

Final

CITY OF MORENO VALLEY

Greenhouse Gas Analysis

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Prepared for:



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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
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 ₂ F ₆	Hexafluoroethane
CF ₄	Carbon Tetrafluoride
CH ₄	Methane
CIWMB	California Integrated Waste Management Board
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	Carbon dioxide Equivalent
DPM	Diesel Particulate Matter
EMFAC2007	On-Road Emission Factors published by the CARB in 2007
EMWD	Eastern Metropolitan Water District
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
IPCC	Intergovernmental Panel on Climate Change
Lbs/year	Pounds per Year
LEED	Leadership in Energy and Environmental Design
MMBTU	Million BTUs
MMT	Million Metric Tons
MMT CO ₂ e	Million Metric Tons Carbon Dioxide Equivalent
MVU	Moreno Valley Utility
MWD	Metropolitan Water District of Southern California
MWh/year	Megawatt hours per year
MWh	Megawatt hours
N ₂ O	Nitrous Oxide
O ₃	Ozone
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 Moreno Valley 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 our buildings, recycling our waste, conserving water, and enhancing access to sustainable transportation modes, Moreno Valley will keep dollars in our local economy, create new green jobs and improve community quality of life. These efforts toward reducing GHG emissions described in this report must be done in coordination with the City's land use decisions. The foundation of planning land use decisions is found in the General Plan policies and programs.

Through this GHG Analysis, Moreno Valley has established goals and policies that incorporate environmental responsibility into its daily management of residential, commercial and industrial growth, education, energy and water use, air quality, transportation, waste reduction, economic development, and open space and natural habitats to further their commitment.

The first step in completing the Moreno Valley GHG Analysis was to inventory the City's GHG emissions. Moreno Valley's community-wide emissions were calculated for the year 2007 and 2010. Sources of emissions include transportation, electricity and natural gas use, landscaping, water and wastewater pumping and treatment, and treatment and decomposition of solid waste. The 2007 inventory represents conditions prior to the economic recession and will be used to set the target for reducing emissions by the year 2020. The 2010 inventory was calculated using the most recent data available; this inventory serves as a baseline to demonstrate Moreno Valley's progress toward reducing emissions. The City's GHG emissions amounted to 939,639 metric tons (MT) of CO₂e community-wide in 2007 and 920,712 MT CO₂e in 2010.

Following the state's adopted GHG reduction target, Moreno Valley has set a goal to reduce emissions back to 1990 levels by the year 2020. This target was calculated as a 15 percent decrease from 2007 levels. The AB 32 Scoping Plan suggests a 15 percent decrease from existing levels; however, the Scoping Plan was based on 2005 emissions. For Moreno Valley, 2007 was the year closest to 2005 with the best data available. The projected business-as-usual emissions for the year 2020, based on population and housing growth estimates, are 1,298,546 metric tons of CO₂e. In order to reach the reduction target, Moreno Valley must offset this growth in emissions and reduce community-wide emissions to 798,693 metric tons CO₂e by the year 2020.

The City of Moreno Valley has already demonstrated its commitment to sustainability through a variety of programs and policies. These programs include EECBG-funded energy upgrade projects, participation in the Community Energy Partnership, tracking of building energy use through the Energy Star Portfolio Manager, and the Solar Incentive Program for Moreno Valley Utility customers.

Various state policies have enacted programs that will also contribute to reduced GHG emission in Moreno Valley by the year 2020. Some of these policies are: Renewable Portfolio Standard, Pavley Vehicle Emissions Standards, Low Carbon Fuel Standards, and updated Title 24 building standards. By

supporting the state in the implementation of these measures, Moreno Valley will experience substantial emissions reductions.

In order to reach the reduction target laid out in this GHG Analysis, Moreno Valley needs to implement the additional reduction measures described in this report. These measures encourage energy efficient retrofits, transportation oriented planning, water conservation, and increase recycling and reduced landfill waste. Table ES-1, below, summarizes the community wide emissions for 2007, 2010, 2020 business-as-usual (BAU), and the reduced 2020 inventory with the inclusion of the reduction measures.

Table ES-1 Projected GHG Emissions Comparison					
Source Category	2007	2010	Metric tons of CO₂e		% Reduced from BAU
			BAU 2020	Reduced 2020	
Transportation	517,098	513,581	788,267	421,561	46.5
Energy	287,261	277,230	356,192	251,372	29.4
Area Sources	69,390	69,437	84,665	73,046	13.7
Water and Wastewater	21,595	16,831	20,216	14,158	30.0
Solid Waste	44,294	43,633	49,203	38,000	22.8
Total	939,639	920,712	1,298,543	798,137	38.5
2020 Emission Reduction Target			798,693	798,693	
Note: Mass emissions of CO ₂ e shown in the table are rounded to the nearest whole number. Totals shown may not add up due to rounding.					

This report sets a baseline for the City’s GHG emissions, projects how these emissions will grow, and includes strategies to reduce emissions to a level consistent with California’s emissions reduction target. These strategies complement the City’s General Plan policies and are consistent with Moreno Valley’s vision for a more sustainable community.

Chapter 1 Introduction

CHAPTER 1 INTRODUCTION

The City of Moreno Valley 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 our buildings, recycling our waste, and enhancing access to sustainable transportation modes, we can keep dollars in our local economy, create new green jobs and improve community quality of life.

This section describes the purpose and goals of this report; describes the relationship of the report to the current City General Plan; provides background information on GHG emissions; and summarizes the regulatory framework surrounding GHG emissions and climate change.

1.1 Purpose

The analysis was completed 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; and
- Guide the development, enhancement, and implementation of actions that reduce GHG emissions.

1.2 Goals

With regards to reducing GHG emissions, the City identified the following achievement goals:

- Provide a list of specific measures that will reduce GHG emissions from community sources and municipal operations.
- Reduce emissions attributable to Moreno Valley to levels at or below 1990 GHG emissions by year 2020 consistent with the target reductions of AB 32.

1.3 Relationship to the City's General Plan

The current Moreno Valley General Plan discusses the City's vision and the realization of this vision the following areas: Community Development; Economic Development; Parks, Recreation, and Open Spaces; Circulation; Safety; Conservation; and Housing. Many of the policies of the General Plan indirectly reduce GHG emissions by conserving energy, promoting the use of alternative transportation,

and reducing waste sent to landfills. These policies that are related to reducing GHG emissions are summarized in Section 4.1.

1.4 Background

This report achieves the purpose and goals described above by providing: an analysis of GHG emissions and sources attributable to the City of Moreno Valley; estimates on how those emissions are expected to increase to 2020; and recommended policies and actions that can reduce GHG emissions to meet State, Federal and International targets.

The following discussion includes a brief overview regarding the nature of GHG emissions, the climate change impacts anticipated within the City of Moreno Valley, and the international, federal, state, and local regulatory framework designed to address climate change.

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 suitable range. The 'blanket' is a collection of atmospheric gases called 'greenhouse gases' or GHGs based on the idea that these gases also trap heat like the glass walls of a greenhouse. These gases, mainly water vapor, carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons (CFCs) all act as effective global insulators, reflecting back to earth infrared radiation. 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), Moreno Valley does not generate significant emissions of these GHGs and therefore, they are not considered any further in this analysis. This also includes other synthesized gases such as HFCs and CF₄ which have been banned and are no longer available on the market. Because of the ban, Moreno Valley will not generate emissions of these GHGs and therefore, they are not considered any further in this analysis.

Another GHG with a high global warming potential 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 potencies, a common unit of measurement, the carbon dioxide equivalent (CO₂e) is used to report the combined potency from all of the GHGs. The potency each GHG has in the atmosphere is measured as a combination of the volume of its emissions and its global warming

potential¹, and is expressed as a function of the potency with respect to the same mass of carbon dioxide. Thus, by multiplying the individual gas by its global warming potential, the emissions of each individual gas can be measured in terms of metric tons of CO₂e (MT CO₂e).

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

KYOTO PROTOCOL

The United States participated in the United Nations Framework Convention on Climate Change (UNFCCC) signed on March 21, 1994. The Kyoto Protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008–2012 (UNFCCC 1997). It should be noted that although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the United States is not bound by the Protocol's commitments.

In anticipation of providing an updated international treaty for the reduction of GHG emissions, representatives from 170 countries met in Copenhagen in December 2009 to ratify an updated UNFCCC agreement (Copenhagen Accord). The Copenhagen Accord, a voluntary agreement between the United States, China, India, and Brazil, recognizes the need to keep global temperature rise to below 2 °C and obliges signatories to establish measures to reduce GHG emissions and prepare to help poorer countries in adapting to climate change. The countries met again in Cancun in December 2010 and adopted the Cancun Agreements, which reinforces and builds upon the Copenhagen Accord. The nations agreed to recognize country targets, develop low-carbon development plans and strategies, and report inventories annually. In addition, agreements were made regarding financing for developing countries and technology support and coordination among all nations. The next conference of the parties is scheduled for December 2011 in South Africa.

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

¹ The potential of a gas or aerosol to trap heat in the atmosphere.

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 GHG, 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).

EPA issued a Final Rule for mandatory reporting of GHG emissions in October 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 was effective December 29, 2009, with data collection to begin on January 1, 2010, and the first annual reports due in September 2011. This rule does not regulate the emission of GHGs—it only requires monitoring and reporting of GHG emissions for those sources above certain thresholds (EPA 2009). EPA adopted a Final Endangerment Finding for the six defined GHGs on December 7, 2009. The Endangerment Finding is required before EPA 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 (PSD) and title V Operating Permit programs. This rule took effect on January 2, 2011.

State

CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board, a part of the California EPA (CalEPA) is responsible for the coordination and administration of both federal and state air pollution control programs within



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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 (such as 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 (SIP), 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 percent below 1990 levels.

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 below.

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 U.S. EPA in order to implement the GHG standards and in March of 2008, the U.S. EPA denied the request. However, in June 2009, the decision was reversed and the U.S. EPA

² California Environmental Protection Agency, Climate Action Team Report to Governor Schwarzenegger and the Legislature, March 2006.

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 allowed California to coordinate its 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 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 for Proposed Early Actions to Mitigate Climate Change in California in October 2007. This report described recommendations for discrete early action measures to reduce GHG emissions. The measures included are part of California’s strategy for achieving GHG reductions under AB 32. Three new regulations are proposed to meet the definition of “discrete early action GHG reduction measures,” which include the following: a low carbon fuel standard; reduction of HFC-134a emissions from non-professional servicing of motor vehicle air conditioning systems; and improved landfill methane capture³. CARB estimates that by 2020, the reductions from those three measures would be approximately 13-26 million metric tons (MMT) CO₂e.

Under AB 32, CARB has the primary responsibility for reducing GHG emissions. CARB has published a staff report titled California 1990 GHG Emissions Level and 2020 Emissions Limit⁴ that determined the statewide levels of GHG emissions in 1990 to be 427 million MT CO₂e. Additionally, in December 2008, CARB adopted the Climate Change Scoping Plan, which outlines the state’s strategy to achieve the 2020 GHG limit. This 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, but also includes the discrete early actions.

³ California EPA- California Air Resources Board, Proposed Early Actions to Mitigate Climate Change in California, October 2007.

⁴ California EPA- California Air Resources Board, California 1990 GHG Emissions Level and 2020 Emissions Limit, November 2007.

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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.

CEQA Guidelines § 15183.5, Tiering and Streamlining the Analysis of GHG Emissions, was added as part of the CEQA Guideline amendments 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. The following quote is from the CEQA Guideline amendments:

“§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;*

1.6 REGULATORY SETTING

- (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."*

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

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agencies to promote resiliency. This is the first step in an ongoing, evolving process to reduce California's vulnerability to climate impacts⁵.

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.

⁵ California Natural Resources Agency, 2009 California Climate Adaption Strategy- A Report to the Governor in Response to Executive Order S-13-2008, WWW.Climatechange.Ca.Gov/Adaptation, September 2009

SENATE BILL 375

Senate Bill 375 (SB 375), which establishes mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions, was adopted by the State on September 30, 2008. On September 23, 2010, CARB adopted the vehicular GHG emissions reduction targets that had been developed in consultation with the metropolitan planning organizations (MPOs); the targets require a 7 to 8 percent reduction by 2020 and between 13 to 16 percent reduction by 2035 for each MPO. SB 375 recognizes the importance of achieving significant GHG 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 GHG emissions while meeting housing needs and other regional planning objectives. MPOs will prepare their first SCS according to their respective regional transportation plan (RTP) update schedule; to date, no region has adopted an SCS. The first of the RTP updates with SCS strategies are expected in 2012.

The Southern California Association of Governments (SCAG) is the MPO serving the area including Moreno Valley. SCAG is currently in the process of developing the 2012 RTP and SCS for their jurisdiction aimed at attaining the reduction targets of an 8% per capita reduction in GHG emissions from passenger vehicles by the year 2020 and a 13% reduction by 2035. SCAG is currently developing the SCS and expecting to adopt the SCS, RTP, and the associated programmatic EIR in April 2012. Many of the transportation-related reduction measures included in this analysis will coordinate with efforts in SCAG's SCS.

CALIFORNIA GREEN BUILDING CODE 2010

The California Green Building Standards Code referred to as CALGreen went into effect on January 1, 2011. The code sets new mandatory measures with sensible minimum standards for all new structures in the State. Each local jurisdiction can additionally exceed the new standards by adopting CALGreen voluntary measures as mandatory in their jurisdiction. The measures aim to reduce water consumption, employ building commissioning to increase building system efficiencies, divert construction waste from landfills, and install low pollutant-emitting finish materials.

CALGreen has approximately 52 nonresidential mandatory measures and an additional 130 provisions that have been placed in the appendix for optional use. Some key mandatory measures for commercial occupancies include specified parking for clean air vehicles, a 20% reduction of potable water use within buildings, a 50% construction waste diversion from landfills, use of building finish materials that emit low levels of volatile organic compounds (VOCs), and commissioning for new, nonresidential buildings over 10,000 square feet. For residential buildings, some key measures include a 20% reduction in water use, required irrigation controllers for outdoor water use, 50% construction waste diversion from landfills, and required use of low-VOC paints and building materials (CBSC 2010).

Regional

The City of Moreno Valley is located in the South Coast Air Basin, and the South Coast Air Quality Management District (SCAQMD) is the agency principally responsible for comprehensive air pollution control in the Basin. In order to provide GHG emission guidance to the local jurisdictions within the South Coast Air Basin, the SCAQMD has organized a Working Group to develop GHG emission analysis guidance and thresholds.



SCAQMD released a draft guidance document regarding interim CEQA GHG significance thresholds in October 2008, and issued revised interim CEQA GHG significance threshold in January 2009. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for projects where the SCAQMD is lead agency. SCAQMD proposed a tiered approach, whereby the level of detail and refinement needed to determine significance increases with a project's total GHG emissions. The tiered approach defines projects that are exempt under CEQA and projects that are within a GHG Reduction Plan as less than significant.

SCAQMD has also begun work on an energy policy that integrates criteria and toxic air contaminants, GHGs, and energy issues to ensure clean air and a healthy economy. The policy includes energy facts and statistics related to the South Coast region, policies for the SCAQMD staff to promote zero emissions and clean energy, and actions for staff to take to develop plans to reduce energy use and air emissions and participate in state regulatory proceedings. The draft policy will be presented to the board on July 8, 2011. (SCAQMD 2011)

Chapter 2 **Methodology**

2.1 Overview

GHG inventories include all major sources of emissions attributable directly or indirectly to the City's municipal operations or activities within the community the City serves. GHG inventories are divided into two broad categories, Municipal GHG inventories and Community-wide GHG inventories. Municipal GHG Inventories are emissions resulting from City municipal operations. Community-wide GHG inventories are a broader measure of emissions associated with both the activities within the community the City serves and the municipal operations. As such, the Municipal GHG inventory is a subset of the larger Community-wide GHG inventory. The methodology for preparing GHG inventories incorporates the protocols, methods, and emission factors found in the California Climate Action Registry (CCAR) *General Reporting Protocol* (version 3.1, January 2009), the *Local Government Operations Protocol* (LGOP) (version 1.1, May 2010), and the *Draft Community-wide GHG Emissions Protocol* under development by the Association of Environmental Professionals (AEP) and the International Council for Local Environmental Initiatives (ICLEI). The LGOP provides the guidance and protocols in the development of the Municipal GHG inventory. Currently, there is not an adopted protocol for the development of Community-wide GHG inventories. However, the AEP/ICLEI Draft Community-wide GHG Emissions Protocols provide draft guidance in the development of the Community-wide inventory.

The LGOP and the draft AEP/ICLEI Draft Community-wide GHG Emissions Protocols categorize GHG emissions into three distinct “scopes” as a way of organizing GHG emissions, as follows:

- **Scope 1 Emissions** – All “direct” sources of community-wide GHG emissions from sources within the jurisdictional boundaries of the City. This includes fuel burned onsite in buildings and equipment such as natural gas or diesel fuel; transportation fuels burned in motor vehicles; and wood-burning emissions from household hearths. For inventories of only municipal operations, these emissions are limited to activities under the operational control of the local government.
- **Scope 2 Emissions** – Encompasses “indirect” sources of GHG emissions resulting from the consumption of purchased electricity, which is electricity used by the residents, businesses, and City's facilities. An “indirect” source is one where the action that generates GHGs is separated from where the GHGs are actually emitted. For example, when a building uses electricity, it necessitates the burning of fossil fuels, such as coal or natural gas (and resultant release of GHGs) to generate electricity by a utility facility located elsewhere. Thus they are distinguished from *direct* emissions (i.e., Scope 1 emissions) from electricity production, which are reported by the utility itself, in order to avoid double counting.
- **Scope 3 Emissions** is an optional reporting category that encompasses all other “indirect emissions” that are a consequence of activities of the City's residents and businesses, but occur from sources out of the jurisdictional control of the local government. The key to this category of emissions is that they must be “indirect or embodied emissions over which the local government exerts significant control or influence.” (CCAR 2010) For example, when

considering GHG emissions from trucks hauling waste under a City contract, the City does not own the waste hauling trucks, but does have significant control over how many pickups the trucks make.

Scope 1 emissions are characterized in this report as “direct emissions” While Scope 2 emissions are characterized as “indirect source emissions.”

The analysis herein is tailored to include all existing and projected emission sources within the City to provide, to the fullest extent feasible, a comprehensive analysis of GHG impacts. The Global Warming Solutions Act of 2006 (AB 32) established a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of GHG emissions. The law mandates the reduction of GHG emissions in California to 1990 levels by 2020.

2.2 Calculation of GHGs

This report establishes 2010 as the year on which to base the existing inventory; this is the most recent year for which reliable data concerning the City’s residential, commercial, and government operations are 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 Section 4. The 2010 inventory serves as a reference against which to measure the City’s progress towards reducing GHG emissions since 2007 and into the future, and also serves as documentation for potential emission trading opportunities.

The methodology used for the calculation GHG emissions differs depending on the emission source, as described below. The emissions calculations follow the CCAR General Reporting Protocol, version 3.1; LGOP, version 1.1; 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 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.

In estimating Moreno Valley’s total GHG emissions, data sources from the City, regional, and state agencies were used. Southern California Edison (SCE) and Southern California Gas Company (SCG) provided both municipal and community wide electricity and natural gas data, respectively. Solid waste data was taken from the California Integrated Waste Management Board’s (CIWMB) database. Transportation emissions were calculated based on vehicle miles traveled (VMT) modeled by the City’s traffic engineer using the TRANSIMS traffic model. Total water use in the City was provided by EMWD. The data used in the calculations for each inventory are summarized in Chapter 3. All of the contributors to GHG emissions (kilowatt-hours of electricity generated by fossil fuel combustion in power plants, natural gas in therms, vehicle travel in VMT, and solid waste in tons) are expressed in the common unit of MT of CO₂e released into the atmosphere in a given year.

In addition, the costs associated with the GHG emissions were calculated for each sector (based on availability of data). The costs were based on the consumer fees for each fuel type included in the

CHAPTER 2 METHODOLOGY

inventory. By including the costs, the City can assess where consumers are spending the most money and utilize the information in making decisions on reduction measures.

GHG emissions are typically segregated into direct and indirect sources as discussed previously. 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 report discusses emissions with respect to the general source categories of Transportation, Energy, Area Source, Water, Wastewater, and Solid Waste.

Transportation

ON-ROAD VEHICLES

Carbon dioxide emissions from vehicles were calculated utilizing EMFAC2007 emission factors for the existing and 2020 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 CH₄, and N₂O 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) and total number of trips were determined by the City’s Transportation Analysis and Simulation System (TRANSIMS) model. TRANSIMS is a transportation model developed by the Federal Highway Administration (FHWA) and tracks individual vehicles second-by-second through the road network. This model is based on the Riverside County Traffic Analysis Model (RivTAM) and the SCAG Regional Transportation Model. TRANSIMS estimates 2007 VMT for all trips that begin and/or end within the City limits. This accounts for traffic entering or exiting Moreno Valley and traffic within the City, but excludes pass-through traffic. Moreno Valley’s VMT includes miles from all trips within Moreno Valley and half of the miles from trips that begin or end in Moreno Valley; Moreno Valley 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 Moreno Valley.

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 (business as usual) BAU vehicle trips were estimated by using predicted land use changes and growth. Costs associated with transportation were based on the diesel and gasoline fuel use and their associated per gallon costs in 2007.

Energy

ELECTRICITY

The City emits carbon dioxide, methane, and nitrous oxide indirectly through the use of electricity provided by Southern California Edison (SCE); SCE provided annual energy usage for 2007. 2020 BAU electricity use was estimated based on anticipated growth in the residential and commercial/industrial areas.



SCE provides electricity from a variety of sources including natural gas, nuclear energy, 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 carbon dioxide, methane, and nitrous oxide to determine emissions from these sources.

Costs of electricity calculations were based on the annual kWh use and price per kWh for each rate class. Electricity rates fluctuate throughout the year, so average values were used.

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 carbon dioxide, methane, and nitrous oxide to determine the emissions from natural gas combustion, typically used for heating. Natural gas usage for 2007 was obtained from The Southern California Gas Company. Anticipated 2020 natural gas data was based on per unit usage in 2007 and the anticipated unit growth by 2020. The costs associated with natural gas use were calculated using California 2007 average rates obtained from the U.S. Energy Information Administration (EIA). The rates align with the use breakdowns of residential, industrial, and commercial use.

Area Source

LANDSCAPING

Emissions of carbon dioxide, methane, and nitrous oxide are generated by the use of landscape equipment through the combustion of gasoline. Carbon dioxide emissions were determined directly through URBEMIS2007 for the existing and 2020 inventories. URBEMIS2007 is a computer software package that is used for modeling projected emissions of air quality pollutants including carbon dioxide. From the carbon dioxide emissions, the approximate number of gallons of gasoline consumed through landscape equipment use was calculated. This number was then multiplied by emission factors presented in the General Reporting Protocol, version 3.1 to determine both methane and nitrous oxide emissions.

WOOD BURNING

Direct carbon dioxide 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. Carbon dioxide, methane, and nitrous oxide 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. Cost estimates were made for wood burning using the average cost of wood.

Water

POTABLE WATER

Electricity is needed to move and treat water. Moreno Valley residents and businesses currently use approximately 9 billion gallons of potable water. The water for Moreno Valley is provided by the Eastern Municipal Water District (EMWD) and Box Springs Mutual Water Company. A portion of EMWD's water comes from local sources while the remaining water is from the Colorado River and the State Project water originating in Northern California, which is delivered to Southern California via the California aqueduct. Box Springs' water comes primarily from local sources; however, the company does purchase a small amount of water from Western Municipal Water District (WMWD). WMWD water comes from similar sources as those described for EMWD. 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 this purchased water from the Colorado River and the State Water Project due to the electricity used to transport the water over a long distance. Costs associated with water were based on the average rates for residential, commercial, and industrial customers.



WASTEWATER TREATMENT

EMWD is also the main provider of wastewater and sewer treatment for the City of Moreno Valley. 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. The electricity and transportation emissions are included in their respective categories. This category of emissions only represents the direct methane emissions.

Waste Management

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 carbon dioxide, methane, and nitrous oxide emissions generated per mile traveled.

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 Badlands landfill used for the disposal of waste for Moreno Valley, is not under the City's direct control, emissions from onsite equipment are not included in this inventory.

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 methane. The emission factor to determine methane 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 by-product of decomposition and therefore no fugitive emissions of nitrous oxide are anticipated from this source.

Chapter 3 Greenhouse Gas Emissions Inventory

The following sections include Moreno Valley’s 2010 municipal operations and community-wide emissions inventories. The municipal operations inventory includes sources and quantities of GHG emissions from government owned or rented buildings, facilities, vehicles, and equipment. The community-wide emissions inventory identifies and categorizes the major sources and quantities of GHG emissions being produced by residents, businesses, and municipal operations taking place in the City of Moreno Valley using the best available data. By having the municipal emissions separated from the community as a whole, the local government can implement reduction strategies where it has direct control, closely monitor the changes in emissions over time, and set an example for the rest of the City.

3.1 2010 Municipal Emissions Inventory

Data Inputs

Data for the municipal inventory was gathered from various City departments. Table 3-1, below, summarizes the data inputs and sources for each of the emission categories included in the inventory.

Category	Data Input	Data Source
Electricity (kWh)	9,937,015	SCE
	3,847,738	MVU
Natural Gas (therms)	90,651	SCG
Vehicle Fleet		
<i>Gasoline(gallons)</i>	77,325	Fleet Manager
<i>Diesel (gallons)</i>	28,544	Special Districts
Equipment		
<i>Gasoline(gallons)</i>	2,118	Parks Division
<i>Diesel (gallons)</i>	2,208	Special Districts
Employee Commute (responses)	141	Employee Survey

With the exception of the employee commute data, each data input was then multiplied by the associated emission factor to calculate the emissions inventory. The data from the employee commute survey was used to estimate total miles traveled, fuel used, and associated GHG emissions for all City employees’ commutes. Additionally, where possible, the emissions were categorized by City Department.

Emissions Summary

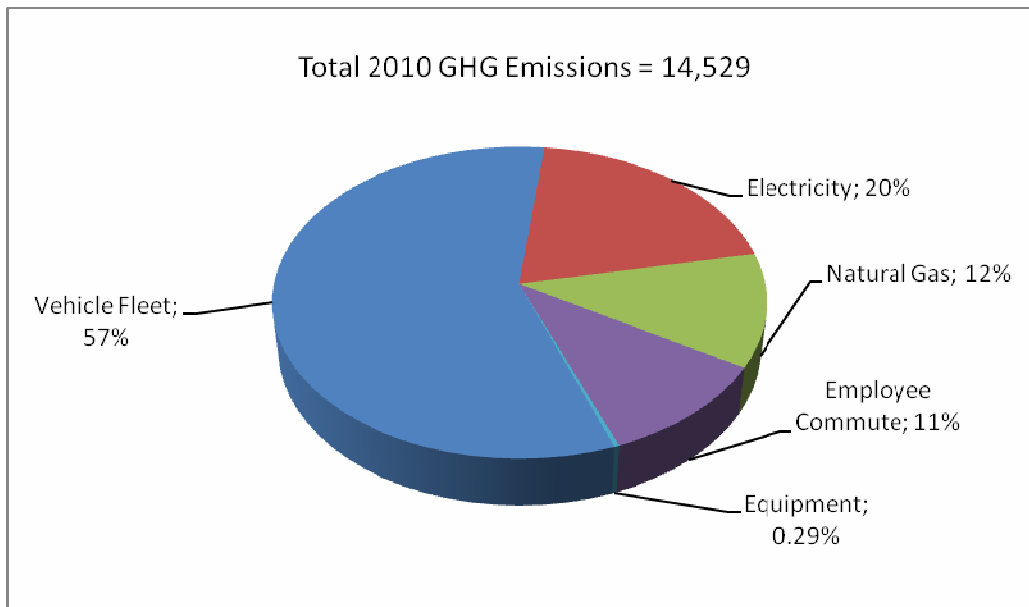
The City of Moreno Valley emitted 14,529 MT CO₂e through its municipal operations in 2010. The emissions were calculated based on the vehicle and equipment fleet fuel use, energy accounts, waste management, and a survey of the City’s employee commutes. The largest portion of the City’s 2010 government emissions were from the City’s vehicle fleet (57 percent), followed by emissions from

3.1 2010 MUNICIPAL EMISSIONS INVENTORY

electricity (20 percent). Table 3-2 summarizes the City’s net 2010 emissions of CO₂e as broken down by emissions category. Figure 3-1 is a graphical representation of Table 3-2.

Table 3-2 2010 Total Municipal Emissions	
Category	Metric tons of CO ₂ e
Vehicle Fleet	7,988
Electricity	2,898
Natural Gas	1,712
Employee Commute	1,538
Equipment	41
Total	14,529

Figure 3-1 2010 Municipal Emissions by Source (metric tons CO₂e)



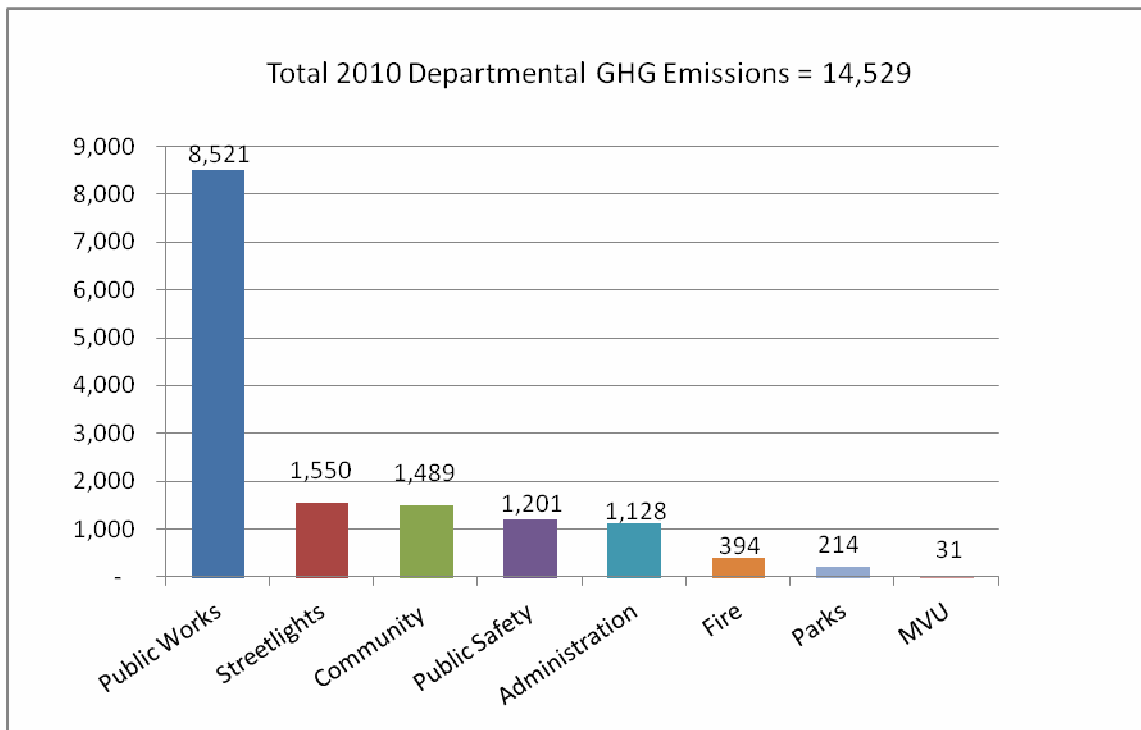
2010 MUNICIPAL DEPARTMENT EMISSIONS AND COSTS

For the municipal inventory it is helpful to see which departments are generating the most emissions. This helps to pinpoint where emissions are coming from and where the focus should be placed for targeting emissions reductions. Table 3-3 and Figure 3-2, below, summarize the electricity, natural gas, and employee commute emissions by department. Vehicle fleet fuel use was not available for each individual department, so those emissions are not included in Table 3-3.

CHAPTER 3 GREENHOUSE GAS EMISSIONS INVENTORY

Table 3-3 2010 Municipal Emissions and Costs by Department		
Category	Metric Tons of CO₂e	Cost (\$)
Public Works ^a	8,521	\$ 561,979
Public Lighting	1,550	\$ 1,753,647
Community/Special Districts	1,490	\$ 343,743
Public Safety	1,201	\$ 210,268
Administration	1,128	\$ 310,242
Fire	394	\$ 87,132
Parks	214	\$ 123,755
MVU ^b	31	\$ 27,236
Total	14,529	\$ 3,418,004
<p>Note: Emission sources include electricity, natural gas, and fuel use in vehicle fleet, equipment, and employee commute.</p> <p>^a Public Works category includes all vehicle fleet emissions with the exception of park-owned vehicles.</p> <p>^b MVU category only represents emissions from indirect electricity use by MVU facilities. See the community-wide inventory for all indirect emissions from MVU electricity used throughout the City of Moreno Valley.</p>		

Figure 3-2 2010 Comparison of Municipal Emissions Generated by Department (MT CO₂e)



2010 MUNICIPAL COST ESTIMATES

The costs associated with the inventory represent the municipal energy and fuel use costs. These cost estimates give the City a perspective on where the City is spending the most money and help to prioritize reduction measures toward the sectors that have the potential to both reduce emissions and costs. Electricity was the largest source of emissions and cost in 2010, while the employees’ commutes followed in emissions and cost. Table 3-4, below, summarizes the cost estimates for 2010.

Category	Cost
Electricity	\$2,634,674
Vehicle Fleet	\$ 383,909
Employee Commute	\$ 303,339
Natural Gas	\$ 79,968
Equipment	\$ 16,113
Total	\$ 3,418,004

3.2 2010 Community-Wide Emissions Inventory

The community-wide inventory represents all emissions from sources located with the jurisdictional boundaries of the City of Moreno Valley. Therefore, the municipal emissions described in the previous section are a subset of the community-wide inventories presented here. In 2010, the City of Moreno Valley emitted a total of 920,657 MT CO₂e from the community as a whole. The following sections describe the data inputs, emissions by source, and emissions by land use in 2010.

Data Inputs

Data for the community-wide inventory was gathered from various City departments, SCE, SCG, and EMWD. Table 3-5, below, summarizes the data inputs and sources for each of the emission categories included in the inventory.

Category	Data Input	Data Source
Electricity (kWh)	633,215,207	SCE
	62,138,000	MVU
Natural Gas (therms)	26,266,326	SCG
Transportation		
<i>Annual Vehicle Miles Traveled</i>	1,077,909,543	City Traffic Engineer
<i>Annual Trips</i>	110,098,975	
Area Source (based on land use)		
<i>SFR (units)</i>	42,642	City Planning
<i>MFR (units)</i>	9,387	
<i>Commercial (ksf)</i>	8,325	
<i>Industrial (ksf)</i>	12,695	
Solid Waste (tons)	144,824	CIWMB
Water (AF)	26,183	EMWD
	87	Box Springs Mutual

Each data input was then multiplied by the associated emission factor to calculate the emissions associated with each source.

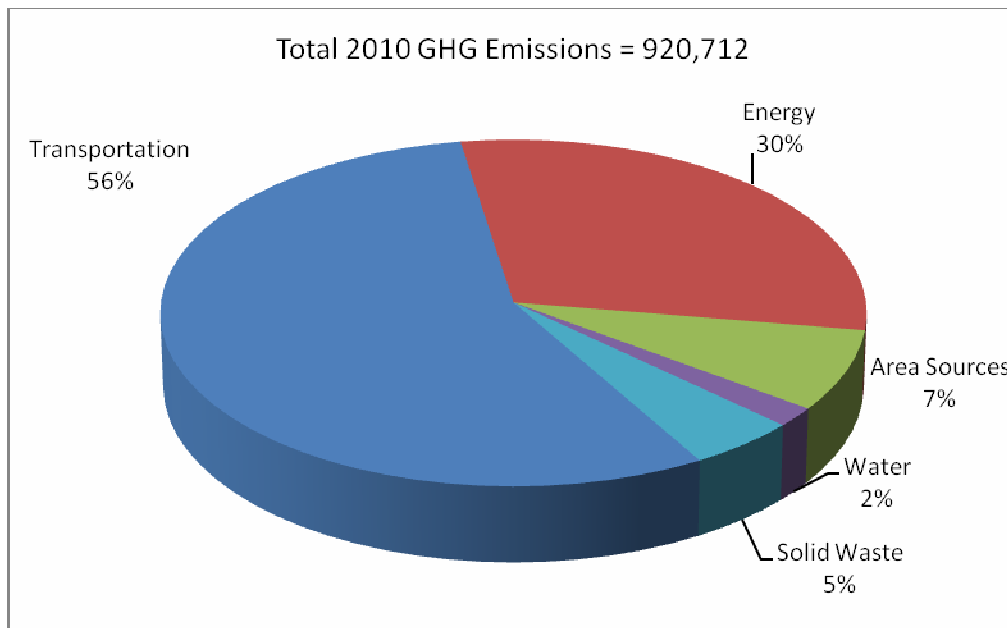
Emissions by Source

Table 3-6 includes the total amount of community-wide GHG emissions for the City of Moreno Valley in 2010 by emission source category. The City of Moreno Valley as a whole emitted 920,657 MT CO₂e in 2010. The largest portion of the City's 2010 emissions were from transportation (56 percent), followed by emissions from electricity and natural gas use in buildings (30 percent). Figure 3-3 provides a comparison of GHG emissions by source category.

3.2 2010 COMMUNITY-WIDE EMISSIONS INVENTORY

Table 3-6 2010 Community-wide GHG Emissions by Source	
Category	Metric tons of CO ₂ e
Transportation	513,581
Energy	277,230
Area Sources	69,437
Solid Waste	43,633
Water and Wastewater	16,831
Total	920,712

Figure 3-3 2010 Emissions Generated by Source



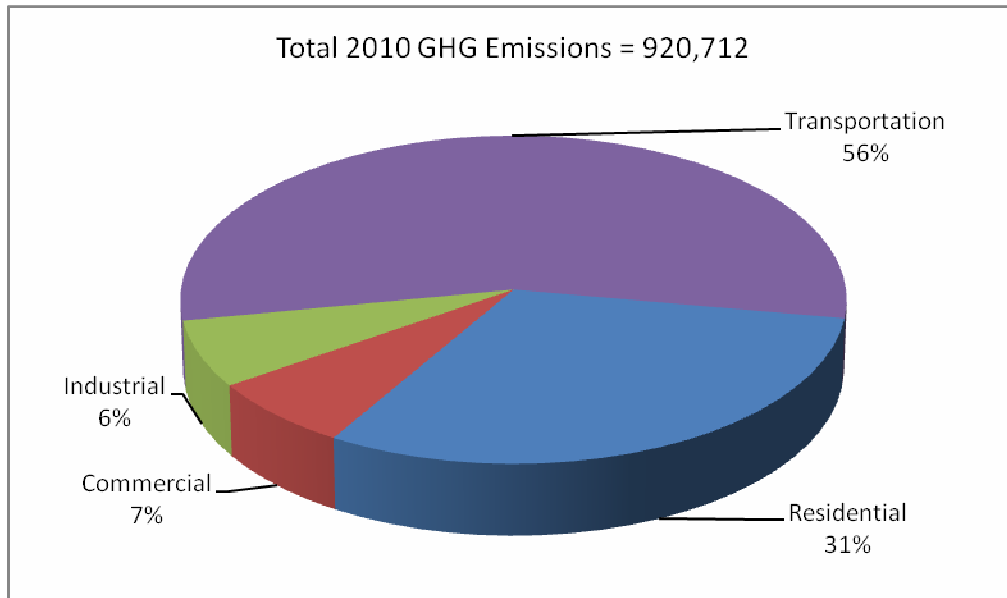
Emissions by Land Use

Table 3-7 summarizes the total amount of community-wide GHG emissions for the City of Moreno Valley in 2010 by land use category. The City of Moreno Valley as a whole emitted 920,712 MT CO₂e in 2010. The largest portion of the City's 2010 emissions were from transportation (56 percent), followed by emissions from residential land uses (31 percent). Due to the nature of mobile emissions, transportation emissions could not be allocated to the individual land use types. Figure 3-4 provides a comparison of GHG emissions by land use category.

CHAPTER 3 GREENHOUSE GAS EMISSIONS INVENTORY

Table 3-7 2010 Community-wide GHG Emissions by Land Use	
Category	Metric tons of CO ₂ e
Transportation	513,581
Residential	283,451
Industrial	60,552
Commercial	63,129
Total	920,712
Note: Numbers may not add up to the total due to rounding.	

Figure 3-4 2010 GHG Emissions by Land Use



3.3 2020 Business-as-Usual Community-Wide Emissions Inventory

In 2020, Moreno Valley is projected to emit a total of 1,298,543 MT CO₂e from a BAU standpoint. BAU refers to continued operations and development of the City according to existing approved General Plan policies, without the inclusion of recently-adopted sustainability initiatives or proposed policies included as part of the General Plan Update as described in Chapter 4. As with the 2010 community-wide inventory, these emissions represent all sources within the jurisdictional boundary of the City of Moreno Valley, including emissions due to the municipal operations of the City. The following sections describe the data inputs, emissions by source, and emissions by land use category for the year 2020.

Data Inputs

Data for the 2020 community-wide inventory was estimated based on projected growth rates for the City and the traffic model's forecasts. Table 3-8, below, summarizes the growth rates and annual VMT data for 2020.

Category	Data Input	Data Source
Transportation		
<i>Annual VMT</i>	1,585,559,510	City Traffic Engineer
<i>Annual Trips</i>	157,447,088	
Growth Rates ^a		
<i>Population</i>	12.8%	City Planning
<i>Housing</i>	19.8%	
<i>Employment</i>	46.2%	
^a Note: The growth rates represent the overall growth from 2010 to 2020.		

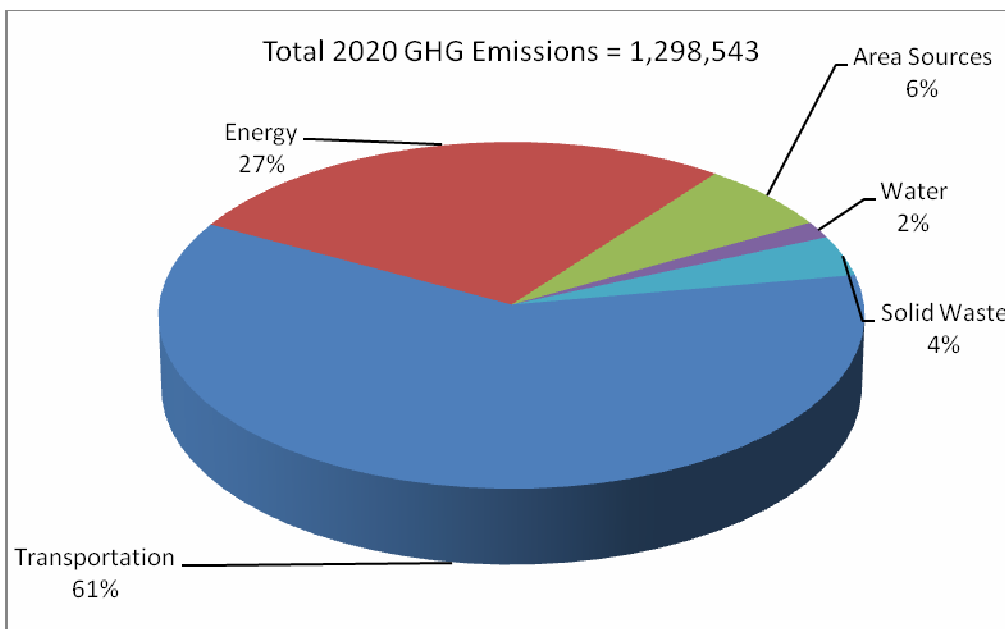
The VMT data from the City's 2035 traffic model was used to extrapolate between 2007 and 2035 in order to estimate 2020 VMT. The growth rates were used to estimate the emissions associated with electricity, natural gas, water, wastewater, area source, and solid waste.

Emissions by Source

The 2020 BAU emissions are estimated based on the projected growth in Moreno Valley from 2010 to 2020. These projections include a 12.8 percent increase in population, 19.8 percent increase in housing, and a 46.2 percent increase employment; these growth rates were applied to 2010 community-wide emissions in order to estimate 2020 BAU emissions. Table 3-9 summarizes the 2020 City emissions of CO₂e as broken down by Emissions category. Figure 3-5 is a graphical representation of Table 3-9.

Table 3-9 2020 BAU GHG Emissions by Source	
Category	Metric tons of CO ₂ e
Transportation	788,267
Energy	356,192
Area Sources	84,665
Solid Waste	49,203
Water and Wastewater	20,216
Total	1,298,543

Figure 3-5 2020 BAU Emissions Generated by Source (MT CO₂e)

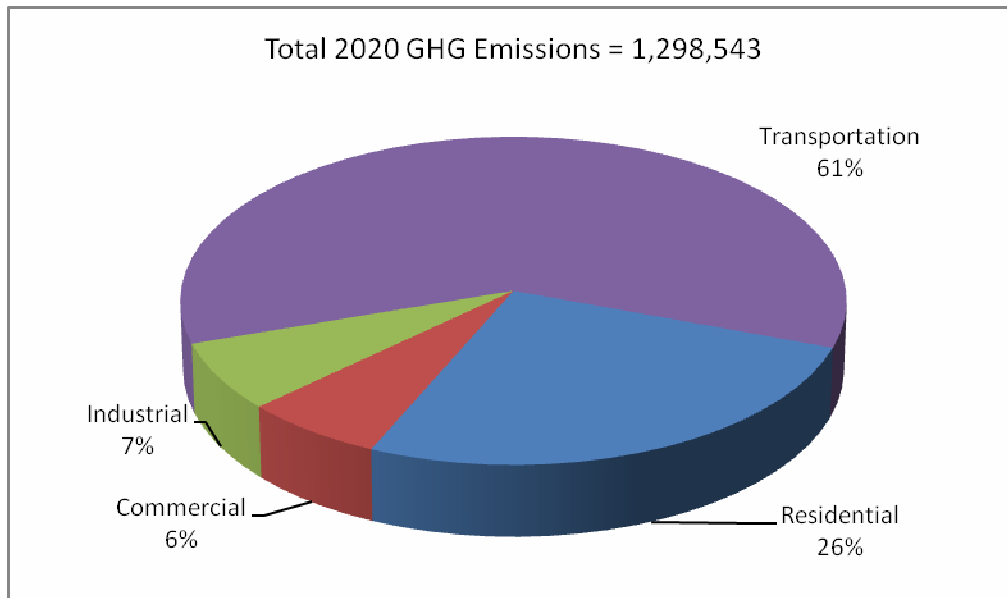


Emissions by Land Use

Table 3-10 summarizes the total amount of community-wide GHG emissions for the City of Moreno Valley in 2020 by land use category. The City of Moreno Valley as a whole is projected to emit 1,298,543 MT CO₂e in 2020. The largest portion of the City’s 2020 emissions are projected to be from transportation (61 percent), followed by emissions from residential land uses (26 percent). Due to the nature of mobile emissions, transportation emissions could not be allocated to the individual land use types. Figure 3-6 provides a comparison of GHG emissions by land use category.

Table 3-10 2020 BAU Community-wide GHG Emissions by Land Use	
Category	Metric tons of CO ₂ e
Transportation	788,267
Residential	338,360
Commercial	84,178
Industrial	87,737
Total	1,298,543
Note: Numbers may not add up to the total due to rounding.	

Figure 3-6 2020 BAU GHG Emissions by Land Use



3.4 2020 Reduction Target

In order for California to meet the goals of AB 32, statewide GHG emissions will need to be reduced back to 1990 levels by 2020. To be consistent with the goals of AB 32, the City of Moreno Valley would also need to achieve the same GHG emission reduction target. In the AB 32 Scoping Plan, CARB equated a return to 1990 levels to a 15 percent reduction from “current” levels. CARB states, “... ARB recommended a GHG reduction goal for local governments of 15 percent below today’s levels by 2020 to ensure that their municipal and community-wide emissions match the state’s reduction target.” (CARB 2008) The reduction target calculated in the Scoping Plan was based on an inventory of the state’s 2004 GHG emissions (then considered to be “current” levels); these emissions represent a high-point in the economy before the economic recession. For Moreno Valley, the reduction target is based

CHAPTER 3 GREENHOUSE GAS EMISSIONS INVENTORY

on the inventory of the City's 2007 GHG emissions. By using 2007, Moreno Valley is consistent with CARB in using an inventory target that is based on pre-recession conditions.

The reduction target is displayed in Table 3-11. Having one overall reduction target, as opposed to targets for each sector, allows Moreno Valley 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 3-11 2020 GHG Emissions Reduction Target	
	Metric Tons CO₂e
2007 Emissions	939,639
% Reduction	15%
2020 Reduction Target	798,693

The 2007 emissions inventory was used to set the GHG emissions reduction target for the year 2020. The 2010 inventory, discussed previously and summarized below, provides a baseline for Moreno Valley to measure future progress toward attaining the 2020 target.

3.5 Emissions Comparison by Year

This report analyzes GHG emissions from the most current year with data available (2010) and estimates the future emissions for the City in 2020. Additionally, this report includes an estimate of 2007 GHG emissions which is used to set the 2020 reduction target for the City. See Table 3-16 for a summary of all inventories.

The 1,298,543 MT CO₂e of GHG emissions for 2020 is an estimated increase of 377,830 MT CO₂e above 2010 levels following BAU projections. The growth from 2007 and 2010 to 2020 is a 38 percent increase and 41 percent increase, respectively. Table 3-12 shows a comparison of total emissions for 2007, 2010, and 2020 BAU emissions.

Table 3-12 GHG Emissions by Source			
Source	Metric Tons CO₂e		
	2007	2010	2020 BAU
Transportation	517,098	513,581	788,267
Energy	287,261	277,230	356,120
Area Sources	69,390	69,437	84,665
Water and Wastewater	21,595	16,831	20,216
Solid Waste	44,294	43,633	49,203
Total	939,639	920,712	1,298,543

3.5 EMISSIONS COMPARISON BY YEAR

The impact of the economic recession is evident in the emission summaries. 2007 emissions represent the peak of the economy with a decline to the levels in 2010; this is consistent with trends in the overall economy.

The AB 32 Scoping Plan suggests local governments estimate a reduction target for 2020 that is 15 percent below 2007 emissions. Table 3-13 shows the 2020 reduction target for the City's community-wide emissions, the 2020 BAU emissions projected for the City, and the difference between the two. This difference represents the total emissions that the City will need to reduce in order to meet the target by 2020.

Table 3-13 2020 GHG Emissions Reduction Target	
	Metric Tons CO₂e
2020 BAU Emissions	1,298,543
2020 Reduction Target	798,693
Amount to Reduce from 2020 BAU	499,850

With the reduction target set at 798,693 MT CO₂e, the City will need to reduce emissions by 499,850 MT CO₂e from the 2020 BAU emissions. This amounts to a 38 percent decrease from 2020 BAU emissions and a 13 percent decrease from the 2010 community-wide emissions. Chapter 4 describes the efforts currently underway in Moreno Valley and the reduction strategies that would be implemented to reduce emissions in the City in order to reach the 2020 reduction target.

CHAPTER 3 GREENHOUSE GAS EMISSIONS INVENTORY

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Chapter 4

GHG Emissions Reduction Programs and Regulations

CHAPTER 4 GHG EMISSIONS REDUCTION PROGRAMS AND REGULATIONS



The State of California has set specific targets for reducing GHG 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 Moreno Valley for regulatory actions already taken or planned by the State of California, this analysis first evaluates the GHG reductions that will occur within the City as a result of these actions. These will be identified 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 GHG 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 and R3 reduction measures are measures that will be incorporated at the City level to provide additional reductions in GHG emissions. R2 measures are those measures that can be quantified to show the value of the reduction from the incorporation of those measures.

R3 measures are those measures that, although they provide a means through which reductions in emissions will occur, cannot be quantified at this time. The R3 measures are supportive measures or methods of implementation for the R2 measures. For example, R3-E2: Energy Efficiency Training and 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.

Also included in the R3 measures are reduction measures that reduce Moreno Valley's government operation emissions. Government operations make up less than 2% 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 Moreno Valley has implemented several programs that have already begun to reduce the City's GHG emissions and will continue to provide reductions through to 2020. 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.

4.1 EXISTING MORENO VALLEY PROGRAMS

The following discussion summarizes the existing Moreno Valley 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 mitigation 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; A – area source; W – water; and S - solid waste.

Each of the R2 measures include the GHG reduction potential, estimated cost, estimated savings, and additional community co-benefits. The co-benefits describe the additional community benefits from implementing the reduction measure beyond the GHG emissions reduced. The following icons are used to indicate the co-benefits for each measure:



Air Quality



Renewable Energy



Energy Use/Energy Efficiency



Transportation Mobility



Land Use/Community Design



Waste Reduction/Recycling



Livable Communities



Water Quality



Public Health



Water Use/Water Conservation

4.1 Existing Moreno Valley Programs

Community Energy Partnership

The Community Energy Partnership (CEP) is a collaboration among seven Southern California cities, Southern California Edison, Southern California Gas Company, and The Energy Coalition. Moreno Valley is one of the member cities participating in CEP. By including in this report an inventory of municipal energy usage, establishing a long term vision and plan for energy efficiency in the City, and identifying policies and funding mechanisms to complete municipal facility energy efficiency projects, Moreno Valley has completed the groundwork for an Energy Action Plan and will soon qualify for Gold Level and an Energy Leader.

Energy Star Portfolio Manager

The Energy Star Portfolio Manager is an online tool for monitoring energy use in buildings. Moreno Valley has setup their portfolio with all municipal buildings; SCE and SCG automatically update the energy use data electronically into the portfolio on a monthly basis. The Portfolio Manager assists the City in comparing energy use and assessing Energy Star qualifying status across facilities.

EECBG Projects

The City has completed a number of energy saving renovations made possible by the allocation of Energy Efficiency and Conservation Block Grant (EECBG) funding. The EECBG Program was funded for the first time by the American Recovery and Reinvestment Act of 2009. It is intended to assist U.S. cities, counties, states, territories, and Indian tribes to develop, promote, implement, and manage energy efficiency and conservation projects and programs designed to:

- Reduce fossil fuel emissions;
- Reduce the total energy use of eligible entities;
- Improve energy efficiency in the transportation, building, and other appropriate sectors; and
- Create and retain jobs.

Table 4-1 summarizes the projects the City has completed along with the annual kWh saved, the project cost, the incentive received, and the annual emissions reduced.

Table 4-1 Municipal EECBG Projects					
Project Name	kWh saved	Project Cost (\$)	Incentive (\$)	Emissions Reduced (MT CO ₂ e)	
Fire Station 48 Lighting	3,155	\$ 3,668	\$ 747	0.61	
Fire Station 65 Lighting	5,368	\$ 3,961	\$ 758	1.03	
Fire Station 6 Lighting	8,095	\$ 10,227	\$ 2,225	1.55	
Senior Center Lighting	14,687	\$ 10,088	\$ 2,038	2.82	
Library Thermostat	26,460	\$ 1,219	\$ 785	5.08	
Library Lighting and HID	79,109	\$ 32,237	\$ 13,670	15.18	
City Hall A/C	179,079	\$ 711,000	\$ 32,017	34.36	
City Hall Lighting	318,988	\$23,817	\$25,354	61.21	
City Hall Window Film ^a	203,250	\$ 43,187	\$ 10,927	230.25	
Total	838,191	\$ 815,587	\$ 88,521	352.09	

^a The window film installation also saved 1,726 therms of natural gas annually.

GREEN MoVal

Getting Residents Energy Efficient Now (GREEN) MoVal is a City initiative that encourages residents to become more energy efficient in their homes. The City has a page on their website that connects members of the community to resources related to energy efficiency: <http://www.moreno-valley.ca.us/green-mv.shtml>

MVU Solar Incentive Program

Moreno Valley Electric Utility offers a Solar Electric Incentive Program, a rebate that can cut the cost of a solar installation. MVU offers a rebate of \$2.80 for every watt of solar installed on the roof of a home or business. All incentives are based on limited available funds and verification of installation. The requirements are as follows:



- Incentives are available to MVU electric customers only.
- The qualifying system must be on the same premises as the customer.
- All solar system components must be new and approved by MVU. Panels and inverters must appear on the latest California Energy Commission certified photovoltaic modules list or certified inverters list.
- Panels must have a warranty for 25 years, and inverters and labor for 10 years. And electric meter must be in place to monitor the system's performance.

Existing General Plan Policies

The City's General Plan lays the framework for continued growth and development in the City. The policies lay the framework for guiding development and land use changes in order to achieve certain goals and objectives. Moreno Valley has goals to create a city that is safe, healthy, and conserves natural resources while accommodating growth and development. While the general plan does not address the reduction of GHGs directly, it does have policies that indirectly reduce emissions. Table 4-2, below, summarizes these relevant policies by emissions category and General Plan element.

CHAPTER 4 GHG EMISSIONS REDUCTION PROGRAMS AND REGULATIONS

Table 4-2 General Plan Polices Related to Reducing GHG Emissions			
Source	Element	Objective	Policies
Energy	Community Development	Residential Opportunities	2.2.15
	Safety	Reduce Air Pollution	6.7.6
	Conservation	Energy Efficiency	7.5.1, 7.5.4, 7.5.5
Transportation	Community Development	Convenient Commercial	2.4.8
		Programs	2-6
	Parks, Recreation, and Open Space Element	Trails System	4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5
		Programs	4-3, 4-10, 4-12, 4-13
	Circulation	Safe Street System	5.1.1, 5.1.2
		Maximize Efficiency	5.4.2, 5.4.5, 5.4.6,
		Retain Rural	5.7.2
		Public Transportation System	5.8.1, 5.8.2, 5.8.3, 5.8.4, 5.8.5
		Pedestrian Facilities	5.9.1, 5.9.2, 5.9.3, 5.9.4
		Encourage Bicycling	5.10.1, 5.10.2, 5.10.3, 5.10.4,
		Eliminate Obstructions	5.11.1, 5.11.2
		School Safety	5.12.1
	Programs	5-10e, 5-10f, 5-11, 5-13, 5-14, 5-15, 5-16, 5-17	
Safety	Reduce Vehicle Trips	6.6.1, 6.6.2, 6.6.3, 6.7.2, 6.7.3	
Conservation	Energy Efficiency	7.5.2, 7.5.3	
Water	Conservation	Minimize Water Consumption	7.3.1, 7.3.2
Area Source	Community Development	High Quality Development	2.10.14
	Safety	Reduce Air Pollutants	6.7.1
Solid Waste	Conservation	Adequate Solid Waste System	7.8.1

4.2 Transportation

Transportation accounts for the largest source of emissions in Moreno Valley. Measures to reduce emissions associated with transportation include encouraging mixed use development, developing near transit corridors, offering incentives for alternative fuels, creating pedestrian and bicycle friendly communities, and replacing older vehicles with more fuel-efficient ones. The measures below describe opportunities for Moreno Valley to reduce the emissions from 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 that will result in emission reductions within the City.

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 percent below 2002 levels by the year 2016, effective with 2009 models. By 2020, this requirement will reduce emissions in California by approximately 16.4 MMTCO₂e, representing 17.3 percent of emissions from passenger/light-duty vehicles in the State (CARB 2008). 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 percent GHG reduction from 2020 model year vehicles. This requirement will reduce emissions in California by approximately 4.0 MMTCO₂e, representing 2.5 percent of emissions from passenger/light-duty vehicles in the State beyond the reductions from the Pavley I regulations described above (CARB 2008).

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

The Low Carbon Fuel Standard (LCFS) will require a reduction of at least ten (10) percent in the carbon intensity of California's transportation fuels by 2020. By 2020, this requirement will reduce emissions in California by approximately 15 MMTCO₂e, representing 6.9 percent of emissions from passenger/light-duty vehicles in the State (CARB 2008). 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 repair service, indicate on the vehicle service invoice that a tired 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 MMTCO₂e, representing 0.3 percent of emissions from passenger/light-duty vehicles in the State (CARB 2008).

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 MMTCO₂e, representing 0.2 percent of emissions from passenger/light-duty vehicles in the State (CARB 2008).

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 MMTCO₂e, representing 1.7 percent of emissions from passenger light-duty vehicles in the State (CARB 2008).

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 MMTCO₂e, representing 1.6 Percent of emissions from all mobile sources (on-road and off-road) in the State (CARB 2008).

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 MMTCO₂e, representing 1.9 percent of emissions from heavy-duty vehicles in the State (CARB 2008).

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 MMTCO₂e, 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 (CARB 2008).

R2 Transportation Measures

The following list of R2 measures are candidate measures the City can implement to achieve an AB 32 compliant reduction target.

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.



GHG Reduction Potential:

20,423 MT CO₂e

4% reduction in passenger vehicle VMT

Community Co-Benefits:



City Costs:

Undetermined costs due to extensive variables in how this is implemented ranging from very modest costs associated with providing incentives to employers to provide commute trip reductions to substantial bicycle and pedestrian infrastructure to facilitate vehicle trip reductions associated with bicycle and pedestrian alternatives.

Private Savings:

\$6,959,091 annually, based on fuel savings from fewer, shorter vehicle trips.

The forthcoming Sustainable Communities Strategy and Regional Transportation Plan for the SCAG region should include opportunities for Moreno Valley to identify areas for Transit Priority Projects (TPPs). TPPs are eligible for streamlined CEQA review.

R2-T2: TRANSIT IMPROVEMENTS

The City of Moreno Valley will continue to coordinate with Riverside Transit Agency (RTA) and SCAG in order to provide timely and cost effective transit services. In particular, the City will work to expand the bus system, incorporate rapid bus transit to desirable destinations, and provide adequate facilities and connections to pedestrian and bicycle systems.



GHG Reduction Potential:

120,087 MT CO₂e

25% reduction in passenger vehicle VMT

Community Co-Benefits:



City Costs:

A more detailed cost analysis must be completed in order to assess the costs that the City will incur from these projects.

City Savings:

--

Private Costs:

A more detailed cost analysis must be completed in order to assess the costs that the RTA and private developers will incur to implement these projects.

Private Savings:

\$40,919,458 annually, based on fuel savings from using public transit rather than personal vehicles

Potential Funding Sources:

In July 2010, RTA published its *Short Range Transit Plan*, which details the plans for improving the RTA system through Fiscal years 2011-2013. In this Plan, RTA identified the following strategies for service improvements in Moreno Valley:

- Establish a base transit network serving major activity centers including schools, shopping centers, medical centers, and the approved Metrolink station
- Connect Moreno Valley to UCR and Downtown Riverside as well as Perris with direct and frequent transit services
- Provide transit service to the existing and planned major development at March Air Reserve Base and adjacent Joint Powers Authority reuse areas.

SCAG is currently in the process of updating the RTP with the draft to be released in December 2011. The RTP will identify plans for the region to expand transit in Moreno Valley and surrounding areas.

R2-T3: EMPLOYMENT-BASED TRIP REDUCTIONS

Transportation Demand Management (TDM) programs work to reduce automobile travel by encouraging ride-sharing, carpooling, and alternative modes of transportation.

The City of Moreno Valley would implement this strategy by including a TDM strategy as mitigation for New Development.



GHG Reduction Potential:

7,401 MT CO₂e

2% reduction in passenger vehicle VMT

Community Co-Benefits:



City Costs:

Undetermined costs depending upon how this is implemented ranging from no costs, to very modest costs associated with providing incentives to employers to provide commute trip reductions.

City Savings:

--

Private Costs:

Minimal administrative fees

Private Savings:

\$2,521,975 annually, based on decreased fuel use

Potential Funding Sources:

New businesses can mitigate transportation related emissions by offering programs, facilities and incentives to their employees that would promote carpooling, transit use, and use of other alternative modes.

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.

R3-T1: REGIONAL LAND USE AND TRANSPORTATION COORDINATION

Promoting the development and use of transit between Moreno Valley and other jurisdictions including the County and neighboring cities enhances the implementation of R2-T1 and R2-T2 described above.

4.3 Energy

Electricity and natural gas use in buildings represent the second largest source of emissions in the City of Moreno Valley. The state has begun to address this source of emissions by requiring new buildings to attain higher standards for energy efficiency and requiring utilities to use more renewable power sources. At the local level, Moreno Valley can encourage developers to go beyond the state requirements and offer incentives to bring older buildings up to current standards.

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.

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 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. 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 (CARB 2008).

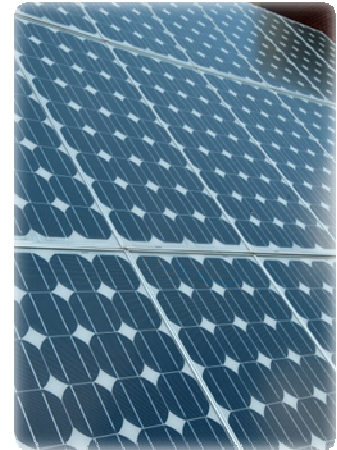
R1-E2 AND R1-E3: AB 1109 ENERGY EFFICIENCY STANDARDS FOR LIGHTING (RESIDENTIAL AND COMMERCIAL INDOOR AND OUTDOOR LIGHTING)

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:

- 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 (CARB 2008).

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 percent of emissions from all electricity in the State (CARB 2008). 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.

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

CHAPTER 4 GHG EMISSIONS REDUCTION PROGRAMS AND REGULATIONS

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 MMTCO₂e, representing 6.2 percent of emissions from all natural gas combustion in the State (CARB 2008). This measure includes similar strategies to those listed above for R1-E4.

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 MMTCO₂e, representing 7.6 percent of emissions from all electricity in the State (CARB 2008).

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 MMTCO₂e, representing 3.9 percent of emissions from all industrial natural gas combustion in the State (CARB 2008). CARB proposes the following possible State-wide measures:

- Oil and gas extraction regulations and programs to reduce fugitive CH₄ emissions;
- GHG leak reduction from oil and gas transmission;
- Refinery flare recovery process improvements; and
- Removal of methane exemption from existing refinery regulations.

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.

R2-E1: NEW CONSTRUCTION RESIDENTIAL ENERGY EFFICIENCY REQUIREMENTS

This measure would facilitate the implementation of energy efficient design for all new residential buildings to be 10% beyond the current Title 24 Standards. This energy efficiency requirement 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 Moreno Valley 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:

GHG Reduction Potential:

3,357 MT CO₂e

10% beyond Title 24 in new residential

Community Co-Benefits:



City Costs:

Administrative costs associated with incorporating energy efficiency mitigation into the development review process

City Savings:

--

Private Costs:

\$15.9 million

The cost is based on an estimated \$1,500 per residential unit.

Private Savings:

\$778,000 annually in reduced energy costs, resulting in an estimated 20 year payback period on the initial cost.

Potential Funding Sources:

WRCOG and SCE

- 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

GHG Reduction Potential:

1,252 MT CO₂e

10% of energy in new residential from on-site renewable energy

Community Co-Benefits:



City Costs:

Administrative costs associated with incorporating alternative energy mitigation into the development review process

City Savings:

--

Private Costs:

\$20 million

Costs assume 10% of units install 2kW solar PV systems at \$7,796/kW. (Anders 2009)

Private Savings:

\$760,000 annually in reduced energy costs, resulting in an estimated 26 year payback period on the initial cost.

Potential Funding Sources:

WRCOG and SCE

This measure would facilitate the incorporation of renewable energy (such as photovoltaic panels or small wind turbines) 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 20% of new residential development participation in this program, thereby resulting in a 10% 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 50% 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

GHG Reduction Potential:

33,418 MT CO₂e

On average, all existing units become 20% more efficient

Community Co-Benefits:



Private Costs:

\$49 million

Assumes cost is equal to \$0.75/kWh and \$4.35/therm saved. (Anders 2009)

Private Savings:

\$7.7 million annually in reduced energy costs, resulting in an estimated 6 year payback period on the initial cost.

Potential Funding Sources:

WRCOG and SCE

This reduction measure would set a goal for the City to increase energy efficiency in existing homes. With the rebates and incentive programs currently available, this measure could allow for all residential units to become, on average, 20% more efficient. One key program ensuring the achievement of this reduction measures is Moreno Valley's partnership with the Western Riverside Council of Governments (WRCOG) surrounding their Energy Efficiency and Water Conservation Program (WRCOG 2009). 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;
- Install solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- Weatherize the existing building to increase energy efficiency.

R2-E4: RESIDENTIAL RENEWABLE ENERGY RETROFITS

GHG Reduction Potential:

5,750 MT CO₂e

10% of energy in residential from on-site renewable energy

Community Co-Benefits:



City Costs:

Undetermined costs depending upon how this is implemented ranging from modest administration costs to moderate costs of incentive programs.

City Savings:

--

Private Costs:

\$81.1 million

Costs assume 10% of units install 2kW solar PV systems at \$7,796/kW. (Anders 2009)

Private Savings:

\$3.5 million annually in reduced energy costs, resulting in an estimated 23 year payback period on the initial cost.

Potential Funding Sources:

WRCOG, SCE, SEC, MVU Solar Incentive

This measure would set a goal for City residents to retrofit their homes with photovoltaic panels or small wind turbines such that 50% of the home's electrical usage is offset. With the current rebates and incentives available, a participation rate of 20% can be achieved. In particular, the California Energy Commission's Solar Initiative has incentives available to home owners. In addition, WRCOG's Energy Efficiency and Water Conservation Program helps finance solar photovoltaic systems for residents.

Residents may also be eligible for an MVU rebate of \$2.80 for every watt of solar installed on the roof of a home.

R2-E5: NEW CONSTRUCTION COMMERCIAL ENERGY EFFICIENCY REQUIREMENTS

GHG Reduction Potential:

3,357 MT CO₂e

On average, all existing units become 10% more efficient

Community Co-Benefits:



City Costs:

Administrative costs associated with incorporating energy efficiency mitigation into the development review process

City Savings:

--

Private Costs:

\$9.7 million

The cost is based on an estimated \$1.00 per square foot to achieve 10% beyond Title 24. (Anders 2009)

Private Savings:

\$1.3 million annually in reduced energy costs, resulting in an estimated 8 year payback period on the initial cost.

Potential Funding Sources:

WRCOG and SCE

This measure would facilitate the implementation of energy efficient design for all new commercial buildings to be 10% beyond the current Title 24 Standards. This energy efficiency requirement meets 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.

R2-E6: NEW CONSTRUCTION COMMERCIAL/INDUSTRIAL RENEWABLE ENERGY

GHG Reduction Potential:

2,030 MT CO₂e

10% of energy in commercial is from on-site renewable energy

Community Co-Benefits:



City Costs:

Administrative costs associated with incorporating alternative energy mitigation into the development review process

City Savings:

--

Private Costs:

\$31.7 million

This cost represents 5kW of solar photovoltaic per 10,000 square feet of new commercial development at an estimated \$6,526/kW. (Anders 2009)

Private Savings:

\$1.2 million annually in reduced energy costs, resulting in an estimated 26 year payback period on the initial cost.

Potential Funding Sources:

SCE, WRCOG

This measure would facilitate the incorporation of renewable (solar or other renewable) energy generation into the design and construction of new commercial, office, and industrial developments. Renewable energy generation would be incorporated such that a minimum of 10% 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, 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 could 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 equal 20% of the total projected energy consumption for the development. See R3-E3 for further details on the financing program.

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 their energy consumption by 25%. The State offers incentives and programs that contribute toward the implementation of this goal. Similar to the residential goals described above, WRCOG's Energy Efficiency and Water Conservation 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.

GHG Reduction Potential:

18,261 MT CO₂e

Assumes a 25% decrease in energy use through a combination of energy efficiency and renewable energy retrofits.

Community Co-Benefits:



City Costs:

Undetermined costs depending upon how this is implemented ranging from modest administration costs to moderate costs of incentive programs.

City Savings:

--

Private Costs:

\$14.6 million

The cost is based on an estimated \$1.50 per square foot to achieve the reductions. (Anders 2009)

Private Savings:

\$6.9 million annually in reduced energy costs, resulting in an estimated 2 year payback period on the initial cost.

Potential Funding Sources:

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 key opportunities for 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.

R3-E2: ENERGY EFFICIENCY TRAINING & PUBLIC EDUCATION

This measure would strengthen Moreno Valley General Plan Policy Infrastructure & Utilities 7.6.8 which provides public education and publicity 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.

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 WRCOG surrounding their Energy Efficiency and Water Conservation Program. The program would provide property with low-interest loans that would be repaid over time through annual property tax payments.

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.

R3-E5: ALTERNATIVE ENERGY DEVELOPMENT PLAN

The accomplishment of this measure would encourage the City and MVU 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.

4.4 Area Source

The following list includes measures related to landscaping and wood burning emissions that will reduce emissions and help the City to achieve an AB 32 compliant reduction target.

R1 Area Source Reduction Measure

R1-L1: 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;
- 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 (AQMD 2008).

R2 Area Source Reduction Measure

R2-L1: ELECTRIC LANDSCAPING EQUIPMENT

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

GHG Reduction Potential:

4,207 MT CO₂e

The change out from gas powered equipment to electric powered equipment reduces emissions by 38.5%. The reduction calculations assume all new developments use electricity rather than gas powered equipment.

Community Co-Benefits:



City Costs:

Undetermined costs due to variables ranging from no costs with no city involvement, modest costs associated engaging the public to participate in the program, to moderate costs of teaming with SCE in the incentive program.

City Savings:

--

Private Costs:

There is no additional cost associated with installing external outlets and purchasing electric equipment rather than gas-powered.

Private Savings:

Savings vary depending on fuel used

Potential Funding Sources:

SCAQMD lawn-mower trade-in program

electric landscaping equipment in used in place of conventional equipment, direct GHG emissions from natural gas combustion are replaced with indirect GHG emissions associated with the electricity used to power the equipment.



R3 Area Source Reduction Measures

The following R3 measures are related to landscape strategies that will help reduce GHG emissions and can be incorporated into development projects without additional cost. These measures strategically place trees and other 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-L1: 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. In support of Environmental Resources Goal 10.10 from Moreno Valley's General Plan, all future development shall be encouraged to preserve native trees and vegetation to the furthest extent possible.

R3-L2: HEAT ISLAND PLAN

The implementation of this measure would include promoting the use of cool roofs, cool pavements, and parking lot shading by increasing the number of strategically placed shade trees. Further, City wide Design Guidelines should be amended to 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

Although emissions associated with water represent a small portion of the total emissions for the City, Moreno Valley can still conserve water use in order to reduce the reliance on imported water from the state and encourage the use of recycled 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.

R1-W1: RENEWABLE PORTFOLIO STANDARD (33 PERCENT 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 MMTCO₂e, representing 15.2 percent of emissions from electricity generation (in-State and imports) (CARB 2008).

R1-W2: CAL GREEN BUILDING STANDARDS

The 2010 California Green Building Standards (CALGreen) went into effect January 1, 2011. The standards include a 20% mandated reduction in indoor water use for all residential and commercial buildings. For outdoor water use, CALGreen requires developers to install landscaping devices that can sense moisture content of soil and restrict landscaping-related water use when moisture content is high.

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.

R2-W1: WATER USE REDUCTION INITIATIVE

GHG Reduction Potential:

3,493 MT CO₂e

The calculated emission reductions assume all new developments reduce water consumption by 20%.

Community Co-Benefits:



City Costs:

Administrative costs associated with water conservation included in the development review process.

City Savings:

--

Private Costs:

Considered negligible if implemented with new development

Private Savings:

\$3.9 million annually in reduced water costs.

Potential Funding Sources:

EMWD rebates

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 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 could 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.

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.

INCREASED RECYCLED WATER USE

Coordinate with EMWD to 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:

CHAPTER 4 GHG EMISSIONS REDUCTION PROGRAMS AND REGULATIONS

- 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;
- Cooperation and coordination with responsible agencies to encourage the use of recycled water where energy tradeoffs are favorable.

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 EMWD and 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.

4.6 Solid Waste

The following measures describe ways for the City of Moreno Valley to reduce the amount of waste sent to the landfill and thus reduce the associated GHG emissions.

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.

R1-S1: WASTE MEASURES

The CARB AB 32 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 MMTCO₂e reduction by 2020 (CARB 2008). 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.

R1-S2: CAL GREEN CONSTRUCTION WASTE REDUCTION

The 2010 CALGreen Standards also include a measure for the reduction of construction waste. This measure states that at least 50% of non-hazardous construction and demolition debris must be recycled or salvaged. This reduces the amount of waste sent to the landfill and thus reduces GHG emissions associated with the decomposition of solid waste.

R2 Solid Waste Measures

The following R2 measure reduces emissions related to solid waste and helps Moreno Valley to achieve an AB 32 compliant reduction target.

R2-S1: CITY DIVERSION PROGRAM

GHG Reduction Potential:

26,577 MT CO₂e

The emissions reductions account for a 20% decrease in non-construction waste sent to landfills. Non-construction waste represents 87% of Moreno Valley's total waste.

Community Co-Benefits:



City Costs:

Administrative costs of including construction material recycling, interior and exterior recycling storage areas in new development, and recycling at public events.

City Savings:

--

Private Costs:

--

Private Savings:

Undetermined

Potential Funding Sources:

--

The state has set the following targets for Moreno Valley's solid waste disposal: 4.4 pounds per day (PPD) per resident and 31.8 PPD per employee (equating to a diversion rate of 50%). As of 2009, the City is below the target for both categories: 3.3 PPD per resident and 26 PPD per employee. To further reduce the amount of waste disposed, and comply with AB 341, this measure would set a target for the City to increase the waste diverted to 75% by 2020 (this equates to 2.2 PPD per resident and 15.9 PPD per employee). 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 of the Inland Empire and Riverside County Waste Management.

- Provide outreach and education programs for residential, commercial, and industrial land uses in order to further promote existing City diversion programs;
- Encourage businesses to adopt a voluntary procurement standard and prioritize those products that have less packaging, are reusable, or recyclable;
- Support State level policies that provide incentives for efficient and reduced packaging waste for commercial products;
- Provide waste audits;
- Make recycling mandatory at all public events;
- Support legislation which advocates for extended producer responsibility;
- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard);

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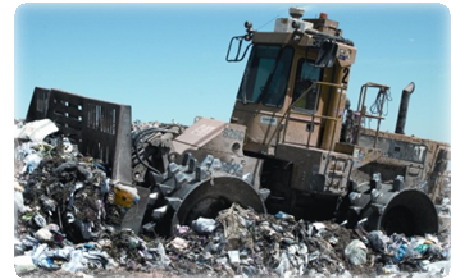
- Require interior and exterior storage areas for recyclables at all buildings associated with new construction;
- Provide adequate recycling containers in public areas, including parks, public golf courses, and City owned facilities; and
- Provide education and publicity about reducing waste and available recycling services.

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.

El Sobrante Landfill and the Badlands Landfill, where Moreno Valley's waste is sent, currently have gas-to-energy systems that convert methane released from the decomposition of waste into energy. This measure would encourage Waste Management of the Inland Empire and Riverside County Waste Management Department 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. Moreno Valley's waste is deposited in the El Sobrante Landfill and the Badlands Landfill, so the emissions from Moreno Valley's solid waste are dependent on the waste management and methane capture systems in place at El Sobrante and Badlands. Any reductions in emissions from the landfill will, in turn, reduce Moreno Valley's emissions from solid waste generation.



R3-S2: WASTE EDUCATION PROGRAM

This measure would 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 5 **Total Estimated Reductions**

CHAPTER 5 TOTAL ESTIMATED REDUCTIONS

In 2020, the City of Moreno Valley is projected to emit a total of 1,298,543 MT CO₂e without the incorporation of reduction measures. With implementation of the reduction measures discussed in Chapter 4, the City emissions for 2020 would be reduced to 798,137 MT CO₂e. The statewide reduction measures (the R1 Measures in Chapter 4) would reduce the bulk of Moreno Valley’s emissions and make a substantial contribution toward reaching the 2020 reduction target. However, the City would need to supplement the state measures with the implementation of the local reduction measures (R2 measures) discussed in Chapter 4.

5.1 Reductions from R1 and R2 Measures

The R1 measures described in Chapter 4 will be implemented at the State level with reductions occurring at the local level in Moreno Valley. The R2 measures go beyond the State measures to reduce GHG emissions in order to meet the 2020 reduction target. Table 5-1 summarizes the MT CO₂e and the corresponding percentage of emissions reduced for each of the R1 and R2 measures.

Table 5-1 Measures and Associated Emissions Reduced from 2020 Inventory		
Transportation	MT CO₂e Reduced	% of Transportation Emissions
R1-T1 & R1-T2: Pavley I and II	150,196	19.1
R1-T3: Low Carbon Fuel Standard	45,941	5.8
R1-T4: Tire Pressure	1,591	0.2
R1-T5: Low Rolling Resistance Tires	1,058	0.1
R1-T6: Low Friction Oils	8,973	1.1
R1-T7: Goods Movement Efficiency	9,288	1.2
R1-T8: Aerodynamic Efficiency	1,152	0.2
R1-T9: Medium/Heavy Duty Hybridization	595	0.1
R2-T1: Land Use and VMT Reduction Policies	20,423	2.6
R2-T2: Transit Improvements	120,087	15.2
R2-T3: Employment Based Trips	7,401	0.9
Transportation Total	366,706	46.5
Energy	MT CO₂e Reduced	% of Energy Emissions
R1-E1: Renewable Portfolio Standard 33%	3,194	0.9
R1-E2: Indoor Residential Lighting	5,900	1.7
R1-E3: Indoor Commercial/Outdoor Lighting	4,380	1.2
R1-E4: Electrical Energy Efficiency	3,060	0.9
R1-E5: Natural Gas Energy Efficiency	1,382	0.4
R1-E6: Combined Heat/Power	12,678	3.6
R1-E7: Industrial Efficiency	791	0.2
R2-E1: New Residential Energy Efficiency	3,357	0.9
R2-E2: New Residential Renewable Energy	1,252	0.4
R2-E3: Residential Energy Efficiency Retrofits	33,418	9.4
R2-E4: Residential Renewable Energy Retrofits	5,750	1.6
R2-E5: New Commercial Energy Efficiency	3,357	0.9
R2-E6: New Commercial Renewable Energy	2,030	0.6
R2-E7: Commercial Energy Retrofits	18,261	5.1
Energy Total	80,549	22.6

5.2 REDUCED 2020 COMMUNITY-WIDE EMISSIONS INVENTORY

Table 5-1 Measures and Associated Emissions Reduced from 2020 Inventory		
Area Source	MT CO ₂ e Reduced	% of Area Source Emissions
R1-L1: SCAQMD Healthy Hearths Programs	6,244	7.6
R2-A1: Electric Landscaping Equipment	4,207	5.1
Area Source Total	10,451	12.7
Water	MT CO ₂ e Reduced	% of Water Emissions
R1-W1: RPS related to Water Supply	2,535	12.7
R1-W2 & R2-W1: Water Conservation Strategies	3,493	17.5
Water Total	6,028	30.1
Solid Waste	MT CO ₂ e Reduced	% of Solid Waste Emissions
R1-S2: CalGreen Construction Waste	10,618	6.5
R2-S1: Waste Disposal Program	26,577	16.3
Solid Waste Total	37,196	22.8

With the statewide reduction measures and the implementation of the R2 measures, Moreno Valley would reduce its community-wide emissions to a level below the established 2020 reduction target. Table 5-2 summarizes the 2020 inventory emissions, the GHG reductions associated with the reduction measures, and the reduced 2020 emissions.

Table 5-2 Reduction Summary for 2020 Inventory				
	2020 MT CO ₂ e	Reductions MT CO ₂ e	Reduced 2020 MT CO ₂ e	% Reduction
Transportation	788,267	366,706	421,561	46.5
Energy	356,193	104,820	251,372	29.4
Area Sources	84,665	11,619	73,046	13.7
Water/Wastewater	20,216	6,057	14,158	30.0
Solid Waste	49,203	11,203	38,000	22.8
TOTAL	1,298,543	500,406	798,137	38.5

The implementation of the R1 and R2 reduction measures would reduce Moreno Valley's emissions by 38.5 percent to 798,137 MT CO₂e.

5.2 Reduced 2020 Community-Wide Emissions Inventory

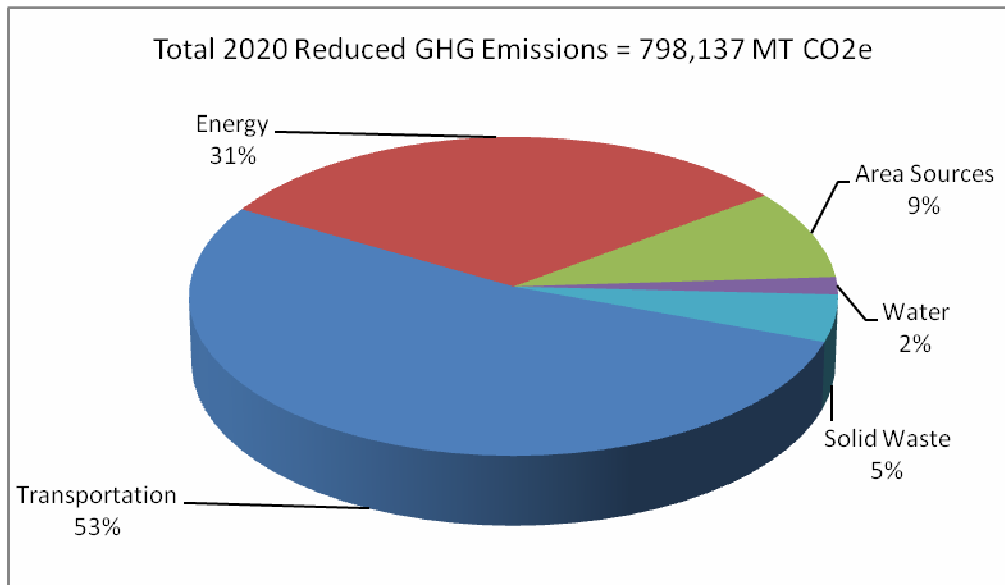
With the implementation of GHG reduction measures, Moreno Valley is projected to reduce its emissions to a total of 798,137 MT CO₂e, which is 556 MT CO₂e below the 2020 reduction target. This is a decrease of 38.5 percent from the City's 2020 BAU emissions inventory and 13 percent from the 2010 emissions. The reduction measures reduce GHG emissions from all sources of community-wide GHG emissions including transportation, energy, area sources, water, and solid waste. The following sections describe the emissions by source and land use category for the year 2020.

Emissions by Source

The emissions by source for the reduced 2020 inventory were calculated by applying a percent reduction to the 2020 emissions for each reduction measure. Table 5-3 summarizes the reduced 2020 City emissions of CO₂e as broken down by emissions category. Figure 5-1 is a graphical representation of Table 5-3.

Table 5-3 Reduced 2020 GHG Emissions by Source	
Category	Metric tons of CO ₂ e
Transportation	421,561
Energy	251,372
Area Sources	73,046
Solid Waste	38,000
Water and Wastewater	14,158
Total	798,137

Figure 5-1 Reduced 2020 GHG Emissions Generated by Source



5.3 Emissions Summary

With the implementation of the reduction measures outlined in Chapter 4, the City of Moreno Valley would reduce its emissions to a level below the 2020 reduction target calculated in Chapter 3. This represents a 38.5 percent decrease from the BAU 2020 inventory and is consistent with the State's GHG

5.3 EMISSIONS SUMMARY

reduction goals. Table 5-4 summarizes the existing 2010 emissions, the 2020 emissions inventory, and the reduced 2020 emissions.

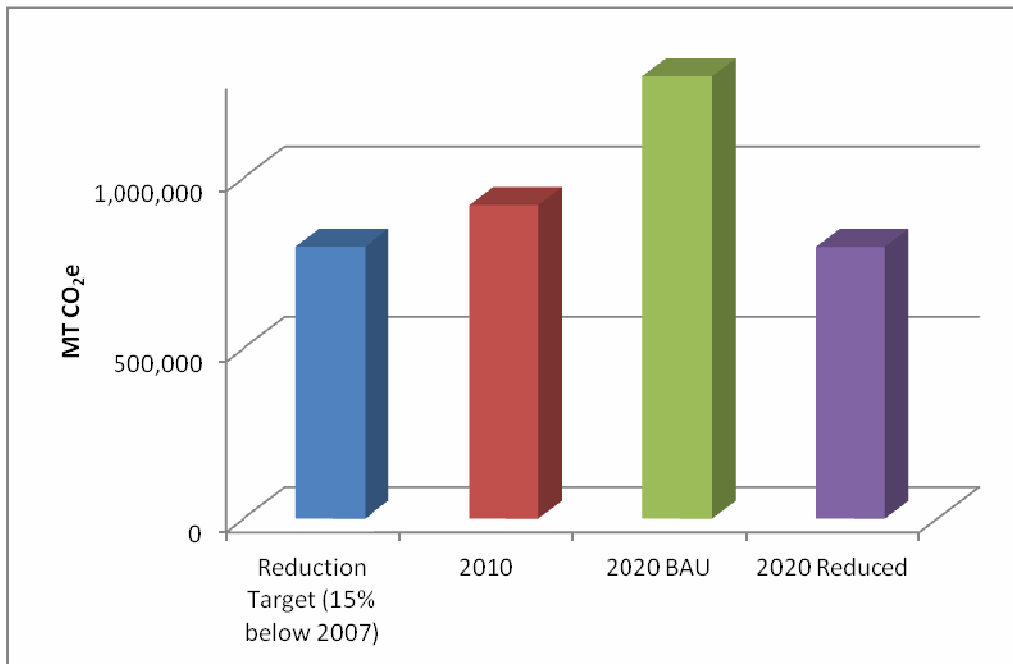
Table 5-4 2020 GHG Emissions Comparison				
Source Category	Metric tons of CO₂e			
	2010	BAU 2020	Reduced 2020	% Reduced
Transportation	513,581	788,267	421,561	46.5
Energy	277,230	356,192	251,372	29.4
Area Sources	69,437	84,665	73,046	13.7
Water and Wastewater	16,831	20,216	14,158	30.0
Solid Waste	43,633	49,203	38,000	22.8
Total	920,712	1,298,543	798,137	38.5
Emission Reduction Target		798,693	798,639	
Below Reduction Target?		No	Yes	
Note: Mass emissions of CO ₂ e shown in the table are rounded to the nearest whole number. Totals shown may not add up due to rounding.				

Chapter 6 Conclusion

6.1 Conclusions

This report serves as a guide to help the City implement the objectives of conserving resources and reducing GHG emissions. This document also serves as a technical resource future updates of the City’s General Plan and other land use related documents that may require evaluation and documentation of GHG emissions. Figure 6-1 shows a comparison between the emission inventories discussed throughout this report.

Figure 6-1 Moreno Valley GHG Emissions by Year



This document sets a target to reduce community-wide GHG emission emissions by 15% from 2007 levels by 2020, consistent with the State reduction goals in AB 32. The CARB Scoping Plan outlines the reduction strategies designed to meet the statewide reduction goal of AB 32. The City has a reduction strategy as described in Chapter 4 that would meet the State reduction goal. Reduction measures provided herein would ensure that Moreno Valley meets the AB 32 reduction target of reducing to 15% below 2007 levels (reduce down to 798,693 MT CO₂e) by 2020. In many cases, implementation of the reduction measures will require the cooperation of other agencies, private businesses, and residents. Even with the anticipated growth, the modernization of vehicle fleets, combined with the continued implementation of the proposed measures, will reduce GHG emissions by approximately 500,406 MT CO₂e from 2020 levels. Therefore, the implementation of the State (R1) measures combined with the City’s R2 and R3 measures will reduce GHG emissions down to 798,137 MT CO₂e by year 2020, which is 556 MT CO₂e below the reduction target.

6.2 Additional Reduction Opportunities

The quantitative analysis of reductions demonstrates that the City can achieve the reduction target by implementing the reduction strategies. The quantitative analysis of future emissions in Moreno Valley also demonstrates that the target is achieved with only 556 MT CO₂e to spare. However, there are many additional opportunities to reduce emissions that cannot be calculated in a quantitative manner at this time.

One class of additional reduction opportunities includes many of the R3 measures which are anticipated to reduce emissions but cannot be calculated due to indeterminate variables. These include cross-jurisdictional coordination on transportation and energy programs that can reap huge additional reduction opportunities beyond what Moreno Valley can do on their own, an Alternative Energy Development Plan coordinated with SCE, City tree planting program that provides additional sequestration and shade, and a Heat Island Plan. Addressing the heat island affect will reduce the energy needed to cool buildings and automobiles, which would result in a reduction in GHG emissions. However, the current state of emission modeling cannot calculate the emissions reductions associated with addressing the heat island effect.

Another class of additional reduction opportunities includes the implementation of the Regional Sustainable Communities Strategy (SCS) within Moreno Valley. The Southern California Association of Governments (SCAG) has released the draft SCS, but has not finalized it or provided the quantitative values to estimate the GHG reductions within Moreno Valley attributable to implementation of the SCS. Once more quantitative data is available, additional reductions due to the SCS within Moreno Valley can be calculated and provided.

The last class of additional reduction opportunities includes the City's ability to implement the R2 measures in a manner that reduces emissions beyond what was calculated in Section 4. As an example, a very modest participation in voluntary energy efficiency retrofits of existing buildings was expected in the calculations that are shown. Increasing participation in these programs will result in additional reductions.

The City should monitor progress of achieving the reduction goal as the R2 measures are implemented and take advantage of these additional reduction opportunities to insure that the target is achieved.

Chapter 7 Implementation

CHAPTER 7 IMPLEMENTATION

This GHG Analysis sets a framework for Moreno Valley to reduce its GHG emissions. Through this analysis, the City has set a baseline for emissions, a target for emissions reductions, and a strategy to attain the reductions to a series of reduction measures. The implementation of these measures will depend on development review; coordination with other agencies, businesses, and residents; and availability of funding through rebates and incentives.

Many of the proposed reduction measures will be implemented through the development review process. New construction offers the opportunity to build with energy efficiency and renewable energy integrated from the start. Additionally, making land use decisions based on transit accessibility and proximity to a variety of uses will help to reduce the dependency on vehicles as the main mode of transportation. Reductions from existing development will also be critical in order to reduce emissions in Moreno Valley. These improvements to existing buildings can offer direct energy cost savings and there are a variety of rebates and incentives available at the state and local level to make the upfront costs more affordable.

On a municipal level, the City of Moreno Valley has already begun to implement energy efficiency upgrades with funding from the EECBG grant money. By implementing all of the remaining planned projects, the City can set an example for the rest of the community and demonstrate how these retrofits are saving the City money and reducing GHG emissions. The City has also been monitoring its energy use through the Energy Star Portfolio Manager program. This has allowed the City to assess energy use in its facilities and monitor changes in energy use based on the retrofits described above. In the future, Moreno Valley can also work to identify additional funding for future projects and continue to administrate the Energy Star Portfolio Manager.

This report is the first step in getting Moreno Valley on track with reducing its GHG emissions. Moving forward, the City will need to monitor and evaluate the implementation of the plan, reassess the reduction measures, and continually update the plan in order to address emissions beyond 2020.

Chapter 8 **References**

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