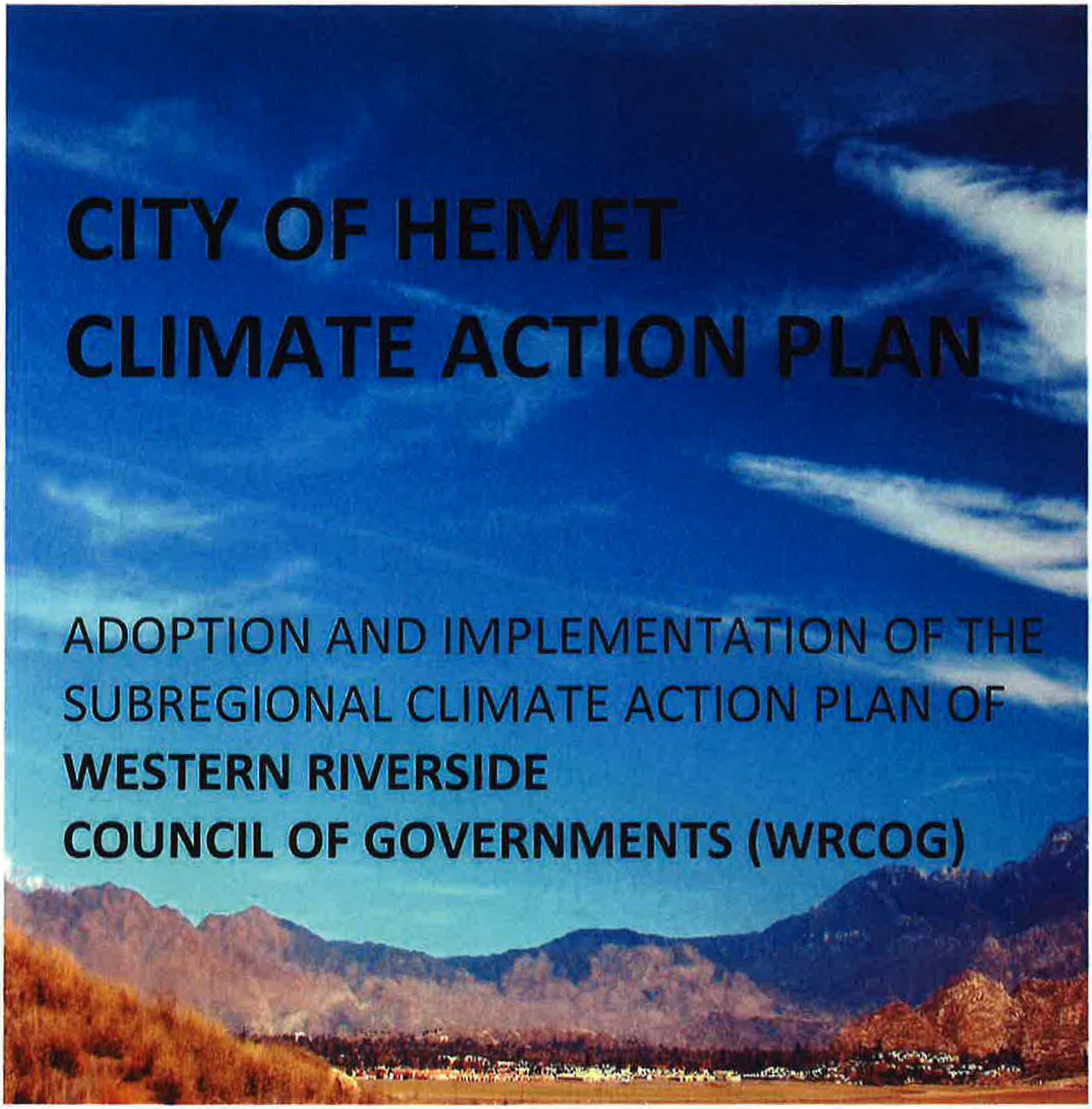

CITY OF HEMET CLIMATE ACTION PLAN

ADOPTION AND IMPLEMENTATION OF THE SUBREGIONAL CLIMATE ACTION PLAN OF **WESTERN RIVERSIDE COUNCIL OF GOVERNMENTS (WRCOG)**

Adopted by the Hemet City Council: September 11, 2018
City Council Resolution No: 4835

Table of Contents

PART 1: CITY OF HEMET CLIMATE ACTION IMPLEMENTATION PLAN

Local Implementation I – 1

General Plan Sustainability Policies GP- 1

PART 2: WRCOG SUBREGIONAL CLIMATE ACTION PLAN

Executive Summary ES – 1

Chapter 1: Introduction 1 – 1

Chapter 2: Emissions Inventory 2 – 1

Chapter 3: Reduction Measures 3 – 1

Chapter 4: Implementation 4 – 1

Chapter 5: Adaption and Resiliency 5 – 1

PART 3: APPENDICES

Appendix A – Hemet Community Energy Action Plan

Appendix B – Hemet Municipal Energy Action Plan

Appendix C – Vulnerability Assessment

Appendix D – CAP Monitoring Tool

List of Figures

Figure	Page Number
Figure ES-1: Baseline Greenhouse Gas Emissions by Source	ES – 2
Figure ES-2: WRCOG Subregion-Community GHG Business as Usual Forecasts and Reduction Target for 2020	ES – 1
Figure 1-1: WRCOG Subregion	1 – 1
Figure 1-2: Greenhouse Gases Regulated Under AB 32	1 – 4
Figure 1-3: Regulatory Framework for Climate Change	1 – 8
Figure 2-1: WRCOG Subregion – Baseline Community Emissions by Sector	2 – 3
Figure 2-2: Baseline Total Community Emissions by Jurisdiction	2 – 4
Figure 2-3: Baseline Community Emissions per Service Population by Jurisdiction	2 – 4
Figure 2-4: Baseline Community Emissions by Jurisdiction by Sector	2 – 5
Figure 2-5: WRCOG Subregion – 2020 Community Emissions Business as Usual Forecast by Sector	2 – 6
Figure 2-6: 2020 and 2035 Community Emissions Business as Usual Forecast by Jurisdiction	2 – 7
Figure 2-7: WRCOG Subregion-Community GHG Business as Usual Forecasts and Reduction Target for 2020	2 – 8
Figure 3-1: WRCOG Subregion-GHG Reductions Achieved through State, Regional and Local Measures	3 – 4
Figure 5-1: Historic and Projected Extreme Heat Days, 1950-2050	5 – 2
Figure 5-2: February Snowpack Levels in the Sierra Nevada, Five State Average, 1980-2014	5 – 3

List of Figures (continued)

Figure 5-3: Baseline Wildfire Risk, 2010 5 – 4

Figure 5-4: Wildfire Risk, 2039 5 – 5

Figure 5-5: Change in Wildfire Risk, Baseline to 2039 5 – 5

Figure 5-6: FEMA 100-Year Flood Zones 5 – 6

Figure 5-7: Social Vulnerability in the Subregion 5 – 9

Figure 5-8: Flood Hazards and Social Vulnerability 5 – 13

Figure 5-9: Wildfire Hazards and Social Vulnerability, 2039 5 – 13

List of Tables

Table	Page Number
Table P-1: Comparison of Chapters in WRCOG Subregional CAP to Chapters in Hemet CAP	P – 2
Table 1-1: WRCOG Member Participation in Sustainability Programs	1 – 2
Table 1-2: Greenhouse Gases Regulated Under AB 32	1 – 5
Table 2-1: WRCOG Subregion – Baseline Community Emissions by Sector	2 – 3
Table 2-2: WRCOG Subregion – Projected Business-As-Usual Community Emissions by Sector	2 – 6
Table 3-1: 2020 Reductions Achieved Through State and Regional Measures	3 – 6
Table 3-2: 2020 Reductions Achieved from Local Measures	3 – 21
Table 4-1: Climate Action Plan Implementation Responsibilities	4 – 4
Table 4-2: Implementation Summary	4 – 5
Table 4-3: Potential Funding Sources to Support CAP Implementation	4 – 11

Acronyms

AB – Assembly Bill

AR4 – Fourth Assessment Report

AFV – Alternative Fuel Vehicle

ARRA – American Recovery and Reinvestment Act

BAU – Business-as-Usual

BEU – Banning Electric Utility

BTA – Bicycle Transportation Account

CALGreen – California Green Building Standards Code

CAP – Climate Action Plan

CAPCOA – California Air Pollution Control Officers Association

CARB – California Air Resources Board

CAT – Climate Action Team

CEC – California Energy Commission

CEESP – California Long-Term Energy Efficiency Strategic Plan

CEQA – California Environmental Quality Act

CESA – California Endangered Species Act.

CH_4 – Methane

CIP – Capital Improvement Plan

CO_2 – Carbon Dioxide

CO_2e – Carbon Dioxide Equivalents

EAP – Energy Action Plan

EGPR – Environmental Goals and Policy Report

EIR – Environmental Impact Report

ESA – U.S. Endangered Species Act

EO – Executive Order

FHA – Federal Housing Administration

GHG – Greenhouse Gas

GWP – Global Warming Potential

HFCs – Hydroflourocarbons

IPCC – International Panel on Climate Change

LGO – Local Government Operations

MPO – Metropolitan Planning Organization

MSCHP – Multiple Species Habitat Conservation Plan

MT – Metric Ton

N_2O – Nitrous Oxide

OPR – Office of Planning and Research

PACE – Property Assessed Clean Energy

PD TAC – Planning Directors' Technical Advisory Committee

PFCs – Perfluorocarbons

RCA – Regional Conservation Authority

RCHC – Riverside County Health Coalition

RCTC – Riverside County Transportation Commission

RPU – Riverside Public Utilities

RTA – Riverside Transit Agency

RTP – Regional Transportation Plan

SAFETEA-LU – Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users

SAR – Second Assessment Report

SB – Senate Bill

SCAG – Southern California Association of Governments

SCE – Southern California Edison

SCG – Southern California Gas Company

SCS – Sustainable Communities Strategy

SGC – Strategic Growth Council

SF_6 – Sulfur Hexafluoride

TAR – Third Assessment Report

TUMF – Transportation Uniform Mitigation Fee

TEA-21 – Transportation Equity Act for the 21st Century

VMT – Vehicle Miles Traveled

WRCOG – Western Riverside Council of Governments

WRELP – Western Riverside Energy Leader Partnership

PART 1:
City of Hemet Climate Action Implementation Plan

Local Implementation
City of Hemet

In 2012, the Western Riverside Council of Governments (WRCOG) invited the City of Hemet to participate in the Western Riverside Energy Leader Partnership (WRELP) and the Subregional Climate Action Plan (CAP). The WRELP consists of energy efficiency programs that will reduce utility costs and greenhouse gas (GHG) emissions associated with energy use at the municipal and community level. The CAP sets forth a subregional emissions reduction target, emissions reductions measures, and actions steps to help the participating jurisdictions demonstrate consistency with California's Global Warming Solutions Act of 2006 (Assembly Bill 32.)

As a participant in both efforts, the City of Hemet unites with other participating jurisdictions to meet shared GHG emissions reduction goals. The approach offers flexibility to jurisdictions to participate at a level that is feasible and practical for each community. This Chapter summarizes the commitments made by the City of Hemet through the WRELP and the Subregional CAP.

PLAN COMPONENTS

The City of Hemet recognizes the comprehensive, professional, and outstanding effort of the WRCOG staff and its consultants in the preparation of the WRELP and Subregional CAP documents. Rather than duplicate efforts at unknown expense, the City of Hemet has chosen instead to adopt the WRCOG Subregional CAP as the Hemet Climate Action Plan incorporating as appendices the WRELP's Community Energy Action Plan and the Municipal Energy Action Plan for the City of Hemet.

This chapter demonstrates how the City has integrated the sustainability measures of the Hemet General Plan with the reductions measures outlined in the Subregional CAP. The City's General Plan sustainability policies are listed in the next chapter. Outlined below, by chapter, is Hemet's participation in the Subregional CAP.

INTRODUCTION (CHAPTER 1)

Chapter 1 explains the regulatory context for monitoring and addressing climate change listing State legislation and regulations as well as regional programs and accomplishments. It also discusses the purpose and the strength of a subregional approach to demonstrating consistency with mandated emission reduction targets including AB 32 that directs California to reduce statewide GHG emissions to 1990 levels by 2020. To reach this target, local governments such as the City of Hemet are expected to reduce 2020 emissions by 15% below current levels.

EMISSIONS INVENTORY (CHAPTER 2)

Chapter 2 establishes the baseline (current) level of emissions for the 12 jurisdictions participating in the Subregional CAP. The baseline inventory describes the cumulative GHG emissions generated by each participating jurisdiction from the following sectors: residential energy, commercial/industrial energy, transportation, waste, and wastewater. Because the City of Hemet is a participant in the Subregional CAP, it does not have to determine its own City baseline inventory or monitor its reductions separately. Through data provided by the City of Hemet and the other participating jurisdictions through the Community Energy Action Plan, the Municipal Energy Action Plan, and other inventories, WRCOG determined the baseline emissions inventory for the subregion. It is from this baseline that emission reductions are measured.

HEMET REDUCTION MEASURES (CHAPTER 3)

Chapter 3 outlines the federal, state, and regional emission reductions as well as the local measures that the City of Hemet and the other participating jurisdictions are implementing to meet shared GHG emissions reduction goals. The approach offers flexibility by allowing each jurisdiction to participate at a level that is feasible and practical for its community. Through federal, state, and regional measures implemented at the subregion level, participating jurisdictions can reduce 2020 emissions by 1,980,815 $MTCO_2e$, representing 78% of the subregion's 2020 reductions. Summarized below are the local reduction measures to which the City of Hemet has committed:

Measure E-1: Energy Action Plans

Improve municipal and community-wide energy efficiency and reduce energy consumption through the adoption of local Energy Action Plans (EAP).

- **Community Energy Action Plan (CEAP).** In cooperation with the City of Hemet, WRCOG prepared the Hemet Community Energy Action Plan in January 2014 (Appendix A). The City of Hemet has agreed to the following CEAP actions:

- **R2-E1: New Residential Energy Efficiency.** Increase energy efficiency in new residential developments an average of 15% beyond 2008 Title 24 standards.
- **R2-E2: New Commercial Energy Efficiency**. Increase energy efficiency in new commercial developments an average of 10% beyond Title 24 standards.
- **R2-E3: Residential Renewable Energy**. Derive 10 percent of the electricity use in new residential developments from renewable energy.
- **R2-E4: Commercial Renewable Energy**. Derive 10 percent of the electricity use in new commercial developments from renewable energy and install an average of 5kw of solar photovoltaic cells per 10,000 square feet of building space.
- **R2-E5: Residential Energy Retrofits**. Reduce electricity and natural gas use in existing residential developments by 20 percent through retrofits.
- **R2-E6: Commercial Energy Retrofits**. Reduce electricity and natural gas use in existing commercial developments by 20 percent through retrofits.
- **R3-E1: Regional Energy Planning Coordination**. Continue to coordinate with local utilities, regional organizations, non-profits, and other local agencies to optimize energy efficiency and renewable resource development and usage.
- **R3-E2: Energy Efficient Development and Renewable Energy Deployment Facilitation and Streamlining.** Identify and remove any regulatory and procedural barriers to the implementation of green building practices and the incorporation of renewable energy systems.
- **R3-E3: Energy Efficiency Training and Public Education**. Provide 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.
- **R2-W2: Water Conservation Strategies**. Reduce water consumption in new developments by 20 percent through low flush toilets, landscape ordinance, incentive programs, on-site stormwater capture, and other similar programs.
- **R2-W3: Increased Recycled Water Use.** Convert 5 percent of the City's water to reclaimed water.
- **R3-W1: Water Efficiency and Conservation Education**. In coordination with local water purveyors, continue to implement public information and education programs that promote water conservation.

❖ **Municipal Energy Action Plan (MEAP)**. In cooperation with the City of Hemet, WRCOG prepared the Hemet Municipal Energy Action Plan in December 2013 (Appendix B). The City of Hemet has agreed to the following MEAP actions:

- **M1-E1: Municipal Energy Retrofits**. Reduce energy usage at City buildings and facilities by 10 percent through HVAC, mechanical systems, and lighting upgrades.

- **R2-E4: Municipal Renewal Energy.** Reduce the use of nonrenewable electricity sources in City facilities by 5 percent.
- **R3-E1: Regional Energy Planning Coordination.** Continue to coordinate with local utilities, regional organizations, non-profits, and other local agencies to optimize energy efficiency and renewable resource development and usage.
- **R3-E3: Energy Efficiency Training and Education.** Provide education to City staff about energy efficiency measures and reduction programs available within the City through a variety of methods including internal newsletters, brochures, and the City's website.
- **R3-W1: Water Efficiency and Conservation Education.** In coordination with local water purveyors, continue to implement information and education programs to City staff that promote water conservation.

Measure T-1: Bicycle Infrastructure Improvements

Expand on-street and off-street bicycle infrastructure, including bicycle lanes and bicycle trails.

- Implement a 10 percent increase in bicycle land mileage from baseline levels.

Measure T-2: Bicycle Parking

Provide additional options for bicycle parking.

- Amend zoning to require provision of bike parking for all multi-family or mixed-use projects consisting of a mix of residential, retail, and office space.

Measure T-3: End of Trip Facilities

Encourage use of non-motorized transportation modes by providing appropriate facilities and amenities for commuters.

- Provide information to commercial project applicants describing the benefits of installing end-of-trip facilities.

Measure T-4: Promotional Transportation Demand Management

Encourage Transportation Demand Management strategies.

- Train an existing staff person to promote TDM strategies to existing business.

Measure T-7: Traffic Signal Coordination

Incorporate technology to synchronize and coordinate traffic signals along local arterials.

- Coordinate traffic signals on an additional 25 percent of arterial roads which were not coordinated in the base year.

Measure T-8: Density

Improve jobs-housing balance and reduce vehicle miles traveled by increasing household and employment densities.

- Achieve a 5 percent increase in community-wide household and employment density over baseline conditions by 2020.

Measure T-9: Mixed-Use Development

Provide for a variety of development types and uses.

- Achieve a 10 percent jobs/housing ratio improvement over baseline conditions.

Measure T-10: Design/Site Planning

Design neighborhoods and sites to reduce VMT.

- Five percent increase in intersection density and reduction in block length in new development compared to the baseline countywide average.

Measure T-11: Pedestrian-Only Areas

Encourage walking by providing pedestrian-only community areas.

- Designate one additional pedestrian-only area during weekends tied to a special event (e.g., farmer's market) over baseline conditions.

Measure T-12: Limit Parking Requirements for New Development

Reduce requirements for vehicle parking in new development projects.

- Amend zoning to reduce parking requirements for new non-residential development by 5 percent over baseline conditions.

Measure T-13: High Frequency Transit Service

Implement high frequency transit service in the subregion to provide alternative transportation options.

- Work with RTA to offer high frequency transit service within one (1) corridor.

Measure T-15: Accelerated Bike Plan Implementation

Accelerate the implementation of all or specified components of a jurisdiction's adopted bike plan.

- Install 25 percent of all bicycle facility miles identified in the General Plan by 2020.

Measure T-17: Neighborhood Electric Vehicle Programs

Implement development requirements to accommodate Neighborhood Electric Vehicles and supporting infrastructure.

- Adopt an educational program related to the use of NEVs.

Measure SW-1: Yard Waste Collection

Provide green waste collection bins community-wide.

- Provide residential green waste bins for collection and transport to an organic waste processing facility.

IMPLEMENTATION (CHAPTER 4)

Chapter 4 explains that WRCOG will continue to track State reduction measures, facilitate implementation of the regional measures, and coordinate with each participating jurisdiction to implement local measures. Additionally, WRCOG will continue to provide regional leadership and assist in identifying funding, establishing partnerships, and tracking and monitoring progress in achieving GHG emission reduction goals. The City of Hemet will implement the reduction measures to which it committed in Chapter 3 and will report its progress annually to WRCOG for inclusion in the subregional analysis.

One of the major benefits to an adopted Hemet Climate Action Plan is that development projects within the City would not require additional GHG emissions analysis and mitigation under CEQA if they are consistent with the Hemet CAP. The City will develop a project review checklist for inclusion in the Initial Study enabling individual development project to demonstrate that they are minimizing GHG emissions consist with reductions proposed in the CAP. The checklist will apply to all projects subject to CEQA.

HEMET ADAPTATION AND RESILIENCY STRATEGIES (CHAPTER 5)

Chapter 5 identifies assets in the subregion that are expected to be vulnerable to climate change effects and presents adaptation strategies intended to reduce vulnerability and increase resilience. The vulnerabilities were determined by a Vulnerability Assessment completed by WRCOG and included as Appendix C. The four steps in the vulnerability assessment process were:

1. Identify hazards that could change as a result of climate change.
2. Identify assets or populations that could be affected by the hazards.
3. Determine how the hazards would affect the identified assets or populations and how those assets and populations are currently prepared to deal with such impacts.

4. Prioritize impacts by level of vulnerability.

Based upon the Vulnerability Assessment, WRCOG identified issues and developed adaptation strategies that address the identified vulnerabilities through work programs implemented by WRCOG or local governments. Summarized below are the issues and adaptation strategies to which the City of Hemet has committed:

ISSUE 1: STRATEGIES FOR PLANNING AND EMERGENCY RESPONSE

- Adopt a local climate action plan.
- Integrate climate change adaptation considerations into public safety documents.
- Incorporate extreme heat and air quality annexes into emergency operations plans.

ISSUE 2: STRATEGIES FOR DISADVANTAGED COMMUNITIES

- Continue to develop resources and materials that effectively communicate with non-English speakers in emergency and evacuation situations.
- Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened.
- Identify ways for individuals with restricted mobility to reach cooling centers.

ISSUE 3: STRATEGIES FOR PUBLIC HEALTH

- Augment employee and worker training in industries with outdoor work, including assurance of adequate water, shade, rest breaks, training on heat risks, and vector-borne disease avoidance.
- Identify and remedy poor drainage areas to reduce disease risk from stagnant water.
- Target critical health-care facilities' energy efficiency outreach programs.
- Work with local volunteer emergency response teams to include extreme heat as a hazard of concern and update core competencies to address the health-related risks of extreme heat events.

ISSUE 4: STRATEGIES FOR TRANSPORTATION INFRASTRUCTURE AND OPERATIONS

- Use materials and features in transportation infrastructure that can improve resiliency to extreme events.
- Facilitate coordination of traffic signal systems between adjacent communities.
- Coordinate with regional transit providers to identify alternative routes and stops if normal infrastructure is damaged or closed as a result of extreme events.

ISSUE 5: STRATEGIES FOR WILDFIRE AND FLOOD RESILIENT DEVELOPMENT

- Continue to provide information to homeowners about statutory vegetation management requirements.
- Encourage retrofits of hardscaped areas to use permeable paving..
- Establish neighborhood and building design standards that minimize fire hazards in high wildfire risk areas.
- Restore riparian corridors, soft-bottomed streambeds, and seasonal flood basins that reduce flood hazards.
- Encourage the use of low-impact development practices in new development.

ISSUE 6: STRATEGIES FOR ELECTRICITY RESOURCES AND RELIABILILTY

- Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.
- Amend the zoning code to require high-reflectivity pavement or increased tree cover in large commercial parking lots.
- Identify and implement municipal renewable energy projects for daily and emergency operations.

ISSUE 7: STRATEGIES FOR AGRICULTURE

- Promote secondary revenue streams that support a strong, sustained agricultural sector.

ISSUE 8: STRATEGIES FOR BIOLOGICAL RESOURCES

- Continue to monitor and research the potential impacts of climate change on local habitat and wildlife.

ISSUE 9: STRATEGIES FOR PLAN MAINTENANCE

- Monitor and refresh climate change projections.
- Update the adaptation chapter when the Hemet CAP/Subregional CAP is updated and concurrent with the local hazard mitigation plan update cycle.
- Assess the implementation status and effectiveness of adaptation strategies.

Sustainability Policies
City of Hemet General Plan

The City of Hemet is incorporating the sustainability policies of its General Plan into its Climate Action Plan.

SUSTAINABILITY POLICIES

Sustainability is generally defined as any set of activities, programs, policies, or other efforts whose purpose contributes to addressing deleterious environmental impacts that reduce the capacity to sustain natural resources. The City has categorized its General Plan approach to sustainability into six categories: Smart Growth: Land Use and Community Design, Transportation and Connectivity, Water Conservation, Air Quality, Energy and Resource Conservation, Waste Reduction, and Economic Sustainability. General Plan goals, policies, and implementation programs that address climate change and sustainability have been placed into one of the six sustainability categories defined below with policies listed subsequently.

SMART GROWTH: LAND USE AND COMMUNITY DESIGN

Sustainable land use and community design practices concentrate growth in compact centers to avoid sprawl and advocates transit-oriented, walkable, and bicycle-friendly land use patterns. Relevant policies encourage enhanced open space conservation; pedestrian-friendly, mixed-used, and in-fill developments; the restoration of the historic downtown center; and the redevelopment of deteriorating areas to more sustainable development. The model also discourages noncontiguous (leapfrog) development.

Hemet's sustainable land use and community design goals and policies are primarily located within the Land Use Element, the Community Design Element, the Historic Resources Element, the Housing Element, the Art and Culture Element, and the Open Space and Conservation Element. These goals and polices include:

- Establishing land use patterns and development standards that incorporate "smart growth" tenets;
- Creating walkable neighborhoods and connections to open space;
- Preserving significant historic buildings and neighborhoods;
- Protecting environmentally sensitive habitats and species;
- Strengthening and directing development toward existing communities;
- Revitalizing the downtown core through design, intensity, and pedestrian-scale; and
- Facilitating the revitalization of older, deteriorating neighborhoods through rehabilitation, recycling of underutilized properties, incentives, and redevelopment.

In December 2010, the City of Hemet was designated the Inland Empire's "most walkable community" by Walk Score, an online site that helps gauge the pedestrian friendliness of neighborhoods and encourages walkable cities. Points were awarded to residential neighborhoods based on the proximity of nearby amenities such as stores and schools. Hemet's traditional grid system of streets and location of commercial nodes near residential neighborhoods assisted in achieving the top designation.

TRANSPORTATION AND CONNECTIVITY

Transportation and connectivity refers to policies that decrease vehicle miles traveled; encourage the use of alternative forms of transportation; encourage the use of alternative fuel or lower emission vehicles; and increase connectivity between residential neighborhoods, schools, shopping areas, and employment centers. Additionally, the precept addresses the management of transportation systems to improve efficiency through more effective utilization of facilities.

Hemet's transportation and connectivity goals and policies are primarily located within the Circulation Element, the Land Use Element, the Community Design Element, and the Recreation and Trails Element. General concepts include:

- Increasing the capacity, safety, and accessibility of streets through the Complete Streets Program;
- Providing for the expanded use of Neighborhood Electric Vehicles;
- Accommodating a low-speed travel culture in Hemet to reduce GHG emissions while encouraging a healthier level of community interaction;
- Providing expanded and safe facilities for pedestrians, bicyclists, and recreationalists;
- Creating walkable neighborhoods through appropriately scaled and designed developments and associated infrastructure;
- Facilitating access to and use of public transportation systems; and
- Establishing development standards that encourage the siting of employment and commercial centers along transportation corridors and activity centers.

WATER CONSERVATION

Water conservation refers to policies that conserve and protect water resources. Hemet's goals and policies regarding the supply, distribution, and conservation of water are located within the Open Space and Conservation Element and the Community Services and Infrastructure Element. Preservation and conservation of water resources will continue to be a significant issue throughout the planning period. General concepts include:

- Managing the City's watershed and use of groundwater to reduce demand, increase supply, and ensure that water use does not exceed the safe yield of groundwater; and
- Implementing a variety of water conservation measures.

ENERGY, AIR QUALITY, AND RESOURCE CONSERVATION

Energy and resource conservation refers to policies that conserve and preserve open space and natural resources, reduce energy use, promote the production of clean energy resources, protect the air from air pollutants, and decrease Hemet's GHG emissions. This precept requires the participation of a wide range of participants: residents, businesses, schools, industries, transportation users and providers, developers, builders, innovators, conservationists, utility providers, and government.

Hemet's energy and resource conservation goals and policies are primarily located within the Open Space and Conservation Element, Community Services and Infrastructure Element, and the Community Design Element. General concepts include:

- Preserving natural resources;
- Managing agriculture, minerals, and groundwater recharge basins;
- Establishing and protecting outdoor recreation venues and scenic vistas;
- Implementing energy conservation measures;
- Facilitating renewable energy development and use;
- Encouraging building orientations and landscaping that enhance natural lighting and sun exposure;
- Implementing calgreen building standards and facilitating leed certifications to help reduce the negative effects of new buildings on the environment; and
- Addressing sources of air pollution to reduce unhealthy conditions for residents and damage to agriculture, the natural environment, and human-made materials.

WASTE REDUCTION

Waste reduction refers to household solid waste recycling; commercial and industrial recycling; waste reduction targets; and use of recycled materials for City use and for community facilities and infrastructure projects. State law mandates specific per-capita disposal targets for each jurisdiction based on demographics and industrial bases.

The City of Hemet has a franchise agreement with CR&R for refuse hauling and recycling. The City's waste reduction goals and policies are primarily located within the Community Services and Infrastructure Element and focus on the following areas:

- Complying with California statewide waste reduction mandates;
- Promoting the use of recycling and recycled materials in development projects; and
- Promoting the use of recycling and recycled materials in City operations.

ECONOMIC SUSTAINABILITY

Sustainable economic policies support an equitable housing-jobs balance; promote environmental justice in land use decisions, promote sensitive use of cultural and open space facilities; ensure economic opportunities for all segments of the community; and attempt to balance potential impacts of global warming measures, which could affect the lives of residents and the livelihood of businesses. The City's economic goals and policies, which are primarily located in the Land Use Element, the Community Design Element, the Open Space and Conservation Element, the Recreation and Trails Element, and the Art and Culture Element, include:

- Establishing incentives for job creation;
- Enhancing opportunities for sustainable tourism;
- Creating public gathering spaces; and
- Encouraging sensitive, adaptive reuse of historic and culturally sensitive structures where the original use is no longer feasible.

SUSTAINABLE DEVELOPMENT IN WEST HEMET

West Hemet, an approximately 5,400-acre area that extends into the City's sphere-of-influence on its western edge, presents a challenging opportunity to balance growth with natural resource protection. This primarily underdeveloped section of the City and Planning Area contains 1,600 acres of sensitive biological habitats and is primarily located within a 100-year floodplain with minimal flood control. A large portion of the area cannot be developed until habitat preservation and major flood-control solutions are addressed.

Within this area, the City has the opportunity to create innovative infrastructure systems that try to replicate nature, and by doing so, protect groundwater recharge areas, conserve groundwater resources, maintain water quality by reducing pollution, and channel drainage in environmentally sensitive ways. The City can promote the design of attractive and multi-use open space areas for development, recreation, and habitat. The Urban Land Institute, Orange County/Inland Empire, Edge Development Initiative Council in 2010 identified 4 focus areas for sustainable infrastructure in West Hemet:

- **Stormwater** Through groundwater recharge, biofiltration, and habitat hydration, stormwater can be safely conveyed to benefit the local community. Implementing a stormwater management approach that uses open "naturalized" planted channels and treatment detention basins wherever possible can reduce costs, add amenity value, and perform water quality and groundwater recharge functions.

- **Recycling Water** Expanding existing recycled water systems into West Hemet will alleviate the strain on potable water and mitigate the ever-rising cost of water.
- **Energy** By developing a "smart grid" approach to power system development with linkages to alternative energy sources, West Hemet can become less dependent on conventional forms of energy and potentially become more self-reliant.
- **Transportation** West Hemet has the opportunity to develop a three-phased plan to implement transportation systems in "steps" to coincide with demand and revenues. The plan would integrate intercommunity shuttles, bicycle paths, and "complete" or "green" streets as development occurs. Complete streets include pedestrian travel, event spaces, canopy shade trees, pervious pavements or pavers, and other features that enable multipurpose use and value. Complete streets are discussed in detail in the Circulation Element.

ACRONYMS OF GENERAL PLAN ELEMENT POLICIES

AC: Art and Culture

C: Circulation

CD: Community Design

CSI: Community Services and Infrastructure

H: Housing

HR: Historic Resources

LU: Land Use

OS: Open Space and Conservation

PS: Public Safety

RC: Recreation and Trails

Principles of Smart Growth

- **Mix land uses.**
- **Take advantage of compact building design.**
- **Create a range of housing opportunities and choices.**
- **Create walkable neighborhoods.**
- **Foster distinctive, attractive communities with a strong sense of place.**
- **Preserve open space, farmland, natural beauty, and critical environmental areas.**
- **Strengthen and direct development toward existing communities.**
- **Provide a variety of transportation sources.**
- **Make development decisions predictable, fair, and cost effective.**
- **Encourage community and stakeholder collaboration in development decisions.**

Source: Smart Growth Network, a partnership of the Environmental Protection Agency and several non-profit and government organizations.

SMART GROWTH: LAND USE AND COMMUNITY DESIGN

GENERAL PLAN POLICIES

AC-1.2 **Art in Public Places Program** Encourage the development of a coordinated, flexible, citywide Art in Public Places program for new development or community organizations to provide public art or spaces for art as part of a development project.

AC-1.3 **Public Spaces and Facilities** Use artistic elements in coordination with the City's transportation network and pedestrian linkages, landscaping, lighting, paving, and signage at the City's gateways and other public spaces to strengthen Hemet's identity and image.

AC-1.4 **Downtown Focus** Encourage the development of downtown Hemet as the art and cultural center of the City. Encourage the preservation, renovation and reuse of the downtown area's historic structures and cultural facilities.

C-1.16 **Rural Street Character** Avoid changing the visual character of existing rural residential neighborhood streets by constructing the minimum level of street improvements needed for public safety. Consider using rolled curbs and drainage swales instead of curbs and gutters and prohibiting on-street parking.

C-4.1 **Sustainable Urban Design** Promote urban design measures that encourage alternatives to single-occupancy vehicle transportation and direct new growth along transportation corridors as a means of reducing roadway congestion, energy consumption, and air pollution.

C-4.5 **Development Opportunities** Require new development to include opportunities for alternative transportation, such as bicycle paths, pedestrian connections, bicycle storage, and other facilities such as NEV paths, and charging stations.

C-4.15 **Transit-oriented Development Design Features** Require new development to incorporate transit-oriented design features and attractive, accessible, and appropriate transit, bicycle, and pedestrian amenities to promote and support public transit and alternate modes of transportation, including but not limited to:

a. requiring bus turnouts and shaded bus stops where appropriate;

b. requiring all new transit centers be equipped with bicycle racks and/or bicycle lockers;

c. encouraging senior citizen and affordable family housing projects to provide transportation services; and requiring new public facilities to incorporate transit accessibility.

C-5.3 **Bike-Friendly Development** Require the provision of designated bikeways, bicycle racks, lockers, and other bicycle amenities at public buildings, commercial or industrial buildings, shopping centers, and other activity centers as part of discretionary plans for development projects.

C-5.5 **Regional Bikeway Interconnectivity** Require that existing and proposed bikeways within the City connect with those in neighboring jurisdictions and the Riverside County Trails and Bikeway System Master Plan, and WRCOG Non-Motorized Transportation Plan whenever practicable.

C-5.6 **Pedestrian Linkages** Connect commercial activity centers to adjacent residential areas with well-designed pedestrian linkages that include amenities such as benches, trees, landscaping, and shade structures to encourage people to walk to destinations.

CD-1.3 **Unique Sense of Place** Require quality site, architectural, and landscape designs that incorporate those qualities and characteristics that make Hemet a desirable place to live and work including: walkable blocks, distinctive parks and open space, tree-lined streets, and varied architectural styles.

CD-4.2 **View Corridors** New development should consider the preservation of significant view corridors of the surrounding hillsides in the design of new projects. Building heights along the Florida Avenue corridor (Gilbert Street to Buena Vista Street) shall be limited to a two story maximum height in order to maximize views toward Idyllwild and the San Jacinto Mountains

CD-4.3 **Limit Grading** Reduce the amount of grading for development by using natural terrain to determine development design.

CD-4.4 **Cluster Development** Encourage clustering of development to preserve the maximum amount of natural terrain as possible.

CD-4.10 **Natural Land Features** Natural land features should be recognized and integrated into the site plan where feasible. Stream beds, hillsides, rock formations, unique vegetation, and similar natural features should be incorporated into the overall development concept.

CD-5.1 **Complete and Well-Structured Neighborhoods** The City shall promote the design of complete and well-structured neighborhoods whose physical layout and land use mix promote walking to services, biking, and transit use, foster community pride, enhance neighborhood identity; ensure public safety, and address the needs of all ages and abilities.

CD-8.1 **Outdoor Plazas** Promote the establishment of outdoor plazas and courtyards in commercial centers, office complexes, at public buildings and in the Downtown District.

CD-8.4 **Increase Walkability** Require new development to create walkable, pedestrian scaled blocks, publicly accessible mid-block paseos, and pedestrian routes where appropriate, with sidewalks appropriately scaled for anticipated pedestrian use. Walkability can be enhanced by:

a. Discouraging wide expanses of parking lots.

b. Minimizing pedestrian-auto conflicts and ensuring a high-level of safety for pedestrians.

c. Providing pedestrian linkages between uses and buildings.

d. Creating an appealing street scene through the use of attractive street furniture and landscaping.

e. Designing commercial projects to feature a central plaza or main visual focus oriented toward pedestrian and transit connections.

f. Designing commercial projects with building façades that are interesting and in scale with the pedestrian. Ground floor elevations should avoid long bland walls. Windows and entrances should be located at frequent intervals.

g. Integrating features such as awnings and verandas that shield visitors from the elements.

h. Discourage projects that face inward, are surrounded by walls, or have no connection to neighboring uses.

CD-8.7 **Walkable Streets** Require design and development of neighborhoods that are pedestrian friendly and include features such as short blocks, broad and well-appointed sidewalks (e.g., lighting, landscaping), tree-shaded streets, buildings that define and are oriented to adjacent streets and public spaces, limited driveways curb cuts, paseos and pedestrian lanes, alleys, traffic-calming features, convenient pedestrian street crossings, and access to transit.

CD-10.1 **Mixed Use Development**. Mixed use development should:

a. Encourage pedestrian activity by providing sidewalks with ample width, encourage on-street parking, include street furniture sited adjacent to the curb as a barrier to auto traffic, and encourage commercial spaces featuring frequent sidewalk entrances.

b. Create a credible residential environment by making commercial uses visually distinct from residential spaces. Dwelling units should exhibit a residential character, and residential entrances should read differently from entrances to commercial businesses.

c. Include public plazas that attract visitors to the public portions of the development, and offer private open space areas that limit intrusion by nonresidents.

d. Encourage the use of outdoor dining and gathering areas to provide street activity.

e. Incorporate transit systems and amenity within or serving the project, such as local jitney services, shuttle loops, or nonmotorized vehicular trails within the project area.

f. Inclusion of special landscape design improvements such as: streetscape design in the public right-of-way, pedestrian plazas, courtyards, sidewalk cafes and overall landscape design of project open space.

g. Provision of public park facilities, pedestrian connections and easements, bicycle routs that link activity centers and other mixed use areas.

CD-13.5 **Public Gathering Space** Public open space should be created in the Downtown District and the civic center to provide for formal and informal gatherings and events which will further enhance the pedestrian nature of the Downtown District.

H-1.2 **Diversity of Housing** Promote a variety of housing types to meet the special needs of persons with disabilities, elderly households, and others who may need assisted living, group home, institutional care, and other alternative residential environments.

H-3.1 **Access to Employment and Services** Locate appropriate residential uses with convenient access to employment centers and services.

H-5.3 **Sustainable Design** Promote compact, mixed-use development patterns that use land efficiently, reduce pollution and increase energy and resource efficiency.

HR-1.1 **Preservation** Encourage the preservation and re-use of historic structures, landscape features, roads, landmark trees, and trails as well as public access to significant scenic vistas, viewpoints, and view corridors.

HR-1.7 **Historic Design** Encourage the incorporation of historic design features, as well as safety, when street or other public improvements are proposed in older neighborhoods and districts.

LU-1.1 **Land Use Mix** Encourage a diverse mix of land uses throughout the City and within large master planned communities to provide opportunities for housing, commerce, employment, recreation, education, culture, social, civic and spiritual activity in balance with natural open spaces and adequately supported by public services and infrastructure.

LU-1.4 **Walkable Neighborhoods** Create walkable neighborhoods that integrate pedestrian paths and trails into a safe, cohesive and varied transportation system that provides connectivity to nearby land uses and encourages physical activity and less dependence on the automobile.

LU-1.5 **Strong Sense of Place** Foster distinctive, attractive community districts and neighborhoods with a strong sense of place.

LU-1.8 **Balance Land Uses with Services** Accommodate and locate the types, densities, and appropriate mix of land uses that can be adequately supported by the associated transportation network, utility infrastructure and public services such as schools, parks and emergency services.

LU-1.14 **New Residential Communities** Design new residential communities to complement existing neighborhoods and assure a high level of livability. Establish cohesive development patterns united by a landscape and architectural design framework, and recreational amenities that create a distinct sense of place.

LU-2.4 **Concentrate Land Uses** Promote efficient use of land resources through compact building design, infill development, and land use patterns that reduce infrastructure costs and make more effective use of existing and planned transportation systems and public facilities, and minimize impacts to natural environmental resources.

LU-2.5 **Interconnected Neighborhoods** Support the development of compact neighborhoods that locate stores, offices, residences, schools, recreational spaces and other public facilities within walking distance of each other and that facilitate social interaction and alternative modes of transportation.

LU-2.14 **Maximize Existing Infrastructure** Promote the use and reuse of existing developed areas with available infrastructure and service systems, and reinvest in the maintenance, rehabilitation and expansion of existing infrastructure to serve new development.

LU-3.2 **Preservation of Stable, Existing Neighborhoods** Preserve the integrity, quality and livability of Hemet' s existing residential neighborhoods by requiring that new and infill development be designed to complement existing residential uses, density and character.

LU-5.1 **Siting of Mixed Use Districts** Encourage the development of mixed use and higher intensity residential, commercial, and employment centers along major transportation corridors and near future Metrolink rail stations.

LU-5.2 **Land Use Connections** Promote employment and shopping centers in close proximity to residences in mixed use or transit-oriented development areas, and integrate with attractive and walkable pedestrian paths.

LU-5.5 **Public Spaces** Establish interesting and attractive focal points, public spaces or community uses within mixed use and transit oriented developments that are within walking distance and provide a source of activity and identity for the district.

LU-7.1 **Vibrant Land Use Mix** Encourage the revitalization and development of retail, office, restaurant, entertainment, cultural, civic, and housing uses within the Downtown District that create a pedestrian style living environment and sense of place.

LU-7.5 **Nurture Pedestrian Activity** Support a vibrant and active downtown core by requiring street level uses to be pedestrian friendly such as bookstores, coffee houses, restaurants, and specialty stores within appropriate lot sizes.

LU-7.14 **Residential Synergy** Encourage the development of new residential uses in proximity to supporting uses such as medical offices, transit facilities, community centers, parks and grocery stores.

LU-9.1 **Community Plan** Encourage the preparation of a comprehensive Community Plan for West Hemet in conjunction with landowners, stakeholders, and local agencies;

that sets the overall land use, transportation, infrastructure and public facilities framework for future development in the area.

LU-9.8 **Plan for Orderly Development** Ensure the orderly development of West Hemet by updating the City's infrastructure master plans, capital improvement program, and financing mechanisms in anticipation of new development, and coordinate with other public service agencies, adjacent jurisdictions, utilities, resource agencies, and property owners to facilitate a comprehensive approach to new development.

LU-15.1 **Balance of Land Uses** Through the General Plan Land Use and Zoning Maps, establish a balance of land use opportunities for jobs, housing, and services within the community that help achieve the mobility, access, open space, and air quality goals and policies of the City.

LU-15.3 **Pedestrian Linkages and Connectivity** Encourage a built environment that promotes physical activity and access to goods and services while reducing driving and pollution by directing new commercial growth to existing and planned residential areas, incorporating pedestrian linkages and connectivity between land uses, and requiring development and design standards that create walkable streets and neighborhoods.

LU-15.4 **Healthy Development Patterns** Promote development patterns and opportunities that reduce commute times, encourage the improvement of vacant properties and reinvestment in neighborhoods, foster safe and attractive environments, encourage civic participation, and provide public spaces for people to congregate and interact socially.

LU-15.6 **Complete Communities** Coordinate the development of complete neighborhoods that provide for the basic needs of daily life and for the health, safety, and welfare of residents.

LU-15.7 **Public Spaces** Support the creation of public spaces that foster positive human interaction and healthy lifestyles such as public plazas, sidewalk and other outdoor dining opportunities, public art displays, and central gathering and meeting spaces.

OS-2.1 **Development Design** Encourage the use of clustered development and other site planning techniques to maximize the preservation of permanent open spaces.

OS-2.3 **Greenbelts** Use natural, undeveloped greenbelts as buffers between developments and on the edges of the City to preserve the rural and diverse character of Hemet.

OS-3.3 **Land Use Compatibility** Recognize and protect areas of agricultural production from the encroachment of incompatible land uses and establish appropriate buffers, disclosures, easements, and mitigation measures, as warranted.

OS-8.2 **Land Use Planning** Encourage new and infill development that provides employment opportunities for Hemet residents, to be located near activity centers or along transportation corridors, and incorporates off-road trails for pedestrians and cyclists to reduce the length and number of vehicle trips.

PS-1.5	**Dedicated Open Space** Encourage that areas be dedicated as open space when necessary and appropriate to protect property, public health, and safety from hazards such as earthquake fault zones or floodplains.
PS-9.3	**Safety in Land Use and Design** Promote land use and design policies and regulations that encourage a mixture of compatible land uses to promote and increase the safety of public use areas and of pedestrian travel.
RC-1.5	**Conversion of Marginal Land** Require the utilization and maintenance of stormwater basins and undevelopable areas of any project (e.g., utility easements, undersized lots) for recreational uses such as tot lots, picnic areas, community gardens, or passive open space, as feasible.
RC-4.2	**Accessibility** Provide well-designed and easily accessible linkages to pedestrian and bike trails to encourage park users to access the park by nonvehicular means.
RC-4.3	**Historical Structures** Consider the use of the park system to preserve structures of historical significance by acquiring, siting, and reusing in an appropriate manner at a public park or recreation facility.
RC-5.1	**Open Space Corridors** Maintain open space corridors containing watercourses, riparian habitat, floodplains, wetlands, grasslands, and other natural resource areas as integral components of an open space system that is part of a continuous community
RC-5.2	**Open Space Buffers** Provide open space buffer land in areas where development or recreational uses abuts important or ecologically sensitive natural resource areas in order to protect those resources and reduce potential adverse impacts from development.
RC-5.4	**Conservation Areas** Develop passive recreational facilities in conservation areas for natural resources (e.g., Simpson Park and the vernal pool complex), including nature interpretation areas, bird watching, wildlife photography areas, and similar facilities, where such activities can be reasonably provided in accordance with established environmental protections and habitat agreements.
RC-5.5	**Sustainable Recreation** Promote water, energy, and resource conservation and best practices in the design, operation, and maintenance of new and existing parks, trails, and recreational facilities.

TRANSPORTATION AND CONNECTIVITY

GENERAL PLAN POLICIES

C-1.1 **Complete Streets** Support the implementation of complete streets through a multi-modal transportation network that balances the needs of pedestrians, bicyclists, transit riders, mobility-challenged persons, seniors, children, and vehicles while providing sufficient mobility and abundant access options for existing and future users of the street system.

C-1.18 **Mixed Use District Street Design** To facilitate transit-and–pedestrian-oriented street design in the Mixed Use District, consider the implementation of off-street shared parking with parking signage improvements, consolidation of driveways, installation of raised landscaped medians, bus turnouts, traffic signal enhancements, special pavement treatments at pedestrian crossings and intersections, curb extensions, enhanced crosswalks, wider sidewalks, and other appropriate measures which enhance traffic flow, transit efficiency, and pedestrian movements.

C-2.6 **Metrolink Extension** Promote the extension of Metrolink service on the Burlington Northern Santa Fe Railway line from Riverside and Perris to stations located near the realigned SR 79 and downtown Hemet.

C-2.7 **Regional Transit Services** Coordinate with Western Riverside Council of Governments, Riverside County, Riverside Transit Agency, and Riverside County Transportation Commission to identify, protect, and pursue opportunities for public transit along major transportation corridors and future rail service that connect the City with other population and employment centers.

C-4.2 **Transportation Alternatives** Support a variety of transit vehicle types and technologies and encourage alternatives to single-occupancy automobile use such as rail, public transit, paratransit, walking, cycling, and ridesharing.

C-4.3 **Non-Motorized Transportation Plan** Pursue opportunities to implement the city-wide corridors identified in the Western Riverside County Non-Motorized Transportation Plan and connect key activity centers of the City through the development non-motorized transportation corridors and facilities.

C-4.4 **Neighborhood Electric Vehicles** Promote the use of neighborhood electric vehicles (NEVs) by designating low-speed streets within projects and by ensuring connectivity with adjacent supporting uses such as neighborhood commercial uses.

C-4.5 **Development Opportunities** Require new development to include opportunities for alternative transportation, such as bicycle paths, pedestrian connections, bicycle storage, and other facilities such as NEV paths, and charging stations.

C-4.6 **Vehicle Mile Reduction** Create and implement programs that will aid in improving air quality by reducing motor vehicle trips, such as those programs recommended by the Regional Transportation Plan, Riverside County Integrated Project, and the Southern California Air Quality Management Board.

C-4.7 **Employer Incentives** Encourage all employers, especially employers of 100 or more persons to support alternative forms of transportation by providing appropriate facilities, including parking for vanpools, bicycle parking, and transit stops.

C-4.9 **Alternative Fuel Use** Promote public transportation systems that use alternative fuels or promote energy conservation.

C-4.11 **Transportation Services Project Amenity** Encourage new senior citizen and multiple-family housing projects of greater than 100 units to provide transportation services as a project amenity.

C-4.12 **Public Facilities and Transportation Services** Coordinate the development of new public facilities with mass transit service and other alternative transportation services and facilities including the consideration of light rail/monorail within the City.

C-4.14 **Transit Providers** Work with public and private transit providers to improve transit service and encourage ridership through the following actions:

a. Coordinate with RCTC and RTA to get more frequent service and broader transit coverage serving employment, shopping, education, recreation and residential uses.

b. Require transit facilities and other alternative modes of transportation such as park-and-ride lots and bus turnouts in major new development and redevelopment projects.

c. Encourage fixed route transit services along transportation corridors that connect major uses such as the Hemet Valley Mall, Hemet Valley Medical Center, the Florida Avenue commercial corridor, and other commercial nodes and business districts with residential areas.

d. Improve and enhance pedestrian connections between residential, commercial, and industrial uses and transit services.

e. Assess senior mobility needs in coordination with existing paratransit providers and commercial operations and institutions (such as hospitals and senior care centers) that interact with Hemet's senior population.

f. Actively encourage the Riverside County Transportation Commission and Metrolink/Southern California Regional Rail Authority to prioritize and fund the establishment of two commuter rail stations along the existing RCTC rail line right of way.

g. Increase public education about public transit options within the city and greater planning area.

C-5.1 **Bikeway and Pedestrian Network** Maintain an extensive trails network that supports bicycles and pedestrians and links residential neighborhoods, schools, commercial centers and employment centers by implementing the City's Bikeway Circulation Plan, including the provision and dedication of bikeways and pedestrian walkways in conjunction with development permits.

C-5.4 **Roadway Sharing** Evaluate the needs of bicycle traffic in the planning, design, construction, and operation of all new roadway projects including the provision of sufficient paved surface width to enable bicycle traffic to share the road with motor vehicles

CD-3.4 **Enhanced Pedestrian Environment** Promote the transformation of existing automobile-dominated corridors into boulevards that are attractive, comfortable, and safe for pedestrians by incorporating the following:

- wide sidewalks,
- few curb cuts and driveways,
- enhanced pedestrian street crossings,
- building entrances oriented to the street,
- transparent ground floor frontages,
- street trees,
- streetscape furnishings, and
- pedestrian-scaled lighting and signage.

CD-8.2 **Residential Pedestrian Connections** Require the provision of safe, walk-able connections between residential developments, schools and park sites.

CD-8.3 **Commercial Pedestrian Linkages** Encourage the provision of pedestrian linkages to and within large commercial sites, where appropriate to the location, scale of the development, and proximity to residential neighborhoods.

CD-14.2 **Pedestrian Design Concepts** Incorporate pedestrian-friendly design concepts in new development surrounding the transit village. Establish a pedestrian/bicycle trail to link activity nodes in the area.

LU-1.7 **Integrate Land Use and Transportation Networks** Provide a variety of transportation choices to serve adjacent land uses and integrate a comprehensive system of streets, transit, passenger rail, bike paths and pedestrian connections to serve the community.

LU-2.6 **Alternative Modes of Transportation** Promote alternative modes of transportation and provide street systems that disperse rather than concentrate traffic congestion. Provide short, connecting blocks in residential neighborhoods and utilize traffic-calming design strategies to reduce traffic speeds.

LU-7.9 **Metrolink Station** Actively support the location of a future Metrolink station and transit-oriented village within the Downtown District.

LU-7.10 **Pedestrian Linkages** Create a pedestrian link that connects the Metrolink train station to various points of interest, activity, and employment in the Downtown District and Historic Core.

LU-8.4 **Transit Connections** Establish transit connections along Florida Avenue, and require incorporation of transit- and pedestrian-friendly design features.

LU-9.4 **New Metrolink Station** Actively promote the prioritization and funding of the Hemet segment of the Perris Valley Line of the Metrolink System and establish a

Metrolink station and transit-oriented development in West Hemet near the intersection of the proposed alignment of Stetson Road with the existing tracks.

LU-9.5 **Multi-modal Transportation System** Establish a multi-modal transportation network to serve West Hemet and connect to other destinations within the City. Integrate a phased system of master planned, "green streets", transit opportunities, bike paths and pedestrian linkages to connect land uses and activity nodes with the area.

OS-7.2 **Public Transportation** Pursue expansion of the public transportation system, as well as bicycle and pedestrian trails that are linked to the regional transit network, to reduce vehicle trips.

RC-6.2 **Development Requirement** Require new development to provide trails in accordance with the City's recreation and park master plan, specific plan requirements, and the policies of the General Plan.

RC-6.3 **Trail Design and Connections** Design trails for a variety of uses: open space, equestrian, multiple use, and bicycle, as conditions allow. Require that trail designs integrate with the existing and planned Riverside County Regional Trail System and the Diamond Valley Lake Trail System, as appropriate.

WATER CONSERVATION

GENERAL PLAN POLICIES

CD-3.7 **Drought Tolerant Landscaping** Encourage the use of drought tolerant landscape materials in streetscapes that are easy to maintain and that are compliant with the California Friendly Landscape Palette.

CD-4.6 **Native Plant Material** Require the use of native plant material when revegetating open space areas or hillside areas disturbed with new development.

CSI-2.4 **Recycled Water Use** Support water districts' efforts to promote the use of recycled water where infrastructure is available and to expand infrastructure where it does not currently exist.

CSI-2.5 **Recycled Water Line Expansion** Work with the water districts to explore options for expanding recycled water pipelines to serve City parks and public landscape corridors that are near existing infrastructure.

CSI-2.6 **Common Area Recycled Water** Require the installation of recycled water lines for all appropriate streetscapes and common areas when within one-half mile of either an existing and/or master planned tertiary water trunk line, as shown on any water district's master plan, as feasible. The facilities shall meet performance standards established by the supplier of reclaimed water to the site.

CSI-2.7 **Ground Water Recharge** Ensure that adequate aquifer water recharge areas are preserved and protected through a comprehensive water management strategy.

CSI-4.4: **Groundwater Recharge** Require development projects to minimize stormwater runoff and provide on-site opportunities for groundwater recharge that are integrated into the project design and amenities.

CSI-4.6 **Aesthetic Design** Require use of landscaped swales and detention areas that provide percolation to the greatest extent possible using best management practices in order to promote sensitive and aesthetic design solutions for retaining on-site the incremental increases in runoff from a development site.

CSI-4.7 **Bioswales** Discourage lined channels and encourage "soft bottom" channels that provide slower water runoff, first-flush capabilities, groundwater recharge potential, and streambed vegetation.

LU-2.11 **Stormwater Management** Require a Stormwater Management approach to drainage systems that promotes multiple purposes for flood protection, water quality, groundwater recharge, habitat hydration, and serves as an attractive community amenity. Promote naturalized, soft-bottom channels and basins with landscaped banks and setbacks that incorporate trail systems where appropriate.

LU-2.12 **Use of Recycled Water Systems** Require connections and use of recycled water facilities where possible to irrigate public landscapes and create water elements that will add to community value.

OS-1.2 **Vernal Pools** Preserve the integrity of the vernal pool complex by ensuring adequate hydration and through the preservation of native plants, in accordance with the requirements of the Multi-Species Habitat Conservation Plan.

OS-1.3 **Wetland Habitats** Require project applicants to conserve wetland habitats along the San Jacinto River, maintain watershed processes that enhance water quality and contribute to the hydrologic regime, and comply with Clean Water Act Section 404. Identify and, to the maximum extent possible, conserve remaining upland habitat areas adjacent to wetland and riparian areas that are critical to the feeding, hibernation, or nesting of wildlife species associated with these wetland and riparian areas.

OS-5.1 **Natural Approaches** Use natural approaches to the maximum extent possible to manage streams and create drainage infrastructure systems to protect groundwater recharge areas, conserve groundwater resources, maintain water quality through pollution reduction, channel drainage in environmentally sensitive ways, and design attractive and multi-use open space areas for recreation and habitat.

OS-5.2 **Protection of Groundwater Resources** Identify and protect the area's waterways and groundwater resources from depletion and sources of pollution in cooperation with local water districts, Riverside County Flood Control District, the Santa Ana Regional Water Quality Control Board, or other appropriate agencies.

OS-5.3 **Development Design** Encourage the efficient use of water resources by residential, commercial, and industrial users by requiring development project proposals to incorporate best management practices into their designs, including the use of new technology in development design.

OS-5.4 **Reclaimed Water** Use reclaimed water to irrigate parks, golf courses, public landscaped areas, and for other feasible applications as service becomes available from local water providers.

OS-5.5 **Water Efficient Landscaping** Require new landscape installations or rehabilitation projects by public agencies, nonresidential developers, multi-family residential developers, and homeowners to use water efficiently, encourage water conservation, and prevent water waste.

OS-5.6 **Water Management Strategy** In cooperation with local water suppliers, adopt and implement a comprehensive water management strategy that specifies the City's role in the conservation and groundwater recharge effort.

OS-5.8 **Educational Outreach** Support and engage in educational outreach programs with local water suppliers and other agencies that promote water conservation, drought-tolerant landscapes, and widespread use of water-saving technologies

RC-5.3 **Environmentally Sensitive Design and Landscaping** Require that new parks be sited and developed in an environmentally sensitive manner with drought-tolerant landscaping, recycled water for irrigation, and natural drainage courses that recharge groundwater.

ENERGY AND RESOURCE CONSERVATION

GENERAL PLAN POLICIES

C-1.4 **Traffic Management** Continue to improve signal coordination and advanced traffic management systems at major intersections and along roadway corridors in order to optimize traffic flow through the City and reduce traffic queuing.

CD-5.8 **Lighting Aesthetics** Reduce light pollution by requiring new developments to install suitable new fixtures and existing fixtures to be upgraded upon repair and maintenance, as appropriate.

CD-8.5 **Neighborhood Amenities** Encourage appropriately scaled neighborhood–supportive facilities and services to enhance neighborhood identity and provide convenient access within walking and biking distance of city residents.

CD-9.5 **Multi-purpose Commercial Uses** Encourage multi-purpose facilities within commercial developments that may be provided for a variety of public and private events.

CD-1.10 **Neighborhood Street Trees** Encourage the strategic selection of street tree species to enhance neighborhood character and identity and preserve the health and diversity of the urban forest.

CD-13-19 **Public Building Design** Ensure that existing and future buildings in the civic center complex follow design and sustainability guidelines.

CSI-1.1 **Infrastructure Availability** Encourage future development to occur in areas where infrastructure for water, sewer, and stormwater can most efficiently be provided.

CSI-5.3 **Energy Services** Ensure the provision of reliable, quality energy services and promote energy conservation throughout the City.

CSI-5.4 **Solar Energy** Encourage new buildings to maximize solar access to promote passive solar energy use, natural ventilation, effective use of daylight, an on-site solar generation.

CSI-5.5 **Energy Efficient Design** Encourage the efficient use of energy resources by residential, commercial, and industrial users by requiring project proposals to incorporate energy efficient products and techniques into their designs in accordance with adopted California Green Building Standards Code standards and other adopted development standards.

CSI-5.6 **Building Retrofits** Encourage the retrofitting of existing buildings to use low maintenance, durable building materials, and high-efficiency energy systems and appliances

CSI-5.9 **Municipal Operations** Reduce energy consumption in municipal operations.

CSI-5.10 **Conservation and Clean Energy Programs** Explore the use of grant funds and programs with SCE and non-profit agencies to establish programs for energy conservation (e.g., home weatherization, Energy Star applicants) and transition to the use of clean and renewable energy (e.g., photovoltaic retrofits, solar hot water heaters and pumps).

CSI-7.3 **School Siting** Encourage the siting of schools close to the neighborhoods they are intended to serve, siting to facilitate safe access for students walking, bicycling, or driving to and from school sites, and siting to minimize the extension of infrastructure and services.

CSI-7-5 **Facility Design** Promote the design of school and community facilities so that there are multiple-purpose buildings and benefits for the surrounding area and users.

CSI-8.4 **Green Building** Through incentives such as expedited review of development projects, promote nonrequired alternative energy practices and Leadership in Energy and Environmental Design (LEED®) certifications.

CSI-10.7 **Green Leadership** Encourage service providers to provide "green" leadership by incorporating alternative energy products in their facilities and conservation practices in their operations.

H-5.2 **Energy Efficient Design** Enforce energy efficiency standards in new construction and increase energy efficiency in older neighborhoods.

HR-1.6 **Use/Adaptive Re-use** Encourage retention of structures in their original use or reconversion to their original use where feasible. Encourage sensitive, adaptive re-use where the original use is no longer feasible.

HR-1.9 **Public Buildings and Sites** Maintain and improve City-owned or City-funded historic buildings and sites in an architecturally and environmentally sensitive manner.

HR-2.1 **Consultation** Consult with the Soboba Band and any other interested Indian tribes to identify and appropriately address cultural resources and tribal sacred sites through the development review process. Require a Native American Statement as part of the environmental review process of development projects with identified cultural resources.

HR-2.2 **Monitoring** Require monitoring of new developments where resources or potential resources have been identified in the review process

HR-2.3 **Evaluation** Resources found prior to or during site development shall be evaluated by a qualified archaeologist or paleontologist, and appropriate mitigation measures shall be applied before resumption of development activities. Development project proponents shall bear all costs associated with the monitoring and disposition of cultural resources management within the project site.

LU-1.6 **Open Space Preservation** Recognize and preserve open space, prominent landforms, natural beauty and critical environmental areas through creative design and integrate open space and trail networks within the urban fabric to enhance the character and quality of life.

LU-2.9 **Sustainable Design** Require that new development be designed to minimize consumption of water, energy and other resources and provide long-term sustainable site and building design features.

LU-2.13 **Criteria Cell Refinement** In conjunction with affected land owners and agencies, pursue a criteria cell refinement to the Multi-Species Habitat Conservation Plan (MSHCP) to provide for a more viable vernal pool habitat complex while accommodating a comprehensive development footprint and habitat interface buffer for future development.

LU-9.9 **Natural Resource Protection and Refinement** Require that development in West Hemet occur in a manner that respects and protects natural resources; while encouraging a criteria cell refinement to the MSHCP to enhance habitat value and provide improved land use opportunities and synergy.

LU-9.11 **Sustainable Infrastructure and Development** Require new infrastructure systems and site development to incorporate sustainable design and best practices including the use of recycled water, alternative and energy conserving techniques, and naturalized "conjunctive use" drainage basins to accommodate drainage, recharge the aquifer, promote water quality, and add aesthetic value as a neighborhood amenity.

LU-11.5 **Sustainable Industries** Recruit "green technology" entrepreneurs and encourage existing businesses to incorporate sustainable business practices in their daily operations.

LU-15.8 **Rural Residential and Agricultural Areas** Promote healthy land use patterns by preserving scenic and open space resources, preventing inappropriate development in agricultural and rural areas, and developing or honoring incentives that preserve the economic value of agricultural and open space lands.

OS-1.1 **Development Proposals** Require development proposals to identify significant biological resources and to provide mitigation, including the use of adequate buffering and sensitive site planning techniques, selective preservation, provision of replacement habitats, and other appropriate measures.

OS-1.4 **Resource Protection in Development Design** Require appropriate resource protection measures to be incorporated within specific plans and subsequent development proposals. Such requirements may include the preparation of a vegetation management program that addresses landscape maintenance, fuel modification zones, management of passive open space areas, provision of corridor connections for wildlife movement, conservation of water courses, rehabilitation of biological resources displaced in the planning process, and use of project design, engineering, and construction practices that minimize impacts on sensitive species, MSHCP conservation areas, and designated critical habitats.

OS-1.8	**Local Resource Preservation** Maintain and enhance the natural resources of the Santa Rosa Hills, Tres Cerritos Hills, Salt Creek, Bautista Canyon, San Jacinto River/Bautista Creek, Reinhardt Canyon, Lakeview Mountains, Diamond Valley Lake, and all other waterways, ecosystems, and critical vegetation to ensure the long-term viability of habitat, wildlife, and wildlife movement corridors.
OS-2.2	**Resource Conservation** Conserve view corridors and ridgelines, the San Jacinto River and Mountains, slopes, significant rock outcroppings, historic and landmark trees, and other important landforms and historic landscape features through the development review process.
OS-2.4	**Landscaping Guidelines** Require developers and residents to incorporate native drought-resistant vegetation and shade trees into landscape designs to conserve water, improve comfort, augment neighborhood aesthetics, reduce energy use from operation of buildings, and maximize carbon capture and storage.
OS-2.6	**Replacement Trees** Encourage the preservation of mature and heritage trees by requiring the replacement of any tree in the public right-of-way or with a diameter greater than 4 inches with a California-friendly or shade tree of similar size and shape or with smaller trees at a 3:1 ratio, as reasonably feasible.
OS 3.1	**Conservation of Agricultural Land** Support conservation of the remaining productive and prime agricultural lands in the Planning Area by encouraging their preservation, honoring the preservation easements that conserve Bautista Canyon land in perpetuity, and seeking opportunities for additional preservation easements.
OS-4.2	**Protect Mineral Resources** Protect and conserve mineral resource deposits in designated areas to ensure that such deposits are available for future use.
OS-4.3	**Minimize Long-Term Impacts** Ensure that surface mining operations are designed to maintain the integrity of significant viewsheds, hillsides, and aesthetic resources as designated by the City.
OS-6.1	**CALGreen Standards** Encourage the efficient use designs in accordance with adopted California Green Building Standards Code standards and of energy resources by residential, commercial, and industrial users by requiring project proposals to incorporate energy-efficient products and techniques into their other development standards.
OS-6.2	**City Incentives** Through incentives such as expedited review of development projects, promote nonrequired alternative energy practices and Leadership in Energy and Environmental Design (LEED) certifications.
OS-6.3	**Federal, State, Utility Company Incentives** Encourage homeowners, business owners, and other energy users to use incentives offered by federal, state, and utility companies; to identify voluntary retrofit opportunities and funding options that increase building energy performance; and to reduce energy consumption.
OS-6.4	**Public Sector Development and Practices** Require Redevelopment Agency–funded projects, public sector projects, and publicly owned institutions and facilities to use systems, methods, and practices that promote energy conservation.

OS-6.5 **Clean Energy** Support the use and production of clean energy resources through green technology and programs that promote wind, solar, renewable, biomass, and cogenerating energy resources, where compatible with adjacent land uses.

OS-6.6 **Solar Energy** Encourage existing or new structures to maximize solar access by promoting passive solar energy design, natural ventilation, effective use of daylight, an on-site solar generation.

OS-7.1 **Air Pollution Reduction** Reduce the amount of air pollution emissions from mobile and stationary sources, and enhance the South Coast Air Basin by using best management practices in development proposals and project implementation.

OS-7.4 **Municipal Fleet** Manage the municipal fleet to achieve the highest possible number of fuel-efficient and low emissions vehicles commercially available.

OS-7.5 **Trip Reduction** Encourage a mix of housing types that are affordable to all segments of the population and are near job opportunities to further reduce vehicle trips.

OS-7.6 **Transportation Trip Management** Encourage employers to implement transportation demand management (TDM) measures to reduce trips and vehicle miles traveled.

OS-7.7 **Clean Technologies** Encourage businesses to use clean, innovative technologies and promote the use of alternative clean-fueled vehicles, new transportation technologies, and other alternatives to the combustion engine for City vehicles and individual use.

OS-7.8 **Green Building Techniques** Encourage green building techniques that improve indoor air quality, energy efficiency and conservation in buildings, and utilization of renewable energy sources.

OS-7.9 **Stationary Source Pollution** Continue to minimize stationary source pollution through the following:

- Ensure that industrial and commercial land uses are meeting existing South Coast Air Quality Management air thresholds by adhering to established rules and regulations.
- Encourage the use of new technology to neutralize harmful criteria pollutants from stationary sources.
- Reduce exposure of the City's sensitive receptor s to poor air quality nodes through smart land use decisions.

OS-7.14 **Public Education** Protect the air from contamination by working with South Coast Air Quality Management District and other interested organizations to elevate public awareness regarding air pollution sources and pollutant reduction initiatives.

OS-7.15 **State Updates** Consult and coordinate with State resource and emergency management agencies regarding updates to climate change science and development of adaption priorities.

OS-8.1 **Comprehensive Approach** Coordinate policies and implementation measures of the various elements of the General Plan to ensure a comprehensive approach to reducing greenhouse gas emissions and to establish the basis for a sustainability plan.

OS-8.6 **Vehicle Miles Traveled** Cooperate with regional, state, and federal agencies to reduce vehicle miles traveled and consequent emissions through job creation.

OS-8.7 **Innovative Practices** Encourage the efforts of utility companies, water companies, private businesses, and other persons or organizations in their efforts to institute sustainable practices in their operations.

PS-2.2 **Flood Area Preservation** Encourage flood control infrastructure that does not reduce the natural character or limit use of the site.

RC-6.1 **Trail Development** Develop and maintain an off-road trail system in open space areas, greenways, and conservation corridor areas that provide recreational opportunities while protecting significant plant and animal species and other environmental resources.

WASTE REDUCTION

GENERAL PLAN POLICIES

CSI-6.1	**Solid Waste System** Promote efficient, economical, and environmentally sound waste collection, management, and disposal.
CSI-6.2	**Recycling** Achieve maximum diversion of materials from disposal through the reduction, reuse, and recycling of wastes to the highest and best use.
CSI-6.3	**Waste Handling Strategy** Update the City's waste handling strategy, as needed, to address issues of landfill capacity and new state regulations.
HR-1.3	**Incentives** Provide incentives wherever possible to protect, preserve, and maintain the City's heritage by offering alternatives to demolition and encouraging restoration and rehabilitation. Where feasible, allocate resources and/or tax credits to prioritize the retrofitting of irreplaceable historic structures.
HR-1.4	**Demolition Alternatives** Require development applications that include the demolition of structures older than 50 years or are listed in the Eastern Information Center Historic Data File for Riverside County, to consider alternatives to demolition such as architecturally compatible rehabilitation, adaptive reuse, and relocation.
OS-4.5	**Restoration and Reuse** Provide for the restoration and reuse of the surface mining site upon completion of the extraction and production activities in a manner that is sensitive to and compatible with the character and integrity of adjacent land uses and the natural environment.
OS-6.7	**Recycling** Promote the use of recycling and recycled materials in development projects and consumable products.
OS-7.11	**Fugitive Dust** Reduce the amount of fugitive dust released into the atmosphere by construction and demolition, materials handling, paved roads, unpaved roads, and stock piles through development standards and compliance with CEQA regulations.
PS-5-7	**Public Awareness** Raise public awareness of the appropriate manner to dispose of household hazardous waste through education and/or collection events.

EQUITABLE AND STRONG ECONOMY

GENERAL PLAN POLICIES

AC-1.5	**Promote Art and Culture** Promote artistic and cultural facilities and activities that benefit the City in terms of overall image, economic stimulus, and long-term goals.
AC-2.1	**Economic Benefits** Promote the preparation of a strategy that capitalizes on the economic benefits of arts in the community and creates a plan to incorporate the arts into economic development efforts that increase tourism, attract creative and manufacturing industries, improve education, advance the local workforce, and improve the quality of life.
AC-2.2	**Tourism** Include arts and culture in the City's tourism strategy, particularly through efforts that promote, brand, and market Hemet's unique cultural heritage and historic resources.
AC-3.1	**Public Awareness** Increase the awareness of the public to the benefits of art and culture by recognizing and promoting the arts, artists, performing arts, and educational organizations
AC-3.5	**Citizen Involvement** Encourage active citizen involvement in the planning, development, and provision of arts and cultural programs, facilities, and services.
C-2.1	**State Route 79** Advocate efforts by the Riverside County Transportation Commission and California Department of Transportation to plan, fund and build the realignment of State Route (SR) 79, as shown on the Circulation Map, and actively pursue prioritization of this roadway for near-term construction.
C-2.2	**Regional Coordination** Coordinate with appropriate jurisdictions and agencies to encourage the timely improvement of roadway and transit facilities that address area-wide and regional travel needs including the State Transportation Improvement Program (STIP), the Riverside County Integrated Project (RCIP), the Community and Environmental Transportation Acceptability Process (CETAP), and the WRCOG Non-Motorized Transportation Plan..
C-2.3	**Mid-County Parkway** Support development of the Mid-County Parkway that will run from Highway 79 in San Jacinto to I-215 in Perris and will interface with Cajalco Road that connects to I-15 in Corona.
C-7.4	**Airport Operations** Support airport operation efforts to attract new industries and associated development that provide job opportunities and stimulate the local economy.
C-8.4	**Capital Improvement Program** Continue to update, expand and implement the City's Capital Improvement Program (CIP) on an annual basis to prioritize, finance and complete circulation improvement projects.

CD-1.4 **Sustainable Tourism** Maintain and enhance year-round opportunities for sustainable tourism based on the area's natural resources, historic heritage, and cultural amenities without diminishing the quality of life of current residents

CD-1.9 **Iconic Buildings** Encourage the development of iconic public and private buildings in key locations to create new landmarks and focal features that contribute to the City's design form and identity.

CD-14.1 **Mixed Use Hub** Transform the area surrounding the future metrolink station area as a mixed use transit village.

CSI-1.5 **Financing Mechanisms** Encourage the use of specific plans, development agreements, community facilities districts, or other mechanisms that specify and regulate the nature, timing, cost, and financing of water, wastewater, and/or storm drainage improvements and services.

CSI-1.6 **Business and Employment Districts** Work with property owners to establish a financing mechanism, such as financing districts, to provide infrastructure and maintenance in major employment locations and corridors, such as in west Hemet and along the Domenigoni Parkway and Florida Avenue corridors to attract new investment and industry.

CSI-7.9: **Higher Education** Pursue the establishment of technical trade schools and college campuses or facilities that offer education and training opportunities for Hemet residents and businesses.

CSI-8.1: **Health Care Facilities** Encourage the establishment of a broad range of health care facilities and associated hospitals, acute care facilities, medical offices, businesses, and medical educational and research facilities.

CSI-9.4 **Funding** Maintain, expand, and develop public and quasi-public facilities by identifying and soliciting funding from additional sources to supplement cultural, community, and library facilities and services.

CSI-10.1: **Service Provision** Recognize that the City has a diverse population with specialized needs, and provide for the needs of the citizenry through public, nonprofit, and private assistance organizations.

CSI-10.2 **Senior Facilities** Support and encourage the development of independent living or care facilities for seniors in locations with convenient access to social services, commercial areas, medical services, and transportation.

CSI-10.6 **Partnerships** Establish partnerships with other public and private sector agencies to coordinate and facilitate the provision of services to persons residing within the City's jurisdictional boundaries.

H-1.3 **Equal Access to Housing** Ensure that families with children have equal access to housing through enforcement of anti-discrimination policies and by facilitating the construction of housing to meet the needs of such families.

H-2.2 **Housing Availability** Encourage the provision and continued availability of a range of housing types throughout the community, including mobile homes and rental housing, for all economic segments of the community.

H-3.2 **Jobs/Housing Balance** Plan for residential land uses that accommodate anticipated growth of new employment opportunities.

LU-1.2 **Job Creation** Promote job growth within Hemet by establishing land use patterns that encourage commercial and industrial growth opportunities, improve the City's job-housing balance, reduce commute distances and time, lower vehicle emissions, and provide economic growth and stability for all segments of the City's population.

LU-1.13 **Build a Strong Community** Support the development of a strong, socially connected and ethnically diverse community, by working to provide a balance of jobs and housing within the City, reducing commute times, promoting community involvement and activities, enhancing public safety, and providing a wealth of educational, cultural and recreational opportunities.

LU-4.5 **Redevelopment of Existing Properties** Support the upgrading and maintenance of the City's housing inventory, commercial and industrial buildings, and aging infrastructure replacement, through technical and economic assistance where appropriate in Redevelopment and CDBG areas, and in partnerships with community-based efforts.

LU-6.3 **Commercial Growth** Encourage the establishment of retail and other support and entertainment uses that provide a broader selection of high-quality goods and services for residents, workers, and tourists to enjoy, and to minimize sales leakages to other communities.

LU-7.2 **Downtown Principles** Utilize the Downtown Principles concepts and strategies to create a major activity "hub" in the Downtown District.

LU-7.12 **Adaptive Reuse of Buildings** Permit the adaptive reuse of buildings such as older residential homes converting to low intensity office/retail uses, where consistent with the General Plan land use designation.

LU-11.2 **Job Growth Industries** Facilitate job growth and business attraction and retention in areas such as green technology, tourism, airport related industry, health care, leisure and hospitality, manufacturing, and related industries, retirement facilities and services, and by promoting the establishment of higher education and technical schools in the City.

LU-11.6 **Skilled Labor Force** Encourage a variety of businesses and industries to locate in the City, including clean, high-technology industries, innovative start-up companies, and commercial/professional office uses that provide high-skill/high-wage job opportunities.

LU-12.1 **Sustainable Tourism** Maintain and enhance year-round opportunities for sustainable tourism based on the area's natural resources, historic heritage, and cultural amenities without diminishing the quality of life of current residents.

LU-13.5 **Art and Culture** Promote the use of art and culture in the City's economic development efforts of marketing, branding, communication, increasing the pool of educated and qualified employees, attracting the creative industries, and creating an aesthetic environment for tourists and potential businesses.

LU-13.7 **Reuse of Underutilized Properties** Encourage the reuse of vacant, underutilized, or obsolete commercial and industrial buildings with higher value uses that are consistent with the General Plan goals and policies.

OS-8.3 **Mixed Use Development** Support mixed-use commercial-residential development in accordance with the Land Use Element as an opportunity to improve the City's current jobs-housing ratio and work-live balance.

OS-8.4 **Local Employment** Continue to create local employment opportunities by maintaining an adequate supply of designated commercial and industrial land, in accordance with the Land Use Element.

OS-8.5 **Jobs/Housing Balance** Improve the City's jobs-housing balance by encouraging the development, expansion, and retention of business.

PS-7.5 **Fire Protection Adequacy** Maintain adequate and appropriate personnel, emergency vehicles, and other firefighting equipment and technology to respond to fires and other disasters or emergencies.

PS-8.1 **Police Services** Ensure through the development review process that new development and redevelopment will not result in a reduction of law enforcement services below acceptable, safe levels. Maintain sufficient and adequate facilities, personnel, and services to meet the community's needs.

PART 2:
WRCOG
Subregional
Climate Action Plan

A Letter to the Subregion

It is a pleasure to present the Western Riverside Council of Governments (WRCOG) Subregional Climate Action Plan, the result of over three years of collaborative efforts among community leaders, industry experts, renowned scientists and consultants, and local governments. This plan describes the effects climate change could have on our subregion and suggests ways we can work together to address these challenges and reduce our collective carbon footprint while concurrently growing the economy and improving community livability and public health.

In 2012, WRCOG made a commitment to achieve a sustainable quality of life by adopting a Sustainability Framework, which is a blueprint that serves as a beginning point to establish, implement, and continuously refine a subregional sustainability plan for jurisdictions within WRCOG. This Framework presents a practical, integrated approach to sustainability which consists of six core components: Economic Development, Education, Health, Transportation, Water and Wastewater, and Energy and the Environment. WRCOG continues to demonstrate leadership in implementing programs that are environmentally, economically, and socially beneficial to the subregion including innovative award winning programs such as the HERO Program - an energy efficiency and water conservation financing program, the Transportation Uniform Mitigation Fee (TUMF), the Western Riverside Energy Leader Partnership (WRELP), and the Western Riverside County Clean Cities Coalition.

We believe our efforts demonstrate that implementing sustainable practices creates green jobs and a better economy, and makes our subregion a cleaner, safer, more enjoyable place to live. As you will notice in this report, some of the steps we need to take – such as investing in transportation infrastructure – require the involvement of the state and federal government. But many other important – and simple – steps can be achieved at the local level, such as driving less and walking more, using energy-efficient light bulbs, or turning down the thermostat a few degrees in the winter.

This Climate Action Plan provides a roadmap – a set of ideas – to help expand on our successes to slow the effects of climate change. It's no secret that this will require an enormous amount of hard work and cooperation. It will require the commitment of not only government, but of communities, individuals and businesses in our subregion. Our goal is to make WRCOG a vibrant example of how a subregion can collaborate to achieve climate protection goals and, as a result, enhance quality of life for all its residents and businesses. We are confident that if we can embrace this common challenge with creativity and commitment, WRCOG and its member jurisdictions will continue to lead the effort toward a sustainable future.

Sincerely,

Rick Bishop

Rick Bishop
Executive Director

Acknowledgements

The preparation of the Subregional Climate Action Plan was funded by a Sustainable Communities Planning Grant through California's Strategic Growth Council. The Strategic Growth Council, created in September 2008 by Senate Bill 732, is a cabinet level committee that is tasked with coordinating the activities of member state agencies to improve air and water quality, improve natural resource protection, meet the goals of the California Global Warming Solution Act of 2006, encourage sustainable land use planning, and revitalize urban and community centers in a sustainable manner. The Sustainable Communities Planning Grant Program is funded by The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84).

We would like to especially thank the WRCOG Planning Directors' Technical Advisory Committee for their leadership and passion for the project and the communities of Western Riverside County.

WRCOG Planning Directors' Technical Advisory Committee

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Deanna Elliano, Vice-Chair, City of Hemet

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PMC® AECOM FEHR & PEERS

ATKINS ·I·C·L·E·I Local Governments for Sustainability USA

Executive Summary

Climate change is occurring and needs to be addressed to successfully prepare for a sustainable future in which residents are healthy, businesses thrive, and communities prosper. The Western Riverside Council of Governments (WRCOG) tactic to mitigating climate change is to take a unified, collaborative approach and develop this Subregional Climate Action Plan (CAP). The objectives are to create more livable, equitable, and economically vibrant communities. By using energy more efficiently, harnessing renewable energy to power our buildings, enhancing access to sustainable transportation modes, recycling our waste, conserving water, and building local food systems, we can keep dollars in our local economy, create new green jobs, and improve public health and community quality of life. By integrating these elements, the WRCOG Subregional CAP will:

- **Create Local Jobs:** The technologies, products and services required for the shift to a low-carbon future can be provided by employers in our communities. Dollars currently spent on fossil fuels will no longer leave our economy. They will stay here to pay for home insulation; lighting retrofits; solar panels; bicycles; and engineering, design, and construction of more sustainable communities. WRCOG's adopted Sustainability Framework prioritizes sustainability as a key economic engine of the subregion, and our HERO financing program is a prime example of our success. HERO has created more than 1,000 jobs since its inception in 2011.

- **Promote Healthier Communities:** Walkable and bikeable neighborhoods, fresh foods, and clean air provide healthier, more active lifestyle options for our residents. Healthy communities are areas where public health and climate action policy priorities intersect, creating new active transportation and living options, enhancing access to nutritious foods, and improving our quality of life and environment.

- **Become More Energy Self-Sufficient:** Actions in this CAP will help reduce our reliance on fossil fuels. As energy prices continue to increase and supplies become more uncertain, reduced reliance on volatile oil supplies will diminish risks faced by everyone.

- **Enhance Social Equity:** Disparities among residents can be reduced by ensuring that communities most vulnerable to climate change effects are given priority for green jobs, healthy local food, energy-efficient homes and affordable, efficient transportation. We can also improve equity by ensuring that these communities are enabled to implement the CAP in a meaningful and engaging way.

- **Reduce Emissions, Improve Air Quality, and Protect Natural Systems:** Reducing GHG emissions from major sources helps protect and improve the air we breathe and the environment in which we live. Sustaining the values and functions of our habitat is an essential strategy that can simultaneously reduce emissions, sequester carbon and strengthen our ability to adapt to a changing climate. Healthy watersheds and ecosystems are an integral part of a sustainable Western Riverside County.

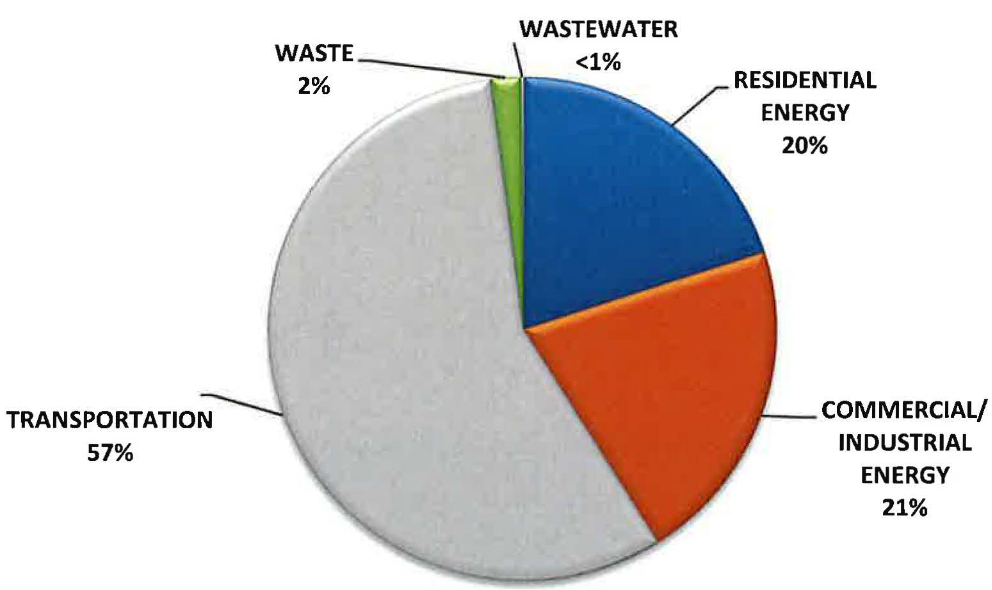
- **Save Money:** Using less energy in our homes, buildings and vehicles means lower energy and transportation bills for residents, business and government. Residents and local governments can also realize health-care cost savings inherent to a healthier, more active community.

Twelve cities in our subregion have joined efforts to develop this Subregional CAP, which sets forth a subregional emissions reduction target, emissions reduction measures, and action steps to assist each community to demonstrate consistency with California's Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32).

MEASURING OUR EMISSIONS

To ensure that the subregion stays on course to meet its greenhouse gas (GHG) reduction target, it is necessary to track our progress by conducting regular, community-wide GHG emissions inventories. It helps to think of an inventory as a "snapshot" of our subregion's GHG emissions for a given year. An inventory identifies the major sources and quantity of GHG emissions produced by residents, businesses, and public institutions. In 2010, Subregional CAP cities emitted approximately 5,834,400 metric tons of GHG emissions. Figure ES-1 below illustrates these emissions by source.

Figure ES-1: Baseline Greenhouse Gas Emissions by Source

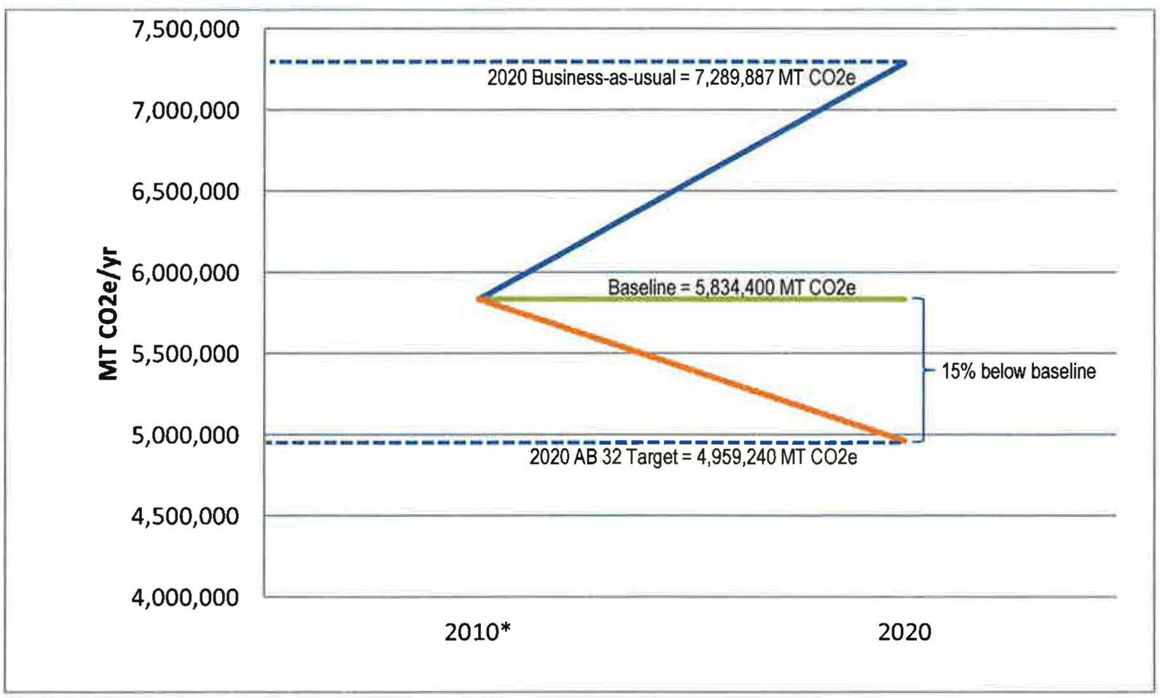


The inventory reflects the emissions that result from motor vehicles driven, electricity and natural gas consumed, waste generated, water consumed, and wastewater treated within participating jurisdictions' limits. It provides a useful tool to track community and local government emissions over time, and to target climate protection strategies to address the main emissions sources.

REDUCING OUR EMISSIONS

WRCOG's subregional emissions reduction targets are 15% below 2010 levels by 2020, and 49% below 2010 levels by 2035. This plan focuses on feasible actions Western Riverside County communities can and should take between now and 2020, as well as innovative approaches currently beyond our current reach that will be needed to achieve the 2035 target. Based on forecasted emissions levels, a 15% reduction from 2010 levels equates to a GHG emissions reduction of nearly 2,330,647 metric tons below business-as-usual (BAU) conditions by 2020, as shown in Figure ES-2. This CAP identifies objectives and actions in four categories to set the subregion on a path to meet our 2020 GHG emission target.

Figure ES-2: WRCOG Subregion–Community GHG Business as Usual Forecasts and Reduction Target for 2020



*2010 is used as baseline year for all jurisdictions except for the cities of Eastvale and Jurupa Valley, as noted in Chapter 2.

TAKING ACTION

This CAP includes feasible strategies that will help the WRCOG subregion advance toward GHG emissions reduction goals, while affording our communities other economic and environmental benefits. The Plan builds upon existing successes and encompasses a range of strategies from expanding the successful HERO program, to increasing residential and business recycling, to reducing vehicle miles traveled, and increasing energy efficiency. It offers cost-effective strategies that will support our local economy; reduce risks for energy and fuel price increases and volatility; and offer a wide range of other environmental, social, and economic benefits. Actions that reduce GHG emissions also support other local community goals and contribute to sustaining the WRCOG subregion as a vibrant community.

The CAP contains GHG reduction measures organized into four primary sectors, as follows:

ENERGY

- Energy measures will increase community-wide building and equipment efficiency and renewable energy use, and promote energy efficiency and renewable energy generation use supporting municipal operations in our communities.

TRANSPORTATION AND LAND USE

- Transportation and land use measures will reduce single-occupancy vehicle travel, increase non-motorized travel, improve public transit access, increase motor vehicle efficiency, and promote sustainable growth patterns.

SOLID WASTE

- Solid waste measures will reduce community and municipal solid waste sent to landfills.

WATER

- Water measures will increase community water conservation and reduce water consumed to support municipal operations in our communities.

If fully implemented, the CAP will exceed our 2020 goal by 2.6%, achieving an overall 17.6% reduction in GHG emissions by 2020. Annual progress reports will allow the Plan to evolve along with local budget priorities, carbon markets, and technology.

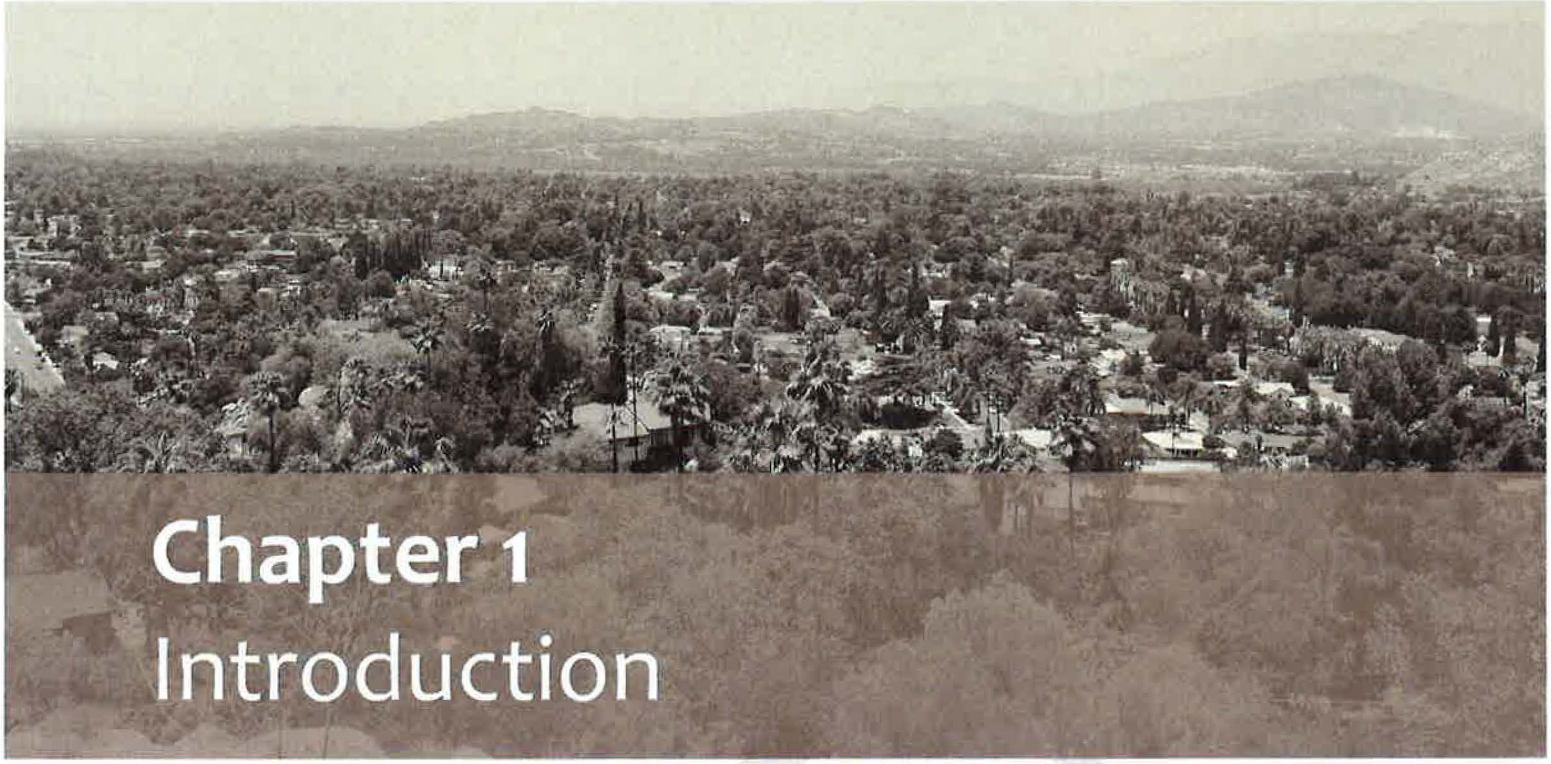
REALIZING OUR GOALS

While measuring GHG emissions, establishing reduction targets, and developing a CAP are essential steps, the most important work lies ahead: **Implementation.**

Turning this plan into action rests on more than just good ideas and intentions. It requires residents, businesses, municipal governments, and other institutions in our communities to rise to the challenge of change. Infrastructure, technology, workforce development, and our daily decisions must reflect these goals.

The CAP recommends strategies to support individuals' and businesses' efforts to consume less energy, move more efficiently, and produce less waste. Implementing the plan will, for example, increase access to public transit and make it safer to commute by foot or bicycle, provide incentives to make homes and businesses more energy efficient, and increase the convenience of recycling and composting waste.

WRCOG is committed to leading the region toward a more sustainable future by realizing the goals set forth in this plan. How can ***you*** contribute?

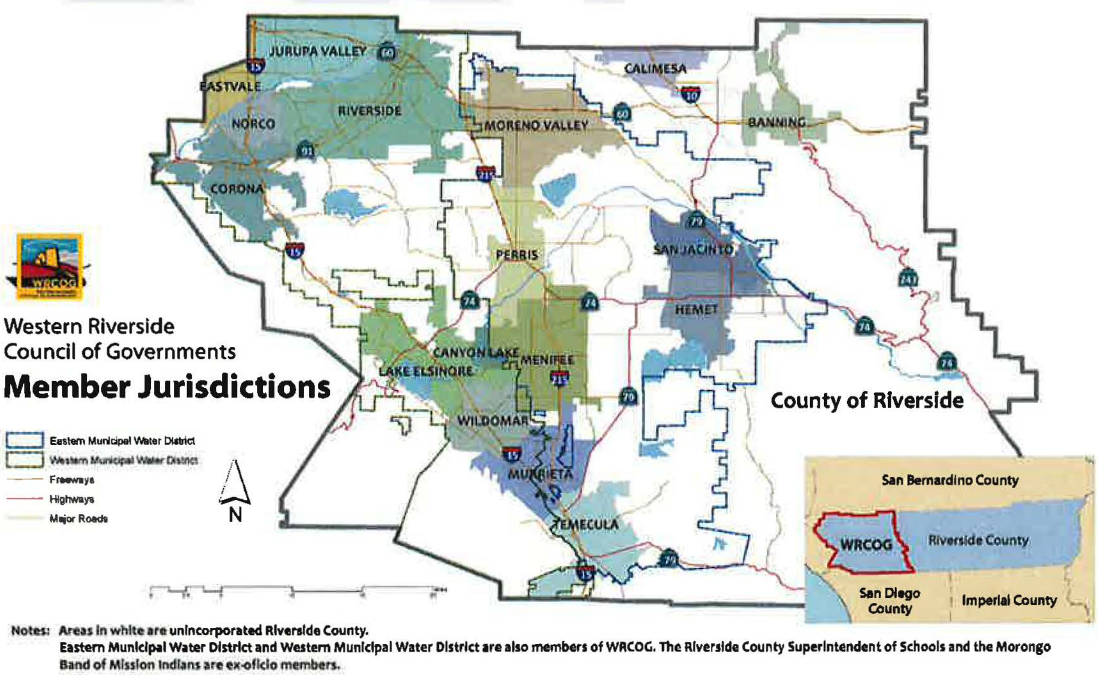


Chapter 1 Introduction

PURPOSE

The Western Riverside Council of Governments (WRCOG) has a strong legacy of collaboration among its member agencies (see **Figure 1-1**) and innovation in implementing programs that are environmentally, economically, and socially beneficial to the subregion. WRCOG has been a leader in promoting sustainability through its adopted Sustainability Framework, Western Riverside Energy Leader Partnership (WRELP), HERO Program - an energy efficiency and water conservation financing program, and Western Riverside County Clean Cities Coalition. This Climate Action Plan (CAP) is another innovative subregional planning effort, led by WRCOG, to reduce **greenhouse gas (GHG) emissions**.

Figure 1-1: WRCOG Subregion



Notes: Areas in white are unincorporated Riverside County.
Eastern Municipal Water District and Western Municipal Water District are also members of WRCOG. The Riverside County Superintendent of Schools and the Morongo Band of Mission Indians are ex-oficio members.

Western Riverside County is establishing itself as a leader in energy efficiency and sustainability efforts and each of WRCOG's member jurisdictions are addressing climate change through different local programs. Twelve cities in Western Riverside County have joined efforts to develop this Subregional CAP, which sets forth a subregional emissions reduction target, emissions reduction measures, and action steps to assist each community to demonstrate consistency with California's Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32). Several jurisdictions in the WRCOG subregion have already adopted a local CAP, or are in the process of doing so. **Table 1-1** below illustrates which jurisdictions are participating in this Subregional CAP effort, and also lists additional sustainability programs that jurisdictions participate in relevant to the subregional CAP. The WRELP Program is a collaboration between WRCOG Southern California Edison (SCE), and the Southern California Gas Company (SCG), which includes the development of Energy Action Plans for 11 communities. Several jurisdictions are participating in separate partnership efforts with SCE, also targeting energy efficiency. Four of WRCOG's member jurisdictions have municipally-owned utilities, which provide energy and/or water and wastewater services to their communities and pursue individual efficiency and sustainability efforts.

Table 1-1: WRCOG Member Participation in Sustainability Programs

	Participating in Subregional CAP	Locally Adopted, or In-Progress CAP	Participating in WRELP Energy Action Plan	Participating in other SCE Partnership	Municipally-Owned Utility
Banning	✓				✓
Calimesa	✓		✓		
Canyon Lake	✓		✓		
Corona		✓		✓	✓
Eastvale	✓				
Hemet	✓		✓		
Jurupa Valley	✓				
Lake Elsinore		✓	✓		
Menifee		✓	✓		
Moreno Valley		✓		✓	✓
Murrieta		✓	✓		
Norco	✓		✓		
Perris	✓		✓		
Riverside	✓				✓
San Jacinto	✓		✓		
Temecula	✓		✓		
Wildomar	✓		✓		
County of Riverside		✓			

AB 32 directs California to reduce statewide GHG emissions to 1990 levels by 2020. To achieve these reductions, the California Air Resources Board (CARB) recommends that local governments target their 2020 emissions at 15% below "current"[1] levels, consistent with the statewide commitment, to account for emissions growth that has occurred since 1990. Several initiatives at the state level will help the subregion reduce GHG emissions, but they alone will not be sufficient to meet the 2020 target. This CAP provides a roadmap for individual communities in the subregion to reduce GHG emissions through local actions.

The release of GHGs into the atmosphere is the direct and indirect result of everyday activities as residents and businesses use energy in their homes and offices, travel to work, generate waste, and use water. Local governments also emit GHGs as they perform essential services and operate buildings, vehicles, street lights, traffic signals, water systems, and wastewater plants. Strategies in this CAP to reduce such emissions include increasing energy efficiency in buildings and facilities, utilizing renewable energy sources, increasing vehicle fuel efficiency, supporting alternative modes of transportation, reducing waste generation, and reducing water consumption. In addition to addressing climate change, reducing GHG emissions often provides co-benefits such as reducing energy and transportation costs for residents, businesses, and local governments; creating green jobs and supporting advancement of green technologies and industries; improving air quality and the overall health of residents; and making the community a more attractive place to live and locate a business.

The WRCOG Subregional CAP is the result of an analysis of existing GHG reduction programs and policies that have already been implemented in the subregion and of applicable best practices from other regions to assist in meeting the 2020 subregional reduction target. The resulting GHG reduction measures were chosen by the subregion based on their GHG-reduction potential, cost-benefit characteristics, funding availability, and feasibility of implementation. The level of implementation of each measure was determined by each community; however, this CAP presents the results collectively, demonstrating the collaborative effort and partnership that will facilitate implementation.

This CAP is organized into four chapters:

- **Chapter 1, Introduction:** provides the framework for the CAP, places the CAP in the context of current climate change science and policy, describes existing regional and local sustainability efforts and accomplishments, and discusses the CAP's relationship to the California Environmental Quality Act (CEQA).
- **Chapter 2, Emissions Inventory, Projections, and Goals:** describes the emissions inventory process and results, forecasted business-as-usual emissions for the subregion, and the adopted subregional emissions reduction target.
- **Chapter 3, Reduction Measures and Actions:** contains the anticipated State and federal emissions reductions, and the local reduction measures and actions that will be implemented to meet the subregional reduction target.
- **Chapter 4, Implementation and Monitoring:** provides best practices and specific resources for implementing reduction measures, the role for measure-specific evaluations, periodic updates to the inventories, use of indicators to monitor the subregion's progress, and the need for future iterations of the CAP to incorporate new data and reduction measures as they become available.

[1] "Current" is a term used by CARB in its Climate Change Scoping Plan of September 2008, but is undefined. It is generally taken to mean emissions for a year between 2005 and 2008, although other years have been used by local communities.

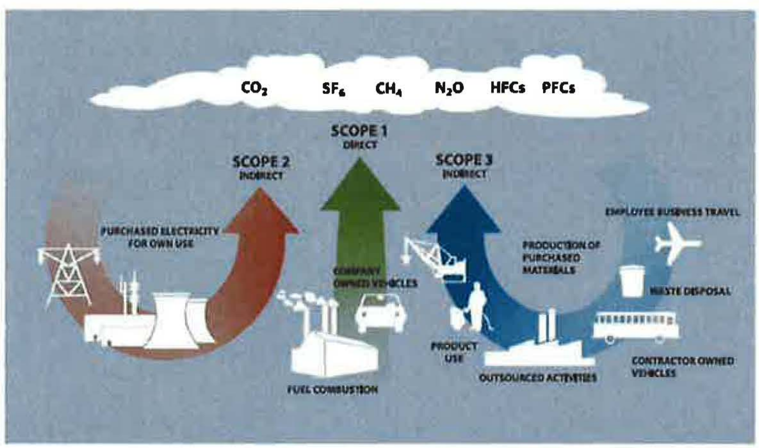
GREENHOUSE GAS EMISSIONS IMPACTS

Naturally occurring gases dispersed in the atmosphere determine the Earth's climate by trapping infrared radiation (heat). This phenomenon is known as the greenhouse effect and without it, the Earth would be about -2°F. Overwhelming evidence shows that human activities are increasing the concentration of GHGs in the atmosphere, trapping more heat, and changing the global climate. The most significant contributor is the burning of fossil fuels for transportation, electricity generation, and other purposes, which introduces large amounts of carbon dioxide and other GHGs into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise, a phenomenon known as global climate change.

The most important GHGs to reduce are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which constitute over 98% of human-released GHGs in the U.S.[2] Other important GHGs include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These gases are emitted through a variety of natural processes and human activities (see **Figure 1-2**), including:

- Fossil fuel combustion (CO_2, N_2O, and CH_4);
- Agricultural operations, such as fertilization of crops (N_2O), livestock production, and rice cultivation (CH_4);
- Anaerobic composting and landfill off-gassing (CH_4);
- Refrigeration and cooling (HFCs); and
- Industrial manufacturing, including aluminum production (PFCs), semi-conductor manufacturing (SF_6), and cement production (CO_2).

Figure 1-2: Greenhouse Gases Regulated Under AB 32



Global Warming Potential (GWP) is a quantitative measurement that expresses the relative warming potency of each GHG over a specific period of time. CO_2 is assigned a GWP value of 1 and the other GHGs are assigned GWPs relative to CO_2. For GHG emission inventories, the amount of each gas emitted is multiplied by its GWP and presented in units of carbon dioxide equivalents (CO_2e). **Table 1-2** lists the six primary GHGs as defined in AB 32, their chemical formula, the lifetime of the compound, and their

[2] U.S. Environmental Protection Agency, 2011, http://www.epa.gov/climatechange/ghgemissions/gases.html

GWPs relative to CO_2. Although CO_2 has a lower GWP than other GHGs, it is the largest contributor to human-caused global warming, constituting about 84% of U.S. emissions.[3]

Table 1-2: Greenhouse Gases Regulated Under AB 32

Greenhouse Gas	Chemical Formula	Lifetime (years)	Global Warming Potential for 100-year horizon
Carbon Dioxide	CO_2	Variable	1
Methane	CH_4	12	21
Nitrous Oxide	N_2O	114	310
Sulfur Hexafluoride	SF_6	3,200	23,900
Hydrofluorocarbons	HFCs	1.4 – 270	140 – 11,700
Perfluorocarbons	PFCs	1,000 – 50,000	6,500 – 9,200

Source: International Panel on Climate Change (IPCC) Second Assessment Report: Climate Change 1995 (SAR). Available at: http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

Note: According to the Local Government Operations Protocol (LGO Protocol) and the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (Community Protocol), the GWP values in **Table 1-2** were applied in this CAP. Since the SAR was published in 1995, the IPCC has published updated GWP values in its Third Assessment Report (TAR) and Fourth Assessment Report (AR4) that reflect new information on atmospheric lifetimes of GHGs and an improved calculation of the radiative forcing of CO_2. However, GWP values from the SAR are still used by international convention to maintain consistency in GHG reporting. For GWP values that were not quantified in the SAR, GWP values from the TAR were used.

While the anticipated effects of climate change are likely to vary regionally, it is anticipated to have the following global effects[4]:

- Higher maximum temperatures and more hot days over most land areas;
- Higher minimum temperatures, fewer cold days, and frost days over most land areas;
- Reduced diurnal temperature range over most land areas;
- Increased heat index over land areas; and
- More intense precipitation events.

Many secondary effects are anticipated to result from climate change in California, including: loss in snow pack; sea level rise and inundation of coastal areas; increased flooding of low-lying areas; more extreme heat days per year; high ozone days; increased incidence of large forest fires; and more frequent and severe drought years.

[3] Ibid.
[4] IPCC Fourth Assessment Report: Climate Change 2007 (AR4). Available at: http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm

REGULATORY CONTEXT

Many strategies for monitoring and addressing climate change have emerged at the international, national, and state levels. California remains a leader in the effort to reduce GHG emissions through mitigation and adaptation strategies. With AB 32, California is the first state in the U.S. to mandate GHG emissions reductions across its entire economy. To support AB 32, California has been developing policy and passing legislation that seeks to control emissions of gases that contribute to climate change. These have included regulatory approaches such as mandatory reporting for significant sources of GHG emissions and caps on emission levels, as well as market-based mechanisms, such as cap-and-trade. Voluntary local actions are also increasing, such as conducting emissions inventories, implementing practices to reduce emissions, and purchasing offsets and renewable energy certificates. While many local actions are currently voluntary, there is more emphasis being placed on monitoring and reporting emissions to demonstrate the effectiveness of policies and local consistency with state reduction goals. The following section highlights the primary state legislation and guidance related to this CAP.

STATE LEGISLATION AND GUIDANCE

AB 32, also known as the Global Warming Solutions Act of 2006, directs public agencies in California to support the statewide goal of reducing GHG emissions to 1990 levels by 2020. Preparing a CAP supports AB 32 at the local level. The CAP provides a policy framework for how the subregion can do its part to reduce emissions. While compliance with AB 32 is not a requirement for local jurisdictions, demonstrating consistency with statewide reduction goals can significantly assist WRCOG jurisdictions to qualify for incentives such as grant funding. Efforts to address climate change, reduce consumption of resources, and improve energy efficiency led by state legislation or programs are briefly described below and identified in **Figure 1-3**.

Executive Order S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order (EO) S-3-05, which established 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.

EO-S-3-05 created the California Climate Action Team (CAT), which is tasked with the preparation of biennial science assessment reports on climate changes and adaptation options for California. The first CAT Report to the Governor and Legislature was published in 2006, and contains recommendations and strategies to help meet the targets in EO-S-3-05. These were expanded upon in the 2009 CAT Biennial Report to the Governor and Legislature. The new information includes revised climate and sea-level projections, and an evaluation of climate change within the context of broader social changes, such as land-use changes and demographic shifts[5]. The action items in the report focus on the preparation of the Climate Change Adaptation Strategy, required by EO-S-13-08.

[5] California EPA - Climate Action Team Report to Governor Schwarzenegger and the Legislature, March 2006. Available at: http://www.climatechange.ca.gov/climate_action_team/reports/index.html

Assembly Bill 32 – California Global Warming Solutions Act of 2006

AB 32 was approved by the legislature and signed by Governor Schwarzenegger in 2006. The landmark legislation requires CARB to develop mechanisms that will reduce GHG emissions to 1990 levels by 2020. Mandatory actions under the legislation to be completed by CARB include:

- Identification of early action items that can be quickly implemented to achieve GHG reductions. These early action items were adopted by CARB in 2007 and include regulations affecting landfill operations, motor vehicle fuels, car refrigerants, and port operations, among other regulations.
- Development of a scoping plan[6] to identify the most technologically feasible and cost-effective measures to achieve the necessary emissions reductions to reach 1990 levels by 2020. The Scoping Plan identifies a variety of GHG reduction measures that include direct regulations, alternative compliance mechanisms, incentives, voluntary actions, and market-based cap-and-trade program. The Plan identifies local governments as strategic partners to achieving the state goal and translates the reduction goal to a 15% reduction of current emissions by 2020.
- Creation and adoption of regulations to require the state's largest industrial emitters of GHGs to report and verify their emissions on an annual basis.

Senate Bill 97 – California Environmental Quality Act Guideline Amendments of 2007

Senate Bill (SB) 97 was adopted in 2007 and directed the Governor's Office of Planning and Research (OPR) to amend the CEQA Guidelines to address GHG emissions. The CEQA Guidelines prepared by OPR were adopted in December 2009 and went into effect March 18, 2010. Local governments may use adopted plans consistent with the CEQA Guidelines to assess the cumulative impacts of projects on climate change, if the plan for the reduction of GHG emissions accomplishes the following:

- Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area.
- Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable.
- Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.
- 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.
- Establish a mechanism to monitor the plan's progress toward achieving the level and to require an amendment if the plan is not achieving specified levels.
- Be adopted in a public process following environmental review.

SB 375 – Sustainable Communities and Climate Protection Act of 2008

SB 375, also known as the Sustainable Communities and Climate Protection Act of 2008, builds off of AB 32 and aims to reduce GHG emissions by linking transportation funding to land use planning. It requires the state's metropolitan planning organizations (MPO) to create a sustainable communities strategy (SCS) in their regional transportation plans (RTP) for the purpose

e of reducing urban sprawl. Under SB 375, CARB established regional targets for GHG emissions reductions from passenger vehicle use for each MPO. The regional reduction targets for the Southern California Association of Governments (SCAG) region, which is the MPO with jurisdiction over the

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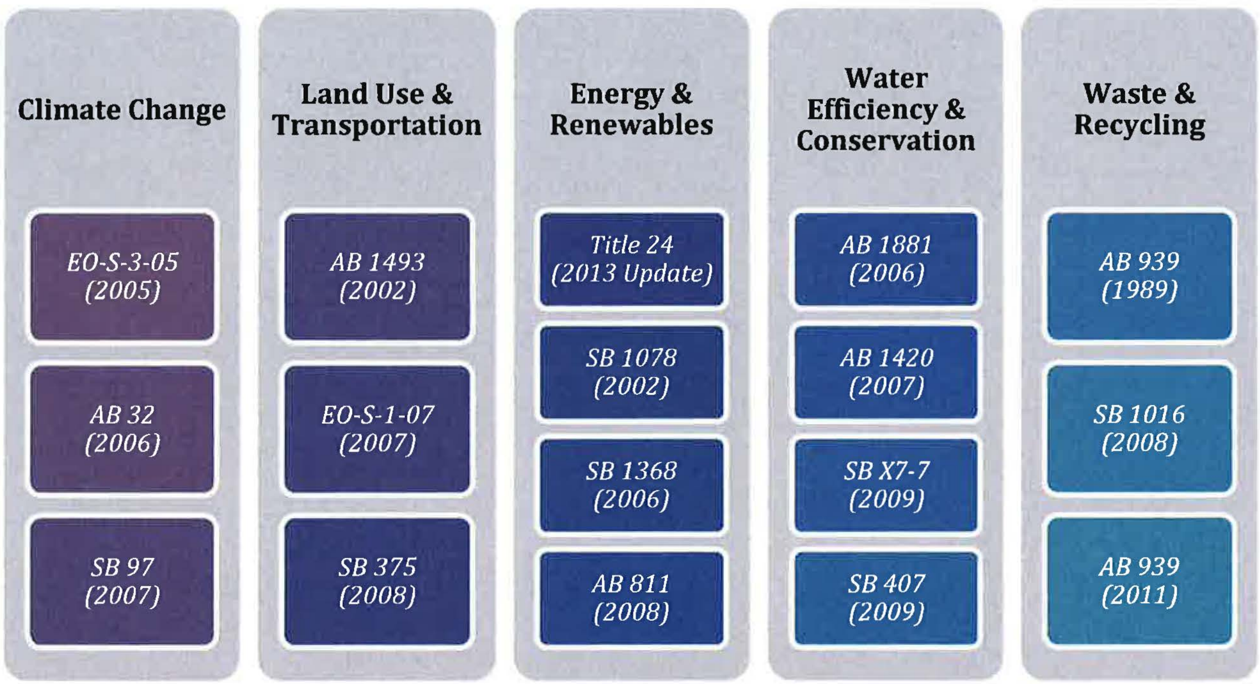
[6] CARB 2008 Scoping Plan. Available at http://arb.ca.gov/cc/scopingplan/scopingplan.htm

WRCOG subregion, are 8% per capita by 2020, and a conditional target of 13% per capita by 2035 from 2005 levels. In April 2012, SCAG adopted its first SCS, which demonstrates how the region will achieve the GHG emissions reduction targets set by CARB.

Figure 1-3 categorizes the applicable state regulations that provide a policy framework for addressing climate change. A more detailed description of these regulations is included in the jurisdictional Greenhouse Gas Inventory Reports available at the WRCOG offices.

Figure 1-3: Regulatory Framework for Climate Change



REGIONAL PROGRAMS

The regional initiatives described below contribute to the development and success of this CAP. Many of these programs are administered by WRCOG and several are conducted by other regional entities in partnership with WRCOG.

Southern California Association of Governments Regional Transportation Plan and Sustainable Communities Strategy

SCAG is the regional planning agency for Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties, and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. SCAG serves as the federally designated MPO for the Southern California region and is the largest MPO in the U.S. With respect to air quality planning, SCAG has prepared the 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy (2012 RTP/SCS): Towards a Sustainable Future, to fulfill federal planning requirements contained in the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which calls for regions to consider urban form and natural resources as part of the transportation planning process. Under SB 375, all of California's MPOs must prepare an SCS as a component of their RTP. The RTP serves as a long-range transportation plan that is developed and updated by SCAG every four years. The RTP provides a vision for the development of transportation facilities throughout the region based on growth forecasts and economic trends that project over a 20-year period. The SCS expands upon transportation strategies in the RTP to analyze growth patterns and establish future land use strategies that aid the region in meeting its GHG reduction targets. The SCS does not mandate future land use policies for local jurisdictions, but rather provides a foundation of regional policy upon which local governments can build. WRCOG and its member jurisdictions partner with SCAG and are active members in the development and implementation of the RTP/SCS.

HERO Program

Established under the guidance of AB 811 (2008) and AB 474 (2009), WRCOG's HERO Program is a Property Assessed Clean Energy (PACE) program that provides financing to residential and commercial property owners for the installation of energy efficient, renewable energy, and water conservation improvements on existing properties. Financing provided through the HERO Program is repaid through an assessment on property tax bills over 5-, 10-, 15-, 20-, and 25-year terms, based on the useful life of the products, and upon sale of the property, the balance generally stays with the property.

Sustainability Framework for Western Riverside County

WRCOG's Sustainability Framework (Framework) is a subregional planning effort that establishes, implements, and continuously refines an overarching sustainability plan for the communities in Western Riverside County. The Framework aims to: initiate a dialogue about the importance of sustainability in the region; provide a vision and goals to guide local action and regional collaboration; define more immediate short-term goals that can contribute to the longer-term vision of the Framework; and define indicators, benchmarks, and targets that provide a measure of the effectiveness of Framework programs and policies. The Framework acts as a "living" document and contains goals and actions applying to economic development, education, public health, transportation, water and wastewater, energy, and the environment.

Western Riverside County Clean Cities Coalition

The Western Riverside County Clean Cities Coalition (Coalition) is a voluntary local government and industry partnership that aims to reduce the consumption of petroleum fuels and improve air quality in the WRCOG subregion. The Coalition works to mobilize local stakeholders toward expanding the use of alternative fuel vehicles (AFV) and advanced technology vehicles, promoting local idle reduction measures, and strengthening local AFV fueling infrastructure. The governments of Western Riverside County have taken leadership roles in the Coalition, coordinating efforts between government and industry to recognize the value of partnership in achieving air quality, energy efficiency, economic development, and transportation goals, while advancing the clean air and energy efficiency goals of the national Clean Cities program administered by the U.S. Department of Energy.

Healthy Communities

WRCOG and its member jurisdictions are engaged in numerous efforts and initiatives to promote healthy communities, including participating in the Riverside County Health Coalition (RCHC). The RCHC is a collaboration of public and private sectors, school districts, community businesses, local and regional organizations and community members committed to policy development and advocacy, environmental change and community empowerment for healthy lifestyles in Riverside County. This initiative includes a focused partnership effort with local governments to integrate healthy communities into the local planning and policy-making process.

Multiple Species Habitat Conservation Plan

The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) is a comprehensive, multi-jurisdictional plan to conserve sensitive species and their associated habitats in the subregion. Created in 2004 by the Western Riverside County Regional Conservation Authority (RCA), the MSHCP provides subregional transportation and green infrastructure benefits to local agencies and allows WRCOG jurisdictions to make land use decisions and maintain a strong economy in a context that comprehensively addresses federal and state Endangered Species Acts (ESA and CESA) requirements.

Transportation Uniform Mitigation Fee

WRCOG's Transportation Uniform Mitigation Fee (TUMF) was implemented in 2003 as one of the largest multi-jurisdictional fee programs in the nation. TUMF makes improvements to the regional transportation system and provides transportation demand management through funds from new development, ensuring that development mitigates for increases in traffic volumes. TUMF is a 32-year program that provides subregional transportation and infrastructure benefits to local agencies in Western Riverside County. The program is expected to raise $4.2 billion, and 1.64% is allocated to the Riverside Transit Agency (RTA) for transit improvements. To mitigate the impacts of transportation construction projects, WRCOG allocates 1.59% of TUMF funds collected to the RCA to purchase habitat for the MSCHP.

EXISTING LOCAL SUSTAINABILITY ACCOMPLISHMENTS

Several jurisdictions within the WRCOG subregion have already adopted, or are in the process of adopting, GHG emissions reduction policies or entire CAPs independent of the Subregional CAP process. Existing policies and programs were identified that reduce GHGs through energy conservation, renewable energy development, solid waste reduction, commute reduction, and the expansion of the urban forest. Several energy programs are available throughout the subregion, which are managed by WRCOG, SCE, Southern California Gas Company (SCG), Riverside Public Utilities (RPU), Banning Electric Utility (BEU), and the County of Riverside. These programs include financing for building energy retrofits and renewable energy projects, energy efficiency retrofit rebates, smart metering and smart grid technologies, and various energy efficiency education and outreach campaigns.

Some jurisdictions have building code requirements to implement and expand upon the California Green Building Standards Code (CALGreen), or policies to streamline energy efficiency and renewable energy permitting. Many are improving the efficiency of public realm lighting, including street lights, traffic lights, parking lot lighting and outdoor commercial lighting, and their water and wastewater conveyance and treatment facilities.

Policies to reduce solid waste include waste collection billing policies through municipalities or their contracted waste haulers, food scrap and compostable paper diversion outreach, lumber scrap diversion ordinances and outreach, yard waste collection, recycling outreach campaigns and voluntary waste audits, landfill methane capture, and food waste biodigestion programs in Norco and Riverside.

Policies that reduce GHG emissions from potable water conveyance focus on reducing water demand through consumer behavior pricing, water conservation education, and landscape irrigation efficiency. Some jurisdictions have adopted ordinances requiring the installation of certain water conservation measures at properties before selling or renovating properties. While many jurisdictions are seeking to expand recycled water deliveries, fewer promote rainwater collection or graywater system use at this time.

Existing transportation policies focus on enhancing pedestrian and bicycle amenities and facilities alongside the expansion and improvement of transit systems, but also include various transportation demand management programs to reduce single-occupancy vehicle miles traveled (VMT) during commute hours. Several jurisdictions have policies supporting the expansion of the urban forest, and some have mandatory shade tree planting requirements that also reduce building energy. Finally, many jurisdictions are actively expanding mixed-use developments and transit-oriented developments to encourage people to drive less, and enrich the character and economic vitality of their communities.

WESTERN RIVERSIDE ENERGY LEADER PARTNERSHIP

The WRELP Program builds upon the existing policies and programs in the region to analyze energy-sector emissions and propose energy conservation and renewable energy measures that reduce GHG emissions within Energy Action Plans (EAPs) for 11 WRCOG jurisdictions served by SCE. The WRELP partners include Calimesa, Canyon Lake, Hemet, Lake Elsinore, Menifee, Murrieta, Norco, Perris, Temecula, San Jacinto, and Wildomar (see **Table 1-1**). The WRELP effort uses funding provided by SCE to implement within the region the California Long-Term Energy Efficiency Strategic Plan (CEESP), developed by the California Energy Commission (CEC) as a collaborative effort in response to California's need for a long-term strategic energy efficiency plan. Following CEESP Goal 4, individual EAPs were developed for each participating jurisdiction, creating a comprehensive program to address energy efficiency, sustainability, and climate change through the years 2020 and 2035. The EAPs informed the development of the energy efficiency measures in this CAP.

RELATIONSHIP TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

In 2007, state lawmakers identified the need to analyze GHG emissions in the CEQA process through the adoption of SB 97. The bill required OPR to develop, for adoption by the Natural Resources Agency, amendments to the CEQA Guidelines that clarified several points about the analysis and mitigation of GHG emissions. Aside from establishing the need for lead agencies to analyze and mitigate for a project's potentially significant impacts relating to GHG emissions, the amendments also provided that a lead agency may streamline the analysis of GHG emissions for projects that follow a programmatic GHG emissions reduction plan, or climate action plan, meeting certain criteria. The amendments to the CEQA Guidelines became effective on March 18, 2010. OPR is currently developing a Technical Advisory that will further describe, among other climate action planning topics, how plans for reducing GHGs can be used in CEQA analyses.

Chapter 2 Emissions Inventory

A jurisdiction's greenhouse gas (GHG) inventory serves multiple purposes. It quantifies the GHG emissions resulting from activities taking place throughout the community by residents, businesses, and local governments, and creates an emissions baseline against which the jurisdiction can set emissions reduction targets and measure future progress. It also provides an understanding of where GHG emissions originate and allows a jurisdiction to develop effective policies, strategies, and programs to reduce emissions.

As part of the Subregional Climate Action Plan (CAP) process for Western Riverside County, baseline inventories were prepared for each participating jurisdiction to quantify GHG emissions resulting from the community and government operations. Community-wide inventories encompass the GHG emissions resulting from activities taking place within each jurisdiction's boundaries, where the local government has jurisdictional authority, in addition to some activities taking place outside the boundaries that support activities in the jurisdiction (for example, solid waste sent to landfill areas outside the boundaries). The baseline inventories include emissions from the following sectors: residential energy, commercial/industrial energy, transportation, waste, and wastewater.

2010 is the inventory base year for 10 of the 12 participating jurisdictions within the WRCOG subregion (the cities of Banning, Calimesa, Canyon Lake, Hemet, Norco, Perris, Riverside, San Jacinto, Temecula, and Wildomar). For the cities of Eastvale and Jurupa Valley, which incorporated in October 2010 and July 2011, respectively, the most recent available data were used. The baseline inventory summary presented in this chapter describes the cumulative GHG emissions generated by the jurisdictions participating in the WRCOG Subregional CAP effort, as determined from individual jurisdictional inventories.

BASELINE EMISSIONS INVENTORY

INVENTORY PROCESS

The emissions inventory for each participating jurisdiction was developed using guidance from two standards for emissions accounting and reporting: the Local Government Operations Protocol (LGO Protocol) and the U.S. Community Protocol for Accounting and Reporting of GHG Emissions (Community

Protocol). The LGO Protocol was developed through a partnership between CARB, The Climate Registry, and ICLEI USA. The Community Protocol was released by ICLEI USA in October 2012 and represents the first comprehensive U.S. standard for community-wide inventories.

The emissions inventory is intended to represent emissions sources in each jurisdiction with greatest influence on community-wide activities and government operations. As communities provide different services to their residents and businesses, the scale of the services and resulting emissions are highly dependent upon the size and purview of the local government. For these reasons, comparisons among community or local government inventories should not be made without also describing the municipal services provided by each jurisdiction or presenting community-level indicators such as population or socioeconomic factors.

Furthermore, the inventory estimates current emissions using the best available data and methods at the time the inventory was completed. As data collection and estimation methodologies evolve, future inventories may incorporate emission sources that were not captured previously, or may use newer approaches to estimating emissions.

INVENTORY CATEGORIES

In the community inventory, baseline emissions are categorized into sectors based on their source(s), as follows:

- Residential Energy: Residences consume electricity and natural gas for daily operations and heating/cooling.
- Commercial/Industrial Energy: Commercial and industrial buildings consume electricity and natural gas for daily operations and heating/cooling. This sector includes all non-residential building energy use, including municipal government buildings, industrial buildings, and commercial buildings.
- Transportation: On-road passenger and freight vehicle use results in combustion of gasoline and diesel fuels.
- Waste: Disposal of solid waste in landfills causes anaerobic decomposition, which results in GHG emissions (CH_4).
- Wastewater: Emissions in this sector are associated with the treatment of community industrial, residential, and commercial wastewater.

The LGO inventory is a subset of the community inventory, and represents what the municipality owns or operates and has operational control over, such as government buildings, vehicles, and other municipally-owned equipment and services. While the overall community inventory is important to focus GHG reduction efforts, the LGO inventory provides a closer look at what changes a local jurisdiction can make to improve efficiency and reduce emissions.

INVENTORY RESULTS

The baseline GHG inventory for the 12 WRCOG subregion jurisdictions participating in the CAP totals 5,834,400 metric tons (MT) of carbon dioxide equivalents (CO_2e). **Figure 2-1** and **Table 2-1** provide a breakdown of these emissions by sector. Emissions from the transportation sector accounted for 3,317,387 MT CO_2e, or 57% of the total emissions in the subregion, followed by the commercial/industrial energy sector, which generated 1,226,479 MT CO2e, or 21% of the total. The residential energy sector produced 1,167,843 MT CO2e, or 20% of the total.

Figure 2-1: WRCOG Subregion – Baseline Community Emissions by Sector

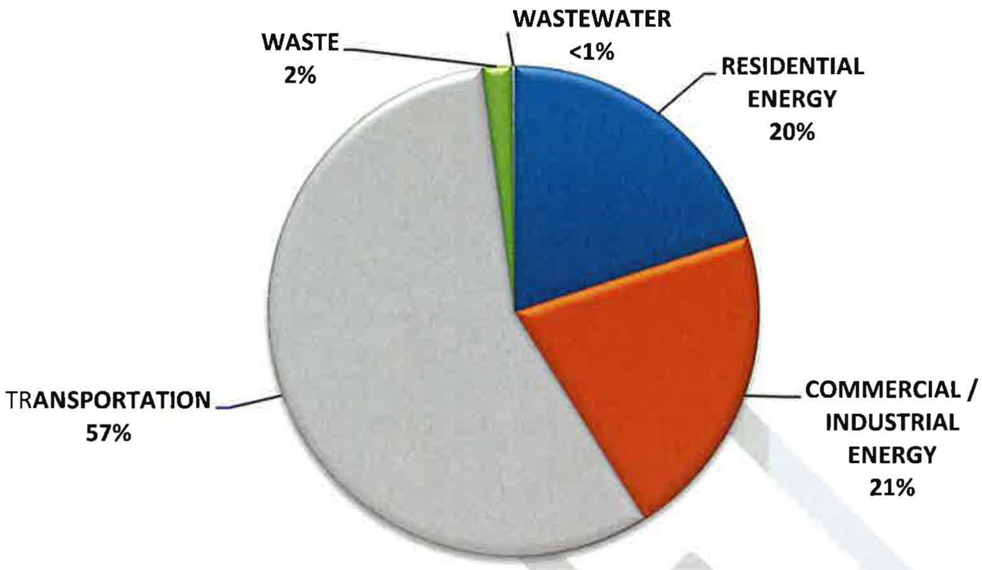


Table 2-1: WRCOG Subregion – Baseline Community Emissions by Sector (MT CO_2e)

Sector	Total Emissions (MT CO_2e)	% of Total
Transportation	3,317,387	56.9%
Commercial/Industrial Energy	1,226,479	21.0%
Residential Energy	1,167,843	20.0%
Waste	112,161	1.9%
Wastewater	10,531	0.2%
TOTAL INVENTORY	**5,834,400**	**100%**

Note: Totals may not add up due to rounding.

The baseline total GHG inventory for each participating jurisdiction is shown in **Figure 2-2** below, sorted by greatest to smallest total emissions. **Figure 2-3** shows baseline community emissions by service population for each jurisdiction. Service population is the number of residents and jobs in each community, and can be useful for measuring progress per-unit reduction of GHGs and comparing emissions between jurisdictions. Per capita emissions ranged from 3.6 MT CO_2e emissions per service population in Eastvale to 7.2 MT CO_2e in Calimesa.

Figure 2-2: Baseline Total Community Emissions by Jurisdiction (MT CO_2e)

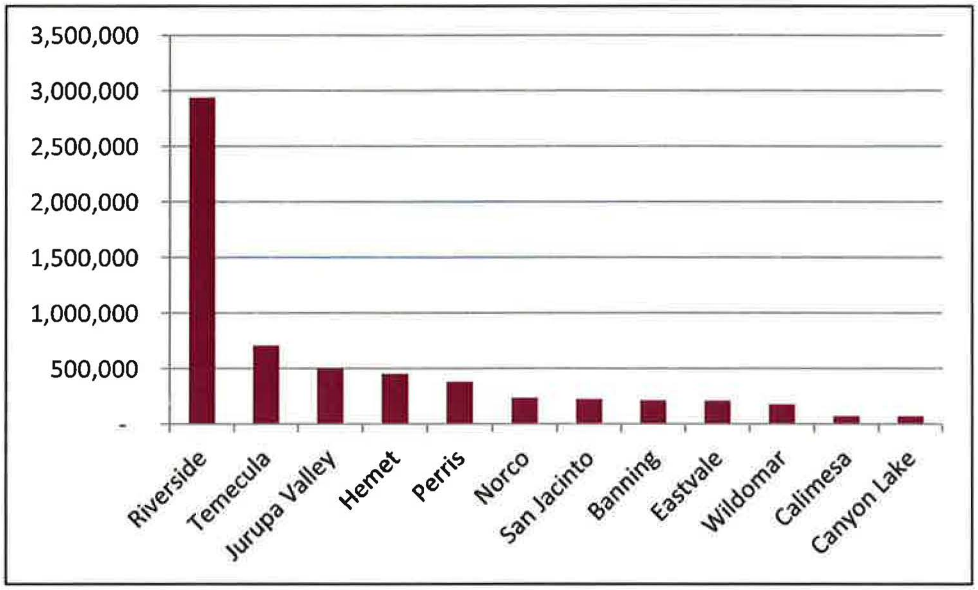
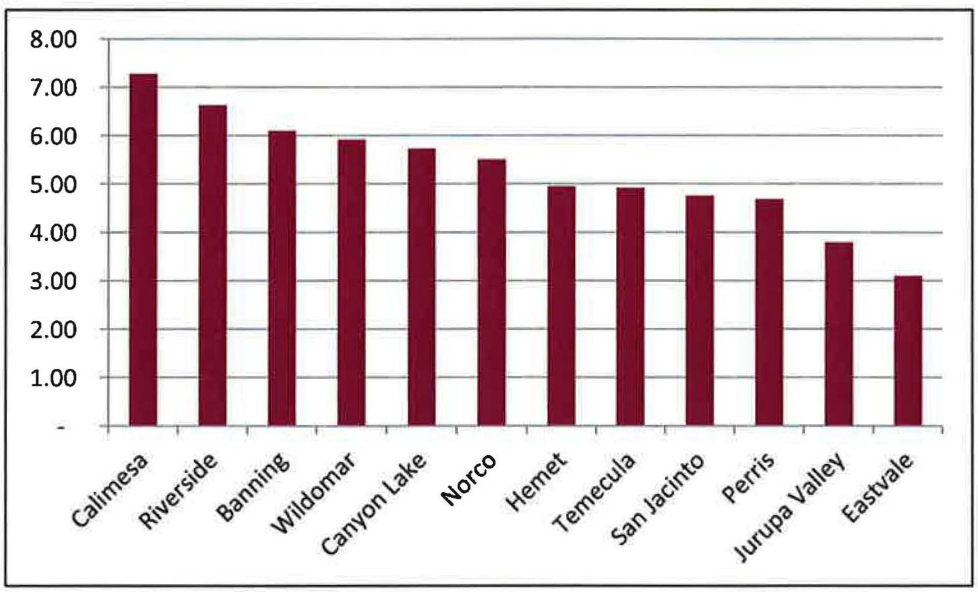
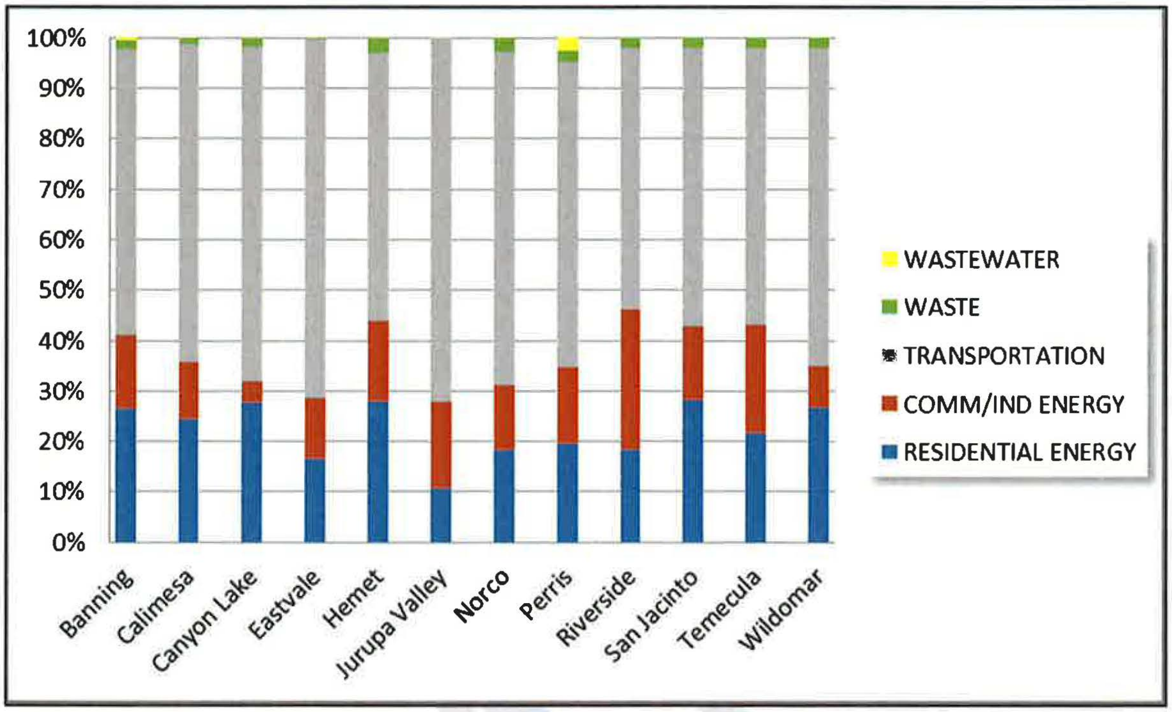


Figure 2-3: Baseline Community Emissions per Service Population by Jurisdiction (MT CO_2e/SP)



The baseline GHG Inventory by sector for each participating region is shown in **Figure 2-4** below. The transportation sector is the largest emissions source in each jurisdiction, followed by residential energy, commercial/industrial energy, and waste for most jurisdictions. For the communities of Jurupa Valley and Riverside, commercial/industrial energy takes up a larger share of emissions than residential energy, due to a more developed commercial and industrial building infrastructure. Perris is the only jurisdiction for which wastewater emissions are included, because they are the only community containing a wastewater treatment plant within its boundaries for which emissions data could be calculated, and they make up a larger share of the Perris inventory than waste-related emissions.

Figure 2-4: Baseline Community Emissions by Jurisdiction by Sector



EMISSIONS FORECASTS

The emissions forecasts establish projections for future-year 2020 and 2035 emissions under "business-as-usual" (BAU) conditions. If the WRCOG subregion were to continue historic patterns of vehicular travel, energy consumption, and waste/wastewater generation and disposal, the resulting emissions would be considered business-as-usual. BAU emissions are GHG emissions that would take place in the absence of state, regional, and local strategies designed to reduce emissions over time.

Future BAU emissions projections have been developed using regionally-adopted estimates for population and employment growth within each city under BAU conditions. Reduction goals were established for 2020 and 2035 using guidance from the California Air Resources Board (CARB).

Annual community emissions in participating WRCOG subregion jurisdictions are projected to increase over time. In 2020, subregional emissions are expected to be approximately 7,289,887 MT CO_2e, which represents an approximate 25% increase from baseline conditions. In 2035, subregional emissions are projected to increase to about 9,113,087 MT CO_2e, which represents an increase of approximately 56% from baseline conditions.

Table 2-2 presents community GHG emissions BAU forecasts by sector for 2020 and 2035. Transportation is expected to contribute the largest share of emissions through 2035. **Figure 2-5** illustrates 2020 BAU community emissions by sector. The percentage contributions from each sector in 2035 are expected to be similar to those in 2020. **Figure 2-6** shows community emissions BAU forecasts by jurisdiction for 2020 and 2035.

Table 2-2: WRCOG Subregion – Projected Business-As-Usual Community Emissions by Sector (MT CO_2e)

Sector	2020 Emissions (MT CO_2e)	% of Total	2035 Emissions (MT CO_2e)	% of Total
Transportation	4,057,626	55.7%	5,399,600	59.3%
Commercial/Industrial Energy	1,655,925	22.7%	1,953,137	21.4%
Residential Energy	1,368,126	18.8%	1,729,452	19.0%
Waste	138,326	1.9%	169,107	1.9%
Wastewater	13,740	0.2%	18,797	0.2%
TOTAL INVENTORY	**7,289,887**	**100%**	**9,113,087**	**100%**

Note: Totals may not add up due to rounding.

Figure 2-5: WRCOG Subregion – 2020 Community Emissions Business as Usual Forecast by Sector

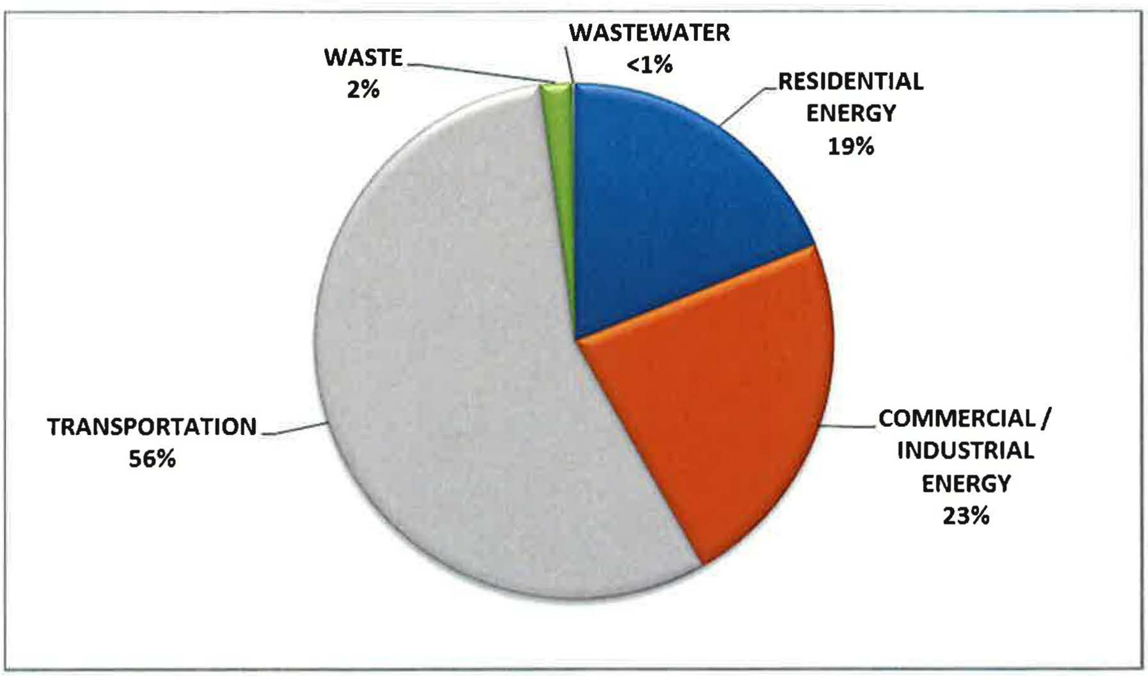
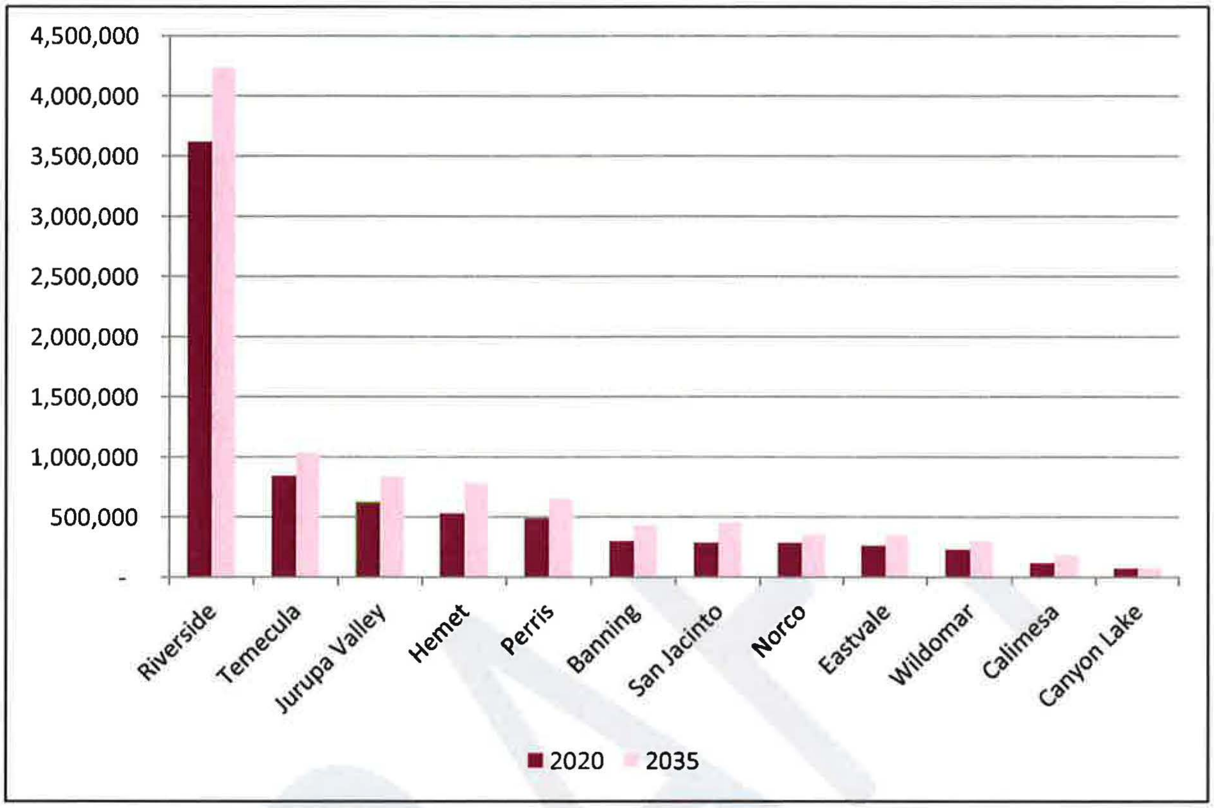


Figure 2-6: 2020 and 2035 Community Emissions Business as Usual Forecast by Jurisdiction ($MT\ CO_2e$)



EMISSIONS REDUCTION TARGET

The WRCOG Subregional CAP establishes a community-wide emissions reduction target of 15% below 2010, following guidance from CARB and the Governor's Office of Planning and Research. CARB and the California Attorney General have determined this approach to be consistent with the state-wide AB 32 goal of reducing emissions to 1990 levels.[1] The Subregional CAP does not establish a reduction target for 2035 or future years; however the CAP identifies a reduction goal of 49% below baseline emissions levels to set the WRCOG subregion on a trajectory to meet targets identified in SB 375 and Executive Order (EO) S-3-05, recognizing that information, methodologies, and data availability may change between now and 2035.

As further described in Chapter 4, progress toward achieving the 2020 emissions reduction target will be monitored over time through preparation of an annual memorandum documenting program implementation and performance. Following each annual report, WRCOG and the participating jurisdictions may adjust or otherwise modify the strategies to achieve the reductions needed to reach the target. Such adjustments could include more prescriptive measures, reallocation of funding to more

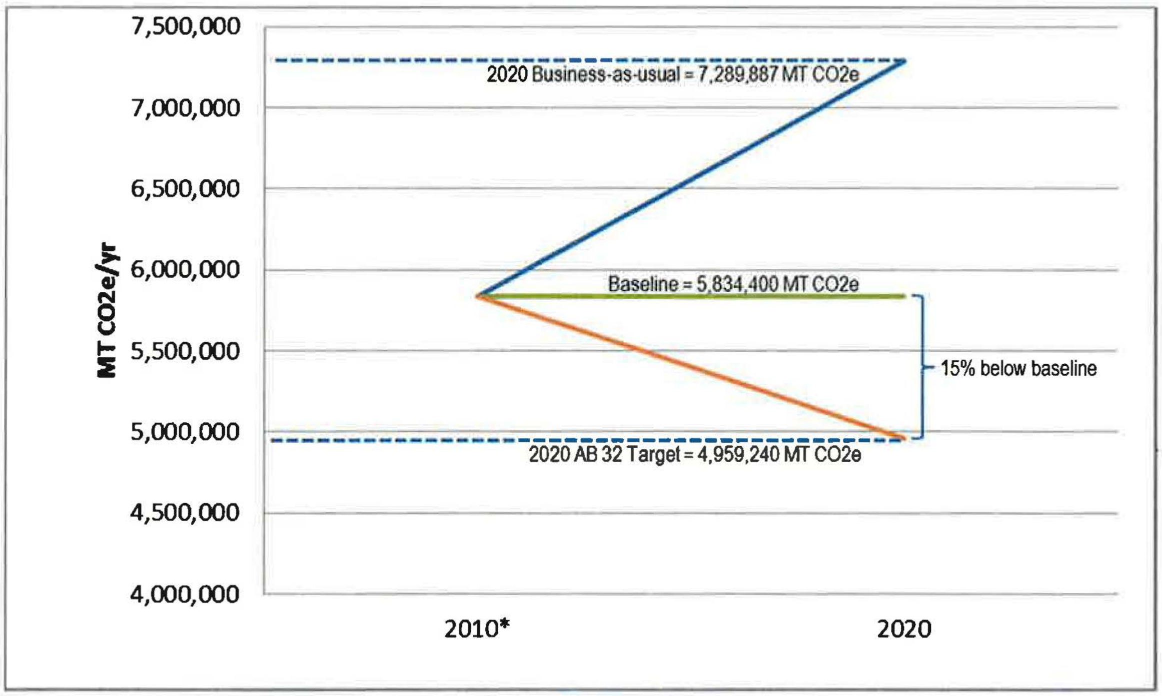
[1] In its Climate Change Scoping Plan of September 2008, CARB recommends that local governments adopt a GHG reduction target consistent with the State's commitment to reach 1990 levels by 2020. This is identified as equivalent to either 15% below 2005 levels by 2020 or a 28% reduction below BAU forecasts by 2020.

successful programs, and modifications to the 2020 BAU emissions projection and reduction target based on revised population, housing, and employment growth estimates. Additionally, there will be a comprehensive inventory update prior to 2020 to track overall progress toward meeting the GHG reduction target.

COMMUNITY EMISSIONS TARGET

The Subregional CAP target for community emissions in 2020 is 4,959,240 MT CO_2e equivalent to a 15% reduction from 2010 baseline emissions of 5,834,400 MT CO_2e. This is a net a reduction of 2,330,647 MT CO_2e from the 2020 BAU emissions forecast of 7,289,887 MT CO_2e. The community-wide emissions reduction target is shown in **Figure 2-7**. As outlined in the next chapter, CAP strategies are expected to reduce community-wide emissions by 2,480,559 MT CO_2e by 2020, exceeding the target by approximately 2.6% (for a total 17.6% reduction).

Figure 2-7: WRCOG Subregion–Community GHG Business as Usual Forecasts and Reduction Target for 2020



*2010 is used as baseline year for all jurisdictions except for the cities of Eastvale and Jurupa Valley, as noted previously.

Chapter 3 Reduction Measures

The emissions projections described in Chapter 2 illustrate the need for the subregion to implement strategies to reduce greenhouse gas (GHG) emissions by 2020 and beyond. Western Riverside County jurisdictions have a long history of working collectively through WRCOG toward common objectives, and have successfully demonstrated commitment to reduce energy and water consumption, solid waste, and vehicle miles traveled (VMT) through existing programs like the HERO Program, the Western Riverside County Clean Cities Coalition, and the Transportation Unified Mitigation Fee (TUMF).

This chapter discusses how participating jurisdictions are uniting to meet shared GHG emissions reduction goals. The approach offers flexibility to jurisdictions to participate at a level that is feasible and practical for each community.

PROCESS AND OVERVIEW

The process of developing this Subregional Climate Action Plan (CAP) included ongoing coordination and information sharing among participating jurisdictions. The WRCOG Planning Directors' Technical Advisory Committee (PD TAC) served as the primary technical working group. The PD TAC met regularly over the course of three years to discuss the CAP and provide feedback. Perspectives from jurisdictions participating in this CAP and those in the subregion who had already prepared a CAP were shared. In addition, WRCOG staff met individually with each participating jurisdiction to review emissions inventories, discuss potential emissions reduction measures and participation levels, and review the Draft CAP. Regular presentations were made to the WRCOG Public Works Committee, Technical Advisory Committee, and Executive Committee to keep jurisdictional staff, management officials, and elected leaders informed.

The following stakeholder agencies and organizations served as advisors throughout the process:

- American Lung Association
- Building Industry Association – Riverside County Chapter
- California Apartment Association – Apartment Association of the Greater Inland Empire
- California Air Resources Board

- Caltrans, District 8
- The Governor's Office of Planning & Research
- Riverside County Department of Public Health
- Riverside County Transportation Commission
- Riverside Transit Agency
- Safe Routes to School – Southern California Regional Network
- Southern California Edison
- South Coast Air Quality Management District
- Southern California Association Governments
- Southern California Gas Company
- TransForm

Why a "subregional" Climate Action Plan?

Developing a subregional CAP encourages input and coordination among participating jurisdictions. A subregional CAP uses consistent methodologies and allows jurisdictions to collaboratively implement regionally-effective measures. This creates economies of scale and may lead to lower administrative costs and greater publicity of incentives. It also demonstrates that WRCOG member jurisdictions can continue to work effectively towards common goals.

REDUCTIONS ACHIEVED

To meet emissions reduction targets, the CAP considers existing programs and policies in the subregion that achieve GHG emissions reductions in addition to new GHG reduction measures. Several proposed measures apply to participating jurisdictions uniformly, because they respond to adoption of a state law (e.g., the Low Carbon Fuel Standard) or result from programs administered at the discretion of a utility serving multiple jurisdictions (e.g. utility rebates). For other, more discretionary measures, participating jurisdictions have voluntarily committed to a participation level that could be implemented in their community. These levels—categorized and referred to for the purposes of this CAP as Silver, Gold, and Platinum—generally range from programs that a jurisdiction may promote through its website or outreach campaigns (Silver level), to programs that could be codified through local ordinances (Platinum level). Gold and Platinum levels have the benefit of achieving higher GHG reductions using fewer programs and often with less administrative burden to the jurisdiction. However, Silver level programs offer greater flexibility to determine how GHG reduction measures best fit individual projects.

MEASURE DEVELOPMENT

The GHG emissions reduction potential of each measure was estimated for jurisdictions participating at each level. Maximum participation in GHG reduction measures was encouraged, but jurisdictions were also encouraged to participate at a level that could be realistically achieved by 2020. As a result of the subregion's efforts, the 2020 reduction goal is achieved through implementation of the measures described below. Implementation of the CAP will result in a 15% reduction from the subregion's baseline (2010) emissions, consistent with State-recommended goals for local jurisdictions. Considering the large amount of anticipated growth in Western Riverside County, this equates to a 32% reduction below a business-as-usual (BAU) scenario. The CAP also looks beyond 2020 and demonstrates an ongoing commitment to reducing GHG emissions aligned with State-established goals included in SB 375 and Executive Order (EO) S-3-05. Continued implementation of the CAP beyond 2020 will place the subregion on a trajectory to reduce GHG emissions 49% below baseline emissions by 2035.

FEDERAL, STATE, AND REGIONAL EMISSIONS REDUCTIONS

Emissions reductions are achieved through the efforts of federal, State, and regional programs, in addition to local measures that jurisdictions will implement in their community. State and federal emissions reductions are primarily achieved through regulations, such as efficiency standards for passenger vehicles (e.g., the Corporate Average Fuel Economy standards), reduction in carbon content of transportation fuels (e.g., the Low Carbon Fuel Standard), and minimum renewable energy supply requirements for utilities (e.g., the Renewables Portfolio Standard). Measures regulated and implemented by the State and federal government achieve reductions without additional action by local communities. That is, even if vehicle miles traveled within the subregion remain constant over time, resulting GHG emissions would decrease because as new vehicles are purchased, they would in general be more GHG-efficient than those they replace.

Some State and federal programs also require local action within communities. The California Green Building Standards Code (CALGreen) requires, at a minimum, that new buildings and renovations in California meet certain design standards. New residential and commercial buildings must meet certain baseline efficiency and sustainability standards. These baselines are established through locally-adopted building codes and will result in GHG reductions. Additional voluntary building code provisions, known as Tier 1 and Tier 2 requirements, can be adopted locally, providing even greater energy savings and emissions reductions.

The Water Conservation Bill, known as SB X7-7, requires the State to reduce urban per capita water use 20% by 2020. Regional Urban Water Management Plans provide strategies and create incentives to achieve these targets, but local implementation strategies vary, and consumer participation is necessary to realize water use reductions. Local implementation strategies typically include tiered pricing or water budget-based (i.e., pricing water according to the amount consumed); water-efficient landscape requirements for water and irrigation management, planting location, and plant materials; and incentives where some utilities pay for turf grass removal and replacement with efficiently-irrigated landscaping.

Regional programs are those developed or administered at a level of government above the local jurisdiction but below the State. These programs often are more responsive to local context than statewide programs. They require local participation but do not require local administration to achieve GHG reductions.

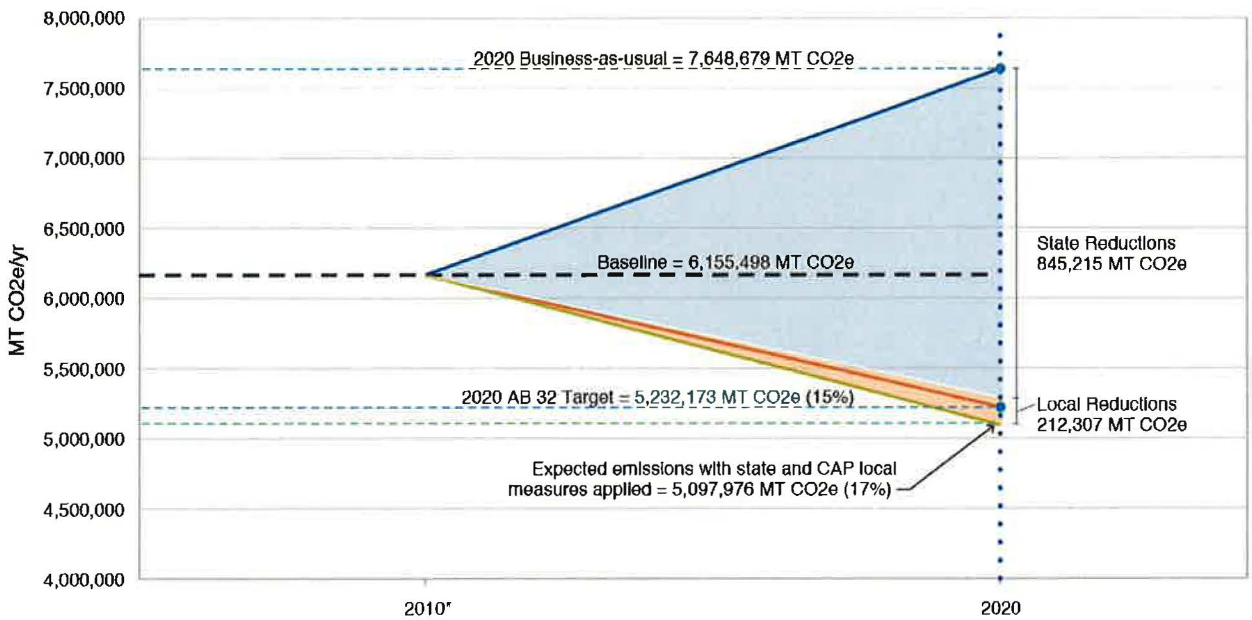
The WRCOG HERO Program, described in Chapter 1, is a regionally-administered program that offers financing options for home and business owners to retrofit or install energy-efficient, water conservation, and/or renewable energy generating products. This program is voluntary and therefore also up to individuals to implement, but regional administration lowers the burden to local governments and has already led to demonstrable reductions in the subregion since the HERO Program's inception in 2011.

WRCOG also administers the TUMF Program. The TUMF Program establishes a funding source to mitigate the cumulative regional transportation impacts of new development on regional arterials. TUMF fees are collected locally, and WRCOG works with its member agencies to identify priority projects to fund using fee revenues in order to reduce subregional transportation impacts caused by development. Facilitating movement on roads, by encouraging non-motorized transportation, increasing access to transit, or easing congestion on critical roadways may lead to GHG reductions. Therefore, TUMF can fund projects that meet this objective. Because the project relies on locally-collected fees, available funding depends on the economic vitality and development opportunities in the region.

A number of other transportation-related programs and projects under the primary control of the Riverside Transit Agency (RTA), Riverside County Transportation Commission (RCTC), California Department of Transportation (Caltrans), and other transportation entities can be implemented to reduce GHG emissions. The long-term planning of major transportation infrastructure is not under the participating jurisdictions' direct control; however, subregional jurisdictions participate in transportation planning decisions in a way that benefits the subregion. Local jurisdictions are in direct control of land uses, which can dictate how future transit is shaped. Individuals also play an important role in how they choose to move throughout the subregion; therefore, while individual jurisdictions do not implement these programs, local input is critical to the success of these programs. Additional projects anticipated to result in GHG reductions include California High Speed Rail, Metrolink expansion, express lanes, congestion pricing, goods movement, high frequency transit service, and electric vehicle infrastructure implementation.

Through federal, state, and regional measures implemented at the subregion level, participating jurisdictions can reduce 2020 emissions by 1,980,815 $MTCO_2e$, representing 78% of the subregion's 2020 reductions, as illustrated in **Figure 3-1**.

Figure 3-1: WRCOG Subregion–GHG Reductions Achieved through State, Regional, and Local Measures



*2010 is used as baseline year for all jurisdictions except for the cities of Eastvale and Jurupa Valley, as noted previously.

LOCAL EMISSIONS REDUCTIONS

While federal, state, and regional measures are critical to meet emission reduction goals, choices made by each local government, resident, and business owner will determine the subregion's ability to achieve the overall emissions reduction target. Through outreach campaigns, incentives, zoning changes, and ordinances, local communities can achieve additional reductions identified in this CAP.

Reduction measures are organized into major economic sectors, similar to the emissions inventory:

- Energy – including electricity and natural gas consumption
- Transportation and Land Use
- Water
- Waste

Each measure is described using the following information.

MEASURE DESCRIPTION

A general description of each measure is provided along with the implementing actions that constitute the Silver, Gold, or Platinum level that each participating jurisdiction will take to implement the measure. Jurisdictions are listed by level of participation.

What is a metric ton of CO_2e?

GHG emissions are reported as metric tons (MT) of CO_2e. Emitting 1 MT CO_2e is equal to the following:

- **102 gallons of gasoline**
- **41 propane cylinders used for home barbecues**
- **One month's worth of energy used in a house**

In contrast, reducing 1 MT CO_2e would require:

- **Growing 25 tree seedlings for 10 years**
- **Recycling 600 pounds of waste instead of throwing it away**

Note: Equivalencies are approximate and are adapted from: http://www.epa.gov/cleanenergy/energy-resources/calculator.html

GHG REDUCTIONS

The GHG reduction potential of each measure is quantified based on the assumption that past trends would continue into the future (e.g., energy consumption, VMT) and standard methods and assumptions recommended by the State (e.g., CAPCOA 2010)[1]. For voluntary programs, the level of participation anticipated by each jurisdiction was developed using case studies and evidence of success with similar programs.

PROGRESS METRICS

Monitoring emissions and reporting reductions will be necessary to validate the success of the measures or to identify measures that are not achieving anticipated reductions. Metrics for monitoring progress are provided for individual measures, although jurisdictions are also encouraged to work with WRCOG to re-inventory local government and community-wide emissions to demonstrate progress.

[1] California Air Pollution Control Officers Association Report titled Quantifying Greenhouse Gas Mitigation Measures (CAPCOA), 2010

COMMUNITY BENEFITS

CAP measures often have benefits that go beyond reducing GHG emissions. Many measures will improve public health by encouraging walking and biking or reducing air pollution; increase economic potential of the subregion by providing development and retrofitting incentives; reduce energy use and lower utility bills; preserve natural resources by consuming and wasting less; and increase mobility through alternative transportation measures. The following icons are used to identify co-benefits that jurisdictions can achieve by implementing local GHG reduction measures.

Energy Health Economy Resources Mobility

STATE AND REGIONAL MEASURES

Table 3-1 lists the state and regional measures included in the Subregional CAP and provides a breakdown of the GHG reduction potential for these measures.

Table 3-1: 2020 Reductions Achieved Through State and Regional Measures

State and Regional Measures by Sector		2020 (MT CO_2e/yr)
SR-1	Renewables Portfolio Standard	434,606
SR-2	2013 California Building Energy Efficiency Standards (Title 24, Part 6)	30,923
SR-3	HERO Residential Program	71,649
SR-4	HERO Commercial Program	10,079
SR-5	Utility Programs	9,182
SR-6	Pavley & Low Carbon Fuel Standard	1,095,555
SR-7	Metrolink Expansions	23,074
SR-8	Express Lanes	60,864
SR-9	Congestion Pricing	3,246
SR-10	Telecommuting	40,576
SR-11	Goods Movement	22,688
SR-12	Electric Vehicle Plan and Infrastructure	81,152
SR-13	Construction and Demolition Waste Diversion	3,574
SR-14	Water Conservation and Efficiency	23,192
TOTAL STATE AND REGIONAL REDUCTIONS		1,910,361

Note: Total may not add up due to rounding.

STATE AND REGIONAL ENERGY MEASURES

The following are state and regional measures that are expected to reduce GHG emissions associated with the energy sector.

Measure SR-1: Renewables Portfolio Standard

Utilities must secure 33% of their power from renewable sources.

2020 GHG Reduction Potential: 434,606 MT CO_2e/yr

Through a series of increasingly stringent bills first enacted in 2002, California has placed requirements on electric utilities to procure a portion of their energy from renewable sources. The standard, known as the Renewables Portfolio Standard (RPS), applies to investor-owned utilities, publicly-owned utilities, electricity service providers, and community choice aggregators. Therefore, all electricity-providing utilities in Western Riverside (SCE, Riverside Utility and Banning Utility) must meet these targets:

- 20% of retail sales from renewables by 2013
- 25% of retail sales from renewables by 2016
- 33% of retail sales from renewables by 2020

Meeting these goals will likely lead to reduced emissions associated with electricity, as more electricity will be generated by less carbon-intensive sources.

Community Benefits

Measure SR-2: 2013 California Building Energy Efficiency Standards (Title 24, Part 6)

Mandatory energy efficiency standards for buildings.

2020 GHG Reduction Potential: 30,923 MT CO_2e/yr

Building energy efficiency standards are designed to ensure new and existing buildings achieve energy efficiency and preserve outdoor and indoor environmental quality. These measures (Title 24, Part 6) are listed in the California Code of Regulations. These standards began in 1978 and are updated every 5 years. The 2013 standards differ from the 2008 standards by requiring usage of less energy for lighting, heating, cooling, ventilation, and water heating. Buildings are also required to be solar-ready, allowing for easier and less expensive installation of photovoltaic or solar thermal panels in the future. The California Energy Commission estimates that the 2013 standards will result in residential construction that is 25% more efficient and nonresidential construction that is 30% more efficient than the 2008 standards. The new standards go into effect on July 1, 2014 and as the industry moves toward the goal of net-zero energy, even greater energy and GHG savings may be achieved over time.

Community Benefits

Measure SR-3: HERO Residential Program

Financing for homeowners to make energy efficient, renewable energy, and water conservation improvements.

2020 GHG Reduction Potential: 71,649 MT CO_2e/yr

The HERO Program is a public-private partnership administered by WRCOG, offering financing to homeowners in the subregion for the installation of energy efficient, renewable energy, and water conservation improvements. This property assessed clean energy (PACE) financing program offers a continually expanding list of eligible products for financing and an ever-growing cadre of trained contractors who can assist property owners with selecting and installing eligible products. Products eligible for HERO Financing include, but are not limited to:

- Energy audits
- Insulation of attics, floors, walls, and home perimeter
- Lighting upgrades
- Drip and weather-based irrigation systems
- Rainwater catchment systems
- Pool pumps and heaters
- Energy-efficient windows
- Solar PV panels
- Air sealing and weatherization
- Cool roof system
- Cool wall coatings

This award-winning program is offered to eligible property owners in the WRCOG subregion who wish to participate.

WRCOG's Residential Program partner, Renovate America, collects data regarding participation, energy savings, renewable energy installation, job creation, and economic development by jurisdiction in the subregion. WRCOG will continue to partner with Renovate America to track ongoing participation and energy savings on a monthly or annual basis. Emissions reduction estimates for this CAP were calculated based on program participation assumptions developed by Renovate America. Since its inception in 2011, the HERO program has funded more than $135 million worth of eligible projects, and created more than 1,000 jobs. The program's growth has led to energy savings, GHG reductions, water conservation, and local job creation in each of its participating communities. The HERO program has also been an award-winning model for other PACE programs, earning recognition from various industry organizations including the Southern California Association of Governments, the U.S. Green Building Council, the Urban Land Institute, and the Governor of California.

Community Benefits

Measure SR-4: HERO Commercial Program

Financing for business owners to make energy efficient, renewable energy, and water conservation improvements.

2020 GHG Reduction Potential: 10,079 MT CO_2e/yr

The HERO Program is a public-private partnership administered by WRCOG, offering financing to business owners in the subregion for the installation of energy efficient, renewable energy, and water conservation improvements. This PACE financing program offers a continually expanding list of eligible products for financing and an ever-growing cadre of trained contractors who can assist property owners with selecting and installing eligible products. Products eligible for HERO Financing include, but are not limited to:

- Energy audits
- Insulation of attics, floors, walls, and home perimeter
- Lighting upgrades
- Drip and weather-based irrigation systems
- Rainwater catchment systems
- Pool pumps and heaters
- Energy-efficient windows
- Solar PV panels
- Air sealing and weatherization
- Cool roof system
- Cool wall coatings

This award-winning program is offered to eligible property owners in the WRCOG subregion who wish to participate.

Community Benefits

Measure SR-5: Utility Programs

Financing for business owners to make energy efficient, renewable energy, and water conservation improvements.

2020 GHG Reduction Potential: 9,182 MT CO_2e/yr

Southern California Edison (SCE), Southern California Gas Company (SCG), Riverside Public Utilities (RPU), and the Banning Electric Utility (BEU) provide energy to customers in the subregion. Each utility offers rebate programs to reduce energy consumption, which in turn, reduces local GHG emissions. The utilities offer a selection of rebates and other incentives to assist property owners (residential and commercial) with the installation of energy- and water-saving products. The following list provides a sample of programs and indicates which utilities are currently offering:

- ENERGY STAR™ appliance rebates – SCE, SCG, RPU, BEU
- Light bulb discounts – SCE
- Solar rebates – SCE, RPU
- Low-income programs – SCE, SCG, RPU, BEU
- Shade trees – RPU, BEU

Note: Some programs may have funding cycle and annual rebate limits; check with your local utility for up-to-date information regarding specific rebates.

These utility programs are provided to customers throughout the subregion and are managed at the discretion of each participating utility. Therefore, they do not have tiered implementation actions.

Community Benefits

STATE AND REGIONAL TRANSPORTATION MEASURES

The following are state and regional measures that are expected to reduce GHG emissions associated with the transportation sector.

Measure SR-6: Pavley and Low Carbon Fuel Standard

Requirements for vehicles to use cleaner fuels.

2020 GHG Reduction Potential: 1,095,555 MT CO_2e/yr

In 2002, California adopted AB 1493, referred to as "Pavley I", which directed CARB to develop fuel-efficiency standards for passenger vehicles in California by 2005. Through a series of rulings, CARB and the federal government agreed on federal standards that began in 2009 and increase through 2016. CARB and the federal government are currently finalizing fuel-efficiency standards that continue to become increasingly-stringent from 2017 through 2025. Building from Pavley 1, Executive Order S-1-07, known as the Low Carbon Fuel Standard (LCFS), requires the carbon-intensity of California's transportation fuel to be reduced by at least 10% by 2020.

Community Benefits

Measure SR-7: Metrolink Expansion

Additional Metrolink transit service provided to Western Riverside County.

2020 GHG Reduction Potential: 23,074 MT CO_2e/yr

Identified in SCAG's 2012 RTP/SCS, the Metrolink Perris Valley Line will be extended from Riverside to Perris in Western Riverside County, allowing for alternative transportation, reducing VMT and GHG emissions in Western Riverside County. Service along this route is expected to begin in 2015.

Community Benefits

Measure SR-8: Express Lanes

Additional express lanes added along major freeways in Western Riverside County.

2020 GHG Reduction Potential: 60,864 MT CO_2e/yr

SCAG's analysis of critical corridors found inter-county trips account for over 50% of all trips. Ongoing congestion issues—and therefore increased idle time and GHG emissions—have led to SCAG proposing increasing the network of express lanes that connect counties, including Riverside County. Extension of express lanes along State Route-91 (SR-91) and Interstate-15 (I-15) would be operational by 2017 and 2020 respectively, and would lead to reduced congestion according to regional transportation modeling. The SR-91 extension project is currently under construction. The I-15 Toll Express Lanes from State Route-60 (SR-60) to Cajalco Road has entered the preliminary engineering phase, and the anticipated opening year is 2020.

Community Benefits

Measure SR-9: Congestion Pricing

Additional express lanes added along major freeways in Western Riverside County.

2020 GHG Reduction Potential: 3,246 MT CO_2e/yr

Transportation demand management (TDM) consists of methods used to encourage transportation other than single-occupancy vehicle travel at peak traffic times. TDM strategies and are generally categorized as "soft" or "hard" strategies. Soft mechanisms are incentive-based and include:

- Increasing the availability and use of carpooling, vanpooling, transit, bicycling, and walking;
- Shifting work schedules to non-peak periods or locations; and
- Using telecommuting.

Congestion pricing is a TDM tool examined by SCAG through its Express Travel Choices Study. Pricing mechanisms may include toll lanes/roads or mileage-based user fees, which discourage automobile traveling by increasing travel costs. Currently an expansion of the toll lanes on SR-91 is planned to continue these toll lanes through Corona and into Riverside.

The effectiveness of congestion pricing reflects the regional share of VMT reduction associated with this strategy, in addition to local actions. This approach accounts for the high degree of out-commuting that currently occurs in Western Riverside County as residents travel to jobs in Los Angeles, San Bernardino, and Orange Counties. Since many TDM strategies will be implemented at employment locations instead of residential locations, a separate accounting is needed in addition to the jurisdiction-specific TDM strategies identified in this Subregional CAP.

Community Benefits

Measure SR-10: Telecommuting

Additional express lanes added along major freeways in Western Riverside County.

2020 GHG Reduction Potential: 40,576 MT CO_2e/yr

Telecommuting is a soft TDM mechanism that has increased considerably over the past decade. According to SCAG, telecommuting could increase even more by 2020 (to 5% of workers in the region) and 2035 (to 10% of workers), from the current 2.6% that currently telecommute. By telecommuting, GHG emissions associated with vehicles no longer on the road are reduced, as are idling or congestion-related emissions from vehicles remaining on the road. Similar to **Measure SR-9: Congestion Pricing**, this strategy reflects the regional share of TDM strategies that may be implemented on a regional level given the high degree of out-commuting that occurs in Western Riverside County.

Community Benefits

Measure SR-11: Goods Movement

Efficient movement of goods through inland Southern California.

2020 GHG Reduction Potential: 22,688 MT CO_2e/yr

Southern California is a major hub for importing and exporting goods. SCAG estimates that over $2 trillion in cargo was moved across the region in 2010 alone, much of which travels through inland Southern California, including Western Riverside County. However, the many warehouses and distribution facilities employ non-passenger vehicles that contribute to GHG emissions. At the state level, more standards are being implemented to increase vehicle efficiencies and the 2012 RTP/SCS and AQMD are supporting greater penetration of low-emission trucks in the region. While goods will continue to be moved to support local and regional economies, electrification and other low-emission technologies installed in vehicles can reduce the GHG emissions of goods movement. The GHG reductions estimated here account for the region's "share" of SCAG and AQMD's anticipated investments and the effect of the investment on GHG emissions. These investments include both policies as well as physical improvements such as "truck climbing" lanes on State Route-60 (SR-60), funded by RCTC.

Community Benefits

Measure SR-12: Electric Vehicle Plan and Infrastructure

Facilitate electric vehicle use by providing necessary infrastructure.

2020 GHG Reduction Potential: 81,152 MT CO_2e/yr

SCAG has developed a regional plug-in electric vehicle (PEV) readiness plan, and WRCOG has a similar subregional plan for PEV readiness. Together, these plans identify viable locations for charging stations, changes to development codes, and other strategies to encourage the purchase and use of electric vehicles. PEV chargers are already being installed in the WRCOG subregion. Through these plans and outreach efforts, alternative-fuel vehicles will be promoted as one strategy to reduce GHG emissions associated with passenger vehicles. This measure is anticipated to reduce nearly 82,000 MT CO_2e in participating jurisdictions by 2020.

Community Benefits

STATE SOLID WASTE MEASURE

The following state measure is expected to reduce GHG emissions associated with the solid waste sector.

Measure SR-13: Construction & Demolition Waste Diversion

Mandatory requirement to divert 50% of construction and demolition waste from the landfill waste stream.

2020 GHG Reduction Potential: 3,574 MT CO_2e/yr

Recycling construction and demolition materials reduces GHG emissions by removing material from landfills that would otherwise generate methane. Construction and demolition (C&D) waste recycling also may reduce the need to harvest and transport new raw construction materials, as recycled materials can be locally repurposed and reused. For growing areas like the WRCOG subregion, C&D waste accounts for a significant portion of the waste stream.

Effective July 1, 2012, CALGreen, the state's Green Building Standards Code, requires jurisdictions to divert a minimum of 50% of their nonhazardous C&D waste from landfills.

Community Benefits

STATE AND REGIONAL WATER MEASURES

The following state measure is expected to reduce GHG emissions associated with the water sector.

Measure SR-14: Water Conservation and Efficiency

State requirement to reduce urban per capita water use.

2020 GHG Reduction Potential: 23,192 MT CO_2e/yr

SB X7-7 is part of a California legislative package passed in 2009 that requires urban retail water suppliers to reduce per-capita water use by 10% from a baseline level by 2015, and to reduce per-capita water use by 20% by 2020. In Southern California, energy costs and GHG emissions associated with the transport, treatment, and delivery of water from outlying regions are high. Therefore, the region has extra incentive to reduce water consumption. While this is considered a state measure, it will be up to the local water retailers, jurisdictions, and water users to meet these targets. A number of policies have been established at the local level within the subregion requiring more efficient use of water, including landscape ordinances that require native or low-irrigation landscaping. Water retailers also offer resources that incentivize purchase of high-efficiency appliances and provide information on best management practices, landscaping, and the use of recycled and gray water systems.

Community Benefits

LOCAL REDUCTION MEASURES

Table 3-2 lists the local measures included in the Subregional CAP and provides a breakdown of the GHG reduction potential for these local measures.

Table 3-2: 2020 Reductions Achieved from Local Measures

Local Measures by Sector		2020 Reductions Achieved (MT CO_2e/yr)
E-1	Energy Action Plans	357,581
E-2	Traffic and Street Lights	4,697
E-3	Shade Trees	2,014
Energy Subtotal		***364,292***
T-1	Bicycle Infrastructure Improvements	29,255
T-2	Bicycle Parking	6,290
T-3	End of Trip Facilities	1,836
T-4	Promotional Transportation Demand Management	1,831
T-5	Transit Service Expansion	704
T-6	Transit Frequency Expansion	2,723
T-7	Traffic Signal Coordination	94,600
T-8	Density	2,857
T-9	Mixed-Use Development	4,069
T-10	Design/Site-Planning	912
T-11	Pedestrian Only Areas	2,812
T-12	Limited Parking Requirements for New Development	28,423
T-13	High Frequency Transit Services	1,801
T-14	Voluntary Transportation Demand Management	2,464
T-15	Accelerated Bike Plan Implementation	5,340
T-16	Fixed Guideway Transit	10,489
T-17	Neighborhood Electric Vehicle Programs	4,707
T-18	Subsidized Transit	3,628
Transportation Subtotal		***204,744***
SW-1	Yard Waste Collection	1,007
SW-2	Food Scrap and Paper Diversion	155
Solid Waste Subtotal		***1,162***
TOTAL LOCAL ACTION REDUCTIONS		**570,199**

LOCAL ENERGY MEASURES

The following are local measures that can be implemented to reduce GHG emissions associated with the energy sector. As described in Chapter 1, at the time this CAP was developed 11 jurisdictions were participating in the Western Riverside Energy Leader Partnership (WRELP) Program, which includes the development of municipal and community-wide Energy Action Plans (EAPs) for these jurisdictions (**Table 1-1**). Measure E-1 includes the aggregate total GHG reduction potential for the 11 WRELP jurisdictions implementing the EAPs, while Measures E-2 and E-3 describe the GHG reduction potential from energy strategies implemented by the 4 jurisdictions included in this Subregional CAP that were not WRELP jurisdictions at the time of this CAP development.

Measure E-1: Energy Action Plans

Improve municipal and community-wide energy efficiency and reduce energy consumption through the adoption of local Energy Action Plans (EAP).

2020 GHG Reduction Potential: 357,581 MT CO_2e/yr

In 2011, Southern California Edison (SCE) provided funding to WRCOG to implement the California Long-Term Energy Efficiency Strategic Plan (CEESP) developed by the California Energy Commission. WRCOG and 11 participating jurisdictions established the WRELP Program and adopted energy efficiency targets and programs to meet those targets, which will reduce utility costs and GHG emissions associated with the energy use at the municipal and community level (**Table 1-1**). These targets and actions are captured in each jurisdiction's EAP. The EAPs use a similar approach to that described in this CAP, but only address emissions and GHG reductions associated with the energy sector. The CAP contains similar energy-efficiency actions for non-EAP jurisdictions.

By implementing the proposed efficiency measures, jurisdictions demonstrate the potential economic, social, and environmental benefits of increasing energy efficiency and providing environmental stewardship within the community.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
This measure does not include tiered implementation actions. Each WRELP jurisdiction has individual energy-conserving measures and actions in its EAP. Energy sector reductions anticipated in each jurisdiction's EAP are captured within this local CAP measure, and will be tracked and reported in conjunction with the measures proposed within the CAP for non-WRELP jurisdictions.		357,581

PROGRESS INDICATORS	YEAR
1 Each WRELP jurisdiction has received a tracking and monitoring tool, which identifies the jurisdiction's energy usage projections and goals, and provides a user-friendly workbook to evaluate emissions annually. Each jurisdiction has its own monitoring tool, but the assumptions used are consistent across all tools in the subregion and can be aggregated for subregional monitoring and reporting.	2020

Measure E-2: Traffic and Street Lights

Replace traffic and street lights with high-efficiency bulbs.

2020 GHG Reduction Potential: 4,697 MT CO_2e/yr

Similar to many household light fixtures, traffic lights are typically illuminated with inefficient incandescent bulbs. Street lights commonly use high-pressure sodium (HPS) bulbs, which also produce light inefficiently. Newer lighting technology, such as light-emitting diodes (LEDs), last significantly longer than traditional incandescent or HPS bulbs, and use much less energy to perform the same task. Jurisdictions can install LEDs in their traffic signals and upgrade street light fixtures to accommodate LEDs or other high-efficiency bulbs to lower municipal utility costs and reduce maintenance costs associated with bulb replacement.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	100% of traffic and street lights converted to high-efficiency bulbs by 2020. Banning, Jurupa Valley, Riverside	4,697
GOLD LEVEL	75% of traffic and street lights converted to high-efficiency bulbs by 2020. No jurisdictions participating at this level.	0
SILVER LEVEL	50% of traffic and street lights converted to high-efficiency bulbs by 2020. No jurisdictions participating at this level.	0

	PROGRESS INDICATORS	YEAR
1	Banning: 1.02 million kWh/year in savings from Freeway Lighting and Streetlights subsectors of Local Government GHG Inventory. (Appendix X)	2020
2	Jurupa Valley: 11,000 kWh/year in savings from Streetlights subsector of Local Government GHG Inventory. (Appendix X)	2020
3	Riverside: 1.26 million kWh/year in savings from Streetlights and Traffic Signals/Controllers subsector of Local Government GHG Inventory. (Appendix X)	2020

Community Benefits

Measure E-3: Shade Trees

Strategically plant trees to reduce the urban heat island effect.

2020 GHG Reduction Potential: 2,014 MT CO_2e/yr

Planting additional trees in urban environments has a number of benefits, including lowering peak-load energy demands during the hottest months, enhancing the visual aesthetic of a community, and naturally sequestering carbon dioxide. Properly selected and located shade trees can help keep indoor temperatures low, thereby reducing air conditioner demands and utility costs. Trees can also provide shade for parking lots and other paved areas, reducing the urban heat island effect communitywide.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Shade trees are required for all new development or redevelopment. Eastvale, Jurupa Valley	638
GOLD LEVEL	Subsidized program to support planting jurisdiction-identified shade tree species. Banning, Riverside	1,376
SILVER LEVEL	Outreach program to promote the benefits of planting additional trees in urban environments. No jurisdictions participating at this level.	0

PROGRESS INDICATORS		YEAR
1	Banning: 4,300 new shade trees by 2020	2020
2	Eastvale: 12,400 new shade trees by 2020	2020
3	Jurupa Valley: 20,000 new shade trees by 2020	2020
4	Riverside: 62,900 new shade trees by 2020	2020

Community Benefits

LOCAL TRANSPORTATION MEASURES

The following are local measures that can be implemented to reduce GHG emissions associated with the transportation sector.

Measure T-1: Bicycle Infrastructure Improvements

Expand on-street and off-street bicycle infrastructure, including bicycle lanes and bicycle trails.

2020 GHG Reduction Potential: 29,255 MT CO_2e/yr

By providing more bicycle lanes and better connections between existing bicycle lanes, WRCOG jurisdictions can increase the viability of bicycling as an emission-free commute option. Several WRCOG jurisdictions have adopted or are preparing bicycle master plans. Implementing these plans will increase alternative transportation options in the sub-region and can reduce vehicle miles traveled and congestion for vehicles. Community health benefits from increased bicycling include improved air quality and exercise.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Implement a 50% increase in bicycle lane mileage from baseline levels. Riverside	15,905
GOLD LEVEL	Implement a 25% increase in bicycle lane mileage from baseline levels. No participating jurisdictions at this level.	0
SILVER LEVEL	Implement a 10% increase in bicycle lane mileage from baseline levels. Banning, Canyon Lake, Eastvale, Hemet, Jurupa Valley, Norco, Perris, San Jacinto, Temecula, Wildomar	13,350

PROGRESS INDICATORS		YEAR
1	Annual percentage increase in bicycle lane mileage from baseline levels.	2020

Community Benefits

Measure T-2: Bicycle Parking

Provide additional options for bicycle parking.

2020 GHG Reduction Potential: 6,290 MT CO_2e/yr

Safe and convenient bicycle parking is a relatively low-cost action that leads to a demonstrated shift from automobile use to bicycle use. Helping business owners understand the potential benefits of bicycle parking and requiring new development projects to include bike racks as a condition of approval can facilitate implementation of this measure.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Amend zoning to require provision of bike parking for all multi-family or mixed-use projects consisting of a mix of residential, retail, and office space. Calimesa, Canyon Lake, Eastvale, Hemet, Jurupa Valley, Norco, Perris, Riverside, San Jacinto, Temecula, Wildomar	6,152
GOLD LEVEL	Amend zoning to require provision of bike parking for multi-family projects consisting of more than 50 dwelling units, and mixed-use projects greater than 50,000 square feet consisting of a mix of residential, retail, and office space. Banning	138
SILVER LEVEL	Provide information to applicants for large development projects describing the benefits of bike parking. No jurisdictions participating at this level.	0

PROGRESS INDICATORS	YEAR
1 Annual number of new bike parking spaces installed.	2020

Community Benefits

Measure T-3: End of Trip Facilities

Encourage use of non-motorized transportation modes by providing appropriate facilities and amenities for commuters.

2020 GHG Reduction Potential: 1,836 MT CO_2e/yr

End-of-trip commuter facilities further incentivize alternative transportation modes, such as walking and biking. Such facilities commonly include showers, changing rooms, lockers, and bike racks.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Amend zoning to require installation of end-of-trip facilities for new commercial buildings greater than 50,000 square feet. Riverside	1,119
GOLD LEVEL	Amend zoning to require installation of end-of-trip facilities for new commercial buildings greater than 100,000 square feet. Banning, Jurupa Valley, Perris	391
SILVER LEVEL	Provide information to commercial project applicants describing the benefits of installing end-of-trip facilities. Calimesa, Canyon Lake, Eastvale, Hemet, San Jacinto, Temecula, Wildomar	326

PROGRESS INDICATORS		YEAR
1	Annual number of development projects installing end-of-trip facilities.	2020

Community Benefits

Measure T-4: Promotional Transportation Demand Management

Encourage Transportation Demand Management strategies.

2020 GHG Reduction Potential: 1,831 MT CO_2e/yr

Transportation demand management (TDM) describes strategies to reduce demand for roadway travel, particularly in single-occupancy vehicles. TDM strategies can include both "carrot" and "stick" approaches to change travel behavior patterns. Specific examples include preferential parking for carpoolers and parking pricing.

While SCAG offers regional approaches such as high-occupancy vehicle lanes, this measure focuses on efforts by individual existing business owners in the WRCOG sub-region to develop TDM strategies, such as parking "cash out" programs and allowing telecommuting. Several TDM strategies can be offered; often, multiple programs can enhance one another rather than being redundant. In addition to reducing GHG emissions, TDM strategies often ease congestion and improve air quality.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Allocate a full-time staff person to promote TDM strategies to existing businesses. No jurisdictions participating at this level.	0
GOLD LEVEL	Allocate the equivalent of ½ of a full- time staff person to promote TDM strategies to existing businesses. No jurisdictions participating at this level.	0
SILVER LEVEL	Train an existing staff person to promote TDM strategies to existing business. Eastvale, Hemet, Jurupa Valley, Norco, Riverside	1,831

	PROGRESS INDICATORS	YEAR
1	Number of jurisdictions with full-time or part-time staff promoting TDM programs to be established through an annual survey conducted by WRCOG.	2020

Community Benefits

Measure T-5: Transit Service Expansion

Collaborate with local and regional transit providers to increase transit service provided in the subregion.

2020 GHG Reduction Potential: 704 MT CO_2e/yr

It will be crucial for jurisdictions anticipating growth to coordinate with the Riverside Transit Agency (RTA) and Banning Pass Transit to appropriately expand service. Several jurisdictions have identified a need for additional transit service and are working with RTA to identify critical investments to maximize ridership. Increased transit ridership improves air quality as fewer single-occupancy vehicles use the roadways, improves traffic flow for remaining vehicles, and offers mobility to low-income and other disadvantaged communities. Information related to this measure may be updated upon completion of the RTA Forward 10-Year Transit Plan, a comprehensive operational analysis that will guide RTA's bus route and service decisions in future years.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Work with RTA to increase fixed-route service miles by 20% by 2020. No jurisdictions participating at this level.	0
GOLD LEVEL	Work with RTA to increase fixed-route service miles by 10% by 2020. Eastvale, Norco	324
SILVER LEVEL	Work with RTA to increase fixed-route service miles by 5% by 2020. Banning, Jurupa Valley, Temecula, Wildomar	380

PROGRESS INDICATORS	YEAR
1 Annual miles of fixed-route service provided by RTA	2020

Community Benefits

Measure T-6: Transit Frequency Expansion

Collaborate with local and regional transit providers to provide more frequent transit in the subregion.

2020 GHG Reduction Potential: 2,723 MT CO_2e/yr

Future annual transit ridership is expected to grow by 3.5% across the nation, and many transportation systems are already operating beyond their capacity (APTA 2010). In addition to expanding service, transit agencies will need to increase service frequency by reducing headways or the time between buses on existing routes. . WRCOG jurisdictions are working with RTA and Banning Pass Transit to share information regarding anticipated land development patterns and to maximize service frequency investments. Similar to transit service expansion, this measure provides air quality and mobility co-benefits by reducing the number of single-occupancy vehicles on the road. Information related to this measure may be updated upon completion of the RTA Forward 10-Year Transit Plan, a comprehensive operational analysis that will guide RTA's bus route and service decisions in future years. This measure differs from T-5 in that it considers service improvements along existing routes.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Work with RTA to increase fixed-route service frequency by 20% over baseline levels in transit priority areas as defined by SCAG in the RTP/SCS. Perris	698
GOLD LEVEL	Work with RTA to increase fixed-route service frequency by 10% over baseline levels in transit priority areas as defined by SCAG in the RTP/SCS. Eastvale	241
SILVER LEVEL	Work with RTA to increase fixed-route service frequency by 5% over 2010 levels in transit priority areas as defined by SCAG in the RTP/SCS. Banning, Jurupa Valley, Norco, Temecula, Wildomar	1,784

	PROGRESS INDICATORS	YEAR
1	Percentage change in average annual fixed-route service frequency in transit priority areas compared to baseline levels.	2020

Community Benefits

Measure T-7: Traffic Signal Coordination

Incorporate technology to synchronize and coordinate traffic signals along local arterials.

2020 GHG Reduction Potential: 94,600 MT CO_2e/yr

Traffic signal coordination describes a method of timing groups of traffic signals along an arterial to provide smooth movement of traffic with minimal stops. This technique reduces motorist stops and delays, lowers the amount of fuel need to move a certain distance, and reduces GHG emissions. Signal coordination also lessens congestion and resulting tail pipe emissions, which reduces GHG emissions and improves air quality.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Coordinate traffic signals on an additional 50% of arterial roads which were not coordinated in the base year. Canyon Lake, Perris, Riverside, Temecula	78,318
GOLD LEVEL	Coordinate traffic signals on an additional 25% of arterial roads which were not coordinated in the base year. Banning, Hemet, San Jacinto	10,131
SILVER LEVEL	Coordinate traffic signals on an additional 10% of arterial roads which were not coordinated in the base year. Eastvale, Jurupa Valley, Wildomar	6,151

PROGRESS INDICATORS	YEAR
1 Annual percentage of arterial roads with signal coordination which were not coordinated in the base year.	2020

Community Benefits

Measure T-8: Density

Improve jobs-housing balance and reduce vehicle miles traveled by increasing household and employment densities.

2020 GHG Reduction Potential: 2,857 MT CO_2e/yr

Density describes the number of people, jobs, or housing units in a given area. Increasing density generally results in shorter distances between locations, making transit and non-motorized transportation options such as walking and biking more viable. GHG emissions associated with vehicle miles traveled (VMT) are reduced as more individuals choose alternative transportation modes. Increases in density must generally fit within assumptions of a jurisdiction's General Plan, although amendments can be made to increase density in certain areas.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Achieve a 25% increase in community-wide household and employment density over baseline conditions by 2020. No jurisdictions participating at this level.	0
GOLD LEVEL	Achieve a 10% increase in community-wide household and employment density over baseline conditions by 2020. Perris, Riverside, Temecula	2,054
SILVER LEVEL	Achieve a 5% increase in community-wide household and employment density over baseline conditions by 2020. Eastvale, Hemet, Jurupa Valley, Norco, San Jacinto, Wildomar	803

PROGRESS INDICATORS	YEAR
1 Annual percentage change in community-wide household and employment density compared to baseline conditions	2020

Community Benefits

Measure T-9: Mixed-Use Development

Provide for a variety of development types and uses.

2020 GHG Reduction Potential: 4,069 MT CO_2e/yr

Development can occur in many forms, ranging from single-family homes on large plots of land to multi-family housing with high vertical construction for residential areas, and single-use to multi-use zoning for commercial properties. While land development choices are typically made at the household or business level, recent studies show that individuals are more frequently demanding higher-density, multi-use regions that are more walkable. Most WRCOG jurisdictions have identified portions of their communities where future higher-density development is desirable. Such development reduces both VMT and GHGs, as individuals can accomplish many tasks in a single mixed-use area. This also can improve community health by encouraging bicycling and walking, improve air quality by reducing tailpipe emissions, and increase the community's sense of place.

For the WRCOG subregion, mixed-use development is classified as having at least three of the following features either on-site or within ¼ mile:

- Residential development;
- Retail development;
- Park;
- Open space; or
- Office.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Achieve a 25% jobs/housing ratio improvement over baseline conditions. Eastvale, Jurupa Valley	1,897
GOLD LEVEL	Achieve a 10% jobs/housing ratio improvement over baseline conditions. Hemet, Perris	764
SILVER LEVEL	Achieve a 5% jobs/housing ratio improvement over baseline conditions Banning, Norco, Riverside, Temecula, Wildomar	1,408

PROGRESS INDICATORS	YEAR
1 Annual percentage change in jobs/housing ratio within new development areas compared to baseline conditions.	2020

Community Benefits

Measure T-10: Design/Site Planning

Design neighborhoods and sites to reduce VMT.

2020 GHG Reduction Potential: 912 MT CO_2e/yr

The design of projects affects travel behavior. Typical suburban development patterns feature longer blocks which often discourage walking and biking. Conversely, projects with shorter blocks and more frequent intersections have higher levels of walking, biking, and transit use. This higher use of non-motorized and alternative modes leads to a reduction in automobile use, VMT, and GHG emissions.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	25% increase in intersection density and reduction in block length in new development compared to the baseline countywide average. No jurisdictions participating at this level.	0
GOLD LEVEL	10% increase in intersection density and reduction in block length in new development compared to the baseline countywide average. No jurisdictions participating at this level.	0
SILVER LEVEL	5% increase in intersection density and reduction in block length in new development compared to the baseline countywide average. Hemet, Perris, Temecula	912

	PROGRESS INDICATORS	YEAR
1	Annual percentage of neighborhood streets with traffic calming treatments installed.	2020

Community Benefits

Measure T-11: Pedestrian-Only Areas

Encourage walking by providing pedestrian-only community areas.

2020 GHG Reduction Potential: 2,812 MT CO_2e/yr

Also referred to as an urban non-motorized zone, a pedestrian-only area restricts certain portions of a central business district or major activity center to non-motorized transportation.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Designate one additional major activity center in the community as a permanent pedestrian-only area over baseline conditions. Perris, Riverside	1,747
GOLD LEVEL	Designate one additional pedestrian-only area during weekends over baseline conditions. No jurisdictions participating at this level.	0
SILVER LEVEL	Designate one additional pedestrian-only area during weekends tied to a special event (e.g. farmer's market) over baseline conditions. Banning, Hemet, Jurupa Valley, Norco, San Jacinto, Temecula	1,065

PROGRESS INDICATORS	YEAR
1 Annual number of temporary or permanent pedestrian-only zones compared to baseline conditions.	2020

Community Benefits

Measure T-12: Limit Parking Requirements for New Development

Reduce requirements for vehicle parking in new development projects.

2020 GHG Reduction Potential: 28,423 MT CO_2e/yr

Limiting parking requirements for new development in certain areas may encourage alternative individual transportation choices, but caution should be taken to minimize the resulting incentive to travel to more distant locations with plenty of parking. This can be accomplished by:

- Eliminating (or reducing) minimum parking requirements;
- Creating maximum parking requirements; and
- Implementing shared parking.

Limiting parking requirements would encourage modes of transportation other than single-occupancy vehicles, thereby reducing VMT and GHG emissions. If these alternative transportation modes include walking and biking, mobility and health benefits would also be realized.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Amend zoning to reduce parking requirements for new non-residential development by 25% over baseline conditions. Riverside	17,482
GOLD LEVEL	Amend zoning to reduce parking requirements for new non-residential development by 10% over baseline conditions Jurupa Valley, Perris	6,093
SILVER LEVEL	Amend zoning to reduce parking requirements for new non-residential development by 5% over baseline conditions. Canyon Lake, Hemet, Norco, Temecula, Wildomar	4,848

PROGRESS INDICATORS	YEAR
1 Number of jurisdictions which have amended their parking requirements to reduce parking spaces required within new development or redevelopment areas.	2020

Community Benefits

Measure T-13: High Frequency Transit Service

Implement high frequency transit service in the subregion to provide alternative transportation options.

2020 GHG Reduction Potential: 1,801 MT CO_2e/yr

The WRCOG subregion is one of the fastest growing areas in California. As more residents and employees occupy the area, there will be increased need to move people efficiently in and out of the area. A high frequency transit system such as bus rapid transit (BRT) would provide an alternative to constructing more roadways and allow commuters and residents additional transportation options. Jurisdictions participating in this measure have an objective to work with RTA to identify corridors where BRT service would provide an effective and logical transportation option.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Work with RTA to offer high frequency transit service within three (3) corridors No jurisdictions participating at this level.	0
GOLD LEVEL	Work with RTA to offer high frequency transit service within two (2) corridors Eastvale, Riverside	1,640
SILVER LEVEL	Work with RTA to offer high frequency transit service within one (1) corridor Hemet	161

	PROGRESS INDICATORS	YEAR
1	Number of corridors in which high frequency transit service has been implemented.	2020

Community Benefits

Measure T-14: Voluntary Transportation Demand Management

TDM describes strategies to reduce demand for roadway travel, particularly in single-occupancy vehicles. TDM strategies can include both "carrot" and "stick" approaches to change travel behavior patterns. Specific examples include preferential parking for carpoolers and parking pricing.

While SCAG offers regional approaches such as high-occupancy vehicle lanes, this measure focuses on efforts by individual existing business owners in the WRCOG subregion to develop TDM strategies, such as parking "cash out" programs and allowing telecommuting. Several TDM strategies can be offered; often, multiple programs can enhance one other rather than being redundant. In addition to reducing GHG emissions, TDM strategies often ease congestion and improve air quality.

2020 GHG Reduction Potential: 2,464 MT CO_2e/yr

Body text.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	50% of employees within the jurisdiction participate in voluntary TDM programs No jurisdictions participating at this level.	0
GOLD LEVEL	25% of employees within the jurisdiction participate in voluntary TDM programs Riverside	2,185
SILVER LEVEL	12.5% of employees within the jurisdiction participate in voluntary TDM programs Perris	279

PROGRESS INDICATORS	YEAR
1 Percentage of employees in each jurisdiction participating in voluntary TDM programs.	2020

Community Benefits

Measure T-15: Accelerated Bike Plan Implementation

Accelerate the implementation of all or specified components of a jurisdiction's adopted bike plan.

2020 GHG Reduction Potential: 5,340 MT CO_2e/yr

Several jurisdictions within WRCOG are currently implementing existing Bicycle Master Plans and/or Trails Plans. These plans outline a series of on-street and off-street facilities to increase bicycle use within the community. This measure addresses accelerated implementation of these Master Plans to provide additional facilities by 2020 beyond those identified in Measure T-1.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Install 75% of all bicycle facility miles identified in jurisdiction's Bike Plan by 2020 Riverside	3,496
GOLD LEVEL	Install 50% of all bicycle facility miles identified in jurisdiction's Bike Plan by 2020 No jurisdictions participating at this level.	0
SILVER LEVEL	Install 25% of all bicycle facility miles identified in jurisdiction's Bike Plan by 2020 Hemet, Perris, Temecula, Wildomar	1,844

NOTE: Reductions are assumed to be 1/2 of total reduction for bicycle infrastructure measure.

PROGRESS INDICATORS	YEAR
1 Annual % of bicycle facility miles identified in jurisdiction's Bike Plan installed	2020

Community Benefits

Measure T-16: Fixed Guideway Transit

Introduce a fixed-route transit service in the jurisdiction.

2020 GHG Reduction Potential: 10,489 MT CO_2e/yr

This measure applies specifically to the City of Riverside's efforts to conduct a preliminary engineering and economic study for a proposed Streetcar. This Streetcar would provide fixed-route transit service through the City of Riverside, providing access to major destinations such as the University of California, Riverside, Downtown Riverside, and other major destinations throughout the city. The City would plan, design, construct, and operate the streetcar.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Implement a fixed-guideway transit system. Riverside	10,489
GOLD LEVEL	N/a No jurisdictions participating at this level.	0
SILVER LEVEL	N/a No jurisdictions participating at this level.	0

PROGRESS INDICATORS	YEAR
1 Annual community-wide fixed guideway transit ridership.	2020

Community Benefits

Measure T-17: Neighborhood Electric Vehicle Programs

Implement development requirements to accommodate Neighborhood Electric Vehicles and supporting infrastructure.

2020 GHG Reduction Potential: 4,707 MT CO_2e/yr

Neighborhood electric vehicles (NEVs) emit fewer GHGs than traditional passenger vehicles and reduce local air pollution. NEVs generally are used in areas with speed limits of 35 miles per hour or less for relatively short (less than 30 miles) trips. This measure introduces development requirements for signage and educational programs related to the use of NEVs consistent with state regulations.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Provide dedicated NEV facilities within the community. No jurisdictions participating at this level.	0
GOLD LEVEL	Adopt a comprehensive NEV program including signage for NEVs and an educational program related to the use of NEVs. Riverside	3,496
SILVER LEVEL	Adopt an educational program related to the use of NEVs. Hemet	1,211

PROGRESS INDICATORS	YEAR
1 Number of jurisdictions which have implemented NEV plans.	2020

Community Benefits

Measure T-18: Subsidized Transit

Increase access to transit by providing free or reduced passes.

2020 GHG Reduction Potential: 3,628 MT CO_2e/yr

One approach to increase transit use within a jurisdiction is lowering the cost of using transit. Within Western Riverside County, the typical approach has been to provide reduced cost transit passes such as those provided by several universities. This approach is generally targeted at groups such as students or seniors who may lack access to vehicles.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Provide subsidized or discounted transit passes to 3% of residents, students, and employees living, working, or going to school in the community. Riverside	3,496
GOLD LEVEL	Provide subsidized or discounted transit passes to 2% of residents, students, and employees living, working, or going to school in the community. No jurisdictions participating at this level.	0
SILVER LEVEL	Provide subsidized or discounted transit passes to 1% of residents, students, and employees living, working, or going to school in the community. Norco	132

PROGRESS INDICATORS	YEAR
1 Annual number of discounted transit passes provided per total of residents, students, and employees living, working, or going to school in the community.	2020

Community Benefits

LOCAL SOLID WASTE MEASURES

The following are local measures that can be implemented to reduce GHG emissions associated with the solid waste sector.

Measure SW-1: Yard Waste Collection

Provide green waste collection bins community-wide.

2020 GHG Reduction Potential: 1,007 MT CO_2e/yr

All jurisdictions in the subregion offer green waste collection bins for residential yard waste. Diverting yard waste from landfills helps to extend the life of area landfills. In addition, grass clippings and leaves can be composted into nutrient-rich topsoil amendments, and branches can be chipped into mulch for reuse in landscaping. Removing beneficial organic materials from landfills also helps avoid the creation of landfill methane, a potent GHG.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Adopt an ordinance prohibiting deposit of yard waste in the solid waste stream. No jurisdictions participating at this level.	0
GOLD LEVEL	Provide residential green waste bins for collection and transport to an organic waste processing facility. Banning, Calimesa, Canyon Lake, Eastvale, Hemet, Jurupa Valley*, Norco, Perris, Riverside, San Jacinto, Temecula, Wildomar	1,007
SILVER LEVEL	Conduct an outreach campaign promoting the benefits of yard waste collection, without provision of green waste bins. No jurisdictions participating at this level.	0

*Jurupa Valley offers yard waste collection bins, however waste emissions were not quantified within the jurisdiction's inventory due to lack of available data. Therefore, yard waste reductions for Jurupa Valley are not included within this CAP.

PROGRESS INDICATORS	YEAR
1 Achievement of 95% diversion of residential yard waste from landfill waste stream.	2020

Community Benefits

Measure SW-2: Food Scrap and Compostable Paper Diversion

Divert food and paper waste from landfills by implementing collection system.

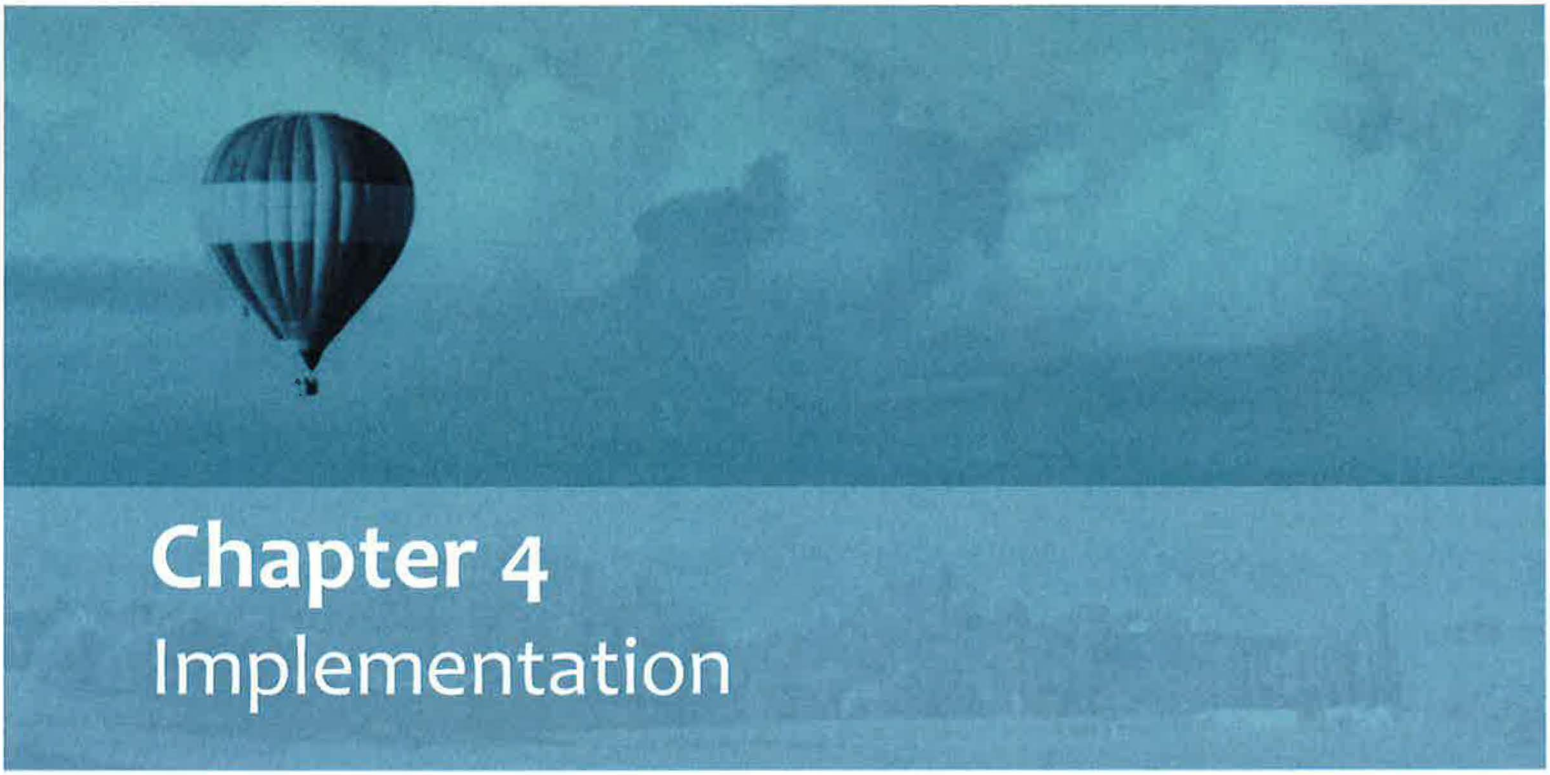
2020 GHG Reduction Potential: 155 MT CO_2e/yr

Food scraps are unwanted cooking preparation and table scraps, such as banana peels, apple cores, vegetable trimmings, bones, egg shells, meat, and pizza crusts. Compostable paper, sometimes called food-soiled paper, usually comes from the kitchen and is not appropriate for paper recycling due to contamination. Materials such as stained pizza boxes, uncoated paper cups and plates, used coffee filters, paper food cartons, napkins, and paper towels are all compostable paper. Food scraps alone represent nearly 20% of total landfilled solid waste statewide. Diverting these organic items from landfills helps to reduce landfill methane gas generation, and can help prolong the lifespan of area landfills.

PARTICIPATION LEVEL	ACTIONS + PARTICIPATING CITIES	GHG REDUCTION POTENTIAL (MT CO_2e/yr)
PLATINUM LEVEL	Accept food scraps and compostable paper within residential green waste bins; establish a commercial food scrap collection program. No jurisdictions participating at this level.	0
GOLD LEVEL	Accept food scraps and compostable paper within residential green waste bins or provide separate food scrap collection bins. Riverside, Temecula	155
SILVER LEVEL	Provide community outreach about benefits of food scrap and compostable paper collection with information about at-home composting. Banning, Calimesa, Canyon Lake, Eastvale, Jurupa Valley, Norco, Perris	0

	PROGRESS INDICATORS	YEAR
1	Temecula - 20% of commercial businesses divert 90% of their waste	2020

Community Benefits



Chapter 4
Implementation

Implementation of the Subregional CAP, including meeting the subregional reduction targets and achieving GHG reduction benefits, will require collaboration between WRCOG, local governments, and the communities at large. Meaningful implementation of the CAP would require the following components, described in more detail below:

- Administration
- Schedule of implementation
- Potential funding sources
- Monitoring and reporting

These steps are not specific to WRCOG or any individual jurisdiction, but are basic steps that WRCOG or any jurisdiction might take, or that other California communities have taken to implement a CAP. These are suggested, not required, and are intended to guide WRCOG and its members in implementation planning for the future.

ADMINISTRATION

WRCOG will continue to provide staffing and administrative support at the subregional level, particularly in implementing subregional programs such as the Transportation Uniform Mitigation Fee (TUMF), HERO Program, Western Riverside Energy Leader Partnership (WRELP) and Clean Cities Coalition. WRCOG will also work to align these programs, and future subregional initiatives, with the goals established in this CAP, where applicable. WRCOG recommends that participating jurisdictions appoint a "CAP coordinator" to oversee the successful implementation and tracking of local GHG reduction strategies. The local CAP coordinator would primarily be responsible for coordinating across municipal departments to gather data, report on progress, track completed projects, and ensure that scheduling and funding of upcoming projects is discussed at key meetings. Some jurisdictions may wish to have the coordinator work primarily as part of the development review process for new projects (i.e., Planning Department staff). The coordinator may be existing staff and does not necessarily require a dedicated full-time position. **Table 4-1** describes the potential responsibilities for WRCOG staff and local CAP coordinators.

In general, the goal in implementing the CAP is not to create new administrative tasks or new staff positions, but rather to leverage existing programs and staff to the maximum extent feasible. Local governments should seek to incorporate GHG planning and long-term reductions into their existing procedures, institutional organization, reporting and long-term planning; this is a process that will be unique to each jurisdiction.

Table 4-1: Climate Action Plan Implementation Responsibilities

WRCOG	Jurisdictions/CAP Coordinators
Secure financing to implement GHG reduction measures (i.e., grants)	Secure long-term financing to implement GHG reduction measures
Coordinate meetings among member jurisdictions, regional partners and stakeholders	Coordinate meetings amongst local community stakeholders
Serve as the external communication hub to regional climate action organizations including California Air Resources Board (CARB), South Coast Air Quality Management District (SCAQMD), Southern California Association of Governments (SCAG)	Serve as the communication hub to the community and local stakeholders
Conduct public outreach to inform the community of the subregion's reduction planning efforts	Submit annual reports to governing bodies
Develop a protocol for monitoring the effectiveness of emissions reduction programs	Utilize tool developed by WRCOG to report and document emission reduction progress
Establish guidelines and develop a tool for reporting and documenting emissions reduction progress	
Submit annual reports to the WRCOG Executive Committee and member agency governing bodies	
Develop a protocol for utilizing the real-time information collected through the verification process to modify and revise existing reduction programs	
Track state and federal legislation and its applicability to member jurisdictions	

SCHEDULE OF IMPLEMENTATION

WRCOG will track State measures, facilitate implementation of the regional measures and will coordinate with each participating jurisdiction to implement local measures. When feasible, WRCOG will act as the convener and assist in identifying funding, establishing partnerships, and track and monitor progress. Ultimately, each participating jurisdiction will be responsible for initiating the local actions to reduce emissions, but success for many measures will ultimately depend on public participation. Tasks that require active promotion may require updates to the WRCOG and jurisdictions' websites, distribution of physical promotional materials, and other active outreach activities. WRCOG and its members will develop programs to reach the public, including public forums, workshops, and meetings; these programs will be administered with the intent to foster an open public input and commenting process. Collaboration and coordination with transportation agencies (e.g., Riverside Transit Agency [RTA], Banning Pass Transit, and Riverside County Transportation Commission [RCTC]) will be essential to improving and increasing transit ridership, and enhancing mobility and transportation efficiency through better planning.

Further, coordination with external agencies and the private sector is critical for the success of many strategies, including utility companies for energy conservation and renewable energy programs, waste haulers for waste reduction actions, local water purveyors for water saving actions, and other local jurisdictions for work-sharing partnerships designed to take advantage of the common goals across Western Riverside County. Dependence on outside agency participation is mentioned explicitly in the strategy descriptions; WRCOG, its member jurisdictions, and partner stakeholders will continue to explore strategies for collaboration.

Table 4-2 provides a summary of the state, regional, and local measures included in this Subregional CAP and the emissions reductions associated with these measures anticipated by 2020. Chapter 3 provides a detailed description of each measure, jurisdictional participation, progress indicators, and community benefits.

Table 4-2: Implementation Summary

Measure	2020 Annual GHG Reductions (MT CO_2e/yr)	Objectives
SR-1: Renewables Portfolio Standard	434,606	• 20% of retail sales from renewables by 2013. • 25% of retail sales from renewables by 2016. • 33% of retail sales from renewables by 2020.
SR-2: 2013 California Building Energy Efficiency Standards (Title 24, Part 6)	30,923	• Residential construction 25% more efficient and nonresidential construction 30% more efficient than the 2008 standards.
SR-3: HERO Residential Program	71,649	• Expanding list of eligible products for financing. • Increase in funded applications and completed projects. • Increased energy savings, renewable energy installation, job creation, and economic development.
SR-4: HERO Commercial Program	10,079	• Expanding list of eligible products for financing. • Increase in funded applications and completed projects. • Increased energy savings, renewable energy installation, job creation, and economic development.
SR-5: Utility Programs	9,182	• Increased participation in programs.

Measure	2020 Annual GHG Reductions (MT CO_2e/yr)	Objectives
SR-6: Pavley & Low Carbon Fuel Standards	1,095,555	• Increasingly-stringent fuel-efficiency standards for passenger vehicles 2017 through 2025. • The carbon-intensity of California's transportation fuel to be reduced by at least 10% by 2020.
SR-7: Metrolink Expansion	23,074	• Extension of service to Perris by 2015.
SR-8: Express Lanes	60,864	• Extended express lanes along SR-91 and I-15 operational by 2020.
SR-9: Congestion Pricing	3,246	• Congestion pricing on the SR-91 and I-15 by 2020.
SR-10: Telecommuting	40,576	• Increasing the availability and use of carpooling, vanpooling, transit, bicycling, and walking. • Shifting work schedules to non-peak periods or locations. • Using telecommuting. • 5% of workers in the region telecommuting by 2020.
SR-11: Goods Movement	22,688	• Penetration of electric and low-emission trucks. • Physical improvements on freeways such as truck climbing lanes.
SR-12: E-Vehicle Plan and Infrastructure	81,152	• Charging stations, changes to development codes, and other strategies to encourage purchase and use of electric vehicles.
SR-13: Construction and Demolition Waste Diversion	3,574	• 50% of scrap lumber diverted from landfill waste stream.
SR-14: Water Conservation	23,192	• Urban retail water suppliers to reduce per-capita water use by 10% from a baseline level by 2015. • Reduce per-capita water use by 20% by 2020.
E-1: Energy Action Plans	357,581	• Implement programs to meet energy efficiency targets.
E-2: Traffic & Street Lights	4,697	• Platinum Level: 100% of traffic & street lights converted to high-efficiency bulbs by 2020. • Gold Level: 75% of traffic & street lights converted to high-efficiency bulbs by 2020. • Silver Level: 50% of traffic & street lights converted to high-efficiency bulbs by 2020.

Measure	2020 Annual GHG Reductions ($MT\ CO_2e/yr$)	Objectives
E-3: Shade Trees	2,014	• Platinum Level: Shade trees required for all new developments. • Gold Level: Subsidized program to support planting city-identified tree species. • Silver Level: Outreach program promoting the benefits of planting additional trees in urban environments.
T-1: Bicycle Infrastructure	29,255	• Platinum Level: 50% increase in bicycle lane mileage from 2010 levels. • Gold Level: 25% increase in bicycle lane mileage from 2010 levels. • Silver Level: 10% increase in bicycle lane mileage from 2010 levels.
T-2: Bicycle Parking	6,290	• Platinum Level: Amend zoning to require provision of bike parking for all multi-family or mixed-use projects. • Gold Level: Amend zoning to require provision of bike parking for multi-family projects consisting of more than 50 dwelling units, and mixed-use projects greater than 50,000 sf. • Silver Level: Provide information to applicants for large development projects describing the benefits of bike parking.
T-3: End of Trip Facilities	1,836	• Platinum Level: Amend zoning code to require installation of end-of-trip facilities for new commercial buildings greater than 50,000 sf. • Gold Level: Amend zoning to require installation of end-of-trip facilities for new commercial buildings greater than 100,000 sf. • Silver Level: Provide information to commercial project applicants describing the benefits of installing end-of-trip facilities.
T-4: Promotional Transportation Demand Management	1,831	• Platinum Level: Allocate a full-time staff person to promote TDM strategies to existing businesses. • Gold Level: Allocate the equivalent of ½ of a full-time staff person to promote TDM strategies to existing businesses. • Silver Level: Train an existing staff person to promote TDM strategies to existing businesses.

Measure	2020 Annual GHG Reductions (MT CO_2e/yr)	Objectives
T-5: Transit Service Expansion	704	• Platinum Level: 20% increase in fixed-route service miles. • Gold Level: 10% increase in fixed-route service miles. • Silver Level: 5% increase in fixed-route service miles.
T-6: Transit Frequency Expansion	2,723	• Platinum Level: 20% increase in fixed-route service frequency over 2010 levels in transit priority areas (TPAs) as determined by the latest available SCAG SCS/RTP. • Gold Level: 10% increase in fixed-route service frequency over 2010 levels in TPAs. • Silver Level: 5% increase in fixed-route service frequency over 2010 levels in TPAs.
T-7: Traffic Signal Coordination	94,600	• Platinum Level: Coordinate traffic signals on an additional 50% of arterial roads. • Gold Level: Coordinate signals on an additional 25% of arterial roads. • Silver Level: Coordinate signals on an additional 10% of arterial roads.
T-8: Density	2,857	• Platinum Level: Achieve a 25% increase in community-wide household and employment density over 2010 baseline conditions by 2020. • Gold Level: Achieve a 10% increase in density by 2020. • Silver Level: Achieve a 5% increase in density by 2020.
T-9: Mixed-Use Development	4,069	• Platinum Level: Achieve a 25% jobs/housing ratio improvement Citywide over 2010 baseline conditions. • Gold Level: Achieve a 10% jobs/housing ratio improvement. • Silver Level: Achieve a 5% jobs/housing ratio improvement.

Measure	2020 Annual GHG Reductions ($MT\ CO_2e/yr$)	Objectives
T-10: Design/Site Planning	912	• Platinum Level: 25% increase in intersection density and reduction in block-length in new development. • Gold Level: 10% increase in intersection density and reduction in block-length in new development. • Silver Level: 5% increase in intersection density and reduction in block-length in new development.
T-11: Pedestrian Only Areas	2,812	• Platinum Level: Designate one additional major activity center in the community as a permanent pedestrian-only area. • Gold Level: Designate one additional pedestrian-only area during weekends. • Silver Level: Designate one additional pedestrian-only area during weekends tied to a special event such as a Farmer's market.
T-12: Limiting Parking Requirements for New Development	28,423	• Platinum Level: Amend zoning to reduce parking requirements for new non-residential development by 25%. • Gold Level: Reduce parking requirements for new non-residential development by 10%. • Silver Level: Reduce parking requirements for new non-residential development by 5%.
T-13: High Frequency Transit Service	1,801	• Platinum Level: Work with RTA to offer high frequency transit service within 3 corridors • Gold Level: Offer high frequency transit service within 2 corridors • Silver Level: Offer high frequency transit service within 1 corridor
T-14: Voluntary Transportation Demand Management	2,464	• Platinum Level: 50% of employees within the jurisdiction participation in voluntary TDM programs. • Gold Level: 25% of employees within jurisdiction participate in voluntary TDM programs. • Silver Level: 12.5% of employees within the jurisdiction participate in voluntary TDM programs.
T-15: Accelerated Bike Plan Implementation	5,340	• Install 75% of all bicycle facility miles identified in City's Bike Plan by 2020 • Install 50% of all bicycle facility miles • Install 25% of all bicycle facility miles

Measure	2020 Annual GHG Reductions (MT CO_2e/yr)	Objectives
T-16: Fixed Guideway Transit	10,489	• Implementation of streetcar could potentially double existing transit mode split within City, which equates to 1.5% reduction in VMT.
T-17: Neighborhood Electric Vehicle Programs	4,707	• Adopt comprehensive NEV programs including signage and designated facilities.
T-18: Subsidized Transit	3,628	• Platinum Level: Provide subsidized or discounted transit passes to 3% of residents, students, and employees living, working, or going to school in the community. • Gold Level: Provide subsidized or discounted transit passes to 2%. • Silver Level: Provide subsidized or discounted transit passes to 1%.
SW-1: Yard Waste Collection	1,007	• Platinum Level: Adopt an ordinance prohibiting deposit of yard waste in the solid waste stream. • Gold Level: Provide residential green waste bins for collection and transport to organic waste processing facility. • Silver Level: Conduct an outreach campaign promoting the benefits of yard waste collection, without provision of green waste bins.
SW-2: Food Scrap and Paper Diversion	155	• Platinum Level: Accept food scraps and compostable paper within residential green waste bins; establish a commercial food scrap collection program • Gold Level: Accept food scraps and compostable paper within residential green waste bins or provide separate food scrap collection bins • Silver Level: Provide community outreach about benefits of food scrap and compostable paper collection with information about at-home composting

POTENTIAL FUNDING SOURCES

Funding Mechanisms

The GHG reduction strategies in this document were formulated with an understanding that WRCOG and member jurisdictions have limited staff time and financial resources to implement them. The costs for implementation include the creation or promotion of voluntary programs, continuing administration of those programs, coordination and outreach with other government agencies and businesses, and—in some cases—exploration or study of potential legislative or regulatory mechanisms not yet codified. A few strategies require up-front capital expenditures by local agencies. WRCOG and member jurisdictions will use a combination of staff time, grant funding, direct spending, and collaboration with other agencies and organizations to achieve CAP goals. This section presents a summary of funding and financing options (Table 4-3) available at the time this document was prepared.

Some funding sources are not necessarily directed towards a jurisdiction, but to a larger regional agency such as WRCOG, SCAG, a Joint Powers Authority (JPA), or a waste services provider serving multiple jurisdictions. WRCOG and its members should continually monitor private and public funding sources for new grant and rebate opportunities and to better understand how larger agencies are accessing funds that can be used for GHG reductions at the local level. Leveraging financing sources is one of the most important roles WRCOG and a local government can play in helping the community to implement many of the GHG reduction measures.

Table 4-3: Potential Funding Sources to Support CAP Implementation

Federal Funds	
Energy Efficient Mortgages	▪ The Federal Housing Administration (FHA) offers an Energy Efficient Mortgage Loan program that assists current or future homeowners with lowering their utility bills. This would be accomplished by enabling homeowners to incorporate the cost of adding energy-efficient improvements into their home mortgage. Energy efficient upgrades could be chosen that would allow owners to realize net monthly savings. The goal is to provide owners additional financing for energy efficiency upgrades at a discounted interest rate.
Moving Ahead for Progress in the 21st Century (MAP-21)	▪ Federal funding through the MAP-21 program is administered through the state and regional governments. MAP-21 funding is administered through Caltrans, MPOs (SCAG in Southern California) and RTPAs (RCTC in Riverside County). Most of the funding programs are transportation versus recreation oriented, with an emphasis on reducing auto trips and providing an intermodal connection. In most cases, MAP-21 provides matching grants of 50 to 100%.
Safe Routes to Schools	▪ Safe Routes to Schools is an international movement focused on increasing the number of children who walk or bike to school by funding projects that remove barriers to doing so. These barriers include a lack of infrastructure and non-infrastructure projects, safety, and limited programs that promote walking and bicycling. In California, two separate Safe Routes to School programs are available at both the state and federal level, and both programs fund qualifying infrastructure projects.

American Recovery and Reinvestment Act (ARRA) Community Partnerships	▪ Federal funding for local energy efficiency programs is available. Funding for energy efficiency has been provided to the California Department of Community Services and Development, which has dispersed funds locally through the Community Action Partnership of Riverside County. The Partnership provides free home weatherization and other energy assistance resources to low-income and elderly citizens of Riverside County. Programs include the Low-Income Home Energy Assistance Program and the Weatherization Assistance Program.
State Funds	
California Air Resources Board (CARB)	▪ CARB offers several grants, incentives, and credits programs to reduce on-road and off-road transportation emissions. Residents, businesses, and fleet operators can receive funds or incentives depending on the program. o The following programs can be utilized to fund local measures: o Air Quality Improvement Program (AB 118) o Carl Moyer Program – Voucher Incentive Program o Goods Movement Emission Reduction Program (Prop 1B Incentives) o Loan Incentives Program o Lower-Emission School Bus Program/School Bus Retrofit and o Replacement Account (Prop 1B and EPA Incentives)
California Energy Efficiency Financing	▪ For years, the California Energy Commission (CEC) has provided a loan program that supports local government energy retrofits and some new construction projects. Since 1979, more than $272 million has been allocated to more than 773 recipients, as of 2012. The program provides low interest loans for feasibility studies and the installation of cost-effective energy projects in schools, hospitals, and local government facilities. The loans are repaid out of the energy cost savings and the program will finance lighting, motors, drives and pumps, building insulation, heating and air conditioning modifications, streetlights and traffic signal efficiency projects, and certain energy generation projects, including renewable energy projects and cogeneration. Loans can cover up to 100% of project costs and there is a maximum loan amount of $3 million.
California Department of Resources Recycling and Recovery (CalRecycle)	▪ CalRecycle grant programs allow jurisdictions to assist public and private entities in management of waste streams. ▪ Incorporated cities and counties in California are eligible for funds. ▪ Program funds are intended to: o Reduce, reuse, and recycle all waste. o Encourage development of recycled-content products and markets. o Protect public health and safety and foster environmental sustainability.
Strategic Growth Council (SGC)	▪ In September 2008, California Senate Bill 732 created the Strategic Growth Council, which is a cabinet level committee whose tasks include coordinating the activities of member state agencies to assist state and local entities in the planning of sustainable communities and meeting AB 32 goals, including coordination of Planning Grants and Urban Greening Grants.

State Funding for Infrastructure	▪ The state's Infill Infrastructure Grant Program may potentially be used to help fund measures that promote infill housing development. ▪ Grants can be used for gap funding for infrastructure improvements necessary for specific residential or mixed-use infill development projects.
Existing Capital Improvement Program	▪ State and federal funds would most likely continue to local governments, builders, and homeowners in the following forms: o Grants o Transportation and transit funding o Tax credit and rebate programs o The Capital Improvement Program can be utilized for measures relating to traffic or transit.
Private and Non-Governmental Support	
▪ Community-based non-profits, local businesses, and investor owned utilities should be considered as resources for direct and indirect support, including funding, for program activation and operations. ▪ Private investors may provide funding to local governments. For example, energy service companies can finance the up-front investments in energy efficiency, reimbursed by the local government over a contract period. Private companies may finance solar power installations, and then recoup their investment by selling the resulting power to the building owner.	

Additional Considerations

In addition to pursuing the funding options above and monitoring the availability of others, WRCOG and its member jurisdictions may take the following steps to inform decisions related to the cost of GHG reduction measures.

- **Perform and refine cost estimates:** Cost estimates for local reduction measures should be performed to identify the cost-effectiveness of each measure to inform and guide the implementation process. This analysis will likely be based on a variety of participation, per-unit and other assumptions. As programs are developed, cost estimates should be refined an updated over time with more precise implementation-level data.
- **Integrate GHG measures into existing city budget and Capital Improvement Plan (CIP):** Certain capital improvements, particularly those identified in Energy and Land Use/Transportation Measures, may need to be added to the city's CIP and facility master plan programs, as well as those of the city utility enterprises and other public agencies (such as transit agencies) that have control for project implementation. For CIPs completely under the city's control, new projects would need to be assessed for consistency with a city's local CAP or adherence to some minimum energy efficiency standard similar to that achieved by the local plan.
- **Adopt or update ordinances and/or codes:** Some local reduction measures may represent a continuation of recently enacted ordinances, while others would require new ordinances. WRCOG will develop a "plug and play" implementation toolkit of model general plan, zoning and building code amendments and other programs to help facilitate the GHG reduction and climate adaptation measures outlined in the Subregional CAP. The model "best practices and programs" aspect of the toolkit will include, but not be limited to, those related to energy, water, land use, transportation, stormwater management, building reuse, and waste reduction. The policies and model codes of the toolkit will be drafted so they can be easily integrated into a jurisdiction's planning process.
- **Pursue outside funding sources:** A range of funding from state and federal agencies has been identified. WRCOG and local jurisdictions should pursue these and other emerging funding sources as a part of implementation efforts.

- **Implement and direct preferred city funding sources.** While city funding sources are limited in most cities, the city, when financially able, as a part of its budget process, could appropriate funding from general sources or make changes in its fee schedules, utility rates, and other sources as needed to support funding the implementation of the GHG reduction measures.
- **Create monitoring/tracking processes:** Local reduction measures will usually require program development, tracking, and/or monitoring. WRCOG will develop a tool to enable member jurisdictions to report their progress on a regular basis. GHG emissions reduction and adaptation measures could be sorted based on implementation timing, responsible agency, and level of success/completion. By allowing specific tasks to be checked off once each phase of the CAP is completed, jurisdictions will be able to save time reviewing reports, tracking data manually, and verifying that measures are fully completed. Each proposed measure included in the CAP will be built-in the database with information such as:
  - Program;
  - Responsibility;
  - Cost;
  - Potential Funding Sources;
  - Priority; and
  - Time Frame
- **Identify economic and health indicators to consider future funding options:** Identification and monitoring of economic and health indicators and trends, such as home prices, energy prices cost per kWh on solar installations, unemployment rates, or real wage increases, can guide the potential for funding local reduction measures through different financing mechanisms. WRCOG will work with the County of Riverside and other regional agencies to identify and develop measurable health outcome indicators for each CAP measure. Indicators will be used to identify health co-benefits of the CAP, establish priorities, develop target resources, create benchmarks, and track progress towards community objectives.

MONITORING AND REPORTING

Regular monitoring is important to ensure programs are functioning as they were originally intended. Early identification of effective strategies and potential issues would enable WRCOG and its member jurisdictions to make informed decisions on future priorities, funding, and scheduling. Moreover, monitoring provides concrete data to document the subregion's progress in reducing GHG emissions. WRCOG will work with local jurisdictions to develop a protocol for monitoring the effectiveness of emissions reduction programs as well as for undertaking emissions inventory updates.

- **Update GHG Inventory**: It is recommended that emissions be inventoried on a regular basis, including regular data collection in each of the primary inventory sectors (utility, regional VMT, waste, wastewater, and water), and compare to the baseline GHG emissions in 2010. A combined inventory effort could be conducted through WRCOG similar to the inventory preparation that was done for this Subregional CAP.
- **Track State Progress**: The Subregional CAP relies heavily on state-level measures. WRCOG may be responsible for tracking the state's progress on implementing state-level programs. Close monitoring of the real gains being achieved by state programs would allow WRCOG and participating jurisdictions to adjust its CAP, if needed.
- **Track Completion of GHG Reduction Measures**: Tracking of measures implemented as scheduled in the CAP, including progress reports on each measure, funding, and Savings will allow at least a rough attribution of gains when combined with regular GHG inventory updates.

- **Regular Progress Reports**: WRCOG will develop a formal framework for monitoring performance and tracking the progress of CAP implementation, including health and economic indicators. The framework may take the form of an annual report card, progress report, or similar type of tool that will help monitor the achievements, effectiveness and appropriateness of each performance measure. If annual reports, periodic inventories, or other information indicates that the GHG reduction measures are not as effective as originally anticipated, the CAP may need to be adjusted, amended, or supplemented. The report card (or similar) will be periodically (i.e., annually) presented to WRCOG's Executive Committee and various technical committees (Technical Advisory Committee, Planning Directors' Technical Advisory Committee, and Public Works Committee) as well as member jurisdictions and will focus on the status of agreed upon performance measures.

REDUCING GHG EMISSIONS AFTER 2020

In order to assess whether implementing this CAP achieves the state's long-term climate goals, one must look beyond 2020 to see whether the emissions reduction measures included for the 2020 milestone set the subregion on the trajectory toward future greater reductions in the post-2020 period. To date, there is no state or federal mandate requiring local action to reduce GHG emissions after 2020. AB 32 contains no post-2020 reduction target nor provides CARB with the authority to mandate compliance with a post-2020 target. SB 375, while it contains requirements for SCAG to promote reductions in the passenger and light duty vehicle sector, does not contain mandatory requirements for local jurisdictions to reduce their GHG emissions overall.

Governor Schwarzenegger's Executive Order (EO) S-3-05 calls for an 80% reduction below 1990 GHG emissions levels by 2050. However, an executive order is only binding on state agencies, and does not represent a legal mandate for local governments or the private sector. Nevertheless, S-03-05 contains a 2050 reduction target that is based on current scientific understanding of the reductions needed to avoid the effects of climate change that could result from unabated rise in anthropogenic GHG emissions. The 2050 target in EO-S-03-05 is equivalent to a 2050 statewide target of about 85 million metric tons of carbon dioxide equivalent (MT CO_2e) (total emissions), as compared to the 1990 level of 427 million MT CO2e.

The state is on track to achieve significant reductions by 2020 and has made some advancement towards deeper reductions by 2050, however, it is clear that our energy-intensive economy cannot achieve long-term growth unless we find greater efficiencies and low-carbon alternatives to powering our industries, homes, businesses, and transportation systems.Climate protection must be compatible with economic growth for successful implementation of GHG reduction strategies in California. The AB 32 Scoping Plan emphasizes clean energy, end-use efficiencies and clean vehicle standards to lower the state's emissions, outlining a mix of incentives and programs designed to smooth California's transition to a low-carbon economy. The 2013 update to the Scoping Plan points to the critical need for rapid market penetration of new technologies that reduce energy demand, electrify our vehicle fleets, and decarbonize electricity and fuel supplies.

Meanwhile, the Governor's Office of Planning and Research (OPR) recently released its first draft Environmental Goals and Policy Report (EGPR) in almost 35 years, entitled *California @ 50 Million:*

California's Climate Future[1] The central theme of that document is "growth in the context of climate change," emphasizing the massive challenge the state faces in meeting its long-term (2050) GHG emissions goal. As the report states, achieving the 2020 target is just one step toward long-term stabilization of the climate. Significant GHG reductions by 2050 can only be achieved through a low-carbon transformation of our economy and its supporting infrastructure and mobility systems, which in turn must be driven by focused investments and strong policy signals. This is the direction the state is headed, calling for commitments that will "send a strong signal of support for the innovators and entrepreneurs to drive technology and development to tackle the challenge of climate change." The EGPR indicates that climate change will influence nearly every aspect of the state's next phase of planning and investment for the future.

Full implementation and expansion of CARB's Scoping Plan to increase efforts beyond 2020 and expansion of the strategies studied in this CAP could put the subregion on a path toward achieving these required long-term reductions. While the specific measures needed to meet the 2050 goal are too far in the future to define in detail, one can examine the level of achievement that would be needed to keep the region on track through 2035. The measures needed to achieve longer-term targets are logical extensions of the programs recommended in the CARB Scoping Plan at the state level and the measures included in this CAP at the local level. By building on planned state efforts during this period and ramped up efforts in the local building energy and transportation (and other) sectors on the part of local governments, the subregion can be on track to reach a 2035 goal.

This CAP has not assumed any benefit from a cap-and-trade system by 2020, but when implemented, such a system may result in reductions beyond those currently anticipated in the CAP for 2020, and in additional reductions for 2030. The California Cap-and-Trade Program will particularly affect large stationary sources, which are excluded from local measures in this CAP to avoid duplication of state and federal regulatory efforts. In addition, the Cap-and-Trade Program will also affect electricity generation and transportation fuels, which may change energy prices, in turn potentially altering energy use and transportation behavior beyond that assumed for the various local measures included in this CAP.

WRCOG will continue to monitor developments at the national and state levels regarding implementation of GHG emissions reductions beyond 2020.

CEQA PROJECT REVIEW

Under the California Environmental Quality Act (CEQA), the effects of GHG emissions are considered a potentially significant environmental impact. In addressing climate change, CEQA provides a useful mechanism for local agencies to evaluate the environmental effects of new development, but may also create inefficiencies for both agency staff and applicants through repetitive assessments of small projects on an individual basis, rather than considering cumulative effects of future development and determining needed mitigation up front. The CEQA Guidelines recognize this, and include a provision for streamlining the analysis of projects that are consistent with a comprehensive plan for the reduction of GHG emissions (CEQA Guidelines, Section 15183.5).

[1] California @ $50 Million, September 2013. Available at opr.ca.gov/docs/EGPR_ReviewDraft.pdf.

To meet the requirements of CEQA Guidelines Section 15183.5(b)(1) a qualified CAP must:

1. Quantify existing and projected GHG emissions within the plan area
2. Establish a reduction target based on AB 32's provisions (a level where GHG emission are not cumulatively considerable)
3. Identify and analyze sector specific GHG emissions from Plan activities
4. Specify policies and actions (measures) that local jurisdictions will enact and implement over time to achieve specified reduction target
5. Establish a tool to monitor progress and amend if necessary
6. Adopt in a public process following environmental review

A development project would demonstrate consistency with the CAP if it is consistent with the CAP assumptions regarding the amount and type of future development, and is consistent with the GHG reduction measures identified in the CAP. Projects consistent with the CAP, including conformance with any performance measures applicable to the project, would not require additional GHG emissions analysis and mitigation under CEQA Guidelines Sections 15064(h) and 1513.5(b)(2).[2] However, a project applicant can always choose to demonstrate compliance with the AB 32 target by preparing an individual project analysis that calculates GHG emissions as part of their CEQA documentation.

In a future phase of the work program, WRCOG will develop a checklist to assist with determining project consistency with the CAP. The checklist is intended to provide individual projects the opportunity to demonstrate that they are minimizing GHG emissions, while ensuring that new development achieves a proportion of emissions reduction consistent with what is assumed in the CAP. The project review checklist will screen projects for important GHG reduction measures that, when implemented, will facilitate and not impede the subregion's ability to meet its 2020 GHG emissions target. The checklist will apply to all projects subject to CEQA.

[2] If there is substantial evidence that the effects of a particular project may be cumulatively considerable, notwithstanding the project's compliance with the CAP, CEQA requires that an EIR be prepared.

Chapter 5
Adaptation and Resiliency

INTRODUCTION

The greenhouse gas (GHG) mitigation reduction strategies in this Climate Action Plan (CAP) support the statewide approach to reduce long-term climate change effects. However, the state is already experiencing adverse effects from climate change (CEPA and OEHHA 2013; Cal OES and CNRA 2012; WRCC 2013a). Even if global concentrations of GHGs stopped increasing today, climate change will impact the subregion for the foreseeable future. If GHG levels continue to rise, climate change effects will likely become more severe (IPCC 2013).

The Western Riverside Council of Governments (WRCOG) subregion is a diverse area, exhibiting a variety of socioeconomic conditions, infrastructure types, neighborhood compositions, geographies, and character. Nearly two million people live, work, and recreate in Western Riverside County.

For the subregion to flourish, it is important to understand how the climate could change and begin implementing strategies that help the subregion thrive in a variety of future climate conditions. To achieve this objective, Chapter 5 provides a brief overview of expected climate change effects, assets in the subregion that are vulnerable to climate change effects, and adaptation strategies intended to reduce vulnerability and increase resilience. The strategies in this chapter represent actions that increase resilience to natural hazards regardless of the rate and severity of climate change. The chapter concludes with sample work plans to enable local government implementation.

Climate Adaptation and GHG Mitigation

"Greenhouse gas mitigation" strategies reduce greenhouse gas emissions.

"Climate adaptation" strategies reduce the vulnerability of life, property, and natural resources to climate change effects. WRCOG intends to develop adaptation strategies that are GHG emissions neutral or net negative to ensure they are consistent with the CAP emissions reduction target.

Appendix C provides information regarding the adaptation planning process and background research.

CLIMATE CHANGE IN THE SUBREGION

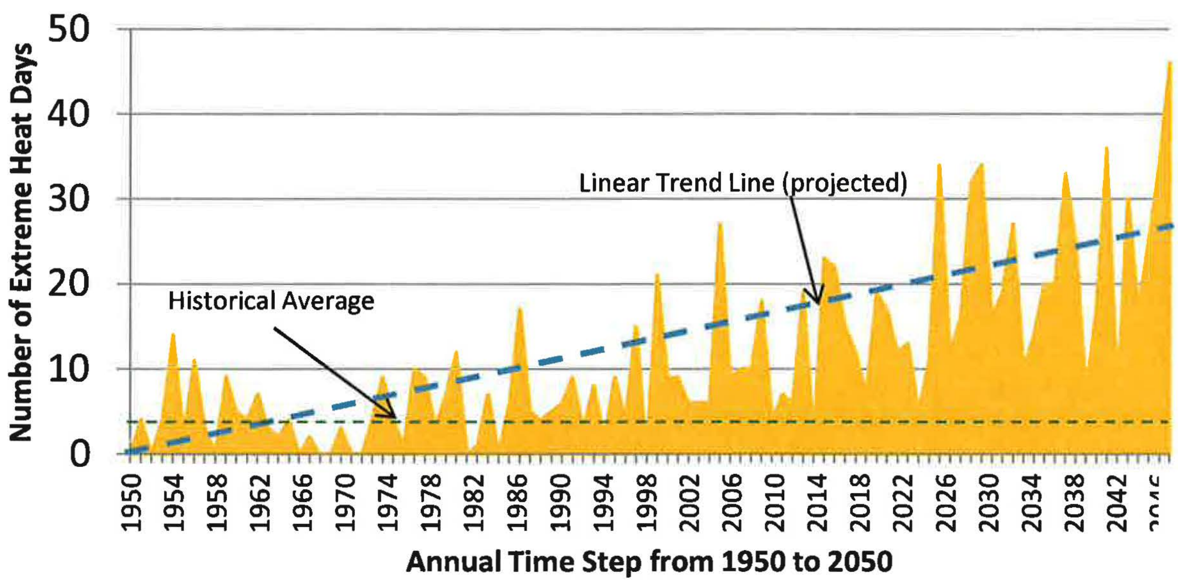
As part of the technical work undertaken to prepare the chapter, WRCOG considered a number of climate change–related hazards. Some hazards, such as possible increases in wind, had too much uncertainty in regard to severity and likelihood of change, to reliably assess impacts. WRCOG identified extreme heat, drought, wildfire, and flooding as the most likely and impactful climate change-related hazards in the subregion. This section explains how these hazards are expected to change as a result of climate change through 2050.

EXTREME HEAT

The WRCOG subregion is a combination of Mediterranean and semi-arid climates. Both climate types are known for hot (sometimes very hot) and dry summers. Residents in the subregion generally expect these desert-like conditions and most of the built environment was designed to withstand extreme heat.[1] In the City of Riverside, for example, the extreme heat day threshold is 100°F. Between 1960 and 1991, the subregion averaged four extreme heat days per year.

Climate change is expected to increase overall global temperatures (IPCC 2013). The subregion will experience this increase in average annual heat in a variety of ways, including increased number of extreme heat days and heat waves, warmer summer evenings, and warmer average years (CEC 2013). In addition to the direct physical threat posed by extreme heat, elevated temperatures impose air quality hazards and can increase the rate of ground-level ozone (smog) formation (EPA 2013). As identified in **Figure 5-1**, the number of extreme heat days is projected to rise through 2050, where the average year could include 27 extreme heat days (CEC 2013).

Figure 5-1: Historic and Projected Extreme Heat Days, 1950 to 2050



Source: CEC 2013

[1] This CAP defines an extreme heat day as a day in April through October when the maximum temperature exceeds the 98th historical percentile of maximum temperatures based on daily temperature maximum data between 1961 and 1990 (CEC 2013).

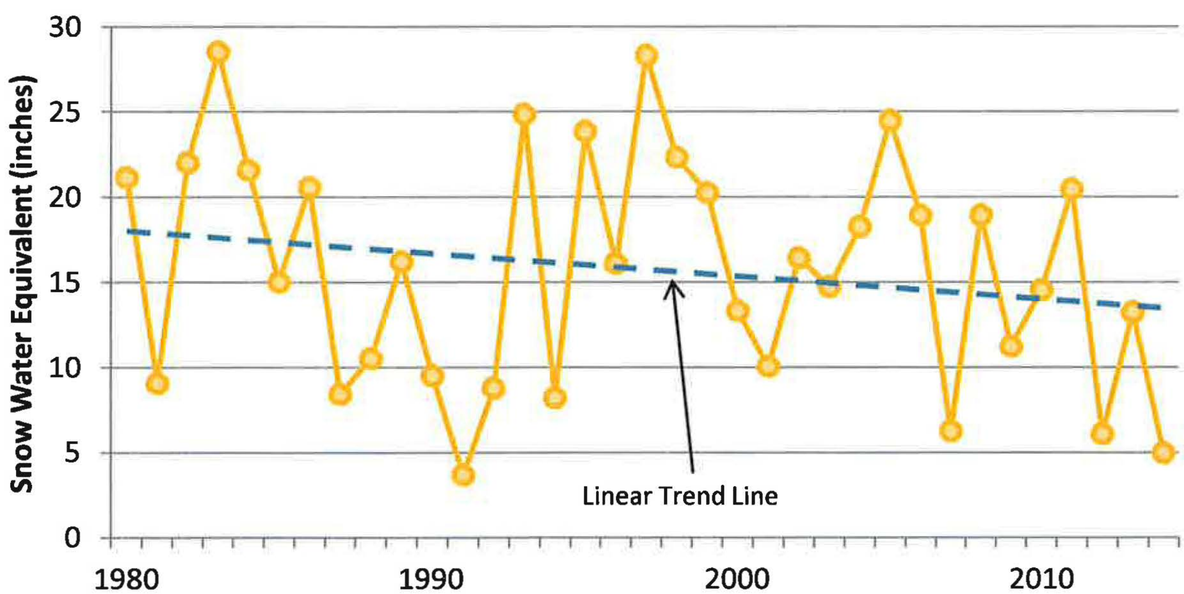
DROUGHT

The subregion contains numerous water agencies and municipal departments that supply water to customers from local and imported sources. From a local government standpoint, the mix of water agencies presents a challenge to implementing jurisdictional water reduction strategies, as some jurisdictions have multiple providers within their boundaries, and some water suppliers function as sub-agencies to others. Eastern Municipal Water District (EMWD) and Western Municipal Water District (WMWD), which account for the majority of residential and commercial water accounts in the subregion, import roughly 75% of their water from the Sacramento-San Joaquin Bay Delta via the State Water Project and from the Colorado River (EMWD 2011; WMWD 2011). The imported sources rely on winter snowpack to deliver supplies year-round. Other parts of the subregion depend on groundwater resources. Aquifer recharge occurs when local rainwater percolates through the ground.

Since the 1950s, Riverside County has received an average of 10–12 inches of rainfall per year, although that number can vary greatly between years (WRCC 2013a, 2013b, 2013c). As of late 2014, the National Drought Mitigation Center classified the entire region as being in an "extreme drought," the second-most intense drought condition classification (Rosencrans 2014). Although precipitation projections tend to be less certain than other types of climate change projections, a slight decrease in average precipitation is expected through midcentury (CEC 2013).

Most of the imported water used in the WRCOG subregion comes from the Sierra Nevada range. Reduced winter precipitation levels and warmer temperatures have greatly decreased the size of the Sierra Nevada snowpack (the volume of accumulated snow), which in turn makes less fresh water available for communities throughout California. Continued decline in the Sierra Nevada snowpack volume is expected, which may lead to lower volumes of available imported water (Cal OES and CNRA 2012). An example of this change can be seen in **Figure 5-2**, which shows February snowpack levels in Sierra Nevada between 1980 and 2014.

Figure 5-2: February Snowpack Levels in the Sierra Nevada, Five-Site Average, 1980–2014



Source: NRCS 2014

WILDFIRE

Existing Conditions

A wildfire is an uncontrolled fire spreading through vegetative fuels, and is one of the hazards in the subregion that poses the greatest risk to life and property (County of Riverside 2012). In addition to the direct physical threat to life and property, smoke released during an event can have a detrimental effect on the subregion's air quality. In 2012, the California Energy Commission (CEC) commissioned a projection of wildfire risks for California. The report (Krawchuk and Moritz 2012) provides baseline wildfire risk, as well as projections for 2039. **Figures 5-3, 5-4**, and **5-5** show baseline (2010) and 2039 fire risk, as well as the change in risk between baseline and 2039. Urban areas have been removed from the maps using Riverside

As shown in **Figures 5-3**, **5-4**, and **5-5**, the report projects increasing fire risk throughout most of the subregion through 2039 with particularly large changes in the southwest and in most high elevation areas. Wildfires may start for any number of reasons, including arson, human error, or lightning, irrespective of climate change. However, with climate change, wildfire risks are expected to increase as a result of hotter and drier conditions and associated secondary impacts such as reduced ground moisture, humidity, and changes to plant communities.

Fire Response in the Subregion

Within the WRCOG subregion, the cities of Corona, Hemet, Murrieta, Norco, Riverside, and Temecula provide their own fire and emergency services. The Riverside County Fire Department, in cooperation with the California Department of Forestry and Fire Protection (Cal Fire), provides fire and emergency services to the unincorporated county and remaining cities. The Riverside County Fire Department and Cal Fire have defensible space requirements for new and existing development, and provide comments on new development in high fire hazard severity areas.

Figure 5-3: Baseline Wildfire Risk, 2010

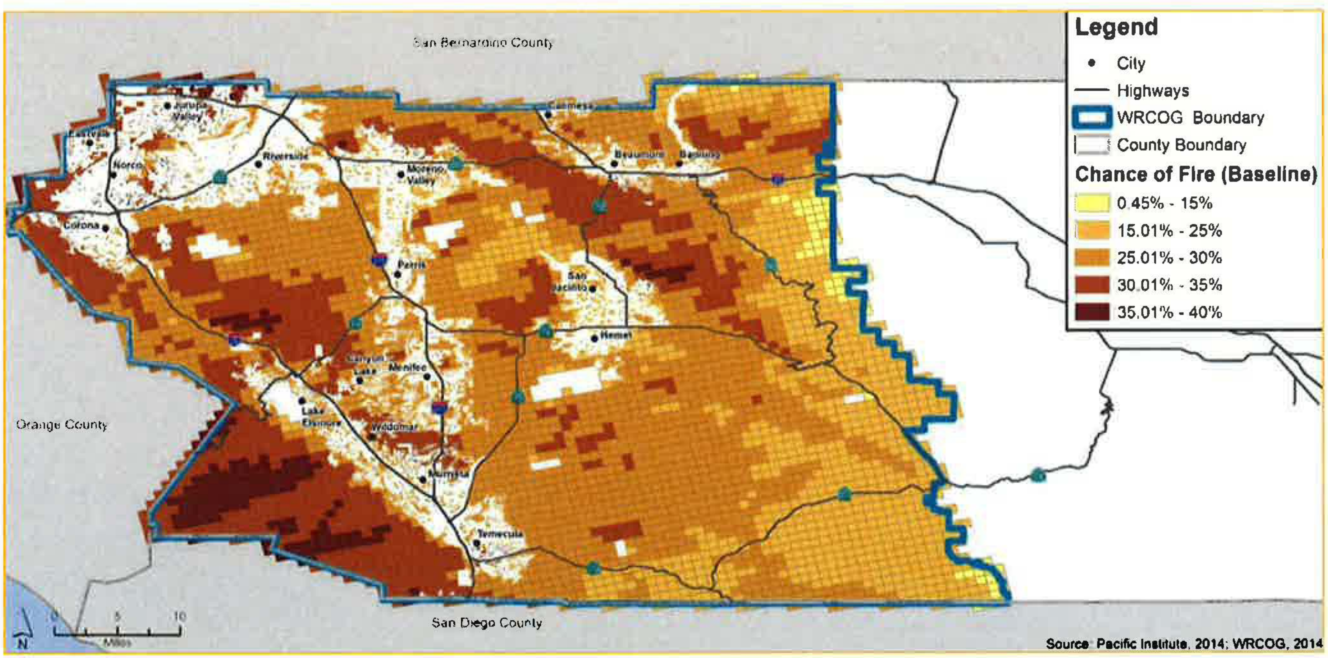


Figure 5-4: Wildfire Risk, 2039

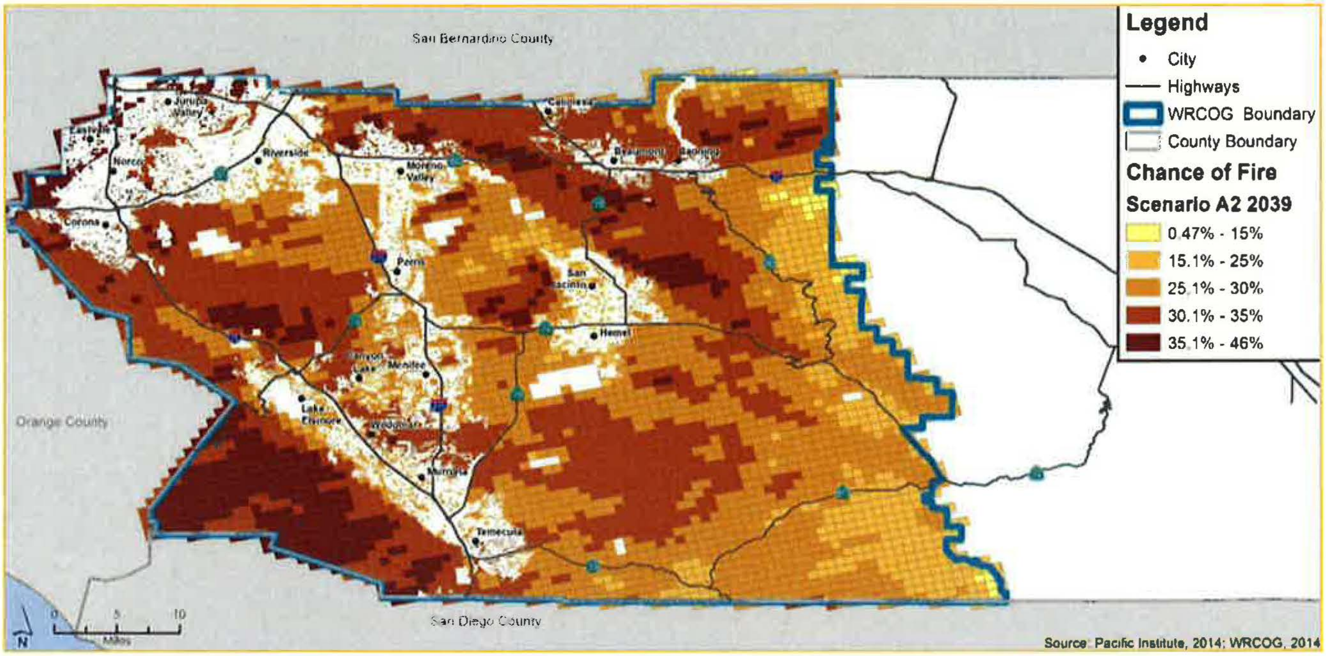
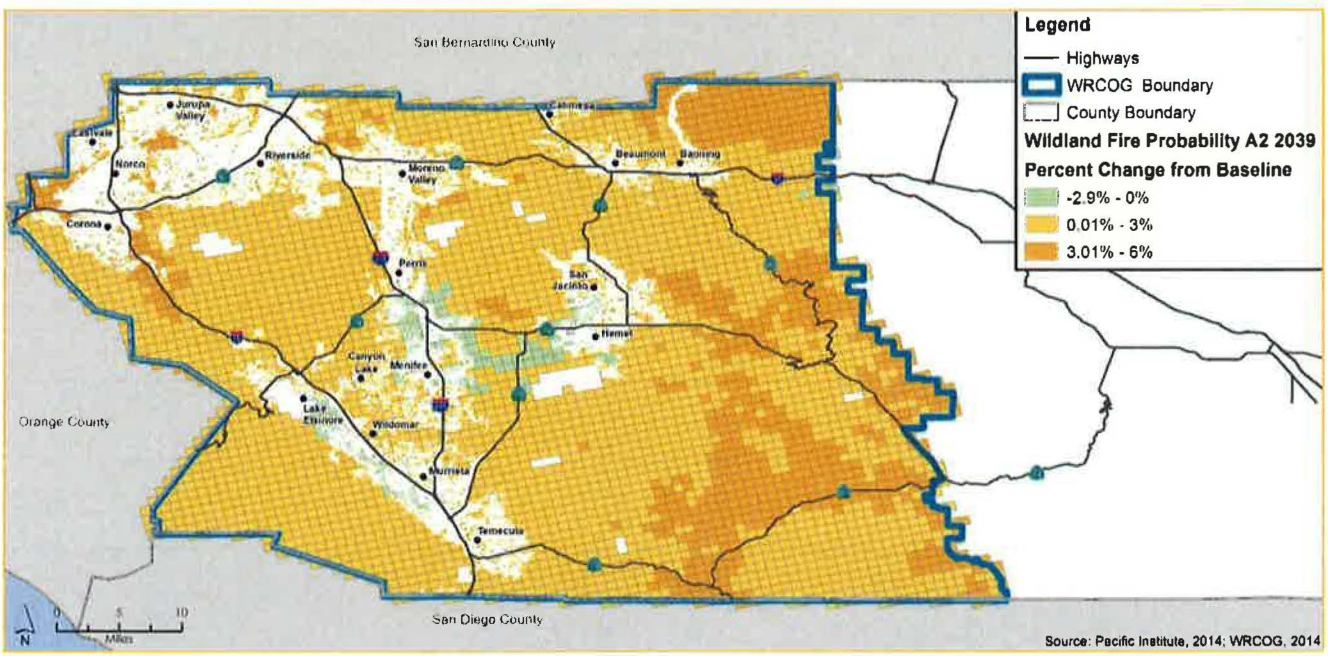


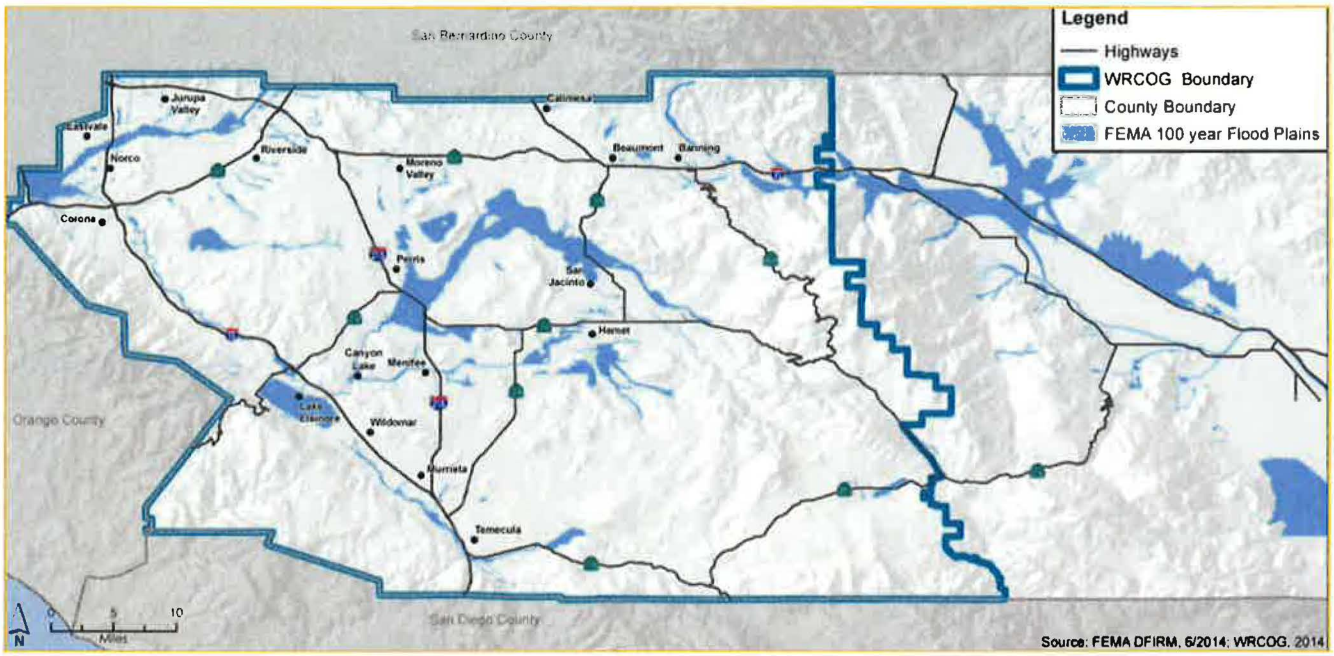
Figure 5-5: Change in Wildfire Risk, Baseline to 2039



FLOODING

The WRCOG subregion consists of valleys nestled within mountain ranges; this topography makes it susceptible to flooding. High volume monsoons are common in the summer. Although flooding may occur in other areas, the regulatory standard for identifying flood areas are through the Federal Emergency Management Agency (FEMA) special hazard flood zone maps, which identify 100-year flood zones.[2] **Figure 5-6** identifies FEMA 100-year flood zones for the subregion.

Figure 5-6: FEMA 100-Year Flood Zones



Although Southern California is likely to experience a decrease in overall precipitation levels due to climate change, the region is also expected to see an increase in the number of extreme precipitation events. A meteorological phenomenon known as the "atmospheric river," a narrow stream of extremely moist air, is frequently responsible for the more intense storms that strike California. Atmospheric rivers generally deliver high levels of precipitation, up to 50% of the state's total precipitation in any given year.

Some recent studies indicate that atmospheric rivers may strengthen as a result of climate change. This is expected to lead to an increase in the number of storms caused by atmospheric rivers (Dettinger 2012; Gershunov et al. 2013). Additionally, there is some indication that the most powerful atmospheric river storms will increase in intensity (Dettinger, Das, and Cayan, n.d.). Although there are no specific flooding projections for the subregion, flood events are expected to become more frequent, and it is possible that the areas subject to flooding will expand.

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[2] A 100-year flood is one that, given historic conditions, is expected to occur once every 100 years, or has a 1% chance of occurring in any given year.

KEY ADAPTATION ISSUES AND STRATEGIES

The next century will likely bring more extreme heat days, more wildfires, less potable water, and more extreme weather and flooding (CEC 2013). To understand how these changes could affect the subregion, WRCOG conducted a vulnerability assessment. Through the assessment, WRCOG identified how important structures, populations, and functions in the subregion would be vulnerable to extreme heat, wildfire, drought, and flooding. The vulnerability assessment process is documented in **Appendix A**. WRCOG identified nine priority issues through the vulnerability assessment process:

1. Planning and Emergency Response Frameworks
2. Disadvantaged Communities
3. Public Health
4. Transportation Infrastructure and Operations
5. Wildfire and Flood-Resilient Development
6. Electricity Resources and Reliability
7. Agriculture
8. Biological Resources
9. Plan Maintenance

This section describes a series of strategies to address each issue. The strategies provide recommendations for WRCOG and its member jurisdictions to consider when planning for the future. To assist with implementation, sample work plans are included which identify the potential implementing agency for each strategy (i.e., some strategies would be implemented by WRCOG, while others may be implemented by local governments).

There are numerous strategies in the CAP and local energy action plans, and through state programs, that increase resilience in the subregion. The strategies in this chapter are designed to remain consistent with these existing strategies without duplicating them.

ISSUE 1: PLANNING AND EMERGENCY RESPONSE FRAMEWORKS

Extreme heat, wildfires, and drought conditions are endemic to Riverside County; much of the subregion is prepared for these harsh conditions. As a result, most local governments and public safety departments are prepared to deal with wildfire, flooding, drought, and extreme heat (County of Riverside 2012). However, most of these agencies are currently prepared for these hazards as they have occurred historically, not as they are projected to occur. As the climate changes and these hazards increase in frequency and severity, public safety departments and governments in general will need to adapt in order to adequately provide services to their residents.

WRCOG conducted a policy audit to identify how local governments currently address the four hazards considered in this chapter and to determine the extent to which climate change is part of their planning framework. WRCOG obtained General Plan Safety Elements, Local Hazard Mitigation Plans (LHMP), and Emergency Operations Plans (EOP) for each member jurisdiction.[3] In general, flood and wildfire are planned for in all communities within the subregion. Extreme heat and drought, on the other hand, are only considered in the Riverside County Multi-Jurisdictional Local Hazard Mitigation Plan, which also considers climate change (County of Riverside 2012).

[3] Not all documents for all jurisdictions could be identified or obtained.

STRATEGIES FOR PLANNING AND EMERGENCY RESPONSE FRAMEWORKS

Strategy 1.1: Adopt a local climate adaptation plan.

WRCOG developed the Subregional CAP and this chapter to be used as resources by the subregion. Member jurisdictions that do not have their own CAP or similar GHG reduction plan are encouraged to take local action to adopt the Subregional CAP, including this adaptation chapter. Local governments that have adopted the Subregional CAP can adopt this additional chapter directly. Alternatively, local governments can utilize information from this chapter and the technical appendix and format this information to be consistent with their local CAPs or public safety planning documents.

- **Implementing Agency:** Local governments

Strategy 1.2: Integrate climate change adaptation considerations into public safety documents.

Almost all communities maintain plans to help prepare community members and municipal staff for disasters and other hazards, and to guide staff response once a disaster occurs. These plans can include General Plan Safety Elements, LHMPs, and EOPs, among others. Climate change-related emergencies can pose threats to human health and property, and should be included in public safety documents. Communities in the WRCOG subregion should strive to ensure that their public safety documents address emergencies that may be created or otherwise affected by climate change, including discussion on how the risks may be altered in the future by a changing climate. These plans should also be updated regularly to include the most recent and relevant climate change projections.

- **Implementing Agency:** Local governments

Strategy 1.3: Incorporate extreme heat and air quality annexes into emergency operations plans.

EOPs describe various emergency events that may threaten a community and how municipal staff should respond when emergencies occur. Extreme heat and air quality are not frequently addressed in EOPs, and existing emergency response protocols may not always be suitable for these types of events. To ensure that EOPs are fully responsive to these threats, communities in the WRCOG subregion should update their EOPs to include annexes on extreme heat and the degraded air quality that results from extreme heat and wildfire events. These annexes should describe the hazards (including how they may change in the future), and include any specific, necessary emergency response policies and practices to address these risks.

- **Implementing Agency:** Local governments

ISSUE 2: DISADVANTAGED COMMUNITIES

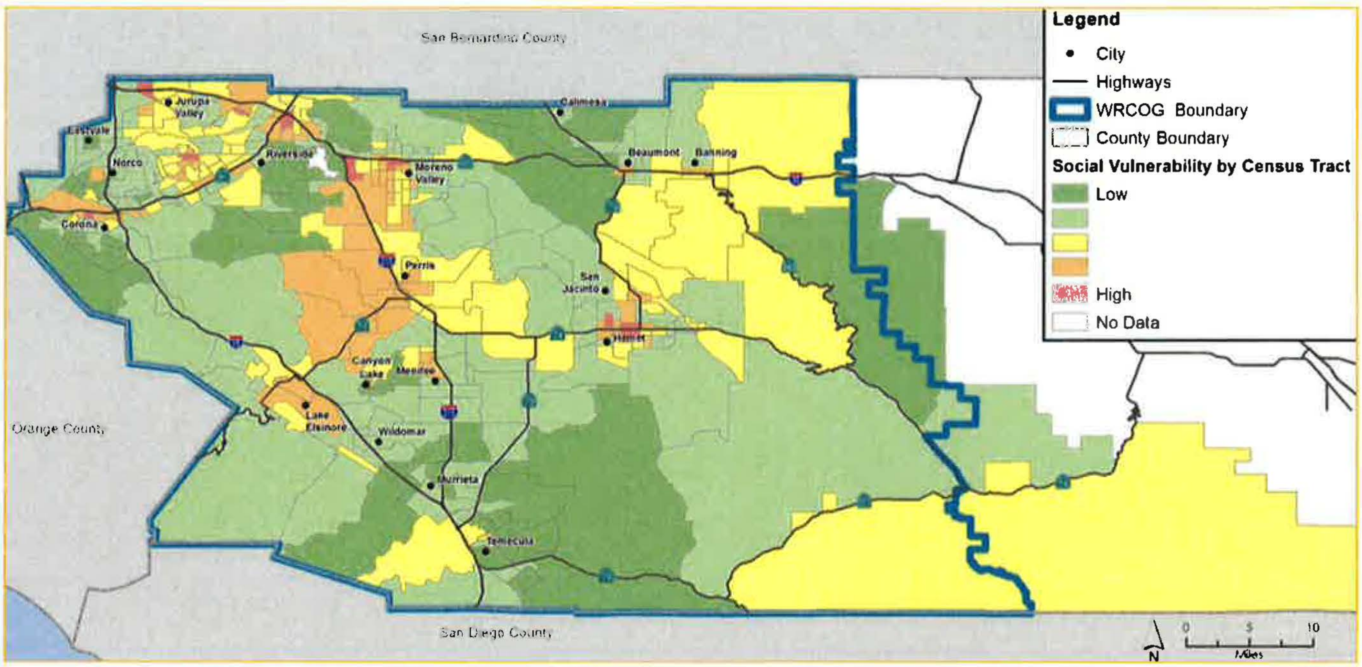
The diversity in socioeconomic conditions across Western Riverside County creates a disparity among communities' abilities to adapt to the four hazards identified in this chapter. For example, communities with older homes that lack modern insulation and air conditioning features are more vulnerable to increases in extreme heat than communities with newer homes. Similarly, local governments with resources to make significant investments in flood management infrastructure are more resilient than governments that cannot afford to maintain their existing flood management infrastructure.

In addition to discrepancies between jurisdictions, certain areas of the subregion have high levels of social vulnerability to climate change effects. Social vulnerability is the susceptibility of a given population to harm from exposure to a hazard based on its ability to prepare for, respond to, and recover from that hazard (Cooley et al. 2012). For example, individuals 65 years of age or older, who make up 3% of the subregion as a whole but as much as 30% in certain census tracts (Cal OEHHA 2014), are more susceptible to the adverse effects of heat than younger adults.

Similarly, low-income individuals are less likely to adapt to increased prices for food, water, and other basic necessities as a result of drought conditions. Some areas in the subregion have high rates of poverty; in some census tracts, over 70% of residents are identified as low income (Cal OEHHA 2014).

Social vulnerability to climate change effects is exacerbated by other variables including limited mobility, physical disabilities, language barriers, and the lack of a formal social support structure. To account for these multiple variables, WRCOG developed a Social Vulnerability Index, which identifies census tracts with demographic conditions that predict increased vulnerability to climate change effects. The index includes 17 social variables, which are detailed in **Appendix A**. **Figure 5-7** illustrates relative social vulnerability to climate change by census tract in the WRCOG subregion. The red areas show census tracts that were identified as having the highest social vulnerability, relative to other census tracts in Western Riverside County, while the dark green areas are census tracts with the lowest social vulnerability. The light green, yellow, and orange areas represent the range in between.

Figure 5-7: Social Vulnerability in the Subregion



STRATEGIES FOR DISADVANTAGED COMMUNITIES

Strategy 2.1: Host a subregional adaptation forum.

An effective subregional response to climate adaptation requires a collaborative and integrated approach. A subregional adaptation forum allows communities and other involved organizations to share information, develop partnerships, and craft unified policy responses. The forum could be a recurring event to ensure participants have access to the latest climate change projection information and project funding opportunities.

- **Implementing Agency:** WRCOG

Strategy 2.2: Provide a space for a menu of best practices on the WRCOG website.

Many communities have already invested in resiliency strategies. WRCOG can leverage these investments by sharing lessons learned and best practices with the rest of the subregion using the WRCOG website. Jurisdictions can use the website to share model ordinances, provide best practices for government operations, and coordinate subregional activities. WRCOG may also link publicly available climate data and provide best practices for using the data to update local plans.

- **Implementing Agency:** WRCOG

Strategy 2.3: Continue to develop resources and materials that effectively communicate with non-English speakers in emergency and evacuation situations.

It is vital that all residents have access to pertinent information during emergency situations such as updates on the status of the emergency, calls for evacuation, and the location of available shelters. This information should be made available in multiple languages, as non-English speakers can comprise up to one-third of all residents in some parts of the WRCOG subregion. WRCOG should use the Social Vulnerability Index to identify those parts of the subregion that are most in need of multilingual communications.

- **Implementing Agencies:** WRCOG, local governments, Cal Fire, Riverside County

Strategy 2.4: Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened.

Members of disadvantaged communities are most in need of a cooling center during extreme heat events. However, limited mobility and reduced access to information can make disadvantaged individuals less aware of available cooling centers or less able to travel to the nearest one. Communities can address this by locating cooling centers as close as possible to where disadvantaged individuals live. By establishing a set temperature for when cooling centers open, communities can help residents know with greater certainty if a center will be open, reducing confusion during times of emergency. WRCOG should help jurisdictions in the subregion work toward ensuring that a sufficient number of new cooling centers are located in areas with higher concentrations of disadvantaged individuals using the Social Vulnerability Index and other tools.

- **Implementing Agencies:** WRCOG, local governments, Cal Fire, Riverside County

Strategy 2.5: Identify ways for individuals with restricted mobility to reach cooling centers.

Communities and organizations should develop ways to ensure that individuals with mobility challenges, such as low-income residents, senior citizens, and physically disabled individuals, can reach a cooling center. For example, senior citizen housing complexes with their own shuttle services can include cooling centers as a destination during extreme heat events. Similarly, in locations with a large concentration of individuals with limited mobility, it may be effective to establish a temporary shuttle service to and from the nearest cooling center for the duration of the extreme heat event.

- **Implementing Agencies:** Local governments, Cal Fire, Riverside County

ISSUE 3: PUBLIC HEALTH

Climate change could degrade public health by directly affecting residents and employees. The increased health-care needs resulting from these hazards could strain the subregion's public health infrastructure (e.g., health-care facilities, health-care workers, emergency responders), particularly during emergencies or disasters.

Increased temperatures are expected to result in more intense and frequent extreme heat and poor air quality events, which pose health risks. Warmer temperatures may help the subregion support a larger population of disease-carrying organisms such as mosquitoes and ticks, potentially causing increased exposure to pathogens such as West Nile virus and the bacteria that cause Lyme disease (California Department of Public Health 2012).

Public health infrastructure faces potential direct effects as well. For example, by 2039, five existing hospitals, 13 existing community health agencies, and 10 existing mental health facilities in the subregion will be located in areas of elevated fire risk (WRCOG 2014b). Losing these facilities to fire, or losing their services to electricity outages during a fire, would degrade the capacity of health-care organizations to respond to emergencies or disasters. The combination of these effects could reduce access to and effectiveness of public health services, further increasing the vulnerability of the subregion, particularly among disadvantaged populations.

STRATEGIES FOR PUBLIC HEALTH

Strategy 3.1: Augment employee and worker training in industries with outdoor work, including assurance of adequate water, shade, rest breaks, training on heat risks, and vector-borne disease avoidance.

Health effects from climate change can be more severe for individuals who work outdoors, who constitute approximately 10% of the employed population in the WRCOG subregion (US Census Bureau 2010a), such as construction workers, landscapers and grounds crews, and agricultural workers. Extreme heat is the primary health risk for these workers, although elevated levels of air pollution and increased exposure to potential disease vectors such as ticks and mosquitoes can also pose hazards. The County and local governments can provide guidance to their employees, as well as work with the private sector, to ensure that outdoor employees are aware of the risks posed by these hazards and how to reduce them.

- **Implementing Agencies:** Local governments, Riverside County

Strategy 3.2: Identify and remedy poor drainage areas to reduce disease risk from stagnant water.

Stagnant water provides a breeding ground for mosquitoes, which in turn can increase the risk of mosquito-borne pathogens such as West Nile virus. Stagnant water can develop in areas of poor drainage following flood events, creating a health risk in the vicinity. Communities in the WRCOG subregion can identify poorly drained areas and complete infrastructure improvements so that they drain properly. If infrastructure improvements are not feasible, the community can categorize these locations as needing mosquito-control efforts following a flood event.

- **Implementing Agencies:** Local governments, Riverside County Flood Control and Water Conservation District (RCFC&WCD), Northwest Mosquito and Vector Control District

Strategy 3.3: Target critical health-care facilities' energy efficiency outreach programs.

Energy efficiency programs can help health-care facilities function more effectively during periods when the electricity grid may be stressed, such as during an extreme heat event. Even under normal conditions, financial savings from energy efficiency measures can be spent to improve quality of care and for other beneficial purposes. WRCOG and its member jurisdictions can work with local health-care facilities to promote grants and rebates for energy efficiency measures from various public and private organizations. WRCOG can also provide HERO-related outreach directly to eligible facilities.

- **Implementing Agencies:** WRCOG, local governments

Strategy 3.4: Work with local volunteer emergency response teams to include extreme heat as a hazard of concern and update core competencies to address the health-related risks of extreme heat events.

Although significant health risks are associated with extreme heat events, extreme heat is not always addressed as part of the training provided to volunteer emergency responders. Extreme heat events are expected to become more intense and more severe as climate change continues. To help ensure that volunteer emergency responders remain effective in WRCOG subregion communities, all volunteers should receive extreme heat training. This training should include the health threats posed by extreme heat, the individuals most at risk from extreme heat, and details on both preventative and curative care. Extreme heat training should also be included in required recurring training sessions.

- **Implementing Agencies:** Local governments, Cal Fire, Riverside County

Strategy 3.5: Include public health topics and invite appropriate staff to a subregional climate adaptation forum.

A subregional climate adaptation forum (Strategy 2.1) offers interested stakeholders an opportunity to share information about climate change adaptation in the WRCOG subregion and to develop adaptive strategies. Given the important public health implications of climate change, the subregional forum should include staff from agencies and organizations who work on public health issues and the forum's organizers should dedicate time to discussing these matters.

- **Implementing Agency:** WRCOG

ISSUE 4: TRANSPORTATION INFRASTRUCTURE AND OPERATIONS

Transportation infrastructure in the subregion is vulnerable to extreme heat, flooding, and wildfire. The average commute time in most of the WRCOG subregion exceeds 30 minutes each way and is greater than 45 minutes in some locations (US Census Bureau 2014). Extreme events caused by climate change may cause more substantial delays. For example, extreme heat can buckle asphalt and rails, slowing or even halting traffic along these routes. Floodwaters can wash away transportation lines or block transportation networks with debris. For safety reasons, roads and rail lines near active wildfires are often closed, and burned areas are more susceptible to landslides which may block roads long after a fire. A closed road or railway line can create congestion throughout the transportation network, causing impacts beyond the directly affected area (DOT 2011).

If major transportation routes are damaged and in need of repair, congestion and delays may continue for months after the event. Public transportation may also be disrupted by damage to transit stops and stations, creating further congestion and mobility problems for individuals lacking access to personal vehicles. Additionally, some emergency events may directly damage transit vehicles, such as floods and fires that affect bus or rail storage facilities. Individuals who maintain and operate transportation networks may also face increased health risks from exposure to extreme events, particularly high temperatures.

Flooding can damage roadways and drainage infrastructure, trigger mudslides, and remove sediment around abutments and piers, which may compromise bridge structures. Approximately six major bridges, including two across I-15, and dozens of smaller bridges are located within 100-year flood zones. Most bridges are designed to span the floodplain, but many are in disrepair. Approximately 15 Arizona crossings (also known as fords) are located in 100-year flood zones (WRCOG 2014c). Because more frequent and intense 100-year floods are anticipated, this could extend periods where such crossings are flooded and impassible (Dettinger 2012), and may damage roads. Certain residential communities can only be accessed by roads with Arizona crossings.

Similarly I-15, I-215, Ramona Expressway, and State Routes 74 and 79 are critical evacuation routes that run through large areas of 100-year flood zones (WRCOG 2014c).

STRATEGIES FOR TRANSPORTATION INFRASTRUCTURE AND OPERATIONS

Strategy 4.1: Use materials and features in transportation infrastructure that can improve resiliency to extreme events.

Agencies can take a number of steps to increase transportation resiliency including the use of special sealants and other materials can help prevent roadways from softening during extreme heat or fire, treating rail lines to be heat-resistant, and incorporating expansion joints into rails that reduce the risk of damage during high temperatures. Roads and railways can also be built on foundations that are resistant to being washed away during flood events. Transportation agencies should integrate these features into all new construction projects throughout the WRCOG subregion.

Implementing Agencies: WRCOG, Riverside County Transportation Commission (RCTC), Riverside County, local governments

Strategy 4.2: Facilitate coordination of traffic signal systems between adjacent communities

Traffic signal synchronization involves adjusting the timing of traffic signals so that a vehicle traveling on a major roadway reaches each intersection during a green light. This allows vehicles to move rapidly with little or no idling time. In addition to reducing air pollution and GHGs, signal synchronization allows faster movement of emergency response vehicles and can facilitate more effective evacuation during emergency events. Given the expected increase in wildfires and extreme weather events, increasing evacuation effectiveness will become critically important.

Within the WRCOG subregion, a major roadway may cross the boundaries of multiple communities, so the transportation agencies in the subregion should coordinate their synchronization efforts to ensure that traffic can continue to flow rapidly across jurisdictional boundaries. RCTC and the California Department of Transportation (Caltrans) would be important partners in the implementation of this strategy.

- **Implementing Agencies:** WRCOG, RCTC, Caltrans, Riverside County, local governments

Strategy 4.3: Commission studies to simulate how expanded wildfire or flooding impacts might affect the transportation system

While there are projections for how wildfire or flooding may affect the WRCOG subregion in the future, this information does not allow for a detailed analysis of particular effects on specific transportation infrastructure components. This detailed information is necessary to prioritize preventative maintenance, to identify alternative routes, and for other emergency preparedness work. The transportation agencies in the WRCOG subregion should initiate studies to investigate the specific effects of climate change on the area's transportation infrastructure, and use the results to develop and implement strategies that reduce risks to the infrastructure.

- **Implementing Agencies:** WRCOG, RCTC, Riverside County

Strategy 4.4: Commission evacuation studies for more frequent and severe wildfire and flood events.

Transportation agencies in the WRCOG subregion should conduct evacuation studies to identify areas where evacuations may be problematic, and take steps to improve infrastructure in these areas.

- **Implementing Agencies:** WRCOG, RCTC, Riverside County

Strategy 4.5: Coordinate with regional transit providers to identify alternative routes and stops if normal infrastructure is damaged or closed as a result of extreme events.

Disruptions to transit services can deprive some residents of their only means of travel. To help ensure that transit services can continue to operate during and after extreme events, transit providers should identify alternate routes and stops in the event that they can no longer use normal infrastructure. These alternative routes and stops should be located as close to the normal routes and stops as possible to minimize disruption. The location of alternative routes should also be clearly communicated to riders through signage and flyers, television, radio, print media, and digital services. All communication should occur in relevant languages and be culturally appropriate.

- **Implementing Agencies:** WRCOG, Riverside Transit Agency, Riverside County, local governments

ISSUE 5: WILDFIRE AND FLOOD-RESILIENT DEVELOPMENT

While drought and extreme heat more or less affect the entire subregion, wildfire and flooding have specific spatial bounds. As the climate changes, the amount of area at elevated risk for such spatially limited hazards may increase (CEC 2013). Areas that are currently vulnerable to wildfires and floods may face these hazards more frequently, and the hazards themselves may be more severe.

Wildfires and floods may begin to affect areas that are not currently vulnerable to these hazards. These risks may be exacerbated by high development pressure, resulting in more buildings and infrastructure built in high-risk areas. Wildfires and floods already occur in the WRCOG subregion; in general, the subregion is well prepared to mitigate and deal with current wildfire and flood effects on urban environments (County of Riverside 2012). However, increases in frequency and severity could increase vulnerability.

As mentioned above, different communities are especially vulnerable or resilient to climate change effects. This is particularly true for spatial hazards like wildfire and flood, where rapid evacuation may be necessary. For example, there are 20 census tracts in projected 2039 high fire risk areas where 10% or more of the current population do not have access to a vehicle (Krawchuk and Moritz 2012; Cal OEHHA 2014). In these locations, individuals will likely need assistance if evacuation is necessary. The lack of vehicle access may make it difficult for such individuals to move to safer areas during extreme events. **Figures 5-8** and **5-9** illustrate how projected flood and wildfire hazards are expected to affect current socially vulnerable communities.

Figure 5-8: Flood Hazards and Social Vulnerability

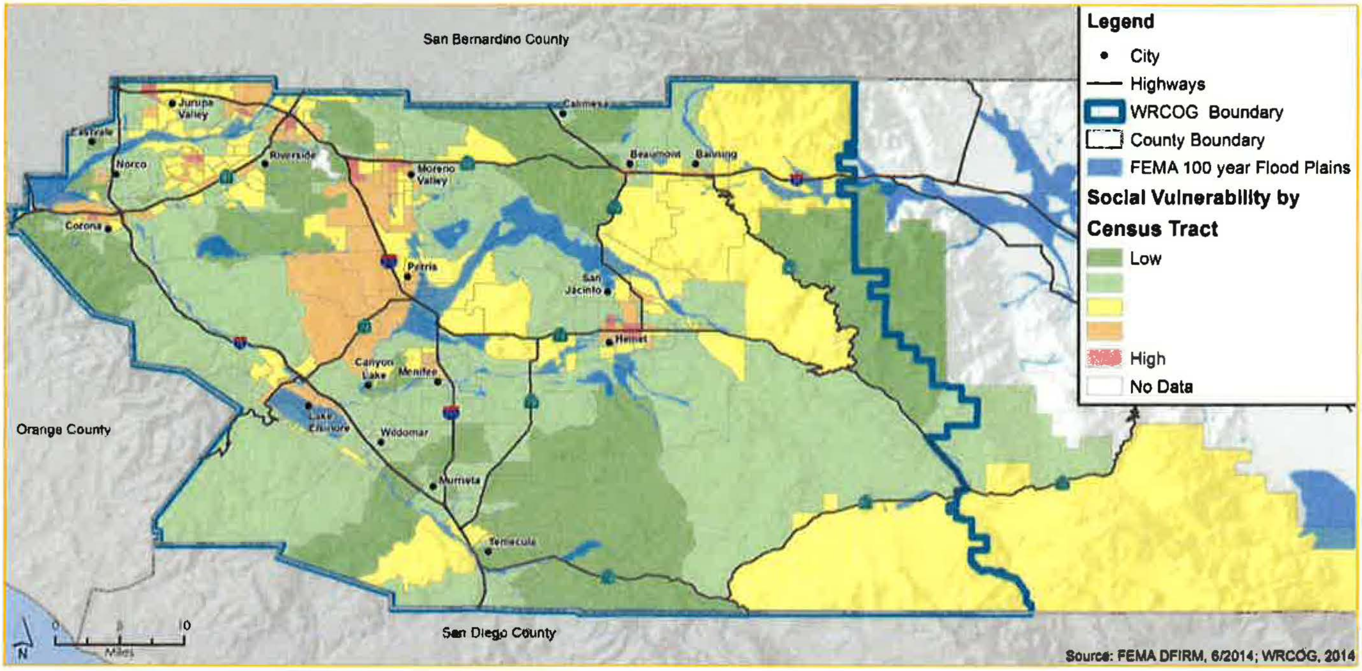
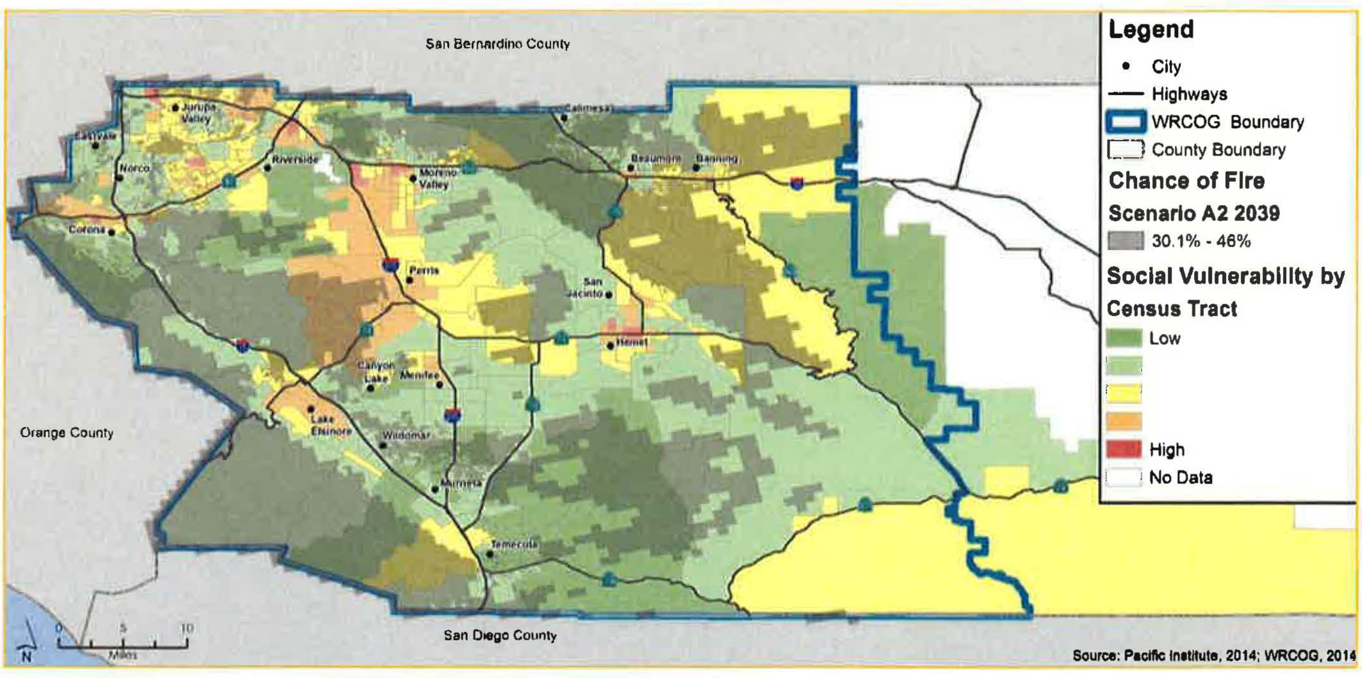


Figure 5-9: Wildfire Hazards and Social Vulnerability, 2039



In addition to vehicle access, a number of additional factors make residents or employees more vulnerable to flooding and wildfire. First, individuals with disabilities could have limited mobility and could be medically dependent on electric devices. There are six census tracts in projected 2039 high fire risk areas where 20% or more of the current population has some type of disability. Physically disabled individuals may have limited mobility in case of an evacuation, and respiratory problems could be aggravated by smoke.

Second, nearly every census tract in projected 2039 high fire risk areas currently has at least 20% of households living at two times below the federal poverty level. Low-income individuals are less likely to have access to high quality housing units, support networks, or other resources that limit exposure to poor air quality or protect against fire. They are also less able to recover and rebuild their quality of life if fire results in destruction of their property or affects their health.

Third, there are 12 census tracts located in projected 2039 high fire risk areas where 20% or more of the current employed population has an outdoor occupation (Krawchuk and Moritz 2012; US Census Bureau 2010a). Outdoor workers are directly impacted by poor air quality caused by wildfire.

Fourth, houses near high fire risk areas are at increased risk of burning. In the WRCOG subregion, 51,875 acres of residential land are currently located in an elevated fire risk area. This acreage is expected to increase to 107,749 acres around 2039 (this does not account for new development, which will increase this figure) (Krawchuk and Moritz 2012).

Fifth, at least 20% of owner-occupied households are overpaying for housing in approximately 75% of census tracts located in the 100-year floodplain (FEMA 2014; Cal OEHHA 2014). At least 20% of renter-occupied households are overpaying for housing in approximately 20% of census tracts located in the 100-year floodplain (FEMA 2014; Cal OEHHA 2014). Individuals paying a high percentage of their income on housing may have fewer resources available to limit exposure to flooding (FEMA 2014; Cal OEHHA 2014). The higher cost of housing may also result in greater financial losses from a given flood event.

Finally, nearly 75% of census tracts located in the 100-year floodplain have at least 20% of households living two times below the federal poverty level (Cal OEHHA 2014). Low-income individuals are less likely to have access to high-quality housing units or access to the necessary resources (e.g., sandbags) to protect their homes from flooding. They are also less able to recover and rebuild if flooding results in destruction of property or degraded health.

STRATEGIES FOR WILDFIRE AND FLOOD-RESILIENT DEVELOPMENT

Strategy 5.1: Continue to provide information to homeowners about statutory vegetation management requirements.

California law requires landowners in areas with flammable groundcover (e.g., forest, brush, grasslands) to maintain defensible space around buildings that can help slow or prevent the spread of wildfire. Local communities and fire protection agencies may require additional vegetation management and other defensible space requirements. While these standards can reduce wildfire risk, not all landowners may be aware of them and may not take appropriate action. Local communities can work with fire protection agencies to provide information to landowners about creating defensible space.

- **Implementing Agencies:** WRCOG, Cal Fire, local governments

Strategy 5.2: Encourage retrofits of hardscaped areas to use permeable paving.

Permeable surfaces allow water to filter through them into the soil below, in contrast to conventional hardscape paving (water that falls on these surfaces runs off and often ends up in a storm drain). By increasing opportunities for water to soak into the ground instead of running off, permeable paving decreases the amount of water on the surface and can minimize flooding. Additionally, permeable paving can replenish groundwater supplies and may qualify as a "cool surface" compared to conventional heat-absorbing surfaces such as asphalt, reducing the urban heat island effect. Local communities can encourage landowners to use permeable paving when making retrofits to sidewalks/pedestrian plazas, driveways, parking lots, and other large hardscaped areas where soil conditions and practical application are cost effective and efficient. Policies encouraging the use of these materials should be integrated into local development codes and communicated to project applicants as part of the ongoing project review process.

- **Implementing Agency:** Local governments

Strategy 5.3: Establish neighborhood and building design standards that minimize fire hazards in high wildfire risk areas.

Numerous design strategies can make buildings more resilient to wildfire, including using fire-resistant materials in the walls and roofs of buildings, fire-resistant window shutters and doors, and hardscaped defensive areas (e.g., patios, swimming pools) around houses. New neighborhoods can also improve resistance to wildfires by using fire-resistant plants and landscaping materials, and by including multiple ingress and egress routes that facilitate evacuations and emergency vehicle movement as needed. Local communities can adopt these provisions using design guidelines, then recommend them through the ongoing development review process and community outreach.

- **Implementing Agency:** Local governments

Strategy 5.4: Restore riparian corridors, soft-bottomed streambeds, and seasonal flood basins that reduce flood hazards.

While converting natural streams to concrete channels can provide flood management benefits in the immediate area, these actions can also exacerbate downstream flood risks. Concrete banks and streambeds offer little opportunity for water to absorb in the ground and present few obstacles to slow the water down, which can lead to a large volume of fast-moving water that may pose hazards. Local communities can work to restore these streams to their natural state, which allows water to slow down and percolate into the ground, potentially reducing flood risks. Natural riparian areas can act as green infrastructure, providing a cooling benefit during extreme heat events. Natural riparian corridors also provide habitat and help connect open space areas to improve the well-being of vegetation communities.

- **Implementing Agency:** Local governments

Strategy 5.5: Encourage the use of low-impact development practices in new development. Low-impact development (LID) uses natural systems and principles to manage stormwater, rather than relying exclusively on concrete drainage channels and storm drains. In many LID systems, water is channeled into landscaped areas, where plants slow the water and allow it to percolate into the ground, reducing runoff and potentially decreasing flood risk. Communities in the WRCOG subregion should promote use of LID principles where practical and where local conditions are suitable through the ongoing development review process and public outreach.

- **Implementing Agency:** Local governments

Strategy 5.6: Avoid siting important infrastructure in or near flood areas. Important infrastructure should not be located in areas that are currently recognized as flood areas or locations that may be vulnerable to flooding within the infrastructure's expected operational life. Keeping important infrastructure out of flood zones decreases the risk of damage or destruction by floodwaters, reducing reconstruction costs and allowing the infrastructure to continue to function during a flood event. If there is no feasible alternative location for an important piece of infrastructure, the facility should be designed to reduce the risk of flood damage to the extent possible.

- **Implementing Agencies:** WRCOG, local governments, RCFC&WCD, RCTC

ISSUE 6: ELECTRICITY RESOURCES AND RELIABILITY

The electrical grid can be less efficient and more prone to breaking down during periods of high temperatures. The US Department of Energy (DoE) estimates that for a 9-degree increase in temperature, transmission line capacity falls by 7%–8% and substation capacity falls by 2%–4% (DoE 2013). These problems are compounded when electricity demand spikes during a heat wave, primarily due to increased air conditioning loads. This can in turn cause health and safety problems when power losses shut down key pieces of equipment.

Because electricity is more expensive during summer afternoons and early evenings, the increased need for air conditioning may also create economic hardships for low-income households. Approximately 34% of housing units in Riverside County were built before 1980 (US Census Bureau 2010b). These homes are more likely to be energy inefficient, making them less likely to retain cool temperatures in the event of a power outage during warm weather. In the Riverside/San Bernardino/Ontario metropolitan area, which includes the WRCOG subregion, 91% of homes have central or in-room air conditioning (US Census Bureau 2011). Older homes may require air conditioners to be used more often due to the home's inefficiency, which can put stress on the grid and increase the occupants' electricity bill. Residents, businesses, and government operations in the WRCOG subregion can reduce their dependence on the electricity grid by promoting energy efficiency and renewable energy, which decreases stress on the grid and reduces utility bills.

In addition to electricity, the subregion has access to natural gas, an affordable and dependable energy source. As part of the technical work undertaken to prepare the chapter, WRCOG reviewed how natural gas infrastructure is vulnerable to climate change. Since natural gas infrastructure is largely located underground, it is already highly resilient to the climate change impacts discussed in this analysis. Therefore, this chapter does not provide natural gas climate change vulnerability strategies.

STRATEGIES FOR ELECTRICITY RESOURCES AND RELIABILITY

Strategy 6.1: Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.

Many of the materials in urbanized areas, such as asphalt and building roofing materials, can radiate heat back to the environment, creating higher temperatures than in rural areas; this is known as the urban heat island effect. By contrast, green infrastructure such as plants and landscaped areas can help reduce temperatures around them, creating a cooler urban environment. Green infrastructure installations should be designed to be drought-tolerant in order to survive and continue to provide benefit during times of little or no rainfall.

- **Implementing Agencies:** WRCOG, local governments

Strategy 6.2: Amend the local development code to require high-reflectivity pavement or increased tree cover in large commercial parking lots.

The dark asphalt surfaces of large parking lots absorb light and radiate large amounts of heat, raising temperatures in the immediate area and increasing the intensity of extreme heat events, which may be particularly problematic for individuals who are highly vulnerable to high temperatures. Communities can address this problem by amending local development codes to require large parking lots to be constructed using materials that radiate less heat, such as high-reflectivity surfaces that do not absorb as much light.

Shade trees, which communities can require for parking lots, also block light from being absorbed and create shaded areas that provide additional cooling effects. Development codes requiring shade trees or other green infrastructure should specify that all plants be drought-resistant in order to provide benefit during times of little or no rainfall. Development codes should also offer flexibility to allow successful implementation under varying local conditions within the subregion.

- **Implementing Agency:** Local governments

Strategy 6.3: Identify and implement municipal renewable energy projects for daily and emergency operations.

Municipal renewable energy measures, together with local municipal energy action plans, offer a number of benefits, including saving taxpayer money and providing a platform to demonstrate leadership. Additionally, these actions allow communities to function with improved effectiveness during periods when the electricity grid is stressed, such as during high heat events. Large renewable energy systems in combination with extensive energy efficiency retrofits allow buildings to produce as much energy as they use, resulting in zero net energy. These buildings can be designed to be entirely grid-independent, allowing them to continue to function for long periods during prolonged power failures.

- **Implementing Agency:** Local governments

Strategy 6.4: Expand participation in the HERO program, identify additional improvements to finance through the HERO program, and consider new approaches to target neighborhoods for focused outreach.

Some residents in the subregion may be unaware of the opportunities the HERO program can offer. Many of these residents may be elderly individuals, people with limited English skills, low-income individuals, or otherwise members of a disadvantaged community. WRCOG communities can expand their HERO outreach events to reach locations with a large proportion of disadvantaged individuals as determined by the Social Vulnerability Index.

- **Implementing Agency:** WRCOG, local governments

ISSUE 7: AGRICULTURE

Agriculture is a major activity in Riverside County, and in 2013 the county produced over $1.3 billion in agricultural products. Agricultural activities can be highly vulnerable to the impacts of climate change, including drought conditions and extreme heat. In 2014, drought conditions cost agriculture in California approximately $2.2 billion, and costs may be substantially higher in the future if continued drought further depletes groundwater supplies (Howitt et al. 2014). Additionally, changes to temperatures and precipitation patterns may increase the prevalence of weeds, pest insects, and other organisms that damage agricultural products. Although agriculture is slowly declining in some parts of the subregion with urbanization, local agriculture (mainly nurseries, cattle farms, and dairy operations) still plays an important role in the local economy and culture. Other predicted effects of increased warming on agriculture include yield changes, alteration of viable crop types, new/increased diseases and pest invasions, pollination changes, and increased stress on crops and animals, resulting in losses of crop quality and yield and increasing the risk of livestock morbidity and mortalities (CEC 2006).

In addition to temperature changes, wildfire may also become an elevated issue for agricultural resources. There are currently 84,392 acres of agricultural land in an area of elevated fire risk in the WRCOG subregion. This number is expected to rise to 154,376 acres by 2039 (Krawchuk and Moritz 2012).

STRATEGIES FOR AGRICULTURE

Strategy 7.1: Work with regional education and farming organizations to develop and distribute best practices for responding to anticipated changes such as more resilient pests, new weeds, reduced water availability, and altered growing seasons.

Farmers and ranchers can increase resiliency to climate change through more efficient irrigation practices, the use of biological control agents to target new pest organisms, changes to planting and land management techniques, and expanding into crops that are better suited for a warmer and drier climate. Regional farming organizations, in collaboration with the County Agricultural Commissioner's office and educational institutions such as the University of California, Riverside (UCR), can help distribute information about these ways to reduce risks.

- **Implementing Agency:** WRCOG, UCR, Riverside County, local governments

Strategy 7.2: Encourage efficient irrigation techniques and identify financial resources to support installation.

High-efficiency irrigation techniques (e.g., drip irrigation) can meet the water needs of crops using substantially less water than conventional irrigation systems. They are highly suitable for areas under increased drought pressure such as the WRCOG subregion. However, high-efficiency irrigation systems often have a high upfront cost that may exceed the financial resources of some farmers. The HERO program should target agricultural users in future outreach programs.

- **Implementing Agency:** WRCOG

Strategy 7.3: Promote secondary revenue streams that support a strong, sustained agricultural sector.

Farmers and ranchers face many financial pressures, even without the added stresses caused by climate change. To help agriculture remain viable, communities in the WRCOG subregion can support secondary activities that allow farmers and ranchers to generate additional revenue. For example, farmers and ranchers could devote part of their land to agritourism operations such as direct marketing (e.g., farm stalls, self-pick operations), small-scale processing, retail sales of commodities, and picnic and event space. Other potential sources of revenue include setting aside land for habitat conservation, carbon sequestration and carbon offsets, biomass energy generation, or small-scale renewable energy systems. Communities should alter local development codes to allow these types of operations with minimal permitting and financial barriers for landowners, and promote these operations through tourism and other marketing opportunities.

- **Implementing Agency:** Local governments

ISSUE 8: BIOLOGICAL RESOURCES

Biological communities in the WRCOG subregion are highly variable and include desert scrubs, riparian areas and vernal pools, meadows and marshes, and mountain forests (Western Riverside County Regional Conservation Authority 2003). Many of these communities are highly vulnerable to the effects of climate change, such as wildfire, extreme heat, and drought (CEPA and OEHHA 2013). These communities may not be adapted to extreme events and may have a difficult time reestablishing following a disaster, particularly if these events occur more frequently. Climate change may also indirectly threaten existing biological communities in the WRCOG subregion by making the climate in the area more suitable for invasive species, which may out-compete native species for food and other resources.

STRATEGIES FOR BIOLOGICAL RESOURCES

Strategy 8.1: Incorporate climate change projections in future conservation plans.

Threats posed by climate change to biological communities are varied and may not be fully accounted for in the existing Western Riverside County Multiple Species Habitat Conservation Plan. In order to help ensure the long-term success of the biological communities in the WRCOG subregion, local governments and advocacy groups should work with state and regional agencies to include detailed analyses of how climate change may threaten native habitats and species. These analyses should be used to develop and implement strategies to protect these biological communities in the future.

- **Implementing Agencies:** WRCOG, Western Riverside County Regional Conservation Authority, local governments

Strategy 8.2: Continue to monitor and research the potential impacts of climate change on local habitat and wildlife.

While conservation plans are often developed by state and regional agencies, local communities can also protect habitat and wildlife through planning, through updates to conservation and/or open space elements of local general plans. As with state and regional conservation plans, any local conservation planning efforts should address the risk of climate change on biological communities.

- **Implementing Agency:** Local governments

ISSUE 9: PLAN MAINTENANCE

Climate change is a dynamic topic, with projections and research updated and released regularly. The adaptive needs of residents and businesses in the WRCOG subregion may change with new climate conditions and demographic shifts. WRCOG will regularly update this chapter of the Subregional CAP to ensure measures are adjusted based on ongoing performance and to incorporate best available climate change data.

STRATEGIES FOR PLAN MAINTENANCE

Strategy 9.1: Monitor and refresh climate change projections.

This chapter recommends several strategies to incorporate climate change projections in local planning documents. These projections can change as new science emerges, GHG emission levels deviate from forecasted paths, or as forecasting tools improve. As the policies in these plans depend upon assessments of future climate change effects, any changes to projections may alter the effectiveness or prioritization of individual strategies. To address this, WRCOG should regularly update this chapter of the Subregional CAP. Local plans that include a discussion of climate change effects should be updated concurrently with WRCOG's update to incorporate the most current information.

- **Implementing Agencies:** WRCOG, local governments

Strategy 9.2: Update the adaptation chapter when the Subregional CAP is updated, and encourage local governments to update their own local adaptation plans concurrent with the local hazard mitigation plan update cycle.

WRCOG may update the Subregional CAP as needed to include a new GHG inventory, modify existing GHG reduction measures, or make other changes to the document. When this happens, WRCOG should also update this adaptation chapter to ensure it includes the most recent science and descriptions of climate change-related hazards, and to revise the adaptation measures as needed. WRCOG should also encourage individual communities to develop local climate adaptation plans and to update them along with their own local hazard mitigation plans to keep the documents current and fully integrated.

- **Implementing Agencies:** WRCOG, local governments

Strategy 9.3: Assess the implementation status and effectiveness of adaptation strategies.

WRCOG and local communities should closely monitor implementation of policies in this adaptation chapter, and determine if the strategies are working as intended. If not, WRCOG and local communities should alter implementation to improve effectiveness.

- **Implementing Agencies:** WRCOG, local governments

WORK PLANS

This section organizes the adaptation strategies into a work plan for WRCOG and a work plan for local governments.

WRCOG

WRCOG should implement the following strategies to increase subregional resilience.

WRCOG Strategy		Key Issue
2.1	Host a subregional adaptation forum.	Disadvantaged Communities
2.2	Provide a space for a menu of best practices on the WRCOG website.	Disadvantaged Communities
2.3	Continue to develop resources and materials that effectively communicate with non-English speakers in emergency and evacuation situations.	Disadvantaged Communities
2.4	Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened.	Disadvantaged Communities
3.3	Target critical health-care facilities' energy efficiency outreach programs.	Public Health
3.5	Include public health topics and invite appropriate staff to a subregional climate adaptation forum.	Public Health
4.1	Use materials and features in transportation infrastructure that can improve resiliency to extreme events.	Transportation Infrastructure and Operations
4.2	Facilitate coordination of traffic signal systems between adjacent communities.	Transportation Infrastructure and Operations
4.3	Commission studies to simulate how expanded wildfire or flooding impacts might affect the transportation system.	Transportation Infrastructure and Operations
4.4	Commission evacuation studies for wildfire and flood events.	Transportation Infrastructure and Operations
4.5	Coordinate with regional transit providers to identify alternative routes and stops if normal infrastructure is damaged or closed as a result of extreme events.	Transportation Infrastructure and Operations
5.1	Continue to provide information to homeowners about statutory vegetation management requirements.	Wildfire and Flood-Resilient Development
5.6	Avoid siting important infrastructure in or near flood areas.	Wildfire and Flood-Resilient Development

WRCOG Strategy		Key Issue
6.1	Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.	Electricity Resources and Reliability
6.4	Expand participation in the HERO program, identify additional improvements to finance through the HERO program, and consider new approaches to target neighborhoods for focused outreach.	Electricity Resources and Reliability
7.1	Work with regional education and farming organizations to develop and distribute best practices for responding to anticipated changes such as more resilient pests, new weeds, reduced water availability, and altered growing seasons.	Agriculture
7.2	Encourage efficient irrigation techniques and identify financial resources to support installation.	Agriculture
8.1	Incorporate climate change projections in future conservation plans.	Biological Resources
9.1	Monitor and refresh climate change projections.	Plan Maintenance
9.2	Update the adaptation chapter when the Subregional CAP is updated, and encourage local governments to update their own local adaptation plans concurrent with the local hazard mitigation plan update cycle.	Plan Maintenance
9.3	Assess the implementation status and effectiveness of adaptation strategies.	Plan Maintenance

LOCAL GOVERNMENTS

Local governments should implement the following strategies to increase local and subregional resilience.

	Local Government Strategy	Key Issue
1.1	Adopt a local climate adaptation plan.	Planning and Emergency Response Frameworks
1.2	Integrate climate change adaptation considerations into public safety documents.	Planning and Emergency Response Frameworks
1.3	Incorporate extreme heat and air quality annexes into emergency operations plans.	Planning and Emergency Response Frameworks
2.3	Continue to develop resources and materials that effectively communicate with non-English speakers in emergency and evacuation situations.	Disadvantaged Communities
2.4	Identify and map cooling centers in locations accessible to vulnerable populations and establish standardized temperature triggers for when they will be opened.	Disadvantaged Communities
2.5	Identify ways for individuals with restricted mobility to reach cooling centers.	Disadvantaged Communities
3.1	Augment employee and worker training in industries with outdoor work, including assurance of adequate water, shade, rest breaks, training on heat risks, and vector-borne disease avoidance.	Public Health
3.2	Identify and remedy poor drainage areas to reduce disease risk from stagnant water.	Public Health
3.3	Target critical health-care facilities' energy efficiency outreach programs.	Public Health
3.4	Work with local volunteer emergency response teams to include extreme heat as a hazard of concern and update core competencies to address the health-related risks of extreme heat events.	Public Health
4.1	Use materials and features in transportation infrastructure that can improve resiliency to extreme events.	Transportation Infrastructure and Operations
4.2	Facilitate coordination of traffic signal systems between adjacent communities.	Transportation Infrastructure and Operations
4.5	Coordinate with regional transit providers to identify alternative routes and stops if normal infrastructure is damaged or closed as a result of extreme events.	Transportation Infrastructure and Operations
5.1	Continue to provide information to homeowners about statutory vegetation management requirements.	Wildfire and Flood-Resilient Development
5.2	Encourage retrofits of hardscaped areas to use permeable paving.	Wildfire and Flood-Resilient Development
5.3	Establish neighborhood and building design standards that minimize fire hazards in high wildfire risk areas.	Wildfire and Flood-Resilient Development

	Local Government Strategy	Key Issue
5.4	Restore riparian corridors, soft-bottomed streambeds, and seasonal flood basins that reduce flood hazards.	Wildfire and Flood-Resilient Development
5.5	Encourage the use of low-impact development practices in new development.	Wildfire and Flood-Resilient Development
5.6	Avoid siting important infrastructure in or near flood areas.	Wildfire and Flood-Resilient Development
6.1	Promote and expand the use of drought-tolerant green infrastructure, including street trees, and landscaped areas as part of cooling strategies in public and private spaces.	Electricity Resources and Reliability
6.2	Amend the local development code to require high-reflectivity pavement or increased tree cover for large commercial parking lots.	Electricity Resources and Reliability
6.3	Identify and implement municipal renewable energy projects for daily and emergency operations.	Electricity Resources and Reliability
6.4	Expand participation in the HERO program, identify additional improvements to finance through the HERO program, and consider new approaches to target neighborhoods for focused outreach.	Electricity Resources and Reliability
7.1	Work with regional education and farming organizations to develop and distribute best practices for responding to anticipated changes such as more resilient pests, new weeds, reduced water availability, and altered growing seasons.	Agriculture
7.3	Promote secondary revenue streams that support a strong, sustained agricultural sector.	Agriculture
8.1	Incorporate climate change projections in future conservation plans.	Biological Resources
8.2	Continue to monitor and research the potential impacts of climate change on local habitat and wildlife.	Biological Resources
9.1	Monitor and refresh climate change projections.	Plan Maintenance
9.2	Update the adaptation chapter when the Subregional CAP is updated, and encourage local governments to update their own local adaptation plans concurrent with the local hazard mitigation plan update cycle.	Plan Maintenance
9.3	Assess the implementation status and effectiveness of adaptation chapter measures.	Plan Maintenance

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PART 3:
Appendices

APPENDIX A

HEMET COMMUNITY ENERGY ACTION PLAN

CITY OF HEMET

Community Energy Action Plan

January 2014

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CONTENTS

Chapter 1 **Introduction** **1-1**

1.1 Action Plan Development Task Purpose, Goals, and Objectives 1-3

1.2 Regulatory Setting 1-4

Chapter 2 **Energy Demand** **2-1**

2.1 Current Energy Demand 2-2

2.2 Future BAU Energy Demand 2-5

Chapter 3 **Community Greenhouse Gas Inventory** **3-1**

3.1 Setting and Methodology 3-2

3.2 Baseline Community-wide Energy GHG Inventory 3-3

3.3 Future BAU Community-wide Energy Emissions 3-5

3.4 Reduction Targets 3-9

Chapter 4 **Reductions and Existing Programs** **4-1**

4.1 Existing Local Programs 4-3

4.2 Energy Reduction Measures 4-5

4.3 Water Reduction Measures 4-13

4.4 Summary of the Reductions 4-14

4.5 Comparison to Targets 4-16

Chapter 5 **Implementation** **5-1**

5.1 STEP 1—Administration and Staffing 5-2

5.2 STEP 2—Financing and Budgeting 5-2

5.3 STEP 3—Measure Implementation 5-6

5.4 STEP 4—Public Participation 5-7

5.5 STEP 5—Monitoring and Inventorying 5-7

5.6 STEP 6—Beyond 2020 5-8

Chapter 6 **References** **6-1**

Appendix A **GHG Calculations**

Appendix B **Utility Data**

TABLES

Table 1-1	Hemet General Plan Polices Related to Energy, Water, and GHG Reduction	1-9
Table 2-1	Hemet General Plan 2010 Land Uses	2-2
Table 2-2	2010 Community-wide Electricity Usage	2-4
Table 2-3	2010 Community-wide Natural Gas Usage	2-4
Table 2-4	2010 Community-wide Water Usage	2-5
Table 2-5	2020 and 2035 Growth Projections by Land Use Category	2-6
Table 2-6	2020 Community-wide Electricity BAU Usage	2-7
Table 2-7	2020 Community-wide Natural Gas BAU Usage	2-7
Table 2-8	2020 Community-wide Water BAU Usage	2-8
Table 2-9	2035 Community-wide Electricity BAU Usage	2-9
Table 2-10	2035 Community-wide Natural Gas BAU Usage	2-9
Table 2-11	2035 Community-wide Water BAU Usage	2-10
Table 3-1	2010 Community-wide Data Inputs	3-4
Table 3-2	2010 Community-wide GHG Emissions by Source	3-4
Table 3-3	2010 Community-wide GHG Emissions by Land Use	3-5
Table 3-4	2020 BAU GHG Emissions by Source	3-6
Table 3-5	2020 BAU GHG Emissions by Land Use	3-7
Table 3-6	2035 BAU GHG Emissions by Source	3-8
Table 3-7	2035 BAU GHG Emissions by Land Use	3-8
Table 3-8	2020 and 2035 GHG Emission Reduction Targets	3-10
Table 3-9	2020 Electricity Consumption Reduction Target	3-10
Table 4-1	Summary of Community GHG Reductions in Hemet	4-15
Table 4-2	2020 Community-wide GHG Emissions Summary	4-16
Table 4-3	2035 Community-wide GHG Emissions Summary	4-17
Table 4-4	Community Electricity Consumption Summary	4-17
Table 5-1	GHG Reduction Measure Timeline and Phasing Schedule	5-7

FIGURES

Figure 3-1	Baseline GHG Emissions by Land Use (MT CO_2e)	3-5
Figure 3-2	2020 BAU GHG Emissions by Land Use (MT CO_2e)	3-7
Figure 3-3	2035 BAU GHG Emissions by Land Use (MT CO_2e)	3-9
Figure 4-1	Estimated Future Reduced Emissions (MT CO_2e)	4-16
Figure 4-2	Estimated Future Electricity Usage (kWh)	4-17

ACRONYMS

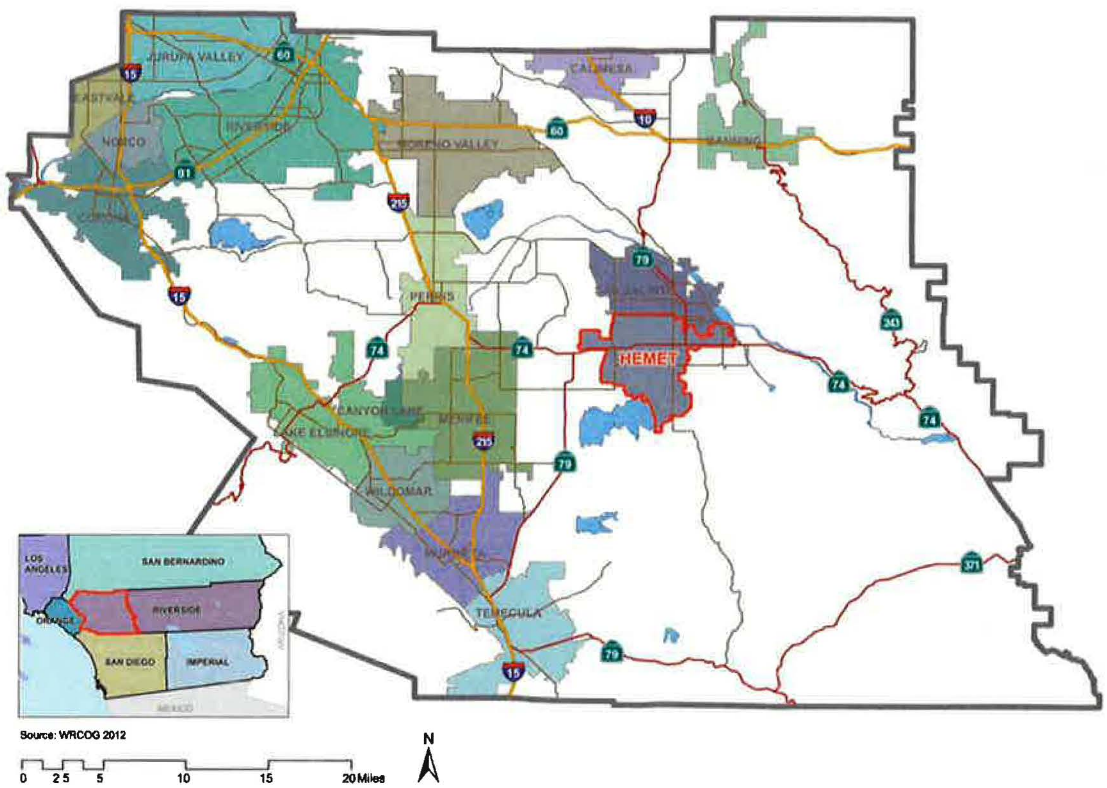
AB	Assembly Bill
AFV	Alternative Fuel Vehicle
AQMP	Air Quality Management Plan
BAU	Business-as-usual scenario
CAA	Clean Air Act
CalGreen	California Green Building Standard Code, CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings
CARB	California Air Resources Board
CAT	California Action Team
CCAR	California Climate Action Registry
CCAT	California Climate Action Team
CCR	California Code of Regulations
CEC	California Energy Commission
CEESP	California Long-Term Energy Efficiency Strategic Plan
CFC	Chlorofluorocarbons
CHP	Combined Heat and Power
CPUC	California Public Utilities Commission
CSI	California Solar Initiative
CWSRF	Clean Water State Revolving Funds
EAP	Energy Action Plan
EMA	Energy Management Assistance
GHG	Greenhouse Gas
GWh	Gigawatt hours
HERO	Home Energy Renovation Opportunity
HFC	Hydrofluorocarbons
IEPR	Integrated Energy Policy Report
kgal	Thousand Gallons
kWh	Kilowatt hours
LHMWD	Lake Hemet Municipal Water District
MMBTU	Million Metric British Thermal Unit
MT CO_2e	Metric Tonne Carbon Dioxide Equivalent
MWD	Metropolitan Water District of Southern California
MWh	Megawatt hours
PACE	Property Assessed Clean Energy Financing Program
PSD	Prevention of Significant Deterioration
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
SAFETEA-LU	Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users
SCAG	Southern California Association of Governments

SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCG	Southern California Gas Company
SCS	Sustainable Communities Strategy
SGIP	Self-Generation Incentive Program
USEPA	United States Environmental Protection Agency
VOC	volatile organic compounds
WRCOG	Western Riverside Council of Governments
WRELP	Western Riverside Energy Leadership Partnership

Chapter 1 **Introduction**

The City of Hemet (City) is committed to providing a more livable, environmentally healthy, equitable and economically vibrant community. The City is located in Western Riverside County, as shown in Figure 1-1. As one of the participating jurisdictions of Western Riverside Energy Leader Partnership (WRELP), which is administered by Western Riverside Council of Governments (WRCOG), the City is adopting new energy efficiency programs that will reduce utility costs and greenhouse gas (GHG) emissions associated with the energy use at the municipal and community level. WRCOG is using funding provided by Southern California Edison (SCE) to implement within the region the California Long-Term Energy Efficiency Strategic Plan (CEESP) developed by the California Energy Commission (CEC). Upon successful implementation of the Community Energy Action Plan (CEAP), the City can keep dollars in its local economy, create new green jobs, and improve quality of life within its community. The efforts toward energy efficiency improvements and GHG emission reductions are consistent with the goals and policies found in the City's General Plan.

Figure 1-1 Location Map



This section describes the relationship of the CEAP to the CEESP; identifies the purpose, goals, and tasks required for the CEAP; summarizes the regulatory framework pertaining to energy efficiency and emissions; and explains the methodology used to evaluate the current and future energy demands.

1.1 Action Plan Development Task Purpose, Goals, and Objectives

California Long-Term Energy Efficiency Strategic Plan Task 4.1.1

Development of the CEAP is the key task to achieving the energy efficiency goals defined by the CEESP. CEESP Task 4.1.1 is to develop a regional template for a CEAP. The main focus of the CEAP is to improve the energy efficiency of the community. The energy efficiency analysis is based on calculating existing energy consumption, forecasting future demand based on known growth assumptions for the years 2020 and 2035. The CEAP will assist the City to prioritize goals, policies, and assign appropriate energy consumption reduction targets across the community.

Energy efficiency improvements can have a substantial positive effect on the City's economy and environment. Depending on the energy reduction targets, the community can save on utility costs and offer a healthier environment by reducing its energy-related GHG emissions. By implementing the proposed efficiency measures described in the CEAP, he City demonstrates the potential economic, social, and environmental benefits of increasing energy efficiency and providing environmental stewardship within the community.

To ensure the accuracy and applicability of City's CEAP over the implementation period of the program, the energy efficiency targets will be measured and evaluated using the following criteria:

- Future projections of energy consumption for the community through the years 2020 and 2035.
- Measures to improve energy efficiency and reduce energy consumption.
- A list of non-SCE sources that can be utilized to sustain the program after SCE funds are expended.
- A contingency plan for addressing shortfalls if delays occur in receiving non-SCE funding.

Strategic Plan Goals and Objectives

The preparation of the City's CEAP is consistent with the goal of the CEESP. CEESP's framework was developed as a collaborative effort in response to California's need for a long-term strategic energy efficiency plan. Following the Strategic Plan Goal 4, the CEAP assists the City in leading its community with a comprehensive program to address energy efficiency, sustainability, and climate change.

The City has identified the following goal for the CEAP: "Develop a comprehensive, long-term plan to increase energy efficiency and reduce energy usage in the City." As part of developing a long-term plan, the CEAP sets efficiency goals through the years 2020 and 2035, and identifies specific strategies to assist in achieving the targets.

The first step in identifying an appropriate strategy for the City was to conduct a detailed analysis of the entire community's energy consumption. The summary of community-wide energy usage is found in Chapter 2, Energy Demand. The GHG emissions associated with current and projected community-wide energy consumption are found in Chapter 3, Community Greenhouse Gas Inventory. In this chapter, the GHG emission analysis projects future business-as-usual energy use and GHG emissions through 2020 and 2035 based on the anticipated growth in housing and employment. The energy efficiency policies and measures, including measures that the City currently implements, to reduce energy demand and corresponding GHG emissions are found in Chapter 4.

The following tasks were completed as part of the preparation of the CEAP:

- Gathered current community-wide energy consumption data.
- Projected future energy demand based on anticipated growth from 2010 to 2020 and to 2035.
- Created a current baseline GHG emissions inventory based on energy consumption.
- Forecasted 2020 and 2035 GHG emissions from the projected energy demand.
- Developed a comprehensive energy usage reduction strategy and specify goals and reduction measures to achieve the GHG emission reduction targets.
- Provided a plan that is consistent with and complementary to the CEESP energy efficiency programs and the GHG emissions reduction efforts being conducted by the State of California through the Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) and the federal government through the actions of the Environmental Protection Agency.
- Guided the development, enhancement, implementation, monitoring and verification of actions that reduce energy use and GHG emissions.
- Provided a policy document with specific implementation measures meant to be considered as part of the planning process for future development projects.

The CEAP is a comprehensive and long-term plan that focuses on improving the efficiency of community wide energy usage and reducing the City's GHG footprint associated with energy use. By developing a database of annual utility usage across major land use categories within the community and by forecasting future usage, the CEAP identifies opportunities for increasing energy efficiency for the City.

1.2 Regulatory Setting

The government agencies discussed below work jointly, as well as individually, to promote energy efficiency and reduce GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

Federal

CLEAN AIR ACT

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, 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 emissions, and the USEPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the USEPA should be required to regulate carbon dioxide and other GHGs as pollutants under Section 202(a)(1) of the federal Clean Air Act (CAA).

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

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

State

EXECUTIVE ORDER S-3-05

On June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets were set:

- 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% below 1990 levels.

The first California Climate Action Team (CAT) report to the Governor in 2006 contained recommendations and strategies to help meet the targets established in Executive Order S-3-05. In April 2010, the second 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 focused on the preparation of the Climate Change Adaptation Strategy, required by Executive Order S-13-08, described later in this section.

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1 USEPA, Final Rule for mandatory reporting of GHG emissions. October 2009. http://www.epa.gov/climatechange/emissions/downloads09/GHG-MRR-FinalRule.pdf

2 California EPA - Climate Action Team Report to Governor Schwarzenegger and the Legislature, March 2006.

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. GHG as defined under AB 32 includes carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFC), perfluorocarbons, and sulfur hexafluoride. AB 32 required the California Air Resources Board (CARB) to adopt rules and regulations that would achieve GHG emissions equivalent to 1990 statewide levels by 2020. Under AB 32, CARB has the primary responsibility for reducing GHG emissions. 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. The measures included are part of California's strategy for achieving GHG reductions under AB 32. Three new regulations defined as "discrete early action GHG reduction measures" were: 1) a low carbon fuel standard; 2) reduction of HFC-134a emissions from non-professional servicing of motor vehicle air conditioning systems; and 3) improved landfill methane capture[3]. CARB estimates that by 2020, the reductions from those three measures would be approximately 13 to 26 million metric tons of carbon dioxide equivalent (MT CO_2e).

In 2007, CARB published a staff report titled *California 1990 GHG Emissions Level and 2020 Emissions Limit*[4] that determined the statewide levels of GHG emissions in 1990 to be 427 MMT CO_2e. Additionally, in December 2008, CARB adopted the Climate Change Scoping Plan (Scoping Plan), which outlined 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 allows a cap-and-trade program, and also includes the discrete early actions.

SENATE BILL 1078, 107, AND X1-2 AND EXECUTIVE ORDER S-14-08 AND S-21-09

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor owned utilities and community choice aggregators, to provide at least 20% of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, Executive Order S-14-08 was signed, which expands the state's Renewable Energy Standard to 33% renewable power by 2020. Additionally, Executive Order S-21-09 (signed on September 15, 2009) directs CARB to adopt regulations requiring 33% of electricity sold in the state come from renewable energy by 2020. CARB adopted the Renewable Electricity Standard on September 23, 2010, which requires 33% renewable energy by 2020 for most publicly owned electricity retailers. SB X1-2 was signed in April 2011 to codify the 33% renewable standard, which applies to publicly-owned utilities, investor-

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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.

owned utilities, electricity service providers, and community choice aggregators. The bill also includes interim targets of procuring 20% renewable by 2014 and 25% renewable by 2017.

SENATE BILL 1368

SB 1368 (Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed into law in September 2006. SB 1368 required the California Public Utilities Commission (CPUC) to establish a performance standard for base-load generation of GHG emissions by investor owned utilities by February 1, 2007. SB 1368 also required the CEC to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards could not exceed the GHG emissions rate from a base-load combined cycle, natural gas fired plant. Furthermore, the legislation states that all electricity provided to California, including imported electricity, must be generated by plants that meet the standards set by CPUC and CEC.

EXECUTIVE ORDER S-20-04

Executive Order S-20-04, the California Green Building Initiative, (signed into law on December 14, 2004), establishes a goal of reducing energy use in state-owned buildings 20% from a 2003 baseline by 2015. It also encourages the private commercial sector to set the same goal.

The initiative places the CEC in charge of developing a building efficiency benchmarking system, commissioning and retro-commissioning (commissioning for existing commercial buildings) guidelines, and developing and refining building energy efficiency standards under Title 24 to meet this goal.

CALIFORNIA CODE OF REGULATIONS TITLE 24, PART 6

California Code of Regulations (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 and natural gas use result in GHG emissions and energy efficient buildings require less electricity and natural gas. Therefore, increased energy efficiency results in decreased GHG emissions.

The CEC adopted the 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. CEC 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.

Newer revisions to the CCR have been proposed by the CEC and the amended standards (2013 Building Energy Efficiency Standards) will go into effect January 1, 2014.

CALGREEN BUILDING CODE

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

ASSEMBLY BILL 811

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

ASSEMBLY BILL 474

AB 474 (2009) is designed to encourage and facilitate the installation of permanent water conservation and efficiency improvements on private property through a voluntary financing program between public entities and property owners. The bill creates financing opportunities for residential, commercial, industrial, and agricultural property owners to improve water efficiency

Regional and Local

HEMET GENERAL PLAN (2012)

The City's General Plan guides development and land use changes to the City's goals to create a City that is safe, healthy, and conserves natural resources while accommodating growth and development. The General Plan includes policies that reduce energy and water consumption and GHG emissions. Table 1-1 summarizes these relevant polices by emissions category and General Plan element.

Table 1-1 Hemet General Plan Polices Related to Energy, Water, and GHG Reduction

Source	Element	Objective	Policies
	Open Space & Conservation	Sustainable Future	OS-6.1, 6.2,6.3, 6.4, 6.5, 6.6, 7.4, 7.7, 7.8, 7.9, 7.14, 7.15, 8.1, 8.7; C-4.1, 4.5, 4.9
	Community Services & Infrastructure	City Developments	CSI-5.3, 5.10, 8.4, 10.7
Energy	Community Design	Sustainable Design	CD-8.5, 13-19
	Housing	Sustainable Design	H-5.3,5.2
	Land Use	Sustainable Design	LU-2.9, 11.5
	Open Space & Conservation	Water Supply	OS-1.2, 1.3, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.8 2.4
	Community Services & Infrastructure	City Developments	CSI-2.4, 2.5, 2.6, 2.7, 4.4, 4.6, 4.7
Water	Community Design	Sustainable Design	CD-3.7, 4.6
	Land Use	Sustainable Design	LU-2.11, 2.12, 9.11

Source: City of Hemet General Plan (Adopted in 2012)

HEMET SUSTAINABILITY PLAN

In January 2012, the City committed to becoming a sustainable community by adopting sustainability goals policies as a part of the General Plan Update with the vision of creating an ecologically sustainable, economically dynamic, and socially equitable future for its citizens. The Plan promotes efficient and effective use of local resources, safeguards human health and the environment, creates a healthy and diverse economy, and improves the livability and quality of life for all community members. The Plan recommends specific actions to enhance City performance in energy, green building, water resources, air resources, waste management, transportation, open space, and community outreach.

HEMET MUNICIPAL CODE - LANDSCAPING AND IRRIGATION ORDINANCE

The City's Water Conservation Ordinance for Landscaping applies to all new and rehabilitated landscaping projects for public agencies and private development projects. Through these regulations, the City establishes provisions for water management practices and wastewater prevention; establishes a structure for planning, designing, installing, maintaining, and managing water-efficient landscapes; reduces the water demands from landscapes without a decline in landscape quality and/or quantity; retains flexibility and encourage creativity through appropriate design; and reduces or eliminates wastewater and storm water runoff.

CLEAN CITIES COALITION

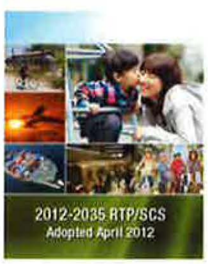
The City is a member of the Clean Cities Coalition. It is a voluntary local government/industry partnership which advances the nation's economic, environmental, and energy security by supporting local actions to reduce petroleum consumption in transportation. Clean Cities works to mobilize local stakeholders toward expanding the use of alternative fuels and idle reduction measures, accelerate the deployment of advanced technology vehicles (AFV), and strengthen local AFV refueling infrastructure in nearly 100 communities around the country.

The governments of Western Riverside County have taken leadership roles in this Clean Cities Coalition, coordinating efforts between government and industry to recognize the value of partnership in achieving air quality, energy efficiency, economic development, and transportation goals, while advancing the clean air and energy efficiency goals of the national Clean Cities program.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT AIR QUALITY MANAGEMENT PLAN

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

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS REGIONAL TRANSPORTATION PLAN



The Southern California Association of Governments (SCAG) is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial counties, and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. SCAG serves as the federally designated metropolitan planning organization for the Southern California region and is the largest in the United States. With respect to air quality planning, SCAG has prepared the *2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS): Towards a Sustainable Future,* to fulfill federal planning requirements contained in the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which calls for regions to consider urban form and natural resources as part of the transportation planning process. The RTP is a long-range transportation plan that is developed and updated by SCAG every four years. The RTP provides a vision for the development of transportation facilities throughout the region based on growth forecasts and economic trends that project over a 20-year period.

Chapter 2 Energy Demand

This chapter describes the City's community-wide energy demand for 2010 and projects future usage for the years 2020 and 2035. The energy demand categories include electricity, natural gas, and water usage. Current energy demand and assumptions for the major land use categories within the City are followed by demand projections for the 2020 and 2035 future business-as-usual (BAU) scenario.

2.1 Current Energy Demand

Developing a baseline energy emissions inventory required collecting utility data for the year 2010. The year 2010 was selected because it is the common year that the participating jurisdictions of the WRELP program are using for the baseline. Community-wide utility data was collected for both municipal and community-wide usage, including electricity, natural gas, and water demand. In the City, Southern California Edison (SCE) supplies electricity, natural gas is provided by Southern California Gas Company (SCG) and water is supplied by Eastern Municipal Water District (EMWD), Lake Hemet Municipal Water District (LHMWD), and the City's Water / Wastewater Department.

For community-wide electricity demand estimates, SCE provided the Electricity Use Report for the City, which reports the community-wide electricity usage for the City sub-divided into residential and nonresidential groups. SCG provided total community-wide natural gas usage data sub-divided into residential (single-family and multi-family), nonresidential, and municipal categories. The 2010 community-wide water consumption for the City was collected from EMWD, LHMWD, and the City's Water/Wastewater Department. Specific details regarding electricity, natural gas, and water usage for City-owned facilities have been provided in the separate stand-alone Municipal EAP (MEAP) targeted for municipal operations. City facilities and operations account for a very small portion of the community-wide energy demand.

Land Use Categories

Table 2-1 summarizes the land uses within the City limits based on the City's General Plan. Consistent with the energy consumption rates, the land use data also reflects the year 2010Land uses within the General Plan include the following categories: residential, commercial, industrial, and public/ institutional/open space. In the General Plan, the category of public/institutional/open space includes City-owned facilities. For the purposes of this analysis, the energy usage for City-owned facilities has been separated out and categorized as "municipal."

Table 2-1 Hemet General Plan 2010 Land Uses

Category	Number of Units	1000 square feet
Residential	35,305	-
Commercial	-	32,348
Industrial	-	36,119
Public/Institutional/Open Space	-	307,276
TOTAL	**35,305**	**375,743**

Note: In the General Plan, the category of "public" includes both municipal and other publicly owned land uses. For the utility usage, municipal demand has been separated out from other non City-owned uses.
Sources: City of Hemet General Plan 2012.

Electricity and Natural Gas (2010)

ELECTRICITY

The community-wide Electricity Usage Report provided by SCE is divided into the two categories of residential and nonresidential. The residential category is also divided into single-family and multi-family sub-categories.

The further categorization of nonresidential energy usage is based on the distribution of employment sectors throughout the City. SCAG prepares profile reports for 190 cities in the region, including the City, which provide the percentage of jobs by sector for the year 2010 based on the data from California Employment Development Department and InfoUSA. Each job sector is associated with a land use category that best suits its industry. For example, retail trade, leisure, finance, and wholesale are categorized under commercial jobs, and manufacturing under industrial jobs.

Education and health services are classified as public/institutional jobs. Public administration data were assumed to represent local City jobs, which are accounted for in the MEAPs. The remainder of uses within this category (education and health services) is referred to in the CEAP as institutional.

Additionally, the category of "open space" accounts for undeveloped land. Typically, open space land uses have minimal electricity demand, though some uses may have security lighting. Therefore, due to the relatively small energy consumption of the open space category, this sector has been grouped with the institutional category in the CEAP.

Table 2-2 summarizes the percentage of electricity usage as well as percentage of total cost for each land use category. In the City, residential electricity usage accounts for 54% of the total usage, followed by institutional/open space at 19% and commercial usage at 21%. Municipal electricity usage accounts for 2% of the total community consumption. Due to the difference between electricity rates across land use designations, the percentage of total cost for each land use varies from the percentage of total electricity usage. Table 2-2 below summarizes the percentage of electricity usage as well as percentage of total cost for each land use category.

Do you know who uses the most energy in the City?

- Residential 54%
- Commercial 21%
- Institutional 19%
- Industrial 4%
- Municipal 2%

Table 2-2	2010 Community-wide Electricity Usage				
Category	**Electricity (kWh)**	**Cost**	**% of Total Usage**	**% of Total Cost**	**Data Source**
Residential	206.39 million	$29.22 million	54%	53%	SCE
Single-Family	*184.83 million*	*$26.17 million*	*48%*	*47%*	
Multi-Family	*21.55 million*	*$3.05 million*	*6%*	*6%*	
Commercial	80.77 million	$12.14 million	21%	22%	SCE
Industrial	15.88 million	$1.72 million	4%	3%	SCE
Institutional/Open Space	70.83 million	$10.66 million	19%	19%	SCE
Municipal	8.56 million	$1.27 million	2%	2%	SCE
SCE-owned Streetlights[1]	833,220	$286,749	<1%	<1%	SCE
TOTAL	**382.81 million**	**$55.07 million**	**100%**	**100%**	

Totals may be off due to rounding.
[1] SCE-owned streetlights are included for informational purposes and are not included in the Total.
Source: Electricity Use Report for City of Hemet (SCE 2012); Profile of City of Hemet (SCAG 2011). See Appendix B.

NATURAL GAS

Annual community-wide natural gas data for the year 2010 is gathered from SCG. The usage data reports natural gas consumption for single-family residential, multi-family residential, municipal, and nonresidential categories. The nonresidential category is divided into commercial, industrial, and institutional/open space sub-categories. Similar to electricity usage, the percentage of total employment is applied to the nonresidential natural gas usage data reported by SCG for each sub-category.

Table 2-3 summarizes the natural gas demand and cost for the major land use categories within the City. As shown, residential natural gas usage accounts for 78% of the total usage, followed by commercial at 12%, institutional/open space at 10%, and industrial at 1%. Municipal natural gas usage accounts for a very small portion of the community consumption, at less than 1% of the total amount. Due to application of tiered rates for natural gas and electricity, it is likely that the contribution of a certain category differs from its contribution towards the total cost.

Table 2-3	2010 Community-wide Natural Gas Usage				
Category	**Natural Gas (therms)**	**Cost**	**% of Total Usage**	**% of Total Cost**	**Data Source**
Residential	11.63 million	$6.79 million	78%	86%	SCG
Single-Family	*8.95 million*	*$5.19 million*	*60%*	*66%*	*SCG*
Multi-Family	*2.68 million*	*$1.56 million*	*18%*	*20%*	*SCG*
Commercial	1.78 million	$584,648	12%	7%	SCG
Industrial	137,030	$45,779	1%	1%	SCG
Institutional/Open Space	1.42 million	$463,542	10%	6%	SCG
Municipal	20,707	$9,731	<1%	<1%	SCG
TOTAL	**14.99 million**	**$7.89 million**	**100%**	**100%**	

Totals may be off due to rounding.
Source: SCG 2012. Costs are estimated based on SCG Schedule Rates for commercial, industrial, and residential services. See Appendix B.

Water

Electricity is needed to move and treat water. The City's residents and businesses currently use approximately 3.55 million thousand gallons (kgal) of water annually. EMWD, LHMWD, and the City's Water/ Wastewater Department provide and deliver water throughout the City. A portion of the City lies within EMWD's East Valley Service Area. EMWD generally serves the area south of Stetson Avenue, west of Sanderson Avenue, and north of Menlo Avenue and the Planning Area to the west and south of the City (Hemet General Plan, 2012). Within the East Valley Service Area, most of the water comes from local wells. These wells are also the primary source of the water that EMWD sells to the City's Water Department and LHMWD. Other sources of water include purchased water from Metropolitan Water District of Southern California (MWD) and some recycled water from EMWD facilities. The City's Water Department provides potable water to an area of 5.25 square miles within the City from locally pumped ground water. The City's Water Department also has one connection with an EMWD well to access on an as-needed basis. Further, LHMWD services the eastern portion of the City, which consists of mostly unincorporated areas. The cost associated with water usage is based on the average rates for residential, commercial, and industrial customers (EVMWD 2010 Urban Water Management Plan).

Table 2-4 summarizes water usage across the City. The residential sector accounts for the largest water demand in the City, at 75% of total water usage, followed by institutional/open space (13%), and commercial (12%). Municipal facilities rely mostly on locally pumped water and purchase limited water from EMWD. This purchased water for municipal usage represents less than 1% of the total community water consumption.

Table 2-4 2010 Community-wide Water Usage

Category	Purchased Water (kgal)	Cost	% of Total Usage	% of Total Cost
Residential	2.65 million	$7.08 million	75%	73%
Single-Family	*2.15 million*	*$5.23 million*	*60%*	*59%*
Multi-Family	*0.50 million*	*$1.57 million*	*14%*	*14%*
Commercial	430,449	$1.10 million	12%	11%
Industrial	24,439	$40,184	1%	<1%
Institutional/Open Space	443,746	$1.50 million	13%	16%
Municipal	2,670	$13,074	<1%	<1%
TOTAL	**3.55 million**	**$9.74 million**	**100%**	**100%**

Totals may be off due to rounding.
Source: Eastern Municipal Water District 2012, City of Hemet; See Appendix B.

2.2 Future BAU Energy Demand

In determining the future BAU, it is assumed that the City's energy and water demand are directly proportional to the growth in employment and the number of households. The City, similar to other jurisdictions within Riverside County, has experienced economic difficulties resulting from the economic recession that began in 2008. The recession resulted in a substantial decrease in housing and employment growth rates in comparison to the pre-recession period. The unemployment rate increased and residential vacancy rates rose. Since 2010, the City's housing and job market is slowly growing, but at slower rates than pre-2008.

Housing and employment growth rates for 2020 and 2035 were collected from SCAG projections. It is assumed that residential energy demand would increase at a similar rate as the number of households. Commercial, industrial, institutional/open space and municipal energy demand rely on the increase in employment. SCAG provides employment rates that are specific to each sector. Growth rates for the nonresidential sectors are approximated by taking into account the City's employment profile in 2010 and the aggregate growth in the City's total employment (Local Profile of City of Hemet, SCAG 2011). This methodology assumes that the growth potential of each sector is directly proportional to the employment ratio in each sector during the baseline year 2010. The following steps were used to arrive at employment growth rates specific to each nonresidential category:

1) Estimate the ratio of commercial, institutional, and public administration (municipal) jobs in 2010 as a percentage of the total jobs in the City (Local Profile of City of Hemet, SCAG 2011)
2) Multiply the employment ratio of each sector (calculated in step 1) by the aggregate growth in employment of the City from 2010 to 2020 and 2035, as provided by SCAG.

Land Use Growth

For the purposes of this analysis, the term business-as-usual refers to the projected energy demand for the City without the implementation of the energy reduction measures included in Chapters 4 and 5 of the CEAP. The BAU projection of energy consumption for the years 2020 and 2035 are calculated based on two factors: (1) current (baseline) energy consumption data, and (2) growth projections. Land use categories included in the CEAP are residential, commercial, industrial, municipal, and institutional/open space.

Each land use category is assigned a growth rate factor for the years between 2010 through 2020 and 2035 based on housing and employment growth (SCAG 2011). Aggregate residential (housing) growth from 2010 to 2020 and 2035 are estimated to be 12% and 52.53%, respectively. Single-family and multi-family residences are expected to grow at the same rate as the aggregate residential category. Nonresidential growth rates are based on the employment growth rates by sector, as described previously. Table 2-5 below summarizes growth projections for 2020 and 2035 for each land use category.

Table 2-5 2020 and 2035 Growth Projections by Land Use Category

Category	Growth Rate (2010-2020)	Growth Rate (2010-2035)
Residential	12%	52.53%
Commercial	33.39%	57.45%
Industrial	7.95%	13.68%
Institutional/Open Space	31.80%	54.71%
Municipal	3.98%	6.84%
Sources: SCAG Growth Projections 2011; Profile of City of Hemet (SCAG 2011).		

2020 BAU Electricity and Natural Gas

ELECTRICITY

Table 2-6 summarizes the BAU projections of electricity usage in 2020 for the major land use designations in the City. In the BAU future condition, the City's community-wide energy demand would increase from 382.81 million kWh in 2010 to 428.71 million kWh in 2020, which represents a total increase of 12% in electricity demand. In 2020, the largest consumer of electricity is the residential category, accounting for 54% of the total usage.

Table 2-6 2020 Community-wide Electricity BAU Usage

Category	Electricity (kWh)	Cost	% of Total Usage	% of Total Cost
Residential	231.13 million	$32.73 million	54%	53%
Single-Family	*206.99 million*	*$29.31 million*	*48%*	*47%*
Multi-Family	*24.38 million*	*$3.42 million*	*6%*	*6%*
Commercial	104.74 million	$15.74 million	24%	25%
Industrial	8.08 million	$873,211	2%	1%
Institutional/Open Space	76.73 million	$11.72 million	18%	19%
Municipal	8.030 million	$1.02 million	2%	2%
SCE-owned Streetlights[1]	866,382	$298,162	<1%	<1%
TOTAL	**428.71 million**	**$62.08 million**	**100%**	**100%**

Totals may be off due to rounding.
[1] SCE-owned streetlights are included for informational purposes and are not included in the Total.
Sources: Electricity Use Report for City of Hemet (SCE 2012); Profile of City of Hemet (SCAG 2011); SCAG Growth Projections 2011.

NATURAL GAS

Table 2-7 summarizes the BAU projections of natural gas usage in 2020 for all major land use categories in the City. In the BAU future condition, the City's community-wide energy demand is projected to increase from about 14.99 million therms in 2010 to 16.78 million therms in 2020, which represents a total increase of 12% in natural gas demand. Residential natural gas usage accounts for the largest proportion, at 78% of total usage.

Table 2-7 2020 Community-wide Natural Gas BAU Usage

Category	Natural Gas (therms)	Cost	% of Total Usage	% of Total Cost
Residential	13.03	$7.61 million	78%	86%
Single-Family	*10.03 million*	*$5.85 million*	*60%*	*66%*
Multi-Family	*3.00 million*	*$1.75 million*	*18%*	*20%*
Commercial	1.99 million	$654,747	12%	7%
Industrial	153,460	$51,268	1%	1%
Institutional/Open Space	1.59 million	$519,736	9%	6%
Municipal	21,531	10,282	<1%	<1%
TOTAL	**16.78 million**	**$8.84 million**	**100%**	**100%**

Totals may be off due to rounding.
Sources: SCG 2012; Profile of City of Hemet (SCAG 2011); SCAG Growth Projections 2011.

2020 BAU Water Demand

Table 2-8 summarizes estimated the BAU water demand for the year 2020. As shown, under BAU conditions and without implementing any mitigation measures or reduction strategies, the water demand would increase from 3.55 million kgal in 2010 to 4.15 million kgal in 2020, which corresponds to a total increase of 17% in water demand. It is important to note that this is a conservative estimation of 2020 water demand based on population growth rates. In reality, water demand does not increase at the same rates as population does; because the EMWD, LHMWD, and City's Water Department implement reduction strategies which reduce demand within their service areas. Residential water usage will continue to be the highest consumer of water in the City, estimated at 71% of the total demand in 2020.

Table 2-8 2020 Community-wide Water BAU Usage

Category	Purchased Water (kgal)	Cost	% of Total Usage	% of Total Cost
Residential	2.97 million	$7.93 million	71%	69%
Single-Family	*2.40 million*	*$6.42 million*	*58%*	*56%*
Multi-Family	*0.56 million*	*$1.51 million*	*14%*	*13%*
Commercial	574,189	$1.47 million	14%	14%
Industrial	26,382	$43,379	<1%	<1%
Institutional/Open Space	585,612	$1.99 million	14%	14%
Municipal	2,777	$13,594	<1%	<1%
TOTAL	**4.15 million**	**$11.44 million**	**100%**	**100%**

Totals may be off due to rounding.
Sources: Eastern Municipal Water District 2012, LHMWD, City of Hemet; Profile of City of Hemet (SCAG 2011); SCAG Growth Projections 2011.

2035 BAU Electricity and Natural Gas

ELECTRICITY

Table 2-9 summarizes the BAU projections of electricity usage in 2035 by land use. In the BAU future condition, the City's community-wide energy demand increased from 382.8 million kWh in 2010 to 587.35 million kWh in 2035, which represents a total increase of 53% in electricity demand. The residential category represents the largest consumer of electricity, at 54% of the total demand in 2035.

Table 2-9	2035 Community-wide Electricity BAU Usage			
Category	**Electricity (kWh)**	**Cost**	**% of Total Usage**	**% of Total Cost**
Residential	314.80 million	$44.58 million	54%	52%
Single-Family	*281.93 million*	*$39.92 million*	*48%*	*47%*
Multi-Family	*32.88 million*	*$4.66 million*	*6%*	*5%*
Commercial	147.25 million	$22.13 million	25%	26%
Industrial	8.20 million	$886,378	1%	1%
Institutional/Open Space	108.84 million	$16.55 million	19%	19%
Municipal	8.25 million	$1.05 million	1%	1%
SCE-owned Streetlights[1]	890,212	$306,362	<1%	<1%
TOTAL	**587.35 million**	**$85.19 million**	**100%**	**100%**

Totals may be off due to rounding.
[1] SCE-owned streetlights are included for informational purposes and are not included in the Total.
Sources: Electricity Use Report for City of Hemet (SCE 2012); Profile of City of Hemet (SCAG 2011); SCAG Growth Projections 2011.

NATURAL GAS

Table 2-10 summarizes the BAU projections of natural gas usage in 2035. In the BAU future condition, the City's community-wide energy demand is projected to increase from about 14.99 million therms in 2010 to 22.92 million therms in 2035, which represents a total increase of 53% in natural gas demand. Residential natural gas usage accounts for the largest proportion, at 78% of total usage.

Table 2-10	2035 Community-wide Natural Gas BAU Usage			
Category	**Natural Gas (therms)**	**Cost**	**% of Total Usage**	**% of Total Cost**
Residential	17.75 million	$10.36 million	78%	86%
Single-Family	*13.66 million*	*$7.97 million*	*60%*	*66%*
Multi-Family	*4.09 million*	*$2.39 million*	*18%*	*20%*
Commercial	2.80 million	$920,530	12%	8%
Industrial	155,774	$52,041	1%	<1%
Institutional/Open Space	2.20 million	$721,941	10%	6%
Municipal	22,123	$10,282	<1%	<1%
TOTAL	**22.92 million**	**$12.06 million**	**100%**	**100%**

Totals may be off due to rounding.
Sources: SCG 2012; Profile of City of Hemet (SCAG 2011); SCAG Growth Projections 2011.

2035 BAU Water Demand

Table 2-11 summarizes the BAU water demand for the year 2035. As shown, under BAU conditions and without implementing any mitigation measures or reduction strategies, the water demand would increase from 3.55 million kgal in 2010 to 5.44 million kgal in 2035, which corresponds to a total increase of 53% in water demand. Residential water usage will continue to be the highest consumer of water in the City, at 74% of the total.

Table 2-11 2035 Community-wide Water BAU Usage

Category	Purchased Water (kgal)	Cost	% of Total Usage	% of Total Cost
Residential	4.04 million	$10.80 million	74%	72%
Single-Family	*3.27 million*	*$8.75 million*	*60%*	*59%*
Multi-Family	*0.77 million*	*$2.05 million*	*14%*	*14%*
Commercial	677,744	$1.74 million	12%	12%
Industrial	27,782	$45,681	<1%	<1%
Institutional/Open Space	687,818	$2.33 million	13%	13%
Municipal	2,853	$13,968	<1%	<1%
TOTAL	**5.44 million**	**$14.93 million**	**100%**	**100%**

Totals may be off due to rounding.
Sources: Eastern Municipal Water District 2012, LHMWD, City of Hemet; Profile of City of Hemet (SCAG 2011); SCAG Growth Projections 2011.

Chapter 3 Community Greenhouse Gas Inventory

This chapter describes the City's community-wide GHG emissions from utility sources for 2010 and projects future emissions for the year 2020 and 2035. The sources of emissions include electricity, natural gas, and the energy used to supply water to the community. Presented below is the methodology used to estimate the emissions from energy sources, followed by a discussion on current emissions for the major land use categories. Finally, projections of future emissions for the year 2020 and 2035 are provided based on the anticipated growth under the BAU scenario.

3.1 Setting and Methodology

Greenhouse Gases

Parts of the Earth's atmosphere act as an insulating blanket, trapping sufficient solar energy to keep the global average temperature within a range suitable for human habitation. The 'blanket' is a collection of atmospheric gases called greenhouse gases or GHGs because they trap heat similar to the effect of glass walls in a greenhouse. These gases, mainly carbon dioxide, methane, nitrous oxide, and all act as effective global insulators, reflecting infrared radiation back to earth. Human activities, such as producing fossil-fuel derived electricity and driving internal combustion vehicles, emit these gases in the atmosphere.

Because GHGs have variable heat-trapping properties, CO_2e is a common unit of measurement that is used to normalize the GHG emission capacity from the different gases. Each GHG is compared to carbon dioxide with respect to its ability to trap infrared radiation, its atmospheric lifetime, and its chemical structure. For example, methane is a GHG that is 21 times more potent than carbon dioxide; therefore, one metric ton of methane is equivalent to 21 MT CO_2e.

Methodology

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) and the Climate Registry (2009). If available, existing action plans or any related information was collected and reviewed. Through a questionnaire, any related policies that have already been prepared, or are being prepared were collected and assessed. Of particular importance are community-wide GHG inventories completed by the City or a third-party agency or organization.

As part of the CEAP, the analysis has been tailored to include only the emissions associated with energy consumption within the community. The methodology used for the calculation GHG emissions differs depending on the emission source. The emission calculations follow the CCAR General Reporting Protocol, Local Government Operations Protocol, and CARB's Mandatory GHG Reporting Regulations (Title 17, CCR 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.

The CEAP uses 2010 as the baseline year for the GHG inventory. The GHG emissions associated with energy consumption data is based on emission factors for each source of energy. Energy use and emissions projections are then estimated based on the anticipated growth patterns from 2010 through 2020 and 2035. In estimating future projections of BAU energy consumption and GHG emissions, SCAG's projections of housing and employment were used to approximate growth and future development. All of the contributors to GHG emissions including kilowatt-hours (kWh) of electricity generated by fossil fuel combustion in power plants and natural gas in therms, and emissions from energy associated with water services are expressed in the common unit of metric ton of CO_2e released into the atmosphere in a given year.

The projected 2020 and 2035 emission inventories provide a framework to design programs and actions that specifically target reductions by emissions sources such as electricity and natural gas. The baseline inventory serves as a reference to monitor progress towards reducing future energy consumption and GHG emissions into. Programs and actions already in place within the City are described in Chapter 4.

In addition, the costs associated with the GHG emissions were estimated for each land use category. The costs were based on the consumer fees for each type of energy source included in the 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 and setting targets. Coefficients, modeling inputs, and other assumptions used in the calculations of GHGs are included in Appendix A of this report.

3.2 Baseline Community-wide Energy GHG Inventory

The community-wide inventory represents GHG emissions from utility sources located with the jurisdictional boundaries of the City. The following sections describe the data inputs, emissions by source, and emissions by land use in 2010.

The City emits carbon dioxide, methane, and nitrous oxide indirectly through the consumption of electricity provided by SCE. SCE generates electricity primarily from natural gas combustion. The GHG emission factor associated with electricity use is therefore based on the emissions from the natural gas used to generate the electricity. 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.

The annual natural gas usage in therms 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 2010 was obtained from SCG.

Electricity is needed to move and treat water. Where available, locally pumped and treated water shows up in the local electricity consumption data provided by SCE. However, purchased water that is imported into the area is not accounted for in the local utility data. Because of where purchased water is pumped and treated, it has additional emissions associated with this electricity use. To account for this, the purchased water quantity (reported in units of kgal, or thousand gallons) was used to calculate the amount of electricity needed to pump and treat the water, based on generation factors provided by the California Energy Commission. The electricity demand (in kilowatts) was then multiplied by the respective emission factors for carbon dioxide, methane, and nitrous oxide to determine the GHG emissions from energy use to treat and deliver purchased water.

Data Inputs

Data for the baseline community-wide inventory was gathered from City departments, water suppliers, SCE, SCG, SCAG, and other reports. Table 3-1, below, summarizes the data inputs and sources for each of the emission categories included in the baseline emission inventory. Each data input was multiplied by the associated GHG emission factor to calculate the GHG emissions associated with each source.

Table 3-1 2010 Community-wide Data Inputs

Category	Data Input	Data Source
Electricity (kWh)	382.81 million	SCE
Natural Gas (therms)	14.99 million	SCG
Water (kgal)	3.55 million	EMWD, LHWD, City of Hemet

Baseline Emissions by Source

Table 3-2 includes the community-wide GHG emissions from energy use in 2010, categorized by emission source. The community emitted 196,739 MT CO_2e in 2010 from utility sources. In 2010, the largest portion of the energy emissions were from electricity use (56%) followed by natural gas use (41%), and water consumption (4%).

Table 3-2 2010 Community-wide GHG Emissions by Source

Category	MT CO_2e	% of Total
Electricity	109,947	56%
Natural Gas	79,721	41%
Water	7,071	4%
TOTAL	**196,739**	**100%**
Totals may be off due to rounding.		

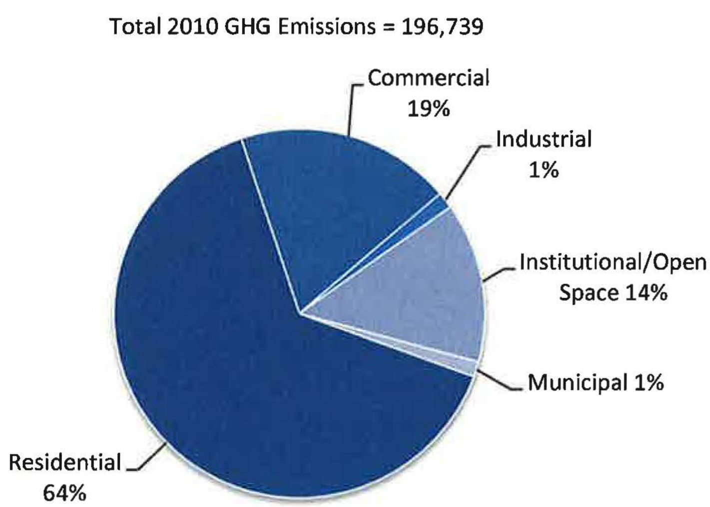
Emissions by Land Use

Table 3-3 summarizes the total amount of community-wide GHG emissions from energy sources in 2010 categorized by land use. The largest portion of 2010 energy-related GHG emissions were from residential usage (64%), followed by commercial (19%), and institutional/open space (14%) uses. Municipal facilities and industrial energy usage account equally for the smallest GHG emissions in the City, estimated at 1% of the total amount each. Figure 3-1 below provides a comparison of the City's GHG emissions by land use category.

Table 3-3	2010 Community-wide GHG Emissions by Land Use	
Category	**MT CO_2e**	**% of Total**
Residential	126,445	64%
Single-Family	*104,986*	*53%*
Multi-Family	*21,459*	*11%*
Commercial	37,170	19%
Industrial	2,849	1%
Institutional/Open Space	27,658	14%
Municipal	2,617	1%
SCE Streetlights[1]	239	<1%
TOTAL	**196,739**	**100%**

Totals may be off due to rounding. See Appendix A.
[1] SCE-owned streetlights are included for informational purposes and are not included in the Total.

Figure 3-1 Baseline GHG Emissions by Land Use (MT CO_2e)



3.3 Future BAU Community-wide Energy Emissions

Energy usage was projected for the future years 2020 and 2035 as described in Chapter 2 to estimate the future GHG community-wide energy emission inventories. In 2020, the energy use is projected to result in a total emission of 220,686 MT CO_2e under the BAU scenario. By 2035, the City's BAU community GHG emission from energy sources is expected to increase to 301,470 MT CO_2e. The BAU scenario does not include the reduction measures described in Chapter 4 of the CEAP. The following sections describe the data inputs, emissions by source, and emissions by land use category for the years 2020 and 2035.

Data Inputs

Data for the 2020 and 2035 community-wide inventory was estimated based on local profile of the City and SCAG's growth projections of housing and employment. Chapter 2 summarizes the growth rates and the methodology for the projected utility usage. Land use specific growth rates were used to estimate the emissions associated with electricity and natural gas.

2020 BAU Emissions by Source

The 2020 BAU emissions are estimated based on the projected growth in the City from 2010 to 2020. The growth rates were applied to residential, commercial, industrial, institutional/open space energy consumption. The total GHG emissions for the year 2020 from energy use would be 220,686 MT CO_2e under the BAU condition. Because the growth factors for these categories are uniform across all three emission sources (electricity, natural gas, and water), the projections of future emissions will not result in a change in the proportion of total emissions from these energy sources. Table 3-4 summarizes the 2020 projections of the community-wide emissions broken down by emissions category.

Table 3-4	2020 BAU GHG Emissions by Source		
Category	**MT CO_2e**	**% of Total**	**Data Inputs**
Electricity	123,130	56%	428.71 million kWh
Natural Gas	89,280	40%	16.78 million therms
Water	8,276	4%	4.15 million kgal
TOTAL	**220,686**	**100%**	

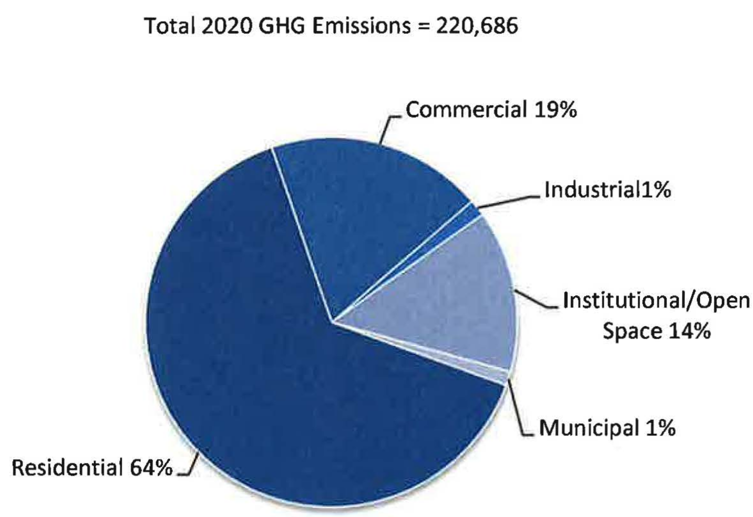
2020 BAU Emissions by Land Use

Table 3-5 summarizes the projected total amount of community-wide GHG energy emissions in 2020 by land use category. The largest portion of the 2020 emissions are from residential (64%), followed by commercial (19%), institutional/open space usage (14%). Industrial and municipal emissions represent the smallest emission categories, each estimated at 1% of the total. Figure 3-2 provides a comparison of GHG emissions by land use category. Comparing the 2010 emissions with the 2020 emissions across the major land use categories in the CEAP indicates similar emission patterns for both current and future cases.

Table 3-5 2020 BAU GHG Emissions by Land Use		
Category	**MT CO_2e**	**% of Total**
Residential	141,606	64%
Single-Family	*117,574*	*53%*
Multi-Family	*24,032*	*11%*
Commercial	41,810	19%
Industrial	3,189	1%
Institutional/Open Space	31,360	14%
Municipal	2,721	1%
SCE-owned Street Lights[1]	249	<1%
TOTAL	**220,686**	**100%**

Totals may be off due to rounding. See Appendix A.
[1] SCE-owned streetlights are included for informational purposes and are not included in the Total.

Figure 3-2 2020 BAU GHG Emissions by Land Use (MT CO_2e)



2035 BAU Emissions by Source

The 2035 BAU emissions are estimated based on the projected growth in the City from 2010 to 2035. The total GHG emissions for the year 2035 from energy use would be 300,920 MT CO_2e under the BAU condition. Similar to the 2020 scenario, because the growth factors for residential, commercial, industrial, and institutional/open space are uniform across all three emission sources (electricity, natural gas, and water), the projections of future emissions will not result in significant change in the proportion of total emissions from these energy sources. Table 3-6 summarizes the BAU 2035 emissions of CO_2e by emissions category. Electricity usage accounts for the largest emissions in the City in 2035.

Table 3-6	2035 BAU GHG Emissions by Source		
Category	**MT CO_2e**	**% of Total**	**Data Inputs**
Electricity	168,297	56%	587.35 million kWh
Natural Gas	121,948	40%	22.92 million therms
Water	10,827	4%	5.43 million kgal
TOTAL	**301,470**	**100%**	

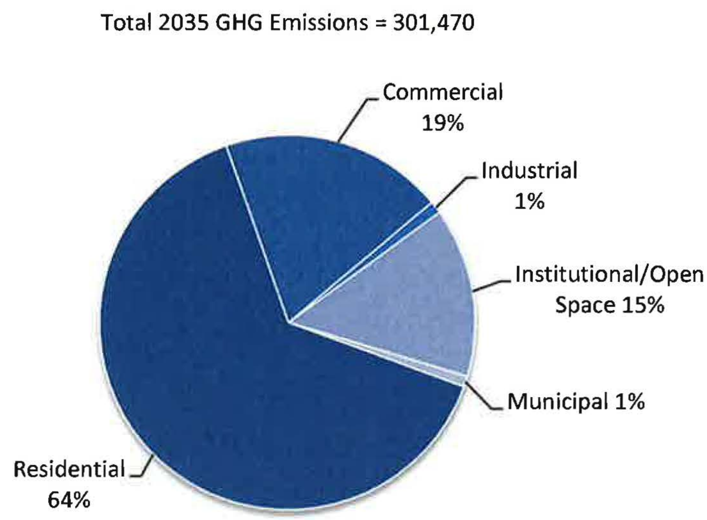
2035 BAU Emissions by Land Use

Table 3-7 summarizes the projected total amount of community-wide GHG energy emissions for the City in 2035 by land use. The largest amount of GHG emissions in the City is estimated to be from the residential category, at 64% of the community-wide emissions. Figure 3-3 provides a comparison of GHG emissions by land use category.

Table 3-7	2035 BAU GHG Emissions by Land Use	
Category	**MT CO_2e**	**% of Total**
Residential	192,867	64%
Single-Family	*160,135*	*53%*
Multi-Family	*32,732*	*11%*
Commercial	58,524	19%
Industrial	3,239	1%
Institutional/Open Space	44,044	15%
Municipal	2,796	1%
SCE-owned Streetlights[1]	256	<1%
TOTAL	**301,470**	**100%**

Totals may be off due to rounding. See Appendix A.
[1] SCE-owned streetlights are included for informational purposes and are not included in the Total.

Figure 3-3 2035 BAU GHG Emissions by Land Use (MT CO_2e)



3.4 Reduction Targets

2020 and 2035 Greenhouse Gas Emission Targets

In order for California to meet the goals of AB 32, statewide GHG emissions will need to be reduced to 1990 levels by 2020. In the AB 32 Scoping Plan, CARB equated the return to 1990 levels to a 15% reduction from "current" (2005) levels. The CARB recommended a GHG reduction goal of 15% below current levels by 2020 to ensure that municipal and community-wide emissions match the state's reduction target (CARB 2008). Additionally, Executive Order S-3-05 requires a further 80% cut below the 1990 threshold by 2050.

Consistent with the State's adopted AB 32 GHG reduction targets, the City has set a goal to reduce its GHG emissions from energy consumption to 1990 levels by the year 2020. This target was calculated as a 15% decrease from 2010 (baseline) levels. The City's reduction target for the year 2035 is estimated at 47.5% from the baseline, based on interpolation between the 2020 and the 2050 reduction targets. The 2035 target is considered as an interim goal to be reviewed prior to 2020 for post 2020 use. At this time, state and federal strategies for post-2020 are speculative; therefore, it is recommended that the City reevaluates the 2035 target as it reaches its 2020 milestone. By that time, the City would have a better understanding of the effectiveness and efficiency of the reduction strategies and approaches. Chapter 5 reviews the details of the implementation process. Table 3-8 summarizes the City's community-wide GHG emission reduction targets from energy consumption, for the years 2020 and 2035.

Table 3-8	2020 and 2035 GHG Emission Reduction Targets		
	2010	2020	2035
BAU Emissions (MT CO_2e)	196,739	220,686	301,470
Reduction from Baseline (%)		15%	47.5%
Amount to Reduce from BAU (MT CO_2e)		53,458	198,182
Reduction Target (MT CO_2e)		**167,228**	**103,288**

With the reduction targets set at 167,228 MT CO_2e for 2020 and 103,288 MT CO_2e for 2035, the City will need to reduce its emissions by 53,458 MT CO_2e and 198,182 MT CO_2e from the BAU emissions respectively. These amounts represent a 15% and a 47.5% decrease from the baseline year. The reduction measures are described further in Chapter 4.

2020 Electricity Consumption Target

The goal of an electricity consumption reduction target is to consume electricity more efficiently. Another goal is to have reasonably achievable levels of efficiency. To achieve these goals the electricity consumption reduction target is set to reduce the electricity consumption by 8% of baseline (2010) consumption levels by 2020. This electricity consumption reduction target for the year 2020 is consistent with the GHG emission target. The 2020 electricity usage target represents the proportion of the energy reduction that would be required to meet the GHG target of 2020 from electricity efficiency measures. Table 3-9 summarizes the City's municipal electricity reduction target for the year 2020.

Table 3-9	2020 Electricity Consumption Reduction Target	
	2010	2020
Electricity (kWh)	382.81 million	428.71 million
Reduction from Baseline (%)		8%
Amount to Reduce from BAU (kWh)		77.70 million
Reduction Target (kWh)		**351.00 million**

With the electricity reduction target set at 351.00 million kWh for 2020, the City will need to reduce its electric usage by 77.70 million kWh from the 2020 BAU consumption. This represents an 8% decrease from the baseline year. The programs and reduction strategies that would help the City to reach its 2020 electricity consumption target are described further in Chapter 4.

Chapter 4 Reductions and Existing Programs

California has set specific targets for reducing GHG emissions by 2020 and has established standards that will increase energy efficiency and promote renewable energy sources. The CEAP identifies these statewide policies as R1 reduction measures. The R1 measures are included 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 local 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 measures would be incorporated at the local level to provide additional reductions in GHG emissions. R2 measures can be quantified to show the value of the reduction in GHG emissions. The R3 measures are supportive measures or methods of implementation for the R2 measures. R3 measures provide a program through which reductions in emissions would occur, but their value cannot be quantified. For example, R3-E3: Energy Efficiency Training and Public Education, is a measure that provides education to inform people of the programs, technology, and potential funding available to be more energy efficient, and provides incentives to participate in the voluntary programs shown in some of the R2 measures. R3-E3 is supportive of measures R2-E1 through R2-E6 because it would provide more publicity, reduce the perceived challenge of being energy efficient, and provide information on potential rebates and other funding programs that will make retrofits more accessible. Therefore, although by itself R3-E3 cannot be quantified, its implementation provides a level of assurance that the reduction goals specified in the R2 measures will be achieved.

A separate standalone document titled "City of Hemet Municipal Energy Action Plan" (Atkins 2013) includes the measures (identified as M1 measures) that reduce municipal emissions. Municipal operations make up a small percentage of the total emissions, but the City can set an example for residents by implementing reduction measures at the municipal level. A detailed analysis of the City's municipal GHG emissions is provided in the City's 2013 MEAP.

Over the last few years, the City has implemented several municipal and community-wide programs that have already begun to reduce GHG emissions and will continue to provide reductions throughout the implementation of the CEAP. 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 and 2035 targets.

The following discussion summarizes the existing programs and the proposed reduction measures to be implemented by the City to further reduce GHG emissions. The reduction measures in the CEAP are organized by source category (electricity, natural gas, and water) then by R1, R2, and R3 measure. The convention to be used for numbering the measures is 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: E – energy and W – water.

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

Energy Use/Energy Efficiency

Land Use/Community Design

Renewable Energy

Water Use/Water Conservation

4.1 Existing Local Programs

Since the baseline emissions year of 2010, California has enacted legislation to promote energy efficiency and the use of renewable energy in utility companies and new building construction. In addition, the City has implemented energy-efficiency measures since 2010 that result in GHG reductions. Any measure, either local or statewide, implemented since 2010 can be "counted toward" the City meeting their emissions target.

Municipal Programs

DEPARTMENT OF PUBLIC WORKS

According to the City's Department of Public Works, there are various Capital Improvement Projects, which upon completion will increase energy efficiency and reduce GHG emissions. Highlights of these projects include HVAC replacement projects, and installation of a slow-fill Compressed Natural Gas station which directly reduces emissions through the use of a lower-emissions fuel. Additionally, the City is required to develop new parks in an environmentally sensitive manner with drought-tolerant landscaping, recycled water for irrigation, and natural drainage courses that recharge groundwater.

Community-Wide Programs

HEMET LANDSCAPING AND IRRIGATION ORDINANCE

As mentioned under in Section 1.3, the City adopted Water Conservation Ordinance for Landscaping. Details of this policy can be found in section 1.3 of the CEAP, under "Regional" framework.

HERO PROGRAM

WRCOG offers energy-saving opportunities through the HERO Program. It is a regional effort that will provide low interest loans to property owners – repaid over time through annual property tax installments – for installing energy efficient, renewable energy, and water conservation improvements to homes and businesses in the sub-region. The Program will bring needed jobs to area contractors, increase energy savings and lower utility bills for area residents and business owners, improve property values, and reduce greenhouse gas emissions. WRCOG's HERO Program is the nation's largest Property Assessed Clean Energy (PACE) program. Financing is repaid through a property owner's property tax bill and, in most cases, may be passed onto the new owners if the property is sold before the financing is fully paid off. This Program puts energy efficiency within reach for property owners and stimulates the local economy. HERO projects will create jobs for local contractors, and enable property owners to save money on their utility bills and reduce greenhouse gas emissions.

THE GREEN COALITION

The Green Coalition of the San Jacinto Valley works with the Cities of San Jacinto and Hemet on achieving sustainability targets to ensure safe and healthy environment for the residents. It includes a wide range of activities and action plans such as development of a green technology business, building or buying an electric vehicle, designing a native garden, solar power options for homes and businesses, solar water heating systems, grey-water systems, and many more informative events.

EMWD WATER SUPPLY SYSTEM EFFICIENCY

As one of the major water supplier of the City, Eastern Municipal Water District has implemented new technologies to decrease peak demand charges and improve pump and water infrastructure efficiency in the region. EMWD offers general consumer behavior pricing programs by implementing strategies such as consumer education billing program, water metering, and tiered-rate pricing. EMWD promotes indoor water efficiency programs for existing buildings. This includes indoor water efficiency outreach campaigns; water efficiency and leakage audits, residential water conservation assistance, and rebate programs. Also, EMWD participates in outdoor water efficiency programs by providing discounted utility hook-up fees or rates for highly water efficiency landscapes and enforcing water efficient landscape ordinance as well as mandatory irrigating system efficiency requirements. There are incentives available for existing outdoor water use as well. EMWD offers cash incentives for lawn conservation, and mandates water efficient landscape ordinance for large retrofits. Recycled water programs are also available through EMWD. The water district provides gray water development guidelines and technical support. It also offers recycled water outreach campaigns, infrastructure development, and sets recycled water use requirements for new constructions.

EASTERN MUNICIPAL WATER DISTRICT BIOMASS POWER PLANT

Biomass is a renewable source of energy. As of date of this report, EMWD is in the preliminary stage to construct a plant in southwest Riverside County that would turn discarded biomass sources (plant oil, grease, etc.) into environmentally-friendly fuel which will power its diesel fleet and equipment. The elimination of the diesel consumption will significantly affect the energy consumption and GHG emissions of the region.

SOUTHERN CALIFORNIA EDISON CUSTOMER ASSISTANCE PROGRAMS

SCE offers a variety of energy conservation services including the Energy Management Assistance (EMA) Program, Single Family Residential Program, and Multifamily Energy Efficiency Rebate Program. EMA helps lower income customers conserve and reduce their electricity costs. Energy improvement projects to single family and multi-family units are eligible to apply for other programs offered by SCE, as listed above.

SOUTHERN CALIFORNIA GAS COMPANY REBATE PROGRAMS

SCG offers rebate programs for residential customers to increase energy efficiency and reduce energy costs. The program offers rebates for both single-family and multi-family homes. The rebate programs involve rebates for installation of qualified energy saving appliances and completing home improvements to increase energy efficiency of units. SCG also encourages homeowners to take advantage of a free Home Energy Efficiency Survey to assess potential opportunities for energy savings.

CLEAN CITIES COALITION

City is a member of the Clean Cities Coalition. It is a voluntary local government/industry partnership which advances the nation's economic, environmental, and energy security by supporting local actions to reduce petroleum consumption in transportation. Clean Cities works to mobilize local stakeholders toward expanding the use of alternative fuels and idle reduction measures, accelerate the deployment of AFV, and strengthen local AFV refueling infrastructure in nearly 100 communities around the country.

The governments of Western Riverside County have taken leadership roles in this Clean Cities Coalition, coordinating efforts between government and industry to recognize the value of partnership in achieving air quality, energy efficiency, economic development, and transportation goals, while advancing the clean air and energy efficiency goals of the national Clean Cities program.

4.2 Energy Reduction Measures

California has already enacted legislation to promote energy efficiency and the use of renewable energy in the utility companies and new buildings statewide. The reduction measures below would be implemented throughout the community, as well as at City-operated facilities. Detailed analysis of the reductions specific to the municipal facilities and operations is provided in the City's MEAP.

R1 Statewide 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. It is important to note that the state reduction measures will apply to the entire community; therefore, City-owned facilities also could benefit from these measures.

R1-E1: RENEWABLE PORTFOLIO STANDARD FOR BUILDING ENERGY USE

GHG Reduction Potential:
11,778 MT CO_2e per year
The reductions are associated with an increase of 14% in renewable energy production by the year 2020.
Co-Benefits:

Private Costs: None – State Program
Private Savings: None
Funding Sources: State Program
kWh Savings: 58.7 million kWh of nonrenewable electricity will be replaced with renewable energy sources.

SB 1075 (2002) and SB 107 (2006) created the state's Renewable Portfolio Standard (RPS), with an initial goal of 20% renewable energy production by 2010. Executive Order S-14-08 established a RPS target of 33% by the year 2020 and requires state agencies to take all appropriate actions to ensure the target is met. In April 2011, Governor Jerry Brown signed SB 2 (2011), which codified the Executive Order and requires the state to reach the 2020 goal (CARB 2008). This increase in electricity production from renewable sources will reduce the GHG emissions from electricity usage by 14% by 2020.

Because of SB 1075, utilities including SCE are required to have a minimum of 33% renewable sources producing electricity. An increase in renewable power sources generated by SCE will result in less electricity being generated by conventional sources burning natural gas within the region. The benefit to the City is a reduction of air pollution and GHGs within the region, which broadly benefits the health of everyone. More speculative is the potential that increasing electricity generation from renewable resources may result in lower electricity rates from SCE over the next few years. However, because the RPS requirement is imposed on utility providers and not the customers, direct savings in utility bills may not be significant from this measure.

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

GHG Reduction Potential:
9,476 MT CO_2e per year
The reductions are associated with an increase of 50% in residential and 25% in commercial lighting efficiency from 2007 levels by 2018.
Co-Benefits:

Private Costs: None – State Program
Private Savings: $4.54 million annually based on average electricity cost.
Funding Sources: State Program
kWh Savings: 32.99 million kWh

AB 1109 (2007) mandated that the 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 statewide electricity consumption in the following ways:

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

It is assumed that 20% of the building's electricity usage is associated with lighting. Because AB 1109 makes residential and commercial lighting 50% and 25% more efficient, respectively, and lighting is 20% of the total electrical usage for the buildings, AB 1109 requires a total reduction of 10% in the commercial electricity consumption and 5% in the residential electricity usage from 2007 levels by 2018.

R1-E4: ELECTRICITY ENERGY EFFICIENCY

GHG Reduction Potential:
2,307 MT CO_2e per year
The reductions are associated with an increase of 17.5% in buildings energy efficiency.
Co-Benefits:

Private Costs: None – State Program
Private Savings: $1.11 million annually based on average electricity cost.
Funding Sources: State Program
kWh Savings: 8.03 million kWh

This measure captures the emission reductions associated with electricity energy efficiency activities included in CARB's AB 32 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 statewide 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 CCR; hereinafter referred to as, "Title 24 Energy Efficiency Standards") of California's Green Building Standards Code (Title 24, Part 11 of the CCR; or "CALGreen").

By 2020, this requirement will reduce emissions in California by approximately 21.3 million MT CO_2e, representing 17.5% of emissions from all electricity in the state. This measure includes the following strategies:

- "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so that they, based on an annual average, extract no energy from the grid);
- Broader standards for new types of appliances and for water efficiency;
- Improved compliance and enforcement of existing standards;
- Voluntary efficiency and green building targets beyond mandatory codes;

- Voluntary and mandatory whole-building retrofits for existing buildings;
- Innovative financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation;
- More aggressive utility programs to achieve long-term savings;
- Water system and water use efficiency and conservation measures;
- Additional industrial and agricultural efficiency initiatives; and
- Providing real time energy information technologies to help consumers conserve and optimize energy performance.

R1-E5: NATURAL GAS ENERGY EFFICIENCY

GHG Reduction Potential:
593 MT CO_2e per year
The reductions are associated with an increase of 6.2% in buildings natural gas energy efficiency.
Co-Benefits:

Private Costs: None – State Program
Private Savings: $4,389 annually based on the average natural gas rates in 2010.
Funding Sources: State Program
Therms Savings: 111,411 therms

This measure captures the emission reductions associated with natural gas energy efficiency activities included in CARB's AB 32 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 statewide 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 million MT CO_2e, representing 6.2% of emissions from all natural gas combustion in the state. This measure includes the following strategies:

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

R1-E6: INCREASED COMBINED HEAT AND POWER

GHG Reduction Potential:
8,462 MT CO_2e per year
The reductions are associated with an increase of 7.6% in electricity usage efficiency.
Co-Benefits:

Private Costs: None – State Program
Private Savings: $4.05 million based on average electricity cost.
Funding Sources: State Program
kWh Savings: 29.46 million kWh

This measure captures the reduction in building electricity emissions associated with the increase of combined heat and power (CHP) activities, as outlined in CARB's AB 32 Scoping Plan. The Scoping Plan suggests that increased CHP systems, which capture "waste heat" produced during power generation for local use, will offset 30,000 gigawatt hours (GWh) statewide 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 million MT CO_2e, representing 7.6% of emissions from all electricity in the state.

An increase in CHP systems will result in higher efficiency in local power generation. The benefit to the City is a reduction in energy demand, reduction of air pollution and greenhouse gases, and potential decrease in energy costs. These broadly benefit the health and economy of the entire community. Because this measure is applicable to power generating entities, immediate savings in energy bills may not occur in all land use categories. However, as a consequence of the reduction in energy demand associated with increased CHP standards, the cost of energy may reduce over the next few years.

R2 Local Energy Reduction Measures

The following list of R2 energy related measures are those measures that the City would implement to reduce GHG emissions beyond the reduction associated with the R1 state measures described above.

R2-E1: NEW RESIDENTIAL ENERGY EFFICIENCY

GHG Reduction Potential:
3,328 MT CO_2e
These emissions reductions assume all new residential units will increase energy efficiency an average of 15% beyond 2008 Title 24 standards. This results in a 25% decrease in electricity and natural gas use from new residential developments.
Co-Benefits:

Private Costs: $5.3 million (one time cost). 100% units going 10% beyond Title 24 is approximately equivalent to 83% of units increasing efficiency to 10% beyond Title 24.
The cost is based on an estimated $1,500 per unit to go 10% beyond Title 24 (Anders 2009).

Construction of new homes allows the opportunity to include energy efficient measures and lessen the impact of the new development on both energy demands and the community-wide GHG emissions. These measures include, but are not limited to:

- 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

Private Savings: $0.72 million annually in reduced energy costs, resulting in an estimated 7 year payback period on the initial cost.

Funding Sources: SCE, SCG

kWh Savings: 5.17 million kWh

Therms Savings: 346,440 Therms

- Incorporate skylights, reflective surfaces, and natural shading in building design and layouts.

A variety of financial incentives and programs exist to assist homeowners with implementation of making these goals feasible (see the Chapter on implementation of this report for details).

R2-E2: NEW COMMERCIAL ENERGY EFFICIENCY

GHG Reduction Potential:

1,011 MT CO_2e

These emissions reductions assume all new commercial units will increase energy efficiency an average of 10% beyond 2008 Title 24 standards. These emissions reductions assume a 25% decrease in electricity and natural gas use from new commercial developments.

Co-Benefits:

Private Costs: $3.4 million (one time cost) based on an estimated $1.00 per square foot to achieve 10% beyond Title 24 (Anders 2009).

Private Savings: $0.3 million annually in reduced energy costs, resulting in an estimated 10 year payback period on the initial cost.

Funding Sources: SCE, SCG

kWh Savings: 2.49 million kWh

Therms Savings: 55,800 Therms

Construction of new commercial buildings allows the opportunity to include energy efficient measures and lessen the impact of the new development on both energy demands and the community-wide GHG emissions. Although not limited to these actions, this reduction goal can be achieved through the incorporation of the following:

- Install Energy Star qualified or equivalent appliances, including air conditioning and heating units, dishwashers, water heaters, etc.;
- Install solar water heaters;
- Install Energy Star qualified or equivalent windows and appropriate insulation for climate zone;
- Install Energy Star qualified or equivalent lighting;
- Install Energy Star qualified or equivalent computer systems and electronics to reduce electricity need from plug load;
- 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-E3: RESIDENTIAL RENEWABLE ENERGY

GHG Reduction Potential:
581 MT CO_2e
These emissions reductions assume 10% of the electricity use from new residential developments would be derived from renewable energy.

Co-Benefits:

Private Costs: $6.6 million (one time cost). This cost is associated with 10% of new residential units installing 2kW solar PV systems at $7,796/kW (Anders 2009).

Private Savings: $0.28 million annually from reduced electricity costs, resulting in an estimated 24 year payback period on the initial cost.

Funding Sources: SCE, WRCOG

kWh Savings: 2.02 million kWh

Construction of new homes allows the opportunity to include renewable energy production and lessen the impact of the new development on both energy demands and community-wide GHG emissions. These renewable energy measures include:

- On-site solar photovoltaic;
- On-site thermal water heating;
- Providing support for off-site solar or wind generation; and

R2-E4: COMMERCIAL RENEWABLE ENERGY

GHG Reduction Potential:
282 MT CO_2e
These emissions reductions assume 10% of the electricity use from new commercial developments would be derived from renewable energy, and that an average of 5kW of solar photovoltaic cells would be installed per 10,000 square feet of building space.

Co-Benefits:

Private Costs: $4.46 million (one time cost). This cost represents 5kW of solar photovoltaic per 10,000 square feet of new commercial development at an estimated $6,526/kW.

Private Savings: $0.15 million annually from reduced electricity costs, resulting in an estimated 30 year payback period on the initial cost.

Funding Sources: SCE, WRCOG

kWh Savings: 0.98 million kWh

Construction of new commercial buildings allows the opportunity to include renewable energy production and lessen the impact of the new development on both energy demands and the community-wide GHG emissions. This measure would provide an incentive for facilities to be equipped with "solar ready" features where feasible to facilitate future installation of solar energy systems. These features would include optimal solar orientation for buildings (south facing roof sloped at 20 degrees to 55 degrees from the horizontal), clear access on south sloped roofs, electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water systems, and space provided for a solar hot water tank. Additional renewable energy measures include:

- On-site solar photovoltaic;
- On-site thermal water heating;
- Providing support for off-site solar or wind generation; and

R2-E5: RESIDENTIAL ENERGY RETROFITS

GHG Reduction Potential:
21,611 MT CO_2e
These emissions reductions assume 20% of the electricity and natural gas use from existing residential developments will be reduced through retrofits.
Co-Benefits:

Private Costs: $26.1 million (one time cost). Cost estimates based on USD EPIC study assumptions: $0.75/kWh and $4.35/therm (Anders 2009).
Private Savings: $4.7 million annually from reduced energy costs, resulting in an estimated 6 year payback period on the initial cost.
Funding Sources: SCE, SCG, WRCOG
kWh Savings: 33.46 million kWh
Therms Savings: 2.26 million Therms

Existing homes, particularly those built prior to implementation of the Title 24 requirements of 1978, are a large source of GHG emissions attributed to energy use. By retrofitting existing homes with energy efficiency upgrades and renewable energy generation systems, homeowners can reduce their monthly energy bills while also reducing GHG emissions. In order to implement this strategy, the City would coordinate with local agencies such as SCE, SCG, WRCOG, and SCAG in order to educate homeowners about rebates and incentive programs available for energy upgrades and renewable energy installations. 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-E6: COMMERCIAL ENERGY RETROFITS

GHG Reduction Potential:
5,940 MT CO_2e
These emissions reductions assume 20% of the electricity and natural gas use from existing commercial developments would be reduced through retrofits.
Co-Benefits:

Private Costs: $7.5 million (one time cost), estimated based on a rate of $0.55 per square foot of commercial building space retrofit (Andres 2009).
Private Savings: $2.0 million annually from reduced energy costs, resulting in an estimated 4 year payback period on the initial cost.
Funding Sources: SCE, SCG, WRCOG
kWh Savings: 14.76 million kWh
Therms Savings: 0.32 million Therms

Existing commercial buildings, particularly those built prior to implementation of the Title 24 requirements of 1978, are also a large source of GHG emissions attributed to energy use. By retrofitting existing buildings with energy efficiency upgrades and renewable energy generation systems, business owners can reduce their monthly energy bills while also reducing GHG emissions. In order to implement this strategy, the City would coordinate with local agencies such as SCE, SCG, WRCOG, and SCAG in order to educate business owners about rebates and incentive programs available for energy upgrades and renewable energy installations. 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 Energy Star qualified or equivalent models;
- Replace older, inefficient appliances with Energy Star qualified or equivalent models;
- Replace old windows and insulation with high quality and energy efficient products;

- Install solar water heaters;
- Replace inefficient and incandescent lighting with energy efficient lighting; and
- Weatherize the existing building to increase energy efficiency.

R3 Other Energy Reduction Measures

The following list of R3 energy measures are those that complement or support the implementation of the R1 and R2 measures described above, but cannot be quantified.

R3-E1: REGIONAL ENERGY PLANNING COORDINATION

Implementation of the above R1 and R2 energy measures is supported by coordination with SCE, SCG, SCAG, WRCOG, local non-profits, and other local agencies in the region to optimize energy efficiency and renewable resource development and usage. This allows for economies of scale and shared resources to more effectively implement these environmental enhancements.

R3-E2: ENERGY EFFICIENT DEVELOPMENT, AND RENEWABLE ENERGY DEPLOYMENT FACILITATION AND STREAMLINING

This measure encourages the City to identify and remove any regulatory and procedural barriers to the implementation of green building practices and the incorporation of renewable energy systems. The City has already adopted the 2010 California Green Building Code (Part 11 of Title 24 of CCR). 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 setbacks in exchange for incorporating green building practices or renewable energy systems.

R3-E3: ENERGY EFFICIENCY TRAINING AND PUBLIC EDUCATION

This measure 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 existing programs 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.

4.3 Water Reduction Measures

R1 Statewide 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% BY 2020) RELATED TO WATER SUPPLY AND CONVEYANCE

GHG Reduction Potential:
1,239 MT CO_2e per year
The reductions are associated with an increase of 15% in renewable energy used in water facilities by the year 2020.
Co-Benefits:

Private Costs: None – Sate Program
Private Savings: None
Funding Sources: State Program

This measure would increase electricity production from eligible renewable power sources to 33% by 2020. A reduction in GHG emissions results from replacing natural gas-fired electricity production with zero GHG-emitting renewable sources of power. By 2020, this requirement will reduce emissions from electricity used for water supply and conveyance in California by approximately 21.3 million MT CO_2e, representing 15.2% of emissions from electricity generation (in state and imports).

R2 Water Reduction Measure

The following list of R2 water related measures are those measures that the City would implement in order to reduce emissions beyond the emissions reduction associated with the R1 state measures described above. The numbering of the local measures is consistent across all cities that are participating in the WRELP program. However, if a measure is not applicable to a particular City, it has been omitted from the list of measures. For example, the first measure R2-W1 has been omitted and the next measure described herein is R2-W2.

R2-W2: WATER CONSERVATION STRATEGIES

GHG Reduction Potential:
205 MT CO_2e
The calculated emission reductions assume all new developments reduce water consumption by 20%.
Co-Benefits:

Private Costs: Considered negligible if implemented with new development.
Private Savings: $121,058 annually in reduced water costs.
Funding Sources: CWSRF, EMWD, LHMWD

Importing water is an energy intensive process. The energy used to transport, treat, and deliver this imported water results in GHG emissions. In contrast, water derived from local sources does not need to be transported as far. By reducing water use, the City can reduce the amount of imported water and utilize more of the local sources. The City is already implementing programs to conserve water, these include:

- Residential ultra-low-flush toilet replacement program;
- Updating the landscape ordinance to further reduce outdoor water usage;
- Working with water agencies to establish an incentive program that assists property owners with retrofitting water intensive landscaping with California Friendly Landscaping; and

In addition to these programs, the City would implement measures that aim to increase the use of recycled water, incorporate water efficient fixtures, drought tolerant landscaping, permeable hardscapes, and on-site storm water capture and reuse facilities.

R2-W3: INCREASED RECYCLED WATER USE

GHG Reduction Potential:
277 MT CO_2e
By using reclaimed water rather than imported water, emissions are reduced by 81%. These emission reductions assume 5% of the City's water is converted to reclaimed water.
Co-Benefits:

Private Costs: Could not be determined at the time of this study.
Private Savings: Could not be determined at the time of this study.
Potential Funding Sources: CWSRF

California water supplies come from a variety of sources including ground water, surface water, and reservoirs. For Southern California in particular, much of the water is transported over long distances, which can require a substantial amount of electricity. Recycled, or reclaimed, water is water reused after wastewater treatment for non-potable uses instead of returning the water to the environment. Since less energy is required to provide reclaimed water, fewer GHG emissions are associated with reclaimed water use compared to the average California water supply use.

Note that the analysis in the CEAP was not able to predict the costs or savings associated with this measure, because specific data on recycled water was not available at the time of analysis. The City would need to conduct a more detailed, in depth cost analysis to determine the City's costs and savings as well as those to the City's customers. Potential costs include recycled water infrastructure and expanded operations at water treatment plants. Potential savings include less imported water and lower rates for consumers.

R3 Other Water Reduction Measure

The following R3 water measure complements the implementation of the R1 and R2 measures described above, but cannot be quantified.

R3-W1: WATER EFFICIENCY AND CONSERVATION EDUCATION

Under this measure, the City, in coordination with local water purveyors would continue to implement its public information and education program that promotes water conservation (See section 4-1 for information on the City's existing program). The program could be expanded to include certification programs for irrigation designers, installers, and managers, as well as classes to promote the use of drought tolerant, native species and xeriscaping. Xeriscaping refers to landscaping techniques that eliminate the need for water.

4.4 Summary of the Reductions

By implementing the statewide and local reduction measures described above, the City would reduce its community-wide GHG emissions associated with the energy and water usage by 30% compared to the 2020 BAU emissions. Statewide measures reduce the City's GHG emissions by 15% and the local measures reduce it further by 15%.

The largest reduction is from the R2-E5 measure, which corresponds to 10% of the total amount. This is as a result of implementing energy efficiency improvements in existing residential units. Table 4-1 summarizes the statewide and local measures and their reductions.

Table 4-1 Summary of Community GHG Reductions in Hemet

	MT CO_2e Reduced	% Reduced from 2020 Emissions
Statewide Measures (R1)		
Energy		
R1-E1: RPS – 33% Renewable by 2020	11,778	5%
R1-E2: Indoor Residential	6,638	3%
R1-E3: Indoor/Outdoor Commercial	2,837	1%
R1-E4: Electrical Energy Efficiency	2,307	1%
R1-E5: Natural Gas Energy Efficiency	593	<1%
R1-E6: Increased Combined Heat and Power	8,462	4%
Water		
R1-W1: RPS – 33% Renewable by 2020	1,239	<1%
Total Statewide Reductions	**33,854**	**15%**
Local Measures (R2)		
Energy		
R2-E1: New Residential Energy Efficiency	3,328	2%
R2-E2: New Commercial Energy Efficiency	1,011	<1%
R2-E3: New Residential Renewable Energy	581	<1%
R2-E4: New Commercial Renewable Energy	282	<1%
R2-E5: Residential Retrofits	21,611	10%
R2-E6: Commercial Retrofits	5,940	3%
Water		
R2-W2: Water Conservation Strategies	205	<1%
R2-W3: Increased Recycled Water Use	277	<1%
Total Local Reductions	**33,235**	**15%**
TOTAL Reductions	**67,089**	**30%**
Totals may be off due to rounding.		

4.5 Comparison to Targets

Greenhouse Gas Emissions

Figure 4-1 shows a comparison between the emission inventories for 2020 and 2035. The blue bar represents the calculated GHG inventories for the baseline year (2010). The red bars show the projected BAU GHG emissions in 2020 and 2035 based on the anticipated growth, and the yellow bars demonstrate the reduced inventories after the implementation of the reduction measures described in Chapter 4. The dashed lines represent the reduction targets for 2020 and 2035. Tables 4-2 and 4-3 summarize the existing 2010 emissions, the projected 2020 and 2035 emissions inventory, as well as the reduced 2020 and 2035 inventories after implementation of the reduction measures.

By 2020, the statewide and local measures together would reduce the City's community GHG emissions from the 2020 BAU condition by approximately 30% or 67,089 MT CO_2e (from 220,686 MT CO_2e to 153,597 MT of CO_2e). This reduction is equivalent to 22% decrease below the 2010 levels, which exceeds the 15% reduction target of the year 2020.

Figure 4-1 Estimated Future Reduced Emissions (MT CO_2e)

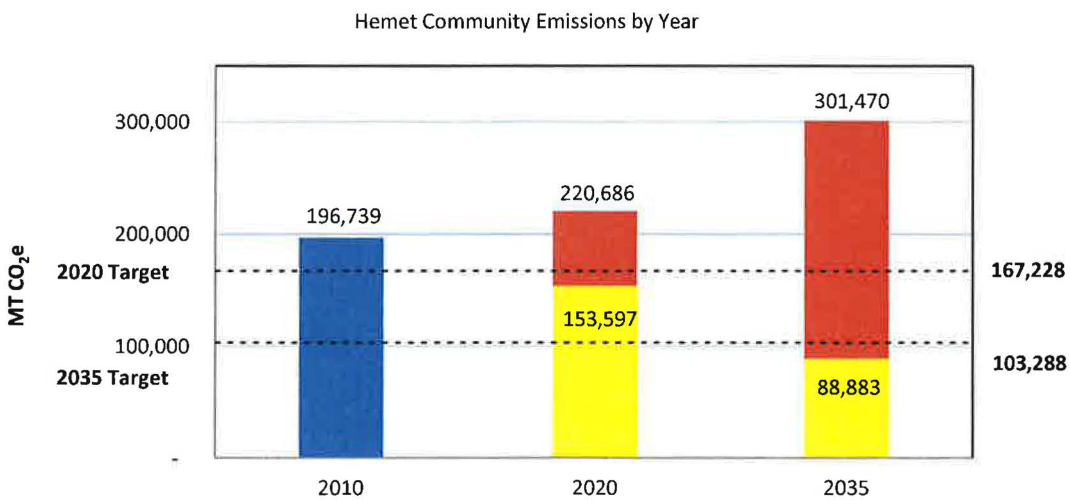


Table 4-2	2020 Community-wide GHG Emissions Summary		
Source Category	MT CO_2e		
	2010	2020 BAU	Reduced 2020
Total Emissions	196,739	220,686	153,597
Emission Reduction Target	-	167,228	167,228
Below Reduction Target?	-	NO	YES
Note: Sources of emissions include electricity, natural gas, and the energy associated with purchased water.			

Table 4-3	2035 Community-wide GHG Emissions Summary		
Source Category	**MT CO_2e**		
	2010	**2035 BAU**	**Reduced 2035**
Total Emissions	196,739	301,470	88,883
Emission Reduction Target	-	103,288	103,288
Below Reduction Target?	-	**NO**	**YES**
Note: Sources of emissions include electricity, natural gas, and the energy associated with purchased water.			

In estimating reductions for 2035, it is assumed that the City would continue implementation of its local measures, and these measures would continue to reduce municipal GHG emissions. Additionally, it is assumed that the State measures would be enforced post-2020 to further reduce emissions. For the purposes of this analysis, the downward trend of the reductions attributed to GHG emissions from 2020-2035 was extended linearly based on the reductions attributed to GHG emissions from 2010-2020. With these assumptions, by 2035 the City's GHG emissions from energy sources would decrease by 212,587 MT CO_2e from 2035 BAU (from 301,470 MT CO_2e to 88,883 MT CO_2e), which is equivalent to 55% from the 2010 emissions. This exceeds the 47.5% reduction target of the year 2035.

Electricity Consumption

Figure 4-2 and Table 4-4 compare the electricity consumption of the baseline year and the 2020 projections with the 2020 target.

Figure 4-2 Estimated Future Electricity Usage (kWh)

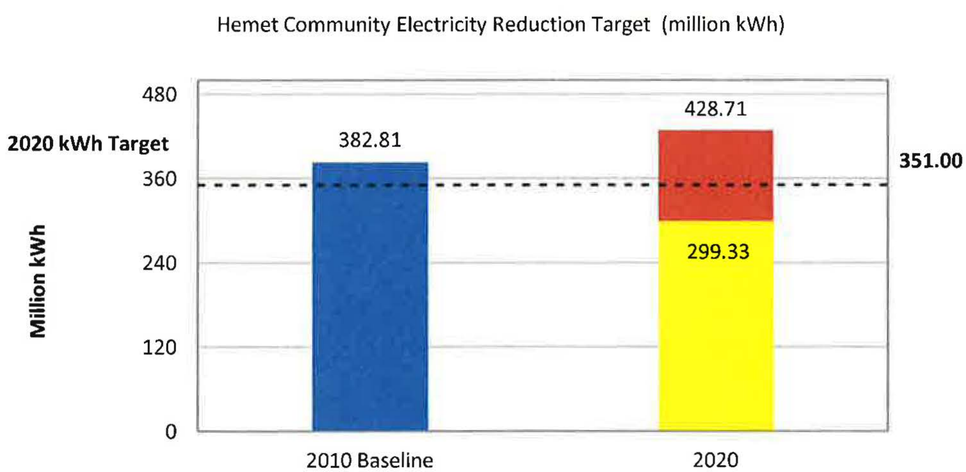


Table 4-4	Community Electricity Consumption Summary		
Source Category	**kWh of Electricity**		
	2010	**2020 BAU**	**Reduced 2020**
Community Electricity Consumption	382.81 million	428.71 million	299.33 million
Electricity Consumption Target		351.00 million	351.00 million
Below Reduction Target?		NO	YES

Implementation of the reduction measures by 2020 would reduce the City's electricity consumption by approximately 30% below the BAU or by 129.37 million kWh (from 428.71 million kWh in 2020 to 299.33 million kWh). This is equivalent to a 22% reduction from the baseline year, which exceeds the 8% reduction target for 2020.

Chapter 5 Implementation

This section describes implementation steps for the CEAP to support achievement of the GHG reduction goals for the community at large. Success in meeting the GHG emission reduction goal will depend on cooperation, innovation, and participation by the City, residents, businesses, and other local governmental entities. This section outlines key steps that the City would follow for the implementation of this CEAP.

5.1 STEP 1—Administration and Staffing

The City would implement the following key internal administration and staffing actions:

1. Create an Energy Efficiency Team to support and guide the City's efforts to conserve energy and reduce emissions.
2. Designate an Implementation Administrator to oversee, direct and coordinate implementation of the CEAP as well as monitor and report the energy efficiency and GHG reduction efforts.

The City Energy Efficiency Team (Team) would be responsible for the implementing the CEAP, coordinating among all involved City departments, and recommending modifications and changes to the CEAP over time. The Team would include the following departments and divisions, but would be expanded as needed to ensure coordinated leadership in plan implementation: Planning, Engineering, Building & Safety, Code Enforcement, Parks, and Water/Wastewater department.

5.2 STEP 2—Financing and Budgeting

Successful implementation of the CEAP will require a strong commitment from the City and community. Local, regional, state, and federal public sources of funding will be needed along with the substantial involvement of the private sector. The following financing options should be explored by the City:

- **State and federal grants and low-interest loans** — A variety of grant and loan programs exist in various sectors.
- **Support from local businesses, non-profits, and agencies** — Opportunities for public/private partnerships (like the SCE partnerships) exist to provide cooperation on many aspects of the CEAP including energy and water efficiency retrofits and raising public awareness regarding conservation strategies.
- **Self-funding and revolving fund programs** — Innovative programs to fund renewable energy investments.
- **Agreements with private investors** — Energy service companies and other private companies can finance up-front investments in energy efficiency and then be reimbursed through revenues from energy savings.

- **Local funding** — Various local governments have used targeted finance instruments for renewable energy resource development and energy efficiency improvement projects.

Given that financing is the key to implementing many measures, a review of current and potential funding sources was completed for the different sectors covered in the CEAP and is presented below to help early phase implementation. It is likely that there will be stronger legislation aimed at energy efficiency and renewable energy generation that will further curb GHG emissions. Such requirements are likely to influence energy prices (for electricity and natural gas), and may make currently cost-ineffective measures more economically feasible and allow the financing of a broader range of plan measures.

Energy Efficiency and Renewable Energy Financing

Western Riverside Council of Government HERO Program. WRCOG, in partnership with Renovate America, Inc. is offering homeowners and businesses in WRCOG participating jurisdictions and opportunity to finance energy and water efficiency projects in their properties. The HERO Program is a Property Assessed Clean Energy (PACE) financing program and allows property owners to finance energy efficiency improvement projects and to repay the financing through special assessments on their property taxes. A wide range of products are eligible under the HERO program. Lighting upgrades, building insulation improvements, water efficiency enhancement, renewable energy production, water heating technologies, and mechanical system upgrades are a few to name. For a complete list of eligible products under the HERO program, visit the website at http://heroprogram.com and www.commercialhero.com.

Federal Tax Credits for Energy Efficiency. On October 3, 2008, former President Bush signed into law the "Emergency Economic Stabilization Act of 2008." This bill extended the Production Tax Credit for solar energy systems and fuel cells to 2016. New tax credits were established for small wind energy systems. Tax deductions for owners and designers of energy efficient commercial buildings were also extended.

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

Southern California Edison Energy Efficiency/Renewable Energy Incentives

- Residential and commercial customers can qualify for a variety of rebate programs through SCE. SCE offers savings to customers who purchase qualified energy efficient appliances, heating and cooling systems, pool pumps, Energy Star, CFLs lighting fixtures and other energy efficient technologies.
- Multifamily residential developments can benefit from a variety of SCE's rebate programs. Using energy efficient products and technologies such as high-performance dual-pane windows, Energy Star labeled ceiling fans; Energy Star CFLs, proper insulation, energy efficient electric storage water heaters, refrigerators, LED lights, and cold vending machine controls would save both money and energy.
- SCE will provide free evaluation of mobile homes and provides free supply and installation of the energy upgrades that is recommended by their energy specialist.

- SCE and SCG residents can benefit from incentives up to $4,000 for detached single-family residential energy upgrades.
- SCE offers incentives, through utility rebate programs, for non-residential customers. This rebate is regardless of size and energy usage. Express efficiency rebates for lighting, refrigeration, and air conditioning technologies are available. In addition, SCE has a Custom Contracting Program in which non-residential users have the option of designing an energy retrofit conservation measure. Incentives are based on the type of measure installed and the reduction in energy usage over a 12-month period.

  See http://energy.gov/savings/sce-non-residential-energy-efficiency-programs
- SCE's Self-Generation Incentive Program (SGIP) provides financial incentives for the installation of new, qualifying customer self-generation equipment for their own on-site usage. Technologies currently eligible for SGIP incentives are generation related to wind, fuel cell, waste heat capture, and conventional CHP. The SGIP program is designed with business and large institutional customers in mind. Rebates for renewable generation—such as wind turbines or fuel cell—that generate less than 30 kilowatts of energy are available through the California Energy Commission's Emerging Renewables Program. Fuel cells of any size using non-renewable fuels may receive incentives under the SGIP program.

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

Southern California Gas Company.

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

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

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

California Energy Commission Energy Efficiency Financing. The CEC offers energy efficiency financing and low interest loans (up to 15 years) to cities and counties for installing energy-saving projects. Examples of projects include lighting systems, pumps and motors, streetlights and LED traffic signals, automated energy management systems/controls, building insulation, energy generation including renewable and combined heat and power projects, heating and air conditioning modifications, and wastewater treatment equipment. The CEC also offers the Energy Partnership Program Technical Assistance Grant, which would provide the City with up to $10,000 of technical assistance services, including a feasibility of energy efficiency opportunities for City facilities to maximize energy cost savings and GHG emissions reductions.

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

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

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

California Solar Initiative (CSI). In January 2006, the California Public Utilities Commission adopted the CSI to provide more than $3 billion in incentives for solar-energy projects with the objective of providing 3,000 megawatts of solar capacity by 2016. In December 2011, the Commission increased the CSI budget by $200 million in order to cover a budget shortfall. The action implements SB 585 signed by former Governor Jerry Brown on Sept. 22, 2011. The CSI program is administered by Pacific Gas & Electric, Southern California Edison, and CCSE for the SDG&E territory. The CSI incentive for non-residential buildings includes a transition to performance-based and expected performance-based incentives, with the aim of promoting effective system design and installation. The applicable rebate programs for municipal facilities include: (1) the general CSI Program of solar rebates for public agencies; (2) the CSI-Thermal Program for solar hot water rebates for municipal facilities; and (3) the CSI Research, Development, Demonstration, and Deployment Program.

See http://energycenter.org/csi

Water Conservation and Treatment Financing

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

CWSRF's offer:

- **Low interest rates, flexible terms** — Nationally, interest rates for CWSRF loans average 2.3%, compared to market rates that average 5%. For a CWSRF program offering this rate, a CWSRF funded project would cost 22% less than projects funded at the market rate. CWSRFs can fund 100% of the project cost and provide flexible repayment terms up to 20 years.

- **Funding for nonpoint source pollution control and estuary protection** — CWSRFs provided more than $167 million in 2009 to control pollution from nonpoint sources and for estuary protection, more than $3 billion to date.
- **Assistance to a variety of borrowers** — The CWSRF program has assisted a range of borrowers including municipalities, communities of all sizes, farmers, homeowners, small businesses, and nonprofit organizations.
- **Partnerships with other funding sources** — CWSRFs collaborate with banks, nonprofits, local governments, and other federal and state agencies to provide the best water quality-financing source for their communities.

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

SoCal Water Smart. The SoCal Water Smart program offers rebates to customers of the Metropolitan Water District's member agencies for installing water-saving appliances. Qualifying products include high-efficiency clothes washers, rotating nozzles, and weather-based irrigation controllers.

See http://socalwatersmart.com/home

5.3 STEP 3—Measure Implementation

After taking into account the reductions in energy and water usage and the GHG emissions resulting from statewide measures, the City would need to implement the local (R2) measures to reach its reduction targets for 2020 and 2035.

The City would develop an implementation schedule for the R2 reduction measures. Prioritization would be based on the following factors:

- Cost effectiveness
- GHG reduction efficiency
- Availability of funding
- Level of City Control
- Ease of implementation
- Time to implement

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

- **Phase 1 (2013-2017)** — Development of key ordinances, completion of key planning efforts, implementation of most cost-effective measures, and support of voluntary efforts.
- **Phase 2 (2017–2020)** — Continued implementation of first phase measures, implementation of second phase measures.

Because the goals of this CEAP are aggressive, success in meeting the goals depends on some flexibility in the GHG reduction actions. The City is committed to flexibility in implementing the reduction measures and meeting the goals of the CEAP. The goals of each reduction measure can often be achieved through a variety of means, especially those related to building energy efficiency. For example, the City would adopt energy efficient design requirements for new development (measures R2-E1 and R2-E2). Compliance with the energy efficient design programs can be achieved through many combinations of actions including, but not limited to, installing energy efficient appliances, lighting, and HVAC systems; installing solar water heaters; siting and orienting buildings to optimize conditions for natural heating, cooling, and lighting; installing top-quality windows and insulation; and incorporating natural shading, skylights, and reflective surfaces. Possible sources of funding to implement these measures are presented in Chapter 4. Table 5-1 presents the potential timeline and phasing schedule for the GHG reduction measures.

Table 5-1 GHG Reduction Measure Timeline and Phasing Schedule

Reduction Measure	Phase
Energy	
R2-E1: New Residential Energy Efficiency Requirements	1, 2
R2-E2: New Commercial Energy Efficiency Requirements	1, 2
R2-E3: New Residential Renewable Energy Requirements	2
R2-E4: New Commercial Renewable Energy Requirements	2
R2-E5: Existing Residential Energy Retrofits	1, 2
R2-E6: Existing Commercial Energy Retrofits	1, 2
Water	
R2-W2: Water Conservation Strategies	1, 2
R2-W3: Increase Recycled Water Use	2

5.4 STEP 4—Public Participation

The residents and businesses in the City are integral to the success of GHG reduction efforts. Their involvement is essential in order to reach the reduction goals because the CEAP depends on a combination of state and local government efforts, public and private sources of finance, and the voluntary commitment, creativity, and participation of the community at large. The City will need to strike a balance between development and environmental stewardship to keep the economy strong and, at the same time, protect the environment. Education programs should be developed for stakeholders such as businesses, business groups, residents, developers, and property owners outlining the benefits of the CEAP's cost-saving measures to encourage participation in efforts to reduce GHG emissions in all possible sectors.

5.5 STEP 5—Monitoring and Inventorying

The City will use a system for monitoring the reductions in energy use from local and statewide measures. If promising new strategies emerge, the City will evaluate how to incorporate these strategies into the CEAP. Further, state and federal action would also result in changes that would influence the level of the City's GHG emissions. WRCOG through Task 11 of the SCE administered grant fund is providing the City qualitative and quantitative metrics by which the City can track progress in energy savings. A customized emissions inventory software package will be provided for City use in tracking emissions based upon energy consumption data. The CEAP Implementation Coordinator would be responsible for maintaining records of reduction measure implementation and insuring that the periodic updates to the emissions inventory are completed using the emission inventory worksheet. A simple energy efficiency measure-tracking tool will be provided to track the implementation of the measures. In this way, the City can see 1) emissions estimates without implementation of the CEAP; 2) emissions estimates predicted with full implementation of the CEAP; and 3) progress-to-date as data are entered annually. This will demonstrate progress toward the goal and identify whether adjustments need to be made to programs to meet the reduction goal.

5.6 STEP 6—Beyond 2020

The 2020 target is only a milestone in GHG reduction planning. Executive Order S-03-05 calls for a reduction of GHG emissions to a level 80% below 1990 levels by 2050, and this level is consistent with the estimated reductions needed to stabilize atmospheric levels of carbon dioxide at 450 parts per million. Thus, there will be a need to start planning for the post-2020 period.

Because state and federal strategies for post-2020 are speculative at this point, it is recommended that the City commence planning for the post-2020 period in 2017, at the approximate midway point between plan implementation and the reduction target. By that time, the City would have a better understanding of the effectiveness and efficiency of the reduction strategies and approaches. The State's regulations under AB 32 would have been fully in force; federal programs and policies for the near term are likely to be well underway; market mechanisms that influence energy and fuel prices would likely be in effect; and technological advances are anticipated in the fields of energy efficiency, alternative energy generation, fuels, and other areas. The City would then be able to take the local, regional, state, and federal context into account. Further, beginning the post-2020 plan preparation in 2017 would allow enough time so that the plan could be ready for full implementation, including potential new policies, revisions to the plan (as necessary), programs, ordinances, and financing by 2020.

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Appendix A to Community Energy Action Plan

GHG Calculations

ATKINS

CITY OF HEMET
Greenhouse Gas Emission Inventory
Annual Usage and Generation

Inventory Year: 2010

	Growth Rates 2010 to 2020	2010 to 2035
Residential	11.99%	52.53%
Commercial	32.60%	56.08%
Industrial	7.16%	12.31%
Public/Institutional	31.80%	54.71%
Other (Mixed Use)	0.00%	0.00%

Electricity and Natural Gas

Electricity

Electricity Emission Factors		
SCE	WECC CAMX 2012	Units
630.89	658.68	lbs CO2/MWh
0.00486	0.02894	lbs CH4/MWh
0.00711	0.00617	lbs N2O/MWh

43560 sq. ft/acre

Southern California Edison

	Bundled Service		Direct Access	
	Annual kWh	$/kWh	Annual kWh	
Total - Residential	206,387,305	$0.14160	0	
HR Hillside				
RR Rural				
VL Very Low				
L Low Density	184,833,177	$0.14160		provided by SCE
LM Low Medium Density				
M Medium Density				
H High Density	21,554,128	$0.14160		provided by SCE
Total Commercial & Office Use	93,522,926	$0.15030	0	
N Neighborhood	93,522,926	$0.15030		
C Community				
HT Hwy/Tourist				
SC Service				
PO Professional Office				
Total - Industrial	7,212,968	$0.10810	0	
IP Industrial Pk.	7,212,968	$0.10810		
Total - Public/Institutional and Open Space Uses	75,684,107	$0.15030	0	
PI Public/Inst.	75,684,107	$0.15030		
VA Vineyards/Agricultural				
OS Open Space				
TTL Tribal Trust				
Total - Overlay Designation	0	$0.15030	0	
Mixed Use		$0.15030		
TOTAL	382,807,306		0	

Direct Electricity Emissions

	Generation (MWh)	CO2 (tons)	CH4(tons)	N2O (tons)	(eGRID2010 data, year 2007)
	0	0	0	0	
Total	0	0	0	0	

Natural Gas

Southern California Gas Co.

	Bundled Service		Direct Access
	therms	$/therm	therms
Total - Residential	11,634,788	$0.58367	0
HR Hillside			
RR Rural			
VL Very Low			
L Low Density	8,952,853	$0.58	
LM Low Medium Density			
M Medium Density			
H High Density	2,681,935	$0.58	
Total Commercial & Office Use	1,776,723	$0.32906	0
N Neighborhood	1776723	$0.33	
C Community			
HT Hwy/Tourist			
SC Service			
PO Professional Office			
Total - Industrial	137,030	$0.33408	0
IP Industrial Pk.	137,030	$0.33	
Total - Public/Institutional and Open Space Uses	1,437,826	$0.32916	0
PI Public/Inst.	1,437,826	$0.33	
VA Vineyards/Agricultural			
OS Open Space			
TTL Tribal Trust			
Total - Overlay Designation	0	$0.00000	0
Mixed Use		$0.00000	
TOTAL	14,986,367	$ 7,894,576.25	0

ATKINS

Water and Waste Water

Metered Water Deliveries

	AF	kgal	Cost of Service
Residential	8,130	2,649,169	7,080,269
L	6,586	2,146,055	$ 5,735,306
M			
H	1,544	503,114	$ 1,344,963
Commercial	1,321	430,449	1,103,013
-	1,321	430,449	$ 1,103,013
Industrial	75	24,439	40,184
IP	75	24,439	$ 40,184
Public/Institutional	1,370	446,416	1,517,492
PI	295	96,126	
VA	46	14,989	
OS	1,029	335,301	
TTL			
Overlay Designation	0	0	0
Mixed Use			
Land Use 6			
Land Use 7			
Land Use 8			
TOTAL	10,896	3,550,472	$ 9,740,958.00

Source	AF
Local Water	3457
Purchased Water	7438

Wastewater Treatment Plant

Digester Gas	0
Fraction of methane in Gas	0.61

Land Use

	2010 Estimate	Estimate 2020	
Residential	35,305	39,538	units
Commercial	32,348	42,893	1000 square feet
Industrial	36,119	38,705	1000 square feet
Public/Institutional	307,276	404,990	1000 square feet
Other (Mixed Use)	-	-	1000 square feet

ATKINS

CITY OF HEMET
Greenhouse Gas Emission Inventory

	2010	2020	2035	Reduced 2020
Energy				
Electrical Consumption	109,947	123,130	168,297	74,194
Electricity Generation	0	0	0	0
Natural Gas	79,721	89,280	121,808	72,848
Subtotal	***189,669***	***212,410***	***290,105***	***147,042***
Water and Wastewater				
Water consumption	7,071	8,269	10,815	6,550
Wastewater Generation	0	0	0	0
Subtotal	7,071	8,269	10,815	6,550
TOTAL	***196,739***	***220,679***	***300,920***	***153,592***

Source	2010	2020 BAU	2035	2020 Reduced
Energy	189,669	212,410	290,105	147,042
Water and Wastewater	7,071	8,269	10,815	6,550
Total	196,739	220,679	300,920	153,592
				-13,636
				Reduction target has been met

15% reduction from **2010**	167,228
Amount to reduce	53,450

ATKINS

CITY OF HEMET
Greenhouse Gas Emission Inventory
Electricity and Natural Gas Emissions

Electricity and Natural Gas

Electricity	2010		2020 BAU	2035	2020 Reduced
CO2 metric tons/year:	109,546.78		122,681.44	167,683.76	84926.73536
CH4 metric tons/year:	0.84388		0.945065	1.291736	0.654224879
N2O metric tons/year:	1.23457		1.382594	1.889761	0.957106767
Total (CO2e metric tons/year):	109,947.22		123,129.89	168,296.71	74,193.73

Elec. Generation	2010		2020 BAU	2035	2020 Reduced
CO2 metric tons/year:	0.00		0.00	#VALUE!	0.000
CH4 metric tons/year:	0.00		0.00	#VALUE!	#DIV/0!
N2O metric tons/year:	0.00		0.00	#VALUE!	#DIV/0!
Total (CO2e metric tons/year):	0.00		0.00	#VALUE!	#DIV/0!

Natural Gas	2010		2020 BAU	2035	2020 Reduced
CO2 metric tons/year:	79,517.66		89,051.83	121,496.84	72661.710
CH4 metric tons/year:	7.49		8.39	11.45	6.847
N2O metric tons/year:	0.15		0.17	0.23	0.137
Total (CO2e metric tons/year):	79,721.48		89,280.08	121,808.26	72,847.95

Note: emissions for 1990 and 2020 are based on 2008 emission factors

Emission Factors		
SCE	WECC CAMX 2012	
630.89	658.68	lbs CO2/MWh
0.00486	0.02894	lbs CH4/MWh
0.00711	0.00617	lbs N2O/MWh

Electricity: Southern California Edison

Rate Code	Bundled Service 2010 kWh	2020 kWh	2035 kWh	$/kWh	2010 ($)	2020 ($)	2035 ($)
Residential	206,387,305	231,133,143	314,802,556	$ 0.14160	$29,224,442	$32,728,453	$44,576,042
Commercial	93,522,926	104,736,324	145,970,582	$ 0.15030	$14,056,496	$15,741,870	$21,939,379
Industrial	7,212,968	8,077,803	8,100,885	$ 0.10810	$779,722	$873,211	$875,706
Public/Institutional	75,684,107	84,758,632	117,090,882	$ 0.15030	$11,375,321	$12,739,222	$17,598,760
Overlay Designation	0	0	0	$ -	$0	$0	$0
Land Use 6	0	0	0	$ -	$0	$0	$0
Land Use 7	0	0	0	$ -	$0	$0	$0
Land Use 8	0	0	0	$ -	$0	$0	$0
TOTAL	382,807,306	428,705,902	585,964,905		$55,435,981.28	$62,082,755.44	$84,989,885.72
Muni	7723403	8,030,794	8251683.765		$ 979,511.32	$ 1,018,495.87	$ 1,046,509.89
PI w/o Muni	67,960,704	76,727,837	108,839,198		$10,395,809.99	$11,720,726.47	$16,552,249.71
		12%	53%				

Generation

	Generation (MWh)	CO2 (tons)	CH4(tons)	N2O (tons)	
xx Power Plant	0	0	0	0	
xx Energy	0	0	0	0	**(not included in totals above)
Total	0	0	0	0	

Natural Gas: Southern California Gas Co.

	Bundled Service 2010 therms	2020 therms	2035 therms	$/therms	2010 ($)	2020 ($)	2035 ($)
Residential	11,634,788	13,029,799	17,746,542	$ 0.58	$6,790,876.71	$7,605,102.83	$10,358,124.25
Commercial	1,776,723	1,989,752	2,773,109	$ 0.33	$584,647.78	$654,747.05	$912,518.26
Industrial	137,030	153,460	153,898	$ 0.33	$45,779.08	$51,267.99	$51,414.48
Public/Institutional	1,437,826	1,610,221	2,224,461	$ 0.33	$473,272.67	$530,018.07	$732,200.15
Overlay Designation	0	0	0	$ -	$0.00	$0.00	$0.00
Land Use 6	0	0	0	$ -	$0.00	$0.00	$0.00
Land Use 7	0	0	0	$ -	$0.00	$0.00	$0.00
Land Use 8	0	0	0	$ -	$0.00	$0.00	$0.00
TOTAL	14,986,367	16,783,232	22,898,010		$7,894,576.25	$8,841,135.94	$12,054,257.14
PI w/o Muni		1,588,690	2,202,337			519,736	721,918
xxx		12%	53%				

Natural Gas Use (MMBTU)	2020 Natural Gas Use (MMBTU)	2035 Natural Gas Use (MMBTU)
1498636.7	1678323.24	2289801.039

ATKINS

CITY OF HEMET
Greenhouse Gas Emission Inventory
Water and Wastewater Emissions

Water and Wastewater

Water - Electricity	2010	2020 BAU	2035	2020 Reduced
CO2 metric tons/year:	7,043.60	8,237.23	10,773.73	6525.224
CH4 metric tons/year:	0.31	0.36	0.47	0.287
N2O metric tons/year:	0.07	0.08	0.10	0.061
Total (CO2e metric tons/year):	7,070.56	8,268.75	10,814.96	6550.19252

Wastewater	2010	2020 BAU	2035	2020 Reduced
CH4 metric tons/year:	0.00	0.00	0.00	0.000
Total (CO2e metric tons/year):	0.00	0.00	0.00	0

Total Water Into the System

	2010 (kgal)	Cost of Service (2010)	2020 (kgal)	Cost of service (2020)	2035 (kgal)	Cost of Service (2035)	2010%	2010 CO2e (MT/yr)	2020%	2020 CO2e (MT/yr)	2035%	2035 CO2e (MT/yr)
Residential	2,649,169	$ 7,080,269	2,966,804	$ 7,929,193	4,040,777	$ 10,799,534	74.61%	5275.663046	71.45%	5908.214997	74.41%	8046.968778
Commercial	430,449	$ 1,103,013	570,776	$ 1,462,595	671,845	$ 1,721,583	12.12%	857.2141309	13.75%	1136.665928	12.37%	1337.939805
Industrial	24,439	$ 40,184	26,189	$ 43,061	27,447	$ 45,131	0.69%	48.66847829	0.63%	52.1531409	0.51%	54.65956752
Public/Institutional	446,416	$ 1,517,492	588,376	$ 2,000,054	690,650	$ 2,347,712	12.57%	889.01087	14.17%	1171.716317	12.72%	1375.388706
Overlay Designation	0	$ -	0	0	0	0	0.00%	0	0.00%	0	0.00%	0
Land Use 6	0	$ -	0	0	0	0	0.00%	0	0.00%	0	0.00%	0
Land Use 7	0	0	0	0	0	0	0.00%	0	0.00%	0	0.00%	0
Land Use 8	0	0	0	0	0	0	0.00%	0	0.00%	0	0.00%	0
TOTAL	3,550,472	$ 9,740,958.00	4,152,144	$ 11,434,904.12	5,430,719	$ 14,913,959.52	100%	7,071		8,269		10,815
2010 TOTAL (MG)	3,550											
Muni	2,670	$ 13,074.00	2,777	$ 13,594.35	2,853	$ 13,968.26	0.08%	5.317864409	0.07%	5.529515368	0.05%	5.681606288
PI w/o Muni	443,746	$ 1,504,418.00	585,599	$ 1,986,460.11	687,797	$ 2,333,743.61	12.50%	883.6930056	14.10%	1166.186802	12.66%	1369.707099

Source	2010 AF	2010 MG	2020 MG	2035 MG
Local Water	3457	1126.47	1,317.36	1,723.02
Purchased Water	7438	2423.68	2,834.41	3,707.21
		3550.15	4,151.77	5,430.23
kWh		23,575,164	27,570,269	36,060,016

loss rate
-0.01%

Wastewater

Digester Gas	0.00	cubic feet/day
Fraction of methane in Gas	0.61	
Stationary Methane Emissions	0.00	metric tons

WECC 2005	Units
658.68	lbs CO2/MWh
0.02894	lbs CH4/MWh
0.00617	lbs N2O/MWh

Appendix B to Community Energy Action Plan

Utility Data

Electricity Use Report
For City of Hemet
Year 2010

Prepared by

Southern California Edison

Version 1.0

October 4, 2012

I. Introduction

The purpose of this report is to fulfill your request for overall energy consumption data for the City of Hemet. SCE has made every effort to fulfill this request. However, our legal responsibility of maintaining confidentiality of individual customer data limits us to providing only the following information:

- Customer Classifications grouped by California Energy Commission (CEC) sectors: Residential, Commercial, Industrial, and Agriculture,
- kWh consumption,
- kW demand for Commercial, Industrial, and Agriculture Sectors with demand meters; no kW demand data is available for Residential Sector, and
- Number of Accounts

II. Data Description

The summaries provided in the Table below in page 3, are based on 12 months usage data ending December, 2010 for SCE installed service accounts within the city's boundaries. The accounts included in the dataset were extracted from SCE's Customer Service System based on the Public Authority Code for the City of Hemet. This code is used to identify accounts by municipality for the purpose of calculating state and local taxes. Public Authority Code is permanently retained as a part of each premise's identification regardless of occupancy. The only time a Public Authority Code changes is when a city or county annexes a given piece of property into its territory or a particular piece of property is transferred from one public authority to another through other means.

III. Summary of Results (January 1, 2010 – December 31, 2010)

Table – Total of Account Summary Data for Bundled and Direct Access Customers

CALIFORNIA ENERGY COMMISSION (CEC) SECTOR GROUP	ANNUAL KWH	% of TOTAL	KW DEMAND	NUMBER OF ACCOUNTS	% of TOTAL
NON RESIDENTIAL	176,420,001	46.1%	53,810	2,962	9.1%
RESIDENTIAL MULTI FAMILY	21,554,128	5.6%	-	61	0.2%
RESIDENTIAL SINGLE FAMILY	184,833,177	48.3%	-	29,565	90.7%
Grand Total	382,807,306			32,588	
DA % of kWh	8.8%				

Application of 15/15 Rule (Section V. Release of Aggregated Customer Information, p. 4)

The Commercial, Industrial and Agriculture Sectors were combined into Non Residential Sector.

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IV. Public Goods Charge Energy Efficiency Funds

SCE estimated the City of Hemet's proportional share of Public Goods Charge (PGC) funded energy efficiency activities that the California Public Utilities Commission might make available to the customers in the City of Hemet if it became a community choice aggregator ("CCA") but did not implement energy efficiency programs in the CCA territory. SCE performed the estimated proportional share calculation in accordance with the directives of Decision (D.) 03-07-034 of the California Public Utilities Commission, and determined that the City of Hemet's estimated proportional share $ 542,362. Please note that the estimated proportional share calculation does not necessarily represent an amount of funds that would be made available for energy efficiency programs in the City of Hemet's territory should the City of Hemet become a CCA. As stated in D.03-07-034, the proportional share calculation is only used to estimate non-CCA expenditures in a CCA's territory. Also note that the proportional share estimate is not equal to the amount of PGC funds collected from ratepayers in the City of Hemet, since the PGC rate includes authorized amounts for energy efficiency as well as other public interest programs.

V. Release of Aggregated Customer Information

The 15/15 Rule is intended to protect customer confidentiality by reducing the possibility of identifying customers through the release of usage information. SCE will apply the 15/15 Rule in releasing aggregated customer information. The rule was initially implemented by the California Public Utilities Commission during Direct Access proceedings in 1997 and was adopted through D. 97-10-031.

The 15/15 rule requires that any aggregated information provided by the Utilities must be made up of at least 15 customers, and a customer's load must be less than 15% of an assigned category. If the number of customers in the compiled data is below 15, or if a single customer's load is more than 15% of the total data, categories (e.g., rate classes) must be combined before the information is released. The rule further requires that if the 15/15 rule is triggered for a second tie after the data has been screened once already using the 15/15 rule, then the customer is dropped from the information provided.

VI. Disclaimer

Southern California Edison Company has provided the above information at your request. The data presented here represents 12 months ending December, 2010. These estimates are provided for informational purposes only, and are not intended to, nor do they, predict what energy usage and loads within your city boundaries will be in the future. The actual future loads and energy consumption will vary from these estimates for a variety of reasons, including changes in energy usage, demand levels, and weather patterns. Southern California Edison Company assumes no liability for the use of the information provided above. If you have any questions regarding this information, please contact your Southern California Edison Company Account Representative.

City of Hemet Natural Gas Usage Report (Southern California Gas Company, 2010)

	Non-Residential	Municipal Accounts	Single Family	Multi Family
City of Hemet 2010	3,351,973	20,707	8,952,853	2,681,935

Source: SCG 2010 Usage Report for the City of Hemet

ATKINS

Hemet Water 2010 - Atkins Summary

	EMWD 2010		LHMWD 2010		City of Hemet WD* 2010		Total 2010			
	AF	kgal	AF	kgal	AF	kgal	AF	kgal	$	
Residential	4208	1371137	1425	464338	2497	813650	8130	2649125	$ 7,080,269	
SFR	*3781*	*1231970*	*1293*	*421242*	*1512*	*492687*	*6586*	*2145899*	$ 5,735,306	81% *Divide residential based on residential ratio of EMWD, LHMWD, and*
MFR	*427*	*139167*	*132*	*43096*	*985*	*320963*	*1544*	*503226*	$ 1,344,963	19% *City of Hemet WD*
Commercial	442	144026	95	30793	784	255467	1321	430286	$ 1,103,013	
Industrial	75	24439	0	0	0	0	75	24439	$ 40,184	
Institutional/Governmental	200	65170	95	30793	0	0	295	95963	$ 196,932	
Landscape	808	263338	45	14663	176	57350	1029	335351	$ 1,295,914	
Agriculture	46	14989	0	0	0	0	46	14989	$ 24,646	
	5,779	**1,883,100**	**1,659**	**540,587**	**3,457**	**1,126,467**	**10,895**	**3,550,154**	**$ 9,740,958.03**	

Estimated rateS:

City of Hemet Rate ~ $2.5/CCF = 1004/AF

LHMWD Rate ~ $950/AF

Water Sources:
* City of Hemet WD is 100% locally pumped water - AF pumped groundwater
EMWD is 75% imported water
LHMWD is 90% locally sourced water

EMWD TOTAL Potable Retail Residential Water Deliveries (2010):

SFR	54000 AF	90% of residential
MFR	6100 AF	10% of residential
Sub-TOTAL Residential	60100 AF	

LHMWD TOTAL Potable Retail Residential Water Deliveries (2010):

SFR	6158 AF	91% of residential
MFR	630 AF	9% of residential
Sub-TOTAL Residential	6788 AF	

City of Hemet TOTAL Potable Retail Residential Water Deliveries (2010):

SFR	1512 AF	61% of residential
MFR	985 AF	39% of residential
Sub-TOTAL Residential	2497 AF	

Source(s): 2010 Community Usage Report (EMWD, 2012); LHMWD 2010 UWMP

Water Usage Data 2010

City of Hemet, EMWD Water Service

	Annual Usage*	Rate**	Total Bill ($)
Residential	1,832,407 BU	Tiers 1 - 4	$3,219,531
Commercial	422 AFY	$535.788 AF	$226,102
Industrial	75 AFY	$535.788 AF	$40,184
Public/Institutional	200 AFY	$535.788 AF	$107,157
Agricultural	46 AFY	$535.788 AF	$24,646
Landscape	351,984 BU	Tiers 1 - 4	$1,076,460

BU=Billing Unit 748 gallons 1 BU = 0.00229636

Rate A201	Rate A202
50% meters at this rate	50% meters at this rate
Tier 1 = $1.483 BU	Tier 1 = $0.876 BU
Tier 2 = $2.714 BU	Tier 2 = $1.604 BU
Tier 3 = $4.864 BU	Tier 3 = $2.875 BU
Tier 4 = $8.898 BU	Tier 4 = $5.258 BU

* Please specify units (gallons, units, etc.)

** Please specify units ($/gallons, $/units, etc.)

Water Usage Data 2010

City of Hemet, City of Hemet Water Service

	Annual Usage*	Rate**	Total Bill ($)
Residential	2,497 AFY		
Commercial	784 AFY		
Industrial	0 AFY		
Public/Institutional	0 AFY		
Agricultural	0 AFY		
Landscape	176 AFY		

CONSUMPTION WATER RATES
Bimonthly Consumption

Rate Per 100 CF		per AF	
0-600 CF	$2.30	$	1,004.37
601-1200 CF	$2.50	$	1,004.37
1201-OVER CF	$2.88	$	1,004.37

* Please specify units (gallons, units, etc.)

** Please specify units ($/gallons, $/units, etc.)

Water Usage Data 2010
City of Hemet, Lake Hemet Municipal Water District Service

	Annual Usage*	Rate**	Total Bill ($)
Residential	1,425 AFY	Tiers 1 - 5	
Commercial/Institutional	189 AFY	$2.19 HFC	
Industrial	0 AFY		
Agricultural	0 AFY		
Landscape	45 AFY	$2.19 HFC	

Residential: Tiered Rate Schedule

Tier	Water Usage Per Bi-Monthly Billing Period (CCF)	Commodity Charge	Imported Water Surcharge	Capital Improvement Surchage	Total $/CCF	Total $/AF
1	0.00 to 14.00	$1.85	$0.22	$0.07	$2.14	$934.50
2	14.01 to 26.00	$1.87	$0.22	$0.07	$2.16	$943.67
3	26.01 to 49.00	$1.89	$0.23	$0.07	$2.19	$957.64
4	49.01 to 75.00	$1.92	$0.23	$0.07	$2.23	$971.62
5	> 75.01	$2.01	$0.24	$0.08	$2.33	$1,017.90

HCF = 100 cubic feet or 748 gallons

* Please specify units (gallons, units, etc.)
** Please specify units ($/gallons, $/units, etc.)

Estimated 21% of the water services are within the City of Hemet

Utility Data Summary from Murrieta CAP (2009)

	Electricity (kWh)				Natural Gas (therms)			
	2009	2010	2020	2035	2009	2010	2020	2035
Residential	183,632,081	186,195,817	211,833,181	250,289,227	2,138,842	2,161,916	2,392,662	2,738,780
Commercial	93,077,067	98,209,131	149,529,773	226,510,735	3,686,991	3,890,284	5,923,213	8,972,606
Industrial	4,256,340	4,343,312	5,213,029	6,517,605	303,557	309,760	371,788	464,829
Business Park	9,406,149	10,952,303	26,413,844	49,606,156	798,294	929,516	2,241,734	4,210,062
Civic/Institutional	13,249,690	13,117,560	11,796,256	9,814,300	670,414	663,728	596,872	496,587
Office	25,947,111	37,166,495	149,360,333	317,651,090	506,836	725,990	2,917,530	6,204,840
Mixed-Use	0	504,137	5,545,508	13,107,565	0	11,887	130,760	309,069
MUNICIPAL	87,127,136	87,985,952	96,574,111	109,456,350	18,501	18,572	19,284	20,351

	Growth % (from electricity)	
	2010-2020	2010-2035
Residential	14%	34%
Commercial	52%	131%
Industrial	20%	50%
Business Park	141%	353%
Civic/Institutional	-10%	-25%
Office	302%	755%
Mixed-Use	1000%	2500%
MUNICIPAL	10%	24%

	Growth % (from Natural Gas)	
	2010-2020	2010-2035
Residential	11%	27%
Commercial	52%	131%
Industrial	20%	50%
Business Park	141%	353%
Civic/Institutional	-10%	-25%
Office	302%	755%
Mixed-Use	1000%	2500%
MUNICIPAL	4%	10%

	(kWh)				MMBTU			
Sub-TOTAL Residential	626,553	635,300	722,775	853,987	213,884	216,192	239,266	273,878
SUB-TOTAL non-residential	145,936,357	164,292,938	347,858,743	623,207,451	5,966,091	6,531,164	12,181,896	20,657,994

	MMBTU							
Sub-TOTAL non-residential (MMBTU)	497,935	560,568	1,186,894	2,126,384	596,609	653,116	1,218,190	2,065,799
Sub-TOTAL Municipal (MMBTU)	297,278	300,208	329,511	373,465	1,850	1,857	1,928	2,035

	TOTAL by Year (MMBTU)			
	2009	2010	2020	2035
Residential	840,437	851,492	962,041	1,127,865
Non-Res	1,094,544	1,213,684	2,405,084	4,192,183
Municipal	299,128	302,065	331,439	375,500

	Total Growth (%)	
	2010-2020	2010-2035
Residential	13.0%	32%
Non-residential	98%	245%
Municipal	10%	24%

APPENDIX B

HEMET MUNICIPAL ENERGY ACTION PLAN

CITY OF HEMET

Municipal Energy Action Plan

December 2013

Prepared for:

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CONTENTS

Chapter 1	**Introduction**		**1-1**
	1.1	Action Plan Development Task Purpose, Goals, and Objectives	1-3
	1.2	Regulatory Setting	1-5
Chapter 2	**Energy Demand**		**2-1**
	2.1	Baseline Energy Demand	2-2
	2.2	Future Business-As-Usual Energy Demand	2-5
Chapter 3	**Municipal Greenhouse Gas Inventory**		**3-1**
	3.1	Setting and Methodology	3-2
	3.2	Baseline Municipal Energy GHG Inventory	3-3
	3.3	Future BAU Municipal Energy Emissions	3-6
	3.4	Reduction Targets	3-10
Chapter 4	**Reductions and Existing Programs**		**4-1**
	4.1	Existing Local Programs	4-3
	4.2	City Energy Reduction Measures	4-3
	4.3	Water Reduction Measures	4-8
	4.4	Summary of the Reductions	4-9
	4.5	Comparison to Targets	4-10
Chapter 5	**Implementation**		**5-1**
	5.1	STEP 1—Administration and Staffing	5-2
	5.2	STEP 2—Financing and Budgeting	5-2
	5.3	STEP 3—Measure Implementation	5-5
	5.4	STEP 4—Monitoring and Inventorying	5-6
	5.5	STEP 5—Beyond 2020	5-6
Chapter 6	**References**		**6-1**

APPENDICES

A. GHG Calculations

B. Utility Data

TABLES

Table 1-1	General Plan Polices Related to Energy, Water and GHG Reduction	1-10
Table 2-1	2010 Municipal Electricity Data Inputs	2-3
Table 2-2	2010 Municipal Natural Gas Data Inputs	2-4
Table 2-3	2010 Municipal Water Data Inputs	2-5
Table 2-4	2020 BAU Municipal Electricity Data Inputs	2-6
Table 2-5	2020 BAU Municipal Natural Gas Data Inputs	2-6
Table 2-6	2020 BAU Municipal Water Data Inputs	2-7
Table 2-7	2035 BAU Municipal Electricity Data Inputs	2-7
Table 2-8	2035 BAU Municipal Natural Gas Data Inputs	2-8
Table 2-9	2035 BAU Municipal Water Data Inputs	2-8
Table 3-1	2010 Municipal Data Inputs	3-4
Table 3-2	2010 Municipal Emissions by Source	3-5
Table 3-3	2010 Municipal Emissions and Costs by Facility	3-5
Table 3-4	2020 and 2035 Municipal Data Inputs	3-6
Table 3-5	2020 BAU Municipal Emissions by Source	3-7
Table 3-6	2020 BAU Municipal Emissions and Costs by Facility	3-8
Table 3-7	2035 BAU Municipal Emissions by Source	3-9
Table 3-8	2035 BAU Municipal Emissions and Costs by Facility	3-9
Table 3-9	2020 and 2035 GHG Emissions Reduction Targets	3-11
Table 3-10	2020 Electricity Consumption Reduction Target	3-11
Table 4-1	Summary of Municipal Reductions in Hemet	4-9
Table 4-2	Municipal GHG Emissions Summary	4-10
Table 4-3	Municipal Electricity Consumption Summary	4-11
Table 5-1	Summary of Reduction Measures in Hemet	5-6

FIGURES

Figure 1-1	Location Map	1-2
Figure 2-1	Highest Municipal Electricity Users 2010	2-3
Figure 3-1	Baseline Municipal Emissions by Source (MT CO_2e)	3-5
Figure 3-2	Baseline Municipal Emissions by Facility (MT CO_2e)	3-6
Figure 3-3	2020 BAU Municipal Emissions by Source (MT CO_2e)	3-7
Figure 3-4	2020 BAU Municipal Emissions by Facility Type (MT CO2e)	3-8
Figure 3-5	2035 BAU Municipal Emissions by Source (MT CO_2e)	3-9
Figure 3-6	2035 BAU Municipal Emissions by Facility Type (MT CO_2e)	3-10
Figure 4-1	Estimated Future Reduced Emissions (MT CO_2e)	4-10
Figure 4-2	Estimated Future Electricity Usage (kWh)	4-11

ACRONYMS

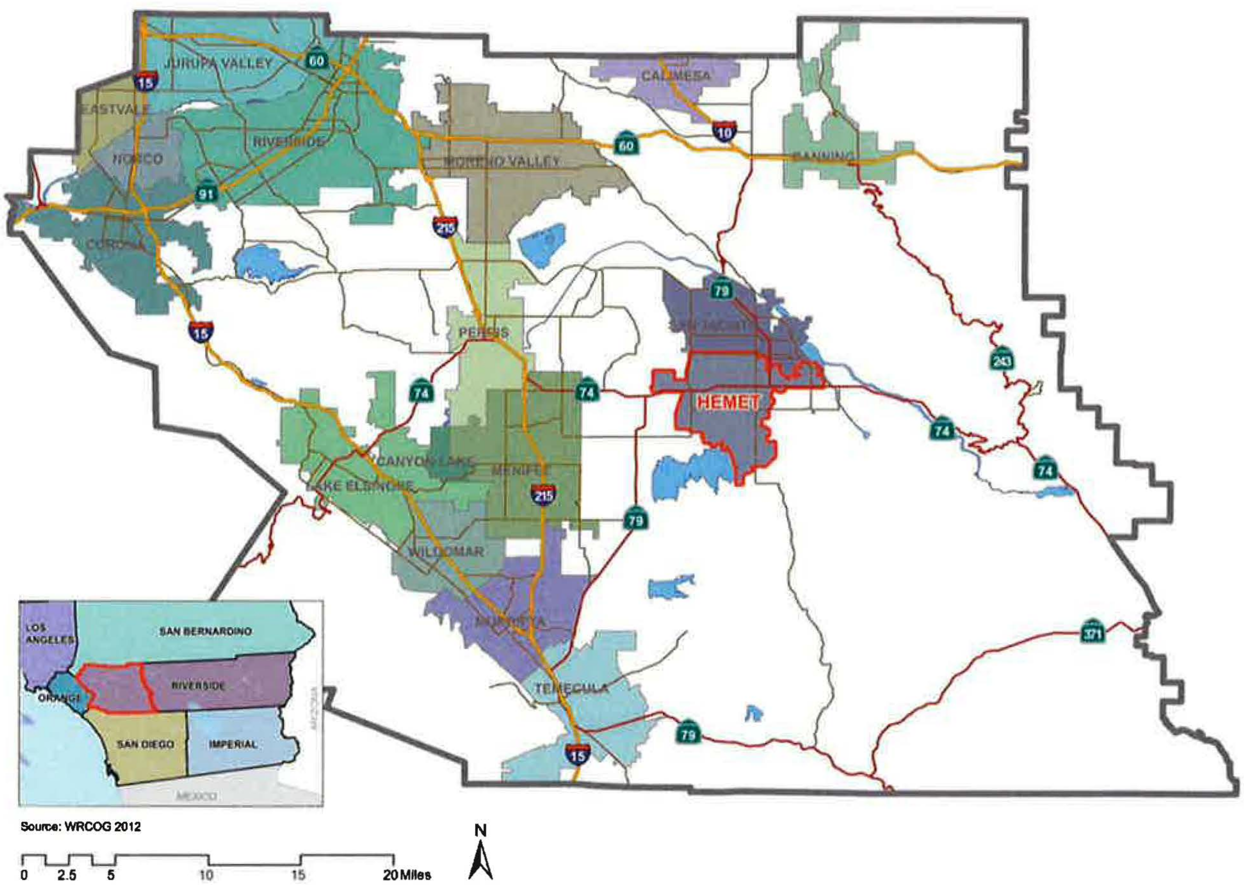
AB	Assembly Bill
AFV	Alternative Fuel Vehicle
BAU	Business as usual scenario
CAA	Clean Air Act
CalGreen	California Green Building Standard Code, CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings
CARB	California Air Resources Board
CAT	California Action Team
CCAR	California Climate Action Registry
CCAT	California Climate Action Team
CCR	California Code of Regulations
CEAP	Community Energy Action Plan
CEC	California Energy Commission
CEESP	California Long-Term Energy Efficiency Strategic Plan
CO_2e	Equivalent Carbon dioxide
CPUC	California Public Utilities Commission
CSI	California Solar Initiative
CWSRF	Clean Water State Revolving Funds
EMWD	Eastern Municipal Water District
ERP	Emerging Renewables Program
GHG	Greenhouse Gas
HFC	Hydrofluorocarbons
IEPR	Integrated Energy Policy Report
kgal	Thousand Gallons
kWh	Kilowatt Hours
LED	Low Emitting Diode
LGOP	Local Government Operations Protocol
LHMWD	Lake Hemet Municipal Water District
MEAP	Municipal Energy Action Plan
MMBTU	Million Metric British Thermal Unit
MT CO_2e	Metric Ton Carbon Dioxide Equivalent
MWh	Megawatt Hours
NAICS	North American Industry Classification System
PSD	Prevention of Significant Deterioration
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
SAFETEA-LU	Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users
SCAG	Southern California Association of Governments
SCE	Southern California Edison

SCG	Southern California Gas Company
SCS	Sustainable Communities Strategy
SGIP	Self-Generation Incentive Program
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
VOC	Volatile Organic Compounds
WRCOG	Western Riverside Council of Governments
WRELP	Western Riverside Energy Leadership Partnership

Chapter 1 Introduction

The City of Hemet (City) is committed to providing a more livable, environmentally healthy, equitable and economically vibrant community. The City is located in Western Riverside County, as shown in Figure 1-1. As one of the participating jurisdictions of Western Riverside Energy Leader Partnership (WRELP), which is administrated by Western Riverside Council of Governments (WRCOG), the City is adopting new energy efficiency programs that will reduce utility costs and greenhouse gas (GHG) emissions associated with the energy use at the municipal and community level. WRCOG is using funds provided by Southern California Edison (SCE) to implement the California Long-Term Energy Efficiency Strategic Plan (CEESP) developed by the California Energy Commission (CEC). Upon successful implementation of this Municipal Energy Action Plan (MEAP), the City can keep dollars in its local economy, create new green jobs, and improve quality of life within its community. The efforts toward energy efficiency improvements and GHG emission reductions are consistent with the goals and policies in the City's General Plan.

Figure 1-1 Location Map



The MEAP focuses on the energy usage and reduction goals for facilities owned and operated by the City. The results of this report have been incorporated into the City's Community Energy Action Plan (CEAP), which is available at the City's Planning Department office or on the City's website at www.cityofhemet.org. This section describes the relationship of the MEAP to the CEESP; identifies the purpose, goals, and tasks required for the MEAP; summarizes the regulatory framework pertaining to energy efficiency and emissions; and explains the methodology used to evaluate the current and future energy demands.

1.1 Action Plan Development Task Purpose, Goals, and Objectives

California Long-Term Energy Efficiency Strategic Plan Task 3.2.1

Aligned with CEESP Strategic Plan Goal 3, which is defined as "the local government leads by example with its own facilities and energy usage practices," the Strategic Plan Task 3.2.1 aims to develop a municipal energy chapter for the City climate action plan. The main focus of the MEAP is to improve the energy efficiency at City-owned facilities. The energy efficiency analysis is based on calculating existing energy consumption of municipal facilities. The MEAP will assist the City to set and prioritize goals, policies, and assign appropriate energy consumption reduction targets.

WRCOG has developed the following goals, objectives, and endpoints for task 3.2.1:

> **Goal:** Develop comprehensive, long-term plan to increase energy efficiency and reduce energy usage in municipal facilities.
>
> > **Objective 1:** Identify current municipal energy usage and develop a forecast of projected usage.
> >
> > > **End Point:** Baseline emissions inventory and energy usage profile for the City.
> >
> > **Objective 2:** Develop an energy usage reduction plan for municipal facilities that identifies specific goals (i.e. 10% reduction in energy usage within 5 years).
> >
> > > **End Point:** Municipal facility energy usage reduction strategies for the City.

Energy efficiency improvements can have a substantial positive effect on the City's economy and environment. The City can save on utility costs and offer a healthier, more livable environment by reducing its energy-related GHG emissions. By implementing the proposed efficiency measures described, the City can demonstrate the potential economic, social, and environmental benefits of increasing energy efficiency and providing environmental stewardship within the community.

To ensure the accuracy and applicability of the MEAP over the implementation period of the program, the energy efficiency targets will be measured and evaluated using the following criteria:

- Future projections of business-as-usual energy consumption by the City.
- Measures to improve energy efficiency and reduce energy consumption of City facilities.
- A list of non-SCE sources that can be utilized to sustain the program after SCE funds are expended.
- A contingency plan for addressing shortfalls if delays occur in receiving non-SCE funding.

Strategic Plan Goals and Objectives

The preparation of the City's MEAP is consistent with the goal of the CEESP. CEESP's framework was developed as a collaborative effort in response to California's need for a long-term strategic energy efficiency plan. Following the Strategic Plan Goal 3, this MEAP helps the City lead by example with its own facilities and energy usage practices.

The City has identified the following goal for the MEAP: "Develop a comprehensive, long-term plan to increase energy efficiency and reduce energy usage in the City's facilities." As part of developing a long-term plan, the MEAP sets efficiency goals through the year 2020 and identifies specific strategies to assist in achieving the targets.

The first step in the development of the City's MEAP was to review energy use within City-owned or operated facilities. The summary of municipal energy usage is found in Chapter 2. The GHG emissions associated with municipal energy consumption are found in Chapter 3. Energy efficiency policies and measures, including measures that the City currently implements, to reduce energy demand and corresponding GHG emissions are found in Chapter 4.

The following tasks were completed as part of the preparation of the MEAP:

- Gathered current municipal energy consumption data.
- Created a baseline 2010 GHG emissions inventory from 2010 energy consumption at City-owned facilities.
- Forecasted 2020 GHG emissions from the projected municipal energy demand.
- Developed a comprehensive energy usage reduction strategy and specified goals and reduction measures to achieve the GHG emission reduction targets.
- Provided a plan that is consistent with and complementary to the CEESP energy efficiency programs and the GHG emissions reduction efforts being conducted by the State of California through the Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) and the federal government through the actions of the United States Environmental Protection Agency.
- Guided the development, enhancement, implementation, monitoring and verification of actions that reduce energy use and GHG emissions.
- Provided a policy document with specific implementation measures meant to be considered as part of the planning process for future development projects.

The MEAP focuses on improving the efficiency of the City's energy usage, and reducing the City's GHG footprint associated with energy use. By developing a baseline of utility usage database of annual utility usage across departments, this MEAP provides opportunities for the City's savings related to operational utility costs at its facilities.

1.2 Regulatory Setting

The government agencies discussed below work jointly, as well as individually, to promote energy efficiency and reduce GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

Federal

CLEAN AIR ACT

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, 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 emissions, and the USEPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the USEPA should be required to regulate carbon dioxide and other GHGs as pollutants under Section 202(a)(1) of the federal Clean Air Act (CAA).

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

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

1 USEPA, Final Rule for mandatory reporting of GHG emissions. October 2009. http://www.epa.gov/climatechange/emissions/downloads09/GHG-MRR-FinalRule.pdf

State

EXECUTIVE ORDER S-3-05

On June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets were set:

- 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% below 1990 levels.

The first California Climate Action Team (CAT) 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 second 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 focused on the preparation of the Climate Change Adaptation Strategy, required by Executive Order S-13-08, described later in this section.

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 includes carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFC), perfluorocarbons, and sulfur hexafluoride. AB 32 required the California Air Resources Board (CARB) to adopt rules and regulations that would achieve GHG emissions equivalent to 1990 statewide levels by 2020. Under AB 32, CARB has the primary responsibility for reducing GHG emissions. 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. The measures included are part of California's strategy for achieving GHG reductions under AB 32. Three new regulations defined as "discrete early action GHG reduction measures" were: 1) a low carbon fuel standard, 2) reduction of HFC-134a emissions from non-professional servicing of motor vehicle air conditioning systems, and 3) improved landfill methane capture.[3] CARB estimates that

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

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

by 2020, the reductions from those three measures would be approximately 13 to 26 million metric tons of carbon dioxide equivalent (MT CO_2e).

In 2007, CARB published a staff report titled *California 1990 GHG Emissions Level and 2020 Emissions Limit*[4] that determined the statewide levels of GHG emissions in 1990 to be 427 million MT CO_2e. Additionally, in December 2008, CARB adopted the Climate Change Scoping Plan (Scoping Plan), which outlined 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 allows a cap-and-trade program, and also includes the discrete early actions.

SENATE BILL 1078, 107, AND X1-2 AND EXECUTIVE ORDER S-14-08 AND S-21-09

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor owned utilities and community choice aggregators, to provide at least 20% of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, Executive Order S-14-08 was signed, which expanded the state's Renewable Energy Standard to 33% renewable power by 2020. Additionally, Executive Order S-21-09 (signed on September 15, 2009) directed CARB to adopt regulations requiring 33% of electricity sold in the state come from renewable energy by 2020. CARB adopted the Renewable Electricity Standard on September 23, 2010, which requires 33% renewable energy by 2020 for most electricity retailers. SB X1-2 was signed in April 2011 to codify the 33% renewable standard, which applies to publicly-owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. The bill also includes interim targets of procuring 20% renewable by 2014 and 25% renewable by 2017.

SENATE BILL 1368

SB 1368 (Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed into law in September 2006. SB 1368 required the California Public Utilities Commission (CPUC) to establish a performance standard for base-load generation of GHG emissions by investor owned utilities by February 1, 2007. SB 1368 also required the CEC to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards could not exceed the GHG emissions rate from a base-load combined cycle, natural gas fired plant. Furthermore, the legislation states that all electricity provided to California, including imported electricity, must be generated by plants that meet the standards set by CPUC and CEC.

EXECUTIVE ORDER S-20-04

Executive Order S-20-04, the California Green Building Initiative (signed into law on December 14, 2004), established a goal of reducing energy use in state-owned buildings 20% from a 2003 baseline by 2015. It also encourages the private commercial sector to set the same goal.

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

The initiative places the CEC in charge of developing a building efficiency benchmarking system, commissioning and retro-commissioning (commissioning for existing commercial buildings) guidelines, and developing and refining building energy efficiency standards under Title 24 to meet this goal.

CALIFORNIA CODE OF REGULATIONS TITLE 24, PART 6

California Code of Regulations (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 and natural gas use result in GHG emissions and energy efficient buildings require less electricity and natural gas. Therefore, increased energy efficiency results in decreased GHG emissions.

The CEC adopted the 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. CEC 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 Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards. Newer revisions to the CCR have been proposed by the CEC and the amended standards (2013 Building Energy Efficiency Standards) will go into effect on January 1, 2014.

CALGREEN BUILDING CODE

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

ASSEMBLY BILL 811

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

ASSEMBLY BILL 474

AB 474 (2009) is designed to encourage and facilitate the installation of permanent water conservation and efficiency improvements on private property through a voluntary financing program between public entities and property owners. The bill creates financing opportunities for residential, commercial, industrial, and agricultural property owners to improve water efficiency.

Regional and Local

HEMET SUSTAINABILITY PLAN

In January 2012, the City committed to becoming a sustainable community by adopting sustainability goals policies as a part of the City's General Plan Update with the vision of creating an ecologically sustainable, economically dynamic, and socially equitable future for its citizens. The plan promotes efficient and effective use of local resources, safeguards human health and the environment, creates a healthy and diverse economy, and improves the livability and quality of life for all community members. The Plan recommends specific actions to enhance City performance in energy, green building, water resources, air resources, waste management, transportation, open space, and community outreach.

CITY OF HEMET MUNICIPAL CODE - LANDSCAPING AND IRRIGATION ORDINANCE

The City's Water Conservation Ordinance for Landscaping applies to all new and rehabilitated landscaping projects for public agencies and private development projects. Through these regulations, the City establishes provisions for water management practices and wastewater prevention; establishes a structure for planning, designing, installing, maintaining, and managing water efficient landscapes; reduces the water demands from landscapes without a decline in landscape quality and/or quantity; retains flexibility and encourage creativity through appropriate design; and reduces or eliminates wastewater and stormwater runoff.

CITY OF HEMET GENERAL PLAN POLICIES (2012)

The City's General Plan guides development and land use changes to the City's goals to create a City that is safe, healthy, and conserves natural resources while accommodating growth and development. The general plan includes policies that reduce energy and water consumption and GHG emissions. Table 1-1, below, summarizes these relevant polices by emissions category and General Plan element.

Table 1-1	General Plan Polices Related to Energy, Water and GHG Reduction		
Source	**Element**	**Objective**	**Policies**
Energy	Open Space & Conservation	Sustainable Future	OS-6.1, 6.2,6.3, 6.4, 6.5, 6.6, 7.4, 7.7, 7.8, 7.9, 7.14, 7.15, 8.1, 8.7; C-4.1, 4.5, 4.9
	Community Services & Infrastructure	City Developments	CSI-5.3, 5.10, 8.4, 10.7
	Community Design	Sustainable Design	CD-8.5, 13-19
	Housing	Sustainable Design	H-5.3,5.2
	Land Use	Sustainable Design	LU-2.9, 11.5
Water	Open Space & Conservation	Water Supply	OS-1.2, 1.3, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.8 2.4
	Community Services & Infrastructure	City Developments	CSI-2.4, 2.5, 2.6, 2.7, 4.4, 4.6, 4.7
	Community Design	Sustainable Design	CD-3.7, 4.6
	Land Use	Sustainable Design	LU-2.11, 2.12, 9.11
Source: City of Hemet General Plan (Adopted in 2012)			

CLEAN CITIES COALITION

The City is a member of the Clean Cities Coalition. It is a voluntary local government/industry partnership which advances the nation's economic, environmental, and energy security by supporting local actions to reduce petroleum consumption in transportation. Clean Cities works to mobilize local stakeholders toward expanding the use of alternative fuels and idle reduction measures, accelerate the deployment of advanced technology vehicles (AFV), and strengthen local AFV refueling infrastructure in nearly 100 communities around the country.

The governments of Western Riverside County have taken leadership roles in this Clean Cities Coalition, coordinating efforts between government and industry to recognize the value of partnership in achieving air quality, energy efficiency, economic development, and transportation goals, while advancing the clean air and energy efficiency goals of the national Clean Cities program.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT AIR QUALITY MANAGEMENT PLAN

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

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS REGIONAL TRANSPORTATION PLAN

The Southern California Association of Governments (SCAG) is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial counties, and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. SCAG serves as the federally designated metropolitan planning organization for the Southern California region and is the largest in the United States. With respect to air quality planning, SCAG has prepared the *2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS): Towards a Sustainable Future,* to fulfill federal planning requirements contained in the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which calls for regions to consider urban form and natural resources as part of the transportation planning process. The RTP is a long-range transportation plan that is developed and updated by SCAG every four years. The RTP provides a vision for the development of transportation facilities throughout the region based on growth forecasts and economic trends that project over a 20-year period.

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Chapter 2 **Energy Demand**

The following sections describe the City's energy consumption. The energy categories include electricity, natural gas, and water usage in City-owned buildings, facilities, and operations. The energy usage is divided by City departments, which is consistent with the municipal utility accounts. Sorting the energy consumption by department allows the City to determine energy intensive facilities and operations, and implement effective reduction strategies where it has direct control. The City can monitor the reduction in energy demand of its facilities over time and set an example for the community.

2.1 Baseline Energy Demand

As part of developing a baseline energy GHG emissions inventory, utility data was collected for municipal usage, including electricity, natural gas, and water demand. The year 2010 was used for the baseline, because 2010 is the year that complete utility usage data was available for all of the WRELP jurisdictions that are preparing MEAPs. In the City, Southern California Edison (SCE) supplies electricity, natural gas is provided by Southern California Gas Company (SCG), and water is supplied by Eastern Municipal Water District (EMWD), Lake Hemet Municipal Water District (LHMWD), and the City of Hemet Water Department.

For City electricity demand estimates, SCE provided a comprehensive list of electricity accounts and the consumption data. The total natural gas was provided by SCG. The water usage was estimated from the information provided by the EMWD and the City's 2010 Urban Water Management Plan (UWMP).

The City energy usage is a subset of the community-wide consumption. Specific details regarding community-wide electricity, natural gas, and water usage have been provided in the separate stand-alone CEAP.

Electricity and Natural Gas (2010)

ELECTRICITY

SCE provided a list of the City's accounts and their monthly usage for the year 2010. Based on the service type and the service address for each municipal electricity account, the usage data was classified into "Water Services," "Executive Offices," "Police Station," "Fire Station," Buildings & Facilities," "Library," "Streetlights," and "Traffic Signals."

As shown in Table 2-1, the City's baseline electricity usage is about 7.72 million kilowatt hours (kWh). The two municipal service categories that consume the largest amount of electricity are "Water Services" and "Streetlights." The City Water Department consumed the largest portion of electricity in 2010 to pump and distribute water locally. This accounted for 52% of the total electricity usage. The electricity usage for the street and traffic lights comprises 14% of the total municipal usage. The streetlights and traffic signals categories include only the fixtures that are controlled and owned by the City. They consist of the streetlights with the electricity billing code "LS-3" and "AL-2-A," and the traffic signals with the billing code "TC-1." Figure 2-1 shows the five largest electricity consumers of the major use categories during 2010. In 2010, out of the Water Services category, Wells No. 16 and No. 13, located at Seven Hills and

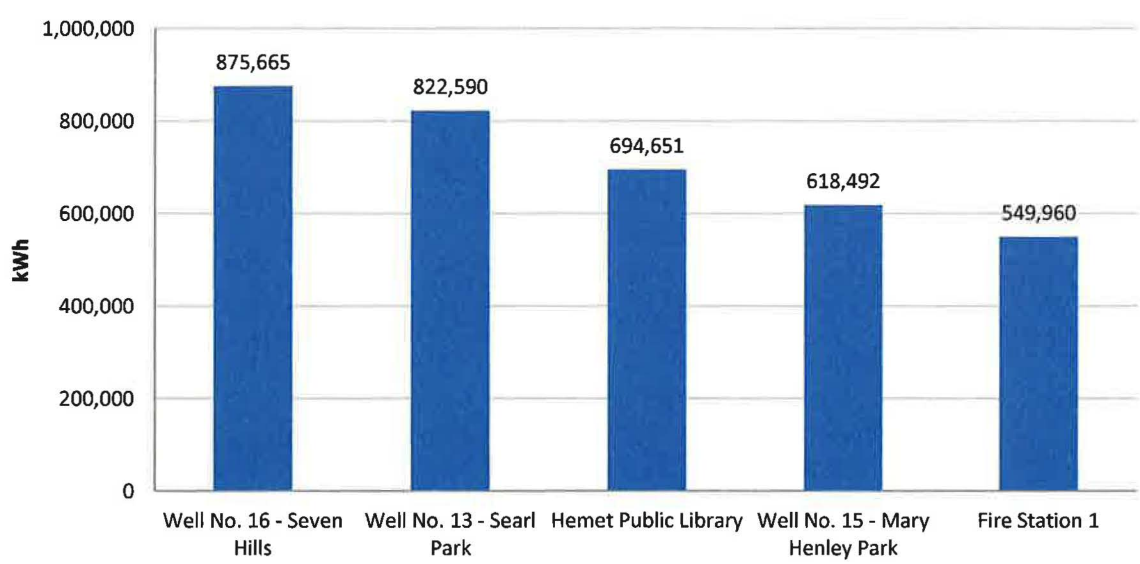
Searl Park, are the two largest electricity consumers, equally accounting for 11% of the total usage. The third largest electricity consumer of the City is the Hemet Public Library, at about 9% of the total. Well No. 15 located at Mary Henley Park, is the fourth largest electricity user in the City at 8% of the total consumption, followed by Fire Station #1 at 5% of the total amount (see Figure 2-1).

Table 2-1 2010 Municipal Electricity Data Inputs

Category	Electricity (kWh)	Cost	% of Total Usage	% of Total Cost	Data Source
Water Services	4.05 million	$436,460	52%	45%	SCE
Well No. 16 – Seven Hills	*875,665*	*$83,443*	*11%*	*9%*	*SCE*
Well No. 13 – Searl Park	*822,590*	*$83,684*	*11%*	*9%*	*SCE*
Well No. 15 – Mary Henley Park	*618,492*	*$62,446*	*8%*	*6%*	*SCE*
Other	*1.73 million*	*$206,887*	*22%*	*21%*	*SCE*
Executive Offices	506,593	$77,491	7%	8%	SCE
Police Station	40,234	$7,498	1%	1%	SCE
Fire Station	861,292	$123,593	11%	13%	SCE
Fire Station #1	*549,960*	*$73,881*	*7%*	*8%*	*SCE*
Other Fire Stations	*311,332*	*$49,712*	*5%*	*5%*	*SCE*
Buildings & Facilities(1)	355,135	$90,356	5%	9%	SCE
Library	694,651	$99,567	9%	10%	SCE
Streetlights	1.1 million	$116,796	14%	12%	SCE
Traffic Signals	162,710	$27,750	2%	3%	SCE
TOTAL	**7.72 million**	**$979,551**	**100%**	**100%**	

((1) Buildings & Facilities also includes parks and recreation centers.
Totals may be off due to rounding.
Streetlights include only City owned and operated facilities.
Source: SCE - 2010 Hemet Monthly Municipal Accounts. See Appendix B for source data.

Figure 2-1 Highest Municipal Electricity Users 2010



NATURAL GAS

Annual natural gas data for the year 2010 was provided by SCG. The usage data provides annual usage for all accounts associated with the City. Based on the North American Industry Classification System (NAICS) codes, each natural gas account is classified by its type of service. Table 2-2 summarizes the City's major natural gas consumers. "Buildings and Facilities" consumed the largest portion of natural gas in 2010, estimated at about 32% of the total amount.

Table 2-2 2010 Municipal Natural Gas Data Inputs

Category	Natural Gas (therms)	Cost	% of Total Usage	% of Total Cost	Data Source
Water Services	-	-	-	-	SCG
Executive Offices	2,811	$1,447	14%	15%	SCG
Police Station	1,251	$678	6%	7%	SCG
Fire Station	6,407	$2,851	31%	29%	SCG
Buildings & Facilities[1]	6,683	$2,942	32%	30%	SCG
Library	3,555	$1,813	17%	19%	SCG
Street & Traffic Lights	-	-	-	-	SCG
TOTAL	**20,707**	**$9,731**	**100%**	**100%**	

[1]Buildings & Facilities includes parks and recreation centers also.
Costs have been estimated based on average natural gas rates in 2010.
Totals may be off due to rounding.
Source: SCG - 2010 Hemet Municipal Accounts. See Appendix B for source data.

Purchased Water

Electricity is needed to move and treat water. Locally pumped and treated water is included in the local electricity consumption data provided by SCE. However, purchased water that was imported into the area is not accounted for in the local utility data. The City of Hemet Water Department distributes approximately 1.1 million thousand gallons (kgal) of potable water to an area of 5.25 square miles within the City from pumped groundwater. The electricity used to pump and distribute the groundwater has been incorporated into the electricity usage data provided by SCE, and is listed under "Water Services" in Table 2-1. As shown, the electricity used at the City Water Department accounts for the largest usage (52%) of the total municipal electricity consumption. In addition to locally pumped water, the City purchases a small amount of water from EMWD and LHMWD for municipal usage. The total amount of the purchased water during 2010 was 2,670 kgal. This purchased water was consumed by fire station 2, fire station 4, fire station 5, police gun range office, corporation yard office and landscaping, and Simpson Park. Table 2-3 shows the amount of water that the City purchased from EMWD and LHMWD for using at its facilities.

Table 2-3	2010 Municipal Water Data Inputs				
Category	Water (kgal)	Cost	% of Total Usage	% of Total Cost	Data Source
Fire Station	697	$4,009	26%	31%	City of Hemet
Buildings & Facilities[1]	1,973	$9,065	74%	69%	City of Hemet
TOTAL	**2,670**	**$13,074**	**100%**	**100%**	

[1] Buildings & Facilities includes parks and recreation centers also.
Source: City of Hemet 2010 water bills. See Appendix B for source data.

2.2 Future Business-As-Usual Energy Demand

City operations account for a small portion of the community's overall energy and water demand (City of Hemet CEAP 2012). In determining the future BAU, it is assumed that the City's energy and water demand are directly proportional to the employment growth and development of City facilities. Energy demand will generally increase at a similar rate as the employment in the public administration sector. According to the Local Profile of the City (SCAG 2011), during the year 2010, approximately 5% of the total employment was categorized under the public administration within the public and institutional sector. Based on SCAG's employment data (2011), it is estimated that the public and institutional job sector will grow by 3.98% from 2010 to 2020, and by 6.84% from 2010 to 2035. Therefore, it is assumed that the energy and water usage will grow at a similar rate.

Because a uniform growth rate is applied across all municipal categories in this study, the individual facilities that consumed the highest amount of energy during the baseline year would continue to have the largest contribution to energy demand. Therefore, because similar ratios of energy demand apply to City facilities under BAU scenarios, the future municipal energy demand categories have not been further divided into sub-categories. For the largest energy-consuming facilities, refer to Table 2-1.

Future BAU Electricity and Natural Gas (2020)

ELECTRICITY

Table 2-4 summarizes the projections of business as usual (BAU) electricity usage in 2020 for the major City categories. BAU assumes that the City continues to consume energy without any statewide or local efficiency measures, and that utility use will grow in relation to the growth in the City's activities. Using BAU projections, the City's electricity usage is projected to increase from 7.72 million kWh to 8.03 million kWh, which represents a total increase of 3.98% in electricity demand and costs from 2010 to 2020. Because a uniform growth rate (equivalent to the public service employment growth) is applied to all of the City categories, the percentage of the total usage and total cost of each category will remain consistent from 2010 to 2020. The electricity used to pump and distribute the groundwater has been incorporated into the electricity usage data provided by SCE, and is listed under the "Water Services" category. The Water Services category is projected to consume the largest amount of electricity in 2020, at about 52 of the total.

Table 2-4	**2020 BAU Municipal Electricity Data Inputs**			
Category	**Electricity (kWh)**	**Cost**	**% of Total Usage**	**% of Total Cost**
Water Services	4.2 million	$453,831	52%	45%
Executive Offices	526,755	$80,575	7%	8%
Police Station	41,835	$7,797	1%	1%
Fire Station	895,571	$128,512	11%	13%
Buildings & Facilities[1]	369,269	$93,953	5%	9%
Library	722,298	$103,530	9%	10%
Streetlights	1.1 million	$121,444	14%	12%
Traffic Signals	169,186	$28,855	2%	3%
TOTAL	**8.03 million**	**$1.02 million**	**100%**	**100%**

[1] Buildings & Facilities includes parks and recreation centers also.
Costs have been estimated based on average natural gas rates in 2010.
Totals may be off due to rounding.
Source: SCG - 2010 Hemet Municipal Accounts.

NATURAL GAS

Table 2-5 summarizes the BAU projections of natural gas demand in 2020 for the major usage categories. The City's natural gas usage is projected to increase from 20,707 therms to 21,531 therms, which represents a total increase of 3.98% in the demand and costs from 2010 to 2020. In 2020, the Buildings and Facilities continue to be the highest natural gas consumers, at about 32% of the total.

Table 2-5	**2020 BAU Municipal Natural Gas Data Inputs**			
Category	**Natural Gas (therms)**	**Cost**	**% of Total Usage**	**% of Total Cost**
Water Services	-	-	-	-
Executive Offices	2,923	$1,502	14%	15%
Police Station	1,301	$702	6%	7%
Fire Station	6,662	$2,935	31%	29%
Buildings & Facilities[1]	6,949	$3,029	32%	30%
Library	3,696	$1,883	17%	19%
Street & Traffic Lights	-	-	-	-
TOTAL	**21,531**	**$10,051**	**100%**	**100%**

[1] Buildings & Facilities includes parks and recreation centers also.
Costs have been estimated based on average natural gas rates in 2010.
Totals may be off due to rounding.

Future BAU Water Demand (2020)

The electricity used to pump and distribute the groundwater has been incorporated into the electricity usage data provided by SCE, and is listed under the "Water Services" category in Table 2-4. Table 2-6 estimates the projected BAU purchased water demand in 2020.

Table 2-6	2020 BAU Municipal Water Data Inputs			
Category	**Water (kgal)**	**Cost**	**% of Total Usage**	**% of Total Cost**
Fire Station	725	$4,169	26%	31%
Buildings & Facilities[1]	2,052	$9,426	74%	69%
TOTAL	**2,777**	**$13,594**	**100%**	**100%**

[1] Buildings & Facilities includes parks and recreation centers also.

Future BAU Electricity and Natural Gas (2035)

ELECTRICITY

Table 2-7 summarizes the BAU projections of electricity usage in 2035 for the major City categories. The City's electricity usage is projected to increase from 7.72 million kWh to 8.25 million kWh, which represents a total increase of 6.84% in electricity demand and costs from 2010 to 2035. Because a uniform growth rate (equivalent to the public service employment growth) is applied to all of the City categories, the percent of the total usage and total cost of each category will remain consistent from 2010 to 2035. Water services will continue to be the highest electricity consumer, at about 52% of the total usage in 2035.

Table 2-7	2035 BAU Municipal Electricity Data Inputs			
Category	**Electricity (kWh)**	**Cost**	**% of Total Usage**	**% of Total Cost**
Water Services	4.3 million	$453,831	52%	45%
Executive Offices	541,244	$80,575	7%	8%
Police Station	42,986	$7,797	1%	1%
Fire Station	920,204	$128,512	11%	13%
Buildings & Facilities[1]	379,426	$93,953	5%	9%
Library	742,165	$103,530	9%	10%
Streetlights	1.13 million	$124,785	14%	12%
Traffic Signals	173,839	$29,648	2%	3%
TOTAL	**8.25 million**	**$1.05 million**	**100%**	**100%**

[1] Buildings & Facilities includes parks and recreation centers also.
Costs have been estimated based on average natural gas rates in 2010.
Totals may be off due to rounding.
Source: SCG - 2010 Hemet Municipal Accounts.

NATURAL GAS

Table 2-8 summarizes the BAU projections of natural gas demand in 2035 for the major usage categories of the City. The City's natural gas usage is projected to increase from 20,707 therms to 22,123 therms, which represents a total increase of 6.84% in the demand and costs from 2010 to 2035. The largest natural gas consumption is associated with buildings and facilities owned by the City, estimated to be about 32% of the total usage.

Table 2-8	2035 BAU Municipal Natural Gas Data Inputs			
Category	**Natural Gas (therms)**	**Cost**	**% of Total Usage**	**% of Total Cost**
Water Services	-	-	-	-
Executive Offices	3,003	$1,541	14%	15%
Police Station	1,337	$720	6%	7%
Fire Station	6,845	$2,995	31%	29%
Buildings & Facilities(1)	7,140	$3,092	32%	30%
Library	3,798	$1,933	17%	19%
Street & Traffic Lights	-	-	-	-
TOTAL	**22,123**	**$10,282**	**100%**	**100%**

(1) Buildings & Facilities includes parks and recreation centers also.
Costs have been estimated based on average natural gas rates in 2010.
Totals may be off due to rounding.

Future BAU Water Demand (2035)

Projected BAU 2035 demand for purchased water is shown in Table 2-9. It is assumed that the City would continue purchasing water from EMWD and LHMWD through 2035 for use at its facilities.

Table 2-9	2035 BAU Municipal Water Data Inputs			
Category	**Water (kgal)**	**Cost**	**% of Total Usage**	**% of Total Cost**
Fire Station	745	$4,283	26%	31%
Buildings & Facilities(1)	2,108	$9,685	74%	69%
TOTAL	**2,853**	**$13,968**	**100%**	**100%**

(1) Buildings & Facilities includes parks and recreation centers also.

Chapter 3 Municipal Greenhouse Gas Inventory

This chapter describes City's GHG emissions from energy consumption including electricity, natural gas, and the energy used to supply water to City facilities. The methodology used to calculate the GHG emissions from energy consumption is first described, followed by the baseline and future GHG emissions inventory.

3.1 Setting and Methodology

Greenhouse Gases

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

Because GHGs have variable heat-trapping properties, a common unit of measurement, the carbon dioxide equivalent (CO_2e), is used to normalize the GHG emission capacity from the different GHGs. Each GHG is compared to carbon dioxide with respect to its ability to trap infrared radiation, its atmospheric lifetime, and its chemical structure. For example, methane is a GHG that is 21 times more potent than carbon dioxide; therefore, one metric ton of methane is equivalent to 21 MT CO_2e.

Methodology

The methodology for preparing GHG inventories incorporates the protocols, methods, and emission factors found in the California Climate Action Registry (CCAR), The Climate Registry *General Reporting Protocol* (version 3.1, January 2009), and the *Local Government Operations Protocol* (LGOP, version 1.1, 2010). If available, existing action plans or any related information was collected and reviewed. Through a questionnaire, any related policies that have already been prepared, or are being prepared for the City were collected and assessed. Of particular importance are municipal and/or community-wide GHG inventories completed by the City or a third-party agency or organization.

As part of the MEAP, the analysis has been tailored to include only the emissions associated with energy consumption at City-owned facilities. The methodology used for the calculation of GHG emissions differs depending on the emission source. The emission calculations follow the CCAR General Reporting Protocol, the LGOP, 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.

The City's MEAP uses 2010 as the baseline year for the GHG inventory. The GHG emissions associated with energy consumption data is based on emission factors for each source of energy. The 2010 energy and emissions inventory provides a framework to design programs and actions that specifically target reductions by emission sources such as electricity and natural gas in City facilities and operations. The baseline inventory also serves as a reference to monitor the City's progress towards reducing future energy consumption and GHG emissions. Programs and actions that have already been implemented in the City are described in Chapter 4.

3.2 Baseline Municipal Energy GHG Inventory

The inventory represents GHG emissions from utility sources associated with the facilities and operations owned by the City. The following sections describe the data inputs, emissions by source, emissions by City department, and the cost associated with energy usage in 2010.

The inventory of baseline energy GHG emissions was developed using the LGOP methodology. The LGOP categorizes GHG emissions into three distinct scopes that provide a way of organizing the GHG emissions. These three distinct scopes are defined in the LGOP as follows.

Scope 1 Emissions: Includes all "direct" sources of GHG emissions from sources that are owned or controlled by the City including, but not limited to, production of electricity, heat, or steam in owned or controlled boilers, furnaces, etc. For the City, emissions resulting from natural gas consumption are Scope 1 emissions.

Scope 2 Emissions: Accounts for "indirect" sources of GHG emissions from the generation of purchased utilities consumed by the City. A purchased utility is defined as one that is bought or otherwise brought into the jurisdictional authority of the local government, but not physically generated in power plants owned and/or operated by the local government. Scope 2 emissions physically occur at locations outside of the jurisdictional boundaries and direct control of the local government and thus are separated from direct emissions reported by the utility company or local government in order to avoid double counting. For the City, emissions resulting from the consumption of electricity are Scope 2 emissions.

Scope 3 Emissions: GHG Protocol Initiative considers this an optional reporting category that allows for the treatment of all other "indirect emissions." Scope 3 emissions are a consequence of the activities of the local government, but occur from sources not owned or controlled by the local government. For the City, emissions resulting from the consumption of imported water are Scope 3 emissions. The reason for including imported water into the MEAP inventory of GHG emissions is that water conservation measures will reduce emissions from both locally pumped water and imported water purchased from the water suppliers. For this reason it is in the City's best interest to include this Scope 3 emission source in the MEAP.

City facilities emit carbon dioxide, methane, and nitrous oxide indirectly as Scope 2 emissions through the consumption of electricity provided by SCE. SCE generates electricity primarily from natural gas combustion. The GHG emission factor associated with electricity use is therefore based on the emissions from the natural gas used to generate the electricity. 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.

City facilities emit carbon dioxide, methane, and nitrous oxide directly as Scope 1 emissions through the combustion of natural gas. The annual municipal natural gas usage for the City in therms was converted to million British Thermal Units (MMBTUs) and multiplied by the respective emission factors for carbon dioxide, methane, and nitrous oxide to determine the emissions from natural gas combustion, typically used for heating. Natural gas usage for 2010 was obtained from City staff.

Electricity is needed to move and treat water. Locally pumped and treated water shows up in the local electricity consumption data provided by SCE. However, purchased water that was imported into the area is not accounted for in the local utility data. Because of where purchased water is pumped and treated, it has additional GHG emissions associated with this electricity use and are classified as Scope 3 emissions. To account for this, the purchased water quantity was converted to thousand gallons (kgal), which then determined the amount of electricity consumption that was needed to pump and treat the total volume of water, and multiplied by the respective emissions factors for carbon dioxide, methane, and nitrous oxide to determine the emissions from energy use to treat and deliver purchased water.

Data Inputs

Data for the baseline inventory was gathered from City staff, water suppliers, SCE, SCG, and other reports. Table 3-1 summarizes the data inputs and sources for each of the emission categories included in the City's baseline emission inventory. Each data input was then multiplied by the associated GHG emission factor to calculate the emissions associated with each source. The electricity associated with pumping groundwater has been incorporated into the electricity usage provided by SCE.

Table 3-1 2010 Municipal Data Inputs

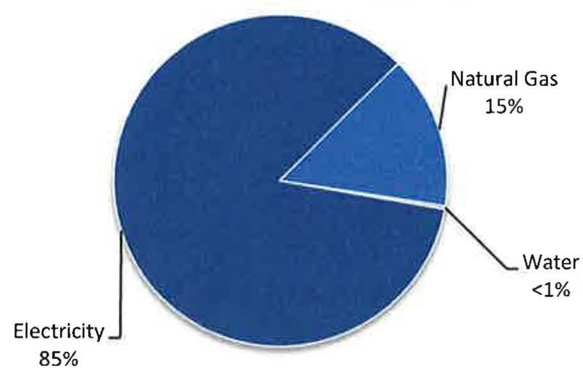
Category	Data Input	Data Source
Electricity (kWh)	7.72 million	SCE
Natural Gas (therms)	20,707	SCG
Purchased Water (kgal)	2,670	City of Hemet

Baseline Municipal Emissions by Source

Table 3-2 includes the City's GHG emissions from energy use in City facilities during the year 2010; sorted by emission source. The City emitted 2,617 MT CO_2e through its operations in 2010. The emissions were calculated based on energy accounts and water data provided by SCE, SCG, EMWD, LHMWD, and City staff. In 2010, the largest portion of the energy emissions was from the electricity consumption, estimated at 85% of the total. Natural gas usage accounts for 15% of the total energy-related GHG emissions (Scope 1 emissions). Finally, the emissions associated with purchased water account for the smallest portion of the emissions, at less than 1% of the total. Figure 3-1 summarizes the City's emissions in 2010, broken down by source.

Table 3-2	**2010 Municipal Emissions by Source**			
Category	**MT CO_2e**	**Cost**	**% of Total Emissions**	**% of Total Cost**
Electricity (Scope 2)	2,218	$979,511	85%	98%
Natural Gas (Scope 1)	391	$9,731	15%	1%
Water (Scope 3)	8	$13,074	<1%	1%
TOTAL	**2,617**	**$1.00 million**	**100%**	**100%**
Totals may be off due to rounding.				

Figure 3-1 Baseline Municipal Emissions by Source (MT CO_2e)



Baseline Municipal Emissions by City Facility

Table 3-3 summarizes the 2010 emissions by category. Electricity usage associated with pumping and delivering water by the City Water Department accounts for 44% of the City's total emissions in 2010. This category represents the emissions from the direct usage of electricity to extract water from local sources. This electricity usage data shows up on SCE's electricity report for the City. The Fire Station category accounted for the second largest source of emissions in the 2010 inventory, at 14% of the total. The GHG emissions associated with the facilities that consumed the largest amount of electricity in 2010 are listed under their appropriate categories in Table 3-3. These amounts represent the GHG emissions from direct consumption of electricity and natural gas at City facilities.

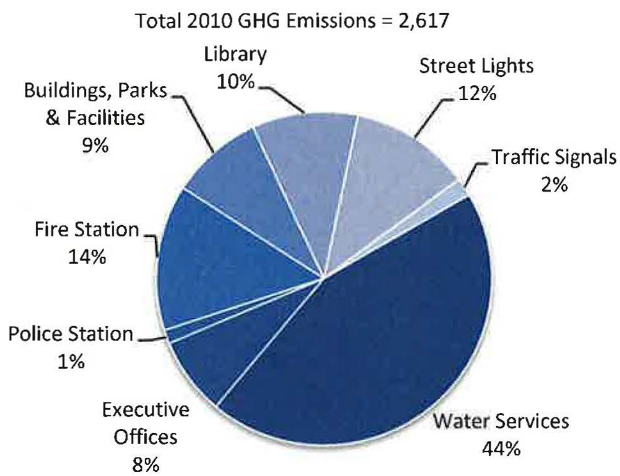
Table 3-3	**2010 Municipal Emissions and Costs by Facility**			
Category	**MT CO_2e**	**Cost**	**% of Total Emissions**	**% of Total Cost**
Water Services	1,162	$436,460	44%	44%
Well No. 16 – Seven Hills	*252*	*$83,443*	*10%*	*8%*
Well No. 13 – Searl Park	*236*	*$83,684*	*9%*	*8%*
Well No. 15 – Mary Henley Park	*178*	*$62,446*	*7%*	*6%*
Other	*496*	*$206,887*	*18%*	*22%*
Executive Offices	199	$78,937	8%	8%
Police Station	35	$8,176	1%	1%

Table 3-3 2010 Municipal Emissions and Costs by Facility

Category	MT CO_2e	Cost	% of Total Emissions	% of Total Cost
Fire Station	370	$130,453	14%	13%
Fire Station #1	*253*	*$76,283*	*10%*	*8%*
Other Fire Stations	*117*	*$54,170*	*4%*	*5%*
Buildings & Facilities[1]	234	$102,363	9%	10%
Library	267	$101,381	10%	10%
Street Lights	303	$116,796	12%	12%
Traffic Signals	47	$27,750	2%	3%
TOTAL	**2,617**	**$1.00 million**	**100%**	**100%**

[1] "Buildings & Facilities" category includes parks and recreation centers also.
Emission sources include electricity, natural gas, and purchased.
Totals may be off due to rounding.

Figure 3-2 Baseline Municipal Emissions by Facility (MT CO_2e)



3.3 Future BAU Municipal Energy Emissions

City facilities and operations account for a small percentage of the community's overall energy and water demand and the associated GHG emissions are relatively low in comparison. Future GHG emissions are based on the assumptions for growth described in Section 2.2. Table 3-4 summarizes the data inputs and sources for each of the emission categories included in 2020 and 2035 emissions inventory. Each data input was then multiplied by the associated GHG emission factor to calculate the emissions associated with each source.

Table 3-4 2020 and 2035 Municipal Data Inputs

Category	2020 Data Input	2035 Data Input
Electricity (kWh)	8.03 million	8.25 million
Natural Gas (therms)	21,531	22,123
Water (kgal)	2,777	2,853

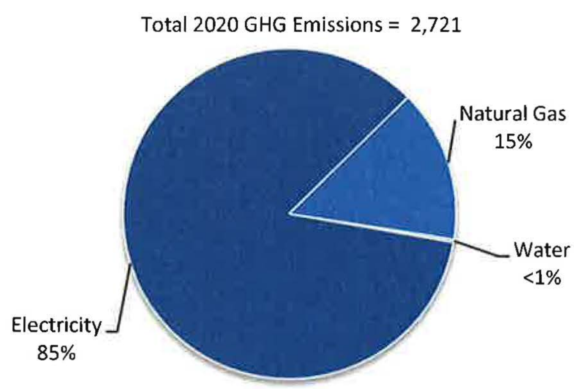
Future BAU Municipal Emissions by Source (2020)

Table 3-5 includes the City's GHG emission projections from energy use in City facilities during the year 2020 sorted by emission source. The City is projected to emit 2,721 MT CO_2e through its operations in 2020. The emissions were calculated based on the projected energy usage. In 2020, the largest portion of the energy emissions will be from electricity use at 85% (combined direct electricity and energy used for water services). A large portion of electricity emissions is associated with the electricity used for providing water services. Natural gas usage accounts for 15% of the total GHG emissions in the City, and purchased water for less than 1%. Because a uniform employment growth rate was applied to the energy and water demand, the emissions ratio of each category remains similar to the baseline inventory. Figure 3-3 summarizes the City's emissions in 2020, broken down by source.

Table 3-5 2020 BAU Municipal Emissions by Source

Category	MT CO_2e	Cost	% of Total Emissions	% of Total Cost
Electricity (Scope 2)	2,306	$1.02 million	85%	98%
Natural Gas (Scope 1)	407	$10,051	15%	1%
Purchased Water (Scope 3)	8	$13,074	<1%	1%
TOTAL	**2,721**	**$$1.04 million**	**100%**	**100%**
Totals may be off due to rounding.				

Figure 3-3 2020 BAU Municipal Emissions by Source (MT CO_2e)



Future BAU Municipal Emissions by City Category (2020)

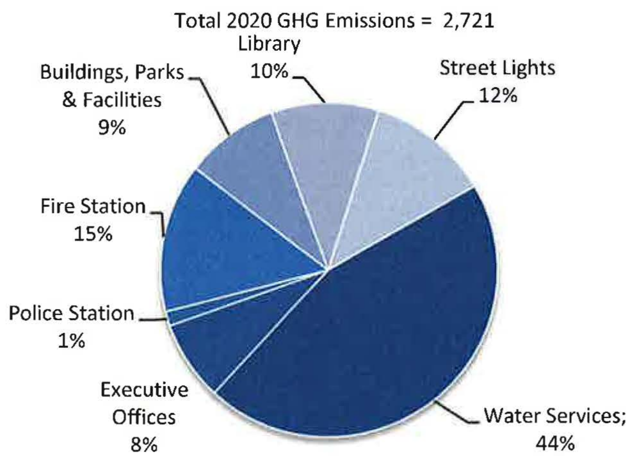
Table 3-6 summarizes the 2020 GHG emission projections by category. Electricity usage associated with pumping and delivering water by the City accounts for 44% of the total emissions in 2020. This category represents the emissions from the direct usage of electricity to extract water from local sources. This electricity usage data shows up on SCE's electricity report for the City. The Fire Station category accounts for the second largest source of emissions in the City's 2020 inventory, at 14% of the total. The ratios of GHG emissions and the cost associated with them are similar to the 2010 inventory because a uniform growth rate was applied to energy and water demand. A breakdown of the baseline emissions is shown above, in Table 3-3.

Table 3-6 2020 BAU Municipal Emissions and Costs by Facility

Category	MT CO_2e	Cost	% of Total Emissions	% of Total Cost
Water Services	1,208	$453,831	44%	44%
Executive Offices	207	$82,076	8%	8%
Police Station	37	$8,499	1%	1%
Fire Station	385	$135,615	14%	13%
Buildings & Facilities[1]	243	$106,408	9%	10%
Library	277	$105,413	10%	10%
Street Lights	315	$121,444	12%	12%
Traffic Signals	48	$28,855	2%	3%
TOTAL	**2,721**	**$1.04 million**	**100%**	**100%**

[1] "Buildings & Facilities" category includes parks and recreation centers also.
Emission sources include electricity, natural gas, and purchased water.
Totals may be off due to rounding.

Figure 3-4 2020 BAU Municipal Emissions by Facility Type (MT CO2e)

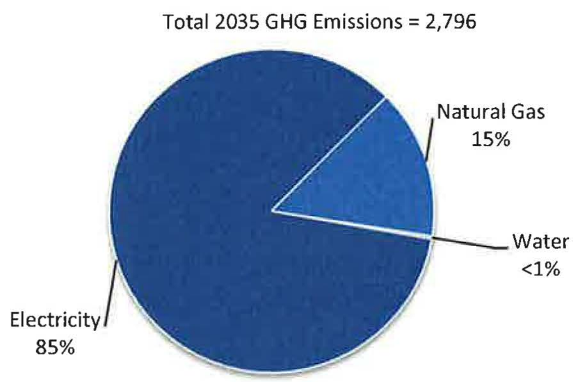


Future BAU Municipal Emissions by Source (2035)

Table 3-7 includes the City's GHG emission projections from energy use in City facilities during the year 2035 sorted by emission source. The City is projected to emit 2,796 MT CO_2e through its operations in 2035. The emissions are calculated based on the projected energy usage. In 2035, the largest portion of the energy emissions will be from electricity use at 85%, including the energy used for pumping local groundwater. Natural gas usage accounts for 15% of the total GHG emissions, and purchased water for less than 1% of the total in the City. Because a uniform employment growth rate is applied to the energy and water demand, the emissions ratio of each category remains similar to the baseline inventory. Figure 3-5 summarizes the City's emissions in 2035 by source.

Table 3-7	2035 BAU Municipal Emissions by Source			
Category	**MT CO_2e**	**Cost**	**% of Total Emissions**	**% of Total Cost**
Electricity (Scope 2)	2,370	$1.05 million	85%	98%
Natural Gas (Scope 1)	418	$10,282	15%	1%
Purchased Water (Scope 3)	8	$13,968	<1%	1%
TOTAL	**2,796**	**$1.07 million**	**100%**	**100%**
Totals may be off due to rounding.				

Figure 3-5 2035 BAU Municipal Emissions by Source (MT CO_2e)



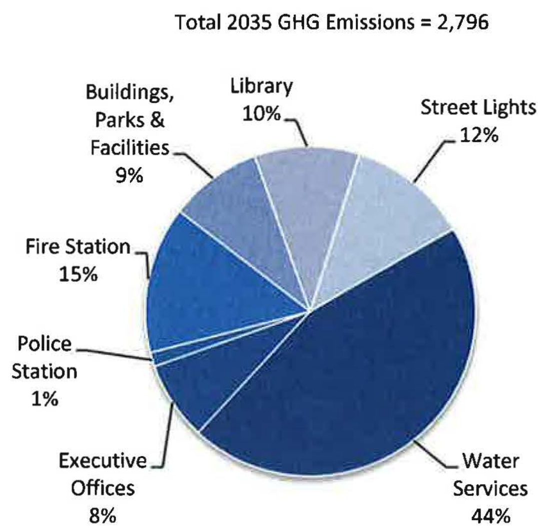
Future BAU Municipal Emissions by City Category (2035)

Table 3-8 summarizes the City's 2035 GHG emission projections by category. Electricity usage associated with pumping and delivering water by the City accounts for 44% of the total emissions in 2035. This category represents the emissions from the direct usage of electricity to extract water from local sources. This electricity usage data shows up on SCE's electricity report for the City. The Fire Station category accounts for the second largest source of emissions in the City's 2035 inventory, at 14% of the total. These ratios are similar to the 2010 inventory because a uniform growth rate was applied to energy and water demand.

Table 3-8	2035 BAU Municipal Emissions and Costs by Facility			
Category	**MT CO_2e**	**Cost**	**% of Total Emissions**	**% of Total Cost**
Water Services	1,242	$466,314	44%	44%
Executive Offices	212	$84,332	8%	8%
Police Station	38	$8,731	1%	1%
Fire Station	396	$139,325	14%	13%
Buildings & Facilities[1]	250	$109,314	9%	10%
Library	285	$108,311	10%	10%
Street Lights	324	$124,785	12%	12%
Traffic Signals	50	$29,648	2%	3%
TOTAL	**2,796**	**$1.07 million**	**100%**	**100%**

[1] "Buildings & Facilities" category includes parks and recreation centers also.
Emission sources include electricity, natural gas, and purchased water.
Totals may be off due to rounding.

Figure 3-6 2035 BAU Municipal Emissions by Facility Type (MT CO_2e)



3.4 Reduction Targets

2020 and 2035 Greenhouse Gas Emission Targets

In order for California to meet the goals of AB 32, statewide GHG emissions will need to be reduced to 1990 levels by 2020. In the AB 32 Scoping Plan, CARB equated the return to 1990 levels to a 15% reduction from "current" levels. CARB states, "...ARB recommended a greenhouse gas reduction goal for local governments of 15% below today's levels by 2020 to ensure that their municipal and community-wide emissions match the state's reduction target" (CARB 2008). Additionally, AB requires a further 80% cut below the 1990 threshold by 2050. Consistent with the State's adopted AB 32 GHG reduction targets, the City has set a goal to reduce its GHG emissions from energy consumption, back to 1990 levels by the year 2020. This target was calculated as a 15% decrease from 2010 levels, as considered to be the "current level." The City's reduction target for the year 2035 is estimated at 47.5% from the baseline, based on interpolation between the 2020 and the 2050 reduction targets. The 2035 target is considered as an interim goal to be reviewed prior to 2020 for post-2020 use. At this time, state and federal strategies for post-2020 are speculative; therefore, it is recommended that the City reevaluate the 2035 target as it reaches its 2020 milestone. By that time, the City would have a better understanding of the effectiveness and efficiency of the reduction strategies and approaches. Chapter 5 reviews the details of the implementation process. Table 3-9 summarizes the City's GHG emission reduction targets from energy consumption, for the years 2020 and 2035.

With the reduction targets set at 2,329 MT CO_2e for 2020 and 1,553 MT CO_2e for 2035, the City will need to reduce its emissions by 393 MT CO_2e and 1,243 MT CO_2e from the BAU emissions respectively. These amounts represent a 15% and a 47.5% decrease from the baseline year. Since 2010, the City has taken steps to reduce GHG emissions; these are described in Chapter 4.

Table 3-9	2020 and 2035 GHG Emissions Reduction Targets		
	2010	2020	2035
Emissions (MT CO_2e)	2,617	2,721	2,796
Reduction from Baseline (%)		15%	47.5%
Amount to Reduce from BAU (MT CO_2e)		393	1,243
Reduction Target		**2,329**	**1,553**

2020 Electricity Consumption Target

There are three goals in setting an electricity consumption reduction target for the City.

- Consume electricity more efficiently.
- Have reasonably achievable levels of efficiency.
- Be consistent with the GHG emissions reduction target.

Note that the 2020 GHG emission reduction target is to reduce GHG emissions by 15% from baseline emission levels. The overall emissions reduction requires various levels of reductions for electricity, natural gas, and water consumption. The various reduction measures needed to achieve the overall GHG emissions reduction target produce different levels of reduction for each of the three contributors to GHG emissions analyzed in this MEAP. To achieve the 2020 GHG emissions reduction target, electricity use needs to be reduced by 7%. The State's Renewable Energy Portfolio requirement of electric utilities also reduces GHG emissions, but does not increase the efficiency of electricity consumption. Therefore, while energy efficiency measures and the State's Renewable Energy Portfolio gives a combined emissions reduction of 15% below baseline emissions in 2020, this energy consumption reduction target must be focused only on efficient consumption of electricity. Focusing on efficient consumption of electricity, the electricity consumption reduction target of 7% below baseline consumption by year 2020 is consistent with the GHG emission target. This level of reduction also increases efficiency and is reasonably achievable. Therefore, the City would need to reduce its electricity consumption by 7% from the baseline year (2010) in order to reach the 2020 target. Table 3-10 summarizes the City's electricity reduction target for the year 2020.

Table 3-10	2020 Electricity Consumption Reduction Target	
	2010	2020
Electricity (kWh)	7.72 million	8.03 million
Reduction from Baseline (%)		7%
Amount to Reduce (kWh)		0.85 million
Reduction Target (kWh)		**7.19 million**

With the electricity reduction target set at 7.19 million kWh for 2020, the City will need to reduce its electric usage by 0.85 million kWh from the 2020 BAU consumption estimates. This represents a 7% decrease from the baseline year. The programs and reduction strategies that will help the City to reach its 2020 electricity consumption target are described further in Chapter 4.

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Chapter 4 Reductions and Existing Programs

The City has already taken steps toward reducing GHG emissions and energy consumption at its facilities. The MEAP first evaluates the GHG and energy consumption reductions that result from the local measures (referred to as M1 measures) that have been implemented since 2010. Programs that were in place prior to 2010 are accounted for in the baseline inventory. In addition, state energy efficiency and renewable requirements provide another level of GHG reductions at City-owned facilities. The statewide reduction requirements, referred to as R1 measures, are included 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 local 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 measures are measures implemented at the community level and are described in the CEAPs. R3 measures are supportive measures or methods that reduce the City's operational (and community) emissions. Due to the nature of these measures, the GHG emissions from their implementation cannot be quantified at this time. For example, R3-E3: Energy Efficiency Training and Public Education for City staff, is a measure that provides education to inform the staff of the programs and technology that are more energy efficient. R3-E3 is supportive of other measures because it would provide more publicity and reduce the perceived challenge of being energy efficient. Therefore, although by itself R3-E3 cannot be quantified, its implementation provides a level of assurance that the reduction goals specified in the M1 measures will be achieved.

City operations make up a small percentage of the total community-wide GHG emissions, and therefore, the majority of the GHG reductions would result from the measures that are applied to the community-wide energy usage. Nevertheless the City can set an example for its residents by improving the energy efficiency and reducing GHG emissions at its own facilities.

The following discussion summarizes the existing City programs and the proposed reduction measures to be implemented by the City to further reduce its GHG emissions associated with energy consumption. The reduction measures are organized by source category (electricity, natural gas, and water).

Each of the measures include the GHG reduction potential, estimated cost, estimated savings, and additional co-benefits. The co-benefits describe the additional 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

Energy Use/Energy Efficiency

Land Use/Community Design

Renewable Energy

Water Conservation

4.1 Existing Local Programs

Municipal Programs

DEPARTMENT OF PUBLIC WORKS

According to the City's Department of Public Works, there are various Capital Improvement Projects, which upon completion will increase energy efficiency and reduce GHG emissions. Highlights of these projects include HVAC replacement projects, and installation of a slow-fill Compressed Natural Gas station which directly reduces emissions through the use of a lower-emissions fuel. Additionally, the City is required to develop new parks in an environmentally sensitive manner with drought-tolerant landscaping, recycled water for irrigation, and natural drainage courses that recharge groundwater.

EASTERN MUNICIPAL WATER DISTRICT BIOMASS POWER PLANT

Biomass is a renewable source of energy. As of date of this report, EMWD is in the preliminary stage to construct a plant in southwest Riverside County that would turn discarded biomass sources (plant oil, grease, etc.) into environmentally-friendly fuel which will power its diesel fleet and equipment. The elimination of the diesel consumption will significantly affect the energy consumption and GHG emissions of the region.

4.2 City Energy Reduction Measures

M1 Local Municipal Energy Reduction Measures

Electricity and natural gas consumption combined account for City's entire baseline GHG emissions (see Table 3-2). It is important to note that the City's electricity consists of the consumption that is associated with the direct usage of electricity, as well as the electricity that is used to treat and deliver water by the City Water Department. Since the baseline emissions year of 2010, California has enacted legislation to promote energy efficiency and the use of renewable energy in utility companies and new building construction. In addition, the City has implemented energy-efficiency measures since 2010 that result in GHG reductions. Any measure, either local or statewide, implemented since 2010 can be "counted toward" the City meeting their emissions target. The following M1 energy-related measure includes the strategies that have been implemented by the City since 2010 to reduce the GHG emissions and energy consumption of City facilities. The M1 measures may result in reductions similar to the statewide measures. To avoid double-counting the reductions from similar strategies and provide credit to the City's local programs, the MEAP first analyzes the reductions that are underway at City facilities (M1 measures), and then incorporates the reductions from the statewide measures (R1).

M1-E1: MUNICIPAL ENERGY RETROFITS

GHG Reduction Potential:
73 MT CO_2e per year
These emissions reductions are associated with an estimated 10% reduction in energy usage from HVAC, mechanical systems, and lighting upgrades at City buildings and facilities.
Co-Benefits:

City Costs: $228,000
City Savings: $32,000 annually, estimate based on the average electricity cost.
Funding Sources: American Recovery Reinvestment Act Grant
City kWh Savings: 255,600 kWh

Existing City facilities, particularly those built prior to implementation of the Title 24 requirements of 1978, are a major source of GHG emissions attributed to energy use. By retrofitting with energy efficiency upgrades and renewable energy generation systems, the City can reduce its monthly energy bills while also reducing GHG emissions. The reductions associated with this measure would satisfy a portion of the statewide electricity and lighting efficiency improvement requirements (R1-E4). The City retrofits are expected to reduce the electricity usage by 255,600 kWh, which corresponds to approximately $32,000 savings in electricity costs every year. Although not limited to the following actions, the City has reduced its facilities' energy use by implementing the following strategies:

- Replace inefficient HVAC units with new energy efficient models.
- Replace inefficient indoor and outdoor lighting with highly efficient fixtures.

R1 Statewide 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 City facilities. It is important to note that the state reduction measures apply to the City-operated facilities as well as the entire community; therefore, the total community-wide reductions from these measures would be significantly larger than from City operations alone. The community-wide reductions are described in a separate CEAP. Measure R1-E2 is a residential lighting measure that is included in the CEAP. For consistency in labeling between the EAPs, measure R1-E2 is not included in the MEAP.

R1-E1: RENEWABLE PORTFOLIO STANDARD FOR BUILDING ENERGY USE

GHG Reduction Potential:
143 MT CO_2e per year
The reductions are from an increase of 14% in renewable energy production by 2020.
Co-Benefits:

City Costs: None – State Program
City Savings: None
Funding Sources: State Program
City kWh Savings: 499,490 kWh converted from nonrenewable sources to renewable electricity sources.

SB 1075 (2002) and SB 107 (2006) created the state's Renewable Portfolio Standard (RPS), with an initial goal of 20% renewable energy production by 2010. Executive Order S-14-08 established a RPS target of 33% by the year 2020 and requires state agencies to take all appropriate actions to ensure the target is met. In April 2011, Governor Jerry Brown signed SB 2 (2011), which codified the Executive Order and requires the state to reach the 2020 goal (CARB 2008). This increase in electricity production from renewable sources will reduce the GHG emissions from electricity usage in City facilities by 14% by 2020.

Because of SB 1075, utilities including SCE are required to have a minimum of 33% renewable sources producing electricity. An increase in renewable power sources generated by SCE will result in less electricity being generated by conventional sources burning natural gas within the region. The benefit to the City is a reduction of air pollution and GHGs within the region, which broadly benefits the health of everyone. More speculative is the potential that increasing electricity generation from renewable resources may result in lower electricity rates from SCE over the next few years. However, because the RPS requirement is imposed on utility providers and not the City, direct savings in utility bills may not be significant from this measure.

R1-E3: ASSEMBLY BILL 1109 ENERGY EFFICIENCY STANDARDS FOR LIGHTING (COMMERCIAL INDOOR AND OUTDOOR LIGHTING)

GHG Reduction Potential:
74 MT CO_2e per year
The reductions are associated with an increase of 25% in lighting efficiency by the year 2020.
Co-Benefits:

City Costs: None – State Program
City Savings: $32,000 annually, estimate based on the average electricity cost.
Funding Sources: State Program
City kWh Savings: 256,000 kWh

AB 1109 (2007) mandated that the 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 statewide electricity consumption in the following way:

- R1-E3: At least 25% reduction from 2007 levels for indoor commercial and outdoor lighting by 2018.

It is assumed that 20% of the buildings electricity usage is associated with lighting. Because AB 1109 makes lighting 25% more efficient and lighting is 20% of the total electrical usage for the building, AB 1109 requires a total reduction of 5% in the electricity consumption from 2007 levels by 2018. By implementing this measure, the City is anticipated to reduce its electricity usage by approximately 256,000 kWh annually. This would save approximately $32,000 annually.

R1-E4: ELECTRICITY ENERGY EFFICIENCY

GHG Reduction Potential:
33 MT CO_2e per year
The reductions are associated with an increase of 7.5% in buildings energy efficiency. Some requirements of this measure have been met by the municipal retrofit projects under M1-E1.
Co-Benefits:

City Costs: None – State Program
City Savings: $14,500 annually, estimate based on the average electricity cost; in addition to the savings from M1-E1 measure.
Funding Sources: State Program
City kWh Savings: 116,000 kWh

This measure captures the emission reductions associated with electricity energy efficiency activities included in CARB's AB 32 Scoping Plan that are not attributed to other reduction measures in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the statewide 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 CCR; hereinafter referred to as "Title 24 Energy Efficiency Standards") of California's Green Building Standards Code (Title 24, Part 11 of the CCR; or "CalGreen").

By 2020, this requirement will reduce emissions in California by approximately 21.3 million MT CO_2e, representing 17.5% of emissions from all electricity in the state. This measure includes the following strategies:

- "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so it, based on an annual average, extracts no energy from the grid).

- Broader standards for new types of appliances and for water efficiency.
- Improved compliance and enforcement of existing standards.
- Achieving efficiency and green building targets beyond mandatory codes.
- Performing whole-building retrofits for existing buildings.
- Water system and water use efficiency and conservation measures.
- Providing real time energy information technologies to help City conserve and optimize energy performance.

Emission reductions that have been achieved since 2010 can be attributed toward the City's goal. The City has achieved 10% reductions from 2010 to 2013 and additional reductions are anticipated by 2020. Therefore, in order to meet the 17.5% reduction in energy usage required by the State, the City would have to achieve an additional 7.5% reduction in its building energy usage from the strategies presented by the Sate measure R1-E4. Successful implementation of this measure would save the City about 116,000 kWh in electricity usage, and $14,500 annually.

R1-E5: NATURAL GAS ENERGY EFFICIENCY

GHG Reduction Potential:
25 MT CO_2e per year
The reductions are associated with an increase of 6.2% in buildings natural gas energy efficiency.
Co-Benefits:

City Costs: None – State Program
City Savings: $600 annually, estimate based on the average cost of natural gas.
Funding Sources: State Program
City therms Savings: 1,280 therms

This measure captures the emission reductions associated with natural gas energy efficiency activities included in CARB's AB 32 Scoping Plan that are not attributed to other reduction measures described in this report. This measure includes energy efficiency measures that CARB views as crucial to meeting the statewide 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 million MT CO_2e, representing 6.2% of emissions from statewide natural gas combustion. A 6.2% reduction in the City's natural gas usage would result in reduction of approximately 128 MMBTU (1,280 therms), which according to average SCG rates, would reflect $600 annual savings. This measure includes the following strategies:

- "Zero Net Energy" buildings (buildings that combine energy efficiency and renewable generation so it, based on an annual average, extracts no energy from the grid).
- Broader standards for new types of appliances and for water efficiency.
- Improved compliance and enforcement of existing standards.
- Achieving efficiency and green building targets beyond mandatory codes.
- Performing whole-building retrofits for existing buildings.
- Water system and water use efficiency and conservation measures.
- Providing real time energy information technologies to help City conserve and optimize energy performance.

R2 Local Energy Reduction Measures

The following R2 energy related measure is what the City would implement to reduce its GHG emissions beyond the reduction associated with the R1 state measures described above.

R2-E4: MUNICIPAL RENEWABLE ENERGY

GHG Reduction Potential:
89 MT CO_2e per year
The reductions are associated with a 5% decrease in municipal electricity usage from nonrenewable sources.

Co-Benefits:

City Costs: $235,000 (one time cost)
This cost represents 5% renewable estimated $6,526/kW.

City Savings: $40,000 annually, estimate based on the average cost of electricity.

Funding Sources: SCE, WRCOG, City General Funds

City kWh Savings: 316,000 kWh

The R2-E4 energy related measure is what the City would implement to reduce its GHG emissions beyond the reduction associated with the R1 state measures described above. To be consistent with the reduction measures in the community-wide EAP, the following local measure, which corresponds to development of renewable energy resources for municipal usage, is labeled as R2-E4. This measure requires electricity to be 5% from renewable resources such as solar energy, geothermal energy, and wind energy. The most common and feasible source of renewable energy production in the City is considered to be solar energy; therefore, the cost is estimated based on the cost of solar energy. From this measure, the City is anticipated to save 316,000 kWh of electricity and $40,000annually. Increasing renewable electricity resources for City usage would particularly help the City reach its 2020 and 2035 energy and GHG emission reduction targets.

R3 Other Energy Reduction Measures

The following list of R3 energy measures are those that complement or support the implementation of measures described above, but cannot be quantified.

R3-E1: REGIONAL ENERGY PLANNING COORDINATION

Implementation of the energy reduction measures is supported by coordination with SCE, SCG, SCAG, WRCOG, local non-profits, and other local jurisdictions in the Western Riverside County to optimize energy efficiency and renewable resource development and usage. This allows for economies of scale and shared resources to more effectively implement these environmental enhancements.

R3-E3: ENERGY EFFICIENCY TRAINING AND EDUCATION

This measure provides education to City staff about energy efficiency measures and reduction programs available within through a variety of methods including internal newsletters, brochures, and the City's website. This measure would enhance this existing program by providing training in green building materials, techniques, and practices for all City staff.

4.3 Water Reduction Measures

R1 Statewide Water Reduction Measure

The electricity associated with pumping and distribution of local water throughout the City accounts for a major portion of the total electricity usage, at about 44% of the total baseline facility emissions. These GHG emissions from water services represent a small fraction of the entire community-wide emissions. 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% BY 2020) RELATED TO WATER SUPPLY AND CONVEYANCE

GHG Reduction Potential:
169 MT CO_2e per year
The % reduction from California's emissions is equal to the City's emissions from electricity used for water supply and conveyance.
Co-Benefits:

City Costs: None – State Program
City Savings: None
Funding Sources: State Program

This measure would increase electricity production from eligible renewable power sources to 33% by 2020. A reduction in GHG emissions results from replacing natural gas-fired electricity production with zero GHG-emitting renewable sources of power. By 2020, this requirement will reduce emissions from electricity used for water supply and conveyance in California by approximately 21.3 million MT CO_2e, representing 15.2% of emissions from electricity generation (in state and imports).

This increase in electricity production from renewable sources will reduce the GHG emissions from electricity usage in water treatment facilities by 14% by 2020.

Increasing electricity generation from renewable resources may result in lower electricity rates for water facilities. The savings from this measure will become more significant as the technology advances and renewable resources become more economical.

R3 Other Water Reduction Measure

The following R3 water measure complements the implementation of the measure described above, but cannot be quantified.

R3-W1: WATER EFFICIENCY AND CONSERVATION EDUCATION

Under this measure the City, in coordination with local water purveyors would continue to implement its information and education program to City staff that promotes water conservation. The program could be expanded to include landscape maintenance contractors, managers, as well as classes to promote the use of drought tolerant, native species and xeriscaping at City facilities. Xeriscaping refers to landscaping techniques that eliminate the need for water.

Reductions from the Utility Manager Software

Under Task 8 of the WRELP project, a utility manager computer program will be installed to track City energy and water usage. The utility manager software will enable the City to access facility energy consumption, archive billing data, and report and analyze energy consumption data via the Internet. The purpose of this benchmarking policy is to evaluate the relative energy efficiency of the City's buildings through the use of the USEPA Energy Star Portfolio Manager tool to set energy savings goals, to make prudent decisions on building investments and improvements, and to regularly monitor progress towards the energy efficiency goals. The benchmarking policy requires the City to set up all (or major) buildings in Portfolio Manager and to work with utility providers such as SCE, SCG, and municipal water suppliers to automate the process of recording usage data into Portfolio Manager. The ability to review the performance of City buildings leads to improved maintenance and operation activities or energy-related investments. The benchmarking policy is considered to be a non-quantifiable supporting measure. By evaluating its facilities' energy consumption through the utility manager program, the City will find opportunities for reducing energy consumption, which also result in lower energy-related GHG emissions.

4.4 Summary of the Reductions

By implementing the reduction measures described above, the City would reduce its GHG emissions associated with the energy and water usage by 22% compared to the 2020 BAU emissions. The largest reductions are from the R1-W1 measure, which represent 6% of the total amount. The improvements from the R1-W1 measure correspond to the reductions associated with the renewable electricity used for providing water services by Hemet's Water Department. The reductions from the R1-E1 measure also correspond to the State RPS requirement of 33% renewable energy production by utility companies and state agencies. Table 4-1 summarizes the reductions associated with the local and statewide measures.

Table 4-1 Summary of Municipal Reductions in Hemet

Measure	Emissions (MT CO_2e)	% of Total CO_2e
M1-E1	73	3%
R1-E1	143	5%
R1-E3	74	3%
R1-E4	33	1%
R1-E5	25	1%
R1-W1	169	6%
R2-E4	89	3%
TOTAL	**607**	**22%**

Totals may be off due to rounding.

4.5 Comparison to Targets

Greenhouse Gas Emissions

The City emissions component accounts for a small percentage of the overall community-wide inventory. As a result, the reductions at the City level are proportionally small. However, the reduction in the GHG emissions at the City level illustrates the City's commitment to leading by example by reducing energy usage at its own facilities, in keeping with Goal 3 of the CEESP.

Figure 4-1 shows a comparison between the emission inventories for 2020 and 2035. The blue bar represents the calculated GHG inventories for the baseline year (2010). The red bars show the projected BAU growth in GHG emissions in 2020 and 2035 based on the anticipated growth. The yellow bars demonstrate the reduced inventories after the implementation of the reduction measures described in Chapter 4. Table 4-2 summarizes the existing 2010 emissions, the 2020 emissions inventory, and the reduced 2020 and 2035 emissions.

Figure 4-1 Estimated Future Reduced Emissions (MT CO_2e)

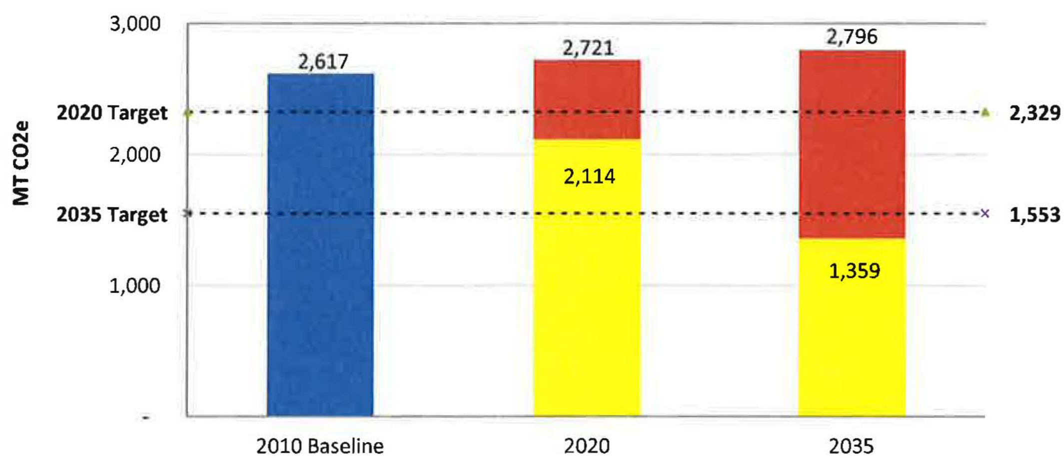

Table 4-2	**Municipal GHG Emissions Summary**				
Source Category	**MT CO_2e**				
	2010	**2020 BAU**	**2035 BAU**	**Reduced 2020**	**Reduced 2035**
Municipal	2,617	2,721	2,796	2,114	1,359
Emission Reduction Target		2,329	1,553	2,329	1,553
Below Reduction Target?		NO	NO	YES	YES
Note: Sources of emissions include electricity and natural gas.					

By 2020, the local and statewide measures combined together would reduce the City's GHG emissions from the 2020 BAU condition by approximately 22% or 607 MT CO_2e (from 2,721 MT CO_2e to 2,114 MT CO_2e). This is equivalent to a 19% decrease from baseline emissions, which exceeds the 15% reduction target of the year 2020.

In estimating reductions for 2035, it is assumed that the City would continue implementation of its local measures, and these measures would continue to reduce GHG emissions. Additionally, it is assumed that the State measures would be enforced post-2020 to further reduce emissions. With these assumptions, by 2035, the City's GHG emissions from energy sources would decrease to 48% below the 2010 levels. This exceeds the 47.5% reduction target of the year 2035.

Electricity Consumption

Figure 4-2 compares the electricity consumption of the baseline year and the 2020 projections with the 2020 target. The blue bar represents the baseline electricity consumption. The red bar shows the projected BAU growth in electricity usage by 2020 based on the anticipated growth. The yellow bar demonstrates the reduced inventories after the implementation of the reduction measures that directly reduce electricity consumption, as described in Chapter 4. Table 4-3 summarizes the electricity usage of the baseline year and the year 2020.

Figure 4-2 Estimated Future Electricity Usage (kWh)

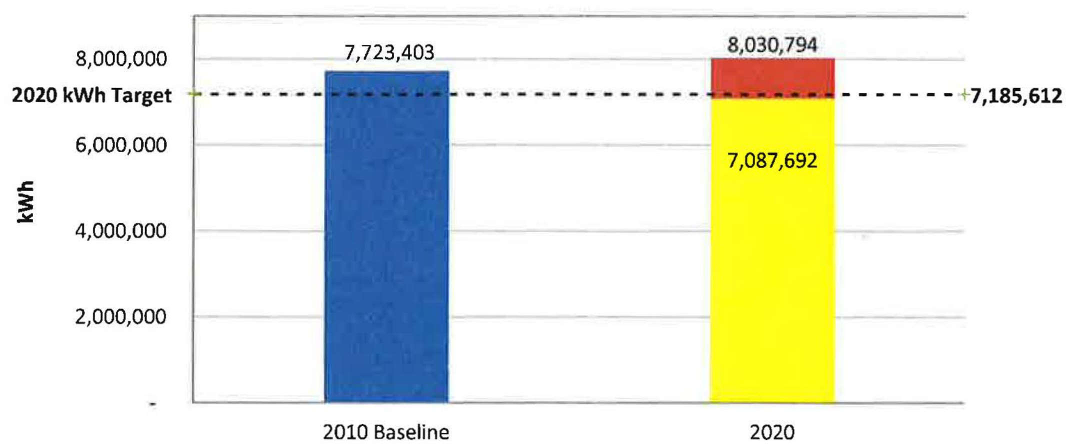

Table 4-3 Municipal Electricity Consumption Summary

Source Category	kWh of Electricity		
	2010	2020 BAU	Reduced 2020
Municipal	7.72 million	8.03 million	7.09 million
Electricity Consumption Target		7.19 million	7.19 million
Below Reduction Target?		NO	YES

Implementation of state and local measures by 2020 would reduce the City's electricity consumption by approximately 12% below 2010 or 0.94 million kWh (from 8.03 million kWh in 2020 to 7.09 million kWh). This exceeds the 7% reduction target of the year 2020.

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Chapter 5 Implementation

This chapter describes the recommended implementation steps for the City to perform to conserve energy and achieve the GHG reduction goals in the MEAP. City GHG emissions are a small part of the entire community; therefore, success in meeting the community GHG emission reduction goal will depend on cooperation and participation by the City, residents, businesses, and other local governmental entities.

5.1 STEP 1—Administration and Staffing

The City would implement the following key internal administration and staffing actions:

1. Create an Energy Efficiency Team to support and guide the City's efforts to conserve energy and reduce emissions.
2. Designate an Implementation Administrator to oversee, direct, and coordinate implementation of the MEAP as well as monitor and report the energy efficiency and GHG reduction efforts.

The City Energy Efficiency Team (Team) would be responsible for the implementing the MEAP, coordinating among all involved City departments, and recommending modifications and changes to the MEAP over time. The Team would include the following departments and divisions, but would be expanded as needed to ensure coordinated leadership in plan implementation: Planning, Engineering, Building & Safety, Code Enforcement, Parks, and Water/Wastewater Department.

5.2 STEP 2—Financing and Budgeting

Successful implementation of the MEAP will require a strong commitment from the City. Local, regional, state, and federal public sources of funding will be needed to successfully implement. The following financing options should be explored by the City:

- State and federal grants and low-interest loans — A variety of grant and loan programs exist in various sectors.
- Support from local businesses, non-profits, and agencies — Opportunities for public/private partnerships (like the SCE partnerships) exist to provide cooperation on many aspects of the MEAP including energy and water efficiency retrofits and raising public awareness regarding conservation strategies.
- Self-funding and revolving fund programs — Innovative programs to fund renewable energy investments.
- Agreements with private investors — Energy service companies and other private companies can finance up-front investments in energy efficiency and then be reimbursed through revenues from energy savings.
- Local funding — Various local governments have used targeted finance instruments for renewable energy resource development and energy efficiency improvement projects.

Given that financing is the key to implementing many measures, a review of current and potential funding sources was completed for the different sectors covered in the MEAP and is presented below to help early phase implementation. It is likely that there will be stronger legislation aimed at energy efficiency and renewable energy generation that will further curb GHG emissions. Such requirements are likely to influence energy prices (for electricity and natural gas), and may make currently cost-ineffective measures more economically feasible and allow the financing of a broader range of plan measures.

Energy Efficiency and Renewable Energy Financing

Federal Tax Credits for Energy Efficiency. On October 3, 2008, former President Bush signed into law the "Emergency Economic Stabilization Act of 2008." This bill extended the Production Tax Credit for solar energy systems and fuel cells to 2016. New tax credits were established for small wind energy systems. Tax deductions for owners and designers of energy efficient commercial buildings were also extended.

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

Southern California Edison Energy Efficiency/Renewable Energy Incentives.

- SCE offers incentives, through utility rebate programs, for non-residential customers. This rebate is regardless of size and energy usage. Express efficiency rebates for lighting, refrigeration, and air conditioning technologies are available. In addition, SCE has a Custom Contracting Program in which non-residential users have the option of designing an energy retrofit conservation measure. Incentives are based on the type of measure installed and the reduction in energy usage over a 12-month period.

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

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

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

- SCE's On-Bill Financing program offers qualified customers zero percent financing to install energy-efficient equipment. All government and institutional customers may receive from a minimum of $5,000 and maximum of $250,000 per service address. The funds may be used for a wide variety of efficiency improvement projects, and the monthly loan payments will be added directly to the customer's bill. Monthly energy savings help to offset the monthly loan charges.

  See http://www.sce.com/business/onbill/about-on-bill.htm

Southern California Gas Company.

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

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

California Energy Commission (CEC) Energy Efficiency Financing. The CEC offers energy efficiency financing and low interest loans (up to 15 years) to cities and counties for installing energy-saving projects. Examples of projects include lighting systems, pumps and motors, streetlights and Low Emitting Diode (LED) traffic signals, automated energy management systems/controls, building insulation, energy generation including renewable and combined heat and power projects, heating and air conditioning modifications, and wastewater treatment equipment. The CEC also offers the Energy Partnership Program Technical Assistance Grant, which would provide the City with up to $10,000 of technical assistance services, including a feasibility of energy efficiency opportunities for City facilities to maximize energy cost savings and GHG emissions reductions.

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

California Solar Initiative (CSI). In January 2006, the California Public Utilities Commission adopted the CSI to provide more than $3 billion in incentives for solar-energy projects with the objective of providing 3,000 megawatts of solar capacity by 2016. In December 2011, the Commission increased the CSI budget by $200 million in order to cover a budget shortfall. The action implements SB 585 signed by former Governor Jerry Brown on September 22, 2011. The CSI program is administered by Pacific Gas & Electric, SCE, and CCSE for the SDG&E territory. The CSI incentive for non-residential buildings includes a transition to performance-based and expected performance-based incentives, with the aim of promoting effective system design and installation. The applicable rebate programs for municipal facilities include: (1) the general CSI Program of solar rebates for public agencies; (2) the CSI-Thermal Program for solar hot water rebates for municipal facilities and (3) the CSI Research, Development, Demonstration, and Deployment Program.

See http://energycenter.org/csi

Water Conservation and Treatment Financing

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

CWSRF's offer:

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

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

5.3 STEP 3—Measure Implementation

After taking into account the reductions in the City energy usage and the GHG emissions resulting from statewide measures the City would only need to implement the City retrofit projects under the M1-E1 measure to reach its reduction targets. With California continuing the implementation of the statewide measures (R1 measure), the City would meet its 2020 and 2035 targets.

After taking into account the reductions in the energy usage and the GHG emissions resulting from statewide measures the City would only need to implement the retrofit projects under the M1-E1 measure to reach its reduction target for 2020. However, post-2020, continuation of the same reduction patterns similar to 2010 through 2020 would not be sufficient to meet the City's 2035 goal. In order for the City to meet its energy and GHG emissions target for the year 2035, the City must successfully implement the local measure R2-E4 by 2035. As described in chapter 4, the R2-E4 measure requires the City to increase its renewable electricity production to 5% of its total usage by 2035. Table 5-1 summarizes the implementation of the state and local measure.

Table 5-1	Summary of Reduction Measures in Hemet	
Measure	Measure Description	Implementation Priority
M1-E1	Reduce municipal electricity usage in City-owned buildings from HVAC and lighting upgrades.	Completed
R1-E1	Renewable Portfolio Standard for Building Energy Use (statewide measure)	Implemented
R1-E3	Energy Efficiency Standard for Lighting (AB 1109, statewide measure)	Implemented
R1-E4(1)	Electricity Energy Efficiency Standards (statewide measure)	Implemented
R1-E5	Natural Gas Energy Efficiency (statewide measure)	Implemented
R1-W1	Renewable Portfolio Standard Related to Water Supply and Conveyance (statewide measure)	Implemented
R2-E4	Generate 5% of the municipal electricity demand from renewable energy sources.	From 2020-2035
(1) Some requirements of this measure have been met by the municipal measure M1-E1.		

5.4 STEP 4—Monitoring and Inventorying

The City would use a system for monitoring the reductions in energy use from local and statewide measures. If promising new strategies emerge, the City would evaluate how to incorporate these strategies into the MEAP. Further, state and federal action would also result in changes that would influence the level of the City's GHG emissions. WRCOG through Task 11 of the SCE administered grant fund is providing the City qualitative and quantitative metrics by which the City can track progress in energy savings. A customized emissions inventory software package will be provided for City use in tracking emissions based upon energy consumption data. In addition, a simple energy efficiency measure-tracking tool will be provided to track the implementation of the measures. In this way, the City qualitatively and quantitatively predicts the reductions that should be achieved based upon the energy efficiency-tracking tool and tracks emissions using the customized emissions inventory software package.

5.5 STEP 5—Beyond 2020

The 2020 target is only a milestone in GHG reduction planning. Executive Order S-03-05 calls for a reduction of GHG emissions to a level 80% below 1990 levels by 2050, and this level is consistent with the estimated reductions needed to stabilize atmospheric levels of carbon dioxide at 450 parts per million. Thus, there will be a need to start planning for the post-2020 period.

Because state and federal strategies for post-2020 are speculative at this point, it is recommended that the City commence planning for the post-2020 period in 2017, at the approximate midway point between plan implementation and the reduction target. By that time, the City would have a better understanding of the effectiveness and efficiency of the reduction strategies and approaches. The State's regulations under AB 32 would have been fully in force; federal programs and policies for the near term are likely to be well underway; market mechanisms that influence energy and fuel prices would likely be in effect; and technological advances are anticipated in the fields of energy efficiency, alternative energy generation, fuels, and other areas. The City would then be able to consider the local, regional, state, and federal context. Further, beginning the post-2020 plan preparation in 2017 would allow enough time so that the plan could be ready for full implementation, including potential new policies, revisions to the plan (as necessary), programs, ordinances, and financing by 2020.

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Appendix A to
Municipal Energy Action Plan

GHG Calculations

Municipal GHG Inventory

Municipality:	City of Hemet
Inventory Year:	2010

Departmental Breakdown of Emissions

Facility Type	Electricity		Natural Gas		Water		TOTAL	
	MT CO2e	$	MT CO2e	$	MT CO2e	$	MT CO2e	$
Water Services	1,162.18	$ 436,459.81	-	$ -	-	$ -	1,162	$ 436,460
Executive Offices	145.50	$ 77,490.53	53.10	$ 1,446.66	-	$ -	199	$ 78,937
Police Station	11.56	$ 7,498.13	23.63	$ 677.80	-	$ -	35	$ 8,176
Fire Station	247.37	$ 123,592.78	121.03	$ 2,851.13	2.03	$ 4,009.00	370	$ 130,453
Buildings, Parks & Facilities	102.00	$ 90,356.47	126.25	$ 2,941.84	5.76	$ 9,065.00	234	$ 102,363
Library	199.51	$ 99,567.30	67.16	$ 1,813.35	-	$ -	267	$ 101,381
Street Lights	303.41	$ 116,795.94	-	$ -	-	$ -	303	$ 116,796
Traffic Signals	46.73	$ 27,750.36	-	$ -	-	$ -	46.73	$ 27,750.36
Department 9	-	$ -	-	$ -	-	$ -	-	$ -
Department 10	-	$ -	-	$ -	-	$ -	-	$ -
Department 11	-	$ -	-	$ -	-	$ -	-	$ -
Department 12	-	$ -	-	$ -	-	$ -	-	$ -
Department 13	-	$ -	-	$ -	-	$ -	-	$ -
Department 14	-	$ -	-	$ -	-	$ -	-	$ -
Department 15	-	$ -	-	$ -	-	$ -	-	$ -
Department 16	-	$ -	-	$ -	-	$ -	-	$ -
Department 17	-	$ -	-	$ -	-	$ -	-	$ -
TOTAL	**2,218.26**	**$ 979,511.32**	**391.18**	**$ 9,730.78**	**7.79**	**$ 13,074.00**	**2,617.23**	**$ 1,002,316.10**

Municipal GHG Inventory

Municipality:	City of Hemet
Inventory Year:	2020
Municipal Growth (2010-2020):	3.98%

Departmental Breakdown of Emissions

Facility Type	Electricity		Natural Gas		Water		TOTAL	
	MT CO2e	$	MT CO2e	$	MT CO2e	$	MT CO2e	$
Water Services	1,208.43	$ 453,830.91	-	$ -	-	$ -	1,208	$ 453,831
Executive Offices	151.29	$ 80,574.65	55.22	$ 1,501.80	-	$ -	207	$ 82,076
Police Station	12.02	$ 7,796.56	24.57	$ 702.34	-	$ -	37	$ 8,499
Fire Station	257.22	$ 128,511.77	125.85	$ 2,934.94	2.11	$ 4,168.56	385	$ 135,615
Buildings, Parks & Facilities	106.06	$ 93,952.66	131.27	$ 3,029.25	5.98	$ 9,425.79	243	$ 106,408
Library	207.45	$ 103,530.08	69.83	$ 1,883.08	-	$ -	277	$ 105,413
Street Lights	315.49	$ 121,444.42	-	$ -	-	$ -	315	$ 121,444
Traffic Signals	48.42	$ 28,854.82	-	$ -	-	$ -	48.42	$ 28,854.82
Department 9	-	$ -	-	$ -	-	$ -	-	$ -
Department 10	-	$ -	-	$ -	-	$ -	-	$ -
Department 11	-	$ -	-	$ -	-	$ -	-	$ -
Department 12	-	$ -	-	$ -	-	$ -	-	$ -
Department 13	-	$ -	-	$ -	-	$ -	-	$ -
Department 14	-	$ -	-	$ -	-	$ -	-	$ -
Department 15	-	$ -	-	$ -	-	$ -	-	$ -
Department 16	-	$ -	-	$ -	-	$ -	-	$ -
Department 17	-	$ -	-	$ -	-	$ -	-	$ -
TOTAL	**2,306**	**1,018,496**	**407**	**10,051**	**8**	**13,594.35**	**2,721**	**1,042,142**

Municipal GHG Inventory

Municipality:	City of Hemet
Inventory Year:	2035
Municipal Growth (2010-2020):	6.84%

Departmental Breakdown of Emissions

Facility Type	Electricity		Natural Gas		Water		TOTAL	
	MT CO2e	$	MT CO2e	$	MT CO2e	$	MT CO2e	$
Water Services	1,241.67	$ 466,313.66	-	$ -	-	$ -	1,242	$466,314
Executive Offices	155.45	$ 82,790.88	56.73	$ 1,541.43	-	$ -	212	$84,332
Police Station	12.35	$ 8,011.00	25.25	$ 719.97	-	$ -	38	$8,731
Fire Station	264.29	$ 132,046.53	129.31	$ 2,995.16	2.17	$ 4,283.22	396	$139,325
Buildings, Parks & Facilities	108.98	$ 96,536.85	134.88	$ 3,092.07	6.15	$ 9,685.05	250	$109,314
Library	213.16	$ 106,377.70	71.75	$ 1,933.19	-	$ -	285	$108,311
Street Lights	324.17	$ 124,784.78	-	$ -	-	$ -	324	$124,785
Traffic Signals	49.75	$ 29,648.48	-	$ -	-	$ -	50	$29,648
Department 9	-	$ -	-	$ -	-	$ -	-	$ -
Department 10	-	$ -	-	$ -	-	$ -	-	$ -
Department 11	-	$ -	-	$ -	-	$ -	-	$ -
Department 12	-	$ -	-	$ -	-	$ -	-	$ -
Department 13	-	$ -	-	$ -	-	$ -	-	$ -
Department 14	-	$ -	-	$ -	-	$ -	-	$ -
Department 15	-	$ -	-	$ -	-	$ -	-	$ -
Department 16	-	$ -	-	$ -	-	$ -	-	$ -
Department 17	-	$ -	-	$ -	-	$ -	-	$ -
TOTAL	**2,370**	**1,046,510**	**418**	**10,282**	**8**	**13,968**	**2,796**	**1,070,760**

Electricity

Instructions: Insert electricity use data for all facilities, streetlights, buildings, and other electric accounts owned/operated by the local government for each department. Also enter the emissions factors for CO2, CH4, and N2O obtained from EPA eGrid or directly from the utility provider. Entering the rate code and associated cost per kWh of gas will allow the calculation of the total cost for each department's electricity use.

Utility Provider: Southern California Edison

Emissions Coefficients SCE (2007)

	SCE (2007)			GWP
CO2	0.000286167	metric tons/kWh		
CH4	2.20534E-09	metric tons/kWh	CH4	21
N2O	3.22548E-09	metric tons/kWh	N2O	310

2010

Facility Type	SCE kWh	Total $	CO2	CH4	N2O	CO2e
Water Services	4046388	$ 436,459.81	1,157.94	0.0089	0.0131	1,162.18
Executive Offices	506593	$ 77,490.53	144.97	0.0011	0.0016	145.50
Police Station	40234	$ 7,498.13	11.51	0.0001	0.0001	11.56
Fire Station	861292	$ 123,592.78	246.47	0.0019	0.0028	247.37
Buildings, Parks & Facilities	355135	$ 90,356.47	101.63	0.0008	0.0011	102.00
Library	694651	$ 99,567.30	198.79	0.0015	0.0022	199.51
Street Lights	1056400	$ 116,795.94	302.31	0.0023	0.0034	303.41
Traffic Signals	162710	$ 27,750.36	46.56	0.0004	0.0005	46.73
Department 9			-	-	-	-
Department 10			-	-	-	-
Department 11			-	-	-	-
Department 12			-	-	-	-
Department 13			-	-	-	-
Department 14			-	-	-	-
Department 15			-	-	-	-
Department 16			-	-	-	-
Department 17			-	-	-	-
TOTAL	7,723,403	$ 979,511.32	2210.1831	0.017033	0.024912	2218.2634

2020

Facility Type	SCE kWh	Total $	CO2	CH4	N2O	CO2e
Water Services	4207434.242	453831	1,204.03	0.0093	0.0136	1,208.43
Executive Offices	526755.4014	80575	150.74	0.0012	0.0017	151.29
Police Station	41835.3132	7797	11.97	0.0001	0.0001	12.02
Fire Station	895571.4216	128512	256.28	0.0020	0.0029	257.22
Buildings, Parks & Facilities	369269.373	93953	105.67	0.0008	0.0012	106.06
Library	722298.1098	103530	206.70	0.0016	0.0023	207.45
Street Lights	1098444.72	121444	314.34	0.0024	0.0035	315.49
Traffic Signals	169185.858	28855	48.42	0.0004	0.0005	48.59
Department 9			-	-	-	-
Department 10			-	-	-	-
Department 11			-	-	-	-
Department 12			-	-	-	-
Department 13			-	-	-	-
Department 14			-	-	-	-
Department 15			-	-	-	-
Department 16			-	-	-	-
Department 17			-	-	-	-
TOTAL	8,030,794	$ 1,018,495.87	2298.148352	0.017710659	0.025903192	2306.550266

2035

Facility Type	SCE kWh	Total $	CO2	CH4	N2O	CO2e
Water Services	4323160.939	466314	1,237.15	0.0095	0.0139	1,241.67
Executive Offices	541243.9612	82791	154.89	0.0012	0.0017	155.45
Police Station	42986.0056	8011	12.30	0.0001	0.0001	12.35
Fire Station	920204.3728	132047	263.33	0.0020	0.0030	264.29
Buildings, Parks & Facilities	379426.234	96537	108.58	0.0008	0.0012	108.98
Library	742165.1284	106378	212.38	0.0016	0.0024	213.16
Street Lights	1128657.76	124785	322.98	0.0025	0.0036	324.17
Traffic Signals	173839.364	29648	49.75	0.0004	0.0006	49.93
Department 9			-	-	-	-
Department 10			-	-	-	-
Department 11			-	-	-	-
Department 12			-	-	-	-
Department 13			-	-	-	-
Department 14			-	-	-	-
Department 15			-	-	-	-
Department 16			-	-	-	-
Department 17			-	-	-	-
TOTAL	8,251,684	$ 1,046,509.89	2361.359588	0.018197796	0.026615666	2369.992598

Notes: Water Services electricity usage shows up on municipal electricity accounts provided by SCE. The City relies on 100% locally pumped water.

Natural Gas

Instructions: Insert natural gas use data for all facilities, buildings, and other accounts owned/operated by the local government for each department. Entering the rate code and associated cost per therm of gas will allow the calculation of the total cost for each department's natural gas use.

Utility Provider: SoCal Gas Company

Emissions Coefficients

CO2	52.91	kg/MMBTU	0.005291	metric tons/therm		GWP	
CH4	5	kg/MMBTU	0.0005	metric tons/therm		CH4	21
N2O	0.1	kg/MMBTU	0.00001	metric tons/therm		N2O	310

		2010							2020							2035						
	Facility Type	Annual therms	Rate Code	$	CO2	CH4	N2O	CO2e	Annual ther	Rate Code	$	CO2	CH4	N2O	CO2e	Annual therms	Rate Code	$	CO2	CH4	N2O	CO2e
0%	Water Services				-	-	-	-				-	-	-	-				-	-	-	-
15%	Executive Offices	2811	G10	$ 1,446.66	14.87	1.41	0.03	53.10	2923	G10	$ 1,502	15.46	1.46	0.03	55.22	3003	G10	$ 1,541	15.89	1.50	0.03	56.73
7%	Police Station	1251	G10	$ 677.80	6.62	0.63	0.01	23.63	1301	G10	$ 702	6.88	0.65	0.01	24.57	1337	G10	$ 720	7.07	0.67	0.01	25.25
29%	Fire Station	6407	G10	$ 2,851.13	33.90	3.20	0.06	121.03	6662	G10	$ 2,935	35.25	3.33	0.07	125.85	6845	G10	$ 2,995	36.22	3.42	0.07	129.31
30%	Buildings, Parks & Facilities	6683	G10	$ 2,941.84	35.36	3.34	0.07	126.25	6949	G10	$ 3,029	36.77	3.47	0.07	131.27	7140	G10	$ 3,092	37.78	3.57	0.07	134.88
19%	Library	3555	G10	$ 1,813.35	18.81	1.78	0.04	67.16	3696	G10	$ 1,883	19.56	1.85	0.04	69.83	3798	G10	$ 1,933	20.10	1.90	0.04	71.75
0%	Street Lights				-	-	-	-				-	-	-	-				-	-	-	-
	Traffic Signals				-	-	-	-				-	-	-	-				-	-	-	-
	Department 9				-	-	-	-				-	-	-	-				-	-	-	-
	Department 10				-	-	-	-				-	-	-	-				-	-	-	-
	Department 11				-	-	-	-				-	-	-	-				-	-	-	-
	Department 12				-	-	-	-				-	-	-	-				-	-	-	-
	Department 13				-	-	-	-				-	-	-	-				-	-	-	-
	Department 14				-	-	-	-				-	-	-	-				-	-	-	-
	Department 15				-	-	-	-				-	-	-	-				-	-	-	-
	Department 16				-	-	-	-				-	-	-	-				-	-	-	-
	Department 17				-	-	-	-				-	-	-	-				-	-	-	-
	TOTAL (Therms)	20707		$ 9,730.78	109.5607	10.3535	0.20707	391.1759	21531.139		$ 10,051.41	113.9213	10.76557	0.215311	406.74	22123.3588		$ 10,281.82	117.0546914	11.0616794	0.221233588	417.93
	TOTAL (MMBTU)	2070.7							2153.1139													

Notes:

Water

Utility Provider(s): EMWD, LHMWD, City of Hemet

Water - Electricity	2010	2020	2035
CO2 metric tons/year:	7.76	8.07	8 29
CH4 metric tons/year:	0.00	0.00	0.00
N2O metric tons/year:	0.00	0.00	0.00
Total (CO2e metric tons/year):	7.79	8.10	8.32

Emissions Coefficients

WECC 2005	Units
658.68	lbs CO2/MWh
0.02894	lbs CH4/MWh
0.00617	lbs N2O/MWh

Total Water Into the System

2010

Facility Type	kgal	Type	$	CO2 (metric ton/yr)	CH4 (metric ton/yr)	N2O (metric ton/yr)	CO2e
Water Services		Purchased Water		-	-	-	-
Executive Offices		Purchased Water		-	-	-	-
Police Station		Purchased Water		-	-	-	-
Fire Station	697	Purchased Water	$ 4,009.00	2.03	0.00	0.00	2.03
Buildings, Parks & Facilities	1973	Purchased Water	$ 9,065.00	5.73	0.00	0.00	5.76
Library		Purchased Water		-	-	-	-
Street Lights		Purchased Water		-	-	-	-
Traffic Signals		Purchased Water		-	-	-	-
Department 9		Purchased Water		-	-	-	-
Department 10		Purchased Water		-	-	-	-
Department 11		Purchased Water		-	-	-	-
Department 12		Purchased Water		-	-	-	-
Department 13		Purchased Water		-	-	-	-
Department 14		Purchased Water		-	-	-	-
Department 15		Purchased Water		-	-	-	-
Department 16		Purchased Water		-	-	-	-
Department 17		Purchased Water		-	-	-	-
TOTAL	2670.36		$ 13,074.00	7.758890909	0.000340897	7.26792E-05	7.788580316

2020

Facility Type	kgal	Type	$	CO2 (metri	CH4 (metri	N2O (metri	CO2e
Water Services		Purchased Water		-	-	-	-
Executive Offices		Purchased Water		-	-	-	-
Police Station		Purchased Water		-	-	-	-
Fire Station	724.9	Purchased	4168.6	2.11	0.00	0.00	2.11
Buildings, Parks & Facilities	2051.8	Purchased	9425.8	5.96	0.00	0.00	5.98
Library		Purchased Water		-	-	-	-
Street Lights		Purchased Water		-	-	-	-
Traffic Signals		Purchased Water		-	-	-	-
Department 9		Purchased Water		-	-	-	-
Department 10		Purchased Water		-	-	-	-
Department 11		Purchased Water		-	-	-	-
Department 12		Purchased Water		-	-	-	-
Department 13		Purchased Water		-	-	-	-
Department 14		Purchased Water		-	-	-	-
Department 15		Purchased Water		-	-	-	-
Department 16		Purchased Water		-	-	-	-
Department 17		Purchased Water		-	-	-	-
TOTAL	2776.640328		$ 13,594.35	8.067695	0.000354	7.56E-05	8.098566

2035

Facility Type	kgal	Type	$	CO2 (metri	CH4 (metri	N2O (metri	CO2e
Water Services		Purchased Water		-	-	-	-
Executive Offices		Purchased Water		-	-	-	-
Police Station		Purchased Water		-	-	-	-
Fire Station	744.8201	Purchased Water	4283.2156	2.16	0.00	0.00	2.17
Buildings, Parks & Facilities	2108.193	Purchased Water	9685.046	6.13	0.00	0.00	6.15
Library		Purchased Water		-	-	-	-
Street Lights		Purchased Water		-	-	-	-
Traffic Signals		Purchased Water		-	-	-	-
Department 9		Purchased Water		-	-	-	-
Department 10		Purchased Water		-	-	-	-
Department 11		Purchased Water		-	-	-	-
Department 12		Purchased Water		-	-	-	-
Department 13		Purchased Water		-	-	-	-
Department 14		Purchased Water		-	-	-	-
Department 15		Purchased Water		-	-	-	-
Department 16		Purchased Water		-	-	-	-
Department 17		Purchased Water		-	-	-	-
TOTAL	2853.013		$ 13,968.26	8.289599	0.000364	7.77E-05	8.321319

Source		2010 AF	2010 MG	2020 MG	2035 MG
Local Water					
Purchased Water			2.67	2.78	2.85
			2.67	2.78	2.85
kWh			25,969	27,003	27,746

Notes: Water Services electricity usage shows up on municipal electricity accounts provided by SCE. The City purchases some water from EMWD and LHMWD for municipal usage.

Appendix B to
Municipal Energy Action Plan

Utility Data

Data Available in the Community Development Department
City of Hemet

The City of Hemet used the Alternative Methodology for Service Area Population (Appendix A, Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use as summarized below:

1: Finalize Census Blocks in the 2000 Distribution Area
All Census Blocks in the City of Hemet water system service area were identified.

2: Scale Population Information from Census Blocks to Distribution Area
Total and group-quarter population in 2000 for each Census Block in the water system service area was obtained from the U.S. Census Bureau website, www.census.gov.

3: Obtain Population by Structure Type
Single-family connection multifamily populations at the Block Group level were obtained from the U.S. Census Bureau website.

4: Obtain Active Connections Data
The City of Hemet Water Department maintains data in its billing system that designates residential connections as either single-family or multifamily.

5: Develop Population Estimates for Non-Census Years
For census year 2000, total single-family population was divided by total single-family connections to obtain a ratio and total multifamily population was divided by total multifamily connections to obtain ratios, which were then applied to connections data from non-census years (2001-2010) to estimate non-census-year single-family and multifamily population.

Step 1F: Calculate Gross Water Use

City of Hemet Water Department	12-month period: 1 Jan to 31-Dec					Volume Units: Million Gallons per Year				
Calculation	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Volume from Own Sources	1,882.1	1,868.5	1,528.0	1,663.9	1,435.5	1,406.7	1,754.0	1,559.0	1,256.1	1,126.4
Volume from Imported Sources	0	0	0	0	0	0	0	0	0	0
TOTAL Volume into Distribution System	1,882.1	1,868.5	1,528.0	1,663.9	1,435.5	1,406.7	1,754.0	1,559.0	1,256.1	1,126.4
Volume Exported to Other Utilities	0	0	0	0	0	0	0	0	0	0
Change in Dist. System Storage	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	1,882.1	1,868.5	1,528.0	1,663.9	1,435.5	1,406.7	1,754.0	1,559.0	1,256.1	1,126.4
Indirect Recycled Water Use Deduction	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	1,882.1	1,868.5	1,528.0	1,663.9	1,435.5	1,406.7	1,754.0	1,559.0	1,256.1	1,126.4
Water Delivered for Ag. Use	0	0	0	0	0	0	0	0	0	0
Process Water Use	0	0	0	0	0	0	0	0	0	0
GROSS WATER USE	1,882.1	1,868.5	1,528.0	1,663.9	1,435.5	1,406.7	1,754.0	1,559.0	1,256.1	1,126.4

Water Usage Data 2010

City of Hemet, City of Hemet Water Service

	Annual Usage*	Rate**	Total Bill ($)
Residential	2,497 AFY		
Commercial	784 AFY		
Industrial	0 AFY		
Public/Institutional	0 AFY		
Agricultural	0 AFY		
Landscape	176 AFY		

CONSUMPTION WATER RATES
Bimonthly Consumption

Rate Per 100 CF		per AF	
0-600 CF	$2.30	$	1,004.37
601-1200 CF	$2.50	$	1,004.37
1201-OVER CF	$2.88	$	1,004.37

APPENDIX C

VULNERABILITY ASSESSMENT

(TECHNICAL APPENDIX TO CHAPTER 5)

Technical Appendix
Vulnerability Assessment

INTRODUCTION

The Western Riverside Council of Governments (WRCOG) developed **Chapter 5** of this Climate Action Plan (CAP) using a two-step adaptation planning process, consistent with the approach outlined by the California Adaptation Planning Guide (Cal OES and CNRA 2012). The first step is to complete a vulnerability assessment which identifies and ranks vulnerable assets within WRCOG communities. The second step is to develop strategies that reduce climate change vulnerability in the subregion (see **Chapter 5** for adaptation strategies).

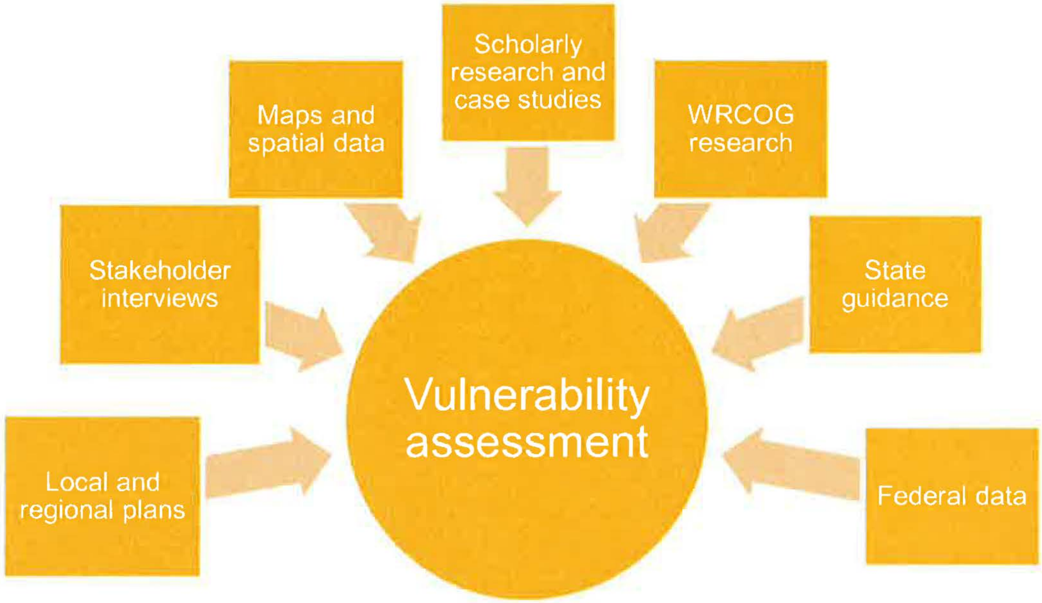
This technical appendix identifies data and guidance sources, and explains and reports outcomes of the vulnerability assessment process.

VULNERABILITY ASSESSMENT DATA SOURCES

This vulnerability assessment analysis relies on local knowledge, scholarly research, and guidance provided by the state of California. One-on-one interviews with local government department heads, first responders, and decision-makers provided additional knowledge of existing conditions and known vulnerabilities.

Figure A-1 identifies the sources used in **Chapter 5** and this Technical Appendix. The sources are discussed following the figure. The Works Cited section at the end of this appendix provides a complete list of resources cited in this vulnerability assessment.

Figure A-1: Vulnerability Assessment Data Sources



LOCAL AND REGIONAL PLANS

Where available, WRCOG obtained and reviewed local general plan safety elements, emergency operations plans, local hazard mitigation plans, and climate change adaptation plans for jurisdictions in the subregion. The plans were used to identify existing planning framework conditions and information about local hazard conditions.

STAKEHOLDER INTERVIEWS

WRCOG interviewed representatives from 11 cities in the subregion. Participants varied by city, but generally included staff from planning, engineering, and public safety departments. The objective of the interviews was to engage key stakeholders in the planning process and obtain local information about exposure to climate change hazards and the political feasibility of climate adaptation strategies. WRCOG interviewed the following cities:

- City of Canyon Lake
- City of Eastvale
- City of Hemet
- City of Lake Elsinore
- City of Menifee
- City of Moreno Valley
- City of Murrieta
- City of Riverside
- City of San Jacinto
- City of Temecula
- City of Wildomar

MAPS AND SPATIAL DATA

WRCOG gathered spatial data for the social vulnerability index (described below), for existing spatial hazards conditions (wildfire and flooding), and to identify vulnerable assets. GIS data obtained from Riverside County provided information about the location of various structures such as recreational facilities, critical infrastructure, and civic offices, and how these locations overlap with hazard zones (e.g., fire and flood). Climate projection data comes from the Pacific Institute and the California Energy Commission (CEC). Spatial data is cited under each map and a complete list of resources used to complete this vulnerability assessment is provided in the citations list at the end of this document.

SCHOLARLY RESEARCH AND CASE STUDIES

This vulnerability assessment relies heavily on peer-reviewed research to estimate the impacts of climate change on the various types of populations, structures, and functions in the subregion. It is important to note that most scholarly research on topics related to this vulnerability assessment is international, national, or statewide in scope and focus. These reports include publications by state and federal agencies (e.g., the CEC or the US Bureau of Reclamation [USBR]), research and case studies from nongovernmental organizations (e.g., the United Nations or the Bipartisan Policy Center), and peer-reviewed studies published in academic journals (e.g., *Journal of Public Health*, *Journal of Geophysical Research*, and *The Lancet*). WRCOG has made its best effort to only use research that studies conditions comparable to those experienced in the subregion. For a complete list of resources used to complete this vulnerability assessment, see the citations list at the end of this document.

WRCOG RESEARCH

Transportation Report

Transportation infrastructure is critical to the economic and social viability of the subregion. To support the vulnerability assessment process, California-based transportation engineers Fehr & Peers provided transportation infrastructure GIS data and a memo detailing best practices for decreasing infrastructure vulnerability to climate change.

Social Vulnerability Index

In addition to physical vulnerability, this vulnerability assessment considers "social vulnerability," or the susceptibility of different populations to harm from exposure to a hazard based on its ability to prepare for, respond to, and recover from that hazard (Cooley et al. 2012). Some demographic groups tend to be more vulnerable to hazards than others; this report gathered Census data from CalEnviroScreen and Southern California Association of Governments at the census tract level for the following:[1]

[1] Homelessness is also an important variable, but data was not available at the census tract level at the time of this report.

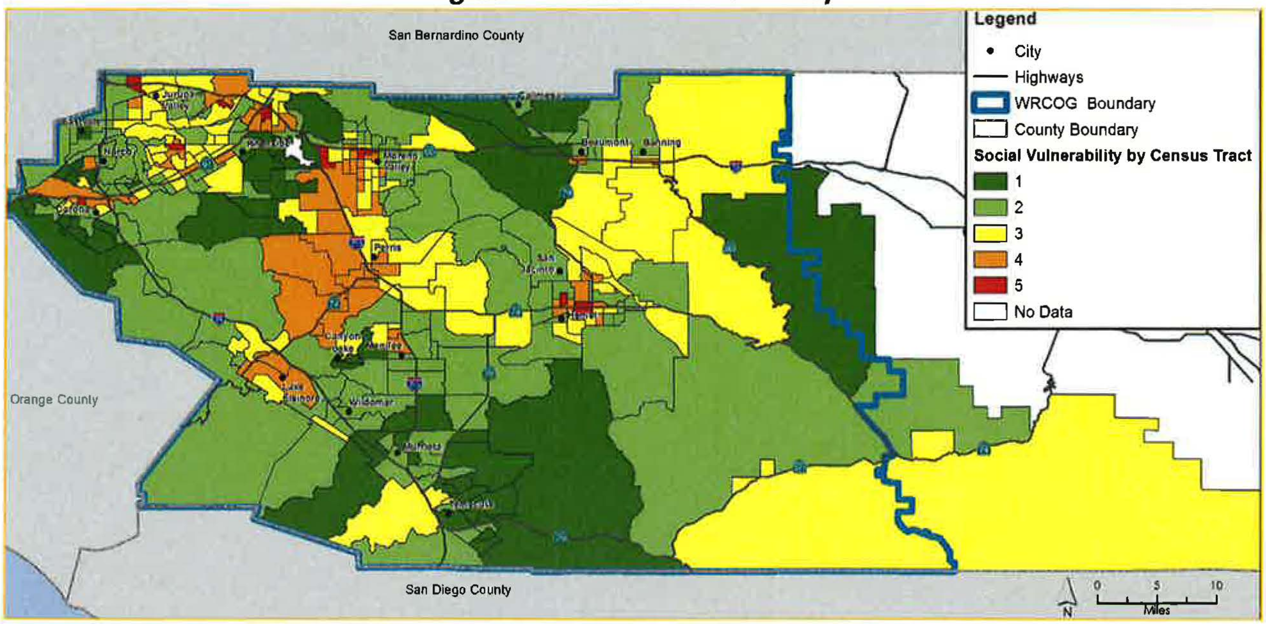
- Age
- Education
- English speaking ability
- Poverty
- Low birth weight rates
- Ethnicity
- Group quarters population
- Housing tenure
- Vehicle access
- Older adults that live alone
- Outdoor workers
- Disabilities
- Single-headed households with very young children
- Overcrowding

Since the interaction of these variables identifies populations that would be more or less vulnerable to climate change effects (i.e., low-income elderly populations may be more vulnerable than high-income elderly populations), WRCOG developed a Social Vulnerability Index (SoVI). A SoVI is a way of assessing variables across multiple geographies. The SoVI process produces a single index or number for each census tract that explains its vulnerability relative to other census tracts.

WRCOG identified the average value for each variable for all census tracts in the subregion (e.g., the census tracts in the subregion have, on average, 5% percent of residents do not have personal vehicles). Then, WRCOG identified how different each tract was compared to that average. These differences were added together to create a composite index. Census tracts that are two standard deviations or more away the subregional mean are identified as having high social vulnerability, indicated by red census tracts in **Figure A-2.**[2]

[2] It should be noted that SoVI scores report vulnerability relative to the other geographies in the study. SoVI scores from this report should not be compared to SoVI scores in other reports.

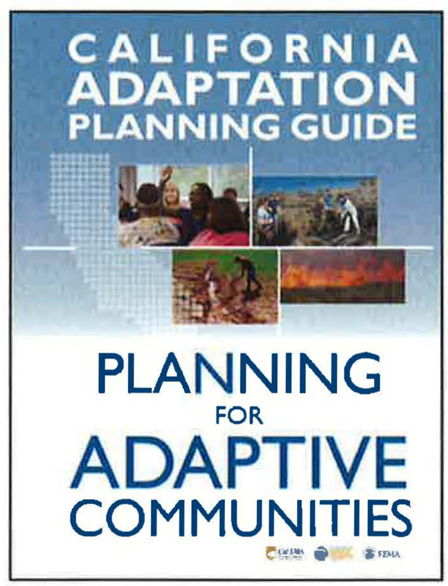
Figure A-2: Social Vulnerability



STATE GUIDANCE

California Adaptation Planning Guide

The California Adaptation Planning Guide provides guidance to support regional and local communities in proactively addressing climate change effects. The California Adaptation Planning Guide provides a step-by-step process for local and regional climate vulnerability assessments and adaptation strategy development and is a primary source of methods for this vulnerability assessment.



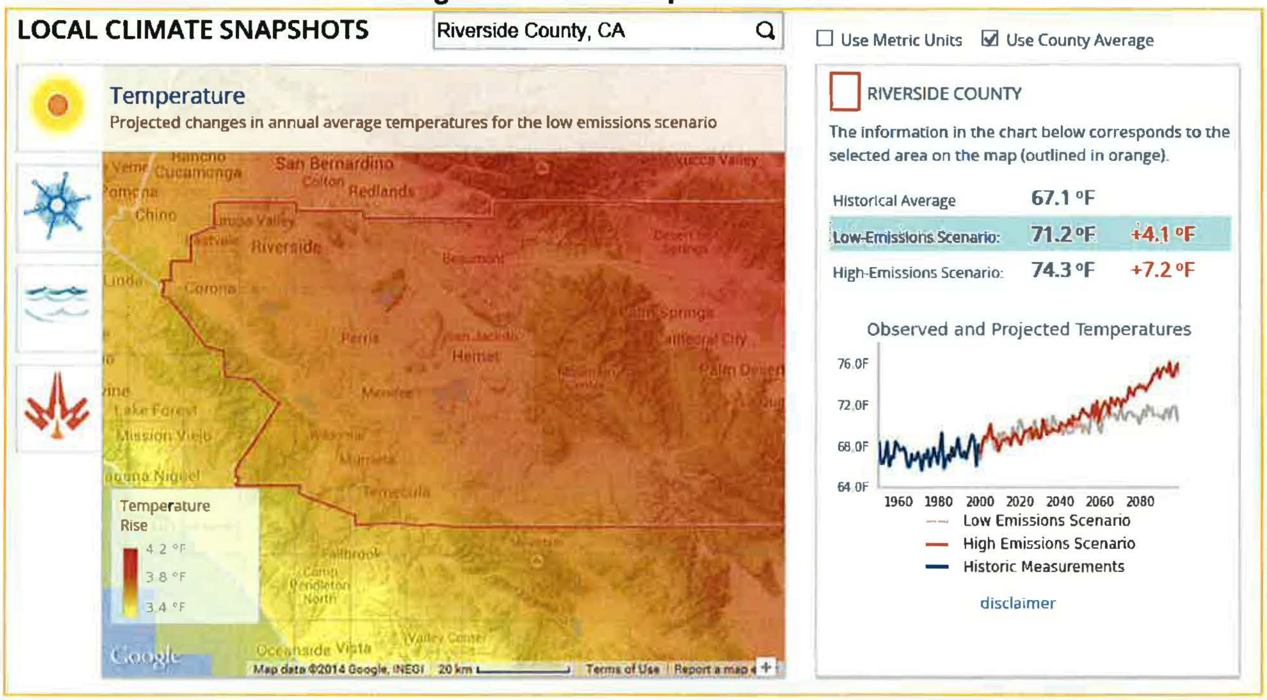
The California Adaptation Planning Guide also includes a climate change exposure summary for 11 California regions. The WRCOG subregion is part of the Desert Region, which includes the counties of Riverside, San Bernardino, and Imperial. As the data in the California Adaptation Planning Guide does not cover all anticipated exposures, the discussions on exposures in this vulnerability assessment are supplemented with data from other sources as needed.

Cal-Adapt

The CEC maintains Cal-Adapt, a web-based climate adaptation planning tool. Cal-Adapt allows users to identify potential changes to the climate in specific geographic areas throughout the state. Cal-Adapt currently uses data from the Coupled Model Inter-comparison Project phase 3 (commonly referred to as CMIP 3), a multi-model climate set generated for the 2007 Intergovernmental Panel on Climate Change (IPCC) Fourth

Assessment Report. The global CMIP 3 data was downscaled to the subregional level for California by the Scripps Institute at UC San Diego and allows users to view climate change projections for different emissions scenarios through 2099. Cal-Adapt is updated as needed to incorporate the most current climate projections. **Figure A-3** provides a screenshot of the Cal-Adapt tool.

Figure A-3: Cal-Adapt Screenshot



Source: CEC 2014

FEDERAL DATA

This vulnerability assessment uses the 2010 Census as a primary source for demographic information. Where information is unavailable through the 2010 Census, this vulnerability assessment also uses data from recent Census surveys, including the 2008–2012 American Community Survey (ACS).

VULNERABILITY ASSESSMENT PROCESS

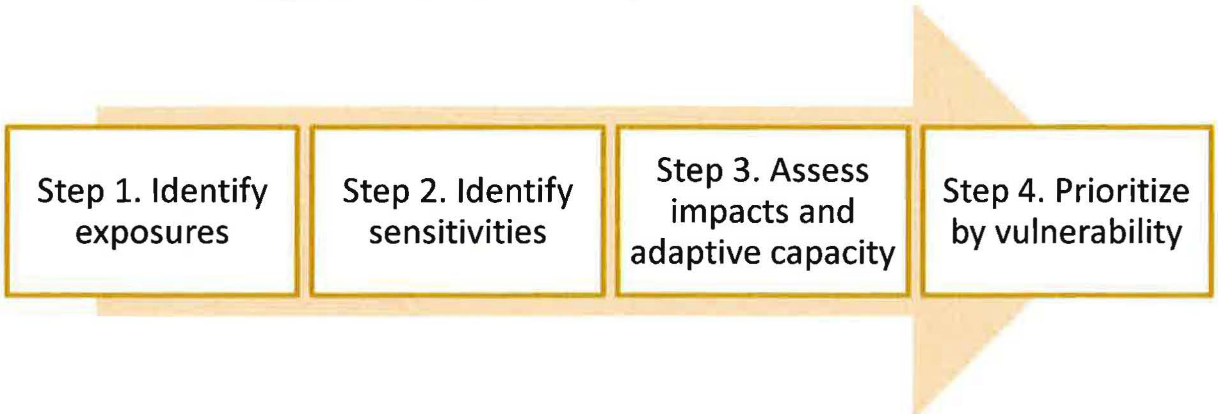
WRCOG conducted this vulnerability assessment using a four-part process consistent with the approach provided by the California Adaptation Planning Guide. The process addresses the following questions:

- What hazards (known as *exposures)* could change in the planning area as a result of climate change?
- What assets or populations in the WRCOG subregion (known as *sensitivities*) could be affected by the exposures?

- How would hazards affect assets or populations (known as *impacts*), and how are those assets and populations currently prepared to deal with such impacts (known as *adaptive capacity*)?
- What topics should adaptation strategies address (what sensitivities are the most *vulnerable*)?

Figure A-4 summarizes the four-part process to answer these questions in sequence.

Figure A-4: The Vulnerability Assessment Process



EXPOSURES

Exposures are the climate changes that communities will likely experience (Cal OES and CNRA 2012) and are identified using best available projections and data. This section discusses climate change exposures based on projections provided by the California Adaptation Planning Guide, Cal-Adapt, other State of California studies, publications by the IPCC, and scholarly research.

Exposure Considerations

This subsection provides background information required to interpret the exposure information in this appendix.

Forecast Uncertainty

Climate change is caused by an increase in the concentrations of greenhouse gases (GHG) such as carbon dioxide (CO_2) in the global atmosphere. How severe the effects of climate change may be in the future and the rate at which these effects occur will depend in large part on the rate of future GHG emissions. A number of factors affect GHG emissions, including population, economic activity, individual behaviors, and government policy. Scientists and scientific groups such as the IPCC often present multiple emission scenarios based on changes to these factors (for example, whether population levels stay constant, increase 2 percent, or increase 5 percent. This vulnerability assessment will discuss possible climate changes from the IPCC's A2 (higher emissions) scenario.

In addition to uncertainty about future human behavior, the computer models that project future climates tend to agree on basic trends, but their actual projections may vary due to differences in assumptions about how parts of the climate interact with each other. The climate projections in this plan have levels of uncertainty and probability associated with them. Despite these uncertainty considerations, projections provide a reasonable range of possible future climate conditions to plan for.

The Difference between "Weather" and "Climate"

"Weather" is a short-term description of the conditions at a particular location at a particular time; "climate" is a long-term *average* description of conditions (IPCC 2007). In other words, climate is a description of what one can generally expect to occur; weather is a much less predictable description of what actually occurs and may be similar to the average or be substantively different, as weather can vary substantially from day to day, month to month, or year to year. For example, in any given year, variability in weather means that rainfall levels in the City of Riverside may be less than 3 inches or close to 25 inches, but the climate in Riverside says that, *on average*, the community will see slightly less than 10 inches per year (Western Regional Climate Center 2013). This is why scientists are able to make reasonably confident projections about climate conditions several decades into the future, while forecasters are often challenged to make accurate weather projections more than a few days in advance.

Because climate is a long-term average, it does not change quickly. The IPCC finds with very high confidence that the present rate of change is unprecedented in the past 22,000 years, and with medium confidence that it is unprecedented in the past 800,000 years (IPCC 2013).[3] Even with the accelerated nature of the current climate change, differences to the climate may be indistinguishable from one year to the next and are generally only discernible when compared across multiple decades. Although this vulnerability assessment discusses projected changes to the climate for specific years or time frames, it does not mean that temperatures will remain constant at current levels until 2049 and suddenly increase the following year. In general, temperatures are expected to increase gradually from current levels to the projected midcentury levels.[4] This long-term, gradual change will occur for all exposures. Even as the climate changes, variability in weather is expected to continue (CEC 2013).

Geographic Scale

Another important consideration is the scale of exposure data. The effects of climate change are estimated using global models that project conditions at a continental or subcontinental level. While some exposures will apply globally, some may only apply to only one hemisphere, or certain regions.

Cal-Adapt and the California Adaptation Planning Guide present the global projections from the IPCC and others, scaled down to a regional level in California. The California Adaptation Planning Guide has 11 regions, each comprising 3 to 12 counties, and presents climate forecasts that are much more locally applicable than the continental and subcontinental projections of the IPCC. In the instances when the California Adaptation Planning Guide information remains too broad to specifically address changes in the WRCOG planning area, the vulnerability assessment uses data from the Cal-Adapt tool.

Cal-Adapt provides a downscaled version of this data for many climate effects; however, the projections apply to regions that are approximately 60 square miles in size. Therefore, the WRCOG subregion covers 23 full quadrants and approximately two dozen partial quadrants. Given the number of partial

[3] Confidence levels (e.g., very high, medium) are qualitative terms and are not quantitatively identified in the manner of probability levels as shown in Table A-2. Confidence levels are based on the type, amount, quality, and consistency of evidence, and the degree of agreement among scientists (IPCC 2013).

[4] Although this is generally how projections are presented, due to the highly complicated nature of climate interactions, some competing research suggests that climate changes could occur relatively rapidly once certain "tipping points" are met (Alley et al. 2003; Lenton et al. 2007). However, there is a high degree of uncertainty in these studies (IPCC 2013).

quadrants, varied topography, urbanization, and geography of the WRCOG subregion, especially between east and west, future climate conditions analysis includes some approximations and may vary slightly from the projections provided in this section.

Wildfire projections used in this vulnerability assessment come from a CEC report titled *Fire and Climate Change in California. California Energy Commission* (Krawchuk and Moritz 2012) and are presented at a much finer resolution of one square kilometer quadrants.

Despite the uncertainty and scale considerations discussed above, these projections are still extremely useful, as they provide a reasonable range of expected future conditions for which to plan. WRCOG used Cal-Adapt, Pacific Institute data, the California Adaptation Guide, and other scholarly research to identify four main climate change exposures for the subregion. The four main exposures are: Extreme Heat, Drought, Wildfire, and Flooding and Extreme Weather Events.

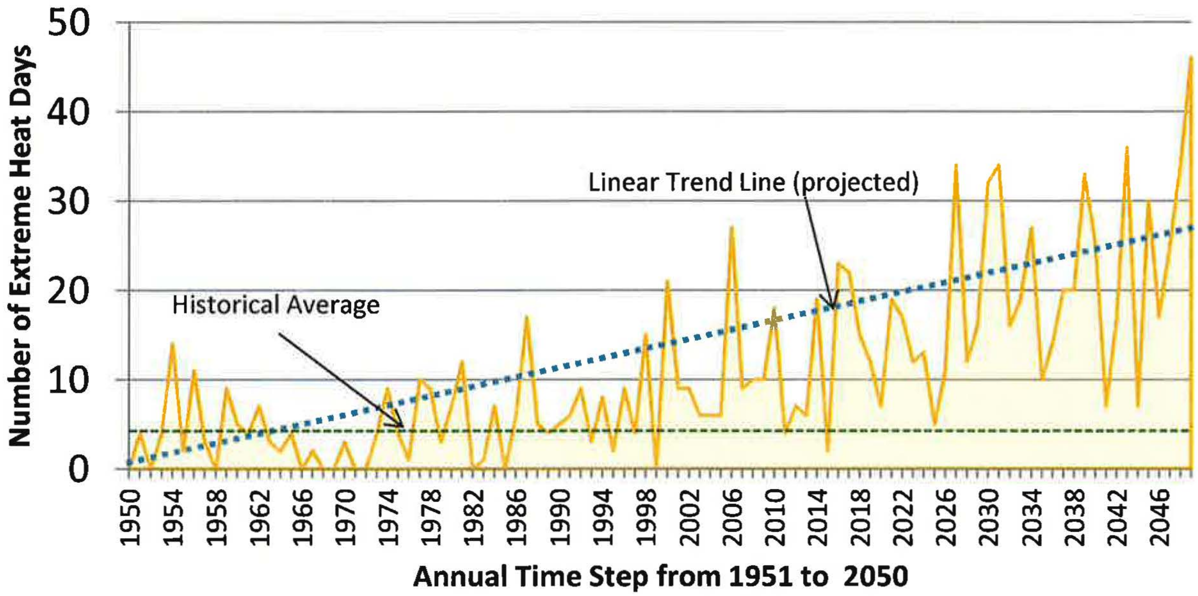
Extreme Heat

The Western Riverside subregion is a combination of hot-summer Mediterranean and semi-arid climates. Both climate types are known for hot (sometimes very hot) and dry summers. Residents in the subregion generally expect these desert-like conditions and most of the built environment was designed to withstand extreme heat.[5] In the City of Riverside, used here as a proxy for the subregion, the extreme heat day threshold is 100°F. Between 1960 and 1991, the subregion averaged four extreme heat days per year.

Climate change is expected to increase overall global temperatures (IPCC 2013). The subregion will experience this increase in average annual heat in a variety of ways, including increased number of extreme heat days and heat waves, warmer summer evenings, and warmer average years. As identified in **Figure A-5**, the number of extreme heat days is projected to rise through 2050, when the average year could include 27 extreme heat days. (CEC 2013)

[5] This CAP defines an extreme heat day as a day in April through October when the maximum temperature exceeds the 98th historical percentile of maximum temperatures based on daily temperature maximum data between 1961 and 1990 (CEC 2013).

Figure A-5: Number of Extreme Heat Days, City of Riverside (1951–2050)



Drought

Multiple water suppliers serve the WRCOG subregion, including the City of Riverside, the Eastern Municipal Water District, the Elsinore Valley Municipal District, the Metropolitan Water District, the Rancho California Water District, the Rubidoux Community Services District, and the Western Municipal Water District, as well as several small community providers and numerous private groundwater wells. The potable drinking water consumed in the WRCOG subregion is either from groundwater resources or imported. Groundwater is drawn from roughly a dozen separate groundwater basins (as defined by the Department of Water Resources Bulletin 118). Imported water supply comes from two primary sources: the California State Water Project, which brings water from the northern Sierra Nevada to Southern California, and the Colorado River. Lengthy and/or severe droughts can result in supply challenges for certain water suppliers and water restrictions throughout the region.

According to the Adaptation Planning Guide, it is likely that annual precipitation in the northern Sierra Nevada will decline by an average of 3 to 5 inches by 2050 and by 6 to 10 inches by 2099. Ranges for precipitation levels in the southern Sierra Nevada are broader but potentially with larger decreases; the Adaptation Planning Guide anticipates a decline of up to 4 inches by 2050 and up to 15 inches by 2099 in the southern Sierra Nevada. As a contrast, precipitation levels are not expected to change by any significant degree for the Colorado River Basin as a whole, although there may be small localized increases or decreases (Colorado Water Conservation Board 2012).

However, it is not only precipitation levels in the Sierra Nevada and Colorado River Basin that affect imported water supplies. When snow falls in these mountainous areas, it is often cold enough to build up on the ground; this accumulated snow is called the snowpack. Much of the snow eventually melts and runs off into rivers during the spring and summer months, continuing to supply water during times when California generally receives little or no rain. As temperatures rise and precipitation levels decrease, the snowpack volume is expected to drop. The Adaptation Planning Guide projects that it is very likely that snowpack volume in the Sierra Nevada will decline by 50–60 percent by 2090. Snowpack volume is also expected to decline in the Colorado River Basin, resulting in a 9 percent decline in the total flow of the Colorado River (USBR 2011). Measurements of snowpack levels show that these declines may already be occurring.

The year 2013 was one of the driest years in California's recorded history, following two years with below-normal precipitation. This prompted Governor Brown to declare a state of emergency as a result of the drought on January 17, 2014, and call on Californians to reduce total water use by 20 percent. At the time of the announcement, the volume of the Sierra Nevada snowpack was only about 14 percent of normal (Cal DWR 2014a). Drought conditions persisted throughout the year; in the end of November of 2014, all of California was considered "abnormally dry" and approximately 94 percent of the state was in a condition of "severe," "extreme," or "exceptional" drought. The WRCOG subregion was in a state of "extreme" drought, the second-most intense category (National Drought Mitigation Center 2014). During the winter and spring of 2014, when the Sierra Nevada sees the most precipitation, the volume of the Sierra Nevada snowpack peaked at only approximately 35 percent of normal levels (Cal DWR 2014a). By the end of October 2014, the major reservoir for the State Water Project, Lake Oroville, was only 45 percent as full as usual for this period, and only held 27 percent of its maximum capacity (Cal DWR 2014b).

Droughts are hardly unheard of in California. As with any individual event, it is not possible to state with certainty whether this drought would have occurred if climate change was not happening, or to what extent climate change made this drought more severe. There is some evidence that the driving factors behind this drought are linked to climate change, although other studies have failed to find a definitive link (Herring et al. 2014). However, this drought is indicative of the changes to precipitation levels, and ultimately to water supply, that are expected to occur as a result of climate change. In his emergency proclamation, Governor Brown observed that dry conditions "may continue beyond this year and more regularly into the future, based on scientific projections regarding the impact of climate change on California's snowpack" (California Office of the Governor 2014).

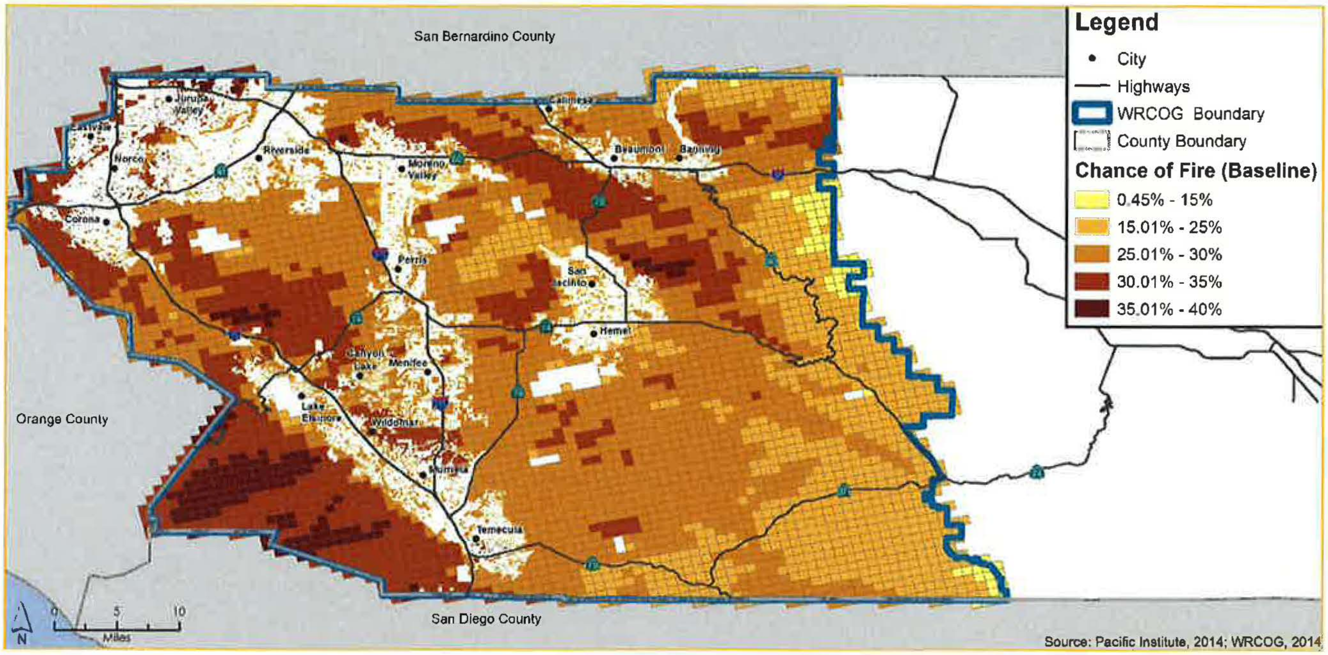
Wildfire

Wildfire already poses a substantial risk to the planning area, as documented in the Riverside County Multi-Jurisdictional Hazard Plan. The plan identifies wildfire as the natural hazard with the highest probability of occurring, and the hazard with the second highest severity (below earthquake).

Some uncertainty remains about how climate change could affect the risk of wildfires (Westerling and Bryant 2007), as changes to the fire regime are dependent on changes to a number of other factors (e.g., winds, precipitation levels, storm frequency, temperatures). According to the Adaptation Planning Guide, it is likely that parts of Riverside County will see risk of wildfire increase by as much as 50–100 percent, with little to no increase to the risk elsewhere in the region.

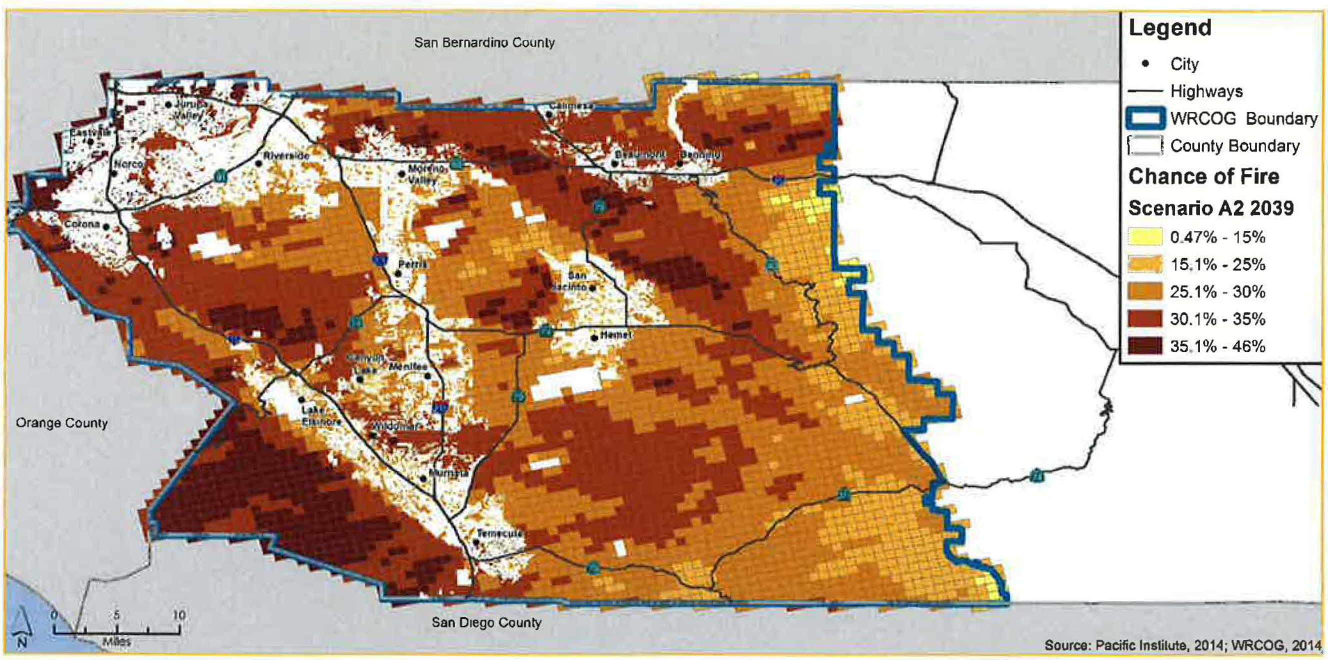
Some studies suggest that, by 2070–2099, the overall risk of wildfires in Southern California could decrease by up to 29 percent or rise by up to 28 percent, relative to current levels (Westerling and Bryant 2007). The Pacific Institute data predicts that wildfire risk will worsen significantly in some parts of the WRCOG subregion, but not in others. Wildfire risk may decrease in certain areas as they become more urbanized and the urban-wildland interface moves outward. **Figure A-6** shows the baseline (2010) wildfire risk in the WRCOG subregion, **Figure A-7** presents the forecasted wildfire in 2039, and **Figure A-8** shows projected change in wildfire risk between 2009 and 2039 (Krawchuk and Moritz 2012).

Figure A-6: Baseline Wildfire Risk, 2010



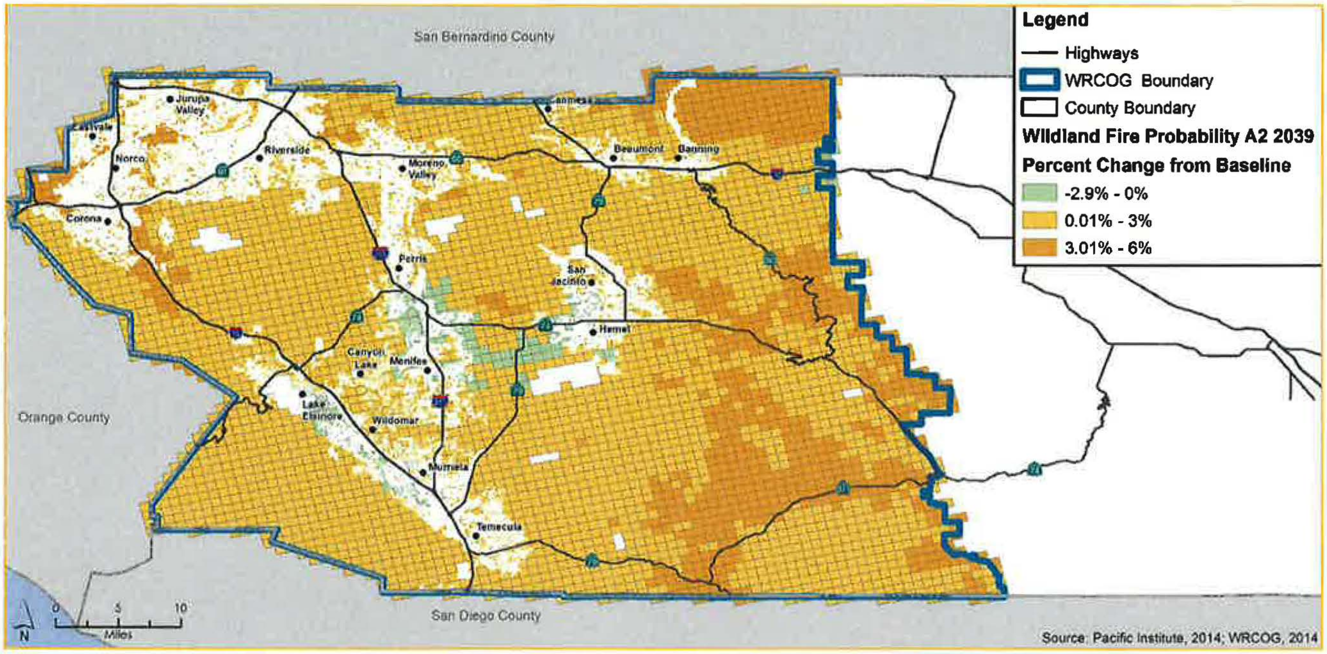
Source: Krawchuk and Moritz 2012; WRCOG 2014a

Figure A-7: Wildfire Risk, 2039



Source: Krawchuk and Moritz 2012; WRCOG 2014a

Figure A-8: Change in Wildfire Risk, Baseline to 2039



Source: Krawchuk and Moritz 2012; WRCOG 2014a

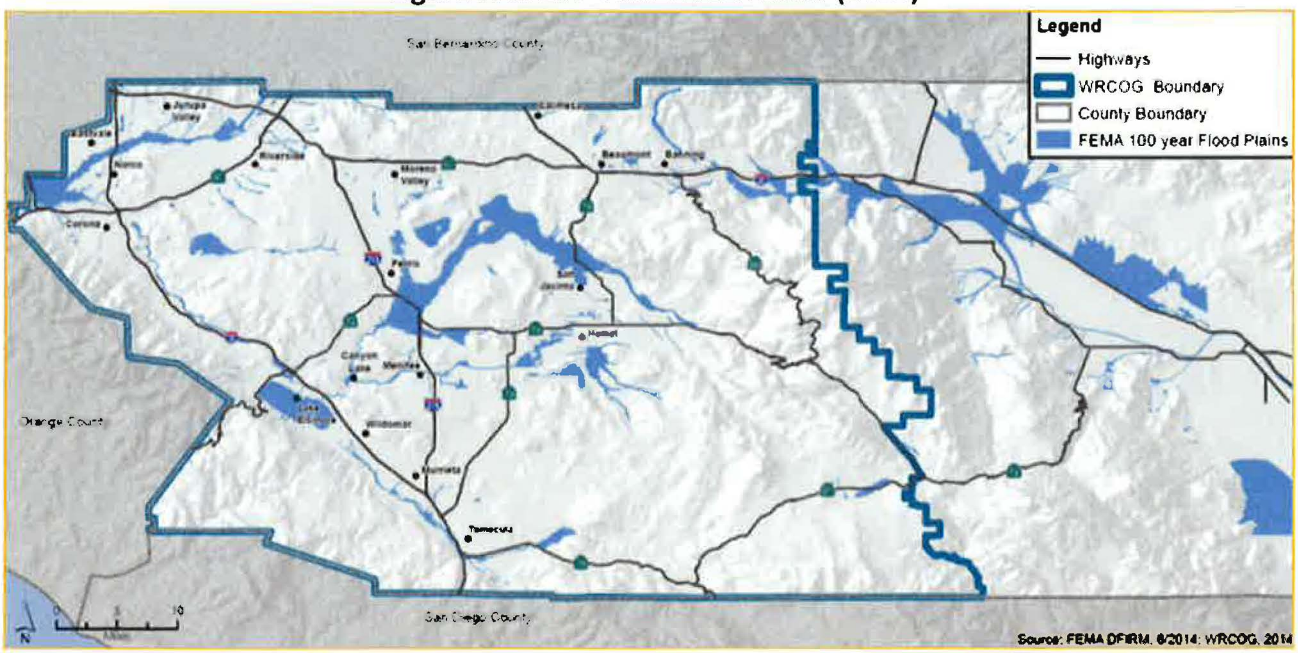
Flooding and Extreme Weather Events

As noted in the Drought section above, Riverside County is likely to see reduced precipitation and reduced snowpack leading to lower surface water levels. However, the subregion is also likely to experience higher intensity precipitation and storm events. A meteorological phenomenon known as the "atmospheric river," a narrow stream of extremely moist air, is frequently responsible for the more intense storms that strike California. Atmospheric rivers generally deliver high levels of precipitation, up to 50 percent of the state's total precipitation in any given year.

Atmospheric rivers are expected to strengthen as a result of climate change, and while there is no scientific consensus on this issue yet, recent studies (Dettinger 2012; Rajagopalan 2013) suggest that this could lead to an increase in the number of intense storms that California experiences. Recently, California has experienced an average of about four atmospheric river storms per year, although some years can see significantly more (20 atmospheric river storms struck California in the winter of 2010–2011) (NOAA's Earth System Research Laboratory, n.d.). On average, some studies indicate that 20–30 percent more atmospheric river storms will strike the state by the middle of the century and that the number of years that see the most atmospheric river storms (15 to 20 or more) will double. Additionally, there is some indication that the most powerful atmospheric river storms will increase in intensity (Dettinger, Das, and Cayan, n.d.).

Figure A-9 shows the areas in the WRCOG subregion that are designated as 100-year flood zones, meaning that they are most likely to flood. This does not mean that areas outside of these flood zones do not face any flooding risk, only that the risk of such an event is lower. Due to the atmospheric river changes described above, flood events are expected to become more frequent, increasing the likelihood of a "100-year"[6] flood in those flood plains. There is a possibility that the areas subject to flooding will expand.

Figure A-9: 100-Year Flood Zones (2014)



Source: FEMA DFIRM 2014; WRCOG 2014a

SENSITIVITIES

Sensitivities are the structures, populations, or other assets that could be affected by climate change. As the second step in the vulnerability assessment process, this chapter identifies sensitivities that are potentially vulnerable to climate change.

The Adaptation Planning Guide provides an initial list of structure and demographic sensitivities to consider. These lists of sensitivities have been refined and supplemented to reflect the specific populations and areas of special focus for the WRCOG subregion. Topics of additional focus for sensitivities include biological resources, transportation assets, and public health assets. The sensitivity categories used for this analysis are described in **Figure A-10**.

[6] A 100-year flood is a flood event that has a 1 percent chance of occurring in any given year. It does not refer to a flood that only happens once every 100 years; there may be multiple 100-year floods over a relatively short time frame.

Figure A-10: Types of Sensitivities

Populations	• A group of people that share a demographic trait • *Examples:* Individuals 85 years and older, ethnic communities
Structures	• A physical building or group of buildings, or a piece of infrastructure or infrastructure network • *Examples:* City halls, houses, electrical transmission lines
Public Health	• A structure, function, or population that provides health care services • *Examples:* Hospitals, emergency response services
Transportation	• Infrastructure that enables the movement of people and goods/services • *Examples:* Sidewalks, roads and highways, railways
Biological Resources	• A distinct type of habitat that supports specific plants and animals • *Examples:* Riparian areas, chaparral, desert scrub

Population Sensitivities

Not all assets or populations are impacted by each exposure. While certain sensitivities may be impacted by all four exposures, some are only impacted by one or two. For example, an increase in drought conditions is not likely to have direct impacts on the older housing stock in the subregion. Therefore the impact and adaptive capacity for housing related to drought conditions were not assessed. Where sensitivity is not relevant to an exposure, it is omitted. **Table A-1** presents the sensitivities considered for each exposure.

Table A-1: Sensitivities and Exposures Considered in the Vulnerability Assessment

Sensitivity	Extreme Heat	Drought	Wildfire	Flooding
Populations (13 sensitivities considered)				
Children age <10	✓		✓	
Household renters			✓	✓
Households overpaying for housing		✓	✓	✓
Individuals age >65	✓		✓	✓

Sensitivity	Extreme Heat	Drought	Wildfire	Flooding
Individuals with disabilities	✓		✓	✓
Individuals with existing medical conditions	✓	✓	✓	✓
Individuals without access to lifelines	✓		✓	✓
Low-income, living in poverty	✓	✓	✓	✓
Non-English speakers	✓		✓	✓
Outdoor workers	✓	✓	✓	✓
Pregnant or nursing women	✓		✓	
Seasonal residents/migrant workers	✓	✓	✓	✓
Undocumented immigrants	✓		✓	✓
Structures (17 sensitivities considered)				
City halls and government offices			✓	✓
Commercial structures			✓	✓
Communication infrastructure	✓		✓	✓
Community gathering areas			✓	✓
Energy generation infrastructure		✓		
Energy transmission/delivery infrastructure	✓		✓	✓
Fire stations			✓	✓
Flood control centers			✓	✓
Industrial structures			✓	✓
Older residential structures	✓		✓	✓
Open spaces			✓	
Parks	✓	✓	✓	✓
Police/sheriff stations			✓	✓
Residential structures near flood zones				✓
Residential structures near high fire areas			✓	✓
Wastewater treatment plants and collection infrastructure		✓	✓	✓
Water treatment plants and delivery infrastructure			✓	✓

Sensitivity	Extreme Heat	Drought	Wildfire	Flooding
Public Health (4 sensitivities considered)				
Emergency response	✓		✓	✓
Health care facilities	✓		✓	✓
Health care service delivery	✓		✓	✓
Health care workforce	✓		✓	✓
Transportation (12 sensitivities considered)				
Airports				✓
Arizona crossings				✓
Bridges/bridge capacity	✓		✓	✓
Emergency systems			✓	
Evacuation routes	✓		✓	✓
Fueling infrastructure and pipelines			✓	
Railway	✓			✓
Road drainage systems/storm drainage		✓		✓
Road signals/traffic control centers	✓			✓
Roads and highways	✓		✓	✓
Sidewalks, bikeways, and trails	✓	✓	✓	✓
Transit-supporting infrastructure	✓	✓		✓
Biological Resources (11 sensitivities considered)				
Agriculture	✓	✓	✓	
Chaparral	✓	✓	✓	✓
Coastal sage scrub	✓	✓	✓	✓
Desert scrub	✓	✓	✓	✓
Grassland	✓	✓	✓	✓
Meadows and marshes	✓	✓	✓	✓
Montane coniferous forest	✓	✓	✓	✓
Playas and vernal pools	✓	✓	✓	✓
Riparian areas	✓	✓	✓	✓
Riversidean alluvial fan sage scrub	✓	✓	✓	✓
Woodland and forest	✓	✓	✓	✓

IMPACTS AND ADAPTIVE CAPCITY

Vulnerability, for the purposes of this analysis, is defined as susceptibility to harm or change. To compare vulnerability across sensitivities, the Adaptation Planning Guide recommends identifying how each sensitivity would be impacted and how each sensitivity could cope with that impact. This section provides an overview of methods for assessing impacts and adaptive capacity.

This vulnerability assessment evaluates both primary and secondary impacts. Primary impacts are those caused directly by an exposure, such as an extreme weather event that damages infrastructure. Secondary impacts are not caused directly by exposures; they occur as a result of a direct impact (e.g., warmer temperatures make conditions more favorable for mosquitoes, resulting in greater risk of mosquito-transmitted diseases). To determine the vulnerability of each sensitivity for each exposure, it is necessary to identify two characteristics: How is the sensitivity *impacted* by the exposure, and what *adaptive capacity* does the sensitivity have to the exposure?

Impacts

The impact assessment methods used in this vulnerability assessment follow the recommended approach in the Adaptation Planning Guide, using a combination of qualitative and quantitative information to determine the severity of each impact. For infrastructure components or functions/services, this evaluation includes the following:

- What is the value of the structure or function, including its assessed value and intangible importance to the community (e.g., contributions to overall quality of life)?
- Does the structure or function benefit only select members of the community, or is it used by most or all residents?
- How substantial must damage be to the structure or function from the exposure in question, before the structure or function ceases to provide the level of service that community members require or expect?
- If the structure or function can no longer provide adequate service, how easy is it to restore service?
- If the structure or function can no longer provide service, is there a risk of mortality or morbidity?
- Is the structure(s) that provide(s) the service located in an area currently at risk for the exposure in question? If not, what is the likelihood that the area will be at risk for the exposure in question as climate change occurs?

A similar set of questions was used to evaluate impacts to populations, including the following:

- What sort of hardships would be felt by the population as a result of the exposure? Would it result in a decrease in quality of life or threaten to damage and/or destroy property?
- Is there a risk of mortality or morbidity to the population as a result of the exposure?
- How many people are affected by the exposure? Is it a relatively small group within the community, or is it most or all of the residents?
- In the event that hardships occur, how long would the population be affected? Would hardships diminish in severity over time or remain at the same level of severity during the course of the impact?

Each sensitivity was given a score from IM0 (minimal impact) to IM4 (severe impact) for each exposure. **Table A-2** reports how each score was qualitatively determined.

Table A-2: Impact Scores

Impact Score	Summary (Structure, Public Health, Transportation)	Summary (Human and Biological Communities)
IM0	Impacts are minimal. There are no service disruptions that community members are aware of.	All impacts are minimal. Community members may not notice effects.
IM1	Performance or services may be somewhat degraded on occasion.	Community members notice minor impacts. There may be mild disruptions to some behaviors or actions.
IM2	The asset is likely to experience chronic stress, limiting the ability to reliably function. Effectiveness may be entirely disrupted on occasion.	There is a marked decline in overall quality of life. Reductions to health,public safety, and/or community viability are likely.
IM3	The asset may only function in a limited way. It may frequently or always be unable to meet community needs.	There is a substantial drop in the well-being of the affected communities. Current lifestyles/habitat may no longer be viable.
IM4	The ability of the asset to provide beneficial service is destroyed.	There is a severe risk of injury or death in human populations and of major habitat shifts or degradation for biological communities.

Adaptive Capacity

This vulnerability assessment evaluates the adaptive capacity of each sensitivity to each exposure. Adaptive capacity is the ability of the sensitivity to respond to impacts using existing resources. While the process for assessing impact includes a combination of qualitative and quantitative data, the adaptive capacity assessment is primarily a qualitative effort. The adaptive capacity evaluation for structures and functions includes the following considerations:

- Are there existing policies, plans, or programs in place or being considered to guide the response? How complete are these resources (e.g., do they allow for a full or partial recovery)?
- Do the owners or operators of the asset have the financial means to respond to impacts? Would such a response be complete or partial?
- Would recovery be voluntary (i.e., does the owner/operator have the ability to choose if and to what degree recovery occurs)? Are there existing laws and regulations that require recovery?
- Are there alternatives to the asset that the community can rely on while service is being restored? Do these alternatives adequately meet the community's needs?
- Are there any significant or insurmountable barriers to a response? Does the response require solutions that are technologically and/or politically infeasible?

A similar set of questions was used to evaluate the adaptive capacity of populations, including:

- Are there any existing/planned policies or programs to assist individuals with the response? Do community members have easy access to such services or are there difficulties associated with receiving assistance?
- Does the population have the financial means to respond to the impact? How complete would the response be?
- What alternatives exist to reduce or eliminate the hardships caused by the exposure?
- Do other barriers exist to the response, including technological capabilities and/or political will?

Each sensitivity associated with each exposure was also given an adaptive capacity score from AC0 (no adaptive capacity) to AC4 (high adaptive capacity). **Table A-3** reports how each score was qualitatively determined. Note that for impacts, a lower score is preferable, while a higher score is better for adaptive capacity.

Table A-3: Adaptive Capacity Scores

Impact Score	Summary
AC4	Assets and populations can adapt with little or no effort. Overall quality of life may improve as a result.
AC3	Adaptive solutions are feasible for most or all sensitivities. Some sensitivities may face limited challenges.
AC2	Threats can be reduced or mitigated, but solutions are only feasible for some assets. Many assets are likely to face substantive difficulties in adapting.
AC1	Adaptive solutions are expensive and/or technologically difficult, but feasible. Approach may require politically unpopular actions or widespread lifestyle changes.
AC0	No method of adapting is currently feasible, although solutions may be possible in the future.

Assessing Vulnerabilities

The combination of each sensitivity's impact score and adaptive capacity score results in a vulnerability score, ranging from V0 (low) to V5 (high). A low impact score and high adaptive capacity score results in a low vulnerability score, while the opposite results in a higher vulnerability score. **Table A-4** illustrates how a sensitivity's impact score and adaptive capacity score combine to create a vulnerability score.

Table A-4: Vulnerability Scoring Matrix

		Impact Score				
		IM0	IM1	IM2	IM3	IM4
Adaptive Capacity Score	AC0	V2	V3	V4	V5	V5
	AC1	V1	V2	V3	V4	V5
	AC2	V1	V1	V2	V3	V4
	AC3	V0	V1	V1	V2	V3
	AC4	V0	V0	V0	V1	V2

VULNERABILITY ASSESSMENT OUTCOMES

This section provides information about sensitivities that had a score of V3 or higher. The sensitivities are sorted by exposure, category, and by vulnerability score. Each subsection begins with a brief overview of vulnerability for the respective exposure.

Sensitivities are sorted into five categories: populations, structures, public health, transportation, and biological resources. **Figure A-11** identifies icons used for each category.

Figure A-11: Sensitivity Categories

Populations   Structures   Public Health   Transportation   Biological Resources

EXTREME HEAT

Extreme heat refers to temperatures that are hotter than 98 percent of all observed historic high temperatures. When extreme heat occurs at least five days in a row, the event is known as a heat wave. Within Western Riverside County, extreme heat days are days in which the maximum temperature exceeds 95–105°F. Historically, the area has seen an average of four extreme heat days each year. Warmer air temperatures are a direct consequence of climate change and are likely to cause an increase in extreme heat. By mid-century, projections estimate an average of 27–35 extreme heat days each year, and potentially more in some parts of the subregion.

The greatest threat posed by extreme heat is health impacts caused by higher temperatures, which can be particularly problematic for older individuals, individuals who work outside, and those who lack effective cooling in their homes or workplaces. Some types of infrastructure, particularly electricity transmission and delivery wires, may be less efficient and more vulnerable to disruptions as a result of very high temperatures. Common disease-carrying organisms (known as vectors) such as mosquitoes tend to favor warmer temperatures; longer periods of warm weather are expected to increase the length of the year during which such vectors are able to breed, establish habitat, and spread pathogens such as the West Nile virus. Extreme heat can also increase water loss in plants and animals, which may put stress on the subregion's biological communities.

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
Populations						
V5	Individuals age >65		Regardless of race or gender, individuals 65 years of age or older, who make up 3 percent of the subregion as a whole but as much as 30 percent in certain zip code areas (California Office of Environmental Health Hazard Assessment 2014), are more susceptible to the adverse effects of heat than are younger adults. The risk for heat-related death increases sharply with age, as those 85 years of age or older are most at risk for heat-related mortality (California Department of Public Health 2014). Older individuals are also most likely to suffer neurological conditions from West Nile virus, including encephalitis and meningitis. Most mortality from West Nile virus has occurred in elderly populations.	IM4	The elderly have little inherent adaptive capacity to heat. Air conditioning can limit impacts, but may not be utilized due to the electricity expense associated with its use. Those with adequate transportation options could also go to cooling centers or other air conditioned public facilities such as a library, if they are available. Elderly individuals have a moderate ability to adapt to diseases by limiting outdoor activity, wearing long clothing, and using insect repellant.	AC1
V5	Low income, in poverty		Individuals of low income are less likely to have access to high quality housing units and may be unable to afford the cost of effective cooling in their homes. Over 70 percent of the individuals in some areas of the WRCOG subregion are currently low income (California Office of Environmental Health Hazard Assessment 2014), potentially concentrating and aggravating vulnerability due to lack of resources within their social networks.	IM3	Low-income residents have little ability to adapt. Cities can provide cooling centers or other resources.	AC0

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V5	Outdoor workers (agriculture, forestry, construction)		Approximately 10 percent of the employed population in the WRCOG subregion currently works in outdoor-oriented fields such as agriculture, forestry, and construction (US Census Bureau 2010). Individuals who depend on outdoor activity for wages will be less willing or able to reduce exposure in case of heat waves. These workers will also be most immediately economically impacted if heat waves prevent them from working. The risk of infection from disease vectors such as mosquitoes and ticks is highest for people who work outdoors.	IM4	Since impacts are tied to economic conditions, employers may provide compensation even when workers are unable to work due to heat. If this does not occur, the ability to adapt without economic impacts is low. Use of long clothing and insect repellant can help improve adaptive capacity to disease-borne vectors, but does not help address other extreme heat-related impacts.	AC1
V4	Individuals with existing medical conditions		Individuals confined to bed or unable to care for themselves are at increased risk, particularly those living alone. Additionally, patients taking medications or drugs that modify thermoregulatory capacity are at increased risk.	IM3	Adaptive capacity of those with chronic illness is very dependent on whether the individual has a strong and close-by support network and access (direct and financial) to medications and technologies that enable mobility and limit impacts.	AC1
V4	Individuals with disabilities		Individuals with disabilities, accounting for approximately 10 percent of the subregion's population, could have limited mobility and be medically dependent on electric devices that could be compromised if an event impacts power supply.	IM3	The disabled have little inherent adaptive capacity to heat. Air conditioning can limit impacts, but may not be utilized due to the electricity expense associated with its use. Those with adequate transportation options could also go to cooling centers or other air conditioned public facilities such as a library, if they are available.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V4	Individuals without access to lifelines (household vehicles, unreliable phone/Internet reception, public transportation, etc.)		Persons without access to transportation, communication, or community infrastructure are vulnerable to heat waves. If their residence or work does not provide adequate refuge, they are left no backup options and may be unable to reach publicly provided resources such as cooling centers.	IM3	Individuals without access to lifelines have virtually no adaptive capacity if they are unable to access air conditioned space, shaded space, or other cool areas in their homes. Adaptive capacity is much higher for those who can readily afford air conditioning or those who have strong support networks that could provide refuge and transportation.	AC1
V3	Children age <10		The existing literature does not consistently suggest that mortality among children increases significantly during heat waves, even though infants were associated with more heat-related deaths (Xu et al. 2014). Exposure to heat waves in the perinatal period may pose a threat to children's health. Pediatric diseases or conditions associated with heat waves include renal disease, respiratory disease, electrolyte imbalance, and fever (American Academy of Pediatrics n.d.). Some vector-borne diseases such as Lyme Disease are most common in young children. Children are more frequently bitten around the heat and neck, making them more vulnerable to illnesses of the brain or central nervous system. Children, however, are less likely than older adults to become sick from West Nile virus.	IM3	Schools can provide shelter in extreme events, although not all children attend school. Children may shelter inside and at public facilities more frequently to avoid heat and air quality impacts. Children also have a moderate ability to improve resistance to vector-borne diseases by wearing long-sleeved clothing, using insect repellant, and reducing outdoor activity.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Pregnant or nursing women		Pregnant women have a lower tolerance for high heat. Late-term pregnant women are more likely to have early delivery as a result of high heat and the related health complications for mother and child (Auger et al. 2014).	IM2	Pregnant women can shelter in cooled indoor environments, either in the home or in public facilities. However, economic stress and limited social networks can limit their ability to shelter.	AC1
V3	Seasonal residents/ migrant workers		Seasonal workers typically have lower incomes and are less aware of community resources and safety nets. They are more likely to work in the outdoors and thus have more extreme exposure to high heat conditions. They also have less control over their living environment and frequently have poor quality housing units that are less likely to provide adequate refuge.	IM2	Major employers of migrant workers could be required or incentivized to provide resources or refuge in extreme conditions. Without action by employers or regulators, outdoor workers' ability to adapt without risk to employment is low.	AC1
Structures						
V3	Energy transmission / delivery infrastructur e		Extreme heat decreases the ability of the grid to transmit electricity; the Department of Energy estimates that for a 9-degree increase in temperatures, transmission line capacity falls by 7–8 percent and substation capacity falls by 2–4 percent (US Department of Energy 2013). These problems are compounded by the fact that electricity demand often spikes during a heat wave, primarily due to the increased air conditioning load.	IM3	Retrofits and modifications to operating procedures can offset capacity losses, and improved efficiency can help reduce demand during heat waves. However, implementation may be an expensive and lengthy process. The WRCOG communities have little or no operational control over the electricity grid.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
Public Health						
V4	Emergency response		More extreme heat events could strain existing emergency response capacity and emergency surge capacity. The increase in emergency calls could increase response time and subsequently reduce survival chances for some types of morbidity. Extreme heat directly exposes emergency responders to an increased risk for heat-related illness.	IM4	Emergency operations planning could identify opportunities to increase response and surge capacity during extreme heat events. Protocols could be established to limit exposure of emergency responders to extreme heat events.	AC2
V4	Health care service delivery		More extreme heat days could increase heat-related mortality and morbidity resulting in more emergency department visits and hospitalizations. This surge in patient demand could stress health care service delivery, including health care facility capacity, equipment use, and staff capacity. Patient overcrowding and reduced service quality could be possible. Mental health services could also be strained.	IM4	Emergency preparedness, surge capacity, and other emergency operations plans could be in place to deal with an increase in patient demand due to heat-related mortality and morbidity, including from diseases.	AC2
V3	Health care facilities (e.g. hospital, clinics, mental health)		An increase in extreme heat events could impact health care facilities. More heat-related mortality and morbidity could result in excess emergency department visits and hospitalizations, increasing demand for beds and potentially resulting in overcrowding. Power outages could disrupt building energy use. Higher temperatures, for longer periods of time, could increase building energy consumption.	IM4	Health care facilities have a significant capacity to adapt to extreme heat events. Backup power systems and plans for surge capacity (conventional and contingency) for the triage, treatment, and tracking of patients during extreme heat events could limit impacts to health care facilities. New facilities and facility retrofits could increase energy efficiency, natural lighting and cooling, and reduce resource demand, making the buildings more resilient to extreme heat events.	AC3

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
Transportation						
V3	Evacuation routes		Asphalt rutting, asphalt buckling, and concrete deterioration from extreme heat can compromise many standard concrete/asphalt mixtures on highways currently used as evacuation routes (US Department of Transportation 2002).	IM3	County roadway systems are evaluated through a yearly pavement management assessment and report, which may identify when roadways are affected by high heat and when repairs must be completed and alternate routes identified. While there are over 200 funding sources for necessary road maintenance and upgrades (Riverside Transportation Commission 2013), the funding is nevertheless limited (especially considering funding shortfalls in previous five-year cycles). These limits may prevent appropriate preventative maintenance, leading to more expensive repairs.	AC2
V3	Roads and Highways		Highway asphalt rutting, highway asphalt buckling, concrete deterioration and blow-ups, and limits on periods of construction activity can all reduce highway structural integrity as a result of extreme heat events (US Department of Transportation 2002).	IM3	A few projects are currently funded and under way to enhance road safety on segments of I-215, I-10, State Route 79 and several other major connectors. Riverside County has more than 200 funding sources for necessary road maintenance and upgrades (Riverside Transportation Commission 2013). However, current budget reports do not evaluate the need for additional funding to offset increased road deterioration resulting from extreme heat.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Sidewalks, bikeways, trails, etc.		Extreme heat discourages use of alternative modes of transit and may negatively affect the health of residents who rely on active transportation. Pedestrian/bike bridges and asphalt suffer the same damages from high heat conditions as other roadways, and may be lower priority for safety checks and regular maintenance than auto routes.	IM3	Federal and state funds are available for sidewalk, bikeways, trails, and other related walking and transit improvements. Some of these funds could be used to increase extreme heat resilience.	AC2
Biological Resources						
V4	Meadows and marshes		An increase in extreme heat days could result in a reduced hydroperiod for ephemeral water features. The size and species composition of these features is dependent on rainfall and temperature. Communities associated with perennial features could experience increased heat/water stress and a reduced growing season.	IM3	An increase in evaporation could lead to less water in wetland features. This could lead to features shrinking and eventually disappearing altogether. Less water means less survival of hydrophytic vegetation.	AC1
V3	Agriculture		Dairy farms in Western Riverside County are especially vulnerable to high heat. High temperatures can stress dairy cows, reducing milk production. Production begins to decline at temperatures as low as 77°F and can drop substantially as temperatures climb above 90°F. Other predicted impacts of increased warming on agriculture include yield changes, alteration of viable crop types, new/increased diseases and pest invasions, pollination changes, and increased stress on crops and animals, resulting in losses of crop quality and yield and increasing the risk of livestock morbidity and mortalities (CEC 2006).	IM2	Federal insurance programs such as the crop insurance program cover important crops in the WRCOG subregion such as table grapes, but not ornamental nursery plants, which are susceptible to heat impacts without reimbursement for the grower. Federal livestock insurance does not protect against an unexpected decrease in dairy production, leaving dairy cow ranchers susceptible to heat impacts without reimbursement.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Chaparral		Chaparral vegetation is tolerant of extremely hot conditions; however, an increase in extreme heat days can lead to higher rates of evapotranspiration in plants, leading to a loss of plant moisture and potential stress on vegetation.	IM3	Chaparral vegetation is relatively robust and is able to tolerate hot, dry, drought-prone conditions; however, an increase in the number of extreme heat days could lead to a decline in vegetation cover, especially at lower elevation sites.	AC2
V3	Coastal sage scrub		Coastal sage scrub vegetation is tolerant of extremely hot conditions; however, an increase in extreme heat days can lead to higher rates of evapotranspiration in plants, leading to a loss of plant moisture and potential stress on vegetation.	IM3	Coastal sage scrub vegetation is relatively robust and is able to tolerate hot, dry, drought-prone conditions; however, an increase in the number of extreme heat days could lead to a decline in vegetation cover, especially at lower elevation sites.	AC2
V3	Grassland		Annual plant species associated with grassland communities have short growing seasons; thus, they are greatly influenced by fluctuations in weather, especially temperature and precipitation.	IM3	Species composition in grasslands is greatly influenced by fluctuations in weather. Many of the annual species in grasslands are likely to be done with their growing season by the time extreme heat days occur; however, species that typically emerge and bloom later in the year may be adversely affected.	AC2
V3	Montane coniferous forest		Higher elevation communities can be more sensitive to temperature fluctuations.	IM3	Drought and high temperatures could cause migration of this community to higher elevations; however, several dominant species, such as lodgepole pine, are able to tolerate a wide range of environmental factors such as fluctuating temperature. Successional hot years could lead to invasion of species typical of lower elevations.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Playas and vernal pools		An increase in extreme heat days could result in a reduced hydroperiod for ephemeral water features. The size and species composition of these features is dependent on rainfall and temperature. A reduced hydroperiod could lead to detrimental effects on species that utilize these communities.	IM3	Vernal pools and playas are adapted to annual fluctuations in climatic conditions. Seeds and wildlife associated with these features have adaptive strategies for dealing with long periods of dry conditions; however, successional drought years may have a detrimental effect on these features as upland species invade.	AC2
V3	Riparian areas		An increase in extreme heat days could result in higher rates of evapotranspiration, leading to an earlier, more rapid seasonal drying down of riparian communities.	IM3	Stress will be especially high for heat-intolerant species, and growth and reproduction could become suppressed. Successive extreme heat years could lead to a general shrinking of riparian zones, increasing competition between species that use these areas.	AC2
V3	Woodland and forests		Woodlands are not as tolerant of severe heat as the scrub communities.	IM3	Mature plants are more likely to survive successive extreme heat years, whereas heat could be fatal to seedlings. This could eventually lead to drastic changes/reductions in woodland community distribution.	AC2

DROUGHT

Most water used in Western Riverside County is imported from the Sierra Nevada (through the State Water Project) and the Rocky Mountains (through the Colorado River, delivered to the region by the Metropolitan Water District of Southern California). Close to a quarter of the subregion's water is supplied by local groundwater. Climate change is expected to cause a decrease in precipitation in many parts of California, resulting in less local water to replenish groundwater supplies and less water in the Sierra Nevada to be delivered through the State Water Project. Warmer temperatures are also likely to increase the melting of the snowcap in the Sierra Nevada and the Rocky Mountains and cause increased evaporation from reservoirs and aqueducts, decreasing the amount of water available during summer and early autumn. Some evidence suggests that severe water shortages, such as the recent statewide drought, may become more frequent as climate change exacerbates conditions that result in such droughts, although more research is needed.

Most impacts from droughts are expected to be economic. Industries that rely on prevalent water supplies, such as agriculture, may be forced to scale back operations if enough water is not available, causing financial difficulties for individuals in these industries and supporting businesses. In communities that lack sufficient water supplies (particularly those more dependent on groundwater), individuals may be forced to buy retail water at significantly elevated rates, causing economic hardships for those of limited financial means; this has already happened in some communities in the San Joaquin Valley as a result of the recent drought. A number of biological communities may also be affected by limited water supplies, particularly if droughts persist for multiple years.

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
Populations						
V5	Low income, in poverty		Low-income individuals are less likely to adapt to increased prices for basic food, water, and other necessities as a result of drought conditions. The cost of these products is usually a larger percentage of their overall income, and they have little other spending that can be curtailed to adjust to the higher cost of these goods. Certain areas of the subregion are over 70 percent low income (California Office of Environmental Health Hazard Assessment 2014), potentially concentrating and aggravating vulnerability, due to lack of resources within their social networks. Additionally, as potable water prices respond to reduced supply, low-income residents may be disproportionately burdened by cost increases.	IM4	The Western Municipal Water District is considering possible low-income water rate reductions.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Households overpaying for housing (>30 percent of income)		Individuals overpaying for housing may be less likely to adapt to increased prices for water, basic food, and other necessities as a result of drought conditions. Since they spend a large portion of their income on housing, they may have fewer available resources for other necessities.	IM2	The Western Municipal Water District is considering possible low-income water rate reductions.	AC1
V3	Outdoor workers		Agricultural workers will be among the first to be affected economically if agricultural production suffers.	IM2	Without action by employers or regulators, outdoor workers' ability to adapt without risk to employment is low.	AC1
V3	Seasonal residents/ migrant workers		Seasonal workers frequently work in agriculture and will be among the first to be affected economically if agricultural production suffers.	IM2	Without action by employers or regulators, outdoor workers' ability to adapt without risk to employment is low.	AC1
Structures						
V3	Energy generation infrastructure		Approximately 12 to 20 percent of California's electricity (depending on precipitation patterns) comes from hydroelectric sources, largely in the Sierra Nevada and along the Colorado River (CEC 2014). Studies are mixed about the impact to Sierra Nevada hydroelectric power, since it depends on localized conditions that may be difficult to model. Colorado River hydroelectric potential is expected to decline by about half. Transmission is unlikely to be affected directly as a result of drought.	IM2	Loss from the Colorado River will have to be made up from energy conservation or other electricity sources. Drought in the Sierra Nevada may also cause a decline in capacity.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
Biological Resources						
V5	Agriculture		All agricultural uses depend on a reliable, plentiful water source. In the WRCOG subregion, the water source comes from a mix of groundwater, Colorado River, and Sierra Nevada water through the State Water Project (Western Municipal Water District 2011). As availability of this water decreases, crops may be damaged by insufficient nutrients and water to help them grow, leading to yield reductions. Cattle and dairy cows rely on grass, hay, and alfalfa, all of which require significant amounts of water to sustain year-round. Grazing losses may lead to a need to cull part of the herd, which can equate to significant financial loss.	IM4	Because much of the agricultural production in the WRCOG subregion is in nursery stock, the capacity to utilize recycled water is increased through the development of a closed system, where irrigation water is collected and reused on site. The Livestock Forage Disaster Program, administered by the USDA, provides compensation for livestock ranchers who suffered grazing losses due to drought; this includes dairies.	AC1
V5	Meadows and marshes		Hydrology is the single most important characteristic of wet meadows and marshes, and the availability of water determines the vegetational stability of these communities.	IM4	A decline in water availability in wet meadows over many successional years could lead to a conversion to drier communities such as woodland or grassland.	AC1
V4	Playas and vernal pools		Drought could result in a reduced hydroperiod for ephemeral water features. The size and species composition of these features is dependent on rainfall and temperature. Precipitation is the primary source for vernal pools. During drought years, vernal pools may be invaded by upland species. Early drying of pools will cut the growing season short and possibly interrupt reproduction processes.	IM4	Vernal pools and playas are adapted to annual fluctuations in rainfall. Seeds and wildlife associated with these features have adaptive strategies for dealing with long periods of dry conditions; however, successional drought years may have a detrimental effect on these features as upland species invade.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V4	Riparian areas		Successive drought years could lead to an earlier, more rapid seasonal drying down of riparian communities.	IM4	Herbaceous species could die out due to loss of surface water; however, established trees could persist by accessing groundwater with their deep roots. Nonetheless, growth and reproduction could become suppressed. General shrinking of the riparian zone will put pressure on species that use these areas. Groundwater may keep larger trees alive; however, severe drought could cause the water table to sink below the reach of roots.	AC2
V3	Grassland		Annual plant species associated with grassland communities have short growing seasons; thus, they are greatly influenced by fluctuations in weather, especially temperature and precipitation.	IM3	Species composition in grasslands is greatly influenced by fluctuations in weather. Successive drought years could lead to changes in community composition and a likely loss of diversity.	AC2
V3	Montane coniferous forest		Higher elevation communities can be more sensitive to climatic fluctuations such as drought.	IM3	Drought and high temperatures could cause migration of this community to higher elevations; however, several dominant species, such as lodgepole pine, are able to tolerate a wide range of environmental factors such as low soil moisture.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Woodland and forests		Woodlands are not as tolerant of drought conditions as the scrub communities.	IM3	While many species are drought tolerant, extreme drought can stress a tree and leave it vulnerable to other attacks such as pests and diseases. Climate change and drought can interact with other non-climate stresses to push a species past a threshold beyond which it cannot survive.	AC2

WILDFIRE

The anticipated effects of climate change include warmer temperatures and a decline in precipitation levels, which are expected to lead to an increase in the number of wildfires due to more dry vegetation and favorable atmospheric conditions. Parts of Western Riverside County are already at elevated fire risks, primarily in the forested mountain regions. The risk of wildfires in the subregion is anticipated to increase moderately; by 2039, some locations in the subregion may see the wildfire risk rise by up to 6 percent. The greatest increase in risk is expected to occur in the Santa Ana and San Jacinto mountains.

In addition to the direct risk to people, property, and biological communities from the flames, wildfires can also result in a number of indirect risks. Smoke can cause or exacerbate respiratory problems for sensitive individuals, and the fine particles in smoke can damage machinery. Without vegetation to help hold the ground together, recently burned areas may also be at greater risk from landslides.

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
Populations						
V5	Individuals without access to lifelines (household vehicles, unreliable phone/Interne t reception, public transportation , etc.)		Individuals without access to lifelines have less notification of events and may be unable to evacuate quickly if needed. There are 20 census tracts in 2039 high fire risk areas where 10 percent of the population or more do not have access to a vehicle. Individuals will likely need assistance if evacuation is necessary (California Office of Environmental Health Hazard Assessment 2014). The lack of vehicle access may make it difficult for such individuals to move to safer areas during poor air quality events. Individuals without access to communications may not be aware of evacuation notifications, closures, or other vital news in the event of a local fire.	IM4	A door-to-door notification system will likely be needed. Individuals may set up their own support network that could offer transportation in case of poor air quality or evacuation. However, those with limited social networks could not adapt in this way. In these cases, individuals will be fully reliant on emergency services.	AC1
V4	Individuals age >65		Older adults, who make up 3 percent of the subregion as a whole but as much as 30 percent in certain zip code areas, are more likely to be susceptible to poor air quality and reduced mobility, which is problematic for evacuation planning. There are seven census tracts in 2039 high fire risk areas where 10 percent of the population or more are 65 years or older and living alone (Krawchuk and Morris 2012; California Office of Environmental Health Hazard Assessment 2014). Many retirement-aged residents are on a fixed income and are thus less able to afford defensible space/building material retrofits as well as to recover if wildfire causes health problems or property damage.	IM4	Older adults, especially those living alone, have lower adaptive capacity because they have less notification of events and may be unable to evacuate quickly if needed. They may have fewer social safety nets or places to stay. They also tend to be on fixed incomes and less able to recover financially from lost property or injury. Depending on the community, some older adults may have significant assets in place and may be highly resilient.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V4	Individuals with existing medical conditions		Some of these individuals, particularly those with respiratory and cardiovascular conditions, have increased frailty and susceptibility to poor air quality and fire smoke, which could trigger a number of acute and chronic issues.	IM3	Individuals can try to limit outdoor activities or could use indoor air purifiers. However, this may be insufficient for particularly sensitive persons, who may require medical attention during fire events. Ability to adapt to situations requiring evacuation is extremely limited.	AC1
V4	Individuals with disabilities		Individuals with disabilities could have limited mobility and could be medically dependent on electric devices. There are 6 census tracts in 2039 high fire risk areas where 20 percent of the population has some type of disability (Krawchuk and Morris 2012; California Office of Environmental Health Hazard Assessment 2014). They may be less willing or unable to evacuate in emergencies due to dependence on devices. If evacuation is required, they are more likely to suffer physical injury, to lose their medication and assistive devices, and to have caregiving support disrupted or lost. Physically disabled individuals may have limited mobility in case of an evacuation, and breathing problems could be aggravated by smoke. Mentally disabled individuals may not be fully aware of resources and procedures.	IM3	Mobility is a major concern for people with disabilities. Although some technology devices can increase mobility, these individuals' mobility may still be severely limited. These individuals also may be limited in their choice of places and living environment in order to receive the care they need. Those who choose to/can afford to live in a group living environment could have more resources and support on hand.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V4	Low income, in poverty		Nearly every census tract in 2039 high fire risk areas currently has at least 20 percent of its households living at two times below the federal poverty level (Krawchuk and Morris 2012; California Office of Environmental Health Hazard Assessment 2014). Individuals of low income are less likely to have access to high quality housing units, support networks, or other resources to limit exposure to poor air quality or defend against fire. They are also less able to recover and rebuild their quality of life if fire results in destruction of their property or impacts their health. They may be unable to afford housing in a new location or pay medical bills.	IM3	Programs that provide resources and care at reduced or no cost are currently available and could be utilized by these individuals. Other avenues to adapt would likely require resources that these individuals lack.	AC1
V4	Outdoor workers (agriculture, forestry, construction)		There are 12 census tracts in 2039 high fire risk areas where 20 percent of the current employed population has an outdoor occupation (Krawchuk and Morris 2012; US Census Bureau 2010). Outdoor workers are directly impacted by the poor air quality caused by wildfire.	IM3	Workers may not seek better air quality or go indoors because loss of work time could mean loss of income; thus, adaptive capacity is low.	AC1
V4	Seasonal residents/ migrant workers		Seasonal workers typically have lower incomes and are less aware of community resources and safety nets. They also have less control over their living environment. Additionally, these workers tend to be outdoor workers and therefore are more susceptible to poor air quality that typically accompanies wildfire events.	IM3	Without action by employers or regulators, migrant workers' ability to adapt without risk to employment is low.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Children age <10		Children are impacted by air pollution caused by fires. These impacts may result in acute and chronic conditions.	IM3	Limiting outdoor time can help reduce respiratory problems that could result from poor air quality. However, rates of childhood asthma in Western Riverside County are currently relatively high, which may limit adaptive capacity.	AC2
V3	Households overpaying for housing (>30 percent of income)		Individuals paying a high percentage of their income for housing may have fewer available resources to help them limit exposure to poor air quality or defend against fire. The high cost of housing may also make them less able to recover and rebuild their quality of life if fire results in destruction of their property or substantially impacts their health. They may be unable to afford housing in a new location or pay medical bills.	IM3	Households overpaying for housing may migrate to areas with less risk, although these areas may have higher priced housing.	AC2
Structures						
V4	Residential structures near high fire risk areas		Houses near high fire risk areas are at increased risk of burning. In the WRCOG subregion, 51,875 acres of residential land currently are in an elevated fire risk area. This acreage is expected to increase to 107,749 acres around 2039, but decline to 60,439 acres by 2099 (Krawchuk and Morris 2012).	IM4	Homeowners can take a number of steps to reduce their vulnerability to fires, including using fire-resistant building materials, and creating and maintaining defensible space. Homes are required to have 100 feet of cleared brush around them, but enforcement may be challenging (CAL FIRE 2012). Insurance coverage can help recover from a fire, although it cannot prevent damage from occurring.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	City halls and government offices		By 2039, the following facilities in the WRCOG subregion will be located in areas of elevated fire risk (Krawchuk and Morris 2012; WRCOG 2014a): • 3 of the 11 existing city halls not located in commercial centers (4 by 2099) • 1 of the 4 existing animal services offices • 13 of the 33 existing community health agencies • 4 of the 6 existing district attorney's offices • 1 of the 6 existing DMV offices • 1 of the 8 existing economic development agencies • 2 of the 6 existing environmental health agencies • 7 of the 13 existing probation facilities • 3 of the 4 existing public defender's offices • 11 of the 23 existing social services offices	IM3	Fire-resistant materials and the use of defensible space can help protect these buildings from fire damage. Since the buildings are owned and operated by jurisdictions, enforcement of defensible space and choices of building materials and design alternatives are locally controlled. Local jurisdictions may have limited flexibility to make these upgrades due to financial barriers.	AC2
V3	Community gathering areas (libraries, recreation centers, etc.)		By 2039, 13 of the 30 existing libraries, 1 of the 5 existing malls, and 11 of the 23 existing museums in the WRCOG subregion will be located in areas of elevated fire risk, placing them at heightened risk of damage (Krawchuk and Morris 2012; WRCOG 2014a).	IM3	Fire-resistant materials and the use of defensible space can help protect these buildings from fire damage. Since community gathering areas are owned and operated by jurisdictions, enforcement of defensible space and choices of building materials and design alternatives are locally controlled. However, financial barriers may limit the ability of local jurisdictions to make these changes.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Old residential structures		Older homes in the wildland-urban interface may lack fire-resistant features found in more modern buildings. Only 18 percent of countywide homes were built before 1970 (US Census Bureau 2012). In the WRCOG subregion, 51,875 acres of residential land are currently in an elevated fire risk area. This acreage is expected to increase to 107,749 acres around 2039, but decline to 60,439 acres by 2099 (Krawchuk and Morris 2012). It is unknown how much of this acreage includes older homes, but given the relatively recent construction of many homes in Riverside County, it is reasonable to assume that older homes are the minority.	IM2	Structures can be retrofitted to be more fire resistant, and defensive space can be created. However, such efforts may not be economically feasible for some homeowners. Over 80 percent of the homes in Riverside County were built after 1970, and such homes may already incorporate defensive features. Homes are required to have 100 feet of cleared brush around them, but enforcement may be challenging. Homeowners are required to have insurance, but while insurance facilitates reconstruction and recovery, it does not reduce the risk of damage occurring.	AC1
Public Health						
V4	Emergency response		More wildfires could result in additional requests for emergency response and could require additional surge capacity. More calls could lengthen response times and subsequently reduce survival chances for some types of morbidity. Wildfires expose emergency responders to increased risk of mortality and morbidity.	IM4	Emergency operations planning could identify opportunities to increase response and surge capacity during wildfires, including the use of volunteer staff and obtaining assistance through mutual aid agreements. Limiting available funding may decrease the ability to implement these opportunities.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Health care facilities (e.g. hospital, clinics, mental health)		By 2039, 5 currently existing hospitals in the subregion, 13 currently existing community health agencies in the subregion, and 10 currently existing mental health facilities in the subregion will be in areas of elevated fire risk (Krawchuk and Morris 2012; WRCOG 2014a). These facilities depend on electricity to provide care and could be affected by a wildfire-caused electricity outage. A surge in patient demand could increase health care facility/bed utilization.	IM3	Fire-resistant materials and defensible space can help protect buildings from fire damage. Health care facilities could limit impacts during power outages by using energy generated on-site.	AC2
Transportation						
V4	Evacuation routes		Wildfires can increase the need for evacuation routes and can also physically impact evacuation routes. Wildfires can block evacuation routes through direct damage, as well as contribute to conditions that exacerbate hillside runoff during precipitation events. Fires and mudslides can both lead to road closures and detours in high fire hazard areas.	IM4	Alternative routes can be identified and publicized in areas prone to wildfires. Adaptive capacity to damaged highways from fire or mudslide is limited without major funding sources.	AC2
V3	Bridges/bridge capacity		Hillside vegetation generally slows water and mudflows during large precipitation events. Wildfires that destroy hillside vegetation leave the hillsides unprotected and can exacerbate the impacts of future flooding events. Areas with low lying or poorly maintained bridges downstream from wildfire-impacted hillsides will be most directly affected.	IM3	The WRCOG subregion has several major bridges that are listed as structurally deficient, but the county does not currently have necessary funds for improvements. Rip-rap can be installed to protect bridge piers and abutments as a lower cost option to help protect against mudslide damages. Adaptive capacity for preventing/dealing with damage to bridges is low without major funding sources.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Roads and Highways		Roadways can buckle during intense heat, such as that caused by a wildfire. In addition to physical damage, roads and highways located near a fire are often shut down for safety and access reasons. A wildfire near key pieces of roadway may cause significant, region-wide congestion and delays if the infrastructure is closed. State Route 74 traverses high fire risk zones, and a number of other key freeways, including Interstate 5 and Interstate 10, pass near high fire risk zones.	IM3	Alternative routes can be identified and publicized for highway sections that have been identified as most prone to wildfire impacts. However, the closure of a major freeway is likely to cause substantial traffic impacts and suggestions even if alternative routes are available. Preventing impacts or repairing damaged highways from fire or mudslide is limited without major funding sources.	AC2
Biological Resources						
V5	Desert scrub		Historically, this natural community was composed of scattered scrub species with little groundcover and thus, minimal fuel load for fire. Fire risk has increased with the invasion of annual grass groundcover.	IM4	Desert scrub communities are not adapted to frequent fires. Succession of desert scrub communities following disturbance is relatively slow, in excess of several hundred years for severely disturbed areas. Short-lived species recover quickly; however, large-scale recruitment of long-lived species can take much longer. The flora in this biological community is generally slow growing due to lack of moisture and extreme temperatures.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V5	Riparian areas		Historically, riparian areas acted as natural fire barriers due to the high water content of foliage. The recent invasion of non-native species (e.g., salt cedar, arundo) has greatly increased fire fuel loads and disrupted the fire barrier function of riparian corridors.	IM4	Invasion by exotic species has decreased the adaptability of riparian communities to fire. These invasive species are able to recover quickly and expand their range post-fire, thus increasing fuel loads and leading to a destructive cycle. Native trees are less tolerant of direct exposure to fire. Succession of riparian areas from exposed alluvial soil to mature riparian forest and woodland may take 50 to 75 years or more.	AC1
V4	Montane coniferous forest		Montane coniferous forests have been naturally/historically subjected to small, relatively frequent lightning fires. This vegetation community typically experiences fewer large fire events than communities at lower elevations. Fire suppression practices have resulted in higher risk conditions for severe fires. Higher risk conditions include an increase in accumulated fuel load in the form of leaf litter and dead/dying trees.	IM4	Many species in montane coniferous forests are dependent on fires for reproduction. For example, knob cone pines and Tecate cypress will only release seeds from their cones in the presence of fire. Montane coniferous forests are adapted to small, relatively frequent fires. For example, Jeffrey pine forests are adapted to fire intervals of approximately 26 years, which is enough to burn accumulated fuel loads, encourage seedbed growth, stay relatively small in size, and result in few crown replacements. Fire suppression has increased fuel loads and results in severe fires that are fatal to trees. In addition, fire suppression leads to reduced recruitment of large trees due to competition with shade-tolerant understory trees.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V4	Woodland and forests		Historically, woodland areas were subject to low-intensity passing fires. Similar to other communities, the invasion of non-native annual species has greatly increased the risk of severe fire events.	IM4	Woodland and forests in the region are adapted to infrequent, less intense passing fires. Many trees have thick bark, making them resistant to low-intensity fire events. Many species are able to resprout following more intense fires; however, severe fires are often fatal. Following fire, shrubs rapidly repopulate, competing with oak seedlings. Junipers are susceptible to extirpation following severe fires due to a slow reproductive process.	AC2
V3	Agriculture		There are currently 84,392 acres of agricultural land in the WRCOG subregion in an area of elevated fire risk. This number is expected to rise to 154,376 acres by 2039, and decrease to 95,515 acres by 2099 (Krawchuk and Morris 2012; WRCOG 2014a).	IM4	Controlled use of cattle grazing on ranches may reduce wildfire risk by reducing fuel load, making them less likely to promote the rapid spread of wildfires. Additionally, the Federal Emergency Loan Program provides relief to farmers who can demonstrate that they have suffered 30 percent or more loss of crops or a significant loss of livestock. Loans may be used for repair, reorganization, recovery, and necessary expenses (US Department of Agriculture 2012).	AC3

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Chaparral		Chaparral communities have always been subject to relatively frequent natural fire regimes. Fire risk has increased with the invasion of annual grass groundcover.	IM4	Chaparral is highly adapted to fire and has been shown to quickly recover from fire, meaning it undergoes a relatively rapid succession from herbaceous flora to dense woody vegetation in a short time period with minimal loss of species. Plant species employ several adaptive strategies to fire, including stem regeneration from root burls and production of large amounts of dormant seeds that germinate by heat or chemical processes initiated by fire. This vegetation community is stable and can remain healthy for long periods without fire; however, too-frequent fire can cause invasion of non-native grasses and eventually complete conversion to annual grassland.	AC3
V3	Riversidean alluvial fan sage scrub		Like chaparral and coastal sage scrub communities, this vegetation community has always been subject to frequent fires. Riversidean alluvial fan sage scrub is unique in that it is associated with high endemism of associated plant and wildlife species. Invasion of non-native grasses following fire could lead to a rapid decline of endemic species.	IM4	Riversidean alluvial sage scrub is adapted to fire; however, frequent fire events could overwhelm recovery times for native species and lead to an invasion of non-natives, resulting in the decline and possible extirpation of sensitive endemic species.	AC3

FLOOD

Climate change is expected to cause a decrease in precipitation in many parts of California, including Western Riverside County, but there is also evidence that it may strengthen certain atmospheric mechanisms which are responsible for delivering storm systems to the state. Some studies indicate that the number of strong storms may increase by 20–30 percent by the middle of the century and that the number of years that see 15 or more strong storms may double. Although overall precipitation is expected to decline, the increased frequency and intensity of these storms can create an increased risk of flooding. There is no specific information on how much flood risk may increase due to climate change, but it is reasonable to assume that flood events will be more frequent in already flood-prone areas and that the size of flood-prone areas will expand.

The primary threat from flooding is damage to structures and individuals posed by the floodwaters. Indirectly, floods can have impacts to social and emotional health by limiting the ability to travel. Health risks can also occur after floodwaters recede, including respiratory conditions caused by mold and increased threats of diseases from vectors that rely on stagnant water, such as mosquitoes.

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
Populations						
V4	Households overpaying for housing (>30 percent of income)		At least 20 percent of owner-occupied households are overpaying for housing in approximately 75 percent of census tracts in 100-year floodplains. At least 20 percent of renter-occupied households are overpaying for housing in approximately 20 percent of census tracts in 100-year floodplains (FEMA 2014; California Office of Environmental Health Hazard Assessment 2014). Individuals paying a high percentage of their income on housing may have fewer available resources to help them limit exposure to flooding. The higher cost of housing may result in greater financial losses from a given flood event.	IM3	Programs that provide resources and recovery safety nets such as temporary housing and rebuild assistance at reduced or no cost to this group could aid in adaptation but prove costly.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V4	Individuals with existing medical conditions		Individuals with existing medical conditions, particularly those who live independently, may have limited mobility due to increased frailty and dependence on medications or large and electronic devices depending on the nature of their condition. This makes evacuation more difficult or impossible without significant assistance. They also may be unable to fortify their residences (e.g., with sandbags) prior to a storm.	IM3	Individuals may develop informal support structures (e.g., friends and neighbors) that are available to provide assistance during extreme weather events. Depending on the individual's medical condition, specialty assistance may be needed, which could make such informal networks inadequate. Ability to adapt to situations requiring evacuation without a social network or resources to get medical care on short notice is extremely limited.	AC1
V4	Individuals with disabilities		There are 13 census tracts in 100-year floodplains where 20 percent of the population has some type of disability. Individuals with a disability, accounting for approximately 10 percent of the subregion's population, could have limited mobility and could be medically dependent on electric devices (FEMA 2014; California Office of Environmental Health Hazard Assessment 2014). This means that power outages often associated with powerful storms and flooding can have immediately harmful, if not deadly, impacts on their health. They may be less willing or unable to evacuate in emergencies due to dependence on devices. If evacuation is required, they are more likely to suffer physical injury, to lose their medication and assistive devices, and to have caregiving support disrupted or lost. They also may be unable to barricade their houses (e.g., use sandbags) before a storm. Individuals with some types of disabilities may be substantially more vulnerable than others.	IM3	Maintaining strong informal support structures (e.g., friends and neighbors) available to provide assistance during extreme weather events may be an especially important adaptation measure for disabled individuals. Disabled individuals may also obtain technology or equipment that helps protect their homes and provide greater mobility in case of evacuation; however, such adaptations are likely extremely costly and may be out of reach for these individuals, as they also frequently have low incomes.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V4	Low income, in poverty		Nearly 75 percent of census tracts in 100-year floodplains have at least 20 percent of their households living two times below the federal poverty level (FEMA 2014; California Office of Environmental Health Hazard Assessment 2014). Individuals of low income are less likely to have access to high quality housing units or the resources necessary, such as sandbags, to defend their homes against flooding. They are also less able to recover and rebuild their quality of life if flooding results in destruction of their property or impact on their health. They may be unable to afford housing in a new location or pay medical bills. Certain areas of the subregion are over 70 percent low income, potentially concentrating and aggravating vulnerability, due to lack of resources within their social networks.	IM3	Programs that provide resources and recovery safety nets such as temporary housing and rebuild assistance at reduced or no cost to this group could aid in adaptation but prove costly.	AC1
V4	Seasonal residents/ migrant workers		Seasonal workers typically have lower incomes and are less aware of community resources and safety nets in the event of flooding. They also have less control over their living environment and very often have poor quality housing that is less able to withstand the impacts of storm and flood events.	IM4	Without action by employers or regulators, migrant workers' ability to adapt to flood events without risk to employment is low.	AC2
V3	Household renters		Renters are less likely to have control over their immediate living environment in order to limit risk. Throughout the WRCOG subregion, anywhere between 30 percent and 100 percent of the residents in a neighborhood are renters (US Census Bureau 2012).	IM3	Renters may prioritize living in units with lower risk or buy additional flood insurance. However, for low-income renters, these adaptation behaviors may not be possible.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Individuals age >65		Ten census tracts in 100-year floodplains have at least 10 percent of their households comprising older adults (>65 years) living alone (FEMA 2014; California Office of Environmental Health Hazard Assessment 2014; US Census Bureau 2010). Flooding impacts include isolation, destruction of property, and possible direct injuries. Older persons, who make up 3 percent of the subregion as a whole but as much as 30 percent in certain zip code areas (California Office of Environmental Health Hazard Assessment 2014), have less mobility and are more prone to injury as well as to diseases/bacteria that may be prevalent in the aftermath of a major flood event. They are also less likely to be able to install sandbags or other protective measures prior to a flood. Damage to transportation infrastructure may be more problematic for the elderly because of dependence on medications that are not commonly available.	IM3	Maintaining strong informal support structures (e.g., friends and neighbors) may be especially helpful in reducing risk to the elderly in the case of extreme weather events and their aftermath. The elderly may ensure they are properly covered by flood insurance. They may also develop emergency planning kits that contain an emergency supply of necessary medications to take with them in case of required evacuation. Adaptation addressing low mobility is very difficult.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Individuals without access to lifelines (household vehicles, unreliable phone/Internet reception, public transportation, etc.)		There are 32 census tracts in 100-year floodplains where at least 10 percent of households don't have access to a vehicle (California Office of Environmental Health Hazard Assessment 2014). Flooding and debris may block sidewalks and make walking difficult or impossible during and immediately after intense storms, which would have a more direct impact on individuals with no vehicle or other limitations on transportation. Individuals lacking access to communication resources (e.g., Internet or phone) may not be aware of blockages or warnings to prepare for a storm. Such individuals have little or no capacity to evacuate if necessary.	IM3	Individuals with limited transportation or communication lifelines could invest in better drainage systems that could help reduce flooding. They may also develop more extensive emergency kits that anticipate longer periods of time before help arrives after a flood event. They could participate in any existing door-to-door notification system or informal warning system. Individuals may set up their own support network that could offer transportation in case of flooding or evacuation. However, those with limited social networks could not adapt in this way. In these cases, individuals will be fully reliant on emergency services.	AC2
Structures						
V5	Residential structures near flood zones		Homes in flood zones run significant risks of being damaged or destroyed during flooding, particularly if the strength and frequency of flooding increases as a result of climate change. Within the WRCOG subregion, 2,896 acres of residential land are currently within the 100-year floodplain (FEMA 2014).	IM4	Homes can be designed or retrofitted to be more resilient to flooding, although not all tenants may be able to afford such retrofits. Residents in 100-year floodplains should have flood insurance, which would assist with recovery costs. The ability of these strategies to provide sufficient protection for homes already in a floodplain may be limited.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V4	Commercial structures		Commercial structures are at risk of flooding, particularly those located within flood zones. There are currently 6,240 acres of commercial land in the 100-year floodplain in the WRCOG subregion (FEMA 2014).	IM3	Outside of a flood zone, basic protective actions such as sandbags can reduce the damage caused by flooding. Within flood zones, retrofits and design features can make the building more resilient, although their effectiveness could be limited, and such measures may be expensive.	AC1
V3	Energy transmission/ delivery infrastructure		Transmission and delivery lines are often damaged by flooding, including by toppled trees and utility poles; substations are less commonly damaged. Redundancies in the transmission and distribution network should be able to meet some of the demand in the community, but it is unlikely that the region will be able to avoid power outages entirely in the event of a significant flood.	IM3	Some strengthening of utility poles may be possible to make them more resilient to floods and flood-related debris, but the infrastructure likely cannot be hardened too much. WRCOG communities have no operational control over the energy transmission/delivery network at this time.	AC2
V3	Industrial structures		Industrial structures, particularly those within flood zones, could face flooding risks. Currently, there are 449 acres of industrial land in the WRCOG subregion within the 100-year floodplain (FEMA 2014).	IM3	Outside of a flood zone, basic protective actions such as sandbags can reduce the damage caused by flooding. Within flood zones, retrofits and design features can make the building more resilient, although their effectiveness could be limited, and such measures may be expensive.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Residential structures near high fire risk areas		Wildfires clear vegetation, which can normally slow down and detain water. Without these natural controls, the impacts of flooding can be more severe in recently burned areas, increasing the risk of flooding to houses in high fire risk areas. The lack of vegetation in recently burned areas can also increase the risk of landslides during heavy precipitation events.	IM3	Some features can help to make homes more resilient to flooding and landslides, including installing ground cover to help hold soil together and reduce water flow, and being careful with irrigation to avoid oversaturating land along slopes. Some efforts may be beyond the financial capabilities of many homeowners.	AC2
V3	Wastewater treatment plant and collection infrastructure		Due to limited information about the location of wastewater treatment plants, it is unknown whether any are located in floodplains. Major floods have damaged wastewater treatment plants before, including a storm in March of 1995 that affected five treatment plants in Monterey County. Flood damage to wastewater treatment plants can result in the release of sewage, potentially contaminating water supplies and posing health risks. Septic systems are used in more rural parts of the WRCOG subregion. Such systems are susceptible to floods, potentially causing damage to the system and homes, and creating a source of water pollution.	IM3	Some hardening of wastewater treatment facilities to reduce the risk of inundation by floodwaters can help, but ultimately treatment facilities have little option but to have large, uncovered pools, which makes them potentially vulnerable to flooding. Individuals can reduce contamination from septic tanks by minimizing the use of the system, although this is a limited and often unfeasible approach.	AC2
Public Health						
V3	Emergency response		Major flood events could strain existing emergency response capacity and emergency surge capacity. One fire station is currently located within a 100-year flood zone. The increase in emergency calls could increase response times and subsequently reduce survival chances for some types of morbidity.	IM3	Emergency operations planning could identify opportunities to increase response and surge capacity during major flood events.	AC2

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Health care facilities (e.g., hospital, clinics, mental health)		San Gorgonio Pass Memorial Hospital is located within the 100-year floodplain (FEMA 2014; WRCOG 2014b), although other health care clinics and long-term care facilities could be located in the floodplain in the future. While flooding does not pose a direct risk to the physical buildings, the disruptions to the transportation network caused by flooding may constrict the ability of health care facilities to provide service.	IM3	Buildings can be hardened, using sandbags or more permanent features, to minimize flood damage. New and existing buildings could be climate-proofed by raising ground floors in flood-prone areas, moving high tech surgeries or other operating rooms to a second floor, and locating backup power systems on higher floors.	AC2
V3	Health care service delivery		Major flooding could result in excess mortality and morbidity, increasing demand for health care services. This could place increased demand on existing health care service delivery, increasing facility/bed utilization, and adding to staffing needs and the demand for limited equipment. The impact of flooding on mental health services could be particularly acute. Health care facilities that contract services (e.g., food, laundry) may have interrupted service.	IM3	Emergency preparedness, surge capacity, and other emergency operations plans could be in place to deal with increased patient demands due to flooding. Plans for surge capacity (conventional and contingency) for triage, treatment, and tracking of patients during floods could limit impacts to health care service provision.	AC2
Transportation						
V4	Arizona crossings		Approximately 15 Arizona crossings (also known as fords) are located in 100-year flood zones (FEMA 2014; WRCOG 2014b). Because more frequent and intense 100-year floods are anticipated, this could extend periods where such crossings are flooded and impassible, and may damage roads. Certain residential communities can only be accessed by roads with Arizona crossings.	IM3	Where possible, alternative routes without Arizona crossings or crossing over separate stream systems should be identified and indicated to drivers.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V4	Bridges/bridge capacity		Flooding can damage roadways and drainage infrastructure, trigger mudslides, and remove sediment around abutments and piers, which may compromise bridge structure. Approximately six major bridges, including two across I-15, and dozens of smaller bridges are within 100-year flood zones (FEMA 2014; WRCOG 2014b). Most bridges are designed to span the floodplain, but many are also in disrepair.	IM3	The county has several major bridges that are structurally deficient and lack necessary funds for improvements (WRCOG 2014b). Rip-rap can be placed to protect bridge piers and abutments as a protective, lower-cost option using existing funding sources. For bridges that are found to be less able to withstand flooding conditions, adaptive capacity is low without major funding sources to conduct upgrades or reconstruction.	AC1
V4	Evacuation routes		I-15, I-215, Ramona Expressway, and State Routes 74 and 79 are evacuation routes that run through large areas of 100-year flood zones (FEMA 2014; WRCOG 2014b).	IM4	Riverside County Flood Control & Water Conservation District issues flood watches and warnings that can warn travelers and limit traffic on roadways with flooding or possible flooding. Alternative routes can be identified and publicized during major precipitation events for sections of routes identified as most prone to flooding and mudslides. Adaptive capacity to flood damage to roadways is limited without major funding sources or policy/regulatory changes.	AC2
V3	Airports		Flooding can close airports during the event, as well as damage runways and other infrastructure. Four airports are located in 100-year flood zones: Corona Municipal Airport, Perris Valley Airport, Hemet-Ryan Airport, and Skylark Airport (FEMA 2014; WRCOG 2014b).	IM2	Airports are stationary and have little elasticity in operations. Planes can be re-routed to alternative airports, but this may not be feasible in all instances.	AC1

Vulnerability Score	Sensitivity	Sensitivity Type	Impact Explanation	Impact Score	Adaptive Capacity Explanation	Adaptive Capacity Score
V3	Railway (commuter and freight)		Flooding of railways can lead to disruption of rail travel, rail and railway roadbed damage, and track or signal sensor malfunctions. Major rail lines cross through 100-year flood zones in approximately eight locations (FEMA 2014).	IM3	Train systems can limit routes and slow train speeds during high precipitation events. Adaptive capacity for preventing/dealing with damage to rail bridges is low without major funding.	AC2
V3	Roads and Highways		Flooding can close highways and damage roadways and drainage infrastructure. Highways that run through large areas of 100-year flood zones include I-15, I-215, Ramona Expressway, and State Routes 74 and 79 (FEMA 2014). In general, these highways have been designed to withstand most flood events without severe damage.	IM3	Riverside County Flood Control & Water Conservation District issues flood watches and warnings to help reduce traffic on roads that are at risk of flooding. Agencies can also identify alternative routes and direct travelers onto these roadways as needed. However, congestion is likely to occur, as a result. Improvements to the adaptive capacity to flood damage of roads and highways are limited without major funding sources or policy/regulatory changes.	AC2
V3	Road drainage systems/storm drainage		In general, county drainage systems are designed for much lower precipitation than may occur during extreme storm events.	IM3	Riverside County Flood Control & Water Conservation District issues flood watches and warnings that can warn travelers and limit traffic on roadways experiencing flooding resulting from overflowing drainage. Adaptive capacity to flood damage for drainage infrastructure is limited without major funding or policy/regulatory changes.	AC2

FROM VULNERABILITIES TO STRATEGIES

The matrices above list sensitivities with high vulnerability scores. Since vulnerability indicators are often interrelated and overlapping, WRCOG reviewed these highest scoring sensitivities and identified emerging themes. These themes are expressed as key issues in **Chapter 5**. WRCOG reviewed existing adaptation plans and state guidance to develop a list of best practices for each issue. The list was reviewed and edited to become the strategies provided in **Chapter 5**. Each strategy is intended to respond to a key issue and in some cases responds directly to sensitivities with high vulnerability scores.

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GLOSSARY OF TERMS

Adaptation – Adjustments in natural or human systems in response to actual or expected climate changes or their effects which minimize harm or take advantage of beneficial opportunities (California Natural Resources Agency 2009).

Adaptive Capacity – The ability of a system to respond to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, and to cope with the consequences (California Natural Resources Agency 2009).

Arizona Crossing – A type of road crossing, also known as a ford, that allows a small waterway to pass over the roadbed. Arizona crossings are common in desert environments, where waterways usually do not contain enough water to affect traffic.

Atmospheric River – A narrow region of the atmosphere with extremely moist air, often responsible for delivering large amounts of precipitation to the western United States. The "Pineapple Express" phenomenon that brings warm moisture from Hawaii to California is an example of an atmospheric river (National Oceanic and Atmospheric Administration, n.d.).

Climate – The long-term average of meteorological conditions (temperature, precipitation, wind, etc.) at a particular location or over a broader area (IPCC 2007).

Climate Change – Any long-term change in average climate conditions in a place or region, whether due to natural causes or as a result of human activity (California Natural Resources Agency 2009).

Climate Variability – Variations in the mean state of the climate and other statistics (such as standard deviations or the occurrence of extremes) on all temporal and spatial scales beyond that of individual weather events (California Natural Resources Agency 2009).

Conservation – The preservation of natural resources in their natural, scenic, agricultural, historical, forested, or open space condition (California Civil Code).

Cooling Center – A designated public facility, often air-conditioned, where people may go for relief during periods of extreme heat.

Energy Conservation – Saving energy by reducing or going without an energy-using service, such as turning off a light when leaving the room or unplugging an appliance that is not in use (Lawrence Berkeley National Laboratory 2014).

Energy Efficiency – Saving energy by using less energy to provide the same or better service, such as replacing a washing machine with a model that washes clothes as effectively as the previous device but requires less energy (Lawrence Berkeley National Laboratory 2014).

Evapotranspiration – The sum of water lost through evaporation off of surfaces, and water lost through the pores of a plant as part of its normal respiratory cycle (a process called transpiration) (US Geologic Survey 2014).

Exposure – The climate changes that a community will likely experience based on available data (Cal OES and CNRA 2012).

Heat wave – There is no single quantitative definition of a heat wave. The Cal-Adapt modeling system defines a heat wave as a period when the daily high temperature is hotter than 98 percent of the average daily highs between April and October from 1961 to 1990, for at least five consecutive days (CEC 2013).

Hydroperiod – The seasonal pattern of the water level in a particular environment (US Forest Service, n.d.)

Impact – An effect of climate change on the structure or function of a system (California Natural Resources Agency 2009).

Mitigation – In hazard mitigation planning, mitigation means "sustained action taken to reduce or eliminate the long-term risk to human life and property from natural, human-caused, and technological hazards and their effects. Note that this emphasis on long-term risk distinguishes mitigation from actions geared primarily to emergency preparedness and short-term recovery" (California Governor's Office of Emergency Services 2013).

Property Assessed Clean Energy – A program managed by a third party that would allowing building owners in participating communities to finance energy efficiency, renewable energy, and water efficiency projects through property tax assessments.

Renewable Energy – Energy sources that restore themselves over short periods of time and do not diminish. In California, this includes solar, wind, geothermal, biomass, and limited types of hydroelectric generation (California Public Resources Code, n.d.)

Resilience – The ability of a community, natural resource, or system to anticipate, absorb, accommodate, or recover from the effects of a potentially hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions (IPCC 2007).

Resource Conservation – Reducing the use of a resource (water, electricity, fuel, etc.) by reducing the use of services or devices that require the resource; in short, doing less with less (US Environmental Protection Agency 2014; Lawrence Berkeley National Laboratory 2014).

Resource Efficiency – Reducing the use of a resource (water, electricity, fuel, etc.) by using less of the resource to provide the same service; in short, doing the same or more with less (US Environmental Protection Agency 2014; Lawrence Berkeley National Laboratory 2014).

Risk – The possibility of interaction of physically defined hazards with the exposed systems. Risk is commonly considered to be the combination of the likelihood of an event and its consequences—i.e., risk equals the probability of climate change impact occurring multiplied by the consequences a given system may experience (California Natural Resources Agency 2009).

Sensitivity – A structure, function, or population that could be affected by climate change (Cal OES and CNRA 2012).

Snowpack – A seasonal accumulation of slow-melting snow. In California, the snowpack acts as a reservoir to provide water during drier months (IPCC 2007).

Sustainability – A process in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspiration; sustainability integrates the political, social, economic, and environmental (IPCC 2007). A more common and concise definition of sustainability is a system that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987).

System – A human population or ecosystem; or a group of natural resources, species, infrastructure, or other assets (California Natural Resources Agency 2009).

Urban Heat Island – A phenomenon in which developed areas are warmer than rural zones due to the prevalence of impermeable, dry, and heat-absorbing surfaces (such as asphalt and concrete) in urban areas (Akbari 2005).

Urban-Wildland Interface – The transition area between wild areas and the urban/developed zone (California Fire Science Consortium n.d.)

Vulnerability – A susceptibility to harm or change. More specifically, the degree to which a system is exposed to, susceptible to, and unable to cope with the adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, as well as of non-climatic characteristics of the system, including its adaptive capacity (California Natural Resources Agency 2009).

Water Conservation – Saving water by reducing the use of services that require water, such as replacing a lawn with plants that require little or no irrigation (US Environmental Protection Agency 2014).

Water Efficiency – Saving water by using less water to provide the same or better service, such as a faucet with a model that satisfies the same needs as the previous faucet but requires less water (US Environmental Protection Agency 2014).

Weather – The meteorological conditions (temperature, precipitation, wind, etc.) at a specific location and moment.

APPENDIX D

CAP MONITORING TOOL

Welcome to the WRCOG CAP Data Entry Tool!

Thank you for helping track your City's and the subregion's progress. This tool will ask a series of questions. Please scroll down until you are finished. Contact us with any questions or comments address@wrcog.cog.ca.us.

Background Information

Reporting year: 2014

City: Hemet

Your name: Employee Name

Your e-mail address: address@city.gov

1 E-1. Energy Action Plans

In addition to the WRCOG Subregional CAP, your City has an adopted Energy Action Plan. The following questions help us understand how your Energy Action Plan implementation is progressing.

1.1 Do you enforce the most current California Building Code, including Title 24 energy and water efficiency standards for residential development?

1.2 Do you enforce the most current California Building Code, including Title 24 energy and water efficiency standards for nonresidential development?

1.3 Do you work with developers and property owners to install solar energy panels on the roofs of new residential development as identified in your Energy Action Plan?

1.4 Do you work with developers and property owners to install solar energy panels on the roofs of new nonresidential development as identified in your Energy Action Plan?

1.5 Do you work with property owners, including landlords, to retrofit existing homes to improve energy efficiency and reduce energy use as specified in your Energy Action Plan?

1.6 Do you work with property owners and landlords, to retrofit existing nonresidential buildings to improve energy efficiency and reduce energy use as specified in your Energy Action Plan?

2 T-1. Bicycle Infrastructure Improvements

Since 2010, how many miles of bicycle lanes were constructed in Hemet?

Your Public Works Department (or equivalent department) should be able to provide this information. The answer should be the cumulative total of all Class I and II lanes constructed or designated since 2010.

3 T-2. Bicycle Parking

Since 2010, has your City amended its zoning code to require bike parking in certain projects?

For Banning, this applies to multi-family projects consisting of more than 50 dwelling units and mixed-use projects greater than 50,000 square feet. For Calimesa, Canyon Lake, Eastvale, Hemet, Jurupa Valley, Norco, Perris, Riverside, San Jacinto, Temecula, and Wildomar, this applies to all multi-family and mixed-use projects.

4 T-3. End of Trip Facilities

Does Hemet encourage or require end-of-trip commuter facilities in new development?

For Calimesa, Canyon Lake, Eastvale, Hemet, San Jacinto, Temecula, and Wildomar, the answer is "yes" if the City provides information to commercial project applicants describing the benefits of installing end-of-trip facilities. For Banning, Jurupa Valley, and Perris, the answer is "yes" if the City has amended the zoning code to require installation of end-of-trip facilities for new commercial buildings greater than 100,000 square feet. For Riverside, the answer is "yes" if the City has amended the zoning code to require installation of end-of-trip facilities for new commercial buildings greater than 50,000 square feet.

5 T-4. Promotional Transportation Demand Management

Since 2010, have you trained an existing or new staff person to promote transportation demand management strategies to existing businesses?

6 T-7. Traffic Signal Coordination

As of 2014, has Hemet increased the number of coordinated traffic signals?

7 T-8. Density

In 2014, what is the City's area in square miles?

The answer to this question should include the land area within the City's limits

8 T-10. Design/Site-Planning

Since 2010, has Hemet amended design and planning standards to increase density and reduce block length in new development?

9 T-11. Pedestrian-Only Areas

As of 2014, has Hemet designated a new pedestrian-only area?

For Banning, Hemet, Jurupa Valley, Norco, San Jacinto, and Temecula, the answer is "yes" if the City designated one additional pedestrian-only area during weekends tied to a special event since 2010. For Perris and Riverside, the answer is "yes" if the City designated one additional major activity center in the community as a permanent pedestrian-only area since 2010.

10 T-12. Limited Parking Requirements for New Development

As of 2014, has Hemet amended its zoning to reduce parking requirements?

For Canyon Lake, Hemet, Norco, Temecula, and Wildomar, the answer is "yes" if the City amended zoning to reduce parking requirements for new non-residential development by 5% since 2010. For Jurupa Valley and Perris, the answer is "yes" if the City amended zoning to reduce parking requirements for new non-residential development by 10% since 2010. For Riverside, the answer is "yes" if the City amended zoning to reduce parking requirements for new non-residential development by 25% since 2010.

11 T-13 High Frequency Transit Services

Does Hemet have high frequency transit service routes?

An example of a high frequency transit service route is bus rapid transit. For Hemet, the answer is "yes" if the City has worked with RTA to offer high frequency transit service within one corridor. For Eastvale and Riverside, the answer is "yes" if the City has worked with RTA to offer high frequency transit service within two corridors.

13 T-17. Neighborhood Electric Vehicle Programs

Does Hemet have a neighborhood electric vehicle program?

For Hemet, the answer is "yes" if the City has adopted an educational program related to the use of NEVs. For Riverside, the answer is "yes" if the City has adopted a comprehensive NEV program including signage for NEVs and an educational program related to the use of NEVs.

14 SW-1. Yard Waste Collection

Does Hemet provide residential green waste bins for collection and transport to an organic waste processing facility?

:) Congratulations, you are done!

Thank you for your help. Please save your file as 2014_Hemet_CAP_Data.xls and e-mail to address@wrcog.cog.ca.us

Banning	Yes	5%	2015
Calimesa	No	10%	2016
Canyon Lake		15%	2017
Eastvale		20%	2018
Hemet		25%	2019
Jurupa Valley		30%	2020

Norco	35%
Perris	40%
Riverside	45%
San Jacinto	50%
Temecula	55%
Wildomar	60%
	65%
	70%
	75%
	80%
	85%
	90%
	95%
	100%