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Climate Action 2020 and Beyond

Sonoma County
Regional Climate Action Plan

Climate Action 2020 and Beyond

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More information: rcpa.ca.gov/climate-action-2020

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Climate Action 2020 and Beyond

Climate Action 2020 and Beyond (CA2020) is a collaborative effort among all nine cities and the County of Sonoma to reduce greenhouse gas (GHG) emissions and respond to the impacts of climate change. This effort would not be possible without countless contributions from members of our Sonoma County community – thank you all!

This Plan was prepared by:

The Sonoma County Regional Climate Protection Authority (RCPA)

On behalf of:

County of Sonoma
City of Cloverdale
City of Cotati
City of Healdsburg
City of Petaluma

City of Rohnert Park
City of Santa Rosa
City of Sebastopol
City of Sonoma
Town of Windsor

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The RCPA Board has representatives from all ten local jurisdictions in Sonoma County. The following elected officials oversaw the development of this plan from 2012-2016:

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Staff Working Group

The Plan was developed by a group of local government staff from the RCPA, SCTA, and each of the ten local jurisdictions. This Staff Working Group was responsible for project management, data collection, policy research, community outreach, reviewing and editing draft plan language, and seeking and responding to direction from the RCPA Board, City/Town Councils, and the Board of Supervisors.

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Preface

How to Use This Plan

Given the wide audience and diverse interests in the community, Climate Action 2020 and Beyond (CA2020) is designed to be accessible and useful to a wide range of users. Readers will quickly notice that actions in CA2020 to reduce greenhouse gas (GHG) emissions and adapt to a changing climate are complex and touch on many aspects of everyday life in Sonoma County. Although most actions will be the responsibility of local governments and countywide agencies, Sonoma County's residents, businesses, and community groups must remain engaged in order to achieve the goal of reducing community-wide GHG emissions. This engagement may be action-oriented and contribute directly to accomplishing the actions envisioned in CA2020, or may be focused on ensuring that local representatives are accountable for specific commitments under CA2020.

A Readers' Guide

CA2020 is designed to allow users to dig in to a depth that best suits their interests and needs. References and technical appendices are provided for those who need the most detailed information. CA2020's overall structure provides users an opportunity to directly access the information that they need.

- Chapter 1 provides the overall context for CA2020, including the basics of climate change science and the essential Call to Action that is needed for community-wide action. Chapter 1 also describes the unique regional (countywide) approach that Sonoma County will use to reduce GHG emissions as well as an overview of plan implementation. Chapter 1 is the best place to start for most readers and provides important context for the rest of CA2020.
- Chapter 2 provides an inventory of GHG emissions in Sonoma County by sector (e.g., energy, land use and transportation) and by each city and the County. The inventory is not only the key benchmark for future GHG reductions, but it helps focus attention on the greatest opportunities for emission reductions.
- Chapter 3 lays out the overall strategy for reducing GHG emissions in each sector to meet CA2020's target of reducing emissions to 25% of 1990 levels by 2020 and provides the foundation for long-term success in reducing GHG emissions. These reduction measures are the basis for the specific actions identified in Chapter 5.
- Chapter 4 describes how CA2020 will be implemented, including coordination by the Regional Climate Protection Authority and a management and monitoring structure at each partner agency. Chapter 4 also includes a schedule for implementing the GHG reduction measures and describes ongoing monitoring, adaptive management, and community involvement.

- Chapter 5 contains the near-term action plans for each city and the unincorporated County. These are the specific GHG reduction measures that will be adopted and implemented by each community. This chapter also contains a GHG profile for each community and population, housing, and employment projections throughout the CA2020 planning period (i.e., to 2050).
- Chapter 6 describes Sonoma County’s “climate readiness,” highlighting each community’s vulnerability to the hazards of climate change (e.g., warmer temperatures, increased flooding risk, increased wildfire risk). Chapter 6 also describes goals to improve the resilience of Sonoma County communities to climate-related hazards.

A Community-Wide Plan

As a community-wide plan, CA2020 will have many different audiences, each with their own interests and needs. This section is intended to focus specific audiences on the aspects of CA2020 that will be of greatest interest and usefulness.

Local Governments

Cities and the County will want to be familiar with the overall CA2020 implementation structure described in Chapter 4. In addition, city and County decision makers and staff will also be interested in the sections in Chapter 5 that pertain to their respective jurisdictions. These sections provide detail on specific GHG reduction measures that each jurisdiction has identified for local implementation.

Regional Agencies

Regional (countywide) agencies (the Regional Climate Protection Authority, Sonoma County Transit, Sonoma Clean Power, etc.) have a critical role in reaching the 2020 GHG reduction target by providing countywide services and programs that would be difficult for local governments to provide on their own. Each agency will want to understand its responsibilities under CA2020, which are summarized in Chapter 3 and Appendix C. Agencies will also want to be familiar with the implementation framework in Chapter 4.

Community Groups

The interests of Sonoma County community organizations are extremely varied. Many groups will get the information they need from Chapter 1 and the list of GHG reduction measures in Chapter 3 and Appendix C. Groups with a specific focus will want to review the GHG reduction strategy for their sector of interest. For example, a community organization with a focus on renewable energy will want to carefully review the GHG reduction strategy for the Building Energy sector in Chapter 3 and the energy-related measures in Appendix C.

Residents and Businesses

The interests of individual Sonoma County residents and businesses are almost infinitely varied. As with community groups, many people will find more than enough information about CA2020 in Chapter 1 and can use that as a jumping-off place for more in-depth review of CA2020. Chapter 1 also describes the outreach and engagement associated with CA2020. Individuals interested in climate change actions of a specific city or the County will want to read that jurisdiction's section in Chapter 5. Those with a more countywide interest may want to focus on the bigger-picture GHG reduction strategies in Chapter 3. Lastly, all residents and businesses are encouraged to read the "How Can Sonoma County Residents Help?" section in Chapter 1 and the climate change adaptation goals in Chapter 6.

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List of Acronyms and Abbreviations

°F	degrees Fahrenheit
AB	Assembly Bill
ARB	California Air Resources Board
B2B Project	City of Petaluma’s Biomass-to-Biofuel Project
BAAQMD	Bay Area Air Quality Management District
BAU	business-as-usual
BCM	Basin Characterization Model
C&D	construction and demolition
CA2020	Climate Action 2020
CAP	Climate Action Plan
CCA	Community Choice Aggregation
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH ₄	methane
CNG	compressed natural gas
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
CPUC	California Public Utilities Commission
CWD	climatic water deficit
E3	Energy + Environmental Economics
ESD	Energy and Sustainability Division
EV	electric vehicle
FOG	fats, oils and grease
GBO	Green Building Ordinance
GGE	gallons gas equivalent
GHG	greenhouse gas
GWP	Global Warming Potential
HSW	high strength waste

IPCC	International Panel on Climate Change
kWh	kilowatt hours
LCFS	Low-Carbon Fuel Standard
LED	light-emitting diode
MMTCO _{2e}	million metric tons of carbon dioxide equivalent
MT	metric ton
MTC	Metropolitan Transportation Commission
MTCO _{2e}	metric tons of carbon dioxide equivalent
MUP	Multi-Use Path
N ₂ O	nitrous oxide
NBCAI	North Bay Climate Adaptation Initiative
NQ	not quantified
NSCAPCD	Northern Sonoma County Air Pollution Control District
PACE	Property Assessed Clean Energy
PAYS	Pay As You Save
PG&E	Pacific Gas & Electric Company
PPA	power purchase agreement
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
PV	photovoltaic
PWRPA	Power and Water Resources Pooling Authority
RCPA	Regional Climate Protection Authority
RMDZ	Recycling Market Development Zone Program
RPS	Renewable Portfolio Standard
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
SCEIP	Sonoma County Energy Independence Program
SCEW	Sonoma County Energy Watch
SCP	Sonoma Clean Power

SCT	Sonoma County Transit
SCTA	Sonoma County Transportation Authority
SCWA	Sonoma County Water Agency
SCWMA	Sonoma County Waste Management Agency
SMART	Sonoma-Marín Area Rail Transit
SR	State Route
SSURGO	Soil Survey Geographic
SWG	Staff Working Group
TDM	Transportation Demand Management
TOD	transit-oriented development
TRO	trip reduction ordinance
UC	University of California
UGB	Urban Growth Boundary
VMT	vehicle miles traveled
WWTP	wastewater treatment plant

Glossary of Terms

Assembly Bill (AB) 32. Assembly Bill 32 is commonly known as the California Global Warming Solutions Act of 2006. The bill requires the California Air Resources Board to develop and enforce regulations for the reporting and verification of statewide greenhouse gas emissions and develop and implement measures to reduce greenhouse gas (GHG) measures. The heart of the bill is the requirement that statewide greenhouse gas emissions must be reduced to 1990 levels by the year 2020, or about 15% from today's levels.

Assembly Bill 32 Scoping Plan (AB 32 Scoping Plan). The AB 32 Scoping Plan outlines a range of greenhouse gas reduction actions for achieving the statewide emissions limit set forth by Assembly Bill 32. These strategies include direct regulations, compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. The Scoping Plan presently includes measures to meet the 2020 target in AB 32. The most recent update (in 2013) described potential measures to reduce GHG emissions out to 2020. Executive Order S-15-30 requires ARB to update the Scoping Plan to meet the 40% below 1990 level by 2030.

Association of Bay Area Governments (ABAG). ABAG was created by local governments to meet their planning and research needs related to land use, environmental and water resource protection, disaster resilience, energy efficiency, and hazardous waste mitigation and to provide risk management, financial services, and staff training to local counties, cities, and towns.

Bay Area Air Quality Management District (BAAQMD). The Bay Area Air Quality Management District is the local agency responsible for managing and regulating air quality in the San Francisco Bay Area. It is made up of nine counties in California: San Mateo, San Francisco, Santa Clara, Alameda, Contra Costa, Marin, Napa, and portions of Solano and Sonoma. The District establishes emissions limits and provides guidance for evaluating air quality and climate change impacts of new development projects.

Bay Area Regional Energy Network (BAYREN). BayREN is a collaboration of the 9 counties that make up the San Francisco Bay Area. Led by ABAG, BayREN implements effective energy-saving programs on a regional level and draws on the expertise, experience, and proven track record of Bay Area local governments to develop and administer successful climate, resource, and sustainability programs. BayREN is funded by California utility ratepayers under the auspices of the California Public Utilities Commission. One of only two Regional Energy Networks in the state, BayREN represents 20% of the state's population.

Business-As-Usual (BAU). Business-as-usual represents a future scenario that does not consider the possible reduction of greenhouse emissions that may result from any legislation or regulation that would go into effect after the baseline year. The business-as-usual projections are estimates of future emissions based on current energy and carbon intensity in the existing economy without

considerations of any federal, state, or local reduction measures designed to reduce greenhouse gas emissions.

California Department of Transportation (Caltrans). Caltrans manages more than 50,000 miles of California’s highway and freeway lanes, provides inter-city rail services, permits more than 400 public-use airports and special-use hospital heliports, and works with local agencies. Caltrans carries out its mission of providing a safe, sustainable, integrated, and efficient transportation system to enhance California’s economy and livability, with six primary programs: Aeronautics, Highway Transportation, Mass Transportation, Transportation Planning, Administration, and the Equipment Service Center.

California Environmental Quality Act (CEQA). The California Environmental Quality Act is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.

CEQA Document. Document required by the California Environmental Quality for all projects involving state or local agencies. The document discloses potential impacts that a proposed project may have on the natural and human environmental. Some projects are categorically or statutorily exempt. There are two classes of environmental documents: negative declarations, and environment impact reports.

California Air Resources Board (ARB). The California Air Resources Board is a part of the California Environmental Protection Agency. Its mission is to promote and protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants, while recognizing and considering the effects on the economy of the state.

California Energy Commission (CEC). The California Energy Commission is the state’s primary energy policy and planning agency. Established by the Legislature in 1974 and located in Sacramento, seven core responsibilities guide the Energy Commission as it sets California energy policy:

1. Forecasting future energy needs;
2. Promoting energy efficiency and conservation by setting the state’s appliance and building energy efficiency standards;
3. Supporting energy research that advances energy science and technology through research, development and demonstration projects;
4. Developing renewable energy resources;
5. Advancing alternative and renewable transportation fuels and technologies;
6. Certifying thermal power plants 50 megawatts and larger; and
7. Planning for and directing state response to energy emergencies.

California Public Utilities Commission (CPUC). CPUC regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. CPUC serves the public interest by protecting consumers and ensuring the provision of safe, reliable utility service and infrastructure at reasonable rates, with a commitment to environmental enhancement and a healthy California economy. CPUC regulates utility services, stimulates innovation, and promotes competitive markets, where possible.

Carbon Dioxide Equivalent (CO₂e). A measure for quantifying the potential impact a greenhouse gas may have on global warming using the functionally equivalent amount or concentration of carbon dioxide as a reference.

Carbon Sequestration. Carbon sequestration is the process of increasing the carbon content of a reservoir other than the atmosphere.

Center for Climate Protection (CPC). Formerly known as the Climate Protection Campaign, the Center for Climate Protection's mission is to inspire, align, and mobilize action in response to the climate crisis. The Center for Climate Protection works with business, government, youth and the broader community to advance practical, science-based solutions for significant greenhouse gas emission reductions.

Community Choice Aggregation (CCA). CCA is a policy that enables local governments to aggregate electricity demand within their jurisdictions in order to procure alternative energy supplies while maintaining the existing electricity provider for transmission and distribution services.

Community Climate Action Plan (CAP). A community Climate Action Plan quantifies greenhouse emissions within a jurisdiction and outlines strategies for mitigating and avoiding future emissions under the influence of the local jurisdiction. In order for a CAP to qualify for tiering under State CEQA Guidelines Section 15185, it must be adopted through a public process and include a monitoring and reporting protocol.

Community Inventory. The community inventory includes greenhouse gas emissions occurring in association with the land uses within a jurisdictional boundary, and generally consists of sources of emissions that a community can influence or control. The inventory includes emissions that occur inside and outside the jurisdictional boundary, but only to the extent that such emissions are due to land uses within the jurisdiction.

County of Sonoma Energy and Sustainability Division (ESD). ESD is responsible for the planning, evaluating and administering the countywide Energy Management and Sustainability Program. Services include long- and short-range energy and green procurement strategies, effective and efficient energy use and sustainability practices, and County employee commute reduction planning.

County of Sonoma Permit & Resource Management Department (PRMD). PRMD's mission is to serve the people of Sonoma County by providing a customer-focused process for the orderly development of real property, balanced with resource stewardship under the general policy

direction of the Board of Supervisors, and to develop and maintain standards that protect the health and safety of the public.

County of Sonoma Agricultural Preservation & Open Space District. County department that uses a sales tax for the purchase of conservation easements to protect agricultural lands and preserve open space.

Cost Effectiveness Analysis. The cost effectiveness analysis examines the costs and savings of implementing individual greenhouse gas reduction measures. The analysis can assist jurisdictions in evaluating the financial requirements of a climate action plan. The analysis can also outline co-benefits and uncover additional consequences of implementing a particular reduction measure.

Global Warming. Global warming is a phenomenon created by rising atmospheric concentrations of GHGs in excess of natural levels. The additional GHG concentrations exacerbate the natural greenhouse gas effect (see below), resulting in increasing global surface temperatures.

Global Warming Potential (GWP). The Global Warming Potential, or GWP, is used to compare GHGs based on their potential to trap heat and remain in the atmosphere. Some gases can absorb more heat than others and thus have a greater impact on global warming. For example, CO₂ is considered to have a GWP of 1, whereas N₂O has a GWP of 265. This means that N₂O is 265 times more powerful than CO₂.

Emissions Type. Greenhouse gas emissions can be defined as either direct (emissions that occur at the end use location, such as natural gas combustion for building heating) or indirect (emissions that result from consumption at the end use location but occur at another location, such as emissions that occur at the power plant itself but result from residential electricity use of in-home appliances or other uses). The climate action plan addresses both types of emissions.

Greenhouse Gas (GHG). Greenhouse gases trap longwave infrared radiation emitted from the earth's surface, which would otherwise escape to space. This fundamental process causes the greenhouse gas effect. The primary greenhouse gases include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), halogenated chlorofluorocarbons (HCFCs), ozone (O₃), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs).

Greenhouse Gas Effect. The greenhouse gas effect keeps the atmosphere near the Earth's surface warm enough for the successful habitation of humans and other life forms. It is created by sunlight that passes through the atmosphere, some of which is absorbed by the Earth and converted to heat, which warms the surface.

Greenhouse Gas Emissions Inventory. A greenhouse gas inventory is a quantification of greenhouse gas emissions and sinks within a selected physical and/or economic boundary over a specified time. Greenhouse gas inventories can be performed on a large scale (i.e., for global and national entities) or on a small scale (i.e., for a particular building or person).

Greenhouse Gas Emissions Reduction Goal. The greenhouse gas emissions reduction goal identifies a target for reducing greenhouse gas emissions by a particular date. For example, the California statewide emissions reduction goal is 1990 emissions levels by 2020.

High Global Warming Potential (GWP) GHGs. High global warming potential GHGs are primarily composed of three types of gases: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). These compounds are the most potent greenhouse gases and typically have extremely long atmospheric lifetimes, resulting in irreversible accumulation in the atmosphere once emitted.

Intergovernmental Panel on Climate Change (IPCC). The Intergovernmental Panel on Climate Change is the leading international body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO). Its primary function is to review and assess the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. The Intergovernmental Panel on Climate Change does not conduct any research nor does it monitor climate related data or parameters.

Metropolitan Transportation Commission (MTC). Created by the state Legislature in 1970, MTC is the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area. Over the years, the agency's scope has grown, and it is now three agencies in one, functioning as MTC as well as the Bay Area Toll Authority (BATA) and the Service Authority for Freeways and Expressways (SAFE).

National Resources Conservation Service (NRCS). NRCS helps America's farmers, ranchers, and forest landowners conserve the nation's soil, water, air, and other natural resources. All programs are voluntary and offer science-based solutions that benefit both the landowner and the environment.

North Bay Climate Adaptation Initiative (NBCAI). NBCAI is a coalition of natural resource managers, policy makers, and scientists committed to working together to create positive solutions to the problem of climate adaptation for the ecosystems and watersheds of Sonoma County. NBCAI implements effective climate adaptation strategies that sustain ecological and human communities of North San Francisco Bay watersheds. NBCAI's vision is that the San Francisco North Bay has resilient, biologically diverse natural systems that provide lasting ecosystem functions and services.

Northern Sonoma County Air Pollution Control District (NSCAPCD). The Northern Sonoma Air Pollution Control District is the local agency responsible for managing and regulating air quality in the northern and western parts of Sonoma County. The NSCAPCD establishes emissions limits and provides guidance for evaluating air quality and climate change impacts of new development projects.

Property Assessed Clean Energy (PACE). The PACE finance program is intended to finance energy and water improvements within a home or business through a land-secured financing, and funds are repaid through property assessments. Municipalities are authorized to designate areas

where property owners can enter into contractual assessments to receive long-term, low-interest financing for energy and water efficiency improvements and renewable energy installation on their property.

Pacific Gas & Electric Company (PG&E). PG&E is a utility providing electricity and natural gas service to Sonoma County. The company delivers natural gas and electric service to approximately 16 million people throughout a 70,000-square-mile service area in northern and central California.

Regional. This plan uses the term regional to refer to the county-wide approach that Sonoma County will use to reduce greenhouse gas emissions, except where noted. Regional entities are cross-jurisdictional agencies that can provide some services and resources on behalf of communities in the county, more efficiently than individual communities can on their own. Regional entities and programs may be operating through the county, but may not cover each jurisdiction. This plan highlights the approach that, by working together through regional initiatives, goals, and targets, Sonoma County's communities can achieve greater GHG reductions, and do it more efficiently than if each city and County acted on their own.

Regional Climate Protection Authority (RCPA). The Regional Climate Protection Authority was created in 2009 to improve coordination on climate change issues and establish a clearinghouse for efforts to reduce greenhouse gas emissions. The agency is made up of the same Board of Directors as the Sonoma County Transportation Agency and includes representatives from each of the nine cities in Sonoma County and the Board of Supervisors.

Regional Targets Advisory Committee (RTAC) “accounting rules”. The Regional Targets Advisory Committee was established to provide recommendations on factors to be considered and methodologies to be used in the target setting process, as required under Senate Bill 375. One of the “accounting rules” refer to a method for accounting the three following types of vehicle trips: 1) trips that originated and terminated within a jurisdiction; 2) trips that either originated or terminated (but not both) within a jurisdiction; and 3) trips that neither originated nor terminated within a jurisdiction. The “accounting rules” specify that trips of type 1, 2, and 3 should be weighted by 1, 0.5, and 0 respectively when developing estimates of jurisdiction-generated vehicle miles traveled.

Sonoma Resource Conservation District (Sonoma RCD). The Sonoma RCD is a grassroots conservation delivery system that identifies local conservation problems and guides solutions on a voluntary basis. The Sonoma RCD covers 919,000 acres, or over 85% of Sonoma County, and includes the Russian River, Petaluma River, Sonoma Creek, Stemple Creek, and Gualala River Watersheds.

Sonoma Clean Power (SCP). SCP is official electricity provider in Sonoma County, providing cleaner power at a competitive price from sources like solar, wind, geothermal and hydropower. SCP is a community choice aggregation non-for-profit agency, independently run by Sonoma County and the participating cities of Cloverdale, Cotati, Petaluma, Rohnert Park, Santa Rosa, Sebastopol, Sonoma, unincorporated Sonoma County and the Town of Windsor. SCP will be the

lead for seeking to increase the renewable portfolio for electricity generated to serve the county. As SCP gathers momentum and capacity, the members will fund local energy efficiency programs as well as local renewables for CleanStart and EverGreen revenue.

Sonoma County Energy Independence Program (SCEIP). SCEIP is a County of Sonoma Energy and Sustainability Division program that serves county residents and businesses as a central clearinghouse of information about energy efficiency, water conservation, and renewable energy generation. The program is designed to assist property owners and tenants find the information, resources, rebates, contractors, and financing that fits their situation.

Sonoma County Energy Watch (SCEW). SCEW is a local government partnership between the County of Sonoma and PG&E designed to help save money and energy while reducing harmful impacts on the climate. SCEW provides energy efficiency services to local governments, nonprofit organizations, small businesses, and special districts in the County of Sonoma who are served by either PG&E or Sonoma Clean Power.

Sonoma County Transportation Authority (SCTA). The Sonoma County Transportation Authority serves as the coordinating and advocacy agency for transportation funding for Sonoma County. The SCTA prioritizes, coordinates, and maximizes funding available for transportation projects and provides comprehensive, county-wide planning.

Sonoma County Winegrowers (SCW). The Sonoma County Winegrape Commission, also known as Sonoma County Winegrowers (SCW), was established in 2006 as a marketing and educational organization dedicated to the promotion and preservation of Sonoma County as one of the world's premier grape growing regions. SCW has oversight by California Department of Food and Agriculture, which supports producer regions. With more than 1,800 growers, SCW's goal is to increase awareness and recognition of the quality and diversity of Sonoma County's grapes and wines through dynamic marketing and educational programs targeted to wine consumers around the world.

Sonoma County Water Agency (SCWA). The mission of the Sonoma County Water Agency is to effectively manage water resources for the benefit of people and the environment through resource and environmental stewardship, technical innovation, and responsible fiscal management. SCWA provides an array of services including, but not limited to, naturally filtered drinking water, flood protection services, distribution of recycled water, recreational opportunities, and wastewater treatment.

Sonoma County Waste Management Authority (SCWMA). The Sonoma County Waste Management Agency is a joint powers authority whose mission is to implement waste diversion programs as required by state law AB 939. SCWMA informs local residents and businesses of ways they can help reduce, reuse, and recycle their solid waste and properly dispose of hazardous materials.

Sustainable Communities Strategy (SCS). Under the Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375, Chapter 728, Statutes of 2008), ARB sets regional targets for GHG emissions reductions from passenger vehicle use. In 2010, ARB

established these targets for 2020 and 2035 for each region covered by one of the state's metropolitan planning organizations (MPO).

Each of California's MPOs must prepare a sustainable communities strategy as an integral part of its regional transportation plan (RTP). The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its GHG emission reduction targets. Once adopted by the MPO, the RTP/SCS guides the transportation policies and investments for the region.

Sonoma-Marin Area Rail Transit (SMART). Sonoma-Marin Area Rail Transit (SMART) is a passenger train and bicycle & pedestrian pathway project located in San Francisco's North Bay. SMART will provide rail service along 70 miles of the historic Northwestern Pacific Railroad alignment, connecting urban and rural residents of the two counties with jobs, education, and health care services in the region. The project revives the long-dormant but publicly owned railroad right-of-way, serving stations from Cloverdale in Sonoma County to the San Francisco-bound ferry terminal in Larkspur, Marin County.

Vehicle Miles Traveled (VMT). Total miles travelled on roads and highways by motor vehicles in a particular jurisdiction.

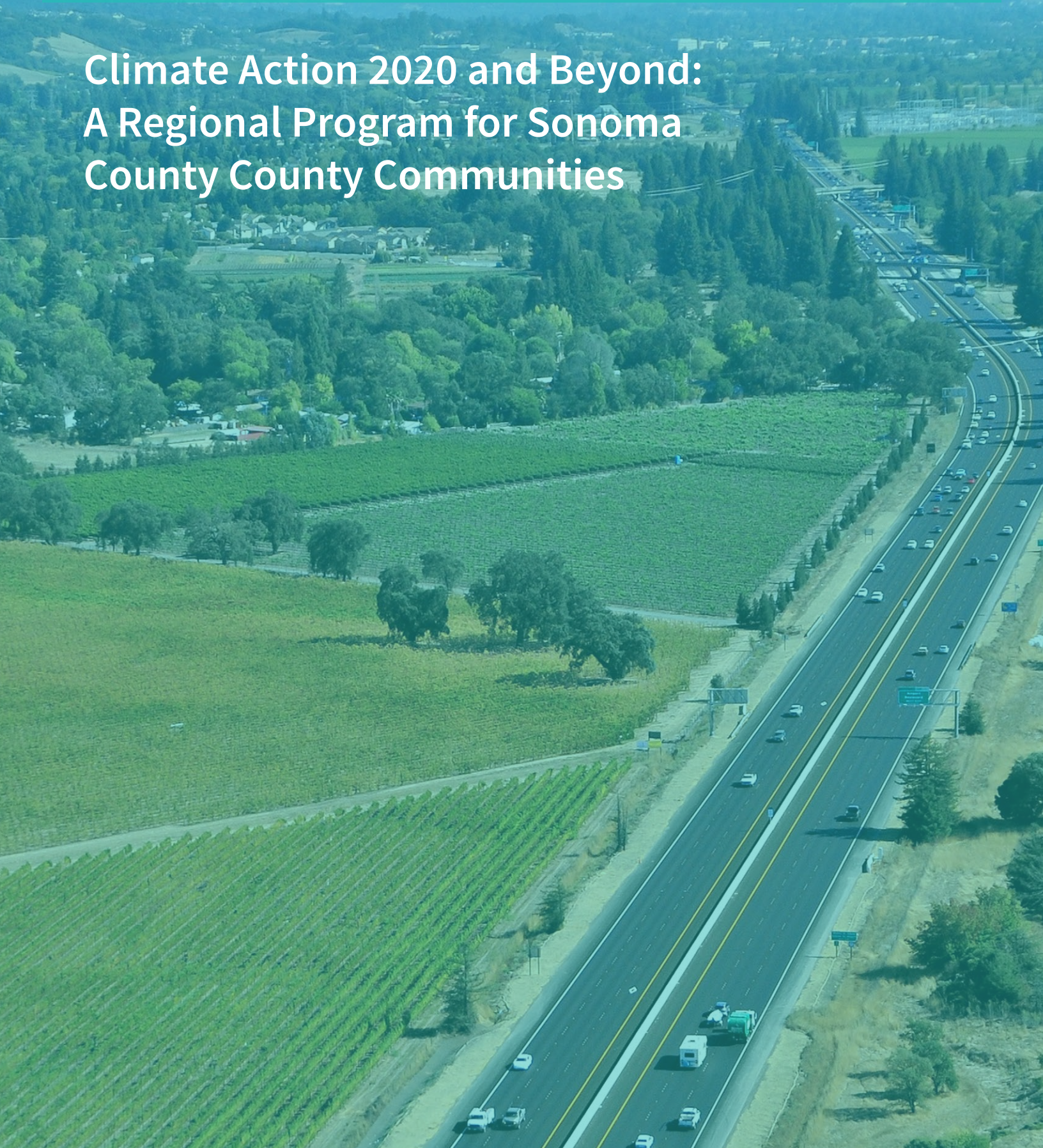
Waste-To-Energy (WTE). WTE is the process of generating energy in the form of electricity and/or heat from the primary treatment of waste. WTE is a form of energy recovery. Most WTE processes produce electricity and/or heat directly through combustion, or produce a combustible fuel commodity, such as methane, methanol, ethanol, or synthetic fuels.

U.S. Environmental Protection Agency (USEPA). The mission of the USEPA is to protect human health and the environment by developing and enforcing regulations. The USEPA also gives grants to state environmental programs, non-profits, educational institutions, and others; studies environmental issues; and provides education on the environment.

Zero Net Energy. A zero net energy (ZNE) building is a building with zero net energy consumption, meaning the total amount of energy used by the building on an annual basis is roughly equal to the amount of renewable energy created on the site. These buildings consequently do not increase the amount of greenhouse gases in the atmosphere.

Executive Summary

Climate Action 2020 and Beyond:
A Regional Program for Sonoma
County County Communities



Executive Summary

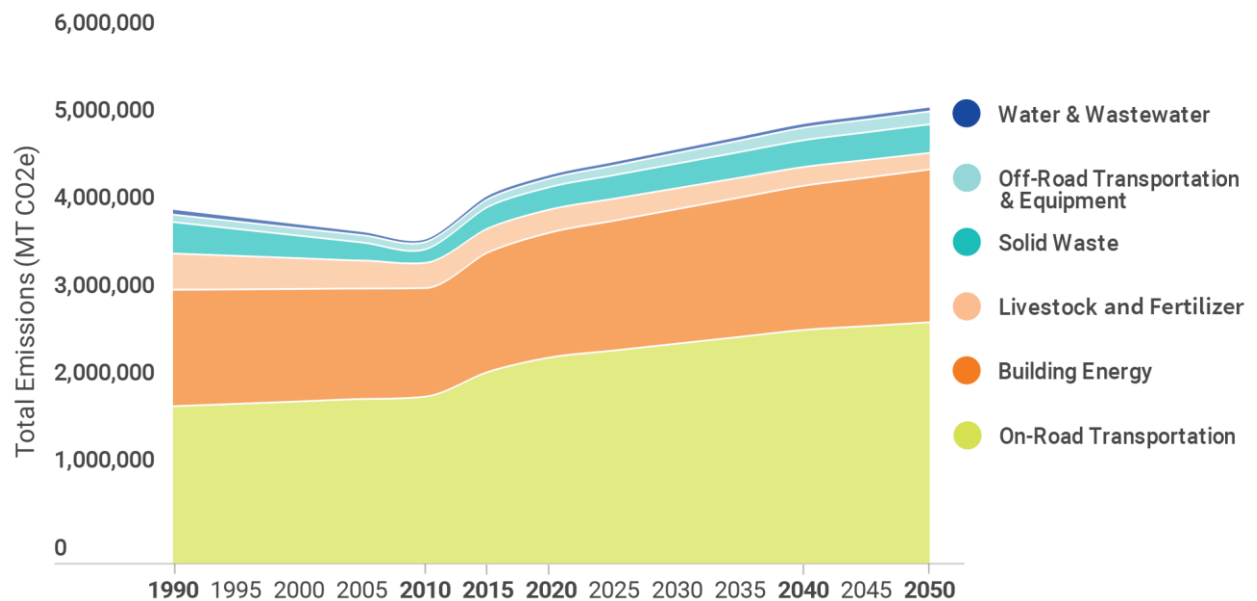
ES.1 Introduction

Human-induced climate change is a global challenge that demands action at every level, including local government. Sonoma County communities are established leaders in locally-based efforts to combat global climate change, and this Regional Climate Action Plan (CAP) takes another step forward as local governments and regional agencies commit to concrete actions that will further reduce countywide Greenhouse Gas (GHG) emissions and create a better future for Sonoma County.

ES.2 A Call to Action: Climate Change is a Serious Threat, But We Know What to Do

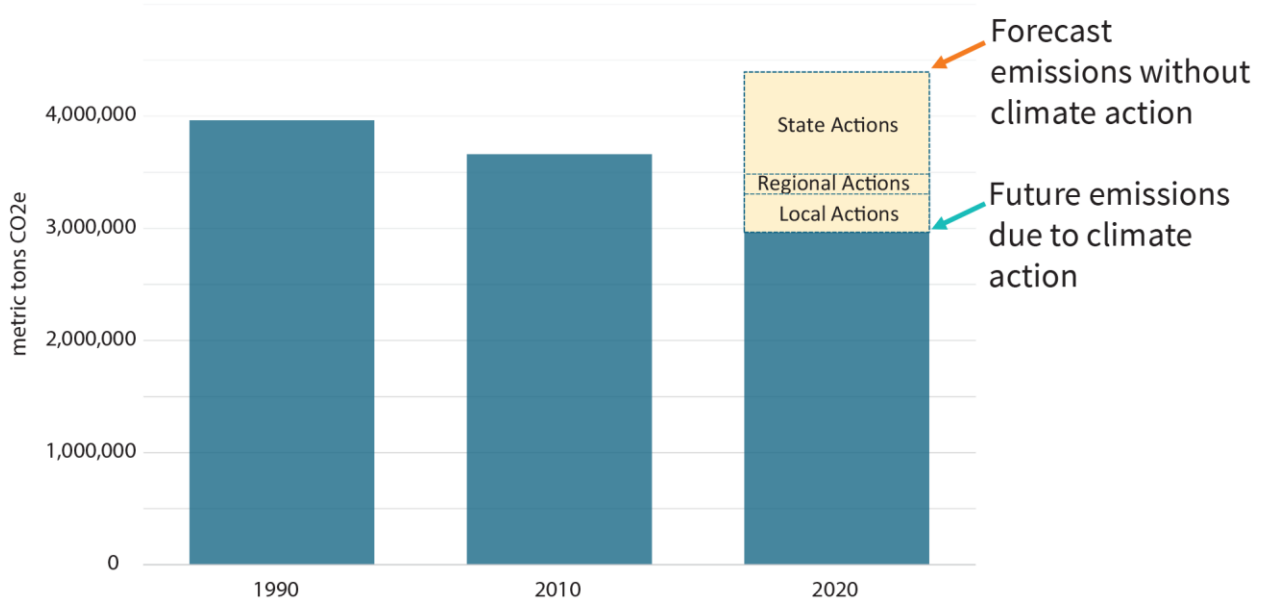
Given the magnitude of human-induced climate change and the projected catastrophic effects from continued global warming, reducing GHG emissions has become an environmental and societal imperative. This CAP is needed because, despite local and state leadership, GHG emissions in Sonoma County will continue to grow without additional action. The chart below shows how emissions from various GHG sources are forecast to increase if a “business-as-usual” approach is taken.

Figure ES-1. Countywide GHG Inventory and Forecast Results by Source and Year¹



¹ The 1990 emissions in this chart include Santa Rosa’s total 1990 emissions apportioned to each source using the 2010 inventory source distribution for the city (actual 1990 emissions by source are not available).







Climate Action 2020 begins a new phase of local climate action by focusing on near-term actions that will be implemented through 2020 to achieve a 25% reduction in countywide GHG emissions (compared to 1990 levels). The figure below shows 1990 emissions (known as a “backcast”), emissions from the 2010 inventory, and projected GHG increases if no action is taken (BAU), as well as the GHG reduction target under this CAP.



This CAP builds on earlier efforts to chart a future that will dramatically reduce countywide GHG emissions. These earlier efforts include the State of California’s adoption of AB 32 (2006), which requires statewide GHG emissions to be reduced to 1990 levels by 2020, and more recent executive orders that target even deeper GHG reductions in the future. Here in Sonoma County, community leaders and forward-thinking elected officials throughout Sonoma County worked together to adopt an ambitious GHG reduction target in 2005 and to create the nation’s first Regional Climate Protection Authority (RCPA), to coordinate countywide efforts to reduce GHG emissions. In 2008, a local non-profit, the Center Climate Protection (then called the Climate Protection Campaign) developed the *Sonoma County Community Climate Action Plan* to help inspire and guide local efforts.

In addition, the City of Santa Rosa adopted a Community Climate Action Plan in 2012 and a Municipal Climate Action Plan in 2013. These plans are referenced in this CAP, and their implementation will contribute substantially to regional GHG reductions. Although this CAP does not contain a chapter focused on Santa Rosa, data in the CAP include Santa Rosa to provide a county-wide picture and measure of future needed action.

Sonoma County’s regional GHG reduction target will be met by combining the new actions described in this CAP with ongoing efforts already underway to accomplish the following 20 goals, grouped together by GHG source:

Source	Key	Goals
Building Energy		<ol style="list-style-type: none"> 1. Increase building energy efficiency 2. Increase renewable energy use 3. Switch equipment from fossil fuel to electricity
Transportation & Land Use		<ol style="list-style-type: none"> 4. Reduce travel demand through focused growth 5. Encourage a shift toward low-carbon transportation options 6. Increase vehicle and equipment fuel efficiency 7. Encourage a shift toward low-carbon fuels in vehicles and equipment 8. Reduce idling
Solid Waste		<ol style="list-style-type: none"> 9. Increase solid waste diversion 10. Increase capture and use of methane from landfills
Water & Wastewater		<ol style="list-style-type: none"> 11. Reduce water consumption 12. Increase recycled water and greywater use 13. Increase water and wastewater infrastructure efficiency 14. Increase use of renewable energy in water and wastewater systems
Livestock & Fertilizer		<ol style="list-style-type: none"> 15. Reduce emissions from livestock operations 16. Reduce emissions from fertilizer use
Advanced Climate Initiatives		<ol style="list-style-type: none"> 17. Protect and enhance the value of open and working lands 18. Promote sustainable agriculture 19. Increase carbon sequestration 20. Reduce emissions from consumption of goods and services, including food

ES.3 A Regional Approach to Reducing GHG Emissions

If ever an issue called for coordinated, multi-partner effort, it is climate change; progress depends on Sonoma County communities working together. Although state programs will be essential to meeting Sonoma County’s GHG reduction goal, long-term regional collaboration will be needed to meet long-term goals. A regional GHG reduction goal—as opposed to individual goals for each jurisdiction—recognizes the shared nature of the challenge as well as the fact that Sonoma County communities each have a different capacity to achieve GHG reductions. This CAP identifies 14 GHG reduction measures for local agency implementation. Each city and the County selected the specific measures to include in their jurisdiction’s commitments.

This CAP also includes GHG reduction measures that will be implemented by regional entities that can provide some services and resources on behalf of *all* communities more efficiently than the individual jurisdictions can on their own, especially the smaller cities. Examples include the RCPA and Sonoma Clean Power, which provides affordable electricity with low carbon content.

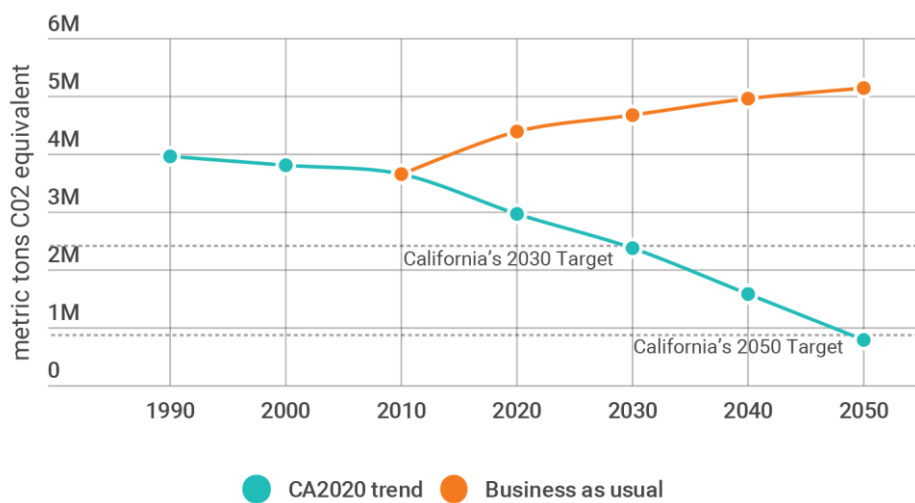
ES.4 Putting This Climate Action Plan to Work

Through this CAP, Sonoma County communities have set an ambitious target for GHG emissions reduction, one that will require decisive and timely action by the local partners. The RCPA will coordinate and facilitate implementation actions by the cities and the county, and regional agencies. Each city and the county will develop its own implementation team for the actions that will occur at the local government level.

Monitoring and Adaptive Management. To ensure that GHG reduction efforts are effective and to adapt to changing technologies, regulations, and community behavior, the CAP calls for ongoing monitoring and adaptive management. Two interim GHG emissions inventories will be completed before 2020 and the RCPA Board will conduct a mid-course review to identify changes or plan amendments that may be needed to stay on-target. Equally important, the results of the interim inventories and the mid-course review will be reported to the community.

This CAP is one part of a much longer term GHG reduction effort. Even with the ambitious GHG reduction goal in this CAP, further actions will be needed to meet longer-term goals. Thus, in adopting this CAP, the RCPA will also adopt goals to reduce GHG emissions by 40% (compared to 1990) by 2030, and by 80% by 2050, which will necessitate another phase of climate action planning after 2020. The good news is that the actions in this CAP will put the county on a solid trajectory for achieving the longer term goals.

Figure ES-2. Sonoma County Greenhouse Gas Emissions Pathways



ES.5 How Will This Plan Help Sonoma County Residents and Businesses?

Reducing GHG Emissions is Good Business. Reducing GHG emissions will save money for Sonoma County residents and business owners. Weatherizing or adding solar to existing homes, for example, creates construction jobs and cuts residents' utility bills. When businesses increase

energy efficiency or add on-site renewable energy generation, they reduce operating costs and employ electricians, engineers, builders and plumbers. Sonoma County businesses are already exporting the products and services they develop to respond to climate change. For example, Enphase Energy is a local business that designs and manufactures micro-inverters for solar photovoltaic systems. As the world moves to a low-carbon economy and invests in climate-ready communities, Sonoma County businesses will reap the rewards of their leadership.

Reducing GHG Emissions Supports Other Community Goals (Co-benefits). Implementing the CAP will result in environmental and community co-benefits that go beyond GHG emissions reductions. For example, many of the actions will improve public health by reducing air pollutants like ozone, carbon monoxide, and fine particulates. Reduction measures focused on reducing energy use in transportation and building energy can help lessen the impact of future energy cost increases.

Climate Action is Essential Risk Management. Even with strong action to reduce GHG emissions, climate-related changes to natural and human systems cannot be avoided entirely. Sonoma County is already experiencing some of these effects, including higher temperatures and more variable rainfall. In response, this CAP also establishes goals for improving climate resilience in three key community resource areas: people and social systems; built systems; and natural and working lands. Many of the strategies to reduce emissions will also help strengthen climate resilience too.

The measures in this CAP provide an opportunity to reduce carbon emissions and achieve a diverse range of community co-benefits, identified in the plan with these icons:



Energy Savings



Equity



Air Quality Improvements



Resource Conservation



Public Health Improvements



Cost Savings



Job Creation



Climate Resilience

ES.6 How Can Sonoma County Residents Help?

Learn about your household carbon footprint. The everyday activities of Sonoma County residents result in GHG emissions, including driving a vehicle, using fossil fuels to light and heat homes, and throwing away household garbage. This CAP focuses on actions that will be taken by cities and the County. Residents can help by supporting local adoption of these actions and participating in the programs that will result from this CAP (see below). In addition to municipal programs, residents can also learn about their household carbon footprint and ways to reduce GHG emissions through their own actions – such as driving an electric vehicle, installing solar or buying electricity from Sonoma Clean Power.

Participate in programs to reduce local emissions. The good news is that while human activities are a major climate change driver, we can also be part of the solution. Sonoma County residents can make impactful choices and changes in their daily lives such as changing lightbulbs to CFLs or LEDs, sealing and insulating their homes, replacing their lawn with drought tolerant plants, reusing and/or recycling materials that might otherwise be thrown away, and using water more efficiently. Residents can also choose to buy items made from local, renewable materials and make other low-carbon lifestyle choices, such as walking or biking, using public transportation, or eating less meat and more local vegetables. This CAP identifies some of the resources available to Sonoma County residents to help make these changes.

ES.7 Public Outreach and Community Engagement

This CAP was prepared with input from community members, elected officials, and staff from the partner agencies. Ten open house-style public workshops were held, including one in each city. These meetings solicited public input on the types of reduction measures that should be included in the CAP. The role of local governments in addressing climate change and reducing GHG emissions was also discussed. The community dialogue that has begun with preparation of this plan will continue throughout implementation of the GHG emissions reduction measures.

To help guide the CAP development process, the RCPA board of directors also selected a Stakeholder Advisory Group to represent a diversity of viewpoints and technical expertise from each jurisdiction. Three representatives from each city and two representatives from each county supervisorial district were selected; some representatives had input from city councils, though none were elected officials themselves. The Group met five times at key milestones during the project. All meetings were open to the public and each meeting included an opportunity for the public to provide comments.

1. Framework

The Framework for Sonoma County Climate Action



Chapter 1

The Framework for Sonoma County Climate Action

1.1 Introduction

Human-induced climate change is a global challenge that demands action at every level, including local government. Sonoma County communities are established leaders in locally based efforts to combat global climate change, and this Climate Action Plan takes another step forward as local governments and regional agencies commit to concrete actions that will further reduce countywide greenhouse gas (GHG) emissions and create a better future for Sonoma County. These local actions will combine with state and regional actions to reduce community GHG emissions to 25% below 1990 levels by 2020 and make substantial progress toward even greater reductions beyond 2020. These local actions will also advance many other community priorities such as economic resilience, public health, water efficiency, air quality, and overall quality of life.

1.2 A Call to Action

1.2.1 Climate Change Is a Serious Threat, But We Know What to Do

Sonoma County has long recognized the need for local action to help meet the global challenge of climate change. In 2008, the Climate Protection Campaign (now called the Center for Climate Protection) released the *Sonoma County Community Climate Action Plan* (also known as *Coolplan*), which outlined a package of solutions to meet a bold greenhouse gas (GHG) reduction target – 25% below 1990 levels by 2015. The plan was developed with the participation and support from local government, business, and community groups. Although *Coolplan* itself was not formally adopted, all nine cities and the County embraced the plan’s ambitious GHG reduction goal and local leaders took initial actions that have made real progress toward reducing countywide GHG emissions, including programs like Sonoma Clean Power (SCP) and the Sonoma County Energy Independence Program. *Climate Action 2020 (CA2020)* begins a new phase of local climate action by updating the countywide GHG reduction goal and focusing on near-term actions that will be implemented through 2020. These actions will substantially reduce emissions in the short term and put Sonoma County on a solid trajectory to achieve deeper GHG reductions that will be needed to meet the goal of reducing emissions 40% by 2030 and 80% by 2050. After 2020, another phase of local climate action planning will be needed to continue and expand the actions in CA2020 and to explore new strategies to meet longer-term GHG reduction goals.

Climate Change Science: A Primer

Although changes in global climate have been recorded throughout history, there is strong consensus among the scientific community that recent changes are the result of GHG emissions created by the burning of fossil fuels and other human activity. The International Panel on Climate Change (IPCC), in its 2014 assessment, observed that human influence on the climate system is clear, and recent increases in GHGs emissions are the highest in history. Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850.

According to the IPCC:

Anthropogenic (man-made) greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane (CH₄), and nitrous oxide (N₂O) that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century.

Even a relatively small increase in global temperatures can dramatically affect human and natural systems. According to the IPCC, “an increase in the global average temperature of 2°C (3.6°F) above pre-industrial levels, which is only 1.1°C (2.0°F) above present levels, poses severe risks to natural systems and human health and wellbeing.” The warming climate is directly related to the amount of GHG in the atmosphere, typically expressed in terms of parts per million (ppm) of carbon dioxide equivalent (CO₂e). Many have called for stabilizing atmospheric GHG concentrations at 450 ppm CO₂e (California Air Resources Board 2014b). However, with GHG concentrations now at or above 479 ppm CO₂e, natural systems and human health and wellbeing are already at high risk (National Oceanic and Atmospheric Administration 2014). Here in Sonoma County, those risks include increased flooding, wild land fires, and economic disruption.

To have an even chance of stabilizing GHG concentrations at 450 ppm CO₂e, global GHG emissions would have to decline by about 50% (compared with 2000 levels) by 2050. Given a more limited capacity to reduce emissions in developing countries, stabilizing at 450 ppm CO₂e will require industrialized countries, including the United States, to reduce their emissions by approximately 80% below 1990 levels by 2050.

Strong action is needed to avoid serious damage to human wellbeing and natural systems. Individuals and communities need to determine how much and how fast they are willing to change energy use and implement other actions to achieve long-term GHG reductions.

Discussions about human-induced climate change often focus on the role of carbon. This is because carbon dioxide (CO₂) is the primary GHG emitted through human activities and accounts for about 82% of all U.S. GHG emissions. Therefore, terms like “atmospheric carbon,” “carbon-neutral,” or “low-carbon” are often heard in climate change discussions. However, human influence on the climate is actually driven by six primary gases, including CO₂. These gases each have different potential to trap heat and remain in the atmosphere (expressed as Global Warming Potential, or GWP). For example, whereas CO₂ has a GWP of 1, nitrous oxide (N₂O) has a GWP of

265. This means that, pound for pound, N₂O is 265 times more powerful as a global warming agent than CO₂. But because there are far more CO₂ emissions than N₂O emissions, CO₂ is still the greatest GHG concern overall. See Table 1.2-1 for a comparison of global warming potential from the six GHG gases.

Table 1.2-1. Principal GHG Emissions

Greenhouse Gas	Primary Emissions Sources	Global Warming Potential (GWP)^a	Atmospheric Lifetime (years)	Atmospheric Abundance
Carbon Dioxide (CO ₂)	Burning of fossil fuels Gas flaring Cement production Land use changes (reducing the amount of forested land or vegetated areas) Deforestation	1	50–200	394 ppm
Methane (CH ₄)	Agricultural practices Natural gas combustion Landfill outgassing	28	12.4	1,893 ppb
Nitrous Oxide (N ₂ O)	Agricultural practices Nylon production Gas-fired power plant operations Nitric acid production Vehicle emissions	265	121	326 ppb
Perfluorinated Carbons (CF ₄ , C ₂ F ₆)	Aluminum production Semiconductor manufacturing	6,630–11,100	10,000–50,000	4.2–79.0 ppt
Sulfur Hexafluoride (SF ₆)	Power distribution Semiconductor manufacturing Magnesium processing	23,500	3,200	7.8 ppt
Hydrofluorocarbons (HFC-23, HFC-134a, HFC-152a)	Consumer products (aerosol sprays, such as air fresheners, deodorants, hair products, etc.) Automobile air-conditioners Refrigerants	138–12,400	1.5–222	3.9–75 ppt

Notes:

^a GWPs listed here are 100-year values without carbon-climate feedbacks.

ppm = parts per million

ppb = parts per billion

ppt = parts per trillion

Sources: Intergovernmental Panel on Climate Change 2013; Blasing 2014.

To provide a consistent framework, GHG emissions are usually quantified in terms of metric tons (MT) of CO₂e per year, which accounts for the relative warming capacity of each gas. All GHGs in the emissions inventory and reduction measures are presented in terms of MTCO₂e. For more information on the latest climate science and IPCC research, visit <http://www.ipcc.ch>.

Sonoma County Must Reduce Greenhouse Gas Emissions

Based on projections from the 2010 GHG inventory, Sonoma County is not expected to meet the 2015 goal of 25% below 1990 levels. Furthermore, the county's population is projected to increase by 5% between 2010 and 2020, and employment is projected to increase by 13% over the same period. Population and economic growth are the main factors influencing the growth of GHG emissions.

Simply put, without additional actions, GHG emissions in 2020 and beyond will not be reduced and could increase because of continued population and economic growth.

Therefore, the primary goal of CA2020 is to grow smarter by **reducing** countywide GHG emissions to a level that is 25% below 1990 emissions by 2020, a target that is well beyond that established in current state law (Assembly Bill 32; see discussion of state regulatory framework in Section 1.2.2, below). This target will be met by combining the new actions described in this Climate Action Plan (CAP) with ongoing efforts already underway and working to achieve reductions in a thoughtful and coordinated manner.

In addition to the near-term emission-reduction goal for 2020, CA2020 also includes longer-term goals of reducing emissions by 40% (compared to 1990) by 2030 and by 80% by 2050, which will necessitate another phase of local climate action planning and implementation after 2020. Although the measures contained in this CAP will endure and continue to reduce emissions beyond 2020, even greater effort will be needed to reach the goals for 2030 and 2050. Specific actions needed after 2020 will be heavily influenced by the changes in technology, regulatory mandates, and behavior that will inevitably occur by 2020. An update to CA2020 is therefore included in the implementation plan.

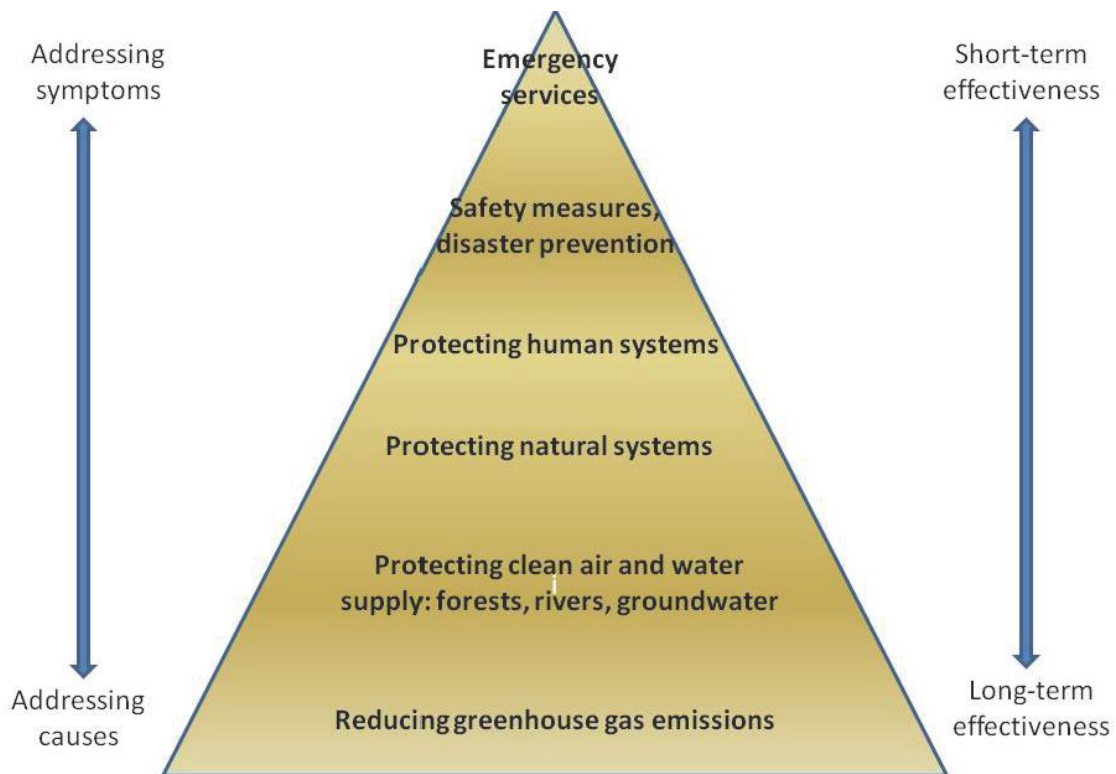
Adapting to Climate Change and Building Resilient Communities

Actions taken to reduce GHG emissions are commonly referred to as *climate mitigation* and are the foundation of climate change response; minimizing the extent of climate changes is the most certain way to ensure that communities can respond to them. However, climate-related changes to natural and human systems cannot be avoided entirely. Sonoma County is already experiencing some of these effects, including higher temperatures and more variable rainfall, which results in increased flooding in some years and drought in others. Actions that reduce the community's vulnerability to these and other climate change hazards are collectively referred to as *climate adaptation*. Adaptation is a fundamental part of the County's overall climate action program and necessary to build community resilience. While climate mitigation and adaptation have different objectives, many strategies can be used to simultaneously achieve both goals.

Chapter 6, *Sonoma County Climate Readiness*, provides a vulnerability assessment that screens potential climate hazard impacts on three key community resource areas: people and social systems, built systems, and natural and working lands. This analysis provides a starting point for a countywide discussion on climate impacts and vulnerabilities. Strategies already underway to prepare for climate change are also discussed, along with recommendations to increase local climate change resilience. While the focus of CA2020 is on reducing local contributions to climate change, many strategies to reduce emissions will also help strengthen climate resilience. Measures that advance local resilience to climate impacts are identified in Chapter 3, *Reducing Community Emissions*.

Figure 1.2-1 illustrates the building blocks of climate response. Again, stopping human contributions to climate change is the most important step to minimize the impact of climate change on communities.

Figure 1.2-1. Building Blocks of Climate Response



Concept: Sara Moore.

1.2.2 Building on Existing Climate Action Efforts

The State of California and Sonoma County communities recognized the challenge of climate change and have already taken action to meet the GHG reduction imperative. The challenge is enormous, but Sonoma County is not starting from scratch. CA2020 builds on earlier efforts to chart a future that will dramatically reduce countywide GHG emissions.

State Leadership

California is a global leader in addressing climate change and reducing GHG emissions.

- In 2005, Governor Schwarzenegger signed Executive Order S-03-05 establishing a long-term goal of reducing GHG emissions by 80% below 1990 levels by 2050.¹
- Enacted in 2006, Assembly Bill (AB) 32 requires statewide GHG emissions to be reduced to 1990 levels by 2020. The *AB 32 Scoping Plan* identifies specific measures for achieving this goal, including recommending that local governments establish GHG reduction goals for both their municipal operations and for the community, consistent with those of the state.
- In 2015, Governor Brown signed Executive Order B-30-15 establishing a medium-term goal of reducing GHG emissions by 40% below 1990 levels by 2030. The Governor's order requires the California Air Resources Board (ARB) to update its scoping plan to identify the measures needed to meet the 2030 target; that effort should be completed in late 2016.

In addition, the state has adopted key regulations that will help Sonoma County meet its regional emissions reduction goals.

- Renewables Portfolio Standard (RPS) – requires greater amounts of renewable energy in electricity generation throughout the state
- Pavley/Advanced Clean Car Program– requires higher gas mileage in new cars sold in California
- Low-Carbon Fuel Standard (LCFS) – requires a reduction in the GHG intensity in transportation fuels
- Cap-and-Trade Program – reduces overall emissions from electricity generation and transportation fuel

More information on these state regulations and their influence on Sonoma County emissions can be found in Chapter 3, *Reducing Community Emissions*, and in Appendix C.

Sonoma County Leadership

In Sonoma County, community leaders and forward-thinking elected officials in each city and in county government have worked together to establish strong action on climate change.

- **1990:** Voters approved a sales tax measure to create the Sonoma County Agricultural Preservation and Open Space District (SCAPOS) to preserve agricultural and open space lands throughout the county. Voters overwhelmingly reauthorized the sales tax measure in 2006.

¹ Executive orders are binding only on state departments, not on the private sector or local governments. However, pending legislation (Senate Bill 32) would, if approved by the legislature and signed by the governor, adopt the target for 2030 into state law and give the ARB authority to adopt binding long-term GHG targets.

- **2001:** All Sonoma County communities committed to the International Council for Local Environmental Initiatives campaign called *Cities for Climate Protection*, an international initiative to reduce GHGs through local government action.
- **2005:** The elected leadership in all Sonoma County communities adopted a countywide GHG emissions reduction target of 25% below 1990 levels by 2015. The City of Cotati adopted an even more aggressive goal of 30% below 1990 levels by 2015.
- **2008:** A local community non-profit group, the Climate Protection Campaign (now known as the Center for Climate Protection), developed the *Sonoma County Community Climate Action Plan*, which was the first community-wide examination of strategies to reduce community-wide GHG emissions.
- **2008:** Voters in Sonoma (and Marin) County approved a local sales tax measure to fund development of passenger rail service, Sonoma-Marin Area Rail Transit (SMART).
- **2009:** Sonoma County jurisdictions established the nation's first Regional Climate Protection Authority (RCPA), a multi-jurisdictional agency tasked with coordinating countywide efforts to reduce GHGs and become more resilient to climate change. RCPA member jurisdictions and their partners have created and successfully pioneered innovative approaches to climate solutions including Property Assessed Clean Energy (PACE) financing, Pay As You Save (PAYS) on-bill repayment for resource efficiency, community choice aggregation, carbon-free water, electric vehicle infrastructure deployment, climate action through conservation, adaptation planning, and more.
- **2012:** The City of Santa Rosa was the first local government in the county to adopt its own CAP and a new GHG emissions target of 25% below 1990 levels by 2020.

Community leadership has resulted in direct actions by the citizens, businesses, and communities in Sonoma County to reduce GHG emissions. For example:

- All communities in the county (except Healdsburg, which has its own electric utility) now participate in the local Community Choice Aggregation program, SCP, which provides electricity with a higher renewable energy content than otherwise available. Healdsburg's municipal utility has provided electricity with a large renewable portfolio for many years.
- The County established a PACE program known as the Sonoma County Energy Independence Program to help property owners finance energy and water efficiency improvements. This program has reduced GHG emissions equal to taking 3,000 cars off the road and generated enough clean energy to power nearly 6,000 homes for a year.
- RCPA and jurisdictions county-wide support energy-efficiency efforts and solar retrofits through a variety of programs. Waste minimization, recycling, and composting programs are already an essential part of resource conservation in the county.
- The Sonoma County Water Agency is a leader in innovating low-carbon methods for delivering water supplies and conserving water. Sonoma County Water Agency reached its

goal of a carbon-free water delivery system in 2015, and is also a prominent supporter of energy conservation financing.

- Sonoma County is a center for sustainable wine growing and other sustainable agricultural practices. The Resource Conservation Districts started a “carbon farming” program in 2015 to accelerate the rate at which carbon is sequestered from the atmosphere into soil and wood biomass.

By 2010, Sonoma County communities had reduced countywide GHG emissions to approximately 7% below 1990 levels, even while the county’s population grew by 25% and employment grew by 17% between 1990 and 2010. On a *per capita* basis, county GHG emissions declined approximately 26% over the same period.

CA2020 builds on these existing programs and proposes additional measures that Sonoma County communities can implement to achieve significant GHG emissions reductions in 2020 and beyond, eventually reaching the goal of an 80% emissions reduction by 2050.

For a list of strategies that have already been implemented by each community, please refer to Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*.

1.2.3 How Will this Plan Help Sonoma County Residents and Businesses?

Reducing GHG Emissions Is No Longer Optional

Given the magnitude of human-induced climate change and the projected catastrophic effects from continued global warming, reducing GHG emissions has become an environmental and societal imperative. In response, GHG reduction mandates from the state and, increasingly, from the federal government will require local government action. In California, state legislation (AB 32) with a mandate to reduce GHG emissions to 1990 levels by 2020 is only the beginning; much sharper GHG reductions are needed to protect our environment, our health, and our economy from the potentially catastrophic effects of increasing global temperatures. CA2020 is intended to help Sonoma County communities respond to the climate change imperative as well as legal mandates.

Reducing GHG Emissions Is Good Business

Reducing GHG emissions will make Sonoma County businesses more efficient and will save money for residents and business owners. Weatherizing or adding solar to existing homes, for example, creates construction jobs and cuts residents’ utility bills. When businesses increase energy efficiency or add on-site renewable energy generation, they reduce operating costs and employ electricians, engineers, builders, and plumbers. For example, a locally owned quarry (Mark West Quarry) recently hired a local solar energy company to install a solar array that will pay for itself in only seven years by cutting the company’s energy bills in half. The Sonoma County Green Business Program recognizes and promotes businesses that operate in an environmentally responsible way, including reducing their carbon footprints. Sonoma County businesses are

already exporting the products and services they develop to respond to climate change. For example, Petaluma-based Enphase has become a worldwide leader in micro-inverter technology used in solar photovoltaic systems. As the world moves to a low-carbon economy and invests in climate-ready communities, Sonoma County businesses will reap the rewards of their leadership.

As described in more detail in Section 1.5, CA2020 will also facilitate a more streamlined environmental review process for future development projects that incorporate its GHG reduction measures.

Reducing GHG Emissions Supports Other Community Goals









Implementing CA2020 will result in environmental and community “co-benefits” that go beyond GHG emissions reductions. For example, many of the actions will improve public health by reducing air pollutants like ozone, carbon monoxide, and fine particulates. Measures to improve mobility and alternative modes of transportation will increase walking and biking, activities that substantially lower the incidence of disease. These changes can also complement and encourage other sustainable modes of transportation, including public transit.

The GHG reduction measures in this CAP create community co-benefits in a variety of ways.

- GHG reduction measures for the Building Energy and Transportation sources will reduce electricity and gasoline usage, which can help lessen the impact of future energy cost increases on county businesses and residents.
- Reducing gasoline consumption also reduces dependence on foreign oil and the environmental impacts of oil exploration, production, and transportation.
- Recycling and waste diversion measures will also reduce material consumption and the need for landfill space.
- Water efficiency measures will reduce water use in a water-constrained future and adapts to the long-term hydrological effects of climate change.
- Land use measures in CA2020 will conserve natural resources and protect the long-term viability of natural and working landscapes in the county.
- Open space preservation also offers aesthetic and recreational benefits for community residents as well as habitat for native wildlife and plants.
- Sustainable agriculture and wine-making practices will help preserve agricultural soil fertility and protect water quality.

The measures in this CAP provide an opportunity to lower carbon emissions and achieve a diverse range of community co-benefits. Anticipated community co-benefits associated with CA2020 are listed in Table 1.2-2. Chapter 3, *Reducing Community Emissions*, provides additional information on the relevant co-benefits.

Table 1.2-2. Community Co-Benefits

Co-Benefit	Key	Description
Energy Savings		Measures to increase energy efficiency can reduce energy costs and lessen the impact of future energy price increases on county businesses and residents. Reducing petroleum and natural gas use through efficiency and fuel switching also reduce dependence on imported energy and the environmental impacts of fossil energy exploration, production, and transportation.
Air Quality Improvements		Measures to reduce or eliminate the combustion of fossil fuels can reduce local and regional air quality challenges caused by ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matter. These air pollutants cause damage to people, ecosystems, and infrastructure.
Public Health Improvements		Measures that improve air quality create benefits for public health by reducing pollutants. Measures that increase use of active transportation and enhance public open spaces can improve health by encouraging walking, biking, and outdoor recreation. These co-benefits directly support the mission of Sonoma County <i>Health Action</i> , aimed at achieving equity and health for all in Sonoma County.
Job Creation		Measures to retrofit buildings, build and operate local and distributed renewable energy systems, increase transit use, increase waste diversion, and other strategies that rely on local labor can create opportunities for the workforce and retain dollars to be reinvested in the local economy.
Resource Conservation		Recycling and waste diversion measures reduce material consumption and the need for landfill space. Water efficiency measures reduce water demand and preserve water resources. Land use measures conserve natural resources and protect the long-term viability of natural and working landscapes in the county. Open space preservation also offers aesthetic and recreational benefits for community residents as well as habitat for native wildlife and plants. Sustainable agriculture practices will help preserve agricultural productivity and ecological health.
Cost Savings		Many strategies to reduce emissions reduce waste by increasing efficiency, therefore reducing the costs to receive the same service (be that light, heat, water, or transportation). Many measures offer downstream cost savings in addition to direct utility or fuel cost savings, such as reduced health care costs, reduced need to invest in marginal water or energy supply, lower maintenance costs, etc.
Climate Resilience		Many strategies to reduce emissions also help prepare communities for local climate impacts by advancing the climate resilience goals adopted by the RCPA Board (see Chapter 6).
Equity		Climate action is a broadly important strategy to promote equity because people with existing social vulnerabilities – lower levels of income, health, or education – are disproportionately affected by climate change impacts. Many measures that reduce GHGs can have equity benefits if designed to serve disadvantaged populations by lowering housing, transportation, and energy costs and improving health outcomes.

1.3 How Does This Plan Work?

1.3.1 A Regional Approach to Reducing GHG Emissions

Sonoma County communities have a long history of implementing and promoting initiatives to protect the environment and conserve natural resources. This tradition includes creation of the RCPA in 2009, the nation's first regional climate protection authority, in a move that recognized both the magnitude of the challenge and the cross-jurisdictional nature of climate change and GHG emissions. If ever an issue called for a coordinated, multi-partner effort, it is climate change; progress depends on Sonoma County communities working together. The approach in CA2020 calls for coordinated local actions to achieve a regional target—reduce countywide GHG emissions to 25% below 1990 levels by 2020—including leveraging initiatives already underway at the state and regional (Bay Area) level. The collaboration embodied in CA2020 will continue as the communities work to meet the RCPA's long-term GHG reduction goals of a 40% reduction by 2030 and an 80% reduction by 2050.

A regional GHG reduction goal—as opposed to individual goals for each community—recognizes the shared nature of the challenge as well as the fact that Sonoma County communities each have a different capacity to achieve GHG reductions; smaller communities typically have fewer opportunities to achieve substantial GHG reductions.

Statewide GHG Reduction Efforts Have Local Impact

Statewide programs to reduce GHG emissions are a fundamental part of CA2020 and will deliver over 50% of the GHG emissions reductions needed to achieve the 2020 target. For example, the state's RPS will reduce the carbon content of electricity throughout the state, including Sonoma County, yielding over 180,000 MTCO_{2e} in annual GHG reductions locally. The CAP reflects the impact of nine state measures that address issues related to building energy and transportation.

1. Title 24 Energy Efficiency Standards for Commercial and Residential Buildings (Title 24)
2. Lighting Efficiency and Toxics Reduction Act (AB 1109)
3. Industrial Boiler Efficiency
4. Renewables Portfolio Standard (RPS)
5. Residential Solar Water Heater Program (AB 1470)
6. Low Carbon Fuel Standard (LCFS)
7. Pavley Emissions Standards for Passenger Vehicles
8. Advanced Clean Cars
9. Vehicle Efficiency Measures in AB 32

Local Government and Regional Agency Action

Although state programs are essential to meeting Sonoma County's GHG reduction goal, they will not be enough to reach that goal by themselves. Action by local governments and regional agencies—the entities that control land use, infrastructure, and community services—is critical. It will take the full combined efforts of local governments and regional initiatives, together with state programs, to reach the County's GHG reduction goal. **Together, CA2020 measures will promote building energy efficiency and renewable energy production, support alternative modes of transportation, enhance open spaces, and help reduce water consumption and wasted materials.**

The GHG reduction measures in this CAP were selected after a comprehensive review of potential measures and after local community outreach meetings and workshops and consultation with a Stakeholder Advisory Group (see Section 1.4). A 2014 report titled *Proven and Promising Climate Measures from U.S. Communities for Possible Application in Sonoma County*, prepared by the Center for Climate Protection, was also used to develop GHG reduction measures in this plan. In addition, measures recommended by the California Attorney General and the California Air Pollution Control Officers Association were considered, as were measures from adopted CAPs throughout California. Each local community's general plan and local policies and programs, and comments collected at meetings in each community were also reviewed to develop the measures. Many of the measures in CA2020 build on local community initiatives that are already underway, including local measures required under state law, like implementation of the CalGreen building codes and adoption of local water-efficient landscape ordinances. Other measures provide new opportunities for addressing climate change. Existing policies and measures are summarized in Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*.

This CAP identifies 14 GHG reduction measures for local agency implementation (see Section 1.3.2). Each city and the County reviewed the local measures and selected those to include in their community's commitments. Thus, the specific combination of measures implemented in each community will vary. Although no community will implement all 14 local measures and sub-components, the individual commitments from each community combine into a comprehensive GHG emissions reduction program that will help the county achieve its countywide goal.

Some of the local measures include voluntary, incentive-based programs that will reduce emissions from both existing and new development in the communities. Other measures establish mandates for new development, either pursuant to state regulations or through existing programs. Local governments will also use CA2020 as a tool to communicate and solidify their priorities within their communities.

CA2020 also includes GHG reduction measures that will be implemented by regional entities that can provide some services and resources on behalf of *all* communities more efficiently than the individual communities can on their own, especially the smaller cities. These regional measures are a critical part of CA2020. For example, the Community Choice Aggregation measure encourages residents and businesses to participate in SCP, which provides electricity with lower

carbon content than the state's RPS. Other regional entities included in CA2020 are RCPA, Sonoma County Transportation Authority, Sonoma County Agricultural Preservation and Open Space District, and the Sonoma County Energy Independence Program. There are 16 regional measures to reduce GHG emissions, as discussed further in Chapter 3, *Reducing Community Emissions*.

Successful implementation of these actions will require commitment from regional agencies, all communities and their various departments, community groups, the development community, and residents and businesses. For this plan to be successful, RCPA, regional entities, and communities will adaptively manage implementation of CA2020 to ensure that the countywide GHG reduction target is met and that measures are implemented as efficiently as possible. Accordingly, RCPA and communities may revise measures or add new measures to ensure that the region achieves its 2020 reduction target. If adopted and implemented prior to 2020, new federal programs that achieve local GHG emissions reductions beyond state and local mandates may also be added to CA2020.

Source-based Emissions Reductions

GHG emissions inventories and reduction measures are grouped together under “sources” that enable an organized, countywide look at the human activities that contribute the most GHG emissions and help focus actions where they can have the greatest emissions reduction. CA2020 looks at the following five GHG sources.

- **Building Energy** includes emissions from electricity generation and combustion of natural gas and other fuels (e.g., propane, wood).
- **Transportation, Land Use, and Off-road Equipment** includes emissions from on-road vehicle fossil fuel combustion as well as emissions from equipment (e.g., construction equipment) and off-road vehicles.
- **Solid Waste** includes CH₄ emissions from decomposing organic matter in landfills.
- **Water and Wastewater** includes energy-related emissions from water supply pumping and CH₄ and N₂O emissions from the wastewater treatment process.
- **Livestock and Fertilizer** includes N₂O emissions from fossil-fuel based fertilizer and CH₄ and N₂O emissions from livestock and manure management. Other agriculture-related emissions are accounted for in the other GHG sources. For example, emissions from traffic related to wineries or grape growing are included in the Transportation source.

This source-based approach is the foundation for the analyses in Chapter 2, *Greenhouse Gas Emissions in Sonoma County*, and Chapter 3, *Reducing Community Emissions*. These sources are also the organizing principle in Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*.

1.3.2 Putting this Climate Action Plan to Work

Plan Adoption by RCPA, Cities, and County

CA2020 reflects an innovative, collaborative approach to responding to climate change. Individual cities and counties throughout the state have adopted CAPs specific to their communities, but CA2020 takes a truly regional (countywide) approach that coordinates the climate protection activities of all the cities and the County to achieve a shared GHG reduction goal. This approach recognizes that, by working together, Sonoma County's communities can achieve greater GHG reductions, and do it more efficiently than if each city and the County acted on their own.

The collaborative, regional approach also improves consistency among the participating local agencies. This similarity will help home and business owners who are planning projects or renovations in the cities and the county.

As the lead agency, RCPA will adopt the CAP first (including certification of the Environmental Impact Report prepared for CA2020). Following adoption by RCPA, each city and the County will adopt its portion of CA2020 (see Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*) in a form appropriate to that community. Local adoption could take the form of a General Plan amendment, ordinance adoption, resolution, or some combination thereof.

Once adopted, the cities, County, and regional agencies will implement the measures each has committed to in their respective CAP adoption processes.

Implementation Framework

Sonoma County communities have set an ambitious target for GHG emissions reduction, one that will require decisive and rapid action by the local partners. RCPA will coordinate and facilitate implementation actions by the cities and the County, and by regional agencies (e.g., transit, energy, waste). RCPA's role will include aggregating funding opportunities to leverage federal, state, and regional grants; providing technical assistance to local partners; developing shared tools and inter-community efficiencies; and accepting overall accountability for CA2020 implementation.

Each city and the County will develop its own implementation team for the actions that will occur at the local government level. This will include designating a CA2020 Coordinator for each community and an internal implementation structure scaled and organized appropriately to each local agency. Among other things, the local CA2020 Coordinator will serve as the liaison between the city/County and RCPA.

Given the immediacy of the 2020 GHG reduction target, timing is an important factor for plan implementation. The CA2020 implementation plan organizes GHG reduction measures into three groups, based on the lead time needed for each measure in order to achieve results by 2020.

Please refer to Chapter 4, *Implementation*, and Appendix C for additional information regarding implementation and the lead entities for each measure.

Monitoring and Adaptive Management

How will Sonoma County local governments, residents, and business know if their GHG reduction efforts are effective? How can the County adapt to changing technologies, regulations, state (or federal) policies, and community behavior changes? Not only will RCPA and local partners need to track implementation of the local and regional reduction measures called for in CA2020, but the comprehensive nature of CA2020 will require regular reassessment of community GHG emissions and the overall direction of CA2020. To accomplish this, CA2020 calls for two interim GHG emissions inventories before 2020: one based on 2015 emissions data and the other based on 2018 data. The RCPA Board will also conduct a mid-course review of overall CA2020 effectiveness to allow time for changes that may be needed to stay on target. Where program tracking and inventory updates indicate that CA2020's emissions-reduction strategies are not as effective as originally projected, RCPA will work with local partners to adaptively manage CAP implementation and stay on target, including updating or amending CA2020, if warranted.

Equally important, the RCPA and its members will report to the community on the results of the interim inventories and the mid-course review. Periodic public meetings and presentations to stakeholder groups will occur and other outreach activities, including a public website and email flyers, will be implemented to educate, engage, and empower the community.

Finally, CA2020 is part of a much longer-term effort that will be needed to reduce GHG emissions in Sonoma County. As noted earlier, CA2020 focuses on relatively short-term actions to reduce emissions by 2020 to a degree that is well beyond current state mandates (AB 32). However, even with the ambitious GHG reduction goal in CA2020, further actions will be needed to meet longer-term goals. Therefore, in adopting this CAP, RCPA will also adopt long-term goals to reduce GHG emissions by 40% (compared to 1990) by 2030 and by 80% by 2050. Although the measures in CA2020 will continue to achieve emissions reductions after 2020 and establish a trajectory for reaching longer-term goals, another phase of climate action planning will be needed to meet the goals for 2030 and 2050. This next phase will build on the measures in CA2020, informed by monitoring and adaptive management, and take advantage of new technologies and climate protection science that will be available in the future.

The Role of New Development in GHG Reduction

Sonoma County's population and economy will continue to grow between now and 2020, and beyond. Some of that growth will result in new development, either on land that is now vacant or as redevelopment with new or more intensive land uses. This new development will be a source of additional GHG emissions in 2020, although emissions related to existing development and activities will remain by far the largest source of GHG emissions. By 2020, new development will account for about 5% of total countywide GHG emissions; existing development and activities will account for 95% of countywide emissions. Emissions from new development are calculated as the growth in emissions from 2016 to 2020, based on socioeconomic forecasts and other emission projection methods (see Chapter 2). In other words, 2020 emissions are estimated to be 5% higher than 2016 emissions.

To ensure that regional GHG emissions are reduced to 25% below 1990 levels, CA2020 accounts for additional emissions from new development in the target inventory for 2020. Meeting the community-wide 2020 GHG reduction target requires new development to be consistent with climate goals by implementing measures that will minimize new GHG emissions. To accomplish this, a “New Development Checklist” (see Appendix A) can be used in the entitlement and permitting process at each jurisdiction that adopts the plan. New development projects that incorporate applicable checklist measures will not only have lower GHG emissions than similar projects had in the past, but they will also contribute to reaching the GHG reduction target set forth in CA2020 by ensuring that emissions from new development do not exceed the GHG “budget” allocated to new development in the 2020 target. Development projects consistent with this CAP may also take advantage of the permit streamlining available under the California Environmental Quality Act (CEQA) (see Section 1.5).

1.3.3 How Can Sonoma County Residents Help?

Learn about their Household Carbon Footprint

The everyday activities of Sonoma County residents, including driving a vehicle, using electricity and natural gas to light and heat their homes, and throwing away household garbage, result in GHG emissions. Many of these emissions are accounted for in the GHG inventory prepared for this CAP, while others occur elsewhere due to the consumption of goods and services in Sonoma County. Residents can learn about their household carbon footprint and how they can reduce GHG emissions through their own actions—such as driving an electric vehicle, installing solar, or buying electricity from SCP. Cool California (<http://www.coolcalifornia.org/>) offers a user-friendly tool that allows residents to calculate household emissions by answering questions relating to travel, housing, food, and shopping habits. After completing the questionnaire, residents receive a personal action plan with tips and actions to help reduce their household carbon footprint and save money.

Participate in Programs to Reduce Local Emissions

The good news is that while human activities are a major climate change driver, we can also be part of the solution. Once county residents take inventory of their household carbon footprints and better understand their contribution to climate change, they can start taking actions to reduce household GHG emissions and improve their economic picture, thereby helping to meet the countywide GHG reduction target. Sonoma County residents can make impactful choices and changes in their daily lives such as changing light bulbs to compact fluorescents or light-emitting diodes, buying energy-efficient (ENERGY STAR) appliances, heating and cooling smartly, sealing and insulating their homes, reusing and/or recycling materials that might otherwise be thrown away, using water more efficiently, composting food scraps, and purchasing clean power (for more information see <http://www3.epa.gov/climatechange/wycd/home.html>).

Some of these individual or household actions will be facilitated through the regional or local programs and strategies presented in CA2020. Other actions are based more on individual

commitment and choice. For example, individuals can learn about and make purchases that consider the carbon footprint and durability of household goods. This might include buying items made from local, renewable materials or that minimize packaging and shipping. Residents can also make low-carbon lifestyle choices, such as walking or biking, using public transportation, or eating less meat and more local vegetables.

Here are a few of the resources available to Sonoma County residents to help make these changes.

- The Energy Independence Program is a County of Sonoma Energy and Sustainability Division program that serves county residents and businesses as a central clearinghouse of information about energy efficiency, water conservation, and solar energy improvements. It offers tools to property owners and tenants to find the information, resources, rebates, contractors, and financing that fits their situation. See more at: <http://sonomacountyenergy.org/homepage/#sthash.3HWfDTmZ.dpuf>.
- Energy Upgrade California: Home Upgrade takes a “whole house” approach to addressing home energy waste through building science, pre- and post-project testing, and energy performance analysis to provide maximum energy efficiency results. More information can be found at (707) 565-6470 or <http://bayareaenergyupgrade.org>.
- Windsor Efficiency PAYS: Windsor residents and businesses can take advantage of the Windsor Efficiency PAYS program, which provides water- and energy-saving upgrades for Windsor residential properties that provide immediate utility bill savings, new water/energy saving appliances, and drought-resistant landscaping—with no upfront cost or debt. See more at: <http://sonomacountyenergy.org/residential-programs/#sthash.2VBjpMOi.dpuf>.
- SCP is Sonoma County’s official electricity provider, reducing costs and environmental impacts of energy use for customers throughout Sonoma County. By participating in CleanStart, SCP’s default service, participants receive 36% renewable power. If residents or businesses participate in EverGreen, they will receive 100% local renewable power for a premium price.

CA2020 also includes several *Advanced Climate Initiatives* that, among other things, will focus on working with Sonoma County residents to reduce consumption-based emissions. See Chapter 3 for more information on these Advanced Climate Initiatives.

1.4 Public Outreach and Community Engagement

CA2020 was prepared with input from community members, elected officials, and staff from the partner agencies. Ten open house-style public workshops were held, including one in each city. These meetings solicited public input on the types of reduction measures that should be included in CA2020. The role of local governments in addressing climate change and reducing GHG emissions was also discussed.

RCPA also provided an online survey that was distributed by email and social media. Additional focus groups and meetings were held with local businesses, agriculture, and service groups. Presentations and updates were given to city and town councils and the Board of Supervisors throughout the project development process, and regular updates were provided to the RCPA Board. The RCPA board held two public study sessions prior to development of CA2020.

The community dialogue that has begun with preparation of this plan will continue throughout implementation of the GHG emissions-reduction measures.

All comments received from the community and the Stakeholder Advisory Group (see below) are documented in Appendix F. Many of the comments support GHG reduction measures that are now included in CA2020. For example, enhanced transit service, expanded bike and pedestrian networks, and promotion of electric vehicles were strongly supported as part of the CA2020 strategy to reduce transportation emissions. Likewise, many comments supported building energy retrofits, distributed renewable energy generation, and sustainable agricultural practices.

The full range of GHG-reduction approaches suggested in public comments is, not surprisingly, extremely varied and generally very forward looking. For example, commenters suggested requiring point-of-sale energy audits, zero-net new water use in new developments, local government divestiture from fossil fuel investments, and greater focus on schools and youth. The measures included in CA2020 represent a subset of the ideas heard from the community. As noted throughout this plan, CA2020 is one step on a long-term path to dramatically reduced GHG emissions. Some of the suggestions gathered as part of the community outreach effort that are not included in CA2020 may very well find a place in future climate action planning in Sonoma County.

Lastly, it is important to acknowledge that a small but vocal segment of the community disagrees with the scientific consensus about the threat posed by global climate change and opposes governmental action to reduce emissions.

1.4.1 Stakeholder Advisory Group

To help guide the process, the RCPA Board of Directors selected a Stakeholder Advisory Group to represent a diversity of viewpoints and technical expertise from each community. The main role of the Advisory Group was to work with local agency staff to develop a CAP that will have broad community support for the GHG emissions-reduction programs and measures needed to meet Sonoma County's ambitious target. Three representatives from each city and two representatives from each county supervisorial district were selected; some representatives had input from city councils, though none were elected officials themselves.

The Stakeholder Advisory Group sought representation from a broad spectrum of interests, including renewable energy, agriculture, viticulture, business, community non-profits, the environment, transportation, social justice, environmental justice, real estate, health, economic development, education, open space, waste, water, and building efficiency.

The Stakeholder Advisory Group met five times at key milestones during the project. All meetings were open to the public and each meeting included an opportunity for the public to provide comments. Several ad hoc working groups from the Stakeholder Advisory Group were also convened during the development of the draft CAP to review detailed assumptions for certain GHG sources.

1.5 Relationship between the CAP and CEQA

The cities of Cloverdale, Cotati, Healdsburg, Petaluma, Rohnert Park, Sebastopol, Sonoma, and Windsor and the County of Sonoma will use CA2020 to comply with project-level GHG impact analysis requirements under CEQA. Santa Rosa will continue to use its adopted CAP for this purpose.

The State CEQA Guidelines (Section 15183.5) allow the GHG impacts of future projects to be evaluated using an adopted plan for reduction of GHG emissions, like CA2020, provided that the plan meets specific requirements. The six requirements specified in the State CEQA Guidelines are listed below with CA2020's compliance described in *italics*.

1. Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area. *CA2020 quantifies GHG emissions from all primary sources within county jurisdictions for 1990, 2010, 2015, 2020, 2040, 2030, and 2050.*
2. 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. *CA2020 establishes a countywide GHG emissions target of 25% below 1990 levels by 2020, a target that goes well beyond the requirements of AB 32 and puts Sonoma County on a trajectory to achieve the even greater GHG reductions needed in the future. CA2020 includes a GHG emissions budget for new development that will ensure that the countywide reduction target is met, even with projected population and economic growth. The GHG reduction measures in CA2020 will reduce project-specific emissions and thereby ensure that the new-development share of total future emissions is not exceeded. Reducing and limiting emissions from new development is part of an overall strategy that substantially reduces emissions countywide and, therefore, contributions from new development that is consistent with CA2020 would not be cumulatively considerable.*
3. Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area. *CA2020 analyzes community emissions, by source, for the partner communities, including emissions from projected growth and development expected by 2020 and beyond.*
4. 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. *CA2020 includes specific measures to achieve the overall reduction target (see Chapter 3 and Appendix C).*

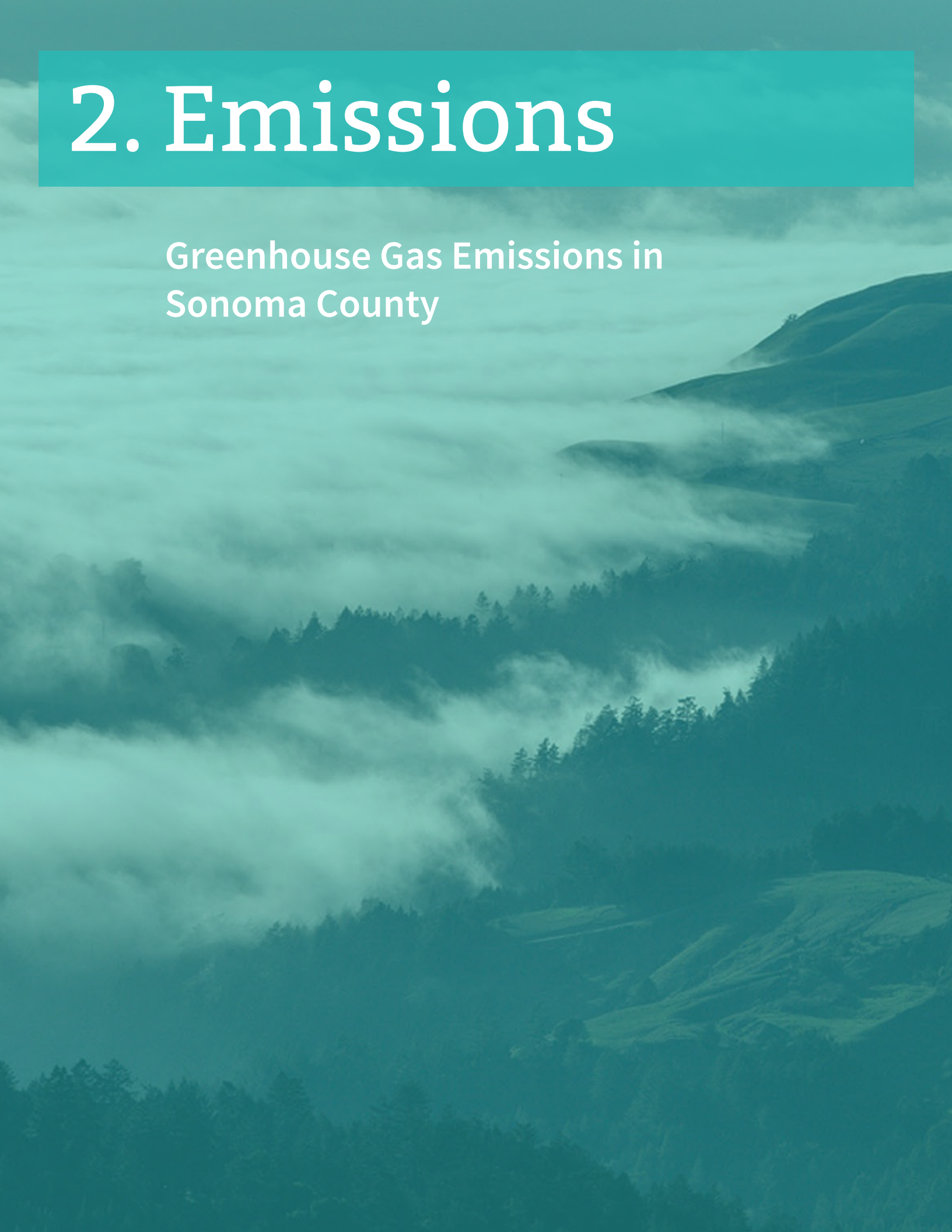
5. Establish a mechanism to monitor the plan’s progress toward achieving the GHG emissions level and to require amendment if the plan is not achieving the specified level. *CA2020 includes periodic monitoring of plan progress and will be amended as needed to reach the reduction target (see Chapter 4).*
6. Adopt the GHG emissions reduction plan in a public process following environmental review. *As described in Section 1.3.2 above, a Programmatic Environmental Impact Report will be prepared for CA2020 and the CAP itself will be adopted first by RCPA, followed by adoption of community-specific portions by each local partner. The adoption process will include public outreach and public hearings.*

Once CA2020 is adopted, it may be used in the cumulative impacts analysis of later projects, a process known in CEQA as “tiering.” Tiering from the CAP potentially eliminates the need to prepare a quantitative assessment of GHG emissions on a project-by-project basis, which can help streamline the environmental review and permitting processes for these projects. To accomplish this, future project-specific environmental documents must include all applicable mandatory CA2020 measures and ensure that they are binding and enforceable by incorporating measures into the project design or identifying them as mitigation measures and conditions of approval. Future projects that incorporate mandatory CA2020 actions will not have a cumulatively considerable impact related to GHG emissions and climate change (unless substantial evidence warrants a more detailed review of project-level GHG emissions).

Appendix A provides a Climate Action Plan consistency checklist template to be adapted and modified for use by local agency planning staff to assist in determining a project’s consistency with CA2020 for the purposes of CEQA tiering. Where the checklist demonstrates that a discretionary project includes all applicable mandatory local or regional measures in CA2020, local agencies can conclude that the project’s impact related to GHG emissions would be less than significant under CEQA because the project is consistent with a qualified GHG reduction plan under State CEQA Guidelines Section 15183.5.

2. Emissions

Greenhouse Gas Emissions in Sonoma County



Chapter 2

Greenhouse Gas Emissions in Sonoma County

2.1 Introduction

Estimates of historic, current, and future greenhouse gas (GHG) emissions are essential to understanding local emissions sources that communities can influence to reduce local contributions to climate change. These estimates, referred to as *inventories*, help to define priorities for emissions reduction strategies and for tracking progress.

The activity-based inventory approach used in this CAP focuses on sources of emissions that a local jurisdiction can readily influence. At this time, it keeps separate two important ways in which actions taken in Sonoma County influence GHG emissions: goods consumption (i.e., emissions that result from local consumption of goods produced in other places) and biological carbon sequestration and emissions from the land base. Although not part of the activity-based inventory at this time, these important aspects of understanding local opportunities to reduce GHG emissions while engaging residents and the agriculture community are explored further in Section 2.4, below, and will be incorporated in the County's GHG goals in the future, as outlined in Chapter 3, *Reducing Community Emissions*.

Several GHG inventories were developed for this plan. The 1990 *backcast* estimates historic emissions levels and serves as the baseline for measuring future GHG reductions; the 2010 inventory measures existing emissions sources and forecasts future emissions in 2020, 2040, and 2050 under a business-as-usual (BAU) scenario (i.e., without implementation of climate action strategies). More details on data sources and specific methods used for each GHG source can be found in Appendix B.

Roughly 3.9 million metric tons of carbon dioxide equivalent (MMTCO₂e) emissions were generated by activities in Sonoma County in 1990 (see Table 2-1). By 2010, emissions were 9% lower, at about 3.6 MMTCO₂e. However, in the absence of state and local climate action, emissions are projected to grow to 4.3 MMTCO₂e by 2020, largely driven by population and economic growth.

Table 2-1. Summary of Countywide Emissions

Key Climate Action Plan Indicators	Backcast	Inventory	Business-as-Usual Forecasts		
	1990	2010	2020	2040	2050
Countywide emissions (MTCO ₂ e)	3,944,000	3,601,000	4,343,000	4,923,000	5,113,000
Percent change from 1990	N/A	-9%	10%	25%	30%
Per capita emissions (MTCO ₂ e/person)	10.2	7.8	8.6	8.6	8.5
CA per capita emissions (MTCO ₂ e/person) ¹	14.5	12.1	12.5	12.9	13.8
Population (people)	388,222	459,973	507,727	573,489	601,140
Housing (housing units)	149,382	180,465	202,035	228,688	239,497
Employment (jobs)	172,064	195,121	230,151	247,051	254,428

¹ For details on how the California per capita emissions were estimated, please refer to Appendix C.

2.2 Measuring Emissions

2.2.1 What Is in the Inventories?

The inventories of community-wide GHG emissions in Sonoma County capture the primary sources of emissions that can be reduced through the actions of local governments and regional entities: energy use in our homes, businesses, vehicles, and off-road equipment; emissions from treating and delivering water; emissions from materials that are thrown away; and fertilizer and livestock operations. This approach is known as an “activity-based” inventory. It involves measuring or modeling the primary emissions-generating activities in Sonoma County and translating them into GHG emissions based on standard or locally specific emissions factors. Most sources included cause emissions within the county. However, some emissions that occur outside the county are also included but only to the extent that such emissions are the direct result of community activities that can be reduced through local actions. For example, GHG emissions from regional power plants that provide electricity to local homes and businesses are included, even though the power plants may not be located within the county.

Example: Estimating Building Energy Emissions

Here is a quick overview of how building energy GHG emissions are estimated:

Step 1: Determine which utilities supply electricity and natural gas to residents and businesses in the unincorporated areas.

Step 2: Obtain annual energy usage from the utilities. Electricity consumption is provided in terms of kilowatt hours, whereas natural gas usage is provided in terms of therms.

Step 3: Multiply electricity and natural gas quantities by GHG emission factors.

Step 4: Add emissions from electricity and natural gas to determine total GHG emissions from building energy use.

Local emissions-generating activities addressed in this plan are summarized in Table 2-2. The analysis of emissions includes carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Of these gases, CO₂ emissions contribute the most to global warming, both internationally and locally. For certain GHG sources (e.g., dairies and livestock, solid waste, wastewater treatment), CH₄ and N₂O play a more significant role. All three gases are expressed as metric tons of carbon dioxide equivalent (MTCO₂e), based on the global warming potential of these gasses relative to CO₂ (see Chapter 1).

Global Warming Potentials for Greenhouse Gases

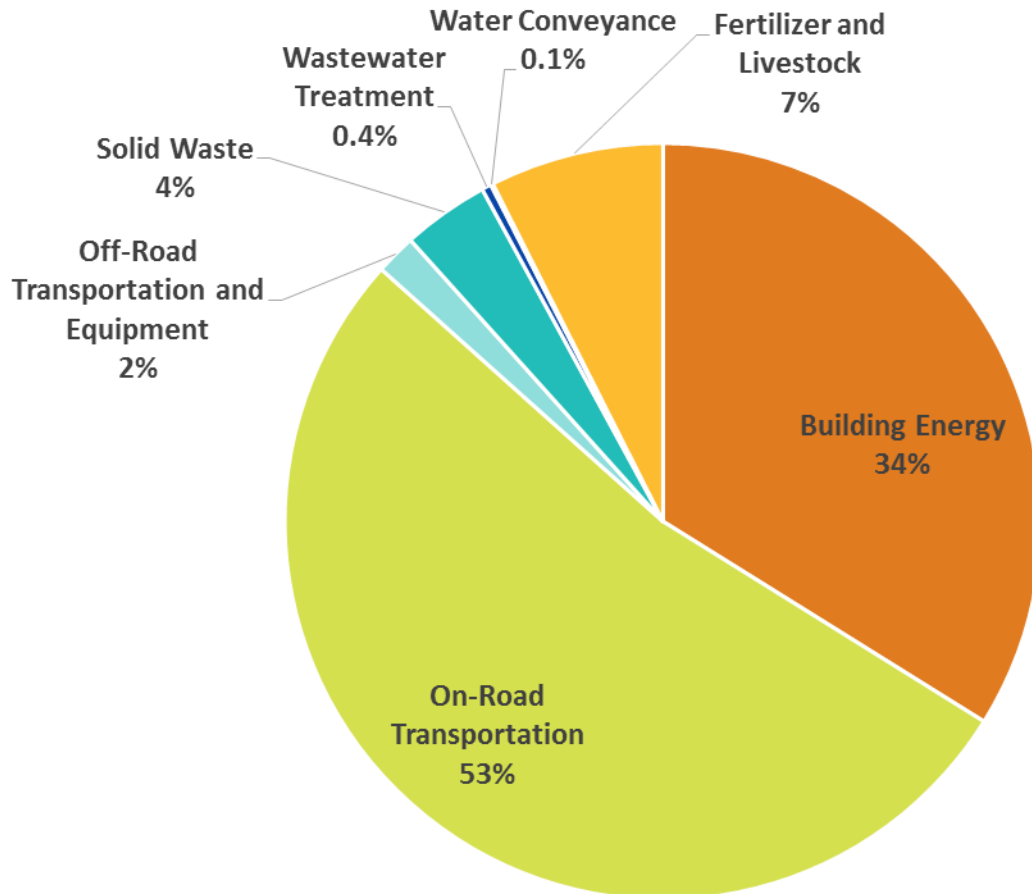
GHGs are not created equally. The Global Warming Potential, or GWP, is used to compare GHGs based on their potential to trap heat and remain in the atmosphere. Some gases can absorb more heat than others and thus have a greater impact on global warming. For example, CO₂ is considered to have a GWP of 1, whereas N₂O has a GWP of 265. This means that N₂O is 265 times more powerful than CO₂.

Table 2-2. Key Activity Data by GHG Source

Source	Primary Emissions Sources	Key Activity Data	Data Sources
Building Energy	<ul style="list-style-type: none"> • Production of electricity (emissions generated at power plants) • Combustion of natural gas • Combustion of other fuels (e.g., propane, fuel oil, wood) in residences 	<ul style="list-style-type: none"> • Total electricity use (megawatt hours) • Total natural gas use (therms) • Total fuel combustion for other fuels 	<ul style="list-style-type: none"> • Electric utilities: Pacific Gas & Electric (PG&E), City of Healdsburg, Sonoma Clean Power (in years after 2010) • Natural gas utilities: PG&E • Other fuels
On-Road Transportation	<ul style="list-style-type: none"> • Combustion of gasoline and diesel fuel in vehicles • Combustion of fuels in transit vehicles 	<ul style="list-style-type: none"> • Vehicle miles traveled • Fuel type and fuel economy of countywide vehicle fleet • Travel patterns 	<ul style="list-style-type: none"> • Sonoma County Transportation Authority • California Air Resources Board’s (ARB) EMFAC2011 model
Off-Road Transportation and Equipment	<ul style="list-style-type: none"> • Combustion of fossil fuels in equipment (e.g., cranes, bulldozers, lawn mowers) • Combustion of fossil fuels in off-road vehicles (e.g., ATVs, boats) 	<ul style="list-style-type: none"> • Fuel consumption in off-road vehicles and equipment • Socioeconomic data 	<ul style="list-style-type: none"> • ARB’s OFFROAD 2007 and OFFROAD2011 model
Solid Waste	<ul style="list-style-type: none"> • Methane emissions from decomposition of organic matter sent to landfills 	<ul style="list-style-type: none"> • Tons of waste (residential and commercial) sent to landfills • Profile of waste material for residential and commercial waste in each jurisdiction (e.g., 19% paper, 36% food waste) 	<ul style="list-style-type: none"> • Sonoma County Waste Management Agency
Wastewater Treatment	<ul style="list-style-type: none"> • Emissions of methane and nitrous oxide that occur during wastewater treatment 	<ul style="list-style-type: none"> • Population served by each wastewater treatment plant (WWTP) • Method of wastewater treatment at each WWTP • Amount of digester gas produced at each WWTP 	<ul style="list-style-type: none"> • Sonoma County Water Agency • Sanitation districts and jurisdictions that operate a WWTP
Water Conveyance	<ul style="list-style-type: none"> • Production of electricity associated with the pumping and movement of water from source to user (emissions generated at power plants) 	<ul style="list-style-type: none"> • Water consumption • Water supply sources (e.g., groundwater, Russian River) 	<ul style="list-style-type: none"> • Urban Water Management Plans for each jurisdiction • Sonoma County Water Agency
Livestock and Fertilizer	<ul style="list-style-type: none"> • Emissions of nitrous oxide from the application of fertilizer • Emissions of methane and nitrous oxide from livestock and manure management 	<ul style="list-style-type: none"> • Acres and types of crops grown in the county • Livestock population numbers 	<ul style="list-style-type: none"> • Sonoma County Agricultural Commissioner

The 2010 countywide inventory reveals that two activities are responsible for 87% of locally generated emissions: transportation and building energy use (see Figure 2-1). Livestock, fertilizer, solid waste, water, wastewater, and off-road equipment represent smaller sources in Sonoma County; however, these activities still hold opportunity for emissions reductions.

Figure 2-1. 2010 Countywide GHG Emissions by GHG Source



2.2.2 Which Years Were Measured?

Several GHG profiles were developed for Climate Action 2020 (CA2020):

1990 Backcast: An estimate of community-wide emissions levels in 1990 was developed to understand historic emissions levels in Sonoma County and provide a baseline for measuring future GHG reductions. This baseline year aligns with the statewide baseline in Assembly Bill 32, California’s climate action framework through 2020. Emissions data for 1990 are not available for all GHG sources to the degree they are available now; therefore, 1990 levels were estimated with available socioeconomic and source-specific data and emissions factors when possible, using the same protocol for the 2010 inventory and future forecasts.

2010 Inventory: The 2010 community inventory was developed by using actual activity data, such as kilowatt-hours and vehicle miles traveled, as reported by utilities and other local agencies. Emissions generated by community activities were analyzed using widely accepted methodologies and procedures recommended by federal, state, and local air quality management agencies. The primary protocol used was the *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* (ICLEI – Local Governments for Sustainability 2012). In that protocol, 2010 was chosen with the input of the jurisdictions and other relevant stakeholders, taking into account data availability and completeness. A key consideration was the existence of highly reliable socioeconomic information from the 2010 U.S. Census.

Business-as-Usual (BAU) Forecast: GHG emissions forecasts for 2015, 2020, 2040, and 2050 were based on projected growth in population, employment, and households in the county (see Table 2-1). Forecasts for 2015 and 2020 were developed to evaluate the magnitude of the challenge in meeting the short-term target of 25% below 1990 levels. Forecasts even further into the future (2040 and 2050) were developed to help prepare the county to meet long-term GHG reduction goals. Data used for the BAU forecasts are predictions of community emissions that would occur in future years without accounting for federal, state, and local actions to reduce GHG emissions. Although Sonoma County’s GHG reduction target is based on a 1990 baseline, the BAU forecasts also help show the magnitude of the challenge to reach the target.

Analysis was done for each source within the inventory and for each jurisdiction in Sonoma County. Detailed methodologies for calculating emissions for each source, jurisdiction, and year are provided in Appendix B.

2.3 Inventory Results

2.3.1 GHG Emissions in Sonoma County by Source

This section begins with an overview of GHG emissions from all sources, calculated as outlined in Appendix B, followed by a more detailed description of existing emissions for each source (see Table 2-3 and Figure 2-2). These source-specific discussions provide a deeper exploration of the main factors that influence GHG emissions. This analysis was then used to identify the most effective emissions reduction opportunities, which are reflected in the reduction measures in Chapter 4.

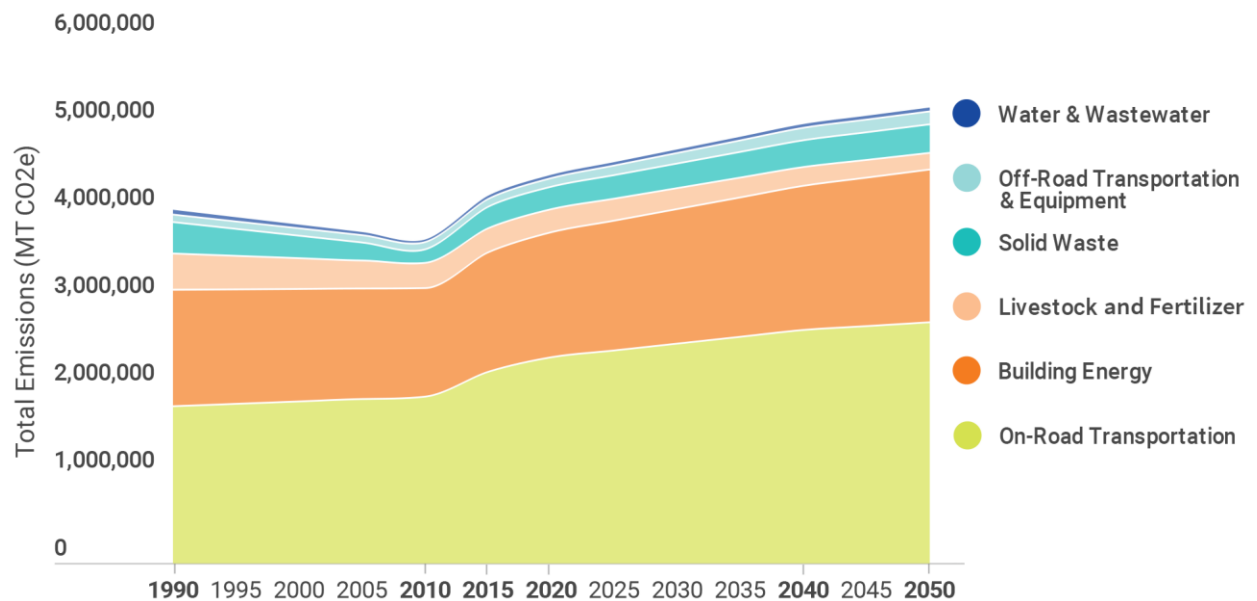
Table 2-3. GHG Inventory and Forecast Results by Source, and Year

Emission Source	Emissions (MTCO ₂ e)					
	Backcast	Inventory	BAU Forecasts			
	1990	2010	2015	2020	2040	2050
Building Energy	859,000	1,220,000	1,347,390	1,410,500	1,629,900	1,728,100
On-Road Transportation	1,203,000	1,899,000	2,183,420	2,349,500	2,661,500	2,749,400
Off-Road Equipment	43,000	62,000	68,470	77,300	121,600	126,600
Solid Waste	281,000	134,000	224,880	235,900	285,100	305,700
Wastewater Treatment	15,000	15,000	13,400	13,600	14,800	15,500
Water Conveyance	27,000	4,000	13,030	13,600	17,000	18,400
Fertilizer and Livestock	393,000	268,000	254,420	242,600	193,500	169,000
Santa Rosa 1990 Emissions ¹	1,123,100	—	—	—	—	—
Sonoma County Total	3,944,000	3,601,000	4,105,000	4,343,000	4,923,000	5,113,000

Notes:

¹ Santa Rosa's emissions in 1990 are not available from the city's Climate Action Plan (CAP); 1990 emissions were thus assumed to be equal to 15% below the baseline level of emissions, per the city's CAP. As a result, source emissions for Santa Rosa in 1990 are not available and are included as a separate line item. Santa Rosa emissions for all other years are disaggregated into each source.

Figure 2-2. Countywide GHG Inventory and Forecast Results by Source and Year¹



Transportation and building energy generate the vast majority of local GHG emissions and, without effective reduction measures, emissions from these sources will steadily increase as the county’s population and employment increase. Fortunately, these two sources also present the greatest opportunities for GHG emission reductions. Emissions from solid waste and water conveyance decreased dramatically between 1990 and 2010 because of increased waste diversion efforts and more efficient water delivery methods. Emissions from wastewater treatment were approximately the same in 1990 and 2010 despite an increase in population, most likely due to a shift to less emissions-intensive wastewater treatment methods and a decline in per capita wastewater flows. Fertilizer and livestock emissions declined between 1990 and 2010 and will continue to do so in future years because of declining livestock-related agriculture and improved livestock manure management in the county.

Countywide GHG emissions decreased by 8.7% between 1990 and 2010 but will increase by 21% between 2010 and 2020 under BAU conditions, absent any GHG reduction effort. Most of the projected increase in BAU emissions between 2010 and 2020 is due to increases in emissions from building energy use and on-road transportation resulting from growth in population and housing. These GHG sources will also increase as a result of new development by 2020.

By 2050, BAU emissions are forecast to grow by 42% from 2010 levels to more than 5 million metric tons. Again, most of that growth will be driven by building energy use and transportation.

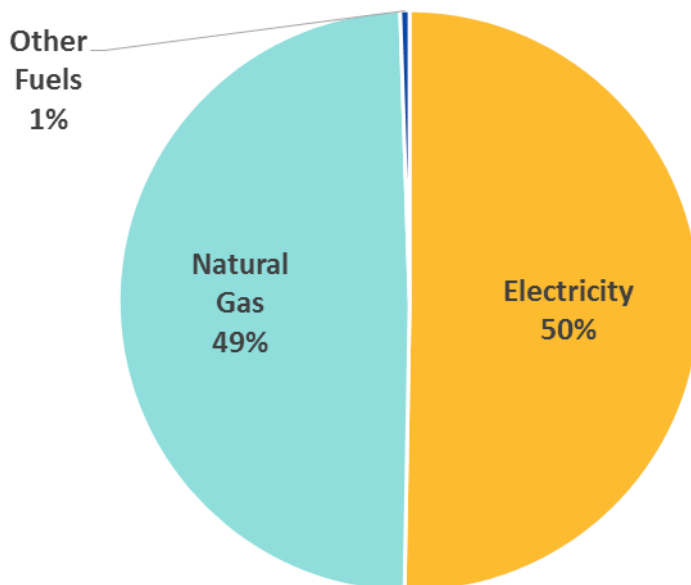
¹ The 1990 emissions in this chart include Santa Rosa’s total 1990 emissions apportioned to each source using the 2010 inventory source distribution for the city (actual 1990 emissions by source are not available).

Existing Emissions from Building Energy

Electricity production and the direct combustion of natural gas in buildings generated more than **1.2 million MTCO₂e in 2010**, making building energy use the second-largest source of community emissions (about 34%), behind on-road transportation. Increases in population and employment, along with rising temperatures and cooling demands, will increase building energy use and associated GHG emissions in the future without further action.

Building Energy Emissions by Fuel. Roughly 50% of total building energy emissions come from electricity generation, and 49% comes from the combustion of natural gas (see Figure 2-3). A relatively small amount of other fuels—wood, propane, and kerosene—are used in buildings in Sonoma County, representing 1% of building energy emissions.² Building energy measures in CA2020 are focused on the two major fuels used in buildings, although measures that improve building energy efficiency will also reduce emissions related to other fuels.

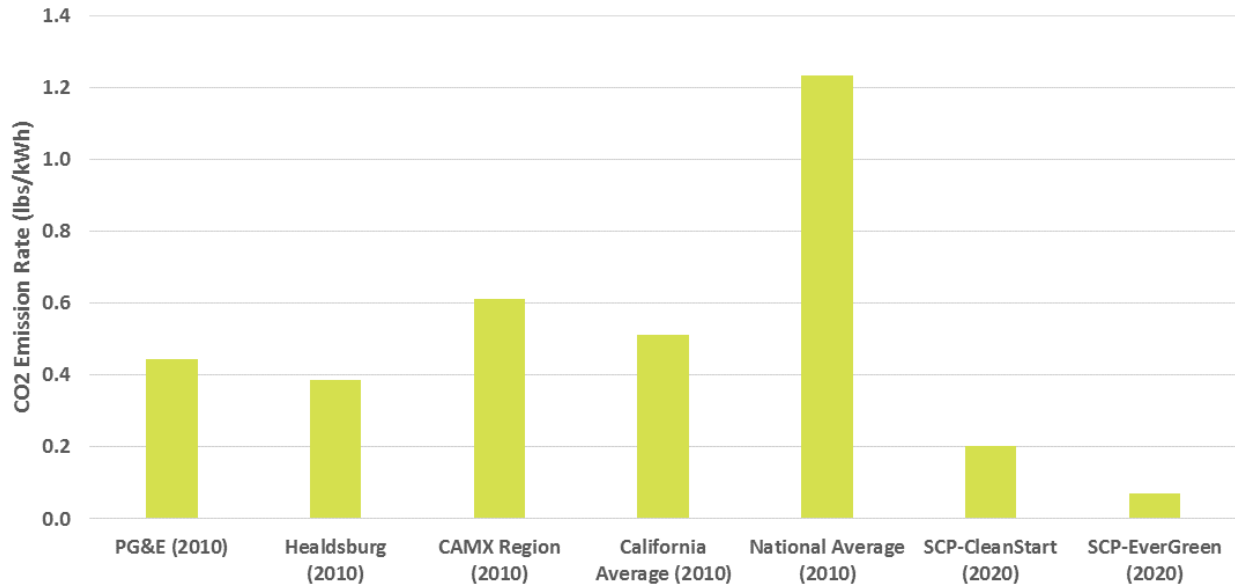
Figure 2-3. Building Emissions by Fuel



As shown in Figure 2-4, the electricity consumed in Sonoma County in 2010 was already relatively low in GHG intensity, compared to both U.S. and California averages. The two primary utilities serving the county in 2010—Pacific Gas & Electric Company (PG&E) and Healdsburg Electric—achieved lower emissions by procuring electricity generated by low-carbon and renewable sources, including hydropower, wind, solar, and geothermal.

² Approximately 6% of homes in the County use these fuels. GHG emissions represent only 1% of total building energy emissions because that source also includes electricity emissions and nonresidential emissions.

Figure 2-4. CO₂ Emissions Factor Comparison by Utility/Region



Continued pursuit of zero-carbon electricity sources presents a major opportunity to reduce emissions in Sonoma County. This includes both on-site electricity generation (such as rooftop solar) and reduced- or zero-carbon electricity generation portfolios provided by utilities. Sonoma Clean Power (SCP) was created in 2014 to offer low-carbon and zero-carbon electricity options for homes and businesses in Sonoma County. The predicted GHG intensity of SCP electricity in 2020 is also shown in Figure 2-4. Over time, both PG&E and SCP will pursue increasingly more renewable generation to comply with state climate and energy goals and ultimately surpass those state goals.

The 2014 power mixes for PG&E and SCP are shown in Figure 2-5.

Another opportunity to reduce emissions is presented by reducing or replacing natural gas with on-site photovoltaic (PV) electric generation. SCP, the County of Sonoma Energy and Sustainability Division, and the Northern Sonoma County Air Pollution Control District will be involved in creating the incentives to support this measure.

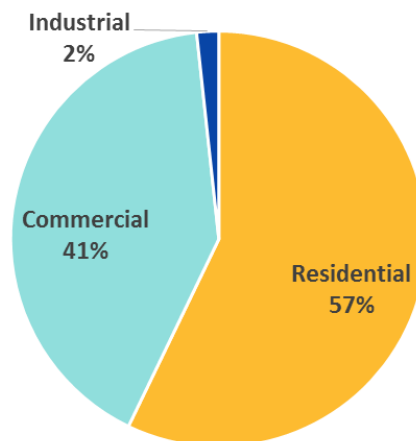
Figure 2-5. Comparison of PG&E and SCP 2014 Electric Power Generation Mixes

Electric Power Generation Mix*	PG&E	Sonoma Clean Power	
		CleanStart	EverGreen
Specific Purchases	Percent of Total Retail Sales (kWh)		
Renewable	27%	36%	100%
• Biomass & Biowaste	5%	3%	0%
• Geothermal	5%	12%	100%
• Eligible hydroelectric	1%	0%	0%
• Solar electric	9%	0%	0%
• Wind	7%	21%	0%
Coal	0%	0%	0%
Large hydroelectric	8%	44%	0%
Natural Gas	24%	0%	0%
Nuclear	21%	0%	0%
Other	0%	0%	0%
Unspecified Sources of Power	21%	20%	0%
TOTAL	100%	100%	100%

*The generation data represents 2014 and is provided in the "Annual Report to the California Energy Commission: Power Source Disclosure Program," excluding voluntary unbundled renewable energy credits. PG&E data is subject to an independent audit and verification that will not be completed until October 1, 2015.

Building Energy Emissions by End Use. Different building types use energy for different purposes, with different opportunities to reduce emissions (see Figure 2-6). In 2010, roughly 58% of building energy was used in homes, compared with 42% used in businesses, institutions, and other nonresidential settings.

Figure 2-6. Building Energy Emissions by End Use



Residential buildings consume energy for heating, cooling, hot water, lighting, and appliances. Policies and programs to reduce emissions from residential buildings must focus on reducing energy demand through conservation and improvements to building energy efficiency and meeting demand with low- or zero-carbon energy sources.

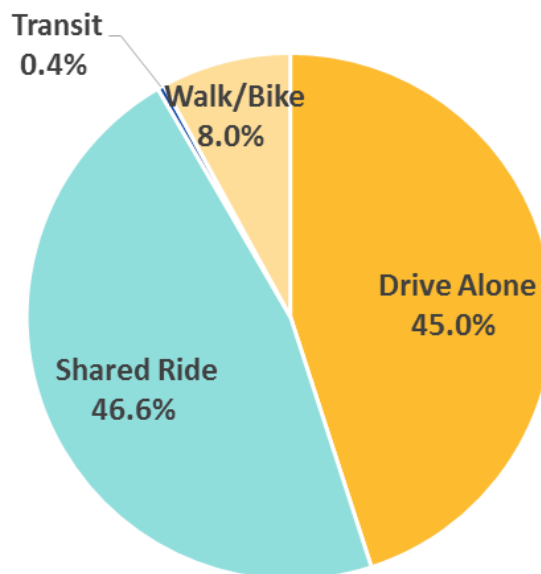
The energy needs of commercial buildings are more diverse. A retail building may have energy needs for lighting and air conditioning, while a hotel may have a very large demand for hot water. Measures to address emissions from nonresidential buildings must be designed with the unique needs of commercial and industrial buildings in mind.

Existing Emissions from Transportation

On-road transportation is the largest source of GHG emissions for the county; approximately 53% of total countywide emissions are from transportation, or nearly **2 million MTCO₂e**. Vehicle trips made by residents and employees within the county are expected to increase as the population and economy grow. Strategies to support alternative modes of transportation, improve transportation efficiency, and reduce vehicle miles traveled are therefore an essential part of CA2020.

Transportation Emissions by Mode. In 2010, motorists traveled more than 11 million vehicle miles in Sonoma County each day. These trips were taken primarily in passenger vehicles, with additional trips by commercial vehicles, transit vehicles, and other vehicle types. Figure 2-7 shows a breakdown of daily countywide trips by mode for 2010 for all trip purposes (e.g., home to work, home to school, nonresidential), as provided by the Sonoma County Transportation Authority.

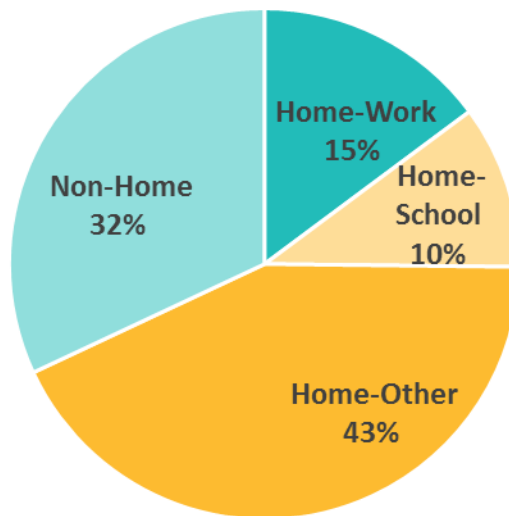
Figure 2-7. Sonoma County Daily Trips by Mode for 2010



Transportation Emissions by Purpose. Opportunities to reduce emissions from transportation must be based on an understanding of how, why, and where people travel in Sonoma County. The Sonoma County Transportation Authority’s Comprehensive Transportation Plan provides a 25-year transportation vision for Sonoma County. Comprehensive Transportation Plan goals include maintaining the current transportation system, reducing traffic congestion, reducing GHG emissions, improving safety and health, and promoting economic vitality. The plan includes bicycle and pedestrian projects, highway and local road infrastructure projects, technology projects (e.g., energy-efficient streetlights and signal timing), smart land use projects, and transit projects.

Most trips in Sonoma County (about 68%) are home-based trips. About two-thirds of these home-based trips are for purposes other than getting to/from work or school. Non-home trips include all trips that do not begin or end at home, including commercial or business-related trips. Figure 2-8 shows a breakdown of daily countywide trips by purpose for 2010, as provided by the Sonoma County Transportation Authority.

Figure 2-8. Sonoma County Daily Trips by Purpose for 2010

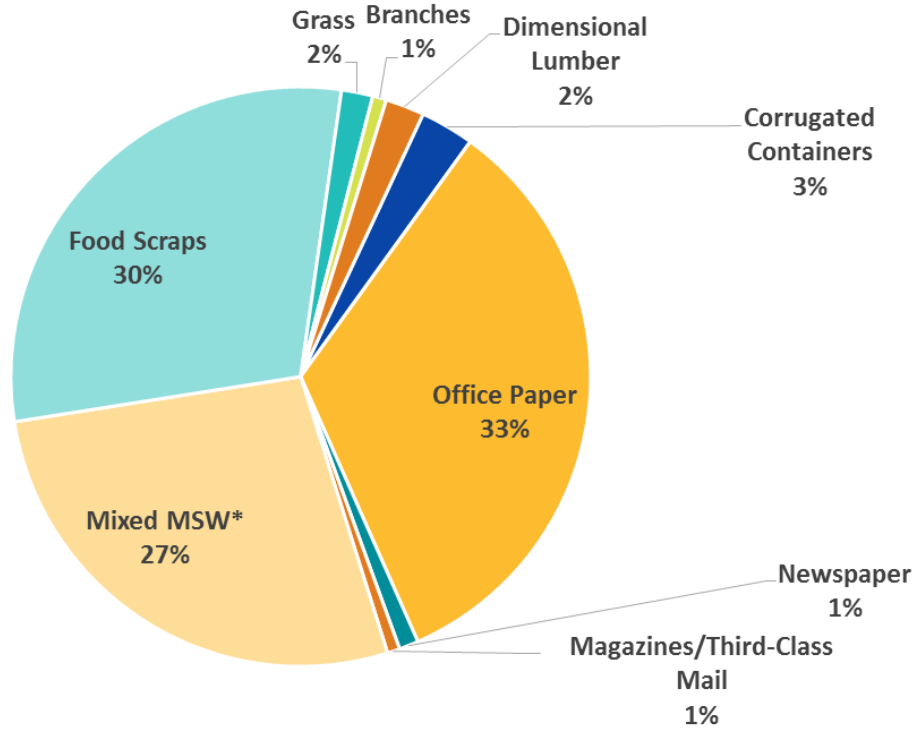


Existing Emissions from Solid Waste

In 2010, county residents and businesses generated an estimated 1.3 million tons of solid waste, 350,000 tons of which was landfilled, generating about **134,000 MTCO₂e** (about 4% of total 2010 emissions). About 58% of this waste comes from commercial sources and 42% from residential sources. Increasing population and employment means more solid waste and associated GHG emissions in the future without further action. Strategies to reduce waste generation, increase waste diversion from landfills (such as through recycling and composting), and increase methane capture are therefore essential parts of CA2020.

Waste landfilled in the county includes a variety of waste categories, such as paper, plastic, glass, and food. Figure 2-9 shows a breakdown of waste emissions by waste type for 2010.

Figure 2-9. Sonoma County Solid Waste Emissions by Waste Type for 2010



* "Municipal solid waste" or "MSW" means all solid wastes generated by residential, commercial, and industrial sources, and all solid waste generated at construction and demolition sites, at food-processing facilities, and at treatment works for water and waste water, which are collected and transported under the authorization of a jurisdiction or are self-hauled. Municipal solid waste does not include agricultural crop residues, animal manures, mining waste and fuel extraction waste, forestry wastes, and ash from industrial boilers, furnaces and incinerators (see: <http://www.calrecycle.ca.gov/laws/regulations/title14/ch9a3.htm>).

Existing Emissions from Water and Wastewater

In 2010, energy used to convey potable water and treat wastewater resulted in GHG emissions of more than **18,000 MTCO₂e** (about 0.5% of total 2010 emissions). County residents and businesses consumed more than 20 billion gallons of water in 2010 and are expected to consume nearly 27 billion gallons by 2020 under BAU conditions, an increase of 28%. This increased water use also means more wastewater generation, resulting in increased GHG emissions in the future without further action. Water resources, including surface and groundwater, are essential parts of the county community and economy. Given the potential for future reductions in water supplies as a result of climate change, water conservation and wastewater treatment are critical strategy areas for CA2020.

The water conveyance emissions include those from large municipal water providers including, but not limited to, the Sonoma County Water Agency (SCWA) wholesale water system, systems operated by SCWA’s retail water contractors, and the smaller supplier-produced groundwater providers. Electricity use (and associated emissions) for private domestic and agricultural wells is accounted for in CA2020 under building energy.

Water Use by Source and End Use. Water conveyance resulted in approximately 3,600 MTCO₂e of emissions in the county in 2010. These emissions represent energy use for water supply and treatment activities and include SCWA operations, groundwater pumping, and recycled water use. SCWA is a water wholesaler that provides water to retail water contractors (primarily cities and water districts). The 2010 emissions from water conveyance are already lower than they would be otherwise because of SCWA’s program to create a zero-carbon water system by 2015. SCWA water contractors provide about 56% of the water supply within the county. End uses of this water include residential, commercial, landscaping, and other uses. Single- and multi-family residential water use represents 68% of all water deliveries by retailers in the county.

Figure 2-10 shows a breakdown of water supply by source for 2010, while Figure 2-11 shows a breakdown of water use by sector for 2010

Figure 2-10. Sonoma County Water Supply by Source for 2010

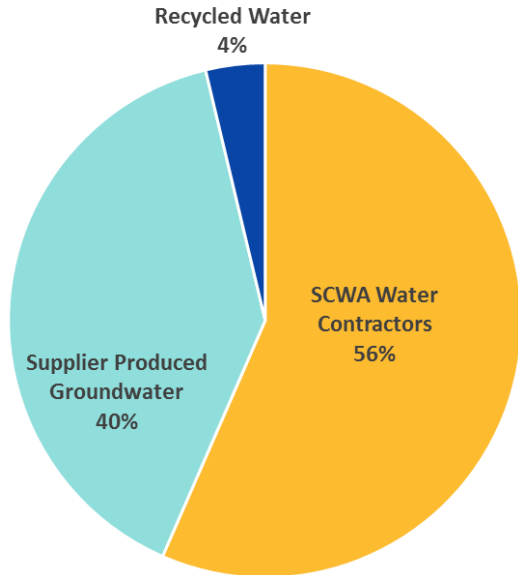
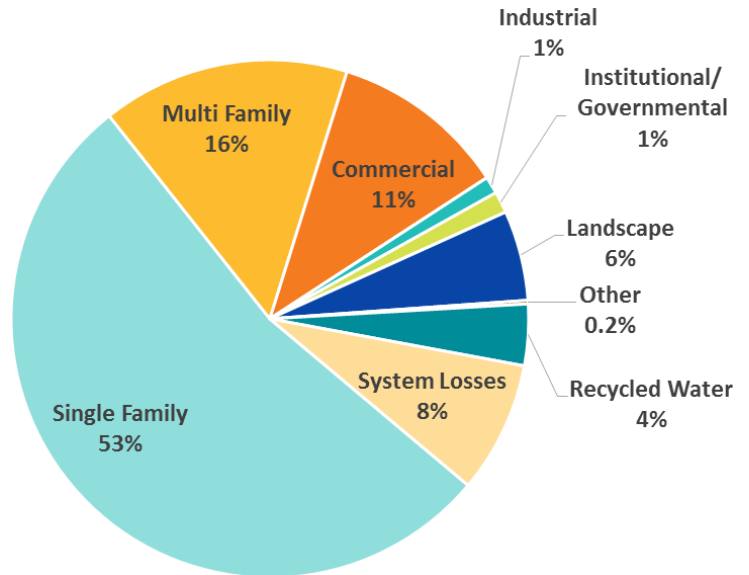


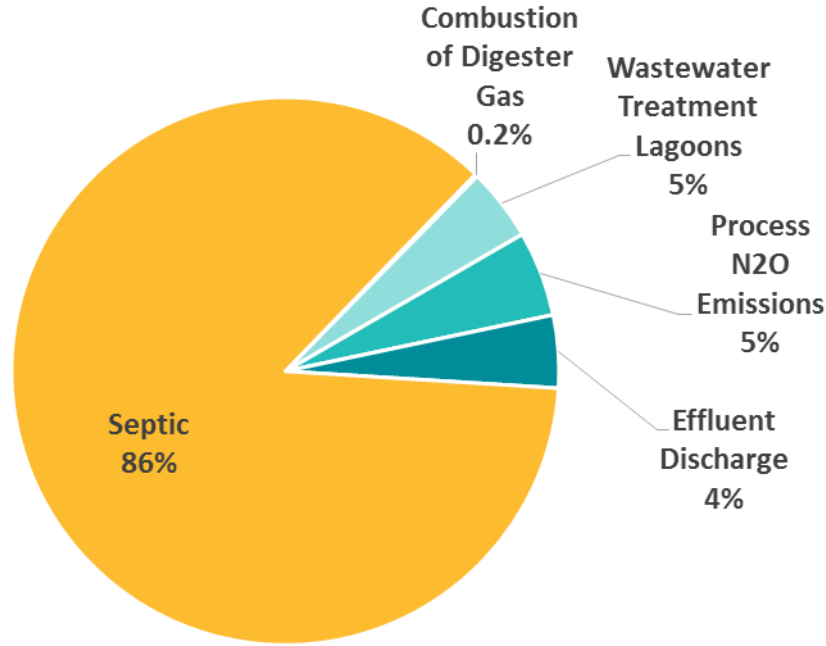
Figure 2-11. Sonoma County Water Use by Sector for 2010



Wastewater Emissions by Source. Wastewater treatment resulted in approximately 15,000 MTCO₂e of emissions in the county. Wastewater treatment includes a variety of different processes, each of which releases CH₄ and N₂O emissions. The majority (86%) of wastewater emissions in the county are from individual septic systems, which serve approximately 24% of the countywide population. Wastewater treatment plants (WWTPs) serve the remaining 76% of the county population, and emissions from WWTPs represent 13% of total wastewater treatment

emissions (WWTPs produce fewer emissions per person served than septic systems). Figure 2-12 shows a breakdown of wastewater emissions by source for 2010.

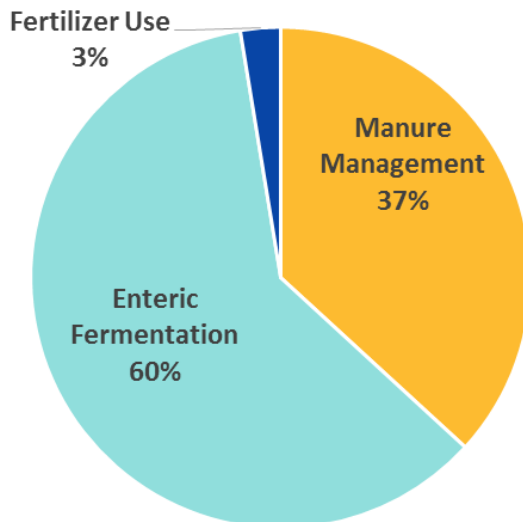
Figure 2-12. Sonoma County Wastewater Emissions by Source for 2010



Existing Emissions from Livestock and Fertilizer

Livestock and fertilizer emissions are the third-largest source of emissions in Sonoma County overall after transportation and building energy, accounting for just over **7% of emissions in 2010** (see Figure 2-13). The primary emissions are CH₄ generated by manure storage and enteric (digestive) fermentation and N₂O generated by fertilizer application.

Figure 2-13. Livestock and Fertilizer Emissions by Source



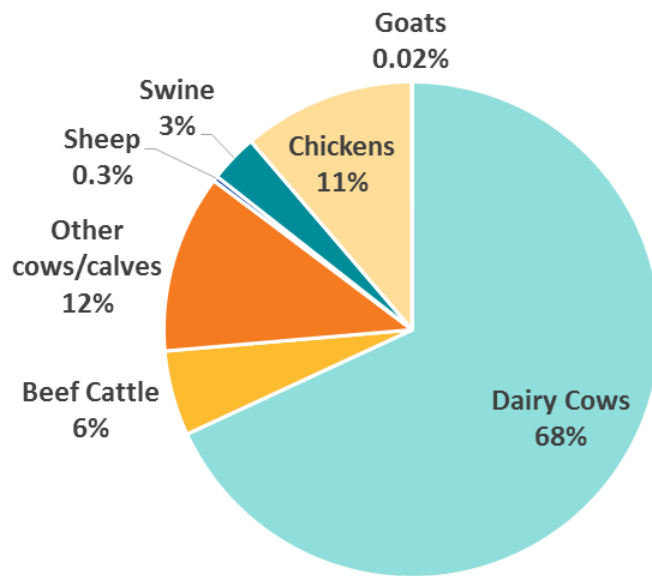
Methane and Nitrous Oxide from Livestock Operations. The majority (97%) of emissions from livestock and fertilizer come from livestock operations (mostly dairy cows) (see Figure 2-14). These emissions arise from the management of livestock manure and livestock enteric fermentation (digestion).

Manure creates both CH₄ and N₂O as it biodegrades. The amount of CH₄ generated varied considerably depending on the type of manure management used. Well-managed pasture systems and aerobic dry composting systems tend to have lower emissions, while anaerobic wet handling systems generate more CH₄.

Dairies in Sonoma County are now predominantly organic, which means that dairy cows must spend at least 1/3 of their time in pasture. This trend has reduced emissions from livestock manure. Dairy farmers are also growing more livestock feed on-site, rather than importing feed, which also reduces GHG emissions related to the transportation of imported feed.

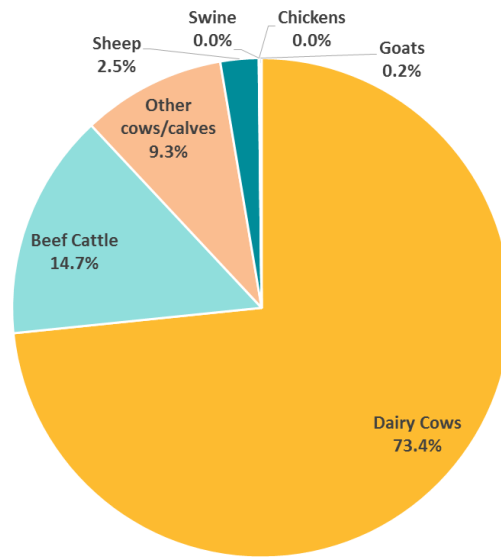
Nonetheless, significant opportunity exists to promote manure management practices that reduce emissions, including practices that rely on anaerobic digesters, dry composting, pasture management and waste-to-energy facilities.

Figure 2-14. Manure Management Emissions by Livestock Type



The other major emissions source is enteric fermentation, again mostly from dairy cows (see Figure 2-15). Enteric fermentation is the process of microbial fermentation that produces CH₄ during animal digestion (ICLEI – Local Governments for Sustainability 2012).

Figure 2-15. Enteric Fermentation Emissions by Livestock Type

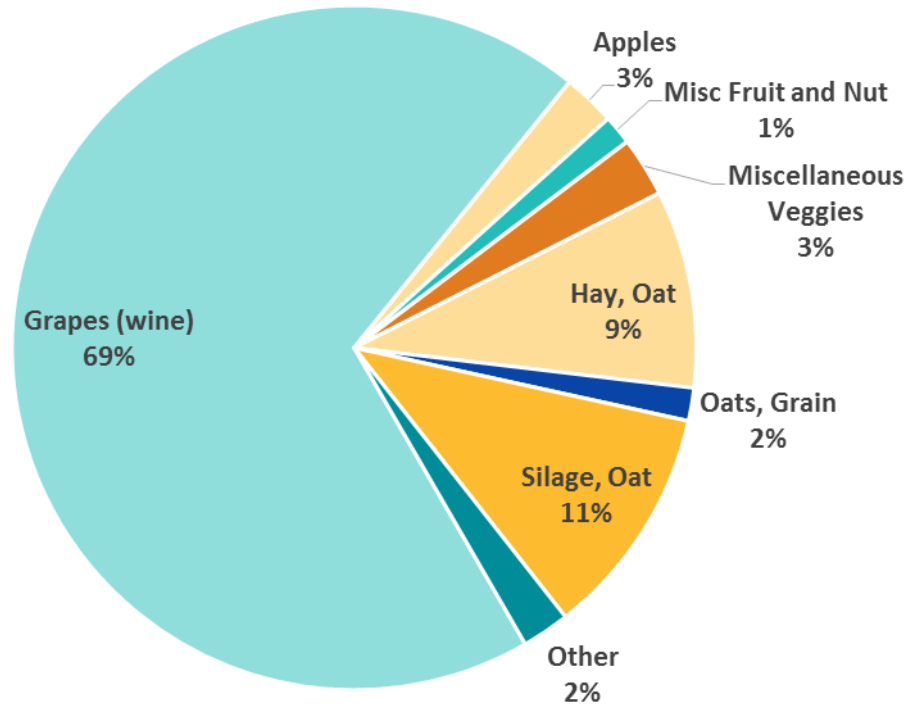


CH₄ emissions can be reduced through animal diets that create a digestive environment that is less conducive to methanogens, although opportunities to significantly reduce enteric emissions are currently limited. Such options include dietary oils (e.g., whole cottonseed oil, sunflower oil, coconut oil, palm oil), the use of corn or legume silage in place of grass silage, and the use of concentrate feeds, nitrates, ionophores, and tannins. Improving forage quality and overall efficiency in dietary nutrient use are other options.

Emissions from Fertilizer Use. The remainder (3%) of emissions from livestock and fertilizer is mainly from the application of nitrogen-based fertilizers (see Figure 2-15). N₂O is emitted when nitrogen is added to the soil through the use of synthetic fertilizers. Fertilizer application is the largest source of N₂O emissions in the U.S., accounting for about 74% of total U.S. N₂O emissions in 2013 (U.S. Environmental Protection Agency 2015). Different crops use fertilizer at different rates; therefore, the rate of emissions from fertilizers varies by crop type; soil management, including irrigation; and fertilizers used.

Despite having a relatively low rate of fertilizer use, wine grape production in the county is responsible for the majority of N₂O emissions associated with fertilizer use because of the total amount of acreage devoted to wine grapes (see Figure 2-16).

Figure 2-16. Total Fertilizer Emissions by Crop Type



Source: U.S. Department of Agriculture National, Agricultural Statistics Service. 2013. *QuickStats Ad-hoc Query Tool*. Available: <http://nassgeodata.gmu.edu/CropScape/>. Accessed: November 2013.

2.3.2 GHG Emissions in Sonoma County by Jurisdiction

Changes in emissions by jurisdiction over time are a product of a number of factors, including economic and population growth, annexations, urban growth boundaries, an emphasis on city-centered growth, and changes in efficiency, energy sources, and behavior (see Table 2-4).

Forecasts for future growth in emissions by jurisdiction are based on socioeconomic projections developed by each jurisdiction. More discussion of the factors that drive growth (or reductions) in emissions within in each jurisdiction’s boundary over time is provided in Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*.

Table 2-4. GHG Inventory and Forecast Results by Jurisdiction and Year

Jurisdiction	Emissions (MTCO ₂ e)					
	Backcast	Inventory	BAU Forecasts			
	1990	2010	2015	2020	2040	2050
<i>Emissions by Jurisdiction</i>						
Cloverdale	57,300	59,000	69,300	73,300	93,200	93,800
Cotati	51,500	52,100	57,300	61,300	69,000	70,900
Healdsburg	93,500	108,800	117,000	121,000	123,700	121,100
Petaluma	387,000	441,900	505,000	543,000	580,900	588,600
Rohnert Park	291,300	264,300	317,400	372,700	371,800	378,600
Santa Rosa*	1,123,100	1,065,200	1,338,400	1,396,900	1,844,700	2,027,500
Sebastopol	73,200	76,300	85,300	93,000	96,500	97,100
Sonoma	96,900	103,400	117,400	122,200	132,500	131,200
Windsor	133,000	157,800	178,300	188,100	212,000	216,500
Unincorporated Sonoma County	1,244,300	1,004,500	1,065,300	1,128,800	1,205,600	1,218,300
<i>Emissions Not Assigned to Individual Communities</i>						
Fertilizer and Livestock	392,800	267,600	254,400	242,600	193,500	169,000
Sonoma County Total	3,944,000	3,601,000	4,105,000	4,343,000	4,923,000	5,113,000
* 2040 and 2050 forecasts for Santa Rosa were derived from the City's CAP. Emissions for each source for the years 2020 and 2035 were linearly extrapolated to 2040 and 2050.						

2.3.3 How Does This Analysis Differ from Previous Inventories?

The GHG inventories prepared for Climate Action 2020 are the most comprehensive look at community-wide GHG emissions in the county to date. This is the first time that a community-wide measurement for each jurisdiction has been completed across all seven sources. They are also based on the most current emissions factors and methodologies in use for community climate action planning in California. However, this is not the first time emissions have been measured in Sonoma County. Local governments and community-based organizations have been measuring

Municipal GHG Inventories in Sonoma County:

In 2002 and 2003, the Sonoma County jurisdictions prepared municipal GHG inventories, with assistance from the Climate Protection Campaign. The Climate Protection Campaign helped the jurisdictions track and reduce emissions from their municipal operations, using a variety of tools, and released annual GHG report cards.

GHG emissions since the early 2000s. Because of differences in protocols, datasets, and emissions factors used, past measurements cannot be compared directly against CA2020 measurements. Nonetheless, they are still important benchmarks in the history of climate action in Sonoma County. The community-wide inventories developed by the Center for Climate Protection (formerly the Climate Protection Campaign) reveal a trend over time that helps show how local climate leadership has influenced local emissions. The inventories prepared by the Center for Climate Protection can be found on its website (<http://climateprotection.org/our-work/reports/>).

The City of Santa Rosa adopted a community climate action plan in 2012. The inventory developed by Santa Rosa for its CAP was calculated by using the best available data and methodology at the time. Santa Rosa's 2007 baseline inventory provides a foundation for the City's adopted target to reduce emissions to 25% below 1990 levels by 2020 (the City's 1990 emissions estimate was calculated as 15% below the 2007 baseline inventory). Santa Rosa's inventory and estimated GHG reductions through measures in its CAP have been integrated into CA2020 through inclusion of the city's commitments in Chapter 3, *Reducing Community Emissions*, and Chapter 5, *Community Greenhouse Gas Profiles and Emissions Reductions for 2020*. An updated 2010 inventory for the City of Santa Rosa is included to give the city more information about progress toward its 2020 target and provide a consistent data set for all jurisdictions. Updated 2020, 2040, and 2050 BAU forecasts for Santa Rosa were not conducted; the forecast values in this document are derived from Santa Rosa's CAP. Emissions for each source for the years 2020 and 2035 were linearly extrapolated to 2040 and 2050.

2.4 Other Emissions Sources and Carbon Sinks

The activity-based GHG inventory approach outlined in Section 2.2 does not include all human activities in Sonoma County that drive an increase or decrease in atmospheric GHG emissions. CA2020 does not address every source of emissions; rather, it tries to move the needle on the largest emissions sources that can most directly be influenced by local government action.

- Several categories of emissions and potential emission reductions are separate from the community-wide GHG inventory. Carbon sinks through biological carbon sequestration
- Consumption of goods and services imported into Sonoma County
- Industrial and commercial stationary sources
- Air travel

These additional sources and sinks are explored in the following sections.

2.4.1 Biological Carbon Sequestration

Biological carbon sequestration is the process of removing carbon dioxide from the atmosphere and storing it as carbon (i.e., photosynthesis) in vegetation, such as trees, shrubs and grasses, and soil, thereby reducing atmospheric carbon. Various ecological processes transfer carbon between the atmosphere, vegetation, and the soil, including photosynthesis, respiration, and decomposition. This terrestrial, or biological, sequestration occurs on agricultural lands (including cropland and grazing land), non-agricultural rural lands (including forests and grasslands), and urban forests.

When disturbed through human activities or natural disturbances, stored carbon can be released to the atmosphere. Conversely, natural and working lands can be protected and managed in ways that actually increase carbon sequestration. Thus, sequestering and storing carbon on natural and working lands is essential to reducing carbon in the atmosphere.

Natural and working lands are also essential “green infrastructure” assets because of the many ecosystem services they provide as well as their essential role in a healthy county economy. Many climate readiness objectives are furthered through the preservation and enhancement of natural and working lands, including trees, vegetation, and soils, as outlined in Chapter 6, *Sonoma County Climate Readiness*.

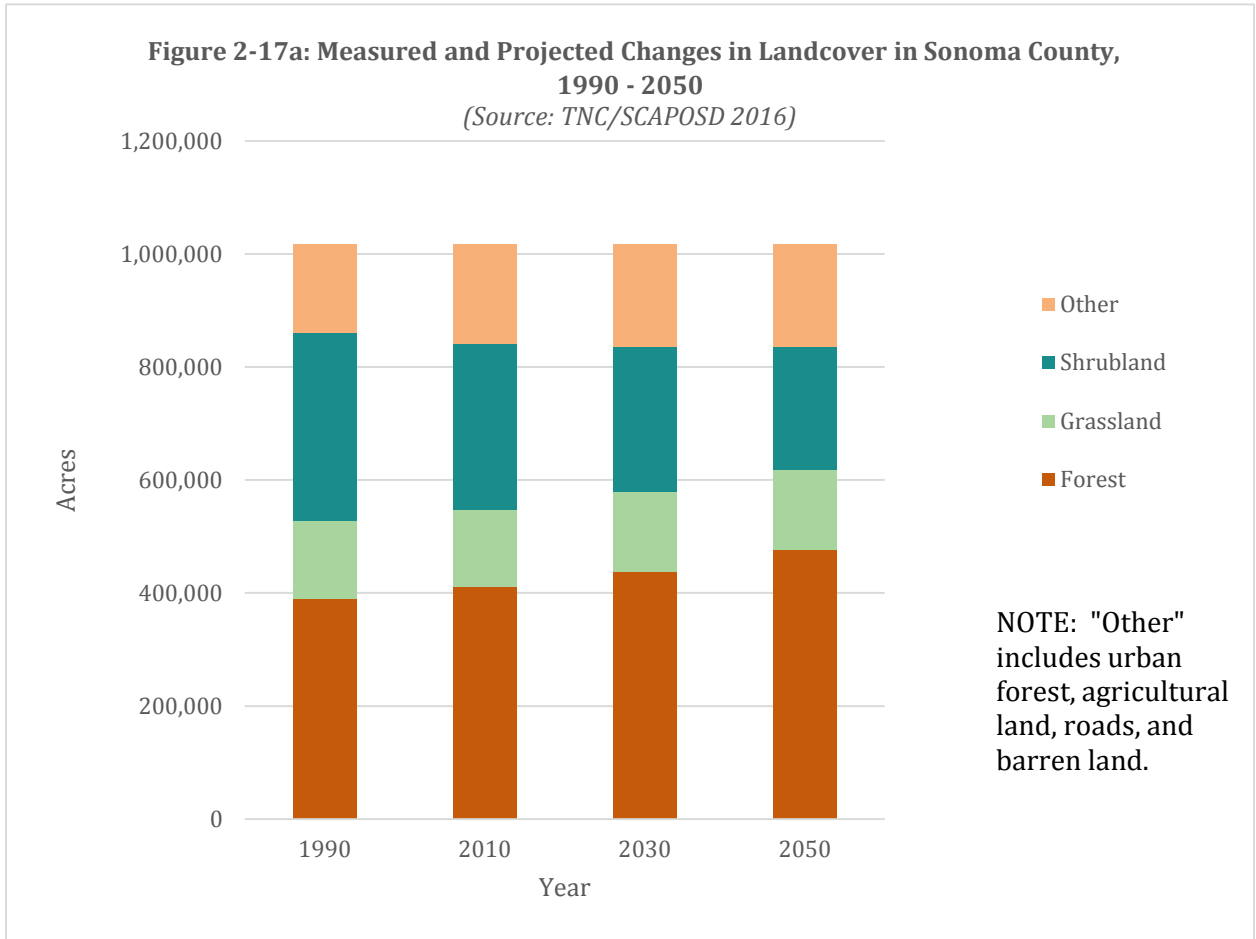
The ICLEI *U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions* recommends that emissions sinks (i.e., sequestered carbon) be disclosed but not combined with other emissions created by human activity in an emissions inventory. While estimates of carbon sequestration are not included in the CA2020 inventory, a new report titled *Conserving Landscapes, Protecting the Climate: The Climate Action Through Conservation Project* (CATC) describes a pilot project that, among other things, provides an estimate of carbon stocks in Sonoma County in various land cover categories. (The Nature Conservancy and Sonoma County Agricultural Preservation and Open Space District, 2015). Figures B5 and B6 from the CATC report (shown as Figure 2-17a and Figure 2-17b, below) show total acres by land cover as well as carbon storage estimates for 1990 and 2010 and projections for 2030 and 2050.

Green infrastructure is a “cost effective, resilient approach to managing wet weather impacts that provides many community benefits.”

Ecosystem services are “the many life sustaining benefits we receive from nature—clean air and water, fertile soil for crop production, pollination, and flood control.”

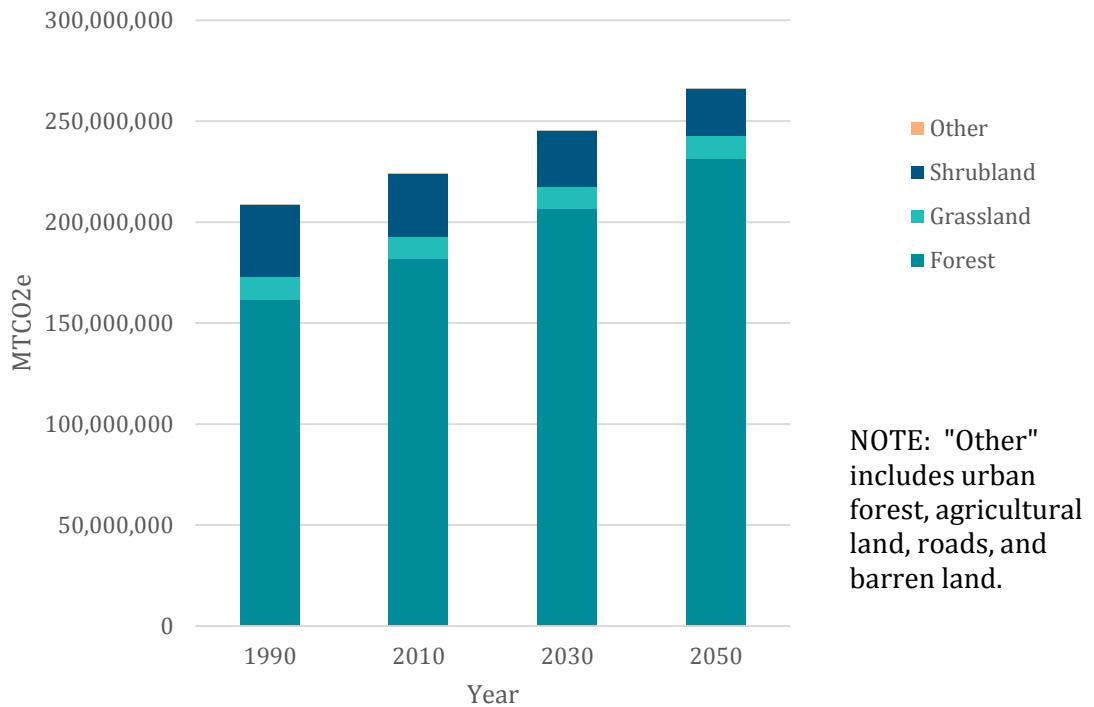
U.S. Environmental Protection Agency

Figure 2-17. Projection of land cover and carbon storage (CO₂e) by cover class to 2050³



³ This figure is from the Climate Action Through Conservation Project report. This report can be found at the following link: http://scienceforconservation.org/dl/CATC_Final_Jan2016.pdf

Figure 2-17b: Measured and Projected Changes in Landscape Carbon Storage in Sonoma County, 1990 - 2050
 (Source: TNC/SCAPOS 2016)



Although CA2020 focuses on reducing other sources of GHG emissions, Sonoma County is already taking steps to identify how human activities impact biological carbon emissions and support land management and conservation practices that reduce emissions and increase biological carbon sequestration. Indeed, improved baseline storage carbon storage estimates, such as those presented in the CATC pilot project, will ultimately become part of a framework to increase biological carbon sequestration through protection and management of open and working lands and sustainable agricultural practices. The CATC project also describes new tools for analyzing the carbon sequestration effects (positive or negative) of future land use and land management changes and for tracking these changes over time. These tools will ultimately enable land managers and decision makers to estimate the value of conserving natural and working lands in the county, as well as the potential to sequester more carbon through restoration and management. The CATC project will inform future steps that the RCPA and its partners will undertake to meet long-term climate protection goals. See Chapter 3, *Reducing Community Emissions*, for more discussion about how this will be addressed in CAP implementation.

Sonoma County Vegetation Mapping Project

The Sonoma County Vegetation & Habitat Mapping Project is a program of the Sonoma County Agricultural Preservation and Open Space District and Sonoma County Water Agency, with contributions from the National Aeronautics and Space Administration, California Department of Fish and Wildlife, United States Geologic Survey, Sonoma County Department of Transportation and Public Works, City of Petaluma, The Nature Conservancy, and the University of Maryland. Products include a fine scale vegetation map for the county, county wide LiDAR, as well as products and tools that document the amount of carbon sequestered in natural and working lands. Sonoma Veg Map (sonomavegmap.org) complements and supports another initiative known as Climate Action Through Conservation (CATC), which provides a way for Sonoma County, other local governments, land managers, and planners to understand the links between climate benefits and conservation values and incorporate that knowledge into decisions about land use and land management.

Many owners and managers of natural and working lands are already implementing practices that increase sequestration and storage of carbon. Examples of practices already being utilized locally include:

- Buffer or Filter Strips
- Compost Application
- Forest Stand Improvement
- Hedgerow or Shelterbelt Planting
- Mulching
- Nutrient/Manure Management
- Reduced or No-Till Farming
- Cover cropping
- Riparian Restoration
- Tree and Shrub Establishment- Windbreaks, Silvopastures
- Wetland Restoration
- Prescribed grazing

Carbon Farming

Land management is the second largest contributor to carbon dioxide emissions on planet earth. Agriculture is the one sector that has the ability to transform from a net emitter of CO₂ to a net sequesterer of CO₂ – there is no other human managed realm with this potential. Common agricultural practices, including driving a tractor, tilling the soil, over grazing, using fossil fuel based fertilizers, pesticides and herbicides result in significant CO₂ release. Alternatively, carbon can be stored long term (decades to centuries or more) beneficially in soils in a process called soil carbon sequestration. *Carbon farming* involves implementing practices that are known to improve the rate at which CO₂ is removed from the atmosphere and converted to plant material and/or soil organic matter. Carbon farming is successful when carbon gains resulting from enhanced land management and/or conservation practices exceed carbon losses. Preliminary analysis suggests that Carbon Farming can beneficially sequester an average of **over 65 metric tons of carbon per acre across 264,693 acres** of agricultural and grazing lands in Sonoma County, potentially resulting in **over 17 million metric tons of additional CO₂e removed from the atmosphere.**

Carbon Cycle Institute, 2016

2.4.2 Emissions from Consumption of Goods and Services

Consumption-based emissions are approximately double the emissions counted in an activity-based inventory, underscoring the importance of reducing consumption-based emissions to achieve long-term GHG reduction goals. Addressing consumption-based emissions also creates an opportunity to engage a wider range of community members and stakeholders who may not see their impact or their opportunity for action in a purely activity-based approach.

As discussed in the introduction to this Chapter, this CAP uses an activity-based inventory that calculates emissions from human activities within Sonoma County. It does not account for global carbon emissions that result from local consumption of goods and services that are produced outside Sonoma County, though it does include emissions associated with the production of goods that are grown or made in Sonoma County, including those consumed outside the county.

An alternative approach to quantifying GHG emissions is a so-called “consumption-based” inventory, which includes global lifecycle emissions associated with products (including food) and services used in a particular geographic location or population. These inventories include emissions from fuels and materials used in buildings, transportation, and the production of goods and services outside the local area, including food. A consumption-based approach also looks at total product lifecycle and supply chain emissions, including those associated with harvesting or mining raw materials, manufacturing and processing, and transportation to market. It also includes product use, disposal, and degradation. Most importantly for the purposes of this CAP, consumption-based inventories focus primarily on indirect emissions resulting from individual and household choices over which local communities have little direct control, whereas activity-based inventories, like the one included in this CAP, focus on those emissions that a local jurisdiction can more directly influence. While this CAP does not include a consumption-based inventory, Chapter 3 does include measures that will help reduce consumption based emissions in the future.

A recent study (Jones & Kammen, UC Berkeley, 2015) presented the first consumption-based inventory of San Francisco Bay Area neighborhoods, cities and counties. According to the study, consumption-based emissions in 2013 were 44.3 metric tons of CO₂e per household in the Bay Area, compared to 50 metric tons for the average U.S. household. Consumption-based emissions in Sonoma County communities were found to be generally lower than the Bay Area average, ranging from 37.4 to 44.7 metric tons per household. Countywide, consumption-based emissions are estimated at 40.4 metric tons per household, about 10% lower than the Bay Area average.

The consumption-based approach used in the UC Berkeley study accounts for much greater emissions from food, goods and services than the activity-based approach used in this CAP. For example, under the consumption-based approach, food generates 19% of all GHG emissions, roughly 3 times more emissions than household energy use. Likewise, goods and services contribute 18% of total emissions. Accordingly, total Sonoma County emissions under the consumption-based approach were 7.2 MMT CO₂e in 2013 (the inventory year in the UC Berkeley

study), compared to 3.7 MMT in the 2010 inventory based on the activity-based approach used in this CAP. Again, with consumption-based emissions approximately double the emissions counted in an activity-based inventory, reducing consumption-based emissions is essential to achieving long-term GHG reduction goals.

Figure 2-18. Average Household Carbon Footprint in Sonoma County⁴



Community-based programs like GoLocal Sonoma County already help reduce consumption-based emissions by promoting local goods and services purchases that typically have a smaller carbon footprint. Local communities also have “buy local” preferences for municipal purchases.

Many of the GHG reduction measures included in this CAP will also reduce consumption-based emissions. For example, moving toward 100% renewable electricity (including both utility-scale and distributed generation), combined with electrification of vehicles and heating, will dramatically reduce consumption-based emissions from transportation and building energy. Likewise, land use and transportation measures in this CAP that focus on higher density infill development near transit will also reduce household carbon footprints. In addition, the *Advanced Climate Initiatives* in Chapter 3 include strategies to reduce emissions related to the consumption of food, goods and services as well as land use and sustainable agriculture strategies that focus on retaining and increasing carbon sequestration in soils and vegetation.

Acknowledging that the activity-based approach alone is incomplete is an important step in understanding the underlying causes of global warming and defining opportunities to reduce our contributions.

2.4.3 Industrial and Commercial Stationary Sources

Emissions from existing industrial and commercial stationary sources (except for natural gas combustion) are not included in the GHG inventory because the County and cities have limited jurisdictional control over existing large stationary sources. Large, stationary point-source emissions are regulated by the State of California (under Assembly Bill 32 through cap and trade) and through the U.S. Environmental Protection Agency (under the Clean Air Act) for GHG emissions. New stationary source emissions that are also subject to local land use authority could be subject to additional emissions reductions mandated by a local entity. However, any such

⁴ 2015 University of California, Berkeley, study, A Consumption-Based Greenhouse Gas Inventory of San Francisco Bay Area Neighborhoods, Cities and Counties, by Christopher Jones and Daniel Kammen.

requirements would need to account for state and federal regulation of such sources before determining if additional reductions are needed. Such determinations are highly source specific, given the complexity of state and federal regulations. As such, the forecasts in CA2020 exclude new industrial and commercial stationary sources. These sources are not covered by CA2020 but would need to be addressed on a case-by-case basis if and when a local land use authority has jurisdiction over such new sources. These sources include combustion of fossil fuels of any type, *except* natural gas (such as diesel, fuel oil, propane, kerosene, wood, digester gas, etc.), and fugitive emissions from industrial processes for each jurisdiction.

Natural gas use from industrial and commercial sources is included as part of the inventory and forecasts for CA2020. Stationary fuel combustion and process emissions associated with fuels other than natural gas were not included because of data limitations as well as concern about duplication of state and federal regulation of such point sources.

2.4.4 Emissions from Air Travel

Emissions resulting from air travel are not included in the inventory because of the challenges in determining the origin and/or destination of flights and because Sonoma County communities do not have control over aircraft sources. Regulation of emissions from aircraft occurs at the federal level. Consequently, emissions from air travel are considered out of scope for this inventory.

Although emissions directly produced by aircraft are not included in the inventory, airport-related emissions (such as energy use in airport buildings) in the county are captured in the inventory and forecasts. Emissions from airport building energy and aircraft ground-support equipment are captured under building energy and off-road transportation and equipment, respectively.

3. Reductions

Reducing Community Emissions

Chapter 3

Reducing Community Emissions

3.1 Introduction

Climate Action 2020 (CA2020) identifies strategies that will reduce regional (countywide) greenhouse gas (GHG) emissions in the near term and put Sonoma County communities on track toward the long-term goals of reducing emissions by 40% below 1990 levels by 2030 and 80% below by 2050. The reduction measures identified in CA2020 support (and actually substantially exceed) the state's 2020 climate protection goals.

GHG reduction measures in CA2020 will be implemented at three levels.

- **State** measures adopted and implemented by state agencies, including statewide fuel efficiency standards and renewable portfolio standards for electricity generation.
- **Regional** measures implemented by cross-jurisdictional agencies like the Regional Climate Protection Authority (RCPA), Sonoma Clean Power (SCP), transit agencies, and waste management and water supply agencies.
- **Local** actions implemented by the cities and the County. These local measures include voluntary, incentive-based, and regulatory approaches.

This chapter explains how, through the implementation of more than 60 state, regional, and local reduction measures, Sonoma County communities can achieve the regional GHG reduction target of 25% below 1990 levels by 2020. Table 3-1 shows how this combination of state, regional, and local measures will meet the reduction target.

Table 3-1. Achieving Sonoma County’s 2020 Greenhouse Gas Reduction Target—Summary

Parameter	Emissions (MTCO ₂ e)
2020 Business as Usual (BAU) GHG Emissions Forecast ¹	4,343,000
2020 Community Emissions Reduction Target (25% below 1990 levels)	2,957,900
Total₁ Reductions Needed to Reach Target	1,385,100
2020 Emissions Reductions from State Measures	744,100
2020 Emissions Reductions from Regional Measures	177,500
2020 Emissions Reductions from Local Measures (w/Santa Rosa CAP)	474,800
Total₂ Emissions Reductions Achieved by Climate Action Strategies	1,396,400
2020 Countywide Emissions under CA2020	2,946,600
<i>Emissions Reductions in Excess of Target (Total₂ minus Total₁)</i>	11,300

¹ 2020 BAU GHG emissions do not include stationary sources

In addition to specific measures to achieve the GHG reduction target for 2020, this plan also includes longer-term goals to provide a foundation for even deeper GHG reductions beyond 2020 (see Section 3.2.2). Section 3.2.3 describes several advanced climate initiatives included in this plan to give Sonoma County a head start on achieving those goals.

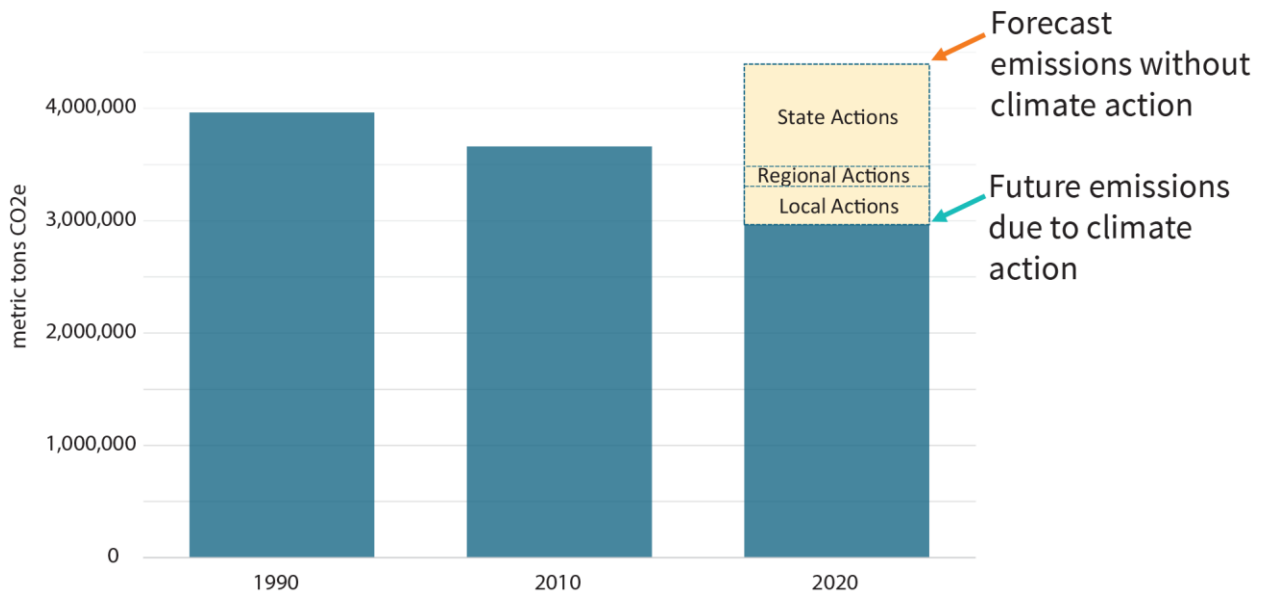
3.2 Greenhouse Gas Reduction Target and Goals

3.2.1 Climate Action 2020 Target

CA2020 was motivated by a need to identify specific near-term actions to reduce GHG emissions and to establish updated goals for 2020 and beyond. The year 2020 is an important milestone because of California’s Global Warming Solutions Act (Assembly Bill [AB] 32), which seeks to reduce statewide GHG emissions down to 1990 levels by 2020. Sonoma County jurisdictions were significantly more ambitious than the state when, in 2006, they adopted a goal of 25% below 1990 levels by 2015. Even though no formal GHG reduction plan was adopted, that ambition has driven positive results: emissions in 2010 were already 7.5% lower than 1990 levels. However, the county is not expected to meet its goal of 25% below 1990 in 2015.

Therefore, Sonoma County jurisdictions have agreed to an updated countywide target of 25% below 1990 levels by 2020, illustrated in Figure 3-1. This goal is ambitious because it is significantly greater than the state’s AB 32 2020 target, but it is also achievable through the state, regional, and local GHG reduction measures outlined in this chapter.

Figure 3-1. Achieving Sonoma County’s 2020 Greenhouse Gas Reduction Target



3.2.2 Long-Term Goals and Vision

As discussed in Chapter 1, *The Framework for Sonoma County Climate Action*, the scientific consensus about the long-term ramifications of unchecked human-induced climate change has already been integrated into state policy. Governor Schwarzenegger’s 2005 Executive Order (EO S-03-05) sets a long-term statewide goal of 80% below 1990 emissions levels by 2050. In order to reach this target, the state will have to go well beyond the steps included in the AB 32 Scoping Plan for 2020. Accordingly, in April 2015, Governor Brown issued Executive Order EO B-30-15 establishing an interim reduction target of 40% below 1990 levels by 2030 and directing the California Air Resources Board to update the AB 32 Scoping Plan to reflect that target. The updated Scoping Plan is expected in late 2016. The state legislature is also considering Senate Bill (SB) 32, which, if adopted, would establish the 2030 goal as a legislative mandate, thus broadening its legal applicability.

In adopting this CAP, RCPA will also adopt long-term goals to reduce GHG emissions by 40% by 2030 and by 80% by 2050. Although the specific path to reach these goals has not yet been determined—neither locally nor by the State of California—it is clear that pursuing the ambitious 2020 target puts the county on a solid trajectory toward meeting the long-term goals. Figure 3-2 shows that current state GHG reduction measures (e.g., vehicle fuel standards and renewable portfolio standards for electricity) will only achieve a portion of the reductions needed to meet long-term goals. While further state action to reduce emissions is anticipated, success will require scaling up existing local and regional strategies, including those in this Climate Action Plan (CAP), and developing new solutions.