, HVAC, and non-solar water heaters). These residential products during 2008 were not eligible for a tax credit, as previous tax credits had expired at the end of 2007. The bill also extended tax credits for solar energy systems and fuel cells to 2016. New tax credits were established for small wind energy systems and plug-in hybrid electric vehicles. Tax credits for builders of new energy efficient homes and tax deductions for owners and designers of energy efficient commercial buildings were also extended.

See: http://www.energystar.gov/index.cfm?c=products.pr_tax_credits.

SOUTHERN CALIFORNIA EDISON ENERGY EFFICIENCY/RENEWABLE ENERGY INCENTIVES

- Residential and commercial customers can qualify for a variety of rebate programs through Southern California Edison (SCE). SCE offers savings to customers who purchase qualified energy efficient appliances, heating and cooling systems, pool pumps, Energy Star, CFLs lighting fixtures and other energy efficient technologies.
- Multifamily residential developments can benefit from a variety of SCE's rebate programs. Using energy efficient products and technologies such as high-performance dual-pane windows, Energy Star labeled ceiling fans; Energy Star CFLs, proper insulation, energy efficient electric storage water heaters, refrigerators, LED lights, and cold vending machine controls would save both money and energy.
- SCE will provide free evaluation of mobile homes and provides free supply and installation of the energy upgrades that is recommended by their energy specialist.
- SCE residential customers can benefit from incentives up to $4,000 for detached single-family residential energy upgrades.
- SCE offers incentives, through utility rebate programs, for non-residential customers. This rebate is regardless of size and energy usage. Express efficiency rebates for lighting, refrigeration, and air conditioning technologies are available. In addition, SCE has a Custom Contracting program in which non-residential users have the option of designing an energy retrofit utilizing conservation measures. Incentives are based on the type of measure installed and the reduction in energy usage over a 12-month period. The maximum incentive is $2.4 million annually, per customer site.

See: http://energy.gov/savings/sce-non-residential-energy-efficiency-programs

- SCE's Self-Generation Incentive Program (SGIP) provides financial incentives for the installation of new, qualifying customer self-generation equipment for their own on-site usage. Technologies currently eligible for SGIP incentives are generation related to wind, fuel cell, waste heat capture, and conventional CHP. The SGIP program is designed with business and large institutional customers in mind. Rebates for renewable generation—such as wind turbines or fuel cell—that generate less than 30 kilowatts of energy are available through the California

Energy Commission's Emerging Renewables Program. Fuel cells of any size using non-renewable fuels may receive incentives under the SGIP program.

See: http://www.sce.com/b-rs/sgip/about-the-program.htm

SOUTHERN CALIFORNIA GAS COMPANY

The Southern California Gas Company (SCG) offers a variety of incentives for its customers.

- The SGIP offers savings based on GHG emissions reductions and energy efficiency audits. Eligible technologies include but are not limited to renewable and waste energy capture technologies, conventional combined heat and power systems, emerging technologies such as fuel cells, biogas, and advanced energy storage.
- The SCG On-Bill Financing program offers qualified business customers 0% financing from $5,000 to $100,000 per meter for qualifying electric and natural gas equipment. All government customers may receive from $5,000 to $250,000 per meter, and the Government can borrow up to $1,000,000 for one service account. The funds may be used for a wide variety of efficiency improvement projects, and the monthly loan payments will be added directly to the customer's bill. Monthly energy savings help to offset the monthly loan charges.
- SCG offers rebates on various types of energy efficient equipment such as pipe insulation, steam traps, boilers, and other equipment. A full list of the eligible equipment can be found at SCG's website below.

  See http://www.socalgas.com/for-your-business/rebates/industry/government/

- Commercial customers can benefit from rebates and incentives for energy efficient equipment such as pipe and tank insulation, water heaters, steam traps, pool heaters, boilers, commercial cooking equipment, and other technologies.
- Single-family residential solar water heating systems qualify for up to $1,875 and commercial/multi-family customers can save up to $500,000 under the California Solar Initiative – Thermal Program. For a complete list and up-to-date savings, visit the SCG website.

See: http://www.socalgas.com/for-your-business/rebates/

AB 811 FINANCING DISTRICTS

AB 811 permits the creation of assessment districts to finance installation of distributed generation renewable energy sources or energy efficiency improvements that are permanently fixed to residential, commercial, industrial, or other real property. La Habra's partnership with SCE in creation of the Local Government Partnership Energy Efficiency Program allows home and business owners to utilize this type of financing program and avoid upfront costs associated with energy system installations. Financing is repaid through the property tax bill and repayment obligations remain with the property when it is sold to a new owner.

California Energy Commission Energy Efficiency Financing

The California Energy Commission (CEC) offers up to $3 million per application in energy efficiency financing and low interest loans to cities and counties for installing energy-saving projects. Examples of projects include: lighting systems, pumps and motors, streetlights and LED traffic signals, automated energy management systems/controls, building insulation, energy generation including renewable and combined heat and power projects, heating and air conditioning modifications, and waste water treatment equipment.

See: http://www.energy.ca.gov/efficiency/financing/

California Energy Commission Bright Schools Program

This is a collaborative project of the CEC, California Conservation Corps, local utility companies and other qualifying energy service companies to assist schools in undertaking energy efficiency projects. Project staff will guide schools through identifying and determining a project's feasibility, securing financing for the project, and purchasing and installing the new energy efficient equipment.

See: http://www.energy.ca.gov/efficiency/brightschools/index.html

Transportation Financing

Federal Energy Efficiency Community Block Grants

As described above, eligible activities include development and implementation of certain transportation programs and efficiency traffic signals and street lighting.

Regional Transportation Improvement Program

The Regional Transportation Improvement Program (RTIP) is funded from 75% of the funds made available for transportation capital improvement projects under the State Transportation Improvement Program (STIP). This program targets urban projects that are needed to improve transportation within the region. The Southern California Association of Governments (SCAG) recommends to the California Transportation Commission (CTC) the selection of projects, which can include State highway improvements, local roads, public transit, intercity rail, grade separations, and more.

Interregional Improvement Program

The Interregional Improvement Program (IIP) is funded from 25% of the funds made available for transportation capital improvement projects under the STIP. IIP targets projects that are needed to improve interregional movement of people and goods. Caltrans recommends to the CTC the selection of projects, which can include State highway improvements, intercity passenger rail, mass transit guide ways, or grade separation projects.

Waste Reduction Financing

California Integrated Waste Management Board Grants and Loans

The California Integrated Waste Management Board Grants and Loans (CIWMB) offers funding opportunities authorized by legislation to assist public and private entities in the safe and effective management of the waste stream.

See: http://www.ciwmb.ca.gov/grants/

Water Conservation and Treatment Financing

Clean Water State Revolving Funds

Clean Water State Revolving Funds (CWSRF) fund water quality protection projects for wastewater treatment, nonpoint source pollution control, and watershed and estuary management. CWSRFs have funded over $74 billion, providing over 24,688 low-interest loans to date.

See: http://www.epa.gov/owm/cwfinance/cwsrf/index.htmCWSRFs offer:

- Low Interest Rates, Flexible Terms—Nationally, interest rates for CWSRF loans average 2.3%, compared to market rates that average 5%. For a CWSRF program offering this rate, a CWSRF funded project would cost 22% less than projects funded at the market rate. CWSRFs can fund 100% of the project cost and provide flexible repayment terms up to 20 years.
- Funding for Nonpoint Source Pollution Control and Estuary Protection—CWSRFs provided more than $167 million in 2009 to control pollution from nonpoint sources and for estuary protection, more than $3 billion to date.
- Assistance to a Variety of Borrowers—The CWSRF program has assisted a range of borrowers including municipalities, communities of all sizes, farmers, homeowners, small businesses, and nonprofit organizations.
- Partnerships with Other Funding Sources—CWSRFs partner with banks, nonprofits, local governments, and other federal and State agencies to provide the best water quality financing source for their communities.

7.3 STEP 3—Timeline and Prioritization

The City will develop an implementation schedule based on the completion of the cost effectiveness analysis and the Climate Finance Plan. The cost effectiveness analysis will determine which strategies can reduce the most emissions at the least cost. Prioritization will be based on the following factors:

- Cost effectiveness
- GHG reduction efficiency
- Availability of funding

- Level of City Control
- Ease of implementation
- Time to implement

In general consideration of these factors, the following is an outline of key priorities for three (3) phases starting in 2013 through 2020.

- Phase 1 (2013–2015): Development of key ordinances, completion of key planning efforts, implementation of most cost-effective measures, and support of voluntary efforts.
- Phase 2 (2015–2017): Continued implementation of first tier measures, implementation of second tier measures, and implementation of key planning outcomes from Phase 1.
- Phase 3 (2017–2020): Continued implementation of first and second tier measures, implementation of third tier of measures.

Because the goals of this CAP are aggressive, success in meeting these goals depend on some flexibility in the GHG reduction actions. The City is committed to flexibility in implementing the reduction measures and meeting the goals of this CAP. Many of the reduction measures in this Plan may be implemented through a menu of options. The goals of each reduction measure can often be achieved through a variety of means, especially those related to building energy efficiency. Compliance with the energy efficient building measures can be achieved through many combinations of actions including (but not limited to): installing energy efficient appliances, lighting, and HVAC systems; installing solar panels and solar water heaters; siting and orienting buildings to optimize conditions for natural heating, cooling, and lighting; installing top-quality windows and insulation; and incorporating natural shading, skylights, and reflective surfaces.

Table 7-1 (GHG Reduction Measure Timeline and Phasing Schedule) presents the potential timeline and phasing schedule for the GHG reduction measures.

Table 7-1 GHG Reduction Measure Timeline and Phasing Schedule

Reduction Measure	Phase
Transportation	
R2-T1: Land Use Based Trips and VMT Reduction Policies	1, 2, 3
R2-T2: Bicycle Infrastructure	1
R2-T3: Electric Vehicle Incentives Program	1, 2, 3
Energy	
R2-E1: New Construction Residential Energy Efficiency Requirements	1
R2-E2: New Construction Residential Renewable Energy	1, 2, 3
R2-E3: Residential Energy Efficiency Retrofits	1, 2, 3
R2-E4: Residential Renewable Energy Retrofits	1, 2, 3
R2-E5: New Commercial Energy Efficiency Requirements	1
R2-E6: New Commercial/Industrial Renewable Energy	1, 2, 3
R2-E7: Commercial/Industrial Energy Efficiency and Renewable Energy Retrofits	1, 2, 3
R2-E8: Municipal Energy Efficiency Retrofit Projects	1, 2, 3
Area Source	
Electric Landscape Equipment Program	1
Water	
R2-W1: Water Use Reduction Initiative	1, 2
Solid Waste	
R2-S1: City Diversion Program	2
SOURCE: Atkins (2013).	

7.4 STEP 4—Public Participation

The citizens and businesses in La Habra are integral to the success of GHG reduction efforts. This is because the CAP not only depends on the combination of State and local government efforts, public and private sources of finance; but the voluntary commitment, creativity, and participation of the community at large as well. The City must strike a balance between development and environmental stewardship to keep its economy strong and, at the same time, protect the environment. The City will educate a variety of stakeholders such as businesses, business groups, residents, developers, and

property owners about the CAP and encourage participation in efforts to reduce GHG emissions in all possible sectors.

7.5 STEP 5—Monitoring and Inventorying

The City will create a system for monitoring the implementation of this CAP and adjusting the plan as opportunities arise. As the plan is implemented and as technology changes, the CAP should be revised to take advantage of new and emerging technology. If promising new strategies emerge, the City will evaluate how to incorporate these strategies into the CAP. Further, State and federal action will also result in changes which will influence the level of La Habra emissions.

The GHG inventory will be periodically updated in coordination with the 3 phases noted above:

- 2013-update with the Regional Transportation Plan outputs and Phase 1 progress;
- 2015-review at Phase 2 progress which will allow for course corrections to keep progress on target for 2020; and to develop post-2020 forecasts for use in planning for after 2020; and
- 2020-establish baseline for post-2020 GHG reduction planning.

The City will also implement a monitoring and reporting program to evaluate the effectiveness of reduction measures with regards to progress towards meeting the goals of the CAP. Through a monitoring and reporting program, La Habra will compare emissions from periodic inventories with the anticipated reductions described in this CAP. The City can then report on their progress toward achieving the reduction targets.

7.6 STEP 6—Beyond 2020

As described above under the discussion of Reduction Goals, 2020 is only a milestone in GHG reduction planning. Executive Order S-03-05 calls for a reduction of GHG emissions to a level 80% below 1990 levels by 2050, and this level is consistent with the estimated reductions needed to stabilize atmospheric levels of CO_2 at 450 parts per million (ppm). Thus, there will be a need to start planning ahead for the post-2020 period. The City will commence planning for the post-2020 period starting in 2017, at the approximate midway point between plan implementation and the reduction target and after development of key ordinances and implementation of cost-effective measures.

At that point, the City will have implemented the first 2 phases of this CAP and will have a better understanding of the effectiveness and efficiency of different reduction strategies and approaches. Further, the State's regulations under AB 32 would have been fully in force; federal programs and policies for the near term are likely to be well underway; market mechanisms like a cap and trade system are likely to be in force and will be influencing energy and fuel prices; and continuing technological change in the fields of energy efficiency, alternative energy generation, vehicles, fuels, methane capture, and other areas will have occurred.

The City will then be able to take the local, regional, State, and federal context into account. Further, starting in 2017 will allow for development of the post-2020 plan so that it can be ready for full implementation, including potential new policies, revisions to the General Plan (as necessary), programs, ordinances, and financing by 2020. The new plan will include a specific target for GHG reductions for 2035, 2040, and 2050. The targets will be consistent with broader State and federal reduction targets and with the scientific understanding of the needed reductions by 2050. The City will adopt the new plan by January 1, 2020.

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APPENDIX A:
THE GREENHOUSE EFFECT, GREENHOUSE GASES, AND CLIMATE CHANGE IMPACTS

GLOBAL CLIMATE CHANGE

Parts of the Earth's atmosphere act as an insulating blanket of just the right thickness, trapping sufficient solar energy to keep the global average temperature in a suitable range. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' (GHGs) based on the idea that the gases also 'trap' heat like the glass walls of a greenhouse. These gases, mainly water vapor, carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), ozone, and chlorofluorocarbons (CFCs) all act as effective global insulators, reflecting back to earth visible light and infrared radiation. Human activities such as producing electricity and driving vehicles have contributed to the elevated concentration of these gases in the atmosphere. This in turn, is causing the Earth's temperature to rise. A warmer Earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

Leading scientists around the world agree that Global Warming Potential is a reality and that human activities are disrupting the earth's climate by intensifying the greenhouse effect.

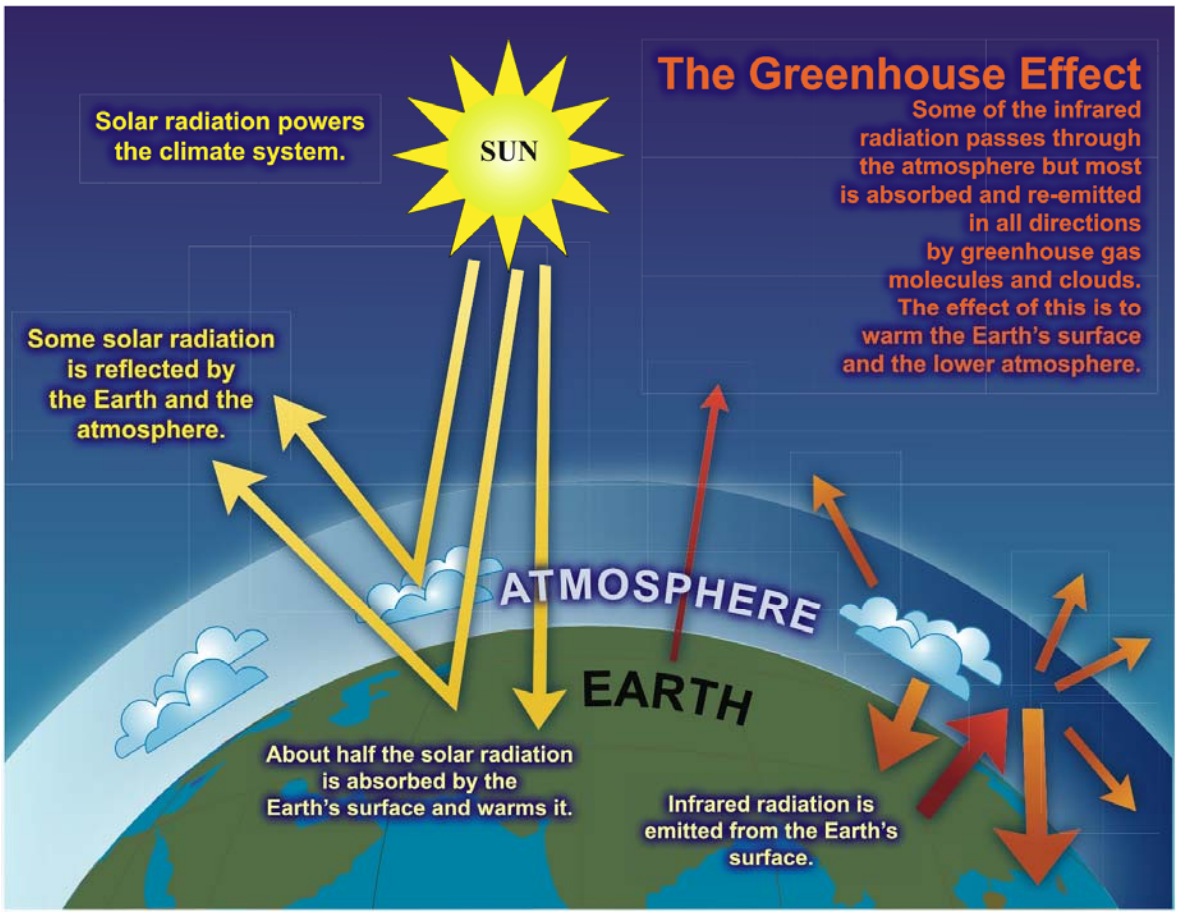
1. THE GREENHOUSE EFFECT

A balance of naturally occurring gases dispersed in the atmosphere determines the Earth's climate by trapping solar heat. This phenomenon is known as the greenhouse effect. As sunlight passes through our atmosphere, the incoming solar radiation is eradiated from the earth's surface as heat energy. Greenhouse gases like carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, and water vapor trap some of this reradiated energy. This trapped heat warms the earth, much as the glass of a greenhouse traps reradiated energy from sunlight and thereby warms the interior of the structure. Figure 1-1 illustrates the Greenhouse Gas Effect.

2. GLOBAL WARMING

The natural "greenhouse effect" allows the earth to remain warm and sustain life. Greenhouse gases trap the sun's heat in the atmosphere, like a blanket, and help determine the existing climate. The increased consumption of fossil fuels (wood, coal, gasoline, etc.) has substantially increased atmospheric levels of greenhouse gases. As atmospheric concentrations of greenhouse gases rise, so do temperatures. Over time this rise in temperatures would result in climate change. Theories concerning climate change and global warming existed as early as the late 1800s. By the late 1900s the understanding of the earth's atmosphere had advanced to the point where many climate scientists began to accept that the earth's climate is changing. Today, many climate scientists agree that some warming has occurred over the past century and will continue through this century.

Figure 1.1 - The Greenhouse Gas Effect



Source: IPPC, 2008

The United Nations Intergovernmental Panel on Climate Change predicts that changes in the earth's climate will continue through the 21st century and that the rate of change may increase significantly in the future because of human activity. Many researchers studying California's climate believe that changes in the earth's climate have already affected California and will continue to do so in the future.

3. GREENHOUSE GASES

Parts of the Earth's atmosphere act as an insulating blanket of just the right thickness, trapping sufficient solar energy to keep the global average temperature in a suitable range. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' (GHGs) based on the idea that the gases also 'trap' heat like the glass walls of a greenhouse. These gases, mainly water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), chlorofluorocarbons (CFCs), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols all act as effective global insulators, reflecting back to earth visible light and infrared radiation.

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without the natural heat trapping effect of GHGs, the earth's surface would be about 34 degrees Centigrade (°C) cooler (CAT

2006). However, it is believed that emissions from human activities have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. This in turn is causing the Earth's temperature to rise. A warmer Earth may lead to changes in rainfall patterns, much smaller polar ice caps, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

Individual GHGs have varying global warming potential (GWP) and atmospheric lifetimes. The reference gas for GWP is carbon dioxide; carbon dioxide has a GWP of one. Compared to methane's GWP of 21 it is clear that methane has a greater global warming effect than carbon dioxide on a molecule per molecule basis (EPA 2006b). As shown below in Table 1.1 GWP ranges from 1 (carbon dioxide) to 23,900 (sulfur hexafluoride).

Atmospheric lifetimes vary from 1.5 (HFC-152a) to 50,000 years (tetrafluoromethane). One teragram (equal to one million metric tons) of carbon dioxide equivalent (Tg CO_2 Eq.) is the mass emissions of an individual GHG multiplied by its GWP. The atmospheric lifetime and GWP of selected greenhouse gases are also summarized in Table 1.1.

Table 1.1 Global Warming Potentials and Atmospheric Lifetimes

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50 - 200	1
Methane	12 ± 3	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-134a	14.6	1,300
HFC-152a	1.5	140
PFC: Tetrafluoromethane (CF4)	50,000	6,500
PFC: Hexafluoroethane (C2F6)	10,000	9,200
Sulfur Hexafluoride (SF6)	3,200	23,900
Source: U.S. Environmental Protection Agency, 2006.		

Of all greenhouse gases in the atmosphere, water vapor is the most abundant, important, and variable. It is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. The main source of water vapor is evaporation from the oceans (approximately 85 percent). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves.

Ozone is also a greenhouse gas; however, unlike other GHGs, ozone in the troposphere is relatively short-lived and therefore is not global in nature. It is difficult to make an accurate determination of the

contribution of ozone precursors (nitrogen oxides and volatile organic compounds) to global climate change (GCC) (CARB 2004b).

Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during bio mass burning and incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Carbon Dioxide

The natural production and absorption of carbon dioxide (CO_2) is achieved through the terrestrial biosphere and the ocean. However, humankind has contributed to the alteration of the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid 1700s, each of these human-caused activities has increased in scale and distribution. Carbon dioxide was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20th century. Prior to the industrial revolution, concentrations were fairly stable at 280 ppm. Today, they are around 370 ppm, an increase of well over 30 percent (EPA 2006). Left unchecked, the concentration of carbon dioxide in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (IPCC 2001). This will result in an average global temperature rise of at least two degrees Celsius (3.6 ^{O}F) (IPPCC 2001).

Carbon dioxide emissions are directly generated primarily in the form of vehicle exhaust and in the consumption of natural gas for heating. Carbon dioxide emissions are also generated from natural gas combustion and indirectly through the use of electricity. Other indirect sources of carbon dioxide include the use of potable water and generation of wastewater (potable water and wastewater treatment generates greenhouse gases), and the generation of solid waste.

Methane

Methane (CH_4) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10-12 years), compared to some other GHGs (such as carbon dioxide, nitrous oxide, and CFCs). Methane has both natural and anthropogenic (human) sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas and mining coal have added to the atmospheric concentration of methane (EPA 2006b).

Nitrous Oxide

Concentrations of nitrous oxide (N_2O) also began to rise at the beginning of the industrial revolution. Microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen, produce nitrous oxide. The use of fertilizers has increased over the last century. Global concentration for nitrous oxide in 1998 was 314 ppb, and in addition to agricultural sources for the gas, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load (EPA 2006b).

Chlorofluorocarbons

Chlorofluorocarbons (CFCs) have no natural source, but were synthesized for use as refrigerants, aerosol propellants and cleaning solvents. Since their creation in 1928, concentrations of CFCs in the atmosphere have been rising. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs in the atmosphere are now remaining static or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years. Since they are also a GHG, along with such other long-lived synthesized gases as CF_4 (carbontatrafuoride) and SF_6 (sulfurhexafluoride), they are of concern. Another set of synthesized compounds called HFCs (hydrofluorcarbons) are also considered GHGs, though they are less stable in the atmosphere and therefore have a shorter lifetime and less of an impact (EPA 2006b). CFCs, CF_4, SF_6 and HFCs have been banned and are no longer available on the market.

4. Human and Cultural Causes of Climate Change

Like all other animals, humans participate in the natural carbon cycle, but there are important differences between human and animal activities. By burning coal, oil, and natural gas, humans are adding carbon dioxide (CO_2) to the atmosphere much faster than the carbon in rocks is released through natural processes. Clearing and burning forests to create agricultural land converts organic carbon to carbon dioxide gas. The oceans and land plants are absorbing a portion, but not nearly all of the CO_2 added to the atmosphere by human activities. Human climate drivers include heat-trapping emissions from cars and power plants, aerosols from pollution, and soot particles.

5. Impacts From Greenhouse Gas Emissions

Global Impacts

While in some cases global climate change may temporarily improve certain aspects of a region, such as lengthening the growing season, it is estimated that the ecology of the natural world will not be able to adjust quickly enough to prevent widespread environmental degradation (IPCC, 2001). In California, it is likely that warmer temperatures will result in frequent and longer periods of drought (UCS 1999). The majority of the scientific community has stated that beyond doubt, global climate change will be one of the

most significant challenges the globe will face in the twenty-first century, and will impact almost every system we depend upon for survival.

Just as humans are affected by climate change, so too are plants and animals. Animals must breathe the same air and are subject to the same types of negative health effects as humans. Certain plants and trees may absorb air pollutants that can stunt their development or cause premature death.

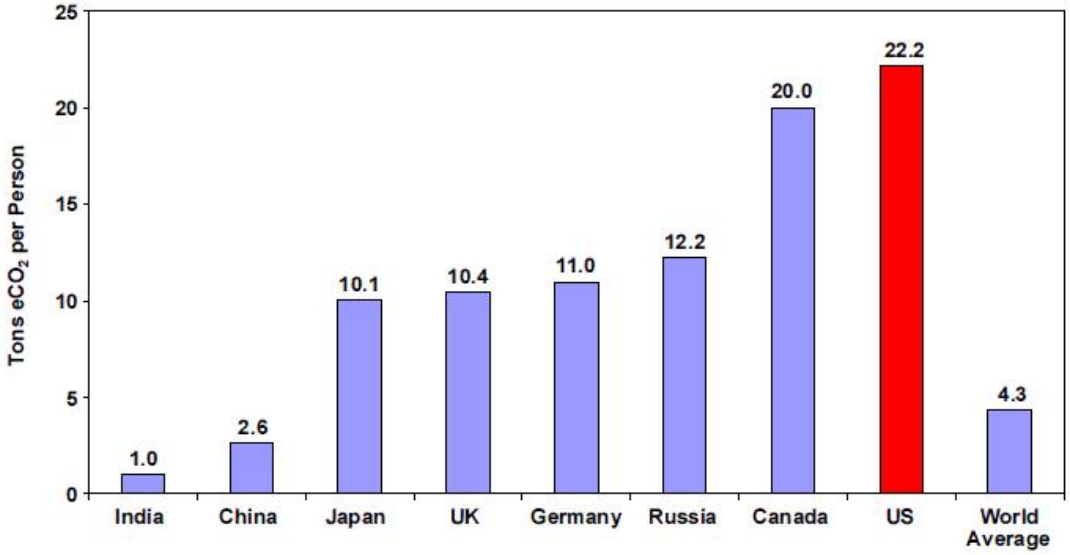
There are also numerous impacts to the human economy including lost workdays due to illness, a desire on the part of business to locate in areas with a healthy environment, and increased expenses from medical costs. Pollutants may also lower visibility and cause damage to property. Certain air pollutants are responsible for discoloring painted surfaces, eating away at stones used in buildings, dissolving the mortar that holds bricks together, and cracking tires and other items made from rubber.

The United States has the highest per capita emissions of GHGs in the world, 22 tons of CO_2 per person per year (see figure 1-2). With only five percent of the world's population, the United States is responsible for 24 percent of the world's CO_2 emissions. California, despite its strong environmental regulations, is the second largest greenhouse gas polluting state in the nation, and emits 2% of global human-generated emissions. Its largest contribution of CO_2 is from vehicle emissions.

According to the International Panel on Climate Change (IPCC), the following are current worldwide statistics for CO_2 concentrations (IPCC, 2008):

- The atmospheric concentration of carbon dioxide (CO_2) during the last two decades has increased at the rate of 0.4% every year.
- Current CO_2 concentrations are higher than they have been in the last 420,000 years, and according to some research, the last 20 million years.
- About three-quarters of the CO_2 emissions produced by human activity during the past 20 years are due to the burning of fossil fuels.

Figure 1-2 – Per Capita CO_2 Emissions from 2001



Source: Energy Information Administration, 2001.

Human Health

According to the Pew Center's report on Human Health and Climate Change, health threats may depend on surpassing a threshold level of a climate factor such as significant change in temperature, precipitation, or storm frequency. Once that threshold has passed, the incidence of disease may drastically increase.

Environmental factors play a significant role in some diseases carried by insects. Warming could make tick-borne Lyme disease more prevalent. Mosquito-borne diseases such as West Nile virus, Dengue Fever, and Malaria could acquire new ranges and access to previously unexposed populations (IPCC, 2001). For example, the temperature range at which the malaria-carrying mosquito lives is sensitive to a mere one-degree in temperature change; thus an overall increase in global temperatures will increase the land areas where it may spread disease. These temperature changes affect not only the mosquitoes, but also disturb and in some cases decrease the habitats of its natural predators (Rogers, 2002).

Ecosystems

Scientists predict serious consequences of global warming. The rapid, unprecedented increase in temperatures accelerates the water cycle, which then increases the occurrence, variability, and severity of storms and drought (IPCC, 2008). Such extreme climate events will potentially disrupt ecosystems and damage food and water supplies. In addition, increased temperatures cause thermo-expansion of the oceans and accelerate the melting of the icecaps, thereby raising the overall level of the oceans. The sea-level rise may have multiple outcomes, including significant environmental disturbances, coastline destruction, major population displacement and economic disruption.

While there is some degree of uncertainty, scientists are able to predict many of the challenges that climate change presents to ecosystems. Warmer temperatures may force some species to higher altitudes or more northern latitudes. This migration may be prevented by human developments that literally block the path as well as non-native species that can out-compete native plants and animals in new locations or make those areas uninhabitable. For example, there is evidence that certain butterflies, often a species that is used to indicate the health of an ecosystem, are moving further north, and are seldom seen in the southern reaches of their range. In addition, warmer temperatures have enabled the Jeffrey pine beetle to have more than one birth cycle per season, lengthening the amount of time this pest is able to damage trees (USC, 200 Pg 1-6). Furthermore, human impact other than greenhouse gas emissions will exacerbate challenges to ecosystems attempting to reestablish at higher elevations or new locations. According to the UCS report, "In many parts of California, fragmentation of the landscape by

human developments, invasions by nonnative species, and air pollution may limit the reestablishment of native ecosystems." (UCS, 200 Pg 1-6).

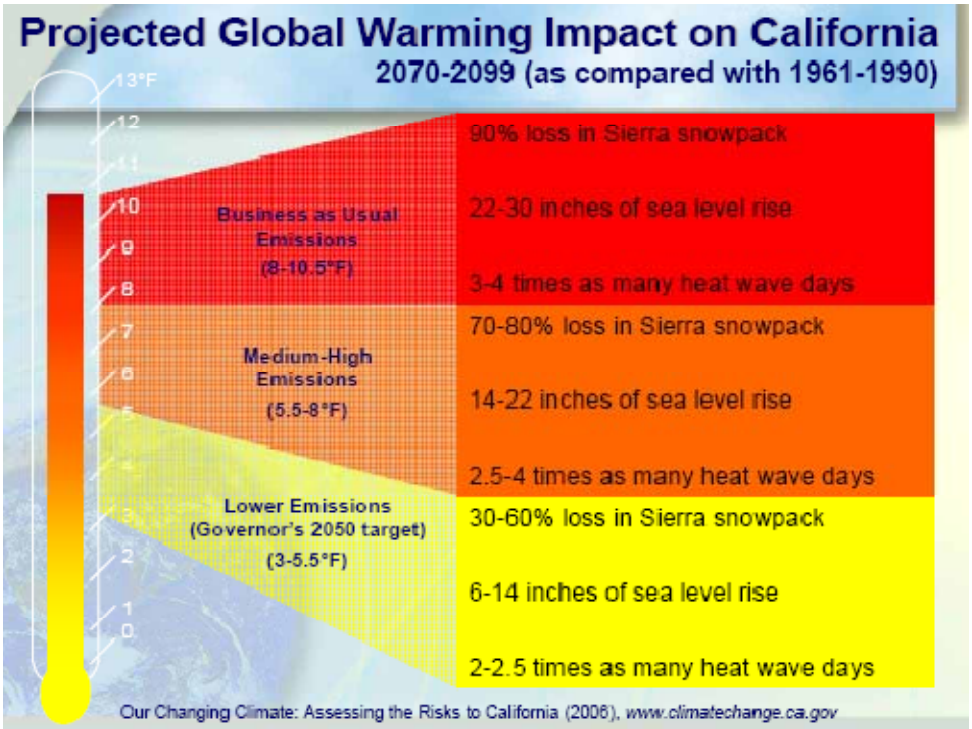
Impacts to California

While it is a global problem, influenced by an array of interrelated factors, climate change is also a regional and local problem, with serious impacts foreseen for California, the Southern California Area, and La Habra.

The impacts of climate change will be variable and widespread. Global and local climate change will impact weather, sea-level rise, water resources, ecosystems, human health, economy, and infrastructure.

Projected future climate change may affect California in a variety of ways. Public health can suffer due to greater temperature extremes and more frequent extreme weather events, increases in transmission of infectious disease, and increases in air pollution. Agriculture is especially vulnerable to altered temperature and rainfall patterns, and new pest problems. Forest ecosystems would face increased fire hazards and would be more susceptible to pests and diseases. The Sierra snowpack that functions as the state's largest reservoir could shrink by one third by 2060, and to half its historic size by 2090. Runoff that fills reservoirs will start in midwinter, not spring, and rain falling on snow will trigger more flooding. The California coast is likely to face a rise in sea level that could threaten its shorelines. Sea level rise and storm surges could lead to flooding of low-lying property, loss of coastal wetlands, erosion of cliffs and beaches, saltwater contamination of drinking water, and damage to roads, causeways, and bridges. Figure 1-3 illustrates potential impacts from global warming on California (2070-2099).

Figure 1- 3 – Projected Global Warming Impacts on California (2070-2099)



Ultimately, in the next few decades, the impacts of climate change on weather in La Habra, like the rest of California, will see warmer overall temperatures and an increase in precipitation events, with an increase of intensity and frequency of rainstorms.

Climate and Weather

There is a key difference between climate and weather. According to the National Science Foundation report on climate change in California, "Weather is the day-to-day phenomena we experience—sun, rain, fog, warm, cold, wind—that vary greatly. Climate is long term statistical patterns of weather…and is reflected in average temperatures, rainfall, and other weather events at a given location, and climate change is signaled by long-term changes in those averages" (CRA, 2002).

In 1999, the Union of Concerned Scientists and the Ecological Society of America published a report called *Confronting Climate Change in California*, which describes the predicted impacts of climate change in California. According to this report, California has had a 2 °F increase in temperature over the past 100 years, and annual precipitation has decreased by 10-25% in some regions The report also noted that most climate change models predict a temperature increase of 4° F in California in the next 20 to 40 years. These models also projected a decrease in the number of long dry spells, and an annual precipitation increase of 20-30% (with a range of 10-50%) in spring and fall, with somewhat larger increases in winter. One model reveals a large increase in precipitation over California, particularly in the form of rain, but with dry areas to the east of the Sierra. This regional model projects that winter

precipitation over the coastal areas and the Sierra will increase by 25% or more, with an associated risk of increases in winter mud slides and flooding (UCS, 1999).

Much of the anticipated changes in climate will depend on the frequency and strength of the El Niño-Southern Oscillation phenomenon (ENSO). Most global climate change models indicate the possibility of more frequent ENSO events. El Niño historically happens every two to seven years off the west coast of South America, as a result of changes in ocean currents and prevailing winds over the Pacific Ocean. These changes bring warm water from the western oceans, displacing the nutrient-rich cold water that normally wells up on the western coasts of the Americas from deep in the ocean. These changes bring more frequent and extreme weather anomalies, including severe droughts and floods, hurricanes and winter storms. According to the National Science Foundation, "the invasion of warm water disrupts both the marine food chain and the economies of coastal communities that are based on fishing and related industries" (CAR, 2002). The effects of El Niño in California vary across the state, but in the past have included abnormally frequent winter rains and storms, and abnormally dry summers and associated wildfires (UCS, 1999). The 1982-83 El Niño, the strongest event in recorded history, brought $8 billion in economic impacts and $100 million in California alone (CAR, 2002).

Water Resources

Climate change impacts will bring an additional burden to California's already over-taxed water supply system. According to the IPCC there will be an increase in the number of intense precipitation days and flood frequencies in basins driven by snowmelt, such as California's Central Valley (IPCC, 2001). For this type of basin, the accumulation of snow in winter is the essential "water tower" that stores water until the spring's warmer temperatures begins to melt the snow, forming the streams and rivers that supply the entire watershed with water for the duration of the summer.

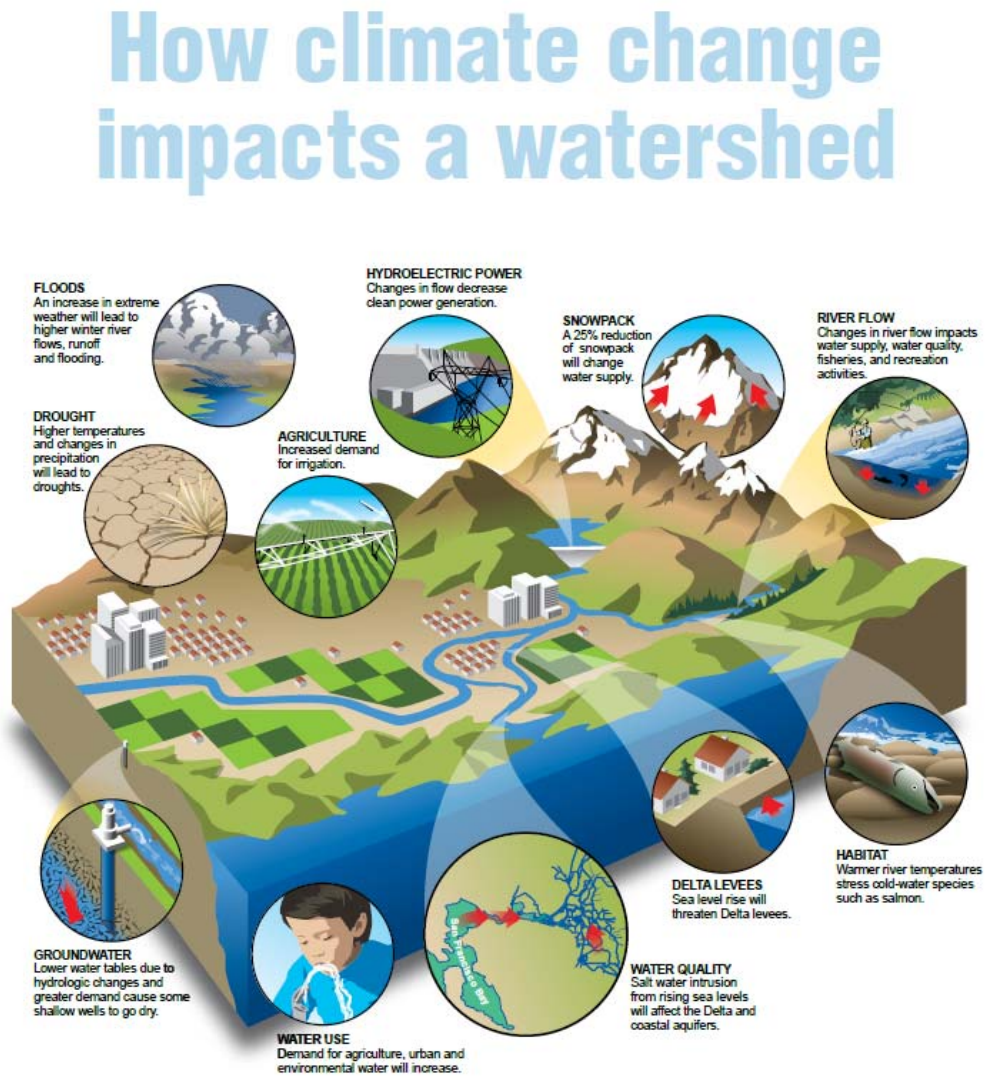
Even under normal climatic conditions, 80% of California's annual rainfall occurs in the winter and is stored in the snowpacks of the various mountain ranges (UCS, 2005). The warmer temperatures associated with climate change will increase rainstorms and decrease snowstorms, shorten the overall snowfall season, and accelerate the rate of spring snowmelt, ultimately leading to more rapid, earlier, and greater spring runoff (Frederick, 1999). The anticipated early spring floods are likely to be followed by excessively dry summers.

California's water supply is already under stress. According to the National Science Foundation report on climate change in California, "Every major water supply source in California is [decreasing in capacity and] currently over-allocated (CRA, 200 Pg 1-5). A combination of natural and human activities is causing this depletion of California water supplies as well as water intrusion and chemical contamination. According to the Union of Concerned Scientists (UCS), 95% of the state's wetlands have already been destroyed.

In the past, California Water Resources on a statewide basis has allowed California to meet most of its agricultural and urban water management and flood management objectives in most years. Generally, during a single dry year or two, surface and groundwater storage can maintain most water deliveries, but can result in critically low water reserves. Longer droughts can create numerous problems, including extreme fire danger, economic harm to urban and rural communities, loss of crops, and the potential for species collapse and degraded water quality in some regions. Water demand in California is already increasing because of population expansion. In addition, demand for water for irrigation rises with warmer temperatures. Summers with higher temperatures and even less rainfall and runoff than usual will exacerbate demands for water in California.

Climate change magnifies the problems that exist with an aging water infrastructure and growing population. While recent bond measures have provided a down payment for improving California's water and flood systems, climate change presents an ongoing risk that requires a long-term commitment of funding that is properly matched to anticipated expenditures, beneficiaries and responsible parties.

Figure 1-4 – How Climate Change Impacts a Watershed



Source: California Department of Water Resources 2008

APPENDIX B:
MODELING COEFFICIENTS AND DATA ASSUMPTIONS

CITY OF LA HABRA
Greenhouse Gas Emission Inventory
Modeling Coefficients and Data Assumptions

Standard

0.85	backcasting multiplier
2204.6226	lbs / metric ton
1000	kg/metric ton
1000000	g/metric ton
0.907	metric tons/short ton
2000	lbs/ton
2204.6226	lbs/metric ton

GWP

21	CH4
310	N2O

Transportation

On-Road Vehicles

8.81	kg/gallon CO_2 Gasoline
10.15	kg/gallon CO_2 Diesel
121	MJ/gallon gasoline
138	MJ/gallon Diesel

Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C.3) - Kg/gallon CO_2

Aviation Fuel

8.32	kg/gallon CO_2
7.04	gr/gallon CH_4
0.11	gr/gallon N_2O

Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C.6) - gr/gallon CH_4 & N

Electricity

Electricity provided by Southern California Edison for accounts within the City of La Habra.
SCE Emission Coefficients taken from EPA eGrid for year 2005

1000	kWh/MWh
1,000,000	kWh/GWh

CARB report Clearwater Emissions		***Standard Conversions***	
46323.73	metric tons	940.66	million scf
46323730	kg	9.41E+08	scf
		940660	Mcf
		974878.2	MMBTU

47.51745272 kg CO2/MMBTU

Natural Gas

Natural Gas data provided by Southern California Gas Company for all accounts within the City of La Habra

53.06	kg CO2/MMBTU
5	g CH4/MMBTU
0.1	g N2O/MMBTU
1000	scf = 1Mcf
0.9649	Mcf/MMBTU
10	therms/mmbtu

Source: California Climate Action Registry General Reporting Protocol, Version 3.1 January 2009 (Table C.7) - Kg/MMBtu

Area Sources: Landscaping and Woodburning Emissions

Land use data provided by California Department of Finance and City of La Habra

Multifamily		**Single Family**		**Non Residential**	
24.55	Acres/property	0.0193	tons/acre/(2*sqft=acreage		
0.25	tons/property/day	3	units/acre	43560	sqft=1 acre
0.010183299	tons/acre/day	**0.00643333**	**tons/unit/(**	21780	sqft/acre
24.44	units/acre			0.010183	tons/acre/day
0.000416665	**tons/unit/day**			**4.68E-07**	**tons/sqft/day**

Source: URBEMIS2007 Emissions Estimation for Land Use Development Projects, Version 9.2

Wood Burning Coefficients and Conversions:

3400	lbs CO2/ton wood
2458	lbs in a cord of wood
316	g CH4/MMBTU
4.2	g N2O/MMBTU
15.38	MMBTU/ton wood

Source: EPA AP-42 Emission Coefficients, Fifth Edition, Volume I October 1996 (Section 1.10)

Water and Waste Water

Wastewater generation data provided by City of La Habra GP Projections

kWh/MG	Indoor Uses		Outdoor Uses	
	NorCal	SoCal	NorCal	SoCal
Water Supply and Conveyance	2117	9727	2117	9727
Water Treatment	111	111	111	111
Water Distribution	1272	1272	1272	1272
Wastewater Treatment	1911	1911	0	0
Regional Total	5,411	13,021	3,500	11,110

California Energy Commissions Refining Estimates of Water-Related Energy Use in California, December 2006 (Table ES-1)

Standard Conversions

1 ccf = 748 gal.

0.000748

1 acre-foot = 325,851 gal

0.325851

Wastewater Numbers

Stationary Methane Emissions

662	g/m3	Density CH4 at standard conditions
0.99		CH4 Destruction Efficiency
0.0283	m3/ft3	conversion
365.25	days/year	conversion
0.000001	metric ton/g	conversion

Local Government Operations Protocol, Version 1.0, September 2008 (Chapter 10: Wastewater Treatment Facilities)

Process CH4

0.000003785	l/MG	Conversion
0.6	kgCH4/kgBOD removed	CH4 producing capacity (Bo)
0.8	(For anaerobic systems	CH4 Correction Factor
365.25	days/year	Conversion
0.001	metric tons/kg	Conversion

Solid Waste

Waste data derived by City of La Habra General Plan Projections

Lists

Solid Waste Vehicle Types	**Horse Power**				
SW_Vehicles	***Compactor***	***Dozer***	***Tractor***	***Track_Loader***	***Wheel_Loader***
Choose Vehicle	15	175	50	25	25
Articulated/On-highway Trucks	25	250	120	50	50
Compactor	50	500	175	120	120
Dozer	120	750	250	175	175
Excavator	175	1000	500	250	250
Tractor	250	Default	750	500	500
Track Loader	500		1000	750	750
Wheel Loader	Default		Default	Default	Default

Methane Recovery Types

CH4_Recovery

****Choose Method****

No Recovery

Flaring

Gas-to-Energy

APPENDIX C:
DATA INPUTS

CITY OF LA HABRA
Greenhouse Gas Emission Inventory
Annual Usage and Generation

Inventory Year: 2010

Input Notes: Red indicates drop down menu

	2020 Growth Rates	2035 Growth Rates
Residential	8.40%	17.00%
Commercial	8.40%	17.00%
Industrial	8.40%	17.00%

Transportation

On-road Transportation	2010	2020	2035
Annual Vehicle Miles Traveled	267,812,545	282,364,000	304,191,365
Annual Residential Trips	10,400,310	10,965,695	11,813,225
Annual Non-Residential Trips	13,280,160	14,001,400	15,083,990
Average $/gallon Gasoline:	3.16	4.55	5.25
Average $/gallon Diesel:	3.16	4.75	5.45

Electricity and Natural Gas

Electricity

Socal Edison Electricity

Source: EIA

Rate Code	**Annual kWh**	**$/kWh**	**$**
AG TOU	0	$0.00000	$0.00
Domestic	110,796,252	$0.14740	$16,331,367.54
GS-1	23,939,482	$0.11505	$2,754,237.40
GS-2	55,860,460	$0.11505	$6,426,745.92
PA-1	0	$0.00000	$0.00
TC-1	264,344	$0.08870	$23,447.31
Street Lighting	11,672,679	$0.08870	$1,035,366.63
TOU-8	45,209,635	$0.11505	$5,201,368.51
TOU-GS	15,415,466	$0.11505	$1,773,549.36
TOTAL	**263,158,318**		**$33,546,082.68**

SoCal Edison Emission Factors		
Default (2007)	2010	Units
630.89		lbs CO2/MWh
4.8619		lbs CH4/GWh
7.1109		lbs N2O/GWh

California Average Emission Factors		
Default (2007)	2010	Units
658.68		lbs CO2/MWh
28.94		lbs CH4/GWh
6.17		lbs N2O/GWh

Natural Gas

	therms	**$/therms**	
Single Family Residential	1,393,197	$9.70	*Source: EIA*
Multi-Family Residential	5,667,820	$9.70	
Commercial/Industrial	2,516,652	$7.49	
TOTAL	**9577669**	**$87,329,005.12**	

res	110,796,252	$ 16,331,368	42%	49%
non res	152,362,066	$ 17,214,715	58%	51%

Area Source Emissions: Landscaping and Woodburning Emissions

Landscaping Emissions

Land use:

Single Family Residential Units:	12,369	units	*Source: DOF*
Multi-family Residential Units:	7,604	units	*Source: DOF*
Commercial/Industrial Building Space:	7,700	1000 square feet	*Source: GPU*
Industrial Building Space:		1000 square feet	

Woodburning Emissions

Homes with wood stoves:	35%	% of residential homes
Amount of wood burned:	0.80	cords/unit
Homes with fireplaces:	10%	% of residential homes
Price of wood:	$3.50	$/cord of wood

Water and Waste Water

Metered Water Deliveries

	acre-feet	$/acre-feet	(estimates based on tiered rates)
Agriculture	0	$1.45	
Commercial	1,420	$1.69	
Government	290	$1.69	
Industrial	0	$1.69	
Landscape	775	$1.69	
Multifamily	1,655	$1.69	
Reclaimed Water	0	$1.33	
Single Family	5,664	$1.69	
TOTAL	**9,990**		
Million Gallons	**3,255.26**		

Water Sources

	%
MWD	43%
Well	57%

Wastewater *(treated outside of the City)*

Digester Gas	0	cubic feet/day
Fractionof methane in Gas	0	
BOD Load (influent)	0	(mg/l/day)
Total Influent	0	MG/day
Fraction BOD removed	0	

Solid Waste

Waste Disposal Sites	Name	Mileage (round trip)*	Annual Waste (tons)	Methane Recovery Type	Entity Owned/ Operated?
Transfer Station 1	El Sobrante Landfill	80	1763	No Recovery	No
Transfer Station 2				*Choose Method*	*Choose*
Landfill 1	Olinda Alpha Sanitary Landfill	7	46087	Gas-to-Energy	No
Landfill 2	Frank R. Bowerman Sanitary LF	60	6319	Gas-to-Energy	No
Landfill 3				*Choose Method*	*Choose*
Landfill 4				*Choose Method*	*Choose*

*Distance from center of area to facilities outsied the city boundaries. For facilities within entity boundaries, use the average trip milage for all trips.

Source: CalRecycle Disposal Reporting System - Jurisdiction Disposal By Facility 2010

APPENDIX D:
GHG INVENTORY CALCULATIONS

CITY OF LA HABRA
Greenhouse Gas Emission Inventory
Climate Action Plan Comparison Summary

Emissions Source	Estimated 1990	2010	2020 BAU	Reduced 2020	2035 BAU	Reduced 2035
Transportation						
Mobile Source Emissions	90,224	106,146	124,054	80,826	128,104	83,268
Sub Total	***90,224***	***106,146***	***124,054***	***80,826***	***128,104***	***83,268***
Energy						
Electrical Consumption	64,245	75,583	81,931	41,347	88,432	53,059
Electrical Generation	0	0	0	0	0	-
Natural Gas	43,307	50,949	55,229	48,385	57,018	34,211
Sub Total	***107,552***	***126,532***	***137,161***	***89,732***	***145,449***	***87,270***
Area Sources						
Landscaping	13,210	15,542	16,847	13,478	18,184	10,910
Woodburning	12,501	14,707	15,943	12,186	17,207	0
Sub Total	***25,711***	***30,249***	***32,790***	***25,664***	***35,391***	***10,910***
Water and Wastewater						
Water consumption	4,515	5,312	5,758	3,739	6,215	3,729
Wastewater Generation	0	0	0	0	0	0
Sub Total	***4,515***	***5,312***	***5,758***	***3,739***	***6,215***	***3,729***
Solid Waste						
Haul Trucks	109	129	129	96	139	84
Landfill Offgasing	13,364	15,722	17,042	11,166	18,395	11,037
Sub Total	***13,473***	***15,850***	***17,172***	***11,262***	***18,534***	*11,120*
TOTAL	**241,476**	**284,089**	**316,935**	**211,223**	**333,694**	**196,297**

Source	1990	2010	2020 BAU	2020	2035 BAU	Reduced 2035
Transportation	90,224	106,146	124,054	80,826	128,104	83,268
Energy	107,552	126,532	137,161	89,732	145,449	87,270
Area Sources	25,711	30,249	32,790	25,664	35,391	10,910
Water and Wastewater	4,515	5,312	5,758	3,739	6,215	3,729
Solid Waste	13,473	15,850	17,172	11,262	18,534	11,120
Total	241,476	284,089	316,935	211,223	333,694	196,297

CITY OF LA HABRA
Greenhouse Gas Emission Inventory
2010 Emission Inventory

	CO_2	CH_4	N_2O	Total MT CO_2e	Annual Cost
Transportation					
Mobile Source Emissions	100,839	690	4,246	105,775	$30,224,559
HFC's from mobile sources	-	-	-	372	
Sub Total	100,839	690	4,246	106,146	***$30,224,559***
Energy					
Electrical Consumption	64,011	10	224	64,245	$33,546,083
Natural Gas	43,196	85	25	43,307	$87,329,005
Sub Total	107,207	96	249	***107,552***	***$120,875,088***
Area Sources					
Landscaping	13,210	-	-	13,210	
Woodburning	11,584	767	150	12,501	$25,166
Sub Total	24,794	767	150	***25,711***	***$25,166***
Water and Wastewater					
Water consumption	4,498	4	13	4,515	$10,249,494
Sub Total	4,498	4	13	***4,515***	***$10,249,494***
Solid Waste					
Haul Trucks	128	0	0	129	
Landfill Offgasing	-	15,722	-	15,722	
Sub Total	128	15,722	0	***15,850***	
Total	237,467	17,278	4,658	259,775	$161,374,306

CITY OF LA HABRA

Greenhouse Gas Emission Inventory

Transportation Emissions

Transportation						
				Reduced		Reduced
Target Year:	**1990**	**2010**	**2020**	**2020**	**2035**	**2035**
Operational Emissions for CO_2 ($MTCO_2e$/year)[1]:	86,019.30	101,199.18	117,851.45	98,689.10	121,699.10	79,104.41
Pavley Regulation Adjustment (CO_2 metric tons/year)[2]:	86,019.30	100,838.84	98,808.69	82,742.63	65,938.57	42,860.07
CH_4 ($MTCO_2e$/year):	586.46	689.95	3,281.91	566.13	5,253.01	5,253.01
N_2O ($MTCO_2e$/year):	3,608.97	4,245.85	20,196.38	3,483.90	32,326.19	32,326.19
HFCs ($MTCO_2e$/year):	315.78	371.51	1,767.18	304.84	2,828.54	2,828.54
US EPA Adjustment (CO_2e metric tons/year)[3]:	90,224.23	106,146.15	124,054.16	87,097.51	128,104.31	83,267.80
Low Carbon Fuels Rule Adjustment (CO_2e metric tons/year)[4]:	90,224.23	106,146.15	124,054.16	80,826.49	128,104.31	83,267.80
Total (CO_2e metric tons/year):	**90,224.23**	**106,146.15**	**124,054.16**	**80,826.49**	**128,104.31**	**83,267.80**
Cost per year ($)[6]:		$ 30,224,559	$ 29,805,089		$ 32,942,467	$ 21,412,603

1 Emissions of CO_2 from motorvehicle usage was determined from the running and start emissions as taken from EMFAC2007 and is based on vehicle and fuel type. Start Emission fractions and % by residential vs non-residnetial land uses were determined from URBEMIS defaults. Total Annual VMT, Total Residential Trips, and Total Non-residential trips were determined from the traffic information provided by LSA.

	Target Year	2010	
Running Emissions		**% Vehicle Type**	**VMT**
LDA	NCAT	0.50000%	1339062.725
	CAT	52.30000%	140065961
	DSL	0.10000%	267812.545
LDT1	NCAT	0.10000%	267812.545
	CAT	6.80000%	18211253.06
	DSL	0.20000%	535625.09
LDT2	NCAT	0.10000%	267812.545
	CAT	22.70000%	60793447.72
	DSL	0.00000%	0
MDV	NCAT	0.10000%	267812.545
	CAT	10.10000%	27049067.05
	DSL	0.00000%	0
LHD1	NCAT	0.00000%	0
	CAT	1.20000%	3213750.54
	DSL	0.30000%	803437.635
LHD2	NCAT	0.00000%	0
	CAT	0.30000%	803437.635
	DSL	0.20000%	535625.09
MHD	NCAT	0.00000%	0
	CAT	0.20000%	535625.09
	DSL	0.70000%	1874687.815
HHD	NCAT	0.00000%	0
	CAT	0.00000%	0
	DSL	0.20000%	535625.09
OBUS	NCAT	0.00000%	0
	CAT	0.00000%	0
	DSL	0.00000%	0
SBUS	NCAT	0.00000%	0
	CAT	0.00000%	0
	DSL	0.10000%	267812.545
UBUS	NCAT	0.00000%	0
	CAT	0.00000%	0
	DSL	0.00000%	0
MH	NCAT	0.00000%	0
	CAT	0.70000%	1874687.815
	DSL	0.10000%	267812.545
MCY	NCAT	1.90000%	5088438.355
	CAT	0.90000%	2410312.905
	DSL	0.00000%	0
Total			267,812,545.00

Starting emissions		2010					
	Residential	**Trips**	**5**	**20**	**30**	**40**	**50**
LDA	NCAT	31200.93	0.12	0.34	0.45	0.40	0.36
	CAT	5044150.35	1.80	6.95	10.60	10.44	10.63
	DSL	10400.31	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	10400.31	0.04	0.11	0.15	0.13	0.12
	CAT	655219.53	0.31	1.12	1.69	1.65	1.68
	DSL	20800.62	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	10400.31	0.04	0.11	0.15	0.13	0.12
	CAT	2194465.41	1.01	3.76	5.68	5.58	5.67
	DSL	0	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	977629.14	0.60	2.29	3.49	3.43	3.49
	DSL	0	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	634418.91	0.39	1.86	2.98	2.99	3.07
	DSL	52001.55	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	135204.03	0.08	0.40	0.65	0.65	0.67
	DSL	41601.24	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	10400.31	0.06	0.17	0.23	0.20	0.18
	CAT	124803.72	0.04	0.37	0.65	0.68	0.70
	DSL	291208.68	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	20800.62	0.01	0.06	0.11	0.11	0.12
	DSL	10400.31	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	20800.62	0.01	0.06	0.11	0.11	0.12
	DSL	10400.31	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	0	0.00	0.00	0.00	0.00	0.00
	DSL	0	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	0	0.00	0.00	0.00	0.00	0.00
	DSL	0	0.00	0.00	0.00	0.00	0.00
MH	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	0	0.00	0.00	0.00	0.00	0.00
	DSL	0	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	52001.55	0.06	0.18	0.23	0.20	0.19
	CAT	31200.93	0.00	0.02	0.03	0.03	0.03
	DSL	0	0.00	0.00	0.00	0.00	0.00
Total		10,400,310.00					

	Residential	60	120	240	300	360	420
LDA	NCAT	0.27	0.37	0.46	0.44	0.44	0.45
	CAT	8.78	19.22	30.75	32.60	35.75	39.09
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	0.09	0.12	0.15	0.15	0.15	0.15
	CAT	1.39	3.10	4.95	5.24	5.74	6.28
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	0.09	0.12	0.15	0.15	0.15	0.15
	CAT	4.69	10.40	16.60	17.59	19.28	21.09
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	2.89	6.34	10.14	10.75	11.79	12.89
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	2.54	5.11	8.31	8.83	9.69	10.58
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.56	1.09	1.78	1.89	2.08	2.27
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	0.14	0.19	0.24	0.22	0.23	0.23
	CAT	0.58	1.01	1.69	1.81	1.98	2.16
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.10	0.17	0.28	0.30	0.33	0.36
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.10	0.17	0.28	0.30	0.33	0.36
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MH	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	0.14	0.19	0.24	0.23	0.23	0.23
	CAT	0.03	0.05	0.08	0.08	0.09	0.10
	DSL	0.00	0.00	0.00	0.00	0.00	0.00

	Residential	480	540	660	720	$MTCO_2$
LDA	NCAT	0.44	0.45	0.45	0.45	7.07
	CAT	41.86	45.12	50.93	53.74	479.63
	DSL	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	0.15	0.15	0.15	0.15	2.36
	CAT	6.73	7.26	8.21	8.68	77.14
	DSL	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	0.15	0.15	0.15	0.15	2.36
	CAT	22.59	24.37	27.54	29.09	258.91
	DSL	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	13.81	14.89	16.81	17.74	158.22
	DSL	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	11.31	12.15	13.60	14.27	129.40
	DSL	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	2.42	2.60	2.90	3.04	27.72
	DSL	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	0.23	0.23	0.23	0.23	3.59
	CAT	2.30	2.46	2.70	2.80	26.27
	DSL	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.38	0.41	0.45	0.47	4.38
	DSL	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.38	0.41	0.45	0.47	4.38
	DSL	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00
MH	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	0.23	0.23	0.23	0.23	3.64
	CAT	0.11	0.12	0.13	0.13	1.23
	DSL	0.00	0.00	0.00	0.00	0.00
Total						1,186.30

Starting emissions		2010					
Non Residential		**Trips**	**5**	**20**	**30**	**40**	**50**
LDA	NCAT	39840.48	0.26	0.45	0.54	0.44	0.41
	CAT	6440877.6	4.04	9.11	12.51	11.68	12.15
	DSL	13280.16	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	13280.16	0.09	0.15	0.18	0.15	0.14
	CAT	836650.08	0.68	1.47	1.99	1.85	1.92
	DSL	26560.32	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	13280.16	0.09	0.15	0.18	0.15	0.14
	CAT	2802113.76	2.25	4.92	6.71	6.24	6.48
	DSL	0	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	1248335.04	1.34	3.00	4.12	3.84	4.00
	DSL	0	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	810089.76	0.87	2.44	3.51	3.35	3.51
	DSL	66400.8	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	172642.08	0.17	0.52	0.76	0.73	0.77
	DSL	53120.64	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	13280.16	0.13	0.23	0.27	0.23	0.21
	CAT	159361.92	0.09	0.49	0.77	0.76	0.81
	DSL	371844.48	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	26560.32	0.01	0.08	0.13	0.13	0.13
	DSL	13280.16	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	26560.32	0.01	0.08	0.13	0.13	0.13
	DSL	13280.16	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	0	0.00	0.00	0.00	0.00	0.00
	DSL	0	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	0	0.00	0.00	0.00	0.00	0.00
	DSL	0	0.00	0.00	0.00	0.00	0.00
MH	NCAT	0	0.00	0.00	0.00	0.00	0.00
	CAT	0	0.00	0.00	0.00	0.00	0.00
	DSL	0	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	66400.8	0.14	0.23	0.28	0.23	0.21
	CAT	39840.48	0.00	0.02	0.04	0.04	0.04
	DSL	0	0.00	0.00	0.00	0.00	0.00
Total		13,280,160.00					

Non Residential		60	120	240	300	360	420
LDA	NCAT	0.34	0.45	1.16	0.37	0.37	0.38
	CAT	11.13	23.39	76.81	27.39	30.03	32.95
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	0.11	0.15	0.39	0.12	0.12	0.13
	CAT	1.76	3.78	12.35	4.40	4.82	5.29
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	0.11	0.15	0.39	0.12	0.12	0.13
	CAT	5.94	12.66	41.46	14.77	16.20	17.77
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	3.66	7.72	25.34	9.03	9.90	10.87
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	3.21	6.22	20.74	7.42	8.14	8.92
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.70	1.33	4.45	1.59	1.75	1.91
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	0.17	0.23	0.59	0.19	0.19	0.19
	CAT	0.74	1.22	4.22	1.52	1.67	1.82
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.12	0.20	0.70	0.25	0.28	0.30
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.12	0.20	0.70	0.25	0.28	0.30
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MH	NCAT	0.00	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	0.18	0.23	0.60	0.19	0.19	0.19
	CAT	0.03	0.06	0.20	0.07	0.08	0.09
	DSL	0.00	0.00	0.00	0.00	0.00	0.00
Total							

Non Residential		480	540	660	720	$MTCO_2$
LDA	NCAT	0.38	0.38	0.38	0.39	8.66
	CAT	35.52	38.04	42.93	46.65	527.89
	DSL	0.00	0.00	0.00	0.00	0.00
LDT1	NCAT	0.13	0.13	0.13	0.13	2.89
	CAT	5.71	6.12	6.92	7.53	84.93
	DSL	0.00	0.00	0.00	0.00	0.00
LDT2	NCAT	0.13	0.13	0.13	0.13	2.89
	CAT	19.17	20.54	23.21	25.25	285.02
	DSL	0.00	0.00	0.00	0.00	0.00
MDV	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	11.72	12.55	14.17	15.40	174.15
	DSL	0.00	0.00	0.00	0.00	0.00
LHD1	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	9.60	10.24	11.46	12.39	142.27
	DSL	0.00	0.00	0.00	0.00	0.00
LHD2	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	2.06	2.19	2.45	2.64	30.47
	DSL	0.00	0.00	0.00	0.00	0.00
MHD	NCAT	0.19	0.19	0.19	0.20	4.40
	CAT	1.95	2.07	2.28	2.43	28.82
	DSL	0.00	0.00	0.00	0.00	0.00
HHD	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.33	0.35	0.38	0.41	4.80
	DSL	0.00	0.00	0.00	0.00	0.00
OBUS	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.33	0.35	0.38	0.41	4.80
	DSL	0.00	0.00	0.00	0.00	0.00
SBUS	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00
UBUS	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00
MH	NCAT	0.00	0.00	0.00	0.00	0.00
	CAT	0.00	0.00	0.00	0.00	0.00
	DSL	0.00	0.00	0.00	0.00	0.00
MCY	NCAT	0.19	0.19	0.19	0.20	4.46
	CAT	0.09	0.10	0.11	0.11	1.35
	DSL	0.00	0.00	0.00	0.00	0.00
Total						1,307.82

2 Emissions from light duty automobiles, light duty trucks, and medium duty vehicles will be reduced by the implementation of the Pavely regulations. The EMFAC emission factors do not take into account these emission reductions, therefore the additional reductions from this regulation are accounted for below.

		Don't Need to Adjust this amt	Unadjusted Amount Affected by Pavley	Adusted	Adusted	Adusted	Adjusted
		Not Affected by Pavley	LDA/ LDT1/ LDT2/ MDV	LDT1	LDT2	MDV	4 totaled
	2010	6,881.54	94,317.64	7,167.02	23,070.06	10,272.49	93,957.30
	1990	6,365.43	79,653.87	6,709.51	17,461.92	4,214.95	79,653.87
	2010	6,881.54	94,317.64	7,167.02	23,070.06	10,272.49	93,957.30
	2020	8,131.75	109,719.70	6,995.03	24,742.01	11,641.09	90,676.94
	2035	5,853.73	73,250.69	4,840.63	17,538.34	8,404.77	60,084.85
Reduced	2020	6,809.55	91,879.55	5,857.66	20,719.02	9,748.28	75,933.09

Pavley Adjustment

Year	% LDA CO2 Emissions	% LDT1 CO2 Emissions	% LDT2 CO2 Emissions	% LDA/LDT1/LDT2/MDV	% everything else
1990	59.60%	7.80%	20.30%	92.60%	7.40%
2008	0.00%	0.00%	0.00%	0.00%	100.00%
2009	50.60%	7.50%	24.40%	93.90%	6.10%
2010	53.00%	7.10%	22.90%	93.20%	6.80%
2011	0.00%	0.00%	0.00%	0.00%	100.00%
2012	0.00%	0.00%	0.00%	0.00%	100.00%
2013	0.00%	0.00%	0.00%	0.00%	100.00%
2014	0.00%	0.00%	0.00%	0.00%	100.00%
2015	0.00%	0.00%	0.00%	0.00%	100.00%
2016	0.00%	0.00%	0.00%	0.00%	100.00%
2017	0.00%	0.00%	0.00%	0.00%	100.00%
2018	0.00%	0.00%	0.00%	0.00%	100.00%
2019	0.00%	0.00%	0.00%	0.00%	100.00%
2020	50.40%	7.30%	24.10%	93.10%	6.90%
2035	47.20%	7.60%	25.60%	92.60%	7.40%

Year	% CO2 Reduction - LDA	% CO2 Reduction - LDT1	% CO2 Reduction - LDT2
1990	0.00%	0.00%	0.00%
2008	0.00%	0.00%	0.00%
2009	0.00%	0.00%	0.07%
2010	0.35%	0.25%	0.45%
2011	1.75%	1.34%	1.31%
2012	4.07%	3.27%	2.60%
2013	6.31%	5.26%	3.88%
2014	8.48%	7.26%	5.17%
2015	10.74%	9.38%	6.54%
2016	12.96%	11.56%	7.94%
2017	15.03%	13.58%	9.27%
2018	16.94%	15.43%	10.54%
2019	18.72%	17.13%	11.74%
2020	20.37%	18.69%	12.89%
2035	21.52%	19.48%	13.39%

3 U.S. EPA assumption that GHG emissions from other pollutants - CH4, N20, and hydrofluorcarbons (HFCs) from leaking air conditioners account for 5 percent of emissions from vehicles, after accounting for global warming potentail of each GHG.

To account for methane and nitrous oxide emissions CO_2 emissions are multiplied by: 1.052631578947

-Methane is approximately 13% of emissions. 13.00%
-Nitrous Oxide is approximately 80% of emissions. 80.00%
-HFCs are approximately 7% of emissions. 7.00%

4 Emissions from motorvehicles will be reduced by the implementation of the Low Carbon Fuel Standards rule. The EMFAC emission factors do not take into account these emission reductions, therefore the additional reductions from this regulation are accounted for below.

Low Carbon Fuels Standards

Year	Reduction Gasoline and Diesel Fuel	% Reduction Tank to Wheels
1990	0.00	0.00
2008	0.00	0.00
2009	0.00	0.00
2010	0.00	0.00
2010	0.00	0.00
2011	0.25	0.18
2012	0.50	0.36
2013	1.00	0.72
2014	1.50	1.08
2015	2.50	1.80
2016	3.50	2.52
2017	5.00	3.60
2018	6.50	4.68
2019	8.00	5.76
2020	10.00	7.20

Source:
Final Regulation Order
Subchapter 10. Climate Change
Article 4. Regulations to Achieve Greenhouse Gas Reductions
Subarticle 7. Low Carbon Fuel Standard
Section 95482. Average Carbon Intensity Requirements for Gasoline and Diesel

6 This section estimates the cost per year for the miles traveled.

	Target Year	2010		
		MG/mile	MPG	Cost ($)
LDA	Gas	267,812,545	28	3.16
	DSL			3.16
LDT1	Gas			3.16
	DSL			3.16
LDT2	Gas			3.16
	DSL			3.16
MDV	Gas			3.16
	DSL			3.16
LHD1	Gas			3.16
	DSL			3.16
LHD2	Gas			3.16
	DSL			3.16
MHD	Gas			3.16
	DSL			3.16
HHD	Gas			3.16
	DSL			3.16
OBUS	Gas			3.16
	DSL			3.16
SBUS	Gas			3.16
	DSL			3.16
UBUS	Gas			3.16
	DSL			3.16
MH	Gas			3.16
	DSL			3.16
MCY	Gas			3.16
	DSL			3.16
Total				$ 30,224,558.65

CITY OF LA HABRA
Greenhouse Gas Emission Inventory
Electricity and Natural Gas Emissions

Electricity and Natural Gas

Electricity	2010	1990	2010	2020 BAU	2020 Reduced	2035 BAU	2035 Reduced
CO2 metric tons/year:	75,307.20	64,011.12	75,307.20	81,633.00	40,828.07	88,109.42	52,865.65
CH4 metric tons/year:	0.58	0.49	0.58	0.63	0.31	0.68	0.41
N2O metric tons/year:	0.85	0.72	0.85	0.92	0.46	0.99	0.60
Total (CO2e metric tons/year):	75,582.51	64,245.14	75,582.51	81,931.45	40,977.34	88,431.54	53,059

Natural Gas	2010	1990	2008	2020 BAU	2020 Reduced	2035 BAU	2035 Reduced
CO2 metric tons/year:	50,819.11	43,196.24	50,819.11	55,087.92	48,030.57	56,872.04	34,123.23
CH4 metric tons/year:	4.79	4.07	4.79	5.19	4.53	5.36	3.22
N2O metric tons/year:	0.10	0.08	0.10	0.10	0.09	0.11	0.06
Total (CO2e metric tons/year):	50,949.37	43,306.96	50,949.37	55,229.11	48,153.68	57,017.81	34,210.69

Electricity

Southern California Edison

Rate Code	Annual kWh	$/kWh	$
AG TOU	0	$0.00000	$0.00
Domestic	110,796,252	$0.14740	$16,331,367.54
GS-1	23,939,482	$0.11505	$2,754,237.40
GS-2	55,860,460	$0.11505	$6,426,745.92
PA-1	0	$0.00000	$0.00
PA-2	264,344	$0.08870	$23,447.31
Street Lighting	11,672,679	$0.08870	$1,035,366.63
TOU-8	45,209,635	$0.11505	$5,201,368.51
TOU-GS	15,415,466	$0.11505	$1,773,549.36
TOTAL	**263,158,318**		**$33,546,082.68**
2020 Total	**285,263,617**		
2035 Total	**307,895,232**		

Growth Factors 2010 to 2020	
8.40%	Residential
8.40%	Commercial
8.40%	Industrial

Growth Factors 2010 to 2035	
17.00%	Residential
17.00%	Commercial
17.00%	Industrial

SoCal Edison Emission Factors	
630.89	lbs CO2/MWh
4.8619	lbs CH4/GWh
7.1109	lbs N2O/GWh

Natural Gas

	therms	$/therms	$
Single Family Residential	1393197	$9.70	$13,514,010.90
Multi-Family Residential	5667820	$9.70	$54,977,854.00
Commercial/Industrial	2516652	$7.49	$18,837,140.22
TOTAL	**9577669**	**$87,329,005.12**	
2020 Total	**10,382,193**		
2035 Total	**10,718,440**		

Total Energy Cost
$120,875,088

res	1,393,197	$13,514,010.90	15%	15%
non-res	8,184,472	$73,814,994.22	85%	85%

Natural Gas Use (MMBTU)	2020 Natural Gas Use (MMBTU)	2035 Natural Gas Use (MMBTU)
957766.9	1038219.32	1071844.021

CITY OF LA HABRA
Greenhouse Gas Emission Inventory
Area Source Emissions

Area Source Emissions: Landscaping and Woodburning Emissions

Landscaping	2010	1990	2008	2020 BAU	2020 Reduced	2035 BAU	2035 Reduced
CO2 metric tons/year:	15,541.63	13,210.38	15,541.63	16,847.13	16,847.13	18,183.71	10,910.22

Woodburning	2010	1990	2008	2020 BAU	2020 Reduced	2035 BAU	2035 Reduced
CO2 metric tons/year:	13,628.32	11,584.07	13,628.32	14,773.10	11,292.04	15,945.14	0.0
CH4 metric tons/year:	42.95	36.51	42.95	46.56	35.59	50.25	0.0
N2O metric tons/year:	0.57	0.49	0.57	0.62	0.47	0.67	0.0
Total (CO2e metric tons/year):	14,707.18	12,501.10	14,707.18	15,942.58	12,185.95	17,207.40	0.0

Landscaping Emissions

Land use:	2010	2020	2035	
Single Family Residential Units:	12,369	13,408	14,472	units
Multi-family Residential Units:	7,604	8,243	8,897	units
Commercial Building Space:	7,700	8,347	9,009	1000 square feet
Industrial Building Space:	0	-	-	1000 square feet

Woodburning Emissions

Homes with wood stoves:	35%	% of residential homes
Amount of wood burned:	0.80	cords/unit
Homes with fireplaces:	10%	% of residential homes
Price of wood:	$3.50	$/cord of wood

Note: Natural gas fired fireplaces accounted for in electricity and natural gas tab

Growth Factors 2010 to 2020	
8.40%	Residential
8.40%	Commercial
8.40%	Industrial

Growth Factors 2010 to 2035	
17.00%	Residential
17.00%	Commercial
17.00%	Industrial

CITY OF LA HABRA
Greenhouse Gas Emission Inventory
Water and Wastewater Emissions

Water and Wastewater

Water - Electricity	2010	1990	2010	2020 BAU	2020 Reduced	2035 BAU	2035 Reduced
CO2 metric tons/year:	5,292	4,498	5,292	5,736	3,717	6,192	3715
CH4 metric tons/year:	0.23	0.20	0.23	0.25	0.25	0.272	0.163
N2O metric tons/year:	0.05	0.04	0.05	0.05	0.05	0.058	0.035
Total (CO2e metric tons/year):	5,312	4,515	5,312	5,758	3,739	6,215	3,729

Wastewater	2010	1990	2008	2020 BAU	2020 Reduced	2035 BAU	2035 Reduced
CH4 metric tons/year:	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total (CO2e metric tons/year):	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Metered Water Deliveries

	acre-feet	%	$/acre-feet	Total $
Agriculture	0	0.00%	$1,045.44	$0.00
Commercial	1,420	14.48%	$1,045.44	$1,484,524.80
Government	290	2.96%	$1,045.44	$303,177.60
Industrial	0	0.00%	$1,045.44	$0.00
Landscape	775	7.90%	$1,045.44	$810,216.00
Multifamily	1,655	16.88%	$1,045.44	$1,730,203.20
Reclaimed Water	0	0.00%	$1,045.44	$0.00
Single Family	5,664	57.77%	$1,045.44	$5,921,372.16
2010 Total (AF)	**9,804**			**$10,249,493.76**
2010 Total (MG)	3,195			
2020 Total (AF)	**10,628**			
2020 Total (MG)	3,463			
2035 Total (AF)	**11,471**			
2035 Total (MG)	3,738			

Growth Factors 2010 to 2020	
8.40%	Residential
8.40%	Commercial
8.40%	Industrial

Growth Factors 2010 to 2035	
17.00%	Residential
17.00%	Commercial
17.00%	Industrial

25.35% % Non-Residential
74.65% % Residential

Source	2010 AF	2010 MG	2020 MG	2035 MG
Local Water	4216	1374	1489	1607
Purchased Water	5588	1821	1974	2131
kWh		17,712,348	19,200,185	20,723,447

Water Sources

	%
MWD	43%
Well	57%

Wastewater

Digester Gas	0.00	cubic feet/day
Fraction of methane in Gas	0.00	
BOD Load (influent)	0.00	(mg/l/day)
Total Influent	0.00	MG/day
Fraction BOD removed	0.00	

SoCal Edison Emission Factors	
630.89	lbs CO2/MWh
4.8619	lbs CH4/GWh
7.1109	lbs N2O/GWh

2005 California Emission Factors	
658.68	lbs CO2/MWh
28.94	lbs CH4/GWh
6.17	lbs N2O/GWh

Stationary Methane Emissions	0.00	metric tons
Process Methane Emissions	0.00E+00	metric tons

Note: Additional kWh due to conveyence and treatment of State water, and conveyence of Colorado Water. All other conveyence and treatment of water emissions are included in Electricity section.

CITY OF LA HABRA
Greenhouse Gas Emission Inventory
Solid Waste Emissions

Solid Waste							
Target Year:	2010	1990	2010	2020	Reduced 2020	2035	Reduced 2035
Truck Haul CO_2 (CO_2e metric tons/year):	128.43	109.17	128.43	129.26	96.33	139.49	83.70
Truck Haul CH_4 (CO_2e metric tons/year):	0.01	0.00	0.01	0.00	0.00	0.00	0.00
Truck Haul N_2O (CO_2e metric tons/year):	0.10	0.00	0.10	0.00	0.00	0.00	0.00
Offgasing CH_4 (CO_2e metric tons/year):	15,721.80	13,363.53	15,721.80	17,042.43	11,165.68	18,394.51	11,036.70
Equipment CO_2 (CO_2e metric tons/year):	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment CH_4 (CO_2e metric tons/year):	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Equipment N_2O (CO_2e metric tons/year):	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total (CO_2e metric tons/year):	15,850.35	13,472.70	15,850.35	17,171.70	11,262.02	18,534.00	11,120.40

Target Year	2010		Hauling					Landfill Offgasing	
landfill /transfer station name	distance (round trip) (miles)	Waste tons/year	tons / truck	# trucks	Metric Tons/year CO_2	Metric Tons/year CH_4	Metric Tons/year N_2O	Methane Recovery type	off-gasing Metric Tons CH_4
El Sobrante Landfill	80	1763	12	147	21.49502	6E-05	5.64E-05	N/A	
0.00	0	0	12	0	0	0	0	N/A	
Olinda Alpha Sanitary Landfill	7	46,087	12	3841	49.14427	0.000137	0.000129	0.30	13,826
Frank R. Bowerman Sanitary LF	60	6319	12	527	57.79529	0.000161	0.000152	0.30	1,896
0.00	0	0	12	0	0	0	0	0.00	0
0.00	0	0	12	0	0	0	0	0.00	0
Total	**147**	**54169**			**128.4346**	**0.000358**	**0.000337**		**15,722**

Target Year	1990		Hauling					Landfill Offgasing	
landfill /transfer station name	distance (round trip) (miles)	Waste tons/year	tons / truck	# trucks	Metric Tons/year CO_2	Metric Tons/year CH_4	Metric Tons/year N_2O	Methane Recovery type	off-gasing Metric Tons CO_2e CH_4
El Sobrante Landfill	80	1499	12	125	0.000051	0.000051	0.000048	N/A	
0.00	0	0	12	0	0	0	0	N/A	
Olinda Alpha Sanitary Landfill	7	39174	12	3265	41.77455	0.000117	0.00011	Gas-to-Energy	11,752
Frank R. Bowerman Sanitary LF	60	5371.15	12	448	49.13148	0.000137	0.000129	Gas-to-Energy	1,611
0.00	0	0	12	0	0	0	0	*Choose Method*	0
0.00	0	0	12	0	0	0	0	*Choose Method*	0
Total	**147**	**46044**			**90.90608**	**0.000305**	**0.000287**		**13,364**

Target Year	2010		Hauling					Landfill Offgasing	
landfill /transfer station name	**distance (round trip) (miles)**	**Waste tons/year**	**tons / truck**	**# trucks**	**Metric Tons/year CO_2**	**Metric Tons/year CH_4**	**Metric Tons/year N_2O**	**Methane Recovery type**	**off-gasing Metric Tons CH_4**
El Sobrante Landfill	80	1763	12	147	21.49502	6E-05	5.64E-05	N/A	
0.00	0	0	12	0	0	0	0	N/A	
Olinda Alpha Sanitary Landfill	7	46,087	12	3841	49.14427	0.000137	0.000129	Gas-to-Energy	13,826
Frank R. Bowerman Sanitary LF	60	6319	12	527	57.79529	0.000161	0.000152	Gas-to-Energy	1,896
0.00	0	0	12	0	0	0	0	*Choose Method*	0
0.00	0	0	12	0	0	0	0	*Choose Method*	0
Total	**147**	**54169**			**128.4346**	**0.000358**	**0.000337**		**15,722**

Target Year	2020		Hauling					Landfill Offgasing	
landfill /transfer station name	**distance (round trip) (miles)**	**Waste tons/year**	**tons / truck**	**# trucks**	**Metric Tons/year CO_2**	**Metric Tons/year CH_4**	**Metric Tons/year N_2O**	**Methane Recovery type**	**off-gasing Metric Tons CH_4**
El Sobrante Landfill	80	1911	12	160	23.39594	6.53E-05	6.14E-05	N/A	
0.00	0	0	12	0	0	0	0	N/A	
Olinda Alpha Sanitary Landfill	7	49958	12	4164	53.27695	0.000149	0.00014	Gas-to-Energy	14,987
Frank R. Bowerman Sanitary LF	60	6850	12	571	62.6207	0.000175	0.000164	Gas-to-Energy	2,055
Total	**147**	**58719**			**139.2936**	**0.000389**	**0.000366**		**17042.43**

Target Year	2035		Hauling					Landfill Offgasing	
landfill /transfer station name	distance (round trip) (miles)	Waste tons/year	tons / truck	# trucks	Metric Tons/year CO_2	Metric Tons/year CH_4	Metric Tons/year N_2O	Methane Recovery type	off-gasing Metric Tons CH_4
El Sobrante Landfill	80	2063	12	172	25.15064	7.02E-05	6.6E-05	N/A	
0.00	0	0	12	0	0	0	0	N/A	
Olinda Alpha Sanitary Landfill	7	53922	12	4494	57.49918	0.00016	0.000151	Gas-to-Energy	16,177
Frank R. Bowerman Sanitary LF	60	7393	12	617	67.66545	0.000189	0.000178	Gas-to-Energy	2,218
Total	**147**	**63378**			**150.3153**	**0.000419**	**0.000395**		**18394.51**

Target Year	2020	Reduced	Hauling					Landfill Offgasing	
landfill /transfer station name	distance (round trip) (miles)	Waste tons/year	tons / truck	# trucks	Metric Tons/year CO_2	Metric Tons/year CH_4	Metric Tons/year N_2O	Methane Recovery type	off-gasing Metric Tons CH_4
El Sobrante Landfill	80	1424	12	119	17.40073	4.86E-05	4.57E-05	N/A	
0.00	0	0	12	0	0	0	0	N/A	
Olinda Alpha Sanitary Landfill	7	37219	12	3102	39.68902	0.000111	0.000104	Gas-to-Energy	11,166
Frank R. Bowerman Sanitary LF	60	5103	12	426	46.71877	0.00013	0.000123	*Choose Method*	0
Total	**147**	**43746**			**103.8085**	**0.00029**	**0.000273**		**11165.68**

Target Year	2035	Reduced		Hauling					Landfill
landfill /transfer station name	distance (round trip) (miles)	Waste tons/year	tons / truck	# trucks	Metric Tons/year CO_2	Metric Tons/year CH_4	Metric Tons/year N_2O	Methane Recovery type	off-gasing Metric Tons CH_4
El Sobrante Landfill	80	2063	12	103	15.06114	4.2E-05	3.96E-05	N/A	
Olinda Alpha Sanitary Landfill	7	7	12	2696	34.49439	9.62E-05	9.06E-05	Gas-to-Energy	9,705.92
Frank R. Bowerman Sanitary LF	60	60	12	370	40.57734	0.000113	0.000107	Gas-to-Energy	1,330.78
Total	**Total**	**2129.71**			**90.13287**	**0.00025**	**0.00024**	**0.00000**	**11036.7**

	No Recovery	Flaring	Gas-to-Energy	*Choose Method*
Mixed Solid Waste	3.10	0.64	0.30	0.00

Emissions (from EMFAC2007, 30 mph for Heavy-Heavy Duty Trucks, CO_2. CH_4 and N_2O from CCAR)

Year	CO2 (grams/mile	CH4 (grams/mile	N2O (grams/mi
1990	1,827.81	0.0051	0.0048
2008	0.00	0.0051	0.0048
2009	1,827.81	0.0051	0.0048
2010	1,827.81	0.0051	0.0048
2011	0.00	0.0051	0.0048
2012	0.00	0.0051	0.0048
2013	0.00	0.0051	0.0048
2014	0.00	0.0051	0.0048
2015	0.00	0.0051	0.0048
2016	0.00	0.0051	0.0048
2017	0.00	0.0051	0.0048
2018	0.00	0.0051	0.0048
2019	0.00	0.0051	0.0048
2020	1,827.81	0.0051	0.0048
2035	1,827.81	0.0051	0.0048

Low Carbon Fuels Standards		
Year	% Reduction Gasoline and Diesel Fuel	% Reduction Tank to Wheels
1990	0.00	0.00
2008	0.00	0.00
2009	0.00	0.00
2010	0.00	0.00
2011	0.25	0.18
2012	0.50	0.36
2013	1.00	0.72
2014	1.50	1.08
2015	2.50	1.80
2016	3.50	2.52
2017	5.00	3.60
2018	6.50	4.68
2019	8.00	5.76
2020	10.00	7.20
2035	10.00	7.20

APPENDIX E:
REDUCTION MEASURES, ASSUMPTIONS, AND ATTRIBUTED REDUCTIONS

Transportation Reduction Measures

R1-T 1 & 2 Assembly Bill 1493: Pavely I & II

Emissions from light duty automobiles, light duty trucks, and medium duty vehicles will be reduced by the implementation of the Pavely regulations.

Reduction to automobiles & light duty Truck exhaust = 45.0%

R1-T 3 Executive Order S-1-07 (Low Carbon Fuel Standard)

The Low Carbon Fuel Standard (LCFS) will require a reduction of at least 10% in the carbon intensity of California's transportation fuels by 2020. The emissions reduced by this strategy overlap with emissions as a result of the Pavley legislation; adding the emissions reductions would be an overestimate of the actual emissions reductions. Therefore, reductions for this measure are calculated with Pavely following the CARB methodology

Reduction to automobiles & light duty Truck exhaust = Accounted for in the combined Pavely calculations.above

R1-T 4 Tire Pressure Program

The AB32 early action measure involves actions to ensure that vehicle tire pressure is maintained to manufacturer specifications. By 2020, this requirement will reduce emissions in California by approximately 0.55 $MMTCO_2e$, representing 0.3 percent of emissions from passenger/light-duty vehicles in the State.

Reduction to automobiles & light duty Trucks = 0.30%

R1-T 5 Low Rolling Resistance Tires

This AB32 early action measure would increase vehicle efficiency by creating an energy efficiency standard for automobile tires to reduce rolling resistance. By 2020, this requirement will reduce emissions in California by approximately 0.3 $MMTCO_2e$, representing 0.2 percent of emissions from passenger/light-duty vehicles in the State.

Reduction to automobiles & light duty Trucks = 0.30%

R1-T 6 Low Friction Engine Oils

This AB32 early action measure would increase vehicle efficiency by mandating the use of engine oils that meet certain low friction specifications. By 2020, this requirement will reduce emissions in California by approximately 2.8 $MMTCO_2e$, representing 1.7 percent of emissions from passenger light-duty vehicles in the State.

Reduction to automobiles & light duty Trucks = 1.70%

R1-T 7 Goods Movement Efficiency Measures

This AB32 early action measure targets system wide efficiency improvements in goods movement to achieve GHG reductions from reduced diesel combustion. By 2020, this requirement will reduce emissions in California by approximately 3.5 $MMTCO_2e$, representing 1.6 Percent of emissions from all mobile sources (on-road and off-road) in the State.

Reduction afforded to Medium and Heavy Duty Vehicle emissions	=	1.60%

R1-T 8 Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency)

This AB32 early action measure would increase heavy-duty vehicle (long-haul trucks) efficiency by requiring installation of best available technology and/or CARB approved technology to reduce aerodynamic drag and rolling resistance. By 2020, this requirement will reduce emissions in California by approximately 0.93 $MMTCO_2e$, representing 1.9 percent of emissions from heavy-duty vehicles in the State.

Reduction afforded to Heavy Duty Vehicles emissions	=	1.90%

R1-T 9 Medium and Heavy Duty Vehicle Hybridization

The implementation approach for this AB 32 measure is to adopt a regulation and/or incentive program that reduce the GHG emissions of new trucks (parcel delivery trucks and vans, utility trucks, garbage trucks, transit buses, and other vocational work trucks) sold in California by replacing them with hybrids. By 2020, this requirement will reduce emissions in California by approximately 0.5 $MMTCO_2e$, representing 0.2 percent of emissions from all on-road mobile sources in the State. This reduction is also equivalent to a 1.0 percent reduction of emissions from all heavy-duty trucks in the State.

Reduction afforded to all on-road mobile sources	=	0.20%

R2-T 1 **Land Use Based Trips and VMT Reduction Policies**

The demand for transportation is influenced by the density and geographic distribution of people and places. Whether neighborhoods have sidewalks or bike paths, whether homes are within walking distance of shops or transit stops will influence the type and amount of transportation that is utilized. By changing the focus of land use from automobile centered transportation, a reduction in vehicle miles traveled will occur. Changing the focus of land use away from vehicle centered transportation to the increased densities and lay-outs that foster the implementation and use of alternate modes of transportation provides a reduction in VMT for the City.

Assumptions:

* Reduction in VMT is approximately 4% per year.
* Measures R2-T2, R2-T3, R2-T5, R2-T6, R2-T8, and R3-T1 are implemented.

Reductions:

Reduction afforded to passenger/light duty VMT in City = 6.00%

R2-T 2 **Bicycle Infrastructure**

La Habra's Bicycle Infrastructure planning is extensive and describes the construction of 4 miles of Class I bike paths and 7 miles of Class II bikeways to build upon the current 19 miles of bikeways.

Increase of 30 miles of bikeways

Reduction in VMT per mile of bikeway per 100,000 residents = 0.075%

Total reduction afforded to passenger/light duty VMT = 2.50%

R2-T 3 **Electric Vehicle Incentives Program**

Implementation of the SCAG's Plub-in Electric Vehicle (PEV) Plan has the potential to decrease VMT in La Habra. A conservative estimate for adoption of NEVs by residents 12.7% reduction in VMT.

PEV	assumes moderate penetration rate due to NEV plan	1	NEV/household
	VMT Reduction per PEV	0.127	
		0.127	

Energy Reduction Measures

R1-E 1 Renewable Portfolio Standard for Building Energy Use

Senate Bills (SBs) 1075 (2002) and 107 (2006) created the State's Renewable Portfolio Standard (RPS), with an initial goal of 20 percent renewable energy production by 2010. Executive Order (EO) S-14-08 establishes a RPS target of 33 percent by the year 2020 and requires State agencies to take all appropriate actions to ensure the target is met. The 33 percent RPS by 2020 goal is supported by the California Air Resources Board (CARB), though its feasibility is not certain due to current limitations in production and transmission of renewable energy.

Assumptions:

* Southern California Edison reaches its 33% goal for 2020.
* Assumes that in 2010 SCE's renewable portfolio was at 14% with respect to California's RPS.
* Assumes a 19% reduction in emissions from existing kWHs used.
* Assumes R1-E2 through R1-E6 have been implemented.

Reductions:

% Reduction Afforded	=	19.00%

R1-E 2 & 3 AB1109 Energy Efficiency Standard for Lighting (Residential and Commercial Indoor and Outdoor Lighting)

Assembly Bill (AB1109) mandated that the California Energy Commission (CEC) on or before December 31, 2008, adopt energy efficiency standards for general purpose lighting. These regulations, combined with other State efforts, shall be structured to reduce State-wide electricity consumption in the following ways:

- R1-E2: At least 50 percent reduction from 2007 levels for indoor residential lighting by 2018; and
- R1-E3: At least 25 percent reduction from 2007 levels for indoor commercial and outdoor lighting by 2018.

Assumptions:

* Assumes 20% of residential electrical use is from lighting.
* Assumes 37.14% of commercial/industrial electrical usage is from lighting.
* No data was available to determine outdoor lighting use, therefore no reduction was taken.

Reductions:

% reduction from residential electrical use	=	10.00%
% reduction from commercial/industrial electrical use	=	9.29%
Total	=	9.50%

R1-E 4 Electrical Energy Efficiency (AB 32)

This measure captures the emission reductions associated with electricity energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial

to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in California's Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6 of the California Code of Regulations; hereinafter referred to as, "Title 24 Energy Efficiency Standards"), the City's adopted Green Building ordinance (effective January 1, 2011), etc. By 2020, this requirement will reduce emissions in California by approximately 21.3 $MMTCO_2e$, representing 17.5 percent of emissions from all electricity in the State. This measure includes the following strategies:

- "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);
- Broader standards for new types of appliances and for water efficiency;
- Improved compliance and enforcement of existing standards;
- Voluntary efficiency and green building targets beyond mandatory codes;
- Voluntary and mandatory whole-building retrofits for existing buildings;
- Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- More aggressive utility programs to achieve long-term savings;
- Water system and water use efficiency and conservation measures;
- Additional industrial and agricultural efficiency initiatives; and
- Providing real time energy information technologies to help consumers conserve and optimize energy performance.

Assumptions:

- The percent reduction from California's emissions from various energy efficiency measures is equal to the City's emissions from this measures or 17.5%.
- Assumes application only to New development

Reductions:

% reduction afforded	=	17.50%
% of 2020 from growth	=	35.08%
% reduction applied	=	6.14%

R1-E 5 Natural Gas Energy Efficiency (AB 32)

This measure captures the emission reductions associated with natural gas energy efficiency activities included in CARB's AB32 Scoping Plan that are not attributed to other R1 or R2 reductions, as described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the State-wide 2020 target, and will result in additional emissions reductions beyond those already accounted for in California's Energy Efficiency Standards for Residential and Non-Residential Buildings (Title 24, Part 6 of the California Code of Regulations; hereinafter referred to as, "Title 24 Energy Efficiency Standards"), the City's adopted Green Building ordinance(effective January 1, 2011), etc. By 2020, this requirement will reduce emissions in California by approximately 4.3 $MMTCO_2e$, representing 6.2 percent of emissions from all natural gas combustion in the State. This measure includes the following strategies:

- “Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);
- Broader standards for new types of appliances and for water efficiency;
- Improved compliance and enforcement of existing standards;
- Voluntary efficiency and green building targets beyond mandatory codes;
- Voluntary and mandatory whole-building retrofits for existing buildings;
- Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- More aggressive utility programs to achieve long-term savings;
- Water system and water use efficiency and conservation measures;
- Additional industrial and agricultural efficiency initiatives; and
- Providing real time energy information technologies to help consumers conserve and optimize energy performance.

Assumptions:

* The percent reduction from California's emissions from various energy efficiency measures is equal to the City's emissions from this measures or 6.2%.
* Assumes application only to New development

Reductions:

% reduction afforded	=	6.20%
% of 2020 from growth	=	7.75%
% reduction applied	=	0.48%

R1-E 6 Increased Combined Heat and Power (AB 32)

This measure captures the reduction in building electricity emissions associated with the increase of combined heat and power activities, as outlined in CARB's AB32 Scoping Plan. The Scoping Plan suggests that increased combined heat and power systems, which capture "waste heat" produced during power generation for local use, will offset 30,000 GWh State-wide in 2020. Approaches to lowering market barriers include utility-provided incentive payments, a possible CHP portfolio standard, transmission and distribution support systems, or the use of feed-in tariffs. By 2020, this requirement will reduce emissions in California by approximately 6.7 $MMTCO_2e$, representing 7.6 percent of emissions from all electricity in the State.

Assumptions:

* The percent reduction from California's emissions is equal to the City's emissions from this measures or 7.6%.

Reductions:

% reduction afforded	=	7.60%

R1-E 7 Industrial Efficiency Measures (AB 32)

This measure captures the reduction in industrial building energy emissions associated with the energy efficiency measures for industrial sources included in CARB's AB32 Scoping Plan. By 2020, this requirement will reduce emissions in California by approximately 1.0 $MMTCO_2e$, representing 3.9

percent of emissions from all industrial natural gas combustion in the State. CARB proposes the following possible State-wide measures:

- Oil and gas extraction;
- GHG leak reduction from oil and gas transmission;
- Refinery flare recovery process improvements; and
- Removal of methane exemption from existing refinery regulations.

Assumptions:

* The percent reduction from California's emissions is equal to the City's emissions from this measures or 3.9%.
* Assumes applies to all residential, commercial, and industrial land uses.

Reductions:

% reduction afforded = 3.90%

R2-E 1 New Construction Residential Energy Efficiency Requirements

This measure involves the adoption of a program that facilitates energy efficient design for all new residential buildings within the City to be 20% beyond the 2008 Title 24 Standards. This energy efficiency measure is equal to that of the LEED for Homes and ENERGY STAR programs.

The 2008 Title 24 Energy Standards were adopted by the Energy Commission on April 23, 2008, with the 2008 Residential Compliance Manual adopted by the Commission on December 17, 2008. Compliance with the 2008 standards went into effect January 1, 2010. In an effort to meet the overall goal of the California Energy Efficiency Strategic Plan of reaching zero net energy for residential buildings by 2020, the stringency of the Title 24 Energy Standards as regulated and required by the State will continue to increase every three years. As energy efficiency standards increase the City may want to periodically re-evaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal.

To facilitate the implementation of this program, the City could provide all developers with a list of potentially feasible GHG reduction measures that reflect the current state of the regulatory environment prior to design development. The developer will then submit to the City a mitigation report demonstrating which of the proposed reduction measures are feasible as well as why the unselected measures are infeasible. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following**:**

- Install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc.;
- Install solar water heaters;
- Install top quality windows and insulation;
- Install energy efficient lighting;
- Optimize conditions for natural heating, cooling and lighting by building siting and orientation.
- Use features that incorporate natural ventilation;

- Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- Incorporate skylights; reflective surfaces, and natural shading in buildings design and layouts.

Assumptions:

- Applies to new development only.
- Assumes new development to be 25% beyond current Title 24.

Reductions:

% of new residential development	=	2.30%
% reduction afforded	=	25.00%
Total % reduction	=	0.57%

R2-E 2 New Construction Residential Renewable Energy Program

This measure facilitates the voluntary incorporation of renewable energy (such as photovoltaic panels) into new residential developments. For participating developments, renewable energy application should be such that the new home's projected energy use from the grid is reduced by 50%. The California Energy Commissions' New Solar Homes Partnership is a component of the California Solar Initiative and provides rebates to developers of 6 or more units where 50% of the units include solar power. In addition this measure would encourage that all residents be equipped with "solar ready" features where feasible, to encourage future installation of solar energy systems. These features should include the proper solar orientation (south facing roof sloped at 20° to 55° from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank. The incentive program should provide enough funding and other incentives as shown in the R3 measures to result in approximately fifty percent of new residential development participation in this program, thereby resulting in a 25% reduction in electrical consumption from new residential developments.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into a purchased energy offset program that will allow for the purchase of electricity generated from renewable energy resources offsite. Purchased energy offsets (or a combination of incorporated renewables and purchased offsets) must be equal to 25% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

Assumptions:

- Applies to new development only.
- Assumes that 50% of new development will participate.
- Assumes that those developments participating will reduce electrical use by 50%.

Reductions:

% of new residential development	=	2.30%
% reduction from energy use	=	25.00%
Total % reduction	=	0.57%

R2-E 3 Residential Energy Efficiency Retrofits

This measure would initiate a City program that facilitates the incorporation of energy reduction measures for residential buildings undergoing major renovations. AB 811 is a potential funding source to the City for implementing incentive programs to encourage residences within the City to undertake energy efficiency retrofitting and reducing energy consumption in retrofitted homes by a minimum of 15%.

- Replace inefficient air conditioning and heating units with new energy efficient models;
- Replace older, inefficient appliances with new energy efficient models;
- Replace old windows and insulation with top-quality windows and insulation;
- Install solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- Weatherize the existing building to increase energy efficiency.

Assumptions:

- Applies to existing development only.
- Assumes that 25% of existing development will participate.
- Assumes that those developments participating will increase efficiency by 25%.
- Assumes reduction from electrical and natural gas.

Reductions:

% of 2020 that is existing residential development	=	27.33%
% reduction applied	=	25.00%
% existing homes participating	=	25.00%
Total % reduction	=	1.71%

R2-E 4 Residential Renewable Energy Retrofit Program

This measure will initiate an incentive program that encourages residents to retrofit their homes with photovoltaic panels such that 50% of all of the home's electrical usage is offset. The California Energy Commission's Solar Initiative has incentives available to home owners.

Assumptions:

- Applies to existing development only.
- Assumes that 25% of existing development will participate.
- Assumes that those developments participating will reduce emissions from electricity by 50%.
- Assumes reduction from electricity.

Reductions:

% of 2020 that is existing residential development	=	27.33%
% reduction applied	=	50.00%
% existing homes participating	=	25.00%

R2-E 5 New Commercial Energy Efficiency Requirements

This measure facilitates the implementation of energy efficient design for all new commercial buildings to be 20% beyond the current Title 24 Standards. This energy efficiency requirement is 10% greater than the minimum requirements of the LEED and ENERGY STAR programs. As energy efficiency standards increase the City may want to periodically re-evaluate their percentage beyond Title 24 goal to ensure it is still a feasibly achievable goal.

As described in R2-E1 above, the City would provide all developers with a list of potentially feasible GHG reduction measures that reflect the current state of the regulatory environment. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Install energy efficient appliances, including air conditioning and heating units, dishwashers, water heaters, etc.;
- Install solar water heaters;
- Install top quality windows and insulation;
- Install energy efficient lighting;
- Optimize conditions for natural heating, cooling and lighting by building siting and orientation.
- Use features that incorporate natural ventilation;
- Install light-colored "cool" pavements, and strategically located shade trees along all bicycle and pedestrian routes; and
- Incorporate skylights; reflective surfaces, and natural shading in buildings design and layouts.

Assumptions:

- Applies to new development only.
- Assumes new development to be 25% beyond current Title 24.

Reductions:

% new com/ind development that is commercial	=	32.79%
% reduction afforded	=	25.00%
Total % reduction	=	8.20%

R2-E 6 New Commercial/Industrial Renewable Energy Program

This measure would facilitate the voluntary incorporation of renewable (solar or other renewable) energy generation into the design and construction of new commercial, office, and industrial developments. Renewable energy generation shall be incorporated such that a minimum of 20% of the project's total energy needs are offset. In addition this measure would encourage all facilities be equipped with "solar ready" features where feasible, to facilitate future installation of solar energy systems. These features should include the proper solar orientation (south facing roof sloped at 20 to 55 degrees from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank.

As an alternative to, or in support of, providing onsite renewable energy, the project proponent can buy into an offset program that will allow for the purchase of renewable energy resources offsite. Purchased energy offsets (or a combination of incorporated renewables and purchased offsets)

must be equal 20% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

Assumptions:

* Applies to new development only.
* Assumes that 25% of new development will participate.
* Assumes that those developments participating will reduce electrical use by 20%.

Reductions:

% of com/ind development from growth	=	32.79%
% reduction from program	=	20.00%
% of participation	=	25.00%
Total % reduction	=	1.64%

R2-E 7 Commercial/Industrial Energy Efficiency and Renewable Energy Retrofits

This measure encourages all commercial or industrial buildings undergoing major renovations to reduce their energy consumption by a minimum of 20%. As with the new development, a menu of options will be provided to assure flexibility in the implementation of this reduction measure. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Replace inefficient air conditioning and heating units with new energy efficient models;
- Replace older, inefficient appliances with new energy efficient models;
- Replace old windows and insulation with top-quality windows and insulation;
- Install solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- Weatherize the existing building to increase energy efficiency.

Assumptions:

* Applies to existing development only.
* Assumes that 25% of existing development will participate.
* Assumes that those developments participating will increase efficiency by 20%.
* Assumes reduction from electrical and natural gas.

Reductions:

% from existing com/ind development	=	37.59%
% reduction applied	=	20.00%
% of participation	=	25.00%
Total % reduction	=	1.88%

R2-E 8 Municipal Energy Efficiency Retrofit Projects

With the aid of the Energy Efficiency and Conservation Block Grant funds, the City has retrofitted the HVAC System in City Hall, replaced windows, and is retrofitting street sign lighting with energy efficient LED lights.

Assumptions:

* HVAC System is 30% more efficent
* Assumes 16% decreasse in energy due to window replacement
* LED lighting will use 50% less energy on street sign lights.

Reductions:

% LED reduction applied	=	50.00%
HVAC retrofitted	=	30.00%
% 2020 electricity use	=	4.44%
Total % reduction	=	0.67%

Area Source Reduction Measures

R1-A1 **SCAQMD Healthy Hearths Program**

No new wood burning devices in homes

25 Mandatory Curtailment days

Total Heating Days	105	(November-February)
% Reduction	0.171429	

R2-A1 **Electric Landscape Equipment Program:**

Assumes 30% participation by new development

Assumes 5% of existing landscape equipment is exchanged for electric equipment

%Participation from new Development:	0.3
% Participation from new Development:	0.05
Reduction Capacity	70%
% Reduction	0.245

Water Related Emission Reduction Measures

R1-W 1 Renewable Portfolio Standard (33% Renewables by 2020) Related to Water Supply and Conveyance

This measure would increase electricity production from eligible renewable power sources to 33 percent by 2020. A reduction in GHG emissions results from replacing natural gas-fired electricity production with zero GHG-emitting renewable sources of power. By 2020, this requirement will reduce emissions from electricity used for water supply and conveyance in California by approximately 21.3 $MMTCO_2e$, representing 15.2 percent of emissions from electricity generation (in-State and imports).

Assumptions:

* The percent reduction from California's emissions is equal to the City's emissions from electricity used for water supply and conveyance or 21%.
* Assumes applies to all residential, commercial, and industrial land uses.

Reductions:

% reduction afforded = 19.00%

R2-W 1 Water Use Reduction Initiative

This initiative would reduce emissions associated with electricity consumption for water treatment and reduction and therefore are included with the energy reductions. This measure encourages the City to adopt a per capita water use reduction goal in support of the Governors Executive Order S-14-08 which mandates the reduction of water use of 20 percent per capita. The City's adoption of a water use reduction goal would introduce requirements for new development and would provide cooperative support for water purveyors that are required to implement these reductions for existing developments. The City would also provide internal reduction measures such that City facilities will support this reduction requirement. The following represent potential programs that can be implemented to attain this reduction goal.

Water Conservation Program:

Under this program the excessive watering of landscaping, excessive fountain operation, watering during peak daylight hours, water of non-permeable surfaces, excessive water use for noncommercial washing, and water use resulting in flooding or runoff would be prohibited. In addition the program would encourage efficient water use for construction activities, the installation of low-flow toilets and showerheads for all new developments, use of drought-tolerant plants with efficient landscape watering systems for all new developments, recycling of water used for cooling systems, use of pool covers, and the posting of water conservation signage at all hotels.

Under the provisions, new developments are required to adhere to the following water conservation and efficiency measures:

- With the exception of ornamental shade trees, use water-efficient landscapes with native, drought resistant species in all public areas and commercial landscaping. Use water-efficient turf in parks and other turf-dependant spaces;
- Install the infrastructure to use reclaimed water for landscape irrigation and/or washing cars;
- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls;
- Design buildings and lots to be water efficient. Only install water-efficient fixtures and appliances;
- Restrict water methods (prohibit systems that apply water to non-vegetated surfaces) and control runoff. Prohibit businesses from using pressure washers for cleaning driveways, parking lots, sidewalks, and street surfaces;
- Provide education about water conservation and available programs and incentives; and
- Construct driveways to single family detached residences, multi-family residences and parking lots with pervious surfaces.

New Development Incentives:

Provide incentives for developers to comply with the California Green Building Standards Code as requirements for all new development. Under this Code new developments are required to reduce indoor potable water use by 20% beyond the Energy Policy Act of 1992 fixture performance requirements, and to reduce outdoor potable water use by 50% from a mid-summer baseline average consumption through irrigation efficiency, native plant selection, the use of recycled water and/or captured rainwater for example.

Water Meter Program:

Encourage water providers to install water meters for all residential units in the City. This would provide for a better accounting of City water usage and provide potential costing per usage to help offset costs of the implementation of water conservation programs.

Water Efficiency Pricing Program

Under this program, the City would encourage water suppliers to adopt a water conservation pricing schedule (i.e. tiered rate) to encourage efficient water use. Notices could be provided in each billing showing water use budgets and the relationship between the budget and the actual usage.

Water Efficiency Retrofit Program:

This program would encourage upgrades in water efficiency for renovations or additions of residential, commercial, office, and industrial properties equivalent to that of new developments. The City would work with local water purveyors to achieve consistent standards, and to develop, approve, and review procedures for implementation.

Water Efficiency Training and Education:

Under this measure the City, in coordination with local water purveyors would implement a public information and education program that promotes water conservation. The program could include certification programs for irrigation designers, installers, and managers, as well as classes to promote the use of drought tolerant, native species and xeriscaping.

Increased Recycled Water Use:

Promote the use of municipal wastewater and graywater for agricultural, industrial and irrigation purposes. This measure would be subject to approval of the State Health Department and compliance with Title 22 provisions. This measure would facilitate the following:

- Inventory of non-potable water uses that could be substituted with recycled or graywater;
- Determination of the feasibility of producing and distributing recycled water for groundwater replenishment;
- Determine the associated energy/GHG tradeoffs for treatment/use vs. out of basin water supply usage; and
- Cooperation and coordination with responsible agencies to encourage the use of recycled water where energy tradeoffs are favorable.

Assumptions:

- Applies to all land uses (existing and new development)
- Assumes emission reduction of 20%.
- Assumes reduction to electricity used to treat and convey water and wastewater.
- Assumes that approximately 14% of the electricity usage is used to pump water from wells.

Reductions:

% reduction applied to water usage directly	=	20.00%
% of electricity from water pumps	=	14.00%
% reduction applied to electricity:	=	2.80%

Solid Waste Reduction Measures

R1-S 1 State Waste Measures

In the AB 32 Scoping Plan, the State is requiring landfills to initate landfill offgassing control and increase efficency of methane capture systems. Another measure requiring high recycling (75% diversion of solid waste) is accounted for in R2-S1 because the City will need to administer compliance with that measure.

Assumptions:

* Applies to existing and future development.
* Assumes existing methane capture systems
* Assumes increase efficency of 90% fugative methane capture rate
* Does not apply to construction activities

Reductions:

% reduction applied	=	45.00%
% not from construction activities	=	87.00%
% reduction applied	=	39.15%

R2-S 1 City Diversion Program

This measure would implement within the City a County wide waste diversion plan to further the goal of diverting 75% of all waste from landfills by 2020. The following is a potential list of waste reduction measures that will further strengthen existing waste reduction/diversion programs.

- Provide outreach and education programs for residential, commercial, and industrial land uses in order to further promote existing diversion programs;
- Increase disposal fees and/or reduce residential pick-up frequency;
- Encourage businesses to adopt a voluntary procurement standard and prioritize those products that have less packaging, are reusable, recyclable, or compostable;
- Support State level policies that provide incentives for efficient and reduced packaging waste for commercial products;
- Expand list of recyclable materials;
- Work with Recology to develop and provide waste audits;
- Make recycling and composting opportunities mandatory at all public events;
- Establish an appliance end-of-life requirement;
- For new developments, require the use of recycled-content materials, or recycled materials;

- Require a minimum of 15% of materials used in construction be sourced locally, as feasible; and
- Encourage the use of recycled building materials and cement substitutes for new developments.

Assumptions:

- Applies to existing and future development.
- Assumes an existing diversion rate of 58%
- Assumes 2020 goal of 75% diversion rate.
- Does not apply to construction activities

Reductions:

% reduction applied	=	29.31%
% not from construction activities	=	87.00%
% reduction applied	=	25.50%