

Draft

RIVERSIDE COUNTY

Climate Action Plan

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ACRONYMS

AB 32	Assembly Bill 32, The California Global Warming Solutions Act of 2006
ARRA	American Recovery & Reinvestment Act
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
Cal Recycle	California Department of Resources Recycling and Recovery
CAS	California Climate Adaption Strategy
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 ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
CSI	California Solar Initiative
CWSRF	Clean Water State Revolving Funds
DPM	Diesel Particulate Matter
EECGB	Energy Efficiency Community Block Grant
EMFAC2007	On-Road Emission Factors published by the CARB in 2007
GCC	Global Climate Change
GHG	Greenhouse Gas
GWh	Gigawatt Hours
GWP	Global Warming Potential
HFC	Hydrofluorocarbons
HFC-23	Trifluoromethane
HFC-134	Hydrofluorocarbon 134
HFC-152a	Difluoroethane

IPCC	Intergovernmental Panel on Climate Change
ITS	Intelligent Transportation Systems
LEED	Leadership in Energy and Environmental Design
MMT	Million Metric Tons
MT	Metric Tons
MWh	Megawatt Hours
N ₂ O	Nitrous Oxide
NSHP	New Solar Home Program
O ₃	Ozone
RIP	Regional Improvement Program
RTIP	Regional Transportation Improvement Program
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
STIP	State Transportation Improvement Plan
URBEMIS 2007	Urban Emissions Model, version 9.2 published in June 2007
USEPA	United States Environmental Protection Agency
VMT	Vehicle miles traveled

EXECUTIVE SUMMARY

Riverside County is committed to providing a more livable, equitable, and economically vibrant community through the incorporation of sustainability features and reduction of greenhouse gas (GHG) emissions. By using energy more efficiently, harnessing renewable energy to power buildings, recycling waste, conserving and recycling water, and enhancing access to sustainable transportation modes, Riverside will keep dollars in the local economy, create new green jobs and improve community quality of life. The efforts toward reducing GHG emissions described in this report would be done in coordination with the County's land use decisions. The foundation of planning land use decisions is found in the General Plan policies and programs.

Through this Climate Action Plan (CAP), the County 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 CAP was to complete a GHG emissions inventory. The CAP includes GHG inventories of community-wide and municipal sources based on the most recent data available for the year 2008. Sources of emissions include transportation, electricity and natural gas use, landscaping, water and wastewater pumping and treatment, and treatment and decomposition of solid waste. Riverside County's 2008 inventory amounted to 7,102,319 MT CO₂e community-wide and 237,085 MT CO₂e from municipal operations.

Following the state's adopted AB 32 GHG reduction target, Riverside County 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 2008 levels, as recommended in the AB 32 Scoping Plan. The estimated community-wide emissions for the year 2020, based on population and housing growth projections associated with the assumptions used in the proposed General Plan Update, are 10,268,937MT CO₂e. In order to reach the reduction target, Riverside County must offset this growth in emissions and reduce community-wide emissions to 6,036,971 MT CO₂e by the year 2020.

The development of this CAP coincides with the County's General Plan Update. A community-wide emissions inventory is also calculated for the horizon year of 2035. The socioeconomic growth rates from the General Plan Update were used to estimate the 2035 emissions.

Various state policies have enacted programs that will also contribute to reduced GHG emissions in Riverside County by the year 2020. Some of these policies include updated building codes for energy efficiency, the low carbon fuel standard, Pavley vehicle emissions standards, and the Renewables Portfolio Standard for utility companies. By supporting the state in the implementation of these measures, Riverside will experience substantial GHG emissions reductions. These GHG reductions from the State measures are accounted for in the reduced inventories.

In order to reach the reduction target, the County would also need to implement the additional local reduction measures described in this report. These measures encourage energy efficiency and

renewable energy in buildings, transit oriented planning, water conservation, and increase waste diversion. Table ES-1, below, summarizes the community wide emissions for 2008, 2020, and the reduced 2020 inventory with the inclusion of the proposed reduction measures.

Table ES-1 2008 and 2020 GHG Emissions Comparison				
Source Category	Metric tons of CO₂e			
	2008	2020 BAU	Reduced 2020	% Reduced
Transportation	2,850,520	4,950,296	2,529,432	48.9%
Energy	1,585,565	2,837,295	1,485,129	47.7%
Area Sources	269,181	442,033	230,969	47.9%
Purchased Water	152,473	175,344	109,021	37.8%
Solid Waste	214,149	341,145	174,134	49.0%
Agriculture	2,030,431	1,522,823	1,507,220	1.0%
Total	7,102,319	10,268,937	6,035,904	41.2%
Emission Reduction Target ^a		6,036,971	6,036,971	
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.				
^a The reduction target for 2020 is based on a 15% decrease from Riverside County's 2008 emissions inventory.				

Table ES-2 summarizes the 2035 emissions for the County based on the anticipated growth rates included in the County's General Plan update. After 2020, GHG emissions would continue to grow; however, the growth in the County's future emissions would be offset by the reductions from incorporation of the CAP measures. The reduction measures included in the CAP have been developed to meet the 2020 reduction target; however the implementation of the CAP would require periodic updates to ensure that the County is continually tracking GHG emissions and making adjustments as necessary to ensure that future targets are met. The 2035 reduced inventory represents the estimated GHG emissions from Riverside County with the continued implementation of the reduction measures outlined in the CAP as well as the assumption that the current statewide measures would be extended beyond 2020. This represents a strategy for the County to continue to reduce emissions below the 2020 reduction target through to 2035 and beyond.

EXECUTIVE SUMMARY

Table ES-2 Projected 2035 GHG Emissions Comparison				
Source Category	Metric tons of CO ₂ e			
	2008	2035 BAU	Reduced 2035	% Reduced
Transportation	2,850,520	6,461,733	2,622,357	59.4%
Energy	1,585,565	3,617,816	1,326,416	63.3%
Area Sources	269,181	529,395	256,482	51.6%
Purchased Water	152,473	293,083	146,121	50.1%
Solid Waste	214,149	424,125	198,061	53.3%
Agriculture	2,030,431	1,522,823	1,485,815	2.4%
Total	7,102,319	12,848,975	6,036,252	53.0%
2020 Reduction Target ^a		6,036,971	6,036,971	
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. ^a The reduction target for 2020 is based on a 15% decrease from Riverside County's 2008 emissions inventory.				

This CAP describes a baseline for the County’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 County’s General Plan policies and are consistent with Riverside County’s vision for a more sustainable community.

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CHAPTER 1 Introduction

The County of Riverside is committed to reducing GHG emissions in an effort to provide a more livable, equitable, and economically vibrant community. By using energy more efficiently, harnessing renewable energy to power our buildings, enhancing access to sustainable transportation modes, and recycling waste, dollars are kept in our local economy, new green jobs are created, and community quality of life improves. These efforts toward reducing GHG emissions must be done in coordination with the County's land use decisions. The foundation of planning land use decisions are the General Plan policies and programs.

The policies and programs of the County General Plan are intended to underlie most land use decisions. Preparing, adopting, implementing, and maintaining a general plan serves to:

- Define the community's environmental, social, and economic goals.
- Provide citizens with information about their community and with opportunities to participate in the planning and decision-making processes of their community.
- Coordinate the community and environmental protection activities among local, regional, state, and federal agencies.
- Guide in the development of the community.

In order to achieve these goals and to provide a more livable, equitable, and economically vibrant community, the County has committed to prepare and implement the Riverside County Climate Action Plan (CAP) to help ensure that the impact of development on air quality is minimized, energy is conserved, and land use decisions made by the County and all internal operations within the County are consistent with adopted state legislation.

This section describes the purpose and goals of the CAP; describes the relationship of the CAP to the County General Plan, provides background information on GHG emissions; and summarizes the regulatory framework surrounding GHG emissions and climate change.

1.1 Purpose

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

- Create a GHG emissions 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), federal government through the actions of the Environmental Protection Agency (EPA), and the global community through the Kyoto Protocol

1.2 GOALS

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

1.2 Goals

To fulfill the purposes of the CAP, the County identified the following goals to be achieved:

- Provide a list of specific actions that will reduce GHG emissions, giving the highest priority to actions that provide the greatest reduction in GHG emissions and benefits to the community at the least cost
- Reduce emissions attributable to Riverside County to levels consistent with the target reductions of AB 32
- Establish a qualified reduction plan for which future development within the County can tier and thereby streamline the environmental analysis necessary under CEQA

1.3 Relationship to the County General Plan

The General Plan includes a series of linked documents including technical reports, and elements containing goals, policies, and implementation programs that provide direction to the County on managing its resources and how future development will occur.

The CAP is a separately bound document that will provide another implementation tool of the General Plan to guide development in the County. The CAP focuses development on attaining the various goals and policies of the General Plan and all community plans relative to GHG emissions, and to achieve the goals outlined in Section 1.2 above.

1.4 Background

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

- An analysis of GHG emissions and sources attributable to the County.
- Estimates on how those emissions are expected to increase.
- Recommended policies and actions that can reduce GHG emissions to meet state, federal and international targets.
- A timeline of implementation.
- A defined tracking and reporting mechanism that will measure progress toward the goals.

In order to understand this process, the reader needs to know a few facts about GHG emissions, the climate change impacts anticipated within the County of Riverside, and the international, federal, state, and local regulatory framework designed to address climate change. The following information provides a brief background on these topics. A more complete description of the greenhouse effect, GHG emissions, and general climate change impacts can be found in Appendix A of this document.

Greenhouse Gases

Parts of the Earth's atmosphere act as an insulating "blanket" of just the right thickness, trapping sufficient solar energy to keep the global average temperature in a suitable range. This blanket is a collection of atmospheric gases called greenhouse gases, based on the idea that these gases also trap heat similar to the glass walls of a greenhouse. These gases, consisting mainly of water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and chlorofluorocarbons (CFC), 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 into the atmosphere.

Due to the successful global bans on chlorofluorocarbons (primarily used as refrigerants, aerosol propellants and cleaning solvents), Riverside County does not generate significant emissions of these GHGs. This also includes other synthesized gases such as hydrofluorocarbons (HFCs) and carbon tetrafluoride (CF₄) which have been banned and are no longer available on the market. Because of the ban, the Riverside County will not generate emissions of these GHGs and therefore, they are not considered any further in this document. Sulfur hexafluoride (SF₆) is another GHG with a high global warming potential; it 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, SF₆ is not released to the atmosphere and therefore, it is not considered further in this document.

Because GHGs have variable potencies, a common metric of carbon dioxide equivalents (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 potential,¹ and is expressed as a function of the potency with respect to the same mass of CO₂. 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).

This CAP contains two types of GHG inventories, one covering community-wide emissions and the other for the County's municipal emissions. The community-wide inventory focuses on the sources and amounts of GHG emissions generated from activities associated with land uses within the unincorporated areas under the jurisdictional control of the County, while the municipal inventory covers emissions solely from the buildings, facilities, and vehicles under the operational control of the

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

1.5 REGULATORY SETTING

local government. The purpose of an the inventories is to create a clear picture of how the unincorporated communities within Riverside County and the government operations uses fossil fuels and other forms of energy, and to pinpoint the activities and sectors contributing the most GHGs.

1.5 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 participates in the United Nations Framework Convention on Climate Change (UNFCCC) signed on March 21, 1994. Specifically, 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% 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 December 2009, representatives from 170 countries met in Copenhagen to ratify an updated UNFCCC agreement known as the “Copenhagen Accord”. This Accord is a voluntary agreement between the United States, China, India and Brazil that recognizes the need to keep global temperature rise to below 2°C and obliges signatories to establish measures to reduce greenhouse gas emissions and to prepare to provide help to poorer countries in adapting to climate change. The countries met again in Cancun in December 2010 and adopted the Cancun Agreements, which reinforce and build 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, as well as for 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

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

U.S. 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 emissions generated by the United States. These programs focus on energy efficiency, renewable energy, methane and other non-CO₂ gases, agricultural practices and implementation of technologies to achieve GHG reductions. The USEPA implements several voluntary programs that help substantially reduce GHG emissions. These programs include: the State Climate and Energy Partner Network, which fosters the exchange of information between federal and state agencies regarding climate and energy; the Climate Leaders program for companies, the Energy Star[®] labeling system for energy-efficient products; and the Green Power Partnership for organizations interested in buying green power. All of these programs play a significant role in encouraging voluntary reductions from large corporations, consumers, industrial and commercial buildings, and many major industrial sectors.

It should be noted that in *Massachusetts v. Environmental Protection Agency* (Docket No. 05–1120), the U.S. Supreme Court held in April of 2007 that the USEPA has authority to regulate greenhouse gases and that the USEPA's reasons for not regulating this area did not fit the statutory requirements. As such, the Court ruled that the USEPA should be required to regulate CO₂ and other greenhouse gases as pollutants pursuant to Section 202(a)(1) of the federal Clean Air Act (CAA).

Towards this aim, in 2009 the USEPA issued a Final Rule for mandatory reporting of GHG emissions by fossil fuel suppliers, industrial gas suppliers, direct GHG emitters and manufactures of heavy-duty and off-road vehicles and vehicle engines. It also requires annual reporting of emissions. The first annual reports required by the Rule were due in March 2011. This rule does not regulate the emission of GHGs; it only requires the monitoring and reporting of greenhouse gas emissions for those sources above certain thresholds (USEPA 2009). In addition, the USEPA adopted a Final Endangerment Finding for the six defined GHGs in December 2009. This Endangerment Finding is required for the USEPA to regulate GHG emissions under Section 202(a)(1) of the CAA.

On May 13, 2010, the USEPA issued a Final Rule that establishes a common sense approach to addressing greenhouse gas emissions from stationary sources under the CAA permitting programs. The rule is in its second phase, which continues through June 2013. In this phase, new construction projects that exceed a CO₂e threshold of 100,000 tons per year and modifications of existing facilities that increase CO₂e emissions by at least 75,000 tons per year are subject to permitting requirements. Additionally, operating facilities that emit at least 100,000 tons per year are subject to title V permitting requirements for GHGs (USEPA 2010a). New and existing industrial facilities that meet or exceed that

1.5 REGULATORY SETTING

threshold require a permit under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs.

State

CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board (CARB), a part of the California Environmental Protection Agency (CalEPA), is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, CARB conducts research, sets the California Ambient Air Quality Standards (CAAQS), compiles air 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. The SIP is required for the State to take over implementation of the federal Clean Air Act in California and consists of rules and technical documentation to support the State's plan for reducing emissions of criteria pollutants in areas that exceed EPA standards and are designated non-attainment.

EXECUTIVE ORDER S-20-04

Governor Arnold Schwarzenegger signed Executive Order S-20-04 regarding Green Buildings on December 14, 2004. It established California's priority for energy and resource-efficient high performance buildings. The Executive Order sets a goal of reducing energy use in state-owned buildings by 20 percent by 2015 (from a 2003 baseline) and encourages the private commercial sector to set the same goal. Executive Order S-20-04 also directs compliance with the Green Building Action Plan which details the measures the state will take to meet these goals. To summarize, Executive Order S-20-04 and the Green Building Action Plan assigned the California Energy Commission to develop the following measures to achieve the goals of Executive Order S-20-04:

- Building efficiency benchmarking system for all state owned and private commercial buildings.
- Develop commissioning and retro commissioning guidelines for commercial buildings.
- Develop and refine (Title 24) building energy efficiency standards applicable to commercial buildings sector to result in 20 reduction in energy use by 2015 using standards adopted in 2003 as the baseline.
- Consult and collaborate with the Department of General Services, Department of Finance and California Public Utility Commission on retrofitting all state owned buildings.

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.
- 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 (CCAT 2010). Action items in the report focus on the preparation of the Climate Change Adaptation Strategy, required by Executive Order S-13-08, described later in this report.

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 from new passenger automobiles 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 (Pavley I and II) 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 granted California the authority to implement the GHG reduction standards for passenger cars, pickup trucks, and sport utility vehicles.

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

ASSEMBLY BILL 32, THE GLOBAL WARMING SOLUTIONS ACT OF 2006

In 2006, the California State Legislature adopted AB 32, *the California Global Warming Solutions Act of 2006*, focusing on reducing GHG emissions 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 directing



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State actions that would reduce GHG emissions to 1990 statewide levels by 2020. CARB was also required to publish a list of “discrete early action” GHG emission reduction measures that would be made enforceable 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 greenhouse gas emissions limit for 2020.

Towards this aim, in October 2007, CARB published its Final Report for Proposed Early Actions to Mitigate Climate Change in California. This report described recommendations for discrete early action measures to reduce GHG emissions. Resulting from this were three new regulations including: a low carbon fuel standard, reduction of HFC-134a (a refrigerant chemical) emissions from non-professional servicing of motor vehicle air conditioning systems and improved landfill methane capture. CARB estimated that by 2020, reductions from these three measures would reduce emissions by approximately 13-26 million metric tons CO₂e.

In 2007, CARB released a report, *California 1990 GHG Emissions Level and 2020 Emissions Limit* establishing that statewide levels of GHG emissions in 1990 were 427 MMT CO₂e. Additionally, in 2008, CARB adopted the *Climate Change Scoping Plan*, outlining the State’s strategy to achieve the 2020 GHG limit. The Scoping Plan proposes a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify energy sources, save energy, create new jobs and enhance public health. The plan emphasizes a cap-and-trade program, but also includes the discrete early actions previously mentioned.

SENATE BILL 97

SB 97, enacted in 2007, amended the California Environmental Quality Act (CEQA) 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 revisions to the *State CEQA Guidelines* “for the mitigation of GHG emissions or the effects of GHG emissions” and directed the Resources Agency to certify and adopt these revised *State CEQA Guidelines* by January 2010 (See PRC Section 21083.05). The revisions were codified into the California Code of Regulations and became fully effective by July 2010. These revisions provide regulatory guidance for the analysis and mitigation of the potential effects of GHG emissions.

Among the changes resulting from SB 97 was the addition of criteria for Climate Action Plans used in the tiering and streamlining of CEQA analysis of GHGs for subsequent development projects. Riverside County has updated the Air Quality Element of the General Plan to include specific policies to address GHG emissions. The implementation mechanisms for these GHG-related policies are the Screening Tables for New Development, included in Appendix N of the General Plan. The Screening Tables allow new development projects a streamlined option for complying with the CEQA requirements for addressing GHG emissions. Additionally, Riverside County’s Climate Action Plan details policies to reduce emissions from municipal and community-wide sources including emissions from existing buildings and new development. The addition to the *State CEQA Guidelines* reads as follows:

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

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

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

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

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

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

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

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

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

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

(2) Use with Later Activities. A plan for the reduction of greenhouse gas emissions, once adopted following certification of an EIR or adoption of an environmental document, may be used in the cumulative impacts analysis of later projects. An environmental document that relies on a greenhouse gas reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if those requirements are not otherwise binding and

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enforceable, incorporate those requirements as mitigation measures applicable to the project. If there is substantial evidence that the effects of a particular project may be cumulatively considerable notwithstanding the project's compliance with the specified requirements in the plan for the reduction of greenhouse gas emissions, an EIR must be prepared for the project.

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

SENATE BILL 375

SB 375 established mechanisms for the development of regional targets for reducing passenger vehicle greenhouse gas emissions and was adopted by the State in September 2008. In response, in 2010, CARB adopted vehicular GHG emissions reduction targets developed in consultation with the States' metropolitan planning organizations (MPOs), which included the Southern California Association of Governments (SCAG), to which Riverside County belongs. The targets require a 7-8% reduction by 2020 and 13-16% reduction by 2035 for each MPO. The objective of these targets is to induce cities and counties to change their land use patterns and improve their transportation alternatives. Through the SB 375 process, MPOs, such as SCAG are to work with local jurisdictions in the development of "Sustainable Communities Strategies" (SCS) designed to integrate development patterns and the transportation network in a way that reduces greenhouse gas emissions while meeting housing needs and other regional planning objectives. In particular, SCAG's reduction target for per capita vehicular emissions is 8% by 2020 and 13% by 2035 (CARB 2010b). SCAG is in the process of preparing its SCS according to its 2012 regional transportation plan (RTP) update schedule. To date, no region has adopted an SCS; the earliest RTP updates with SCSs are expected in 2012.

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.
- Initiate studies on critical infrastructure projects and land-use policies vulnerable to sea level rise.

The resultant 2009 CAS Report summarizes the best known science on climate change impacts in the state to assess vulnerability and outlines possible solutions that can be implemented within and across state agencies to promote resiliency. This is the first step in an ongoing, evolving process to reduce California's vulnerability to climate impacts (California Natural Resources Agency 2009a).

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. 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
- To meet the energy efficiency goals of Executive Order S-20-04 which established California's Green Building Initiative. The Executive Order seeks to improve the energy efficiency of nonresidential buildings through aggressive standards toward the target of a 20% reduction in building energy use from a 2003 baseline by the year 2015

CALIFORNIA GREEN BUILDING CODE

CCR Title 24, Part 11: California's Green Building Standard Code (CalGreen) was adopted in 2010 and went into effect January 1, 2011. CalGreen is the first statewide mandatory green building code and significantly raises the minimum environmental standards for construction of new buildings in California.

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The mandatory provisions in CalGreen will reduce the use of volatile organic compounds (VOC) emitting materials, strengthen water conservation, and require construction waste recycling.

Regional

Riverside County spans three different air basins: South Coast, Salton Sea, and Mojave Desert. The portions of Riverside County within the South Coast and Salton Sea Air Basins are regulated by the South Coast Air Quality Management District (SCAQMD), which also governs Los Angeles and Orange Counties, plus a small portion of San Bernardino County. The easternmost third of the County, that within the Mojave Desert Air Basin, is under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD), which also governs most of San Bernardino County. The AQMDs are responsible for promoting and improving the air quality of their jurisdiction's basins. This is accomplished through air quality monitoring, evaluation, education, implementation of control measures to reduce emissions from stationary sources, permitting and inspection of pollution sources, enforcement of air quality regulations, and by supporting and implementing measures to reduce emissions from motor vehicles. Both the SCAQMD and the MDAQMD have stationary, area, and mobile source² control measures designed to bring the area into compliance with the state ozone standards.

After AB 32 was passed, SCAQMD formed the Climate Change Committee along with the Greenhouse Gases CEQA Significance Thresholds Working Group and the SoCal Climate Solutions Exchange Technical Advisory Group. On September 5, 2008 the board approved the SCAQMD Climate Change Policy, which outlines actions the District will take to assist businesses and local governments in implementing climate change measures, decrease the agencies carbon emissions, and provide information to the public regarding climate change. On December 5, 2008 the SCAQMD Board approved interim CEQA GHG significance thresholds for stationary sources, rules, and plans. The district adopted a tiered approach for determining significance; projects that are exempt from CEQA or consistent with a local GHG reduction plan are determined less than significant. Tier 3, the primary tier the board will use for determining significance, has a screening significance threshold using the 90th percentile of emissions capture rate approach.

Local

In light of State and regional efforts to reduce GHGs, there are several avenues of opportunity Riverside County faces. In preparing this CAP, the County is able to streamline its CEQA review of individual projects. By having a GHG reduction plan that adequately addresses emissions at the plan level, the County is able to determine that projects that are consistent with the plan will not have significant GHG-

² Stationary sources emit pollutants from a fixed location, for example industrial boilers. Mobile sources are motor vehicles and other transportation sources that generate pollution through the combustion of fossil fuels. Area sources are those associated with the activities of a given area, such as from fireplaces and lawnmowers in a residential area.

related impacts. Coordination with CARB, SCAQMD, and the State Attorney General’s office ensures that the inventories and reduction strategies presented in this report adequately address the County’s emissions. The County will use screening tables for new development (described in Section 4 of this report) in order to evaluate the consistency of individual projects with the goals and reduction measures outlined in this report.

The screening tables are setup similar to a checklist with points allocated to certain elements that reduce greenhouse gas emissions; if the project garners 100 points (by including enough GHG-reducing elements), then the project is consistent with the County’s plan for reducing emissions. This streamlined process relieves the County development projects from lengthy studies or uncertainties, particularly for small development proposals. The screening tables are set up in such a way that a new development project can earn points by reducing emissions from an existing source (by making an existing building more energy efficient, for example). This is particularly beneficial for jurisdictions, such as Riverside County, that have significant housing stock built prior to the 1974 inception of Title 24 energy efficiency standards and requirements. Thus, Riverside County is able to reduce emissions from both existing sources and future development.

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CHAPTER 2 Methodology

2.1 Overview

The first step in drafting this CAP is to prepare the GHG inventories for Riverside County. GHG inventories include all major sources of emissions attributable directly or indirectly to the County's government operations or activities within the community the County serves. GHG inventories are divided into two broad categories: government GHG inventories and community-wide GHG inventories. Government GHG Inventories include emissions resulting from County government operations. Community-wide GHG inventories include a broader range of emissions associated with both the activities within the community the County serves and the government operations. As such, the government 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 government 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 Protocol* provides draft guidance in the development of the Community-wide inventory.

The LGOP and the draft AEP/ICLEI *Draft Community-wide GHG Emissions Protocol* 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 and unincorporated areas of the County. 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 government operations, these emissions are limited to activities under the operational control of the County 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 County's facilities. An "indirect" source is one where the action that generates GHGs is separated from the 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 County'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

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hauling waste under a County contract, the County 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 unincorporated areas of the County to provide, to the fullest extent feasible, a comprehensive analysis of GHG reductions. The AB 32 Scoping Plan establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of GHG emissions.

2.2 Calculation of GHGs

The first step in developing the CAP was to establish an existing inventory of Riverside County’s GHG emissions. The purpose of this inventory is to create an existing inventory to align with the Riverside County General Plan Update. The CAP uses 2008 as the year on which to base the existing inventory; this is the most recent year for which reliable data concerning the County’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 County are described in Chapter 4. The 2008 inventory serves as a reference against which to measure the County’s progress towards reducing GHG emissions 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 Riverside County’s total GHG emissions in 2008, many data sources were utilized. For community energy statistics, the following agencies and County departments were consulted: Riverside County Planning Department, Southern California Edison (SCE), Imperial Irrigation District (IID) and Southern California Gas Company (SCG). Transportation data sources included Riverside County Transportation Department, Riverside County Economic Development Agency, Southern California Association of Governments (SCAG), and California Department of Transportation (CalTrans). Agricultural data sources included Riverside County Agricultural Commissioner and SCAG. Water use data was gathered from Coachella Valley Water District, Desert Water Agency, Eastern Municipal Water District, Western Municipal Water District, Palo Verde Irrigation District, San Geronio Pass Water Agency, and Metropolitan Water District of Southern California. Solid waste data was collected from Riverside County Waste Management Department, California Integrated Waste Board (CIWB) and California Department of Resources Recycling and Recovery (Cal Recycle). Appendix C includes a compilation of all data inputs. In cases where specific data for 2008 was not available, estimates were

made by extrapolating from existing data the County had that was as close to 2008 as possible. Details on the data inputs and estimates made when 2008 data was not available can be found in Appendices B and C of this CAP. The data used in the calculations for each inventory are summarized in Chapter 3. All of the contributors to GHG emissions (kilowatt-hours (kWh) 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 inventory. By including the costs, the County can assess where consumers are spending the most money and utilize the information in making decisions on reduction measures. Coefficients, modeling inputs, and other assumptions, used in the calculations of GHGs are included in the Appendix of this report.

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 CAP discusses emissions with respect to the general source categories of Transportation, Energy, Area Source, Water, Wastewater, and Solid Waste.

Energy

ELECTRICITY

Emissions of CO₂, CH₄, and N₂O within Riverside County result from the use of electricity. Annual electricity usage in 2008, obtained from SCE and the Imperial Irrigation District (IID), the two major commercial electricity providers serving Riverside County territory, was used in determining community-wide electricity consumption and generation emission estimates for the existing inventory. For the municipal inventory, electricity use in government facilities and streetlights was included and categorized by department. For 2020, emissions estimates were based on the anticipated growth in population, housing and employment for the County. The 2020 growth projections were interpolated from the General Plan Update growth rates.

SCE and IID provide electricity generated via a variety of sources, including combustion of natural gas and coal, nuclear, large hydroelectric, and renewable sources (solar, wind, etc.). Each of these sources of electricity emits different amounts of GHGs. Therefore, emissions from electricity were determined by multiplying annual usage in megawatt hours per year (MWh/year) by the SCE emission factors appropriate to the inventory year for CO₂, CH₄, and N₂O obtained from EPA’s Emissions and Generation Resource Integrated Database (eGRID) (USEPA 2007).

NATURAL GAS COMBUSTION

The residents and businesses of Riverside County emit GHGs from the combustion of natural gas, most often used for space heating. The annual natural gas usage for the unincorporated areas of the County

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measured in million British Thermal Units (MMBTUs) was multiplied by the respective emissions factors for CO₂, CH₄, and N₂O to determine the emissions from natural gas combustion. Existing inventory consumption levels for municipal operations and the community as a whole were obtained from the Southern California Gas Company (SCG) and future community-wide consumption estimates were based on anticipated growth in the County.

WATERY SUPPLY

Water-related emissions included in this section are indirectly produced as a result of electrical consumption to pump and treat water imported from outside the County. There are many water agencies that operate in Riverside County providing both potable and non-potable water to customers in the unincorporated areas. The six major water importers and wholesalers serving Riverside County are: Coachella Valley Water District (CVWD), Desert Water Agency (DWA), Eastern Municipal Water District (EMWD), Western Municipal Water District (WMWD), Palo Verde Irrigation District (PVID) and San Geronio Pass Water Agency (SGPWA). Serving EMWD and WMWD, the Metropolitan Water District of Southern California (MWD) holds the rights to a large portion of the State Water Project supply (the system of aqueducts and canals that distributes water from the Sacramento Bay-San Joaquin Delta across the State) and is the largest water wholesaler in California. The San Geronio Pass Water Agency also gets its water from the State Water Project. The water agencies in the eastern portion of Riverside County predominantly get their water from the Colorado River.

Each agency's water supply comes from a mixture of the following sources: the Bay-Delta via the State Water Project, the Colorado River, local groundwater, recycled water, and local surface water. The GHG emissions associated with water use come from the energy used to collect, treat, convey, and distribute the water. Water imported through the State Water Project and from the Colorado River have higher GHG emissions associated with them, when compared to local water sources, as these distant sources require energy intensive transport to reach Riverside County. This category, "Water Supply," addresses the GHG emissions resulting from energy used to pump/transport these imported sources of water from their sources to Riverside County. This separate category is necessary, as the energy used is accrued across a varied of providers and is not included in the data collected from SCE and IID. For local water sources, the data collected from SCE and IID include associated electricity usage and, hence GHG emissions are included under the "Electricity" category described above. Showing GHG emissions associated with local water sources in the "Electricity" category avoided double counting because the electricity used to pump local water supplies was embedded in the SCE reported electrical consumption data for unincorporated Riverside County.

WASTE WATER TREATMENT

As with the local water supply just mentioned, GHG emissions associated with wastewater (that is, sewage, urban runoff, and, in some cases, industrial or manufacturing runoff) are based on the electricity needed to pump and treat the wastewater. Again, since wastewater treatment occurs locally within Riverside County, these emissions are also accounted for under the Electricity section of the community-wide inventory to avoid double counting of GHG emissions identical to how locally pumped water were treated.

Solid Waste Management

Riverside County Waste Management Department is responsible for managing the County’s landfills, including both active and closed landfills, with one exception—the El Sobrante landfill, which is privately owned and operated. Table 2-1, below, provides information on the closure year (either past or planned), the year the landfill gas (LFG) system was installed, the in place tonnage at the end of 2008, and the amount of waste disposed at each landfill in 2008. All of the landfills are managed by the County with the exception of El Sobrante, which is privately owned and operated.

Landfill Name (closure year)	Year LFG System Installed	In-place Tonnage (end of 2008)	Waste Disposed in 2008
Badlands (2016)	2001	8,389,807	582,404.62
Blythe (2034)	1998	609,373	15,178.80
Coachella (1997)	2001	3,237,845	-
Corona (1986)	1988	3,200,000	-
Desert Center	-	40,425	15.25
Double Butte (1994)	1997	1,977,463	-
Edom Hill (1997)	2008	7,323,778	-
Elsinore (1965)	1993	1,140,000	-
El Sobrante (2045)*	1989	22,127,558	960,363.49
Highgrove (1998)	1998	3,496,425	-
Lamb Canyon (2021)	2001	6,376,349	688,142.35
Mead Valley (1997)	1995	2,312,837	-
Mecca II	-	228,088	8.86
Oasis	-	176,410	1,479.97
W. Riverside (1993)	1988	1,260,000	-

*El Sobrante is a privately operated landfill; all others are operated by Riverside County Waste Management.

Riverside County’s municipal inventory includes the emissions associated with the landfills that are owned and managed by the County. This includes emissions from County-owned vehicles and equipment as well as fugitive methane emissions from open and closed landfills that are managed by the County. The County’s emissions from vehicles and equipment associated with solid waste are included, respectively, in the vehicle fleet and off-road equipment sections of the municipal operations inventory.

Emissions from solid waste result from three different waste-related sources of emissions: transportation from its source to the landfill, operation of the equipment used at the landfill, and the fugitive emissions from waste decomposition. Emissions from the transportation of solid waste are

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determined based on the average number of miles traveled by each truck multiplied by the CO₂, CH₄, and N₂O emissions generated per mile traveled. These emissions are accounted for under the “Transportation,” Section 2.3.4, of the inventory, described below. The emissions from landfill equipment are dependent upon the type of equipment, fuel use, and duration of use. Emissions from waste decomposition at both active and inactive landfills located in the unincorporated areas of Riverside County are included in the inventory. The operational information used in this section was collected from the Riverside County Waste Management Department.

Emissions from the equipment used at the landfills were calculated from total fuel use by the equipment and the emission factors for CO₂, CH₄, and N₂O, as determined from CARB off-road mobile source emission factors. Fugitive methane emissions from the decomposition of solid waste (typically buried) are calculated based on the annual waste generation multiplied by the applicable emission factors for waste production for CH₄. Many landfills now have a methane capture system in place; depending on the type of system, not all of the methane generated from the decomposition is included in the inventory. In Riverside County, all of the landfills have such systems with the exception of Desert Center, Mecca II, and Oasis landfills; these three landfills are the smallest in the County with limited waste disposal. Although CO₂ is also a by-product of organic waste decomposition, the USEPA considers these emissions to be natural and not anthropogenic. Therefore they are not included in the emissions inventory. Nitrous oxide is not a by-product of decomposition and therefore no fugitive emissions of nitrous oxide are anticipated or calculated from solid waste sources

Area Source Emissions

LANDSCAPING EMISSIONS

Emissions of CO₂, CH₄, and N₂O are generated by the use of landscape equipment that runs on gasoline. CO₂ emissions were determined directly through URBEMIS2007 for the existing (2008) and 2020 community-wide inventories. URBEMIS2007 is a computer software package that is used for modeling projected emissions of air quality pollutants including carbon dioxide. From the CO₂ emissions, the approximate number of gallons of gasoline consumed by landscape equipment use was calculated (CARB 2007e). This number was then multiplied by emission factors presented in the General Reporting Protocol, version 3.1 (CCAR 2010) to derive both CH₄ and N₂O emissions. Landscaping emissions in the municipal inventory were calculated based on the County’s inventory of equipment and fuel use along with the specific CO₂, CH₄, and N₂O emission factors for each equipment type.

WOOD BURNING EMISSIONS

Direct CO₂ emissions are produced from the burning of wood in wood stoves and fireplaces. Natural gas-fired stoves, barbecues and other heating devices are not included in this subcategory; they have already been accounted for under “Energy”. Carbon dioxide, CH₄, and N₂O emissions from wood stoves and fireplaces are calculated based on the percentage of residential units using each type of hearth and the California average amount of wood burned per unit provided by the EIA 2005 Residential Energy Consumption Survey (EIA 2005). The emission coefficients used are taken from the EPA’s AP-42 document (USEPA 1985).

Transportation

ON-ROAD VEHICLES

For Riverside’s municipal inventory, CO₂, CH₄, and N₂O emissions from the County’s municipal fleet were calculated based on the fuel use and annual miles traveled by each vehicle. CO₂ emissions were calculated using the total fuel use multiplied by the emission factor for either gasoline or diesel fuel. CH₄ and N₂O emissions are based on the vehicle’s age, model, and miles traveled. The emissions were then organized by each department.

For the community-wide inventory, emissions from on-road vehicles include all generated from trips attributable to activities taking place in the unincorporated parts of the County. 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 the California Air Resources Board and is used to calculate CO₂ emission rates for on-road motor vehicles, from light-duty passenger vehicles to heavy-duty trucks that operate on highways, freeways, and local roads in California (CARB 2007b). Motor vehicle emissions of CH₄, and N₂O were calculated using USEPA emission factors for on-road vehicles based on the total annual mileage driven multiplied by their respective emission factors by year. Vehicle miles traveled (VMT) were provided by the County Transportation Department. VMT was derived from transportation modeling of the trips entering the County, trips leaving the County, and trips within the County. Pass-through traffic (that is, trips beginning and ending outside of the County) is not included in this analysis. Since trips entering and leaving the County have only one end in Riverside County, only half of these miles were included in the emissions analysis, in order to reflect the split jurisdiction of these trips.

The transportation modeling (RIVTAM) assumed that all vehicles are either gasoline or diesel powered. The estimates therefore do not account for electrical, biodiesel (a blend of diesel and vegetable oil), or hydrogen powered systems. Any electrically-powered vehicle which draws its power from a residential, commercial, or industrial land use within the County will be accounted for under electrical usage, i.e., “Energy”. Predicted 2020 BAU vehicle trips were estimated by using Riverside County General Plan build-out (approximately Year 2060) conditions and interpolating back to year 2020.

AVIATION EMISSIONS

Riverside County owns and operates five airports: Hemet-Ryan, French Valley, Chiriaco Summit, Desert Center and Jacqueline Cochran Regional Airport. The municipal inventory includes the emissions from the energy used to run the facilities and lights at the airports and the emissions from on-site equipment, while the community-wide inventory includes emissions from all aviation activities. The GHG emissions associated with aircraft trips within the County were calculated based on annual fuel consumption (extrapolated from airport aviation fuel sales) and emission factors for jet fuel and aviation fuel for CO₂, CH₄, and N₂O. Fuel services are not provided at the Chiriaco Summit or Desert Center Airport, so all fuel consumption data was obtained from the three larger airports. March Air Reserve Base is not included here as it is not under the direct jurisdiction of the County of Riverside.

Agriculture

Riverside County has a large amount of agricultural land with a variety of cultivation uses. The most prominent uses are field and seed crops, including primarily alfalfa and wheat, as well as irrigated pasturelands and rangelands (for grazing). Other uses include fruit trees, vineyards, vegetables, and livestock. Agricultural practices contribute directly to emissions of greenhouse gases through a variety of processes. Assessment of non-carbon-dioxide emissions are from the following source categories: enteric fermentation in domestic livestock, livestock manure management, crop cultivation, and field burning of agricultural residues.

Livestock emissions are divided into two categories based on the emissions source: enteric fermentation and manure management. Enteric fermentation is defined as a fermentation process that takes place in the stomach of ruminant animals, such as cows, sheep and goats. This process produces methane that is released through belching and flatulence. Manure management is the process of gathering and disposing of manure generated by livestock. Management practices vary by type of livestock, but in the case of dairy cows, manure is often collected and stored in lagoons. As the manure breaks down, methane is released.

Methane and nitrous oxide are the primary greenhouse gases emitted from crop cultivation and associated activities. Rice cultivation and field burning of agricultural residues are contributing sources of CH₄ (USEPA 2009b). Agricultural related emissions for 2008 were based on data from SCAG and the Riverside County Agricultural Commissioner.

CHAPTER 3 GHG Emissions Inventory

The following sections describe Riverside County’s 2008 government operations and community-wide GHG emissions inventories. The government 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 produced by residents, businesses, and municipal operations in the unincorporated areas of Riverside County using the best available data. By having the government 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 County.

3.1 2008 Government Emissions Inventory

Data Inputs

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

Table 3-1 2008 Government Data Inputs		
Category	Data Input	Data Source
Electricity (kWh)	113,650,902	SCE
Natural Gas (therms)	1,622,208	SCG
Vehicle Fleet		Riverside County Fleet Manager
<i>Gasoline(gallons)</i>	3,419,635	
<i>Diesel (gallons)</i>	469,649	
Off-Road Equipment		Riverside County Fleet Manager
<i>Gasoline(gallons)</i>	982	
<i>Diesel (gallons)</i>	178,777	
<i>Propane (gallons)</i>	3,607	
<i>Jet Fuel (gallons)</i>	1,832,210	
<i>Aviation Fuel (gallons)</i>	404,686	
Solid Waste Landfill Gas Collection (MMSCF)	2,854	Riverside County Waste Management

Each data input was then multiplied by the associated emission factor to calculate the emissions inventory. Additionally, where possible, the emissions were categorized by County Department.

Emissions Summary

Riverside County emitted 237,085 MT CO₂e through its government operations in 2008. The emissions were calculated based on the vehicle and equipment fleet fuel use, energy accounts, and waste management. The largest portion of the County’s 2008 government emissions were from solid waste (60 percent), followed by emissions from the vehicle fleet (15 percent). Table 3-2 summarizes the County’s

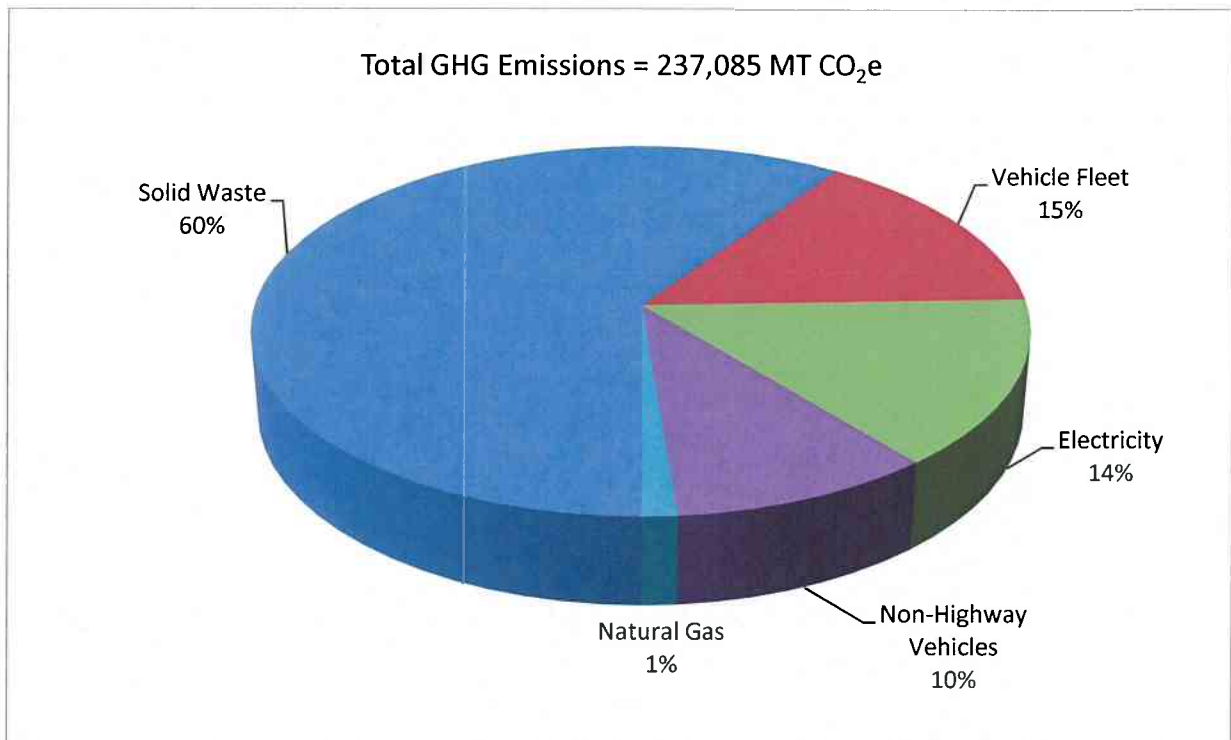
3.1 2008 GOVERNMENT EMISSIONS INVENTORY

2008 emissions of CO₂e as broken down by emissions category. Figure 3-1 is a graphical representation of Table 3-2. A detailed breakdown of 2008 emissions by category is available in Appendix D of this CAP.

Table 3-2 2008 Total Government Emissions	
Category	Metric tons of CO ₂ e
Solid Waste	141,193
Vehicle Fleet	35,331
Electricity	34,478
Off-Road Equipment*	23,018
Natural Gas	3,065
Total	237,085

*Off-Road Equipment includes front end loaders, dozers, forklifts, etc.

Figure 3-1 2008 Government Emissions by Category (metric tons CO₂e)



2008 GOVERNMENT DEPARTMENT EMISSIONS AND COSTS

For the government operations 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 summarizes the solid waste, electricity, natural gas, and vehicle fleet emissions by department.

The solid waste management department represents the largest sources of emissions in the County due to the number of landfills managed and the associated methane emissions from the decomposing waste. The sheriff department accounts for the greatest energy costs primarily due to the numerous vehicles used by the sheriff's fleet.

Table 3-3 2008 Government Emissions and Costs by Department		
Category	Metric Tons of CO₂e	Energy Cost (\$)
Waste Management	142,603	\$ 452,416
Airports	21,250	\$ 253,686
Sheriff	15,039	\$ 5,008,600
Public Safety and Justice	12,981	\$ 4,223,789
Administrative	9,259	\$ 3,033,217
Leased Buildings	8,753	\$ 2,848,502
Community Health	7,780	\$ 2,540,726
Transportation/Land Use/Environment	7,493	\$ 2,201,485
Fire	6,541	\$ 1,975,982
Social Services	5,206	\$ 1,719,473
Parks	179	\$ 59,011
Total	237,085	\$ 24,316,879
Note: Emission sources include electricity, natural gas, vehicle fuels, and solid waste decomposition. Costs include electricity, natural gas, and transportation fuels.		

2008 TOTAL GOVERNMENT COST ESTIMATES

The costs associated with the inventory represent the municipal energy and fuel use costs. These cost estimates give the County a perspective on where the County is spending the most money and help to prioritize reduction measures toward the sectors that have the potential to both reduce emissions and costs. The County's fuel purchases for the vehicle fleet made up the largest cost in 2008, followed closely by electricity costs. Table 3-4, below, summarizes the cost estimates for 2008.

3.2 2008 COMMUNITY-WIDE EMISSIONS INVENTORY

Source	Energy Cost
Vehicle Fleet	\$ 11,433,028
Electricity	\$ 11,211,528
Natural Gas	\$ 989,547
Off-Road Vehicles	\$ 682,775
Total	\$ 24,316,879

3.2 2008 Community-Wide Emissions Inventory

The community-wide inventory represents all emissions from sources located with the unincorporated areas of Riverside County. Therefore, the government operations emissions described in the previous section are a subset of the community-wide inventories presented here. In 2008, Riverside County emitted a total of 7,102,319 MT CO₂e from the community as a whole. The following sections describe the data inputs, emissions by source, and emissions by land use in 2008.

Data Inputs

Data for the community-wide inventory was gathered from various County departments, SCE, IID, SCG, and reports. Table 3-5, below, summarizes the data inputs and sources for each of the emission categories included in the inventory. Each data input was then multiplied by the associated emission factor to calculate the emissions associated with each source.

Table 3-5 2008 Community-Wide Data Inputs		
Category	Data Input	Data Source
Electricity		
<i>SCE (kWh)</i>	2,593,455,382	SCE
<i>IID (kWh)</i>	1,034,292,942	IID
Natural Gas (therms)	95,918,639	SCG
Transportation		
<i>Annual VMT</i>	5,161,531,679	Riverside County Traffic Modeling
<i>Annual Trips</i>	862,485,528	
Area Source (based on land use)		
<i>SFR (units)</i>	112,132	Riverside County Planning
<i>MFR (units)</i>	48,854	
<i>Commercial (ksf)</i>	169,585	
<i>Industrial (ksf)</i>	33,905	
Solid Waste Landfill Gas (SCFM)	7,086	Riverside County Waste Management
Purchased Water (acre-feet)	193,802	Water Agency Reports
Agriculture (acres)		
<i>Hay</i>	29,648	Riverside County Agricultural Commissioner
<i>Corn</i>	497	
<i>Oats</i>	1,150	
<i>Sorghum</i>	3,197	
<i>Wheat</i>	14,817	
<i>Cotton</i>	6,901	
<i>Vegetable & Fruit Trees</i>	43,898	SCAG
Animals (head)		
<i>Dairy Cow</i>	43,773	
<i>Poultry</i>	5,260,914	
<i>Sheep</i>	12,700	

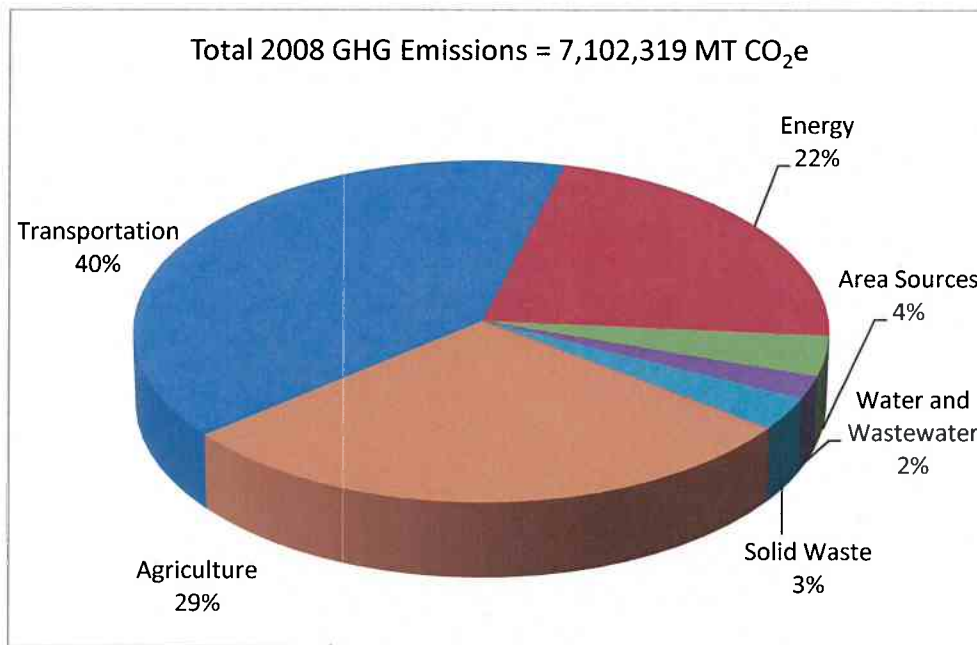
Emissions by Source

Table 3-6 summarizes net 2008 County emissions of CO₂e as broken down by emissions category. The County as a whole emitted 7,102,319 MMT CO₂e in 2008. The largest portion of the County’s 2008 emissions were from transportation (40 percent), followed by electricity and natural gas use in buildings (22 percent). Figure 3-2 provides a comparison of GHG emissions by category.

3.3 2020 BUSINESS AS USUAL COMMUNITY-WIDE EMISSIONS INVENTORY

Table 3-6 2008 Community-wide GHG Emissions by Source	
Emissions Category	Metric tons of CO ₂ e
Transportation	2,850,520
Energy	1,585,565
Area Sources	269,181
Purchased Water	152,473
Solid Waste	214,149
Agriculture	2,030,431
Total	7,102,319

Figure 3-2 2008 Emissions Generated by Emissions Category (metric tons CO₂e)



3.3 2020 Business as Usual Community-Wide Emissions Inventory

In 2020, Riverside County is projected to emit a total of approximately 10.3 MMT of CO₂e from BAU operations. BAU refers to continued operations and development of the County according to 2008 policies, without the inclusion of proposed reduction or sustainability initiatives as part of this CAP. Reduction initiatives coming from the State or other agencies are not included in the BAU scenario;

these reduction measures and their anticipated emission reductions in Riverside County are discussed in Chapter 4.

Data Inputs

Data for the 2020 BAU community-wide GHG inventory was estimated based on the General Plan growth rates for the County. Table 3-7 below, summarizes the County’s socioeconomic growth rates.

Category	Data Input	Data Source
Growth Rates (based on General Plan Update) ^a		Riverside County
<i>Households</i>	62.4%	TLMA/IT/GIS/
<i>Employment</i>	96.1%	Demographics
^a Note: The growth rates represent the overall growth from 2008 to 2020 and are derived from the socioeconomic and land use factors used for the proposed General Plan Update.		

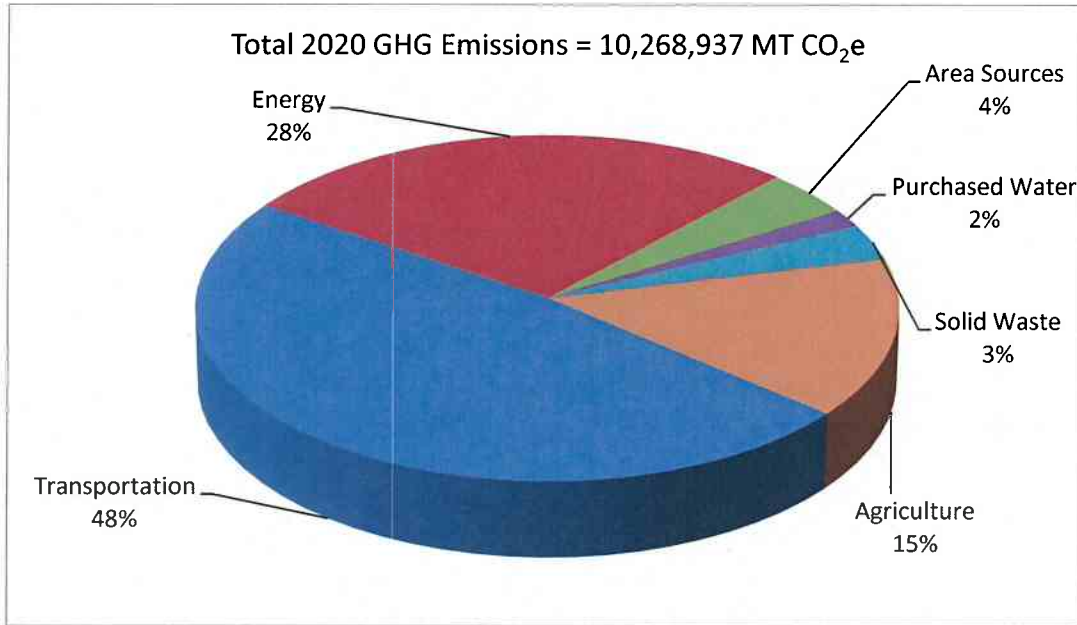
The socioeconomic growth rates were used to estimate the emissions associated with transportation, electricity, natural gas, water, area source, and solid waste.

2020 BAU Emissions by Source

The 2020 BAU emissions are estimated based on the projected growth in Riverside County from 2008 to 2020. These projections include a 62.4 percent increase in households and a 96.1 percent increase in employment; these growth rates were applied, respectively, to residential and non-residential 2008 emissions in order to estimate 2020 BAU emissions. Table 3-8 summarizes the net 2020 County emissions of CO₂e as broken down by emissions category. Figure 3-3 is a graphical representation of Table 3-8. A detailed breakdown of 2020 emissions by category is available in Appendix D of this CAP.

Emissions Category	Metric tons of CO ₂ e
Transportation	4,950,296
Energy	2,837,295
Area Sources	442,033
Purchased Water	175,344
Solid Waste	341,145
Agriculture	1,522,823
Total	10,268,937

Figure 3-3 2020 BAU Emissions Generated by Source (metric tons CO₂e)



3.4 2035 Business As Usual Community-Wide Emissions Inventory

In 2035, Riverside County is projected to emit a total of 12.8 MMT CO₂e based on the growth rates associated with the proposed General Plan Update and without the inclusion of the proposed reduction measures presented in this CAP.

Data Inputs

Data for the 2035 BAU community-wide GHG inventory was estimated based on the General Plan socioeconomic growth rates for the County. Table 3-9, below, summarizes the County’s growth rates.

Category	Data Input	Data Source
Growth Rates (based on General Plan Update) ^a		Riverside County
Households	92.6%	TLMA/IT/GIS/
Employment	165.1%	Demographics

^a Note: The growth rates represent the overall growth from 2008 to 2035 and are derived from the socioeconomic and land use factors used for the proposed General Plan Update.

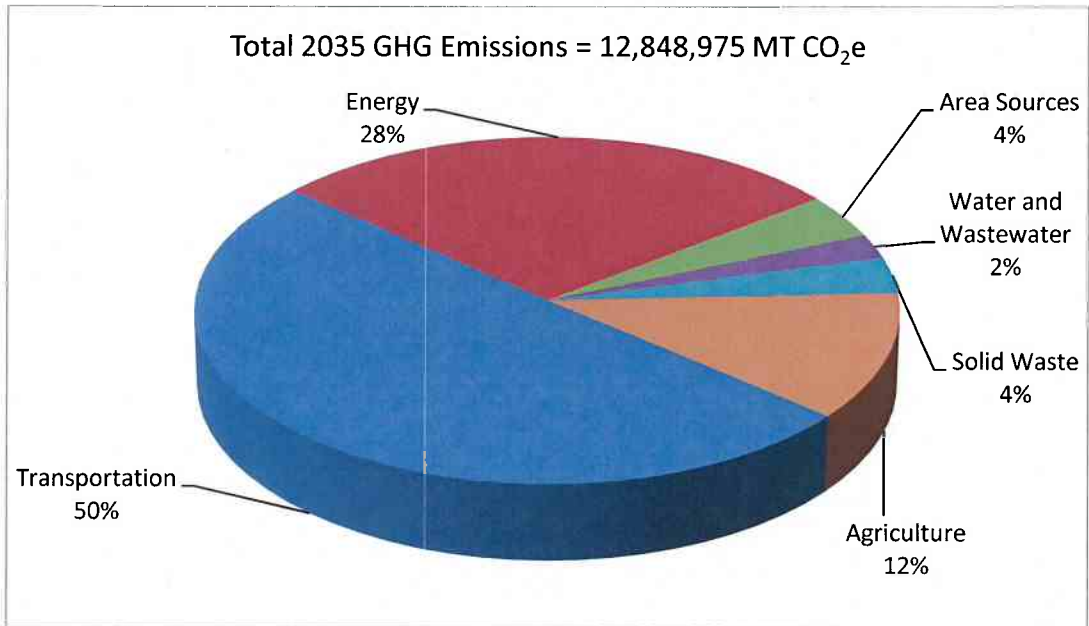
The socioeconomic growth rates were used to estimate the emissions associated with transportation, electricity, natural gas, water, area source, and solid waste.

2035 BAU Emissions by Source

The 2035 BAU emissions are estimated based on the projected growth in Riverside County from 2008 to 2035. These projections include a 92.6 percent increase in households and a 165.1 percent increase in employment; these growth rates were applied, respectively, to residential and non-residential 2008 emissions in order to estimate 2035 BSU emissions. Table 3-10 summarizes the net 2035 County emissions of CO₂e as broken down by emissions category. Figure 3-4 is a graphical representation of Table 3-10. A detailed breakdown of 2035 emissions by category is available in Appendix D of this CAP.

Category	Metric tons of CO ₂ e
Transportation	6,461,733
Energy	3,617,816
Areas	529,395
Purchased Water	293,083
Solid Waste	424,125
Agriculture	1,522,823
Total	12,848,975

Figure 3-4 2035 BAU GHG Emissions by Source



3.5 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, Riverside County 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 greenhouse gas 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. The County’s reduction target is based on Riverside’s 2008 GHG emissions inventory.

Consistent with the State’s adopted AB 32 GHG reduction target, Riverside County has set a goal to reduce GHG emissions back to 1990 levels by the year 2020. This target was calculated as a 15 percent decrease from 2008 levels, as recommended in the AB 32 Scoping Plan. The reduction target is displayed in Table 3-11. Having one overall reduction target, as opposed to targets for each sector, allows the County 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
2008 Emissions	7,102,319
% Reduction	15%
2020 Reduction Target	6,036,971

3.6 Emissions Comparison by Year

This report analyzes GHG emissions from the most current year with data available (2008) and estimates the future emissions for Riverside County in 2020 and 2035.

The 10.3 MMT CO₂e of GHG emissions for 2020 is an estimated increase of 3.2 MMT CO₂e above 2008 levels. The growth from 2008 to 2020 is a 45 percent increase. Table 3-12 shows a comparison of total emissions for 2008, 2020, and 2035 emissions.

Table 3-12 GHG Emissions by Source			
Source	Metric Tons CO₂e		
	2008	2020 BAU	2035 BAU
Transportation	2,850,520	4,950,296	6,461,733
Energy	1,585,565	2,837,295	3,617,816
Area Sources	269,181	442,033	529,395
Purchased Water	152,473	175,344	293,083
Solid Waste	214,149	341,145	424,125
Agriculture*	2,030,431	1,522,823	1,522,823
Total	7,102,319	10,268,937	12,848,975
*Note that Agriculture is assumed to decline between 2008 and 2020 as development of the unincorporated County area continues and then remain the same between 2020 through 2035 as the County increases density of developed areas in order to maintain the remaining open spaces and agricultural lands.			

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

Table 3-13 2020 GHG Emissions Reduction Target	
	Metric Tons CO₂e
2020 Emissions	10,268,937
2020 Reduction Target	6,036,971
Amount to Reduce by 2020	4,231,965

With the reduction target set at 6,036,971 MT CO₂e, the County will need to reduce emissions by 4,231,965 MT CO₂e from the BAU 2020 emissions. Chapter 4 describes the efforts currently underway in Riverside County and the reduction strategies that would be implemented to reduce emissions in the County in order to reach the 2020 reduction target.

3.6 EMISSIONS COMPARISON BY YEAR

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