

# **Appendix B**

Technical Memo #2 -  
Greenhouse Gas Emissions  
Reduction Targets and  
Gap Analysis

# Memo

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**Date:** December 2, 2016

**To:** David Morrison, Jason Hade (County of Napa)

**From:** Honey Walters, Erik de Kok, Brenda Hom

**Subject:** **Napa County Climate Action Plan –Revised Technical Memorandum #2: Greenhouse Gas Emissions Reduction Targets, Measures, and Gap Analysis**

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## INTRODUCTION

This revised technical memorandum summarizes the revised draft results of the quantitative “gap analysis” process for the Napa County Climate Action Plan (CAP), including revisions to the gap analysis since the preliminary results were first reported in June 2016.

The purpose of the gap analysis is two-fold: 1.) to ensure that all greenhouse gas (GHG)-reducing actions to be incorporated in the CAP set the community on course to meet the County’s proposed GHG reduction targets; and 2.) to ensure that specific actions and associated GHG emissions reduction calculations are defensible and appropriate for the purposes of California Environmental Quality Act (CEQA) streamlining benefits for proposed projects in the future.

The gap analysis process takes into account several steps in the climate action planning process, which are listed below and addressed in subsequent sections.

1. Summary of 2014 community-wide GHG emissions inventory;
2. Summary of the GHG emissions projections for 2020, 2030 and 2050;
3. Identification and evaluation of recommended GHG emissions reduction targets for 2020, 2030 and 2050; and,
4. Quantification of GHG emissions reductions and evaluation of the calculated gap between the estimated GHG reductions and the recommended targets.

In addition to the quantitative GHG analysis, we qualitatively addressed the draft GHG measures in terms of potential environmental co-benefits, cost/benefit and economic impacts, and administrative feasibility.

## GREENHOUSE GAS EMISSIONS INVENTORY

The baseline GHG emissions inventory for the year 2014 includes emissions from community-wide sources in the unincorporated County. The purpose of the baseline inventory is to gain an understanding of the sources and levels of GHG emissions within a jurisdiction, as well as to establish a level of GHG emissions

against which future GHG emissions can be compared. The 2014 GHG emissions inventory is summarized below in Table 1. Total emissions from all sectors in the 2014 Inventory were 484,602 metric tons of carbon dioxide equivalent (MTCO<sub>2e</sub>) emissions. The 2014 inventory updates a previous baseline inventory for the year 2005 and includes new emissions sources and accounts for new data sources, calculation methodologies, and an updated set of global warming potential (GWP) factors.

Further details with respect to the 2014 inventory are discussed in the Revised Final Technical Memorandum #1 to the County, dated August 25, 2016. Note that a revision was made to adjust emissions estimates from the Land Use Change sector.

<b>Table 1 2014 Unincorporated Napa County Greenhouse Gas Emissions Inventory</b>	
<b>Sectors</b>	<b>2014<sup>1</sup> (MTCO<sub>2e</sub>/yr)</b>
Building Energy Use	148,338
On-Road Vehicles	125,711
Solid Waste	83,086
Agriculture	52,198
Off-Road Vehicles	42,508
High GWP Gases	13,481
Wastewater	11,189
Land Use Change	7,684
Imported Water Conveyance	88
<b>Total</b>	<b>484,283</b>

**Notes:** Columns may not add to totals due to rounding.

MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent  
 GWP = Global Warming Potential  
 IPCC = Intergovernmental Panel on Climate Change

<sup>1</sup> Uses GWP factors from IPCC's Fourth Assessment Report.

Source: Data compiled by Ascent Environmental in 2016. See Revised Final Tech. Memo #1, August 25, 2016.

## Greenhouse Gas Emissions Projections

GHG emissions projections for a community are used to estimate future levels in the absence of climate action measures. Emissions projections were prepared for both “business-as-usual” (BAU) and legislative-adjusted BAU scenarios for 2020, 2030, and 2050. BAU projections were based on population, housing, and employment growth anticipated in the unincorporated County as forecasted by the Metropolitan Transportation Commission (MTC), assuming no actions would be taken to reduce emissions by Federal, State or local agencies pursuant to Assembly Bill (AB) 32 or other legislation. The BAU projections represent theoretical “worst-case” future conditions, while the legislative-adjusted forecast accounts for future emissions reductions pursuant to AB 32 and other legislation in California from a variety of regulations and programs, including the Renewable Portfolio Standard (RPS), improving vehicle fuel economy standards due to Advanced Clean Cars, and other State and Federal policies.

The legislative-adjusted BAU forecast for community-wide GHG emissions are summarized below in Table 2. Under the legislative-adjusted BAU scenario, community-wide GHG emissions are projected to decrease by approximately 4 percent by 2020, 28 percent by 2030, and 24 percent by 2050 for the unincorporated Napa County compared to 2014 emissions.

Further details with respect to the GHG emissions projections are discussed in the Revised Final Technical Memorandum #1, dated August 25, 2016.

<b>Table 2 Unincorporated Napa County Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO<sub>2e</sub>/yr)</b>				
Sector and Subsector	2014	2020	2030	2050
Energy	148,338	131,643	59,150	66,184
Transportation	125,711	112,854	84,845	85,735
Waste	83,086	62,345	56,711	48,854
Agriculture	52,198	52,521	53,589	57,446
Off-Road Vehicles and Equipment	42,508	45,164	49,592	58,474
High-GWP Gases	13,481	11,828	13,169	15,867
Water and Wastewater	11,277	11,858	12,959	14,335
Land Use Change	7,684	35,608 <sup>1</sup>	18,239	21,669
<b>Total</b>	<b>484,283</b>	<b>463,821</b>	<b>348,253</b>	<b>369,563</b>
<b>Percent change from 2014 (%)</b>	<b>NA</b>	<b>-4</b>	<b>-28</b>	<b>-24</b>

Notes: Columns may not add to totals due to rounding.

BAU = Business as usual  
 NA = Not Applicable  
 GWP = Global Warming Potential  
 MTCO<sub>2e</sub> = metric tons of carbon dioxide equivalent

<sup>1</sup> The large increase in land use change “emissions” is due to sequestration and carbon storage losses associated with land use forecasts from the County that show a high rate of land use change between 2015 and 2020 compared to other years.

Source: Ascent Environmental, 2016

## GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

As directed in AB 32, SB 32, Executive Order (EO) B-30-15, and EO S-3-05, the State aims to reduce annual GHG emissions to:

- ▲ 1990 levels by 2020;
- ▲ 40 percent below 1990 levels by 2030; and
- ▲ 80 percent below 1990 levels by 2050.

To determine an equivalent reduction target at the local level, the Draft 2030 Target Scoping Plan released by the California Air Resources Board (ARB) recommends community-wide GHG reduction goals for local climate action plans that would help the State achieve its 2030 and 2050 targets (ARB 2016a). These goals consist of reducing emissions to 6 MTCO<sub>2e</sub> per capita and 2 MTCO<sub>2e</sub> per capita by 2030 and 2050, respectively. Considering the overall statewide emissions in 1990 and 2014 and the forecasted statewide population in 2030 and 2050, these per-capita goals would be equivalent to reducing 2014 emissions by 40

percent by 2030 and 77 percent by 2050 (ARB 2016b, DOF 2014). Although ARB did not recommend a similar community-level target for 2020, an equivalent target can be calculated by comparing the State’s GHG inventories for 1990 and 2014. According to ARB’s estimate of California’s GHG inventory, the State emitted approximately 431 million MTCO<sub>2e</sub> (MMTCO<sub>2e</sub>) in 1990 and 442 MMTCO<sub>2e</sub> in 2014, a 2 percent increase. Thus, consistent with ARB’s recommended targets, the following recommended targets would reduce annual community-wide GHG emissions in unincorporated Napa County to:

- ▲ 2 percent below 2014 levels by 2020;
- ▲ 40 percent below 2014 levels by 2030; and
- ▲ 77 percent below 2014 levels by 2050.

Specific assumptions and calculations for these adjusted targets are available in Attachment 1.

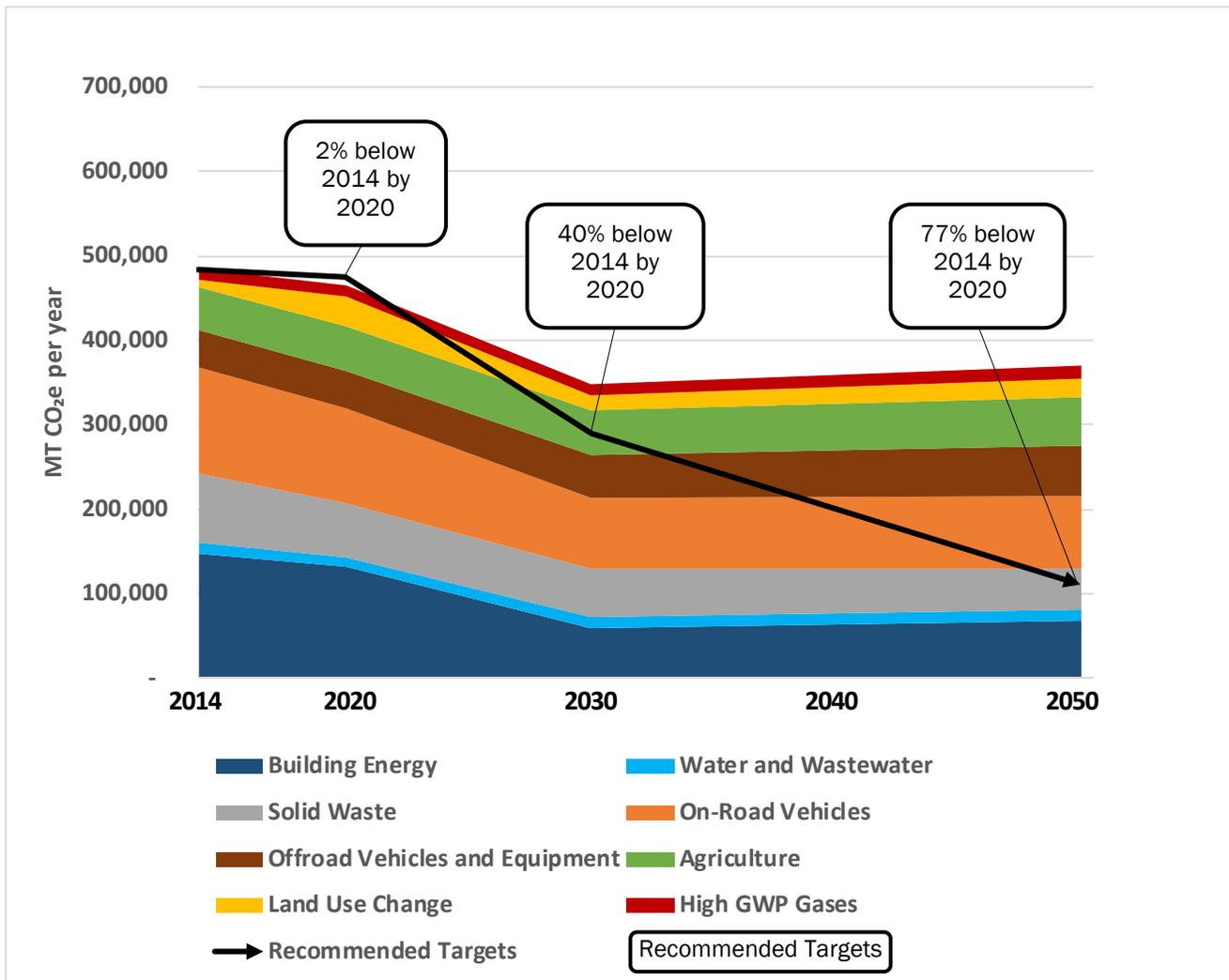
Based on the County’s 2014 inventory shown in Table 1, the targets above aim to reduce annual County emissions to 474,598, 290,570, and 111,385 MTCO<sub>2e</sub> by 2020, 2030, and 2050, respectively. As shown in Figure 1, the County is already meeting the 2020 target due to existing legislative actions, but would require significant additional GHG reductions to meet the 2030 and 2050 targets. The County would need to reduce annual legislative-adjusted BAU 2030 emissions by 57,683 MTCO<sub>2e</sub> (17 percent). However, meeting the 2050 target would require annual emissions reduction of 258,178 MTCO<sub>2e</sub>, or 70 percent, beyond the effect of current legislative reductions.

The recommended targets, along with estimated reductions required to achieve the targets, are summarized below in Table 3.

<b>Table 3 Recommended Greenhouse Gas Emissions Reduction Targets: 2020, 2030, and 2050</b>				
Scenario or Target	2014	2020	2030	2050
<b>Baseline and Projections</b>				
2014 Baseline GHG Inventory (MTCO <sub>2e</sub> )	484,283	NA	NA	NA
Legislative-Adjusted BAU Forecast (MTCO <sub>2e</sub> )	NA	463,821	348,253	369,563
Legislative-Adjusted BAU Forecast: Percent below Baseline (%)	NA	4	28	24
<b>Targets</b>				
Target Percent Reduction below Baseline (%)	NA	2	40	77
Target Annual Emissions (MTCO <sub>2e</sub> )	NA	474,598	290,570	111,385
<b>Gap Analysis</b>				
Reduction from Baseline needed to meet Target (MTCO <sub>2e</sub> )	NA	9,686	193,713	372,898
Reduction from Legislative-Adjusted BAU needed to meet Target (MTCO <sub>2e</sub> )	NA	0	57,683	258,178
Additional Percent Reduction below Legislative-Adjusted BAU needed to meet Target (%) <sup>1</sup>	NA	0	17	70
Notes: BAU = Business as usual, MTCO <sub>2e</sub> = metric tons of carbon dioxide equivalent, GHG = greenhouse gas, NA = Not Applicable				
Source: Ascent Environmental, 2016				

Figure 1, below, depicts the baseline and legislative-adjusted BAU GHG emissions forecasts by sector, as distinguished by colored wedges. The sum of the wedges represents annual anticipated GHG emissions in each year. Each wedge shows how a particular emissions sector is expected to contribute to the County’s annual inventory over time. For example, the reduction in BAU building energy emissions (dark blue wedge)

between 2020 and 2030 illustrates the effect of SB 350 energy efficiency and renewable energy policies on this sector. The black line indicates the recommended GHG emissions reduction targets for 2020, 2030, and 2050. The additional reductions needed to meet the 2020 and 2030 targets to close the expected “gap” between the expected legislative-adjusted BAU emissions levels and the recommended targets are also apparent in Figure 1. With respect to emissions beyond 2030, current legislation, such as SB 350 and the Federal Corporate Average Fuel Economy (CAFE) standards, have specific targets and policies that only address activities up to the year 2030. Though advances in new technologies and policy strategies may allow for additional significant reductions in the future, legislative reductions that may occur past 2030 are currently unknown.



Notes: BAU = Business as Usual; GHG = Greenhouse Gas Emissions; MT CO<sub>2e</sub> = metric tons of carbon dioxide equivalent  
 Source: Ascent Environmental, 2016

**Figure 1: Legislative-Adjusted Business-as-Usual Forecast Emissions by Sector and Recommended Emissions Reduction Targets: 2020 through 2050**

### Greenhouse Gas Emissions Reductions and Estimated Gap

As discussed above, additional GHG reductions are needed to achieve the recommended GHG reduction targets for 2020, 2030, and 2050. As a local government, the County can take action to adopt or update

land use plans, enforce or update County ordinances, adjust municipal operations, encourage or influence County residents and business by partnering with local organizations, and work with local and regional transportation planning or other agencies that provide services or maintain infrastructure that is not directly in the County's control. The County can effectively reduce emissions in some sectors where the County has jurisdictional control (e.g., municipal operations, land use change), but in some cases the County has limited ability to influence reductions because the County has limited jurisdictional control (e.g., on-road transportation). Ascent worked with the County to develop a draft list of recommended GHG reduction measures based on the County's jurisdictional influence, public input, and other measures based on best practices.

GHG reductions associated with these recommended measures were calculated in a step-wise manner for the future years of 2020, 2030, and 2050. In other words, GHG reductions (in MTCO<sub>2e</sub>/year) are assessed during a snapshot in time in years 2020, 2030, and 2050. This is a simplified method of characterizing GHG reductions, which would more realistically occur on a continuous basis. However, a step-wise method is appropriate for a planning-level document because the County's GHG reduction targets and monitoring of CAP implementation progress would be tied to these future years.

Importantly, GHG emissions reductions were quantified for measures wherever substantial evidence and reasonable assumptions were available to support calculations. The County and Ascent have identified numerous programs and policies that were not quantifiable at this time due to lack of available data or quantification methods, but would still be expected to reduce GHG emissions. Such programs will be addressed qualitatively in the draft CAP document and treated as supporting measures to the strategies that were quantified, and could be tracked for potential quantification in the future if data and/or quantification methods would become available in the future.

### **Summary of Results**

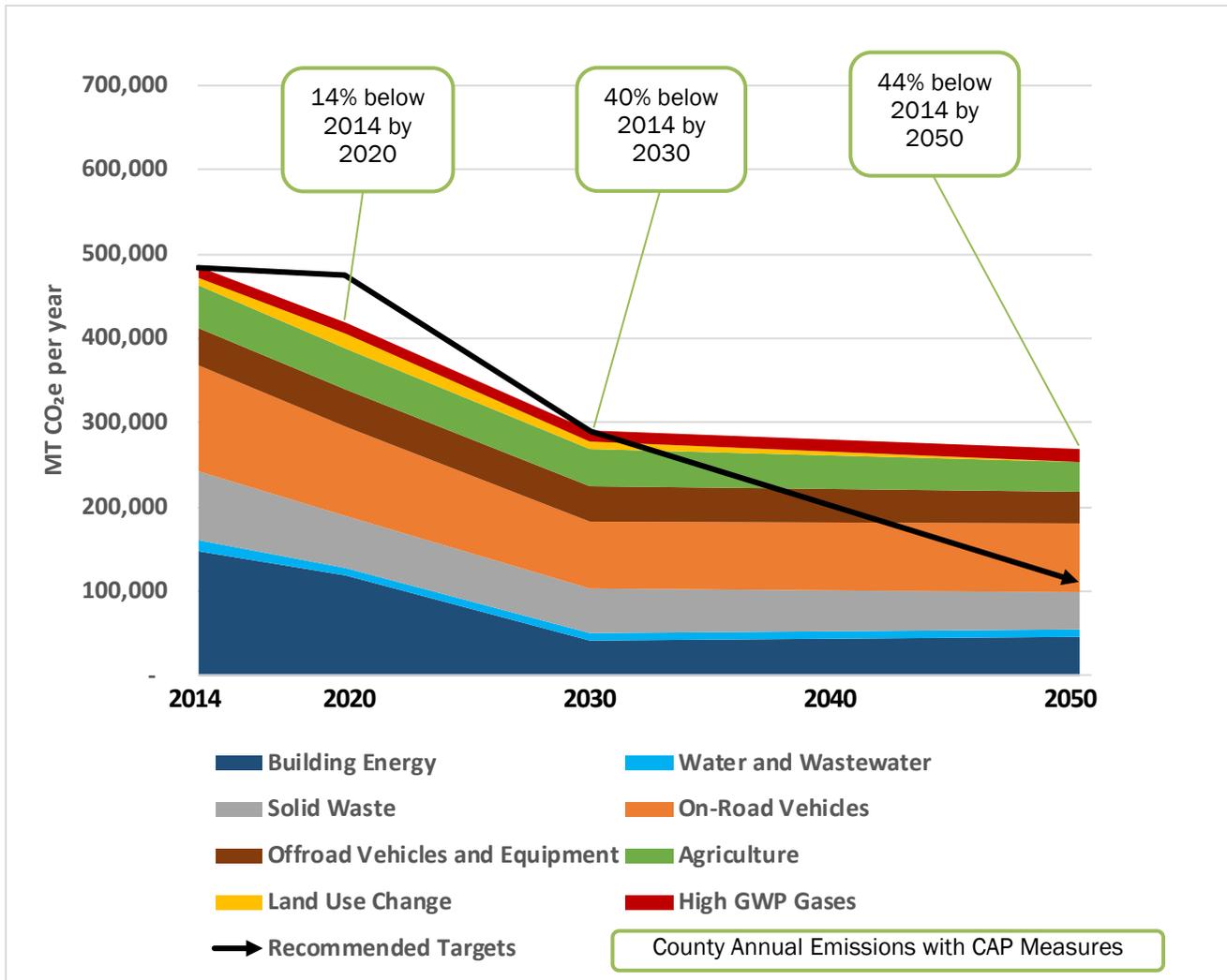
Preliminary estimates of GHG emissions reductions, along with an estimated emissions reduction "gap", are summarized below in Table 4 and illustrated in Figure 2. Detailed measure descriptions, calculations, and assumptions supporting the GHG reduction estimates are provided in Attachment 1.

<b>Table 4 Summary of Greenhouse Gas Emissions Reduction Measures Performance</b>				
Measure Number	Measure Name	GHG Reductions (MTCO <sub>2e</sub> /year)		
		2020	2030	2050
<b>Agriculture</b>				
AG-1	Support BAAQMD in ending open burning of removed agricultural biomass and flood debris	236	236	236
AG-2	Convert all stationary diesel or gas-powered irrigation pumps to electric pumps	1,696	1,792	2,009
AG-3	Support use of electric or alternatively-fueled agricultural equipment	1,617	8,540	19,149
AG-4	Support the use of Tier 4 final Diesel Equipment for Off-Road Agricultural Equipment	-	64	48
<i>Agriculture Subtotal</i>		3,549	10,632	21,442
<b>Building Energy</b>				
BE-1	Work with PG&E, PACE financing programs, and other regional partners to incentivize energy efficiency improvements in existing buildings	-		
BE-2	Require energy audits for major additions to or alterations of existing buildings	-		
BE-3	Require compliance with CalGreen Tier 1 Green Building standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) for eligible alterations or additions to existing buildings	28	23	24
BE-4	Require compliance with CalGreen Tier 1 standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6 for all new construction), and phase in ZNE requirements for new construction, beginning with residential in 2020 and non-residential by 2030.	1,361	2,037	4,587
BE-5	Increase participation in MCE's Deep Green option (100% Renewable Energy)	4,005	1,384	1,338
BE-6	Require new or replacement residential water heating systems to be electrically powered and/or alternatively fueled systems	6,096	11,575	12,550
BE-7	Expand current renewable energy and green energy incentives and update local ordinances	1,479	1,806	1,703
BE-8	Develop a program to allow new development to offset project GHG emissions by retrofitting existing income-qualified homes and buildings	-		
BE-9	Select MCE's Deep Green Option for all County Facilities	382	170	205
BE-10	Support Waste-to-Energy Programs at Unincorporated Landfills	10	5	5
<i>Building Energy Subtotal</i>		13,361	16,999	20,412
<b>Land Use Change</b>				
LU-1	Establish targets and enhanced programs for oak woodland and coniferous forest preservation and mandatory replanting	7,077	4,544	15,360
LU-2	Refine protection guidelines for existing riparian lands	660	660	660
LU-3	Repurpose or otherwise prevent burning of removed trees and other woody material from land use conversions of oak woodlands and coniferous forests	10,839	3,453	4,731
<i>Land Use Subtotal</i>		18,576	8,657	20,751
<b>Off-Road Transportation</b>				
OR-1	Require Tier 4 equipment for all construction activity and mining operations as a condition for approval by 2030	-	354	386
OR-2	Promote use of alternative fuels for recreational watercraft	1,687	7,512	22,629
<b>On-Road Transportation</b>				
TR-1	Update Transportation System Management Ordinance (for Employers)	4,818	3,582	3,547
TR-2	Parking reduction ordinance revisions	78	58	57
TR-3	Increase affordable housing, especially workforce housing, in Napa County	31	23	23
TR-4	Support efforts to allow commuter service to operate on the Napa Wine Train right-of-way	389	289	286

<b>Table 4 Summary of Greenhouse Gas Emissions Reduction Measures Performance</b>				
Measure Number	Measure Name	GHG Reductions (MTCO <sub>2e</sub> /year)		
		2020	2030	2050
TR-5	Support efforts of transit agencies to increase availability and accessibility of transit information		-	
TR-6	Support alternatives to private vehicle travel for visitors		-	
TR-7	Support NCTPA and Cities in developing transit oriented development unique to the needs of the Napa Region		-	
TR-8	Support interregional transit solutions		-	
TR-9	Support implementation of harvest season ride matching or ridesharing service pilot		-	
TR-10	Work with Cities and neighboring regions to increase presence of park and ride facilities near residential centers		-	
TR-11	Increase the supply of electric vehicle charging stations		-	
TR-12	Promote telecommuting at office-based businesses		-	
TR-13	Support efforts of solid waste collection services to convert diesel solid waste collection vehicles to CNG.	284	247	169
<i>On-Road Transportation Subtotal</i>		5,599	4,198	4,083
<b>Solid Waste</b>				
SW-1	Encourage expansion of composting programs for both residential and commercial land uses	629	1,106	1,270
SW-2	Meet an 80% Waste Diversion Goal by 2020 and a 90% Goal by 2030	1,179	2,625	3,163
<i>Solid Waste Subtotal</i>		1,807	3,731	4,433
<b>Water and Wastewater</b>				
WA-1	Amend or revise water conservation regulations for landscape design		-	
WA-2	Adopt a new water conservation ordinance for commercial and residential land uses limiting outdoor watering		-	
WA-3	Expedite and/or reduce permit fees associated with water conservation installations in existing facilities		-	
WA-4	Require water audits for large new commercial or industrial projects and significant expansions of existing facilities		-	
<b>Multiple Sectors</b>				
MS-1	Work with other local jurisdictions within the County to develop a unified Climate Action Plan		-	
MS-2	Support efforts to increase Napa Green Certified wineries and vineyards in the unincorporated County, with a goal of 100% certified by 2030	1,783	5,743	5,737
MS-3	Promote the sale of locally grown foods and/or products		-	
MS-4	Establish a local carbon offset program in partnership with Sustainable Napa County		-	
<b>Total GHG Emissions Reductions</b>		46,362	57,828	99,871
<b>Recommended GHG Emissions Reduction Target</b>		0	57,683	258,178
<b>Remaining GHG Emissions Reduction Gap (Surplus)</b>		(46,362)	(145)	158,306

Notes: "-" = Not enough data to quantify or relies on participation from external or private entities over which the County has no control, BAAQMD = Bay Area Air Quality Management District, CNG = compressed natural gas, CO<sub>2e</sub> = carbon dioxide equivalents, GHG = greenhouse gas, NA = Not Applicable, NCTPA = Napa County Transportation and Planning Agency, MCE = Marin Clean Energy, MT = metric tons, PACE = property assessed clean energy, PG&E = Pacific Gas and Electric, ZNE = zero net energy.

Source: data provided by Ascent Environmental 2016



**Figure 2: Projections of Greenhouse Gases by Sector with Implementation of CAP Measures and Recommended Targets: 2020 through 2050**

The total estimated GHG emissions reductions from all measures quantified is approximately 46,362 MTCO<sub>2</sub>e in 2020, 57,828 MTCO<sub>2</sub>e in 2030, and 99,871 MTCO<sub>2</sub>e in 2050. The total estimated reductions in 2020 would be more than sufficient to meet the recommended 2020 target, with a 46,362 MTCO<sub>2</sub>e annual surplus of GHG reductions beyond legislative-adjusted forecasts. Implementation of the draft GHG reduction measures identified in Table 4 would also meet the recommended 2030 target, with a slight surplus of 145 MTCO<sub>2</sub>e in reductions. However, the projected GHG reductions from all measures in 2050 would fall considerably short of the long-term target for 2050, requiring an additional 158,306 MTCO<sub>2</sub>e to be reduced per year by 2050.

Certainly, the scale of reductions required to achieve the much more aggressive longer-term 2050 target outlined earlier will require significant improvements in the availability and/or cost of near-zero and zero-emissions technology, as well as potential increased reductions from ongoing State and Federal legislative actions that are currently unknown.

Ascent recommends that the County's CAP be updated at least every 5 years after adoption to periodically assess the County's progress toward meeting the GHG reduction targets and identify potential new or revised GHG measures that may be implemented as new technology and policy strategies become available.

### **Additional Considerations and Co-Benefits**

In addition to the GHG emissions gap analysis process identified above, we also qualitatively considered environmental co-benefits, potential implementation costs and regional economic impacts, and administrative feasibility of the proposed GHG reduction measures. Detailed results are shown in Attachment 1, with general discussion below.

The feasibility of the draft GHG reduction measures described above may depend on program participation rates, cooperation from partnering agencies, available County resources, and various economic factors. For example, measure AG-1 in Table 4 requires participation and enforcement by the Bay Area Air Quality Management District (BAAQMD); implementation of BE-3 and BE-4 would depend on the size and number of alterations and new construction that would occur in the future, which are closely linked to the health of the economy; and the various transportation measures would require participation from NVT, residents, and businesses. Many of the measures, such as ordinance revisions, may be implemented by the County, but the effectiveness of those measures would still depend on available County resources and general compliance to proposed ordinances.

The GHG reduction measures would result in considerable environmental co-benefits, including air quality water, biological resources, and public health, and other resources. Reducing natural gas use, fossil fuel use in on-road vehicles, and open-burning would also reduce criteria air pollutant emissions and improve air quality. Preserving oak woodlands, forests, and other carbon-sequestering land uses would also conserve habitats for native plant and animal species, maintain water quality, prevent soil erosion, and provide other benefits that would help to balance the local ecosystem. Switching to alternative and renewable energy sources, such as solar and geothermal resources, would reduce the burden on finite fossil fuel resources. Also, reduced electricity and natural gas use through energy efficiency and conservation efforts allows utilities, residents, and businesses to require less alternative and conventional energy resources and would help people save money.

### **REVISIONS FROM THE JUNE 2016 VERSION OF THIS MEMORANDUM**

In response to public comments, staff direction, and recent policy updates, Ascent has revised the GHG reduction targets and revised, removed, and added new GHG reduction measures to the initial list of measures included in the June 2016 version of this technical memorandum. Also, per public and staff comments, revisions were made to the inventory and forecast document in Technical Memorandum #1 which slightly affected the level of emissions reductions of each measure. The reasons behind each measure removal, revision, and addition are described below.

#### **Revised GHG Reduction Targets**

The GHG reduction targets were revised to reflect recommended targets for local-level GHG reduction plans in the Draft 2030 Target Scoping Plan, and recent updates to California's 2014 GHG emissions inventory by ARB. Previous targets were scaled directly from state level targets. The revised targets are more appropriate for communitywide climate action plans and consistent with the latest State policy guidance from ARB.

#### **Removed Measures**

BE-9 *"Participate in and promote PACE financing options for existing residents and businesses"*

This measure was removed due to overlap with BE-1.

SW-1 *“Reinstate or expand landfill gas capture or flaring at American Canyon and Clover Flat Landfills by 2020”*

This measure was removed because the methane emissions reported in inventory by the EPA for American Canyon and Clover Flat Landfills already account for flaring. The previous analysis incorrectly assumed that flaring was not yet being performed at these landfills. Reported emissions represent fugitive methane emissions after LFG has been capture and flared. According to discussions with the County, the American Canyon landfill’s current operations are state of the art and additional LFG capture or flaring technology would not be feasible (pers. comm., Luthy 2016).

On the other hand, recent discussions with Upper Valley Disposal Service (UVDS) have clarified on-going improvements at Clover Flat Landfill to install a waste-to-energy facility and biomass gasification plant. These improvements are part of the Clover Flat Resource and Recovery Park transition, which was approved by the County in 2011 and began operation in 2014. The emissions reductions from these upgrades are inherently included in the inventory, but were not accounted for in the emissions forecast. The County may continue to support UVDS in providing food waste and support waste diversion programs that increase the energy production and biomass conversion at the Clover Flat Resource and Recovery Park. New measures, BE-10 and TR-13, and the reworked SW-1 measure address the composting and energy recovery actions headed by UVDS.

## Revised Measures

AG-3 *“Support use of electric or alternatively-fueled agricultural equipment”*

Revised to include Napa Green as one of the potential partners in supporting this measure. Also revised measure to increase the participation rate from 5 to 25 percent by 2030. This revised goal assumes alternative fuels and technologies for agricultural equipment will become more readily available and accessible by 2030.

BE-1 *“Work with PG&E, PACE financing programs, and other regional partners to incentivize energy efficiency improvements in existing buildings”*

Revised to include PACE financing as one of the ways to improve/incentivize energy efficiency improvements in existing buildings.

BE-4 *“Require compliance with CalGreen Tier 1 standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) for all new construction, and phase in ZNE requirements for new construction, beginning with residential in 2020 and non-residential by 2030”*

*This measure was modified to add “phase in ZNE requirements for new construction, beginning with residential in 2020 and non-residential by 2030”.* This revision takes into account a ZNE program that the State is considering, but has not yet fully adopted. This measure assumes that all new residential and commercial construction in the County would be built to ZNE standards, starting in 2020 and 2030, respectively. Anticipated emissions reductions have been revised to reflect this change.

BE-7 *“Expand current renewable energy and green energy incentives and update local ordinances”*

This measure has been revised to include a goal for the County to approve 20,000 kW worth of solar projects by 2030. This amount of solar panels would generate approximately 30,000 MWh per year by 2030, or 17 percent of the County’s forecasted electricity use in 2030.

BE-9 *“Select MCE’s Deep Green Option for all County Facilities”*

This measure number has been reassigned to the previous MU-1 “Select MCE’s Deep Green Option for all County Facilities”.

LU-1 *“Establish targets and enhanced programs for oak woodland and coniferous forest preservation and mandatory replanting”*

The measure was revised to prioritize tree preservation along with mandatory tree replanting. The revised measure targets a 30 percent preservation rate for all development projects. Replanting would then be required based on the County’s current 2:1 replacement ratio stated in General Plan policy CON-24, with the assumed rate of replacement being up to 2,500 trees per year due limited County resources, staffing, and available land for replanting. The measure calculates reductions based on tree growth rates for oak and coniferous trees and the ratio between forecasted tree losses for oak and coniferous trees. This assumes that oak trees lost would be replaced with oak trees and coniferous trees lost would be replaced with coniferous trees.

SW-1 *“Encourage expansion of composting programs for both residential and commercial land uses”*

This measure was reworked to focus on the GHG reduction potential of expanding composting programs in the County. Composted organics typically involve aerobic decomposition which emits less methane emissions than the same amount of organics anaerobically decomposing in an enclosed landfill. Under AB1826, no more than 50 percent of the amount of commercial organic waste landfilled in 2014 can be landfilled started in 2020. This legislation was not included in the forecast; however, this measure would exceed AB1826 targets. Under this measure, the County would target a composting rate of 85 percent of all food and 100 of yard waste generated by the unincorporated County by 2030.

## **Added Measures**

AG-4 *“Support the use of Tier 4 final Diesel Equipment for Off-Road Agricultural Equipment”*

This measure was added to provide additional emissions reductions from off-road agricultural equipment. Equipment manufacturers claim that Tier 4 final equipment may increase fuel efficiency by up to 5 percent from Tier 4 interim equipment. Efficiency gains from tiers lower than Tier 4 interim equipment may be greater, but exact gains are currently unknown. This measure assumes a 5 percent participation rate through 2050.

BE-10 *“Support Waste-to-Energy Programs at Unincorporated Landfills”*

This measure accounts for GHG emissions reductions from potential waste-to-energy programs that could be operated in the unincorporated County. The quantification of this measure is based on the potential improvements at the current waste-to-energy facilities at Clover Flat Landfill, as described in UVDS’s “Climate Action Management Plan to 2020 for Clover Flat Landfill and Upper Valley Recycling” (UVDS 2016).

MS-3 *“Promote the sale of locally grown foods and/or products”*

This measure was incorrectly excluded from the measure summary table in the previous version, but was included in the appendices. This measure is now included.

MS-4 *“Establish a local carbon offset program in partnership with Sustainable Napa County”*

This measure was added to offer an opportunity for projects and activities in the County to offset their carbon emissions through a local carbon offset program. Due to the measure's reliance on voluntary participation, this measure was not quantified.

- LU-3 *"Repurpose or otherwise prevent burning of removed trees and other woody material from land use conversions of oak woodlands and coniferous forests"*

This measure was added to provide additional emissions reductions by preventing the carbon stored in removed trees from being released back into the atmosphere. The current emissions inventory and forecasts conservatively assume all trees lost due to development would immediately release their stored carbon into the atmosphere through burning. Under this measure, the County would require a minimum of 80 percent of total removed weight of trees to be repurposed, buried, chipped, or otherwise prevented from burning.

- OR-1 *"Require Tier 4 equipment for all construction activity and mining operations as a condition for approval by 2030"*

This measure was added to provide additional emissions reductions from off-road construction equipment. As with AG-4, equipment manufacturers claim that Tier 4 final equipment may increase fuel efficiency by up to 5 percent from Tier 4 interim equipment. Efficiency gains from tiers lower than Tier 4 interim equipment may be greater, but exact gains are currently unknown.

- OR-2 *"Promote use of alternative fuels for recreational marine vessels"*

This measure was added to provide additional emissions reductions from off-road waterborne pleasure craft. Pleasure craft account for 74 percent of the County's off-road emissions inventory, due to the mostly unincorporated locations of waterways in the County. Under this measure, the County would promote the use of biofuels or other alternative fuels in recreational marine vessels, addressing both private owners and rental businesses. The measure targets an average biofuel share of 5 percent by 2020, 20 percent by 2030, and 50 percent by 2050.

- TR-13 *"Support efforts of solid waste collection services to convert diesel solid waste collection vehicles to CNG"*

This measure was added to account for the potential savings from conversion solid waste collection vehicles from diesel to compressed natural gas (CNG) fuel. The quantification of this measure is based on a similar proposal in UVDS's "Climate Action Management Plan to 2020 for Clover Flat Landfill and Upper Valley Recycling" (UVDS 2016). CNG has lower GHG emissions per unit of energy than diesel, resulting in an overall reduction in GHGs from the on-road transportation sector.

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UVDS. See Upper Valley Disposal Service.

# ATTACHMENT 1

## GHG Measure Reduction Summary

### GHG Emission Reductions by Sector

Sector	Notes	Annual GHG Reduction (MTCO <sub>2</sub> e)		
		2020	2030	2050
Agriculture		3,549	10,632	21,442
Building Energy	Includes MU-1	13,361	16,999	20,412
Land Use Change		18,576	8,657	20,751
Wastewater	Includes GHG-2	1,783	5,743	5,737
On-Road Transportation		5,599	4,198	4,083
Off-Road Transportation		1,687	7,867	23,014
Solid Waste		1,807	3,731	4,433
<b>TOTAL Reductions from Proposed Measures</b>		<b>46,362</b>	<b>57,828</b>	<b>99,871</b>
<b>Needed reductions to meet CAP Targets from 2014 levels (MTCO<sub>2</sub>e)</b>		0	57,683	258,178
Forecasts with Legislative Reductions	Annual GHG Emissions (MTCO <sub>2</sub> e)			
	2014	2020	2030	2050
Building Energy	148,338	131,643	59,150	67,184
Water and Wastewater	11,277	11,858	12,959	14,335
Solid Waste	83,086	62,345	56,711	48,854
On-Road Vehicles	125,711	112,854	84,845	85,735
Offroad Vehicles and Equipment	42,508	45,164	49,592	58,474
Agriculture	52,198	52,521	53,589	57,446
Land Use Change	7,684	35,608	18,239	21,669
High GWP Gases	13,481	11,828	13,169	15,867
<b>TOTAL</b>	<b>484,283</b>	<b>463,821</b>	<b>348,253</b>	<b>369,563</b>
Forecasted Percent Reduction from 2014		-4%	-28%	-24%
CAP Targets (adjusted for percent reduction from 2014)		-2%	-40%	-77%
CAP Targets (MTCO <sub>2</sub> e)		474,598	290,570	111,385
Needed reductions to meet CAP Targets from 2014 levels (MTCO <sub>2</sub> e)		9,686	193,713	372,898
Needed reductions to meet CAP Targets from forecasts (MTCO <sub>2</sub> e)		0	57,683	258,178

Forecasts with Legislative Reductions and County CAP Measures	Annual GHG Emissions (MTCO <sub>2</sub> e)			
	2014	2020	2030	2050
Building Energy	148,338	118,282	42,151	46,772
Water and Wastewater	11,277	10,075	7,216	8,598
Solid Waste	83,086	60,538	52,980	44,420
On-Road Vehicles	125,711	107,255	80,647	81,652
Offroad Vehicles and Equipment	42,508	43,477	41,725	35,460
Agriculture	52,198	48,972	42,956	36,004
Land Use Change	7,684	17,032	9,582	918
High GWP Gases	13,481	11,828	13,169	15,867
<b>TOTAL</b>	<b>484,283</b>	<b>417,459</b>	<b>290,425</b>	<b>269,692</b>
Percent below 2014		-14%	-40%	-44%
Additional Reductions Needed to meet CAP Targets (negative indicates surplus) (MTCO <sub>2</sub> e)		0	-145	158,306

## GHG Measure Reduction Summary (continued)

### Percent below 2014 by Sector. Legislative reductions only

Sector	2020	2030	2050
Building Energy	-11%	-60%	-55%
Water and Wastewater	5%	15%	27%
Solid Waste	-25%	-32%	-41%
On-Road Vehicles	-10%	-33%	-32%
Offroad Vehicles and Equipment	6%	17%	38%
Agriculture	1%	3%	10%
Land Use Change	363%	137%	182%
High GWP Gases	-12%	-2%	18%

### Percent below 2014 by Sector. Combined effect of legislative reductions and proposed actions

Sector	2020	2030	2050
Building Energy	-20%	-72%	-68%
Water and Wastewater	-11%	-36%	-24%
Solid Waste	-27%	-36%	-47%
On-Road Vehicles	-15%	-36%	-35%
Offroad Vehicles and Equipment	2%	-2%	-17%
Agriculture	-6%	-18%	-31%
Land Use Change	122%	25%	-88%
High GWP Gases	-12%	-2%	18%

### Percent below BAU by Sector. Effect of proposed actions

Sector	2020	2030	2050
Building Energy	-10%	-29%	-30%
Water and Wastewater	-15%	-44%	-40%
Solid Waste	-3%	-7%	-9%
On-Road Vehicles	-5%	-5%	-5%
Offroad Vehicles and Equipment	-4%	-16%	-39%
Agriculture	-7%	-20%	-37%
Land Use Change	-52%	-47%	-96%
High GWP Gases	0%	0%	0%

Measure Details								
#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
AG-1	Napa County	Agriculture	Community	Support BAAQMD in ending open burning of removed agricultural biomass and flood debris	Support BAAQMD in encouraging farmers and County public services to find alternatives to open burning of agricultural, forest, and other removed biomass (e.g., waste-to-energy, compost, mulching). Potential alternatives could include converting agricultural and forest waste to biochar for reapplication on cropland. County does not have regulatory control over burning.	236	236	236
AG-2	Napa County	Agriculture	Community	Convert all stationary diesel or gas-powered irrigation pumps to electric pumps	Work with PG&E, MCE, or other utilities to provide incentives to convert stationary diesel or gas-powered pumps to electric pumps that are connected to the grid or use off-grid alternative/renewable energy sources, such as solar. Some vineyards may already be implementing this as part of their participation in Napa Green. Electric pumps are also more efficient (diesel pumps achieve 30-40% efficiency, while electric pumps achieve 70-80% efficiency). This measure would apply to all crop types and assumes that all pumps would be converted to electric by 2020 and that any new pumps associated with growth in agriculture would be electric.	1,696	1,792	2,009
AG-3	Napa County	Agriculture	Community	Support use of electric or alternatively fueled agricultural equipment	Farm equipment, minus irrigation pumps, accounted for 60% of agricultural emissions in 2014 and is anticipated to increase through 2050. This measure would reduce emissions from off-road agricultural equipment by replacing gas or diesel powered equipment with electric or alternative fuel equivalents. The County could work with BAAQMD, ARB, or Napa Green to promote or provide regulatory incentives to encourage the switch to alternatively fueled equipment. Available electric equipment includes vineyard tractors, mulchers, and chainsaws. Electric equipment also allows for quiet operation that can reduce noise pollution. Although not included in the agricultural sector, also consider plug-in hybrid or other alternatively-fueled, pick-up trucks and other vehicles for on-road agricultural fleets. This measure assumes a 5% participation rate by 2020 and a 25% participation rate by 2030, applying to all crop types.	1,617	8,540	19,149
AG-4	Napa County	Agriculture	Community	Support the use of Tier 4 final Diesel Equipment for Off-Road Agricultural Equipment	Alongside the efforts used to support AG-3, work with Napa Green or other entities to encourage vintners and other growers to use Tier-4-final-rated diesel agricultural off-road equipment. Equipment manufacturers claim that Tier 4 final equipment may increase fuel efficiency by up to 5% from Tier 4 interim equipment. Efficiency gains from lower tier equipment may be greater, but exact gains are currently unknown. This measure assumes a 5% participation rate and would apply to all crops.	0	64	48
BE-1	Napa County	Building Energy	Community	Work with PG&E, PACE financing programs, and other regional partners to incentivize energy efficiency improvements in existing buildings	Provide information on County-, State-, and utility-based energy efficiency programs and funding opportunities (e.g., PG&E's Energy Watch Program, Sustainable Napa County, PACE financing). Information sharing can be done through providing informational brochures at County offices, updating the County website, and other methods.	NA	NA	NA
BE-2	Napa County	Building Energy	Community	Require energy audits for major additions to or alterations of existing buildings	Require energy audits when a building permit application is submitted for a substantial addition to or alteration to an existing building. Audits could be triggered by an alteration or addition greater than or equal to 50 percent of a lot's total building square footage. According to County permit records, an average of 300 permits for additions, alterations, and replacements for inhabited residential and commercial land uses were issued or finalized per year between 2010 and 2015.	NA	NA	NA

#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
BE-3	Napa County	Building Energy	Community	Require compliance with CalGreen Tier 1 Green Building standards for eligible alterations or additions to existing buildings	Consider requiring compliance with CalGreen Tier 1 standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) for alterations and additions over 1,000 sqft and requiring energy audits (see above). Incentivize Tier 2 standards for eligible buildings, such as through expedited permitting or reduced permit fees. CalGreen Tier 1 also requires all appliances to be Energy Star rated.	28	23	24
BE-4	Napa County	Building Energy	Community	Require compliance with CalGreen Tier 1 standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) for all new construction, and phase in ZNE requirements for new construction, beginning with residential in 2020 and non-residential by 2030	<p>The State is considering, but has not formally adopted, a zero net energy (ZNE) requirement for all new residential construction and new commercial construction starting in 2020 and 2030, respectively. Under this action, the County would revise the County's building code to phase in and formally adopt the State's proposed ZNE requirement. The State has demonstrated that ZNE can be achieved through a combination of energy efficient design and on-site renewable energy production (e.g. solar).</p> <p>To phase in the ZNE requirements, this measure would require the County's building code to require compliance with CalGreen Tier 1 Green Building standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) for all residential and commercial construction starting before 2020 and 2030, respectively. Consider modeling after City of Napa's High Performance Building Code. CalGreen Tier 1 green building standards include land use, water conservation, and solid waste measures such as promotion of infill development, use of green building materials, solar water heating, turf area limits, and reduction of construction waste through recycling. CalGreen standards not included in or exceeded by the State's ZNE proposed requirements shall continue to be required after ZNE requirements have been phased in.</p> <p>CalGreen already requires compliance with Title 24 building energy efficiency standards. As an estimate, CalGreen Tier 1 would exceed current standards by 15% or more. Consider additional incentives for projects meeting or exceeding CalGreen Tier 2 standards which would have energy efficiencies 30% above current standards for commercial construction. ZNE standards would exceed current building efficiency standards by 100%.</p> <p>With respect to water conservation standards under CalGreen, amend code to:            -Incentivize installation of commercial rainwater capture systems            -Incentivize installation of commercial gray water for discharge to irrigation applications            -Require ultra-low flow fixtures and toilets in new construction</p>	1,361	2,037	4,587
BE-5	Napa County	Building Energy	Community	Increase participation in Marin Clean Energy (MCE) 100% renewable option	Provide regulatory incentivizes for adoption of MCE's Deep Green Option at residents and businesses (100% renewable electricity). Consider subsidizing the extra cost of opting into Deep Green (\$0.01 per kWh) for low-income households and regulatory incentives for businesses. Team with MCE to promote awareness of MCE's Deep Green Option. Prioritize winery, hospitality, and other businesses that opt into Deep Green on County tourist websites. Target a participation rate of 10% by 2020 and 15% by 2030.	4,005	1,384	1,338

#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
BE-6	Napa County	Building Energy	Community	Require new or replacement residential water heating systems to be electrically powered and/or alternatively fueled systems	As part of a new ordinance or revision to an existing one, require, as feasible, any new or replacement water heaters to be either electrically powered or otherwise alternatively fueled. This would be enforced through the County's current permitting process. New or replacement natural gas-powered water heaters would no longer be permitted under this new ordinance. Examples of allowable new water heaters include solar water heaters, tankless and storage electric water heaters, geothermal, and electric heat pump systems. Electric water heaters may be paired with a solar water heating system to provide backup hot water. Heat pump systems may include air or ground-source heat pump systems. Conversion away from natural gas-fueled water heaters allows for more opportunities to reduce emissions with renewable electricity generation.  County to consider offsetting the cost compared to conventional hot water heaters for eligible homeowners based on household income and size.	6,096	11,575	12,550
BE-7	Napa County	Building Energy	Community	Expand current renewable energy and green energy incentives and update local ordinances	Continue to provide expedited permitting incentives for solar panels, electric vehicle charging stations, and wind turbines. Consider expanding incentives to other green technologies (e.g., solar water heating systems, geothermal ground source heat pump, micro-turbines, and battery storage). Revise local ordinances such that ground-based solar panels would not be prohibited against residential acreage limits on agricultural land uses. Work with Google, National Renewable Energy Laboratory, or other information providers to help communicate the customized cost-benefits associated with solar opportunities for each resident and business. Set a goal of approving 20,000 kW worth of solar permits by 2030. Periodically review progress of permit applications and adjust incentives and outreach efforts accordingly.	1,479	1,806	1,703
BE-8	Napa County	Building Energy	Community	Develop a program to allow new development to offset project GHG emissions by retrofitting existing income-qualified homes	Establish a program that would allow new development to offset project GHG emissions by providing funding for residential energy efficiency retrofits in local existing income-qualified homes or buildings. The County would need to determine how the offset funds would be used to fund retrofits. One approach includes setting up a self-funded, low-interest financing program to assist home and business owners. Emissions benefits may be quantifiable once program details are established. Consider pairing funds from the retrofit program with PACE financing to allow for even greater energy efficiency improvements in existing buildings.	NA	NA	NA
BE-9	Napa County	Building Energy	Municipal	Select MCE's Deep Green Option for all County Facilities	Require selection of the Deep Green 100% renewable option from MCE for all County-owned facilities within the County's operational control.	382	170	205
BE-10	Napa County	Building Energy	Municipal	Support Waste-to-Energy Programs at Unincorporated Landfills	Encourage landfills located in the unincorporated county to pursue waste-to-energy programs that convert waste-based "fuel" to usable energy that can offset a facility's non-renewable energy usage.	10	5	5
MS-1	Napa County and Cities in Napa County	Multiple	Community	Work with other local jurisdictions within the County to develop a unified Climate Action Plan	Reducing GHG emissions in the County will require the efforts of all local jurisdictions in the County in addition to the County itself. A comprehensive unified Climate Action Plan can improve effectiveness of intraregional GHG reduction efforts, such as providing affordable housing in city centers and offering transit or rideshare solutions to wineries, vineyards, and other employment centers throughout the unincorporated County.	NA	NA	NA

#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
MS-2	Napa County	Wastewater	Community	Support efforts to increase the number of Napa Green Certified businesses in the unincorporated County, with a goal of 100% certified by 2030 for vineyards and wineries.	Provide a development or "use" bonus for major modifications or expansions of existing and new wineries and vineyards at the time the projects are being permitted, in exchange for the project applicant agreeing to certify the facility in the Napa Green program. "Use" bonuses may include increased visitation limits, winery production, or building square footage. County may also consider highlighting Napa Green Certified wineries on visitnapavalley.com. There is currently a 40% participation rate among wineries in Napa. This measure targets a participation rate of 60% by 2020 and 100% by 2030. Napa Valley Vintners have already targeted a 100% participation rate in the Napa Green program by 2020 for their members.  The program aims to reduce solid waste generation, water use, and wastewater generation; and, it promotes sustainable agricultural practices. Green practices at vineyards include using electrified or alternatively fueled agricultural equipment, converting diesel-powered irrigation pumps to electric, night-shift harvesting, and using biochar as soil amendments. Current emissions reductions only reflect reductions in wastewater emissions. Emissions reductions from other sectors will depend on the individual winery improvements. Improvements in agricultural equipment conversions may also be included under AG-2 and AG-3.	1,783	5,743	5,737
MS-3	Napa County	Multiple	Community	Promote the sale of locally grown foods and/or products	Promote the sale of locally grown food and/or products in the County. Work with local grocery stores, farmers markets, and restaurants to identify opportunities to reduce supply of on imported foods and to encourage local farmers to grow foods that are typically imported. Imported crops are typically off-season crops or tropical fruits for which there is little or no domestic production. Encourage farmers to use greenhouses or other methods to supply off-season crops during the winter. This measure will be a challenge considering the majority of agricultural land in the County dedicated to grape growing	NA	NA	NA
MS-4	Napa County	Multiple	Community	Establish a local carbon offset program in partnership with Sustainable Napa County	In coordination with Sustainable Napa County, establish a local carbon offset program that allows events, persons, businesses, or institutions in Napa County to purchase credits to offset GHG emissions they generate. The funds from the sale of carbon offsets would be used to construct, develop, or run projects that provide short or long term GHG reductions, depending on the emissions being offset.	NA	NA	NA

#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
LU-1	Napa County	Land Use Change	Community	Establish targets and enhanced programs for oak woodland and coniferous forest preservation and mandatory replanting	<p>Establish a program that prioritizes preservation of existing on-site trees for land use development projects, including vineyard conversions. Trees that cannot be preserved would be required to be replaced at a 2:1 ratio, under General Plan Policy CON-24. This program would primarily focus on, but would not be limited to, oak and coniferous trees. The program would target a minimum preservation rate of 30% of existing on-site trees (of a minimum age to be determined by County staff). For any tree replacements, the County should encourage project applicants to prioritize replanting on the project site followed by offering off-site planting opportunities.</p> <p>Considering County resource, staffing, and space limitations, it is assumed that an average of 2,500 replacement trees would be planted per year beginning in 2017. This target could be achieved by a combination of existing or enhanced volunteer replanting efforts (e.g., 5,000 Oaks Initiative) and the County's 2:1 tree replacement policy.</p> <p>The County would work with arborists and local conservation organizations (e.g., Napa Land Trust) to implement policies and programs that would protect or enhance the health of existing oak woodlands and determine ecologically sound locations for tree plantings, including the use of conservation easements or other efforts to protect existing oak woodlands. Potential programs could also include facilitating natural propagation of oaks (e.g., pollination assistance, squirrel/gopher population balance, livestock setbacks, and acorn harvesting). Preservation efforts should incorporate recommendations from the Voluntary Napa County Oak Woodlands Management Plan.</p>	7,077	4,544	15,360
LU-2	Napa County	Land Use Change	Community	Refine protection guidelines for existing riparian lands	<p>Continue to enforce the County's Conservation Regulations (County Code, section 18.108.010 B.4) that protect riparian lands and prevents conversion of riparian lands to urban development, agricultural land use, or other land use types. Work with arborists and local organizations to implement policies or programs that enhance existing riparian lands, especially those deemed unhealthy or at risk. If appropriate, refine guidelines or existing regulations to ensure that no net losses of riparian lands would occur.</p>	660	660	660
LU-3	Napa County	Land Use Change	Community	Repurpose or otherwise prevent burning of removed trees and other woody material from land use conversions of oak woodlands and coniferous forests	<p>This measure would require repurposing of usable lumber from trees removed due to land use conversion and burying or chipping of non-usable lumber. Repurposed wood may be either be used in construction or sold to local woodworking businesses or collectives with proceeds funding the administration of this measure. A minimum of 80% of total removed weight of trees shall be repurposed, buried, chipped, or otherwise prevented from burning. This measure only quantifies trees removed due to land use conversion of oak woodlands and coniferous forests. This measure prioritizes wood repurposing. If any portion of removed tree material cannot be repurposed due to disease or structural limitations, dispose of material either through burial, chipping, or other non-burning measures.</p>	10,839	3,453	4,731

#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
OR-1	Napa County	Off-Road Transportation	Community	Require Tier 4 equipment for all construction activity and mining operations as a condition for approval by 2030	Revised current building ordinances to require the use of Tier 4 final equipment as a condition of approval, for all construction projects occurring in the Unincorporated County by 2030. Equipment manufacturers claim that Tier 4 final equipment may increase fuel efficiency by up to 5% from Tier 4 interim equipment. Efficiency gains from lower tier equipment may be greater, but exact gains are currently unknown. Assume a 5% efficiency improvement because efficiency gains are likely higher when compared to older models.	-	354	386
OR-2	Napa County	Off-Road Transportation	Community	Promote use of alternative fuels for recreational watercraft	Encourage visitor and residents to use alternatively fuels in recreational watercraft. Work with rental companies, marinas, and parks that operate on waterways within the County to explore ways to offset diesel use with biodiesel. This would also include working with Cities that have jurisdiction over similar entities within City limits. Recreational watercraft docking within City limits may still operate in the Unincorporated County. Target an average biofuel share of 5% by 2020, 20% by 2030, and 50% by 2050.	1,687	7,512	22,629
SW-1	Napa County/ Landfill Owners Operators	Solid Waste	Municipal	Encourage expansion of composting program for both residential and commercial land uses	Expand current composting programs that serve the unincorporated County to exceed requirements under AB1826. Under AB1826, no more than 50% of the amount of commercial organic waste landfilled in 2014 can be landfilled started in 2020. Under this measure, the County would target a composting rate of 85% of all food and 100% of yard waste generated by the unincorporated County by 2030.	629	1,106	1,270
SW-2	Napa County/ Waste Management Companies	Solid Waste	Community	Meet an 80% Waste Diversion Goal by 2020 and a 90% Goal by 2030	The goal of this measure is to meet an 80% waste diversion goal by 2020 and a 90% waste diversion goal by 2030. This exceeds the State's 75% waste diversion target by 5% by 2020. Key action steps include: (1) completing an updated waste characterization study to analyze the distribution of waste types in the unincorporated County's generated waste and identify major waste reduction opportunities. The last waste characterization profile available for the unincorporated County was available for 1999. (2) Support and expand existing composting and recycling programs and incentives for residences and businesses. (3) Support and incentivize private waste collection and landfills in reducing landfilled waste.  According to Napa Recycling, recycling rates are already at 70% in the City of Napa and southern unincorporated Napa County. Consider increasing the waste diversion goal above 80% by 2020 if the updated waste characterization study shows that the unincorporated County is already at or near the State's 75% diversion rate.	1,179	2,625	3,163

#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
TR-1	NVTA/Napa County	On-Road Transportation	Community	Update Transportation System Management Ordinance (for Employers)	<p>Revise and update the County's Transportation System Management ordinance. The ordinance should include measures to reduce commute trips to workplaces within the unincorporated County as well as a program to oversee implementation of these measures at businesses. Consider a point-based system that allows employers with more than 20 employees to choose the best trip reduction measures that work for them. The County can recommend a list of trip reduction measures, such as preferential parking for carpools/vanpools or providing shuttle service. The ordinance should also establish a measurable target (e.g. % increased vanpool ridership and number of transit pass sales). See EPA's model trip reduction ordinance from 1996. Also City of Rocklin's Code 17.94.060 (Transportation Control Measure). Integrate the ordinance update with current BAAQMD and MTC rules and ordinances.</p> <p>Under Chapter 10.28 of the County's ordinances, which was last updated in 1992, the County has an existing transportation system management ordinance. However, it primarily applies to large employers. Update performance objectives under 10.28.040. Current objectives ended in 1999. Chapter 10.28 also incorporates BAAQMD's regulation 13 (Transportation Control Measures Rule 1 - Trip Reduction), which was suspended in 1996. However, the BAAQMD adopted Regulation 14 Rule 1 (BAY AREA COMMUTER BENEFITS PROGRAM) in 2014 that serves as the regional commute benefits ordinance, but only applies to employers with 50 or more employees. Many small wineries scattered throughout the Valley have less than 50 employees. Thus, the recommended revision to the ordinance expands the ordinance requirements to smaller businesses with 20 or more employees.</p>	4,818	3,582	3,547
TR-2	Napa County	On-Road Transportation	Community	Parking reduction ordinance revisions	Consider reductions in visitor and employee parking requirements and requiring minimum carpool/vanpool/tour bus or shuttle parking spaces, consistent with voluntary CalGreen measure. Consider EV only parking in lieu of parking reductions. Reductions in standard parking requirements can be made to the standards list in Napa County Code 18.66.280.	78	58	57
TR-3	NVTA/Napa County	On-Road Transportation	Community	Increase affordable housing, especially workforce housing, in Napa County	As allowable under the County's jurisdiction, promote development of affordable housing and TOD in priority development areas in the County. Also, encourage the development of housing closer to jobs and services. The Countywide Transportation Plan (Vision 2040) predicts growth in low wage employment in the County. Without affordable housing in the County, VMT from commuting would increase.	31	23	23
TR-4	NVTA/Napa County	On-Road Transportation	Community	Support efforts to allow commuter service to operate on the Napa Wine Train right-of-way	Support efforts to allow commuter service to operate on the Napa Wine Train right-of-way. Commuter service should operate at normal commute hours and with 15 minutes headways to be effective. Connection services, such as shuttles, between stations and nearby employment destinations, in both incorporate and unincorporated areas, would improve effectiveness of this measure. Sixty-six percent of workers in the County live in Napa County cities and could be serviced by a Napa Wine Train commuter service. Twelve percent of workers in the County work in the unincorporated area. (See Appendix D of the Napa County Transportation Survey: p109). Would reduce more trips associated with VMT to and from incorporated cities.	389	289	286
TR-5	NVTA/Napa County	On-Road Transportation	Community	Support efforts of transit agencies to increase availability and accessibility of transit information	The NVTA is currently working with Google to provide up-to-date transit information online. Currently, Google Maps does not provide transit information related to Vine or ferries. Improve overall availability and accessibility of transit information. Some plans have already been made under NVTA's Short-Range Transit Plan and Vision 2040.	NA	NA	NA

#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
TR-6	Napa County	On-Road Transportation	Community	Support alternatives to private vehicle travel for visitors	<p>Reduce visitor vehicle trips through improving access to available travel alternatives. These alternatives can include:</p> <ul style="list-style-type: none"> <li>-Subsidizing shuttles for visitors;</li> <li>-Offering winery travel trip route plans that reduce trips and VMT;</li> <li>-Providing information of public and private multi-modal options (bike tour, van tour, motorcycle tour, etc.);</li> <li>-Participating in an industry-wide transportation demand management program (such as a "hop-on hop-off" shuttle programs); and</li> <li>-Exploring driverless technology solutions, as they become available.</li> <li>-Provide a dedicated carsharing space at major destinations.</li> </ul> <p>Provide cost comparisons to tourists to show monetary and safety benefits of driving vs. using a shuttle service. If private shuttle services are deemed more expensive than private automobiles, consider subsidizing such services so that costs can be more comparable. Offer additional subsidies for fleets that are more than 50% alternatively fueled.</p>	NA	NA	NA
TR-7	NVTA/Napa County	On-Road Transportation	Community	Support NVTA and Cities in developing transit oriented development unique to the needs of the Napa Region	<p>Support the City of Napa and other incorporated cities in exploring the possibility of making the recently built Soscol Gateway Transit Center, other planned transit hubs, and surrounding areas more visitor-friendly and not just serve commuters. Transit facilities can be marketed as attractions in and of themselves. Encourage development of restaurants, hotels, and other attractions within walking distance of the transit center. Support a "grand station" district concept with easy and walkable access to major downtown destinations (e.g., downtown Napa, Riverfront green). This would encourage transit and other non-automobile ridership for travelers traveling to and from the unincorporated County. This measure should be enacted in tandem with vanpool, shuttle, and transit service in unincorporated County (e.g. unincorporated stops along Vine's Route 10). In addition to funding, the County could install wayfinding signage to promote uses of these developments.</p>	NA	NA	NA
TR-8	NVTA/Napa County	On-Road Transportation	Community	Support interregional transit solutions	<p>Support and work with NVTA, ABAG, MTC, and Bay Area tourism bureaus to develop solutions for interregional passenger travel between San Francisco/East Bay and Napa County, including the unincorporated areas. In addition to expanding connections with ferries, BART, and Amtrak, consider improvements in existing transit/rail connections to Sonoma and Solano Counties to increase ridership. This could also help offset employee commuter trips to and from unincorporated Napa County. Vision 2040 suggests that the growing labor force in Napa will be in low wage workers in agriculture, retail, and hospitality that will likely be commuting from outside the County where housing is cheaper. Some plans have already been made under NVTA's Short Range Transit Plan and Vision 2040.</p>	NA	NA	NA
TR-9	NVTA/Napa County	On-Road Transportation	Community	Work with Cities and neighboring regions to increase presence of park and ride facilities near residential centers	<p>Work with Napa Cities, neighboring jurisdictions, and NVTA to Install additional park and ride facilities near major residential centers. Currently, there are five park and ride facilities in the County (three in Napa, one in Yountville, and American Canyon). According to the Napa County Travel Behavior Study, 92% of employees in the County drive private automobiles, only 20% carpooled, and 43% would take transit if it was a viable option. Also, about of half those employed in the County live in Napa County cities and 24% live in the unincorporated area. Because homes in the unincorporated area are more likely to be scattered, working with neighboring cities and NVTA can promote installation of park and ride facilities in areas where most of those working in the County live.</p>	NA	NA	NA

#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
TR-10	NVTA/Napa County	On-Road Transportation	Community	Promote existing ridematching services for people living and working in the unincorporated County	Support NVTA and the Solano Transportation Authority to promote awareness of the ridematching services provided through the Solano Napa Commuter Information website and other organizations. Work with local businesses, especially winery, vineyards, and hospitality, to provide information to employers and their employees on ridesharing or shuttle options to transport seasonal workers to and from home. Consider both monetary and non-monetary incentives, as appropriate and feasible.	NA	NA	NA
TR-11	NVTA/Napa County	On-Road Transportation	Community	Increase the supply of electric vehicle charging stations	Promote/incentivize installation of charging stations at wineries, industrial centers, hotels, major visitor attractions, and multifamily complexes. Also, install charging stations at park-and-ride facilities. Stations should have clear and obvious signage, require some form of payment to allow for availability, be near amenities, easily accessible, and enforced. Some plans have already been made under Vision 2040.	NA	NA	NA
TR-12	NVTA/Napa County	On-Road Transportation	Community	Promote Telecommuting at Office Based Businesses	To reduce commute vehicle miles travelled, work with local office-based businesses to encourage telecommuting. Telecommuting should not impede on normal business practices and, thus, may not be suitable for businesses that require physical employee attendance, such as at retail storefronts and warehouses.	NA	NA	NA
TR-13	Napa County	On-Road Transportation	Municipal	Support efforts of solid waste collection services to convert diesel solid waste collection vehicles to CNG	Encourage solid waste services to convert diesel and gasoline solid waste collection vehicles to CNG or other alternative fuels.	284	247	169
WA-1	Napa County	Water	Community	Amend or revise water conservation regulations for landscape design	Consider expanding existing ordinance (Chapter 18.118) to include home-owner provided landscaping projects. Section 18.118.020 exempts home-owner provided landscaping on a residential property. Limit documentation requirements for homeowners. Other potential amendments can include minimum drought tolerant plant species and cash-for-grass turf rebates.	NA	NA	NA
WA-2	Napa County	Water	Community	Adopt a new water conservation ordinance for commercial and residential land uses limiting outdoor watering	Adopt a new water conservation ordinance for commercial and residential land uses that focuses on limiting on-site outdoor and indoor water use. Requirements can include: <ul style="list-style-type: none"> <li>- Limiting outdoor watering to 2 days per week and having written violations for the first offense and increasing fines for each offence thereafter. Offender may waive second offense fee after attending a 2-hour water conservation seminar. Allowable watering days can be staggered on an address-number basis (e.g. even address numbers can only water on Tuesday and/or Saturday).</li> <li>-Banning most lawn and landscape watering on consecutive days and irrigation within 48 hours of measurable rainfall, similar to the City of Napa's water conservation ordinance.</li> <li>-Banning outdoor car washing on certain days of the week</li> <li>-Providing educational material for residents and businesses on water conservation tips</li> </ul>	NA	NA	NA

#	Lead Agency	Sector	Community or Municipal	Measure Name	Measure Description	Annual GHG Reduction (MT CO <sub>2</sub> e)		
						2020	2030	2050
WA-3	Napa County	Water	Community	Expedite and/or reduce permit fees associated with water conservation installations in existing facilities	Expedite, reduce, or exempt permits and permit fees associated with water conservation installations in existing facilities. These installations can include graywater plumbing and large rainwater catchment systems.	NA	NA	NA
WA-4	Napa County	Water	Community	Require water audits for large new commercial or industrial projects and significant expansions of existing facilities	Require water audits for large new commercial or industrial projects and significant expansions of existing facilities to identify opportunities for water conservation. Establish a program to follow up with the water audits and explore water conservation that are appropriate to each facility.	NA	NA	NA

Environmental Co-Benefit Potential						
#	Measure Name	Air Quality	Water	Biological Resources	Health	Non-Renewable Energy Resources
		<i>Reduces criteria air pollutants directly or indirectly</i>	<i>Reduces strain on local and state water supply or improves water quality</i>	<i>Improves or preserves natural ecosystems and habitats</i>	<i>Improves public health through reduced pollutants and hazards, and increasing physical activity</i>	<i>Reduces reliance on finite fossil fuel resources</i>
AG-1	Support BAAQMD in ending open burning of removed agricultural biomass and flood debris	Yes	No	Yes	Yes	No
AG-2	Convert all stationary diesel or gas-powered irrigation pumps to electric pumps	Yes	No	Yes	Yes	Yes
AG-3	Support use of electric or alternatively fueled agricultural equipment	Yes	No	Yes	Yes	Yes
AG-4	Support the use of Tier 4 final Diesel Equipment for Off-Road Agricultural Equipment	Yes	No	Yes	Yes	Yes
BE-1	Work with PG&E, PACE financing programs, and other regional partners to incentivize energy efficiency improvements in existing buildings	Yes	No	No	No	Yes
BE-2	Require energy audits for major additions to or alterations of existing buildings	Yes	No	No	No	Yes
BE-3	Require compliance with CalGreen Tier 1 Green Building standards for eligible alterations or additions to existing buildings	Yes	Yes	Yes	Yes	Yes
BE-4	Require compliance with CalGreen Tier 1 standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) for all new construction, and phase in ZNE requirements for new construction, beginning with residential in 2020 and non-residential by 2030	Yes	Yes	Yes	Yes	Yes
BE-5	Increase participation in Marin Clean Energy (MCE) 100% renewable option	Yes	No	No	No	Yes
BE-6	Require new or replacement residential water heating systems to be electrically powered and/or alternatively fueled systems	Yes	No	No	No	Yes
BE-7	Expand current renewable energy and green energy incentives and update local ordinances	Yes	No	No	No	Yes
BE-8	Develop a program to allow new development to offset project GHG emissions by retrofitting existing income-qualified homes	Yes	Yes	No	Yes	Yes
BE-9	Select MCE's Deep Green Option for all County Facilities	Yes	No	No	No	Yes

Environmental Co-Benefit Potential						
#	Measure Name	Air Quality	Water	Biological Resources	Health	Non-Renewable Energy Resources
		<i>Reduces criteria air pollutants directly or indirectly</i>	<i>Reduces strain on local and state water supply or improves water quality</i>	<i>Improves or preserves natural ecosystems and habitats</i>	<i>Improves public health through reduced pollutants and hazards, and increasing physical activity</i>	<i>Reduces reliance on finite fossil fuel resources</i>
BE-10	Support Waste-to-Energy Programs at Unincorporated Landfills	Yes	Yes	No	Yes	Yes
MS-1	Work with other local jurisdictions within the County to develop a unified Climate Action Plan	Yes	Yes	Yes	Yes	Yes
MS-2	Support efforts to increase the number of Napa Green Certified businesses in the unincorporated County, with a goal of 100% certified by 2030 for vineyards and wineries.	Yes	Yes	Yes	Yes	Yes
MS-3	Promote the sale of locally grown foods and/or products	Yes	Yes	No	Yes	No
MS-4	Establish a local carbon offset program in partnership with Sustainable Napa County	Yes	Yes	Yes	Yes	Yes
LU-1	Establish targets and enhanced programs for oak woodland and coniferous forest preservation and mandatory replanting	Yes	Yes	Yes	Yes	No
LU-2	Refine protection guidelines for existing riparian lands	No	Yes	Yes	Yes	No
LU-3	Repurpose or otherwise prevent burning of removed trees and other woody material from land use conversions of oak woodlands and coniferous forests	Yes	No	No	Yes	No
OR-1	Require Tier 4 equipment for all construction activity and mining operations as a condition for approval by 2030	Yes	No	Yes	Yes	Yes
OR-2	Promote use of alternative fuels for recreational watercraft	Yes	Yes	Yes	Yes	Yes
SW-1	Encourage expansion of composting program for both residential and commercial land uses	Yes	Yes	Yes	No	No

Environmental Co-Benefit Potential						
#	Measure Name	Air Quality	Water	Biological Resources	Health	Non-Renewable Energy Resources
		<i>Reduces criteria air pollutants directly or indirectly</i>	<i>Reduces strain on local and state water supply or improves water quality</i>	<i>Improves or preserves natural ecosystems and habitats</i>	<i>Improves public health through reduced pollutants and hazards, and increasing physical activity</i>	<i>Reduces reliance on finite fossil fuel resources</i>
SW-2	Meet an 80% Waste Diversion Goal by 2020 and a 90% Goal by 2030	No	Yes	Yes	Yes	No
TR-1	Update Transportation System Management Ordinance (for Employers)	Yes	No	No	Yes	Yes
TR-2	Parking reduction ordinance revisions	Yes	No	No	Yes	Yes
TR-3	Increase affordable housing, especially workforce housing, in Napa County	Yes	No	No	Yes	Yes
TR-4	Support efforts to allow commuter service to operate on the Napa Wine Train right-of-way	Yes	No	No	Yes	Yes
TR-5	Support efforts of transit agencies to increase availability and accessibility of transit information	Yes	No	No	Yes	Yes
TR-6	Support alternatives to private vehicle travel for visitors	Yes	No	No	Yes	Yes
TR-7	Support NVTA and Cities in developing transit oriented development unique to the needs of the Napa Region	Yes	No	No	Yes	Yes
TR-8	Support interregional transit solutions	Yes	No	No	Yes	Yes
TR-9	Work with Cities and neighboring regions to increase presence of park and ride facilities near residential centers	Yes	No	No	Yes	Yes
TR-10	Promote existing ridematching services for people living and working in the unincorporated County	Yes	No	No	Yes	Yes
TR-11	Increase the supply of electric vehicle charging stations	Yes	No	No	Yes	Yes
TR-12	Promote Telecommuting at Office Based Businesses	Yes	No	No	No	No
TR-13	Support efforts of solid waste collection services to convert diesel solid waste collection vehicles to CNG	Yes	No	No	No	No
WA-1	Amend or revise water conservation regulations for landscape design	Yes	Yes	Yes	No	Yes

Environmental Co-Benefit Potential						
#	Measure Name	Air Quality	Water	Biological Resources	Health	Non-Renewable Energy Resources
		<i>Reduces criteria air pollutants directly or indirectly</i>	<i>Reduces strain on local and state water supply or improves water quality</i>	<i>Improves or preserves natural ecosystems and habitats</i>	<i>Improves public health through reduced pollutants and hazards, and increasing physical activity</i>	<i>Reduces reliance on finite fossil fuel resources</i>
WA-2	Adopt a new water conservation ordinance for commercial and residential land uses limiting outdoor watering	Yes	Yes	Yes	No	Yes
WA-3	Expedite and/or reduce permit fees associated with water conservation installations in existing facilities	Yes	Yes	Yes	No	Yes
WA-4	Require water audits for large new commercial or industrial projects and significant expansions of existing facilities	No	Yes	No	No	No

Measure Cost and Administrative Feasibility					
#	Measure Name	Estimated Cost/Benefit and Regional Economic Impact Considerations		Administrative Feasibility	
		High-Level Cost Assessment	Detail	Coordination Level	Detail
AG-1	Support BAAQMD in ending open burning of removed agricultural biomass and flood debris	Medium	Some costs to the County associated with program-level management	County and BAAQMD	Requires collaboration with BAAQMD. County does not have direct jurisdiction over open burning activities related to agriculture, but may have some jurisdiction over burning of flood control and forest debris.
AG-2	Convert all stationary diesel or gas-powered irrigation pumps to electric pumps	Medium	May involve costs with respect to rebates or other incentives provided to operators who choose to convert the pumps.	County and BAAQMD	County may work with BAAQMD to acquire funds and possibly administration to support this measure.
AG-3	Support use of electric or alternatively fueled agricultural equipment	Low	Some costs to the County associated with program-level management	County and BAAQMD	County may work with BAAQMD to acquire funds and possibly administration to support this measure.
AG-4	Support the use of Tier 4 final Diesel Equipment for Off-Road Agricultural Equipment	Medium	Some costs to the County associated with program-level management. May involve increased costs to equipment operators.	County and Agricultural Community	County would need to establish code or program to enforce requirement. Requires collaboration with agricultural equipment operators.
BE-1	Work with PG&E, PACE financing programs, and other regional partners to incentivize energy efficiency improvements in existing buildings	Medium	Some costs to the County associated with program-level management	County, PG&E, and MCE	Requires collaboration with PG&E, MCE, California Energy Commission to determine applicable energy efficiency incentives.
BE-2	Require energy audits for major additions to or alterations of existing buildings	Medium	Some costs to the County associated with program-level management.	County only	May require County to establish a new energy audit program.
BE-3	Require compliance with CalGreen Tier 1 Green Building standards for eligible alterations or additions to existing buildings	Low	Potential increased costs to building applicants associated with green building and efficiency requirements. Low additional cost to the county due to current code enforcement.	County only	Requires updating current building code ordinances. County already does building code enforcements.

Measure Cost and Administrative Feasibility					
#	Measure Name	Estimated Cost/Benefit and Regional Economic Impact Considerations		Administrative Feasibility	
		High-Level Cost Assessment	Detail	Coordination Level	Detail
BE-4	Require compliance with CalGreen Tier 1 standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) for all new construction, and phase in ZNE requirements for new construction, beginning with residential in 2020 and non-residential by 2030	Low	Potential increased costs to building applicants associated with green building and efficiency requirements. Low additional cost to the county due to current code enforcement.	County only	Requires updating current building code ordinances. County already does building code enforcements.
BE-5	Increase participation in Marin Clean Energy (MCE) 100% renewable option	Medium	This measure would cost the County between approximately \$282,000 and \$343,000 per year. See quantification in separate spreadsheet. Some funding could be available through BAAQMD, who currently funds a similar program in the City of Fairfax through a grant.	County, MCE, and potential funding sources	Requires starting and maintaining an annual subsidy program. May require proposal development to request grant funding.
BE-6	Require new or replacement residential water heating systems to be electrically powered and/or alternatively fueled systems	Low	Potential increased costs to building applicants associated with efficiency requirements. Low additional cost to the county due to current code enforcement.	County only	Requires updating current building code ordinances. County already does building code enforcements.
BE-7	Expand current renewable energy and green energy incentives and update local ordinances	Varies	Potential increased costs associated with monetary incentives. Cost would depend on any changes in level of incentives.	County only	Requires maintaining current program and monitoring total kW of approved solar permits
BE-8	Develop a program to allow new development to offset project GHG emissions by retrofitting existing income-qualified homes	Medium	Some costs to the County associated with program-level management	County Only	Requires County to establish a new program.
BE-9	Select MCE's Deep Green Option for all County Facilities	Low	Assuming an additional cost of \$0.01 per kWh, this would cost the County approximately \$30,000 per year. See quantification in separate spreadsheet.	County and MCE	Requires a one-time selection of Deep Green for all facilities located in the unincorporated County.

Measure Cost and Administrative Feasibility					
#	Measure Name	Estimated Cost/Benefit and Regional Economic Impact Considerations		Administrative Feasibility	
		High-Level Cost Assessment	Detail	Coordination Level	Detail
BE-10	Support Waste-to-Energy Programs at Unincorporated Landfills	High	Costs would be associated with construction and operation of the new facility	Landfills and County	Requires coordination with landfill operators located in the unincorporated County.
MS-1	Work with other local jurisdictions within the County to develop a unified Climate Action Plan	High	Costs associated with coordination and CAP development. May take over a year to complete and require dedicated staff resources to manage technical studies and public participation.	County and Cities	Requires working with local jurisdictions.
MS-2	Support efforts to increase the number of Napa Green Certified businesses in the unincorporated County, with a goal of 100% certified by 2030 for vineyards and wineries.	Medium	Potential costs to winery and vineyard owners to pay certification costs. Costs to County associated with target monitoring. Potential County costs associated with monetary or other incentives (e.g. increased presence on Napa Visitors website).	County, Napa Green, and Businesses	Requires coordination with Napa Green and Napa wineries. May require discussion with Napa Green on feasibility of 2030 target.
MS-3	Promote the sale of locally grown foods and/or products	Low	Costs associated with promotion of locally grown foods/products	County Only	May require establishment and promotion program and dedicated staff time to achieve measure goals.
MS-4	Establish a local carbon offset program in partnership with Sustainable Napa County	High	Costs associated with developing, maintaining, and operating a new program	County and Sustainable Napa County	May require establishment and promotion program and dedicated staff time to manage carbon offsets.
LU-1	Establish targets and enhanced programs for oak woodland and coniferous forest preservation and mandatory replanting	Low	Costs associated with code enforcement, project design to prioritize preservation, and replanting efforts	County, Project Applicants, and Volunteers	Requires updating code and enforcement of code and coordination with volunteer replanting efforts.
LU-2	Refine protection guidelines for existing riparian lands	Low	Costs associated with code enforcement	County Only	Requires updating code and enforcement of code.

Measure Cost and Administrative Feasibility					
#	Measure Name	Estimated Cost/Benefit and Regional Economic Impact Considerations		Administrative Feasibility	
		High-Level Cost Assessment	Detail	Coordination Level	Detail
LU-3	Repurpose or otherwise prevent burning of removed trees and other woody material from land use conversions of oak woodlands and coniferous forests	Low	Costs associated with developing, maintaining, and operating a new program and research. Some costs also associated with contracts with eligible businesses and services.	County and eligible businesses/ organizations	May require dedicated staff time to research feasible repurposing pathways and contracts with eligible businesses or services.
OR-1	Require Tier 4 equipment for all construction activity and mining operations as a condition for approval by 2030	Medium	Some costs to the County associated with program-level management. May involve increased costs to project applicants.	County and Project Applicants	County would need to establish code or program to enforce requirement. Requires participation from and collaboration with developers or project applicants.
OR-2	Promote use of alternative fuels for recreational watercraft	Medium	Some costs to the County associated with promotion and coordination efforts, as well as program management.	County, Dock operators, Local Businesses, and Cities	County would need to coordinate with operators at County and City waterways to encourage use of alternative fuels, especially biodiesel. County would need to do some research related to best implementation methods.
SW-1	Encourage expansion of composting program for both residential and commercial land uses	Medium	Some increased costs associated with promotion of composting.	County and Waste Management Companies	Requires increased County efforts to promote composting of food and yard waste generated in the County.
SW-2	Meet an 80% Waste Diversion Goal by 2020 and a 90% Goal by 2030	Medium	Some increased costs associated with promotion of waste reduction options (e.g. recycling, composting, reuse).	County and Waste Management Companies	Requires increased County efforts to promote recycling, composting, and reuse of waste materials generated in the County.
TR-1	Update Transportation System Management Ordinance (for Employers)	Medium	Increased costs associated with enforcement and monitoring of ordinance.	County and MTC	Requires ordinance update and a new program to be established to monitor progress of and enforce the new ordinance. Some coordination may be needed with MTC to synergize with Bay Area's Commuter Benefits Program.
TR-2	Parking reduction ordinance revisions	Medium	Increased costs associated with enforcement and monitoring of ordinance.	County Only	Requires ordinance update and regular enforcement of ordinance.
TR-3	Increase affordable housing, especially workforce housing, in Napa County	Medium	Costs to be shared throughout the region, depending on location of affordable housing.	County, Cities, and NCTPA	The County has land use authority and can influence design and approval of projects for affordable workforce housing.

Measure Cost and Administrative Feasibility					
#	Measure Name	Estimated Cost/Benefit and Regional Economic Impact Considerations		Administrative Feasibility	
		High-Level Cost Assessment	Detail	Coordination Level	Detail
TR-4	Support efforts to allow commuter service to operate on the Napa Wine Train right-of-way	Medium	High initial capital costs associated with new commuter train cars and annual costs from regular service operation. Train would not be operated by the County. Operation costs would need to be negotiated between agencies (e.g. cities, NCTPA, Napa Wine Train).	County, NCTPA, and Napa Wine Train	The County has seats on the NCTPA Board and can influence transportation planning decisions. Would also depend on agreements with Napa Wine Train.
TR-5	Support efforts of transit agencies to increase availability and accessibility of transit information	Low	Low initial costs associated with linking current transit data with transit information providers, such as Google.	County, NCTPA, and Regional Transit Agencies	The County has seats on the NCTPA Board and can influence transportation planning decisions. Would require some coordination with Google and other transit information providers.
TR-6	Support alternatives to private vehicle travel for visitors	Low	Low costs associated with updating and maintaining visitor bureau website to include focus on private vehicle alternatives.	County and Visit Napa Valley	County funds the VisitNapaValley.com website through Napa County Special Projects Funding. County has some influence over the contents of the website. Requires coordination with Visit Napa Valley.
TR-7	Support NVTA and Cities in developing transit oriented development unique to the needs of the Napa Region	Varies	Costs associated with land use planning and development. Funding sources would depend on the location of proposed developments.	County, Cities, and NCTPA	The County has seats on the NCTPA Board and can influence transportation planning decisions related to transit oriented development.
TR-8	Support interregional transit solutions	Varies	Costs may vary depending on the solutions needed. Higher costs would be associated with developments of new transit infrastructure, stations, or fleet. Lower costs would be associated with coordination of schedules, routes, and information between transit agencies.	County, Cities, NCTPA, and Regional Transit Agencies	The County has seats on the NCTPA Board and can influence transportation planning decisions related to transit solutions. A more aggressive approach requires coordination with local and regional transit agencies to promote synergy across transit service areas.

Measure Cost and Administrative Feasibility					
#	Measure Name	Estimated Cost/Benefit and Regional Economic Impact Considerations		Administrative Feasibility	
		High-Level Cost Assessment	Detail	Coordination Level	Detail
TR-9	Work with Cities and neighboring regions to increase presence of park and ride facilities near residential centers	Medium	Costs associated with coordination and development of a pilot project. Project moves forward, may require regular monitoring of program progress.	County and NCTPA	The County has seats on the NCTPA Board and can influence transportation planning decisions related to transit solutions. A more aggressive approach requires coordination with vineyards and Vine or private ridesharing companies, such as Enterprise, to explore the ridership potential of and best schedule for harvest season ride services.
TR-10	Promote existing ridematching services for people living and working in the unincorporated County	Varies	Some costs associated with coordination. Cost of park and ride facilities will depend on whether the facilities are located in the unincorporated area or not.	County, Cities, and NCTPA	The County has seats on the NCTPA Board and can influence transportation planning decisions related to park and ride facilities. Most facilities would likely be located in Cities where the greatest concentration of residential units are. Park and ride facilities could be located in the unincorporated County if located close to nearby residential concentrations.
TR-11	Increase the supply of electric vehicle charging stations	High	High capital costs associated with construction of EV charging stations, signage, and related infrastructure throughout County. Some costs associated with maintenance.	County and County businesses	Requires coordination with businesses and multi-family complexes to install EV chargers. May require routine maintenance that can be contracted out.
TR-12	Promote Telecommuting at Office Based Businesses	Low	Costs associated with identifying eligible businesses and promotion of telecommuting.	County only	Requires some staff time dedicated to achieving measure goals.
TR-13	Support efforts of solid waste collection services to convert diesel solid waste collection vehicles to CNG	High	High capital cost of performing the vehicle conversions to CNG. May rely on grant funding.	Solid Waste Collection Services and County	Requires coordination with solid waste collection services located in the unincorporated County.
WA-1	Amend or revise water conservation regulations for landscape design	Low	Low additional cost to the county due to current code enforcement.	County only	Requires updating current water conservation ordinance. County already does code enforcements.
WA-2	Adopt a new water conservation ordinance for commercial and residential land uses limiting outdoor watering	Low	Low additional cost to the county due to current code enforcement.	County only	Requires updating current water conservation ordinance. County already does code enforcements.

Measure Cost and Administrative Feasibility					
#	Measure Name	Estimated Cost/Benefit and Regional Economic Impact Considerations		Administrative Feasibility	
		High-Level Cost Assessment	Detail	Coordination Level	Detail
WA-3	Expedite and/or reduce permit fees associated with water conservation installations in existing facilities	Low	Low additional cost for expedited permits. Slightly reduced revenue from lowered permit fees.	County only	Requires updating County permit fee list.
WA-4	Require water audits for large new commercial or industrial projects and significant expansions of existing facilities	Medium	Some costs associated with developing water audit methods, performing audits themselves, providing feedback to businesses, and recommending solutions.	County only	Requires some staff time dedicated to achieving measure goals. May require establishing a water audit program.

Quantification Assumptions		
#	Measure Name	Calculation Assumptions
AG-1	Support BAAQMD in ending open burning of removed agricultural biomass and flood debris	Based on elimination of emissions from open burning of orchard prunings and flood debris in 2014, as categorized by BAAQMD open burning permit data. Assumes same amount of emissions would be reduced in future years.
AG-2	Convert all stationary diesel or gas-powered irrigation pumps to electric pumps	Assumes all pumps are diesel-powered and all are converted to electric, and any future pumps associated with growth in ag sector would be electric
AG-3	Support use of electric or alternatively fueled agricultural equipment	Assumes 5% of emissions from agricultural equipment would be reduced.
AG-4	Support the use of Tier 4 final Diesel Equipment for Off-Road Agricultural Equipment	See separate calculation spreadsheet
BE-1	Work with PG&E, PACE financing programs, and other regional partners to incentivize energy efficiency improvements in existing buildings	Not quantified
BE-2	Require energy audits for major additions to or alterations of existing buildings	Not quantified
BE-3	Require compliance with CalGreen Tier 1 Green Building standards for eligible alterations or additions to existing buildings	See separate calculation spreadsheet
BE-4	Require compliance with CalGreen Tier 1 standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) for all new construction, and phase in ZNE requirements for new construction, beginning with residential in 2020 and non-residential by 2030	See separate calculation spreadsheet
BE-5	Increase participation in Marin Clean Energy (MCE) 100% renewable option	See separate calculation spreadsheet
BE-6	Require new or replacement residential water heating systems to be electrically powered and/or alternatively fueled systems	See separate calculation spreadsheet
BE-7	Expand current renewable energy and green energy incentives and update local ordinances	Not quantified
BE-8	Develop a program to allow new development to offset project GHG emissions by retrofitting existing income-qualified homes	Not quantified
BE-9	Select MCE's Deep Green Option for all County Facilities	See separate calculation spreadsheet

#	Measure Name	Calculation Assumptions
BE-10	Support Waste-to-Energy Programs at Unincorporated Landfills	See separate calculation spreadsheet
MS-1	Work with other local jurisdictions within the County to develop a unified Climate Action Plan	Not quantified
MS-2	Support efforts to increase the number of Napa Green Certified businesses in the unincorporated County, with a goal of 100% certified by 2030 for vineyards and wineries.	<p>In 2014, 40% of wineries were Napa Green Certified. Although this measure would theoretically reduce emissions across all sectors, there is not enough information available to determine the average savings associated with being Napa Green Certified. Only reductions in wastewater emissions were accounted for in this measure because the inventory assumed that all Napa Green Wineries treat their wastewater aerobically. Calculations assumes a 60% certification rate by 2020 and an 100% certification rate by 2030. See separate calculation spreadsheet.</p> <p>For all certified businesses, it is assumed that 75% of businesses already undergoing energy retrofits pursuant to SB350 programs would seek to be or are already Napa Green Certified.</p>
MS-3	Promote the sale of locally grown foods and/or products	Not quantified
MS-4	Establish a local carbon offset program in partnership with Sustainable Napa County	Not quantified
LU-1	Establish targets and enhanced programs for oak woodland and coniferous forest preservation and mandatory replanting	Assumes 30% of trees forecasted to be lost would be conserved and up to 2,500 oak and coniferous trees would be planted per year to replace lost trees. Replanting efforts assume a 20% mortality rate. Original forecasts assume a certain reduction in oak woodland based on land use forecasts. See separate calculation spreadsheet.
LU-2	Refine protection guidelines for existing riparian lands	Assumes all riparian land in 2014 would remain in future years. Original forecasts assume a certain reduction in these land uses based on land use forecasts. Reductions associated with this measure assume that any forecasted removal of riparian lands would not occur. See separate calculation spreadsheet.
LU-3	Repurpose or otherwise prevent burning of removed trees and other woody material from land use conversions of oak woodlands and coniferous forests	Assumes 80% of the lumber from removed oak and coniferous trees would be repurposed, buried, or otherwise unburned and prevented from releasing stored CO2 back into the atmosphere.
OR-1	Require Tier 4 equipment for all construction activity and mining operations as a condition for approval by 2030	This measure assumes that emissions and fuel efficiency are directly proportional. Assume a 5% efficiency improvement because efficiency gains are likely higher when compared to older models.
OR-2	Promote use of alternative fuels for recreational watercraft	Assumes a plan would successfully reduce emissions from pleasure craft by 5% by 2020, 20% by 2030, and 50% by 2050 due to shifts to alternative fuels, including biodiesel.
SW-1	Encourage expansion of composting program for both residential and commercial land uses	See separate calculation spreadsheet.
SW-2	Meet an 80% Waste Diversion Goal by 2020 and a 90% Goal by 2030	See separate calculation spreadsheet.

#	Measure Name	Calculation Assumptions
TR-1	Update Transportation System Management Ordinance (for Employers)	Applies CAPCOA measures TRT-1/TRT-3/TRT-11 (Commuter Trip Reduction measures) and TRT-2 (Commuter Trip Reduction Monitoring Program), which have a minimum VMT reduction of 1-2% and 4.2%, respectively. Calculations assume a rural context and applicability to large employers in the unincorporated area. Measure applies only to commute VMT, available from MTC. See separate calculation spreadsheet.
TR-2	Parking reduction ordinance revisions	Applies CAPCOA TRT-14 and TRT-15 measures which assume a 0.1-19.7% reduction in VMT. This measure assumes a low rate of VMT reduction due to rural nature of Napa County. See separate calculation spreadsheet.
TR-3	Increase affordable housing, especially workforce housing, in Napa County	Applies CAPCOA LUT-6 measure which assumes a 0.4 - 1.2% reduction in VMT. This measure assumes a low rate of VMT reduction due to distance from cities in Napa County to destinations in the unincorporated area. Commute from cities is closer than commuting from neighboring counties, depending on work locations. See separate calculation spreadsheet.
TR-4	Support efforts to allow commuter service to operate on the Napa Wine Train right-of-way	Applies CAPCOA LUT-5 measure which assumes a 0.5-24.6% reduction in VMT. This measure assumes a low rate of VMT reduction due to rural nature of Napa County. See separate calculation spreadsheet.
TR-5	Support efforts of transit agencies to increase availability and accessibility of transit information	Not quantified
TR-6	Support alternatives to private vehicle travel for visitors	Not quantified
TR-7	Support NVTA and Cities in developing transit oriented development unique to the needs of the Napa Region	Not quantified
TR-8	Support interregional transit solutions	Not quantified
TR-9	Work with Cities and neighboring regions to increase presence of park and ride facilities near residential centers	Not quantified
TR-10	Promote existing ridematching services for people living and working in the unincorporated County	Not quantified
TR-11	Increase the supply of electric vehicle charging stations	Not quantified
TR-12	Promote Telecommuting at Office Based Businesses	Not quantified
TR-13	Support efforts of solid waste collection services to convert diesel solid waste collection vehicles to CNG	See separate calculation spreadsheet.
WA-1	Amend or revise water conservation regulations for landscape design	Not quantified
WA-2	Adopt a new water conservation ordinance for commercial and residential land uses limiting outdoor watering	Not quantified
WA-3	Expedite and/or reduce permit fees associated with water conservation installations in existing facilities	Not quantified

## Reduction Measure Quantification

### Building Energy Assumptions

	2020	2030	2050
Napa County Average Electricity Emissions Factor (MTCO <sub>2e</sub> /MWh)	1.29E-01	5.91E-02	5.58E-02
Natural Gas Emissions Factor (MTCO <sub>2e</sub> /therm)		0.00685	

Source: Final Technical Memorandum #1: 2014 Greenhouse Gas Emissions Inventory and Forecasts

### AG-2

Convert all stationary diesel or gas-powered irrigation pumps to electric pumps	2014	2020	2030	2050
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Number of Diesel Pumps in Napa County	25.9	26.5	28.0	31.4
Emissions from Diesel Pumps (MTCO <sub>2e</sub> )	1,657	1,697	1,792	2,009

Assume all diesel pumps are converted to electric

Diesel Emission Factor (kg CO <sub>2</sub> /gal)	10.21			
Calculated fuel use (gal)	162,302	166,231	175,614	196,880
<a href="#">Energy content of diesel (kBTU/gal) - lower heating value</a>	128	128	128	128
Efficiency of diesel pump (%)	35%	35%	35%	35%
Energy required by pumps (kBTU)	7,299	7,476	7,898	8,854
Efficiency of electric pump (%)	75%	75%	75%	75%
Calculated electricity use in electric pumps (kBTU)	9,732	9,967	10,530	11,805
Calculated electricity use in electric pumps (kWh)	2,852	2,921	3,086	3,460
Emissions from electricity use (MTCO <sub>2e</sub> )		0.38	0.18	0.19

Net GHG Reduction from AG-2 (MTCO <sub>2e</sub> )		1,696	1,792	2,009
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### AG-3

Support use of electric or alternatively fueled agricultural equipment	2014	2020	2030	2050
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Emissions from Agricultural Equipment Except for Irrigation Pumps. Scaled by change in cropland. (MTCO <sub>2e</sub> )	31,571	32,336	34,161	38,297
Percent of Equipment Converted to Electric or Alternative Fuel		5%	25%	50%

Net GHG Reduction from AG-3 (MTCO <sub>2e</sub> )		1,617	8,540	19,149
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### AG-4

Support the use of Tier 4 final Diesel Equipment for Off-Road Agricultural Equipment	2014	2020	2030	2050
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Emissions from Agricultural Equipment <b>Except</b> for Irrigation Pumps (MTCO <sub>2e</sub> )	31,571	32,336	34,161	38,297
Emissions Reduced from AG-3		1,617	8,540	19,149
Remaining emissions from diesel agricultural equipment		30,719	25,621	19,149
Participation rate of equipment that are Tier 4 Final		-	5%	5%
Average percent improvement in fuel efficiency with Tier 4 Final equipment		5.00%	5.00%	5.00%

Net GHG Reduction from AG-4 (MTCO <sub>2e</sub> )		-	64	48
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## BE-3

Require compliance with CalGreen Tier 1 Green Building standards for eligible alterations or additions to existing buildings	2020	2030	2050
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**From Inventory Demographics Assumptions (Unincorporated County)**

	<b>2014</b>	<b>2020</b>	<b>2030</b>	<b>2050</b>
Households (HH)	12,356	12,931	13,890	15,844
Population	26,665	28,612	31,857	38,384
Jobs	11,400	11,732	12,284	13,372

Source: Fehr and Peers 2015 (Technical Memorandum to Ascent dated November 5, 2015)

**Residential**

Average number of eligible residential permits per year scaled by population growth	50	52	56	64
Average electricity use per HH (from County HH data and PGE estimates for 2013) (kWh)	9,406	9,406	9,406	9,406
Average natural gas use per HH (from County HH data and PGE estimates for 2013) (therms)	308	308	308	308
Percent of HH applicable to energy audit (conservative assumption)	50%			
CalGreen Tier 1 Percent Reduction from 2008 standards (conservative assumption)	15%			
Electricity Savings per year (kWh)	35,273	36,915	39,653	45,230
Natural Gas Savings per year (therms)	1,155	1,209	1,298	1,481
<b>Emissions savings per year (MTCO<sub>2e</sub>)</b>		<b>13.05</b>	<b>11.24</b>	<b>12.67</b>

**Commercial**

Average number of eligible non-residential permits per year	50	51	54	59
Sqft of new or improved space per permit	1,000	1,001	1,002	1,003
Total SQFT of new or improved existing building space	50,000	51,506	53,986	58,823
Percent of Commercial area applicable to energy audit	50%			
CalGreen Tier 1 Percent Reduction from 2008 standards (conservative assumption)	15%			
Average kwh per commercial sqft (kwh/sqft)	14			
Average therm per commercial sqft (therms/sqft)	0.30			
Electricity Savings per year (kWh)		54,307	56,922	62,022
Natural Gas Savings per year (therms)		1,177	1,233	1,344
<b>Emissions savings per year (MTCO<sub>2e</sub>)</b>		<b>15.07</b>	<b>11.27</b>	<b>11.09</b>

GHG Reductions from BE-3 (MTCO <sub>2e</sub> )	28	23	24
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## BE-4

Require compliance with CalGreen Tier 1 standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) for all new construction, and phase in	2014	2020	2030	2050
<b>Residential</b>				
Forecast energy usage (w/o SB350)				
<i>Electricity (kWh)</i>	116,340,405	121,689,479	130,714,390	149,098,861
<i>Natural Gas (therms)</i>	3,809,649	3,984,808	4,280,335	4,882,347
New Energy Use Only (w/o SB350)				
<i>Electricity (kWh)</i>		5,349,074	14,373,986	32,758,457
<i>Natural Gas (therms)</i>		175,159	470,686	1,072,699
New Energy Use Only (w/ SB350)				
<i>Electricity (kWh)</i>		3,851,334	7,186,993	16,379,228
<i>Natural Gas (therms)</i>		126,115	235,343	536,349
Percent Reduction from CalGreen Tier 1 or ZNE from prior set of standards		100%	100%	100%
Calgreen Tier 1 or ZNE		ZNE	ZNE	ZNE
New Energy Use Only (w/ SB350 + CalGreen Tier 1 or ZNE)				
<i>Electricity (kWh)</i>		-	-	-
<i>Natural Gas (therms)</i>		-	-	-
Energy Reductions				
<i>Electricity (kWh)</i>		3,851,334	7,186,993	16,379,228
<i>Natural Gas (therms)</i>		126,115	235,343	536,349
Emissions Reductions (MTCO <sub>2e</sub> )				
<i>Electricity</i>		<b>497</b>	<b>425</b>	<b>913</b>
<i>Natural Gas</i>		<b>864</b>	<b>1,612</b>	<b>3,674</b>
<b>Commercial</b>				
Forecast energy usage (w/o SB350)				
<i>Electricity (kWh)</i>	214,162,060	220,391,174	230,773,030	251,200,573
<i>Natural Gas (therms)</i>	8,626,723	8,877,640	9,295,835	10,118,682
New Energy Use Only (w/o SB350)				
<i>Electricity (kWh)</i>		6,229,114	16,610,971	37,038,513
<i>Natural Gas (therms)</i>		250,917	669,111	1,491,959
New Energy Use Only (w/ SB350)				
<i>Electricity (kWh)</i>		4,484,962	8,305,485	18,519,256
<i>Natural Gas (therms)</i>		180,660	334,556	745,979
Percent Reduction from CalGreen Tier 1 or ZNE from prior set of standards		15%	100%	100%
Calgreen Tier 1 or ZNE		ZNE	ZNE	ZNE
New Energy Use Only (w/ SB350 + CalGreen Tier 1 or ZNE)				
<i>Electricity (kWh)</i>		3,812,218	-	-
<i>Natural Gas (therms)</i>		153,561	-	-

Energy Reductions				
	<i>Electricity (kWh)</i>	672,744	8,305,485	18,519,256
	<i>Natural Gas (therms)</i>	27,099	334,556	745,979
Emissions Reductions (MTCO2e)				
	<b><i>Electricity</i></b>	<b>87</b>	<b>491</b>	<b>1,033</b>
	<b><i>Natural Gas</i></b>	<b>186</b>	<b>2,292</b>	<b>5,110</b>
<b>Commercial and Residential</b>				
Emissions Reductions (MTCO2e)				
	<b><i>Electricity</i></b>	<b>584</b>	<b>916</b>	<b>1,946</b>
	<b><i>Natural Gas</i></b>	<b>1,050</b>	<b>3,904</b>	<b>8,784</b>
GHG Reductions from BE-4 (MTCO2e)		1,361	2,037	4,587
w/o ZNE		479	725	1,613
Difference		882	1,312	2,974
<b>BE-5</b>				
Increase participation in Marin Clean Energy (MCE) 100% renewable option		2020	2030	2050
City of Fairfax's current participation rate with similar subsidy program for Deep Green which is limited to 100 households	6%			
Target Participation Rate under BE-5		10%	15%	15%
County electricity use prior to measures (with Legislative Reductions) (kWh)		344,385,969	190,832,440	219,495,859
Reductions from other measures (kWh)				
	<i>BE-3</i>	54,307	54,307	54,307
	<i>BE-4</i>	4,524,078	15,492,478	34,898,485
	<i>BE-6</i>	(3,630)	(2,386)	(2,411)
	<i>BE-10</i>	75,353	78,914	85,904
Adjusted County Electricity Use (kWh)		339,735,862	175,209,127	184,459,575
Emissions from Electricity use under MCE/PGE (MTCO2e)		43,868	10,361	10,286
Emissions removed under Deep Green (MTCO2e)		4,387	1,554	1,543
Reductions from MU-1 (assumes that County's participation is accounted for in County's total participation rate)		382	170	205
GHG Reductions from BE-5 (MTCO2e)		4,005	1,384	1,338

Require new or replacement residential water heating systems to be electrically powered and/or alternatively fueled systems		2020	2030	2050
Percent of natural gas use in homes by end use in California	<b>2009</b>			
<i>Space Heating</i>	25%			
<i>Water Heating</i>	34%			
<i>Cooking</i>	25%			
<i>Other</i>	16%			
Water heating usage by fuel type	<b>2009</b>			
<i>Natural Gas</i>	85%			
<i>Electric</i>	11%			
<i>Propane</i>	4%			
<i>Source: EIA 2009. <a href="http://www.eia.gov/consumption/residential/data/2009/">http://www.eia.gov/consumption/residential/data/2009/</a></i>				
Average age of natural gas water heater at replacement (years)	13			
<b>Percent of current main water heaters by age</b>	<b>2009</b>	<b>2020</b>	<b>2030</b>	<b>2050</b>
<i>Less Than 2 Years</i>	16%	0	100%	100%
<i>2 to 4 Years</i>	16%	0	100%	100%
<i>5 to 9 Years</i>	30%	50%	100%	100%
<i>10 to 14 Years</i>	18%	100%	100%	100%
<i>15 to 19 Years</i>	7%	100%	100%	100%
<i>20 Years or More</i>	14%	100%	100%	100%
	<b>2014</b>	<b>2020</b>	<b>2030</b>	<b>2050</b>
Annual Residential Natural Gas Use in Napa with Legislative Reductions (therms)	3,809,649	3,937,389	2,245,464	2,679,159
<i>Savings from BE-3 (therms)</i>		1,177	1,233	1,344
Adjusted Residential Natural Gas Use (therms)		3,936,212	2,244,231	2,677,815
<b>Natural Gas Savings from replacement of Existing Water Heaters</b>				
Natural gas usage in existing water heaters with replacement (therms)	1,282,332.72	593,867	-	-
Natural Gas Savings from replacement of Existing Water Heaters (therms)		688,466	1,282,333	1,282,333
<b>Natural Gas Savings from elimination of new Natural Gas water heaters</b>				
Water heater usage in all residences (therms)		1,325,330	755,826	901,808
Eliminated new water heater usage (therms)		731,463	755,826	901,808
Total reduction in Natural Gas Use due to Measure (therms)		1,419,928	2,038,159	2,184,141
GHG Reductions from Natural Gas Savings (MTCO2e)		9,727	13,961	14,961
<b>Assuming all natural gas replaced by electric water heaters (conservative)</b>				
Therms needed to heat 45 gallons of hot water (61% efficiency)	0.333333			
kWh needed to heat 45 gallons of hot water (99% efficiency)	6.6			
kwh per therm conversion for water heating	19.8000198			
Total electricity use needed to offset natural gas water heating (kWh)		28,114,612	40,355,588	43,246,038
Additional GHG emissions from Electricity Use (discounted from reductions) (MTCO2e)		3,630	2,386	2,411
Net GHG Reductions from BE-6 (MTCO2e)		6,096	11,575	12,550

BE-7				
Expand current renewable energy and green energy incentives and update local ordinances	2014	2020	2030	2050

The quantification of this measure only accounts for the GHG reductions associated with solar installations. Measure assumes that homes/businesses that choose to install solar would not opt into MCE's Deep Green Option.

Target size of all solar permits approved starting from 2014 (kW)		7,500	20,000	20,000
Annual electricity generated for a 10 kW rooftop system ( <i>based on National Renewable Energy Laboratory's PV Watts Calculator for a rooftop system in Napa</i> )		15,271	15,271	15,271
Annual Electricity Generated by new Solar PVs from new permits (kWh)		11,453,250	30,542,000	30,542,000
Annual Electricity Generated by new Solar PVs from new permits (MWh)		11,453	30,542	30,542
Additional GHG emissions from Electricity Use (discounted from reductions) (MTCO <sub>2</sub> e)		1,479	1,806	1,703
<b>Feasibility Check</b>				
Annual Electricity Demand in the County after BE-3, BE-4, BE-6, and BE-10 (MWh)		339,736	175,209	184,460
Percent of County Electricity offset by additional solar under BE-7		3%	17%	17%
Percent of County Electricity generated by MCE's Deep Green option under BE-5		10%	15%	15%
<b>GHG Reductions from BE-7 (MTCO<sub>2</sub>e)</b>		<b>1,479</b>	<b>1,806</b>	<b>1,703</b>

BE-9				
Select MCE's Deep Green Option for all County Facilities	2015	2020	2030	2050
County unincorporated population	26,899	28,612	31,857	38,384
County's Facility Electricity Usage (kWh)	7,425,183	7,898,067	8,793,861	10,595,445
County's Facility Electricity Usage in the Unincorporated Area Only (kWh)	2,789,619	2,967,280	3,303,827	3,980,677
MCE Light Green Emission Factors (MTCO <sub>2</sub> e/MWh)		1.29E-01	5.15E-02	5.15E-02
MCE Deep Green Emission Factors (MTCO <sub>2</sub> e/MWh)		0	0	0
BAU Emissions Associated with Electricity Consumption at County Facilities (MTCO <sub>2</sub> e)		382.08	170.17	205.03
Reduced Emissions Associated with Electricity Consumption at County Facilities (MTCO <sub>2</sub> e)		-	-	-
<b>GHG Reductions from BE-9 (MTCO<sub>2</sub>e)</b>		<b>382</b>	<b>170</b>	<b>205</b>
Additional GHG Reduction if County uses Deep Green at County facilities located within cities.		638	350	386

BE-10				
Support Waste-to-Energy Programs at Unincorporated Landfills	2014	2020	2030	2050

This measure quantifies the potential of having a waste-to-energy program at Clover Flat Landfill

BAU Electricity Demand at CFL (scaled by incorporated population because CFL served incorporated area) (kWh)	73,216	75,353	78,914	85,904
Electricity Demand from Grid with Waste-to-Energy (assumes no sell back to grid. See note.)		0	0	0

Source: Egdar & Associates 2016 ("Climate Action Management Plan to 2020 for Clover Flat Landfill and Upper Valley Recycling")

Note: This does not count reductions from electricity sold back to the grid because those reductions are already accounted for in the RPS targets. Also, the waste-to-energy facility began operations in 2014, which means the project is already accounted for in the inventory. The facility is anticipated to ramp up production in the future.)

Incorporated Population based on MTC forecasts	112,409	115,690	121,157	131,889
Electricity Reduction (kWh)		75,353	78,914	85,904
Reduced Emissions Associated with Reduced Electricity Consumption (MTCO <sub>2e</sub> )		10	5	5

MS-2				
Support efforts to increase the number of Napa Green Certified businesses in the unincorporated County, with a goal of 100% certified by 2030 for vineyards and wineries.	2014	2020	2030	2050

#### Wastewater Emissions Reductions

Winery wastewater emissions (Napa Green Certified Wineries are assumed to have no waste water emissions)	5,087	5,348	5,743	5,737
Percent of Napa Green Certified Wineries under current projections	40%	40%	40%	40%
Percent of Napa Green Certified Wineries under MS-2		60%	100%	100%
<b>Emissions reductions from winery wastewater</b>		<b>1,783</b>	<b>5,743</b>	<b>5,737</b>
GHG Reductions from MS-2 (MTCO <sub>2e</sub> )		1,783	5,743	5,737

LU-1				
Establish targets and enhanced programs for oak woodland and coniferous forest preservation and mandatory replanting	2014	2020	2030	2050

Target minimum percent of trees preserved under project-level avoidance (%)		30%	30%	30%
<b>Oak and Coniferous Tree Conservation</b>				
Forecasted number of trees removed per year		21,039	6,701	9,181
Forecasted Annual Emissions from lost Oak and Coniferous Trees (MT CO <sub>2e</sub> )		22,757	8,475	14,032
<b>Emissions saved from conserved trees (MT CO<sub>2e</sub>)</b>		<b>6,827</b>	<b>2,543</b>	<b>4,210</b>
<b>Replacement of Lost Trees</b>				
Post-conservation number of trees lost per year		14,727	4,691	6,427
Maximum number of trees to be planted per year		2,500	2,500	2,500
Mortality Rate (%)	20%			
Number of surviving trees planted per year		2,000	2,000	2,000
<b>Emissions sequestered from planted trees (MT CO<sub>2e</sub>)</b>		<b>249</b>	<b>2,002</b>	<b>11,150</b>
GHG Reductions from LU-1 (MTCO <sub>2e</sub> )		7,077	4,544	15,360

LU-2				
Refine protection guidelines for existing riparian lands	2014	2020	2030	2050

Assumes that future losses in riparian lands would not occur. Thus, reductions are equivalent to forecasted losses in annual carbon sequestration from riparian woodlands.

GHG Reductions from LU-2 (MTCO2e)		660	660	660
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LU-3				
Repurpose or otherwise prevent burning of removed trees and other woody material from land use conversions of oak woodlands and coniferous forests	2014	2020	2030	2050

This measure would require repurposing of usable lumber from trees removed due to land use conversion and burying or chipping of non-usable lumber.

Repurposed wood may be either be used in construction or sold to local woodworking businesses or collectives with proceeds funding the administration of this measure. A minimum of 80% of total removed weight of trees shall be repurposed, buried, chipped, or otherwise prevented from burning. This measure only quantifies trees removed due to land use conversion of oak woodlands and coniferous forests. This measure prioritizes wood repurposing. If any portion of removed tree material cannot be repurposed due to disease or structural limitations, dispose of material either through burial, chipping, or other non-burning measures.

#### Preservation of Removed Tree Carbon

Post-conservation number of trees lost per year (LU-1)		14,727	4,691	6,427
Weighted average carbon storage rate per oak/coniferous tree removed (MTCO2/tree)		0.92	0.92	0.92
Emissions from lost trees, if burned (MTCO2)		13,549	4,316	5,914
Percent of tree mass prevented from burning		80%	80%	80%

GHG Reductions from LU-3 (MTCO2e)		10,839	3,453	4,731
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OR-1				
Require Tier 4 equipment for all construction activity and mining operations as a condition for approval by 2030		2020	2030	2050

Offroad Construction and Mining Emissions (MTCO2e)		6,766	7,085	7,712
Percent of equipment that are Tier 4 Final	No Change		100%	100%
Average percent improvement in fuel efficiency with Tier 4 equipment		5%	5%	5%

Emissions reductions from OR-1 (MTCO2e)	-		354	386
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OR-2				
Promote use of alternative fuels for recreational watercraft		2020	2030	2050

Pleasure Craft Emissions from OFFROAD 2007 model, assuming all occur within the Unincorporated County		33,736	37,562	45,258
Percent reduction in emissions based on biofuel targets (%)		5%	20%	50%

Emissions reductions from OR-2 (MTCO2e)		1,687	7,512	22,629
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SW-1

Encourage expansion of composting program for both residential and commercial land uses	2014	2020	2030	2050
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**Generation of Organic Waste In Unincorporated Napa County (Ascent Adjusted)**

<i>Disposal</i>	20,156	14,099	15,698	18,914
<u>Commercial</u>				
<i>Percentage of Disposal that is Commercial*</i>	71.4%	71.4%	71.4%	71.4%
<i>Commercial Disposal</i>	14,396	10,070	11,212	13,509
<i>Percentage of Commercial Disposal that is Organic* †</i>	32.8%	32.8%	32.8%	32.8%
<i>Commercial Organic Disposal</i>	4,716	3,299	3,673	4,425
<u>Residential</u>				
<i>Percentage of Disposal that is Residential*</i>	28.6%	28.6%	28.6%	28.6%
<i>Residential Disposal</i>	5,760	4,029	4,486	5,405
<i>Percentage of Residential Disposal that is Organic* †</i>	39.8%	39.8%	39.8%	39.8%
<i>Residential Organic Disposal</i>	2,291	1,603	1,784	2,150

\*Based on 1999 Waste Characterization Study for the Unincorporated Napa County. Same source used for the inventory. Newer sources unavailable. Split between commercial and residential is unlikely to change much over time due to the focus of Napa County on the wine industry.

† This is a conservative assumption because the success of the 75% diversion target would most likely reduce the number of landfilled recyclables and increase the percentage of overall organics per ton of disposal. However, the BAU forecast is also conservative because it assumes the percent organics does not change.

**COMMERCIAL COMPOSTING**

**Tons to Be Landfilled, Which Will Be Composted Instead**

<i>AB 1826's Commercial Organic Waste Disposal Limit</i>	2,358	2,358	2,358
<i>Tons Composted Instead of Landfilled</i>	941	1,315	2,067

Organic Breakdown		
	Residential	Commercial
Food	45%	50%
Green	39%	19%
Lumber	4%	17%
Paper	12%	13%
Manure	0%	1%

Composition of Composted Commercial Tons per AB1826 (no less than 50% of 2014 organics) (For reference only)

Food	466	651	1,023
Green	181	253	398
Lumber	160	223	351
Paper	126	176	277
Manure	8	11	18

Percent of organics composted under SW-1

Food	50%	85%	80%
Green	80%	100%	100%

Composted Commercial Tons

Food	816	1,545	1,752
Green	508	707	852

RESIDENTIAL COMPOSTING

Percent of organics composted under SW-1

Food	50%	85%	80%
Green	80%	100%	100%

Composted Residential Tons

Food	361	683	774
Green	499	695	837

TOTAL ORGANICS COMPOSTED INSTEAD OF LANDFILLED under SW-1

Food	1,177	2,228	2,527
Green	1,007	1,402	1,689
Total	2,184	3,630	4,216

EMISSIONS CALCULATIONS

Emissions reductions per ton of food waste composted instead of landfilled (MTCH4/ton)	1.566E-02	1.566E-02	1.566E-02
Emissions reductions per ton of green waste composted instead of landfilled (MTCH4/ton)	6.659E-03	6.659E-03	6.659E-03
Emissions reductions from food waste composted instead of landfilled (MTCH4)	18.433	34.891	39.566
Emissions reductions from green waste composted instead of landfilled (MTCH4)	6.707	9.335	11.247
Emissions reductions from food waste composted instead of landfilled (MTCO2e)	461	872	989
Emissions reductions from green waste composted instead of landfilled (MTCO2e)	168	233	281
Total Emissions Reduction (MTCO2e)	629	<b>1,106</b>	<b>1,270</b>
GHG Reductions from SW-1 (MTCO2e)	629	1,106	1,270

SW-2

Meet an 80% Waste Diversion Goal by 2020 and a 90% Goal by 2030	2014	2020	2030	2050
Current Diversion Rate	70%			
Target Diversion Rate		80%	90%	90%
Legislative-Adjusted Forecasted Emissions from Solid Waste Generation	19,961	3,537	3,938	4,744
Reduced Solid Waste Emissions with New Diversion Rate		2,358	1,313	1,581
GHG reductions from SW-2 (MTCO2e)		1,179	2,625	3,163

TR-1				
Update Transportation System Management Ordinance (for Employers)	2020	2030	2050	
Work-related, or Commute, VMT (from MTC)	547,462	567,609	570,091	
Total Annual VMT (MTC only provided forecasts through 2040. This assumes 2040 VMT sufficiently represents 2050 VMT.)	747,377	782,909	800,945	
Percent Commute	73%	72%	71%	
Total Legislative Adjust BAU On-Road Transportation Emissions (MTCO2e)	112,854	84,846	85,735	
Percent Passenger	94%	94%	94%	
Total Legislative Adjust BAU On-Road Transportation Emissions (MTCO2e) (Commute Passenger Only)	77,703	57,768	57,213	
CAPCOA TRT-1/TRT-2/TRT-3 Minimum percent reduction in VMT from Commute Trip Reduction Measures				2%
CAPCOA TRT-1/TRT-2/TRT-3 Minimum percent reduction in VMT from Commute Trip Reduction Monitoring				4.20%
<b>GHG reductions from TR-1 (MTCO2e)</b>	<b>4,818</b>	<b>3,582</b>	<b>3,547</b>	
TR-2				
Parking reduction ordinance revisions	2020	2030	2050	
Total Legislative Adjust BAU On-Road Transportation Emissions (MTCO2e) (Commute Passenger Only)	77,703	57,768	57,213	
CAPCOA TRT-14 and TRT-15 Minimum percent reduction in VMT from Pricing Workplace Parking and Implementing Employee Parking Cash-Out				0.10%
<b>GHG reductions from TR-2 (MTCO2e)</b>	<b>78</b>	<b>58</b>	<b>57</b>	
TR-3				
Increase affordable housing, especially workforce housing, in Napa County	2020	2030	2050	
Total Legislative Adjust BAU On-Road Transportation Emissions (MTCO2e) (Commute Passenger Only)	77,703	57,768	57,213	
CAPCOA LUT-6 Minimum percent reduction in VMT from Integrating Affordable and Below Market Rate Housing				0.04%
<b>GHG reductions from TR-3 (MTCO2e)</b>	<b>31.08</b>	<b>23.11</b>	<b>22.89</b>	

TR-4				
Support efforts to allow commuter service to operate on the Napa Wine Train right-of-way		2020	2030	2050
Total Legislative Adjust BAU On-Road Transportation Emissions (MTCO2e) (Commuter Passenger Only)		77,703	57,768	57,213
CAPCOA LUT-5 Minimum percent reduction in VMT from Increasing Transit Accessibility	0.50%			
<b>GHG reductions from TR-4 (MTCO2e)</b>		<b>388.52</b>	<b>288.84</b>	<b>286.06</b>
TR-13				
Support efforts of solid waste collection services to convert diesel solid waste collection vehicles to CNG		2020	2030	2050
Quantification of this measure is based on fuel use Clover Flat Landfill and UVDS in 2014			Scaled by incorporated population	
BAU Diesel Use (Gallons)		203,700	213,327	232,224
Equivalent CNG (MMBTU)		28,858	30,221	32,898
Equivalent CNG (scf)		28,098,892	31,285,854	37,695,336
Incorporated Population based on MTC forecasts		115,690	121,157	131,889
Diesel Emission Factor (kg CO2/gal)	10.21			
Diesel Emission Factor (kg CH4/gal)	5.04E-04			
Diesel Emission Factor (kg N2O/gal)	3.60E-04			
CNG Emission Factor (kg CO2/scf)	0.05			
CNG Emission Factor (kg CH4/scf)	2.67E-06			
CNG Emission Factor (kg N2O/scf)	1.91E-06			
<i>Factor sources: The Climate Registry 2015 and SEMS (as sourced by Edgar &amp; Associates 2016)</i>				
BAU Diesel Emissions (MTCO2e)		2,104	2,203	2,398
Project CNG Emissions (MTCO2e)		1,535	1,709	2,059
Emissions Difference from BAU		568	494	339
50% Apportionment to account for customers in the incorporated areas, consistent with the RTAC method used in the Transportation Sector.		284.16	246.81	169.29
<b>GHG reductions from TR-13 (MTCO2e)</b>		<b>284.16</b>	<b>246.81</b>	<b>169.29</b>

## LU-1: Carbon Storage Loss and Potential Associated with Loss and Replanting of Oak and Coniferous Trees

<b>Calculation of Equivalent New Tree Planting to Offset Lost Carbon Storage/Sequestration</b>	
preserved under project-level avoidance (%)	30%
<b>Forecasted Annual Emissions from Lost Oak and Coniferous Trees (MT CO2e)</b>	
2020	22,757
2030	8,475
2050	14,032
<b>Emissions saved from conserved trees (MT CO2e)</b>	
2020	6,827
2030	2,543
2050	4,210
<b>Replaced Trees</b>	
Maximum number of trees replanted per year (trees)	2,500
Mortality Rate (%)	20%
<b>Annual Emissions Sequestered from Planted Trees (MT CO2e)</b>	
2020	249
2030	2,002
2050	11,150
<b>Total Emissions Reductions from LU-1 (MT CO2e)</b>	
2020	7,077
2030	4,544
2050	15,360

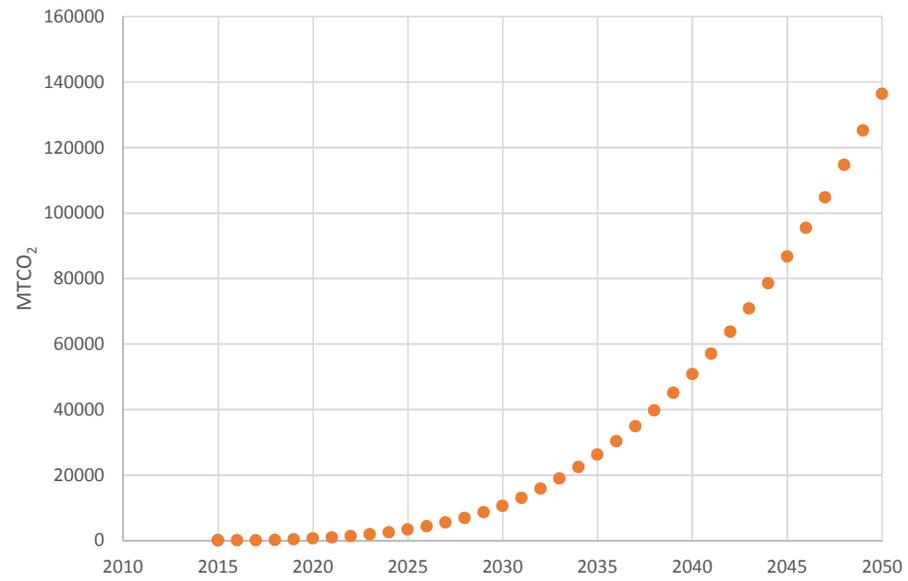
Assumes constant rate of tree removal

Accounts for growth rates over time

## Cumulative Carbon Storage

Year	Annual Oak Trees Lost (Forecasted)	Annual Coniferous Trees Lost (Forecasted)	Annual Oak and Coniferous Trees Replanted	Cumulative CO2 sequestered at 2500 trees per year (MT CO2)	Annual Sequestration from Replanted Trees (MTCO2/year)
2015	5203	529		-	
2016	6808	1986		-	-
2017	8412	3443	2500	4	4
2018	10016	4901	2500	150	146
2019	11620	6358	2500	342	191
2020	13224	7815	2500	591	249
2021	12568	7038	2500	911	320
2022	11911	6261	2500	1,315	404
2023	11255	5483	2500	1,832	518
2024	10598	4706	2500	2,483	651
2025	9942	3929	2500	3,288	805
2026	9285	3151	2500	4,270	982
2027	8629	2374	2500	5,456	1,186
2028	7972	1597	2500	6,876	1,420
2029	7316	819	2500	8,565	1,689
2030	6659	42	2500	10,567	2,002
2031	6696	130	2500	12,939	2,372
2032	6732	217	2500	15,764	2,825
2033	6769	305	2500	18,892	3,129
2034	6805	392	2500	22,342	3,450
2035	6842	479	2500	26,131	3,789
2036	6878	567	2500	30,276	4,145
2037	6915	654	2500	34,795	4,520
2038	6951	742	2500	39,707	4,912
2039	6988	829	2500	45,031	5,324
2040	7025	917	2500	50,785	5,754
2041	7061	1004	2500	56,989	6,204
2042	7098	1092	2500	63,661	6,672
2043	7134	1179	2500	70,822	7,161
2044	7171	1267	2500	78,492	7,669
2045	7207	1354	2500	86,690	8,198
2046	7244	1442	2500	95,437	8,747
2047	7280	1529	2500	104,753	9,316
2048	7317	1617	2500	114,660	9,907
2049	7353	1704	2500	125,178	10,518
2050	7390	1791	2500	136,328	11,150

Cumulative CO<sub>2</sub> Sequestered from Oak and Coniferous Tree planting (MTCO<sub>2</sub>)



● Cumulative CO<sub>2</sub> sequestered at 2500 trees per year (MT CO<sub>2</sub>)

## GHG Reduction Target Calculations

Year	State Emissions (million metric tons of CO <sub>2</sub> equivalent based upon IPCC Fourth Assessment Report's Global Warming Potentials - all sectors) (1)	State Population (2)
1990	431	
2013	459	38,030,609
2014 (Emissions scaled by population from 2013)	463	38,357,121
<b>State Targets</b>		<b>Applicable Rule</b>
Percent below 1990 emissions by 2020	0%	AB 32
Percent below 1990 emissions by 2030	40%	EO B-30-15
Percent below 1990 emissions by 2050	80%	EO B-30-15
<b>Equivalent State Targets for Reduction below 2014</b>		<b>Applicable Rule</b>
Percent below 2014 emissions by 2020	7%	AB 32
Percent below 2014 emissions by 2030	44%	EO B-30-15
Percent below 2014 emissions by 2050	81%	EO B-30-15
Source: (1) ARB 2015 applies to 1990 and 2013 inventories only ( <a href="http://www.arb.ca.gov/cc/inventory/data/data.htm">http://www.arb.ca.gov/cc/inventory/data/data.htm</a> ), (2) DOF 2015 ( <a href="http://www.dof.ca.gov/research/demographic/reports/estimates/e-7/view.php">http://www.dof.ca.gov/research/demographic/reports/estimates/e-7/view.php</a> )		

## Legislative Reductions and Existing Programs

Lead Agency	Sector	Measure Name	Measure Description	Current or Recommended	Included in Inventory Forecasts?
State	Building Energy	Renewable Portfolio Standard	The State has a goal of achieving a 33% renewable portfolio standard (RPS) for electricity generated and sold to retail customers in the State by 2020.	Current	Yes
State	Building Energy	Senate Bill (SB) 350	Signed into law in October 2015, Senate Bill (SB) 350 extends the State's Renewable Portfolio Standard (RPS) target from 33% by 2020 to 50% renewables by 2030. In addition, SB 350 calls for a doubling of building energy efficiency by 2030.	Current	Yes
State	Building Energy	Title 24 Building Energy Efficiency Standards	The 2016 Title 24 building energy efficiency standards were adopted in December 2015 and will go into effect January 2017. The California Energy Commission (CEC) estimates that new residential buildings built to these standards would be 28 percent more efficient than buildings built to the current 2013 Title 24 standard. Relative savings for non-residential buildings was not readily available from the CEC; thus, it was assumed that non-residential buildings built to 2016 standards would have similar improvements as the residential standards.	Current	Yes
PG&E	Building Energy	Napa County Energy Watch Program	Free evaluation of energy usage from residences and businesses. Connects utility customers with available financing and low cost options for energy upgrades.	Current	No
Napa County / MCE	Building Energy	Participation in Marin Clean Energy (MCE)	In February 2015, Marin Clean Energy (MCE), a local Community Choice Aggregator, began serving the unincorporated portions of Napa County. MCE automatically provides customers within its service area with 50 percent renewable electricity, although customers are allowed to opt out of MCE's service or pay into MCE's "Dark Green" program that would allow for a higher percentage renewable mix. Those that opt out would remain under PG&E's electricity service, which is currently 27% renewable. MCE currently has an average participation rate of 89%. According to MCE's Integrated Resource Plan, MCE plans to increase the minimum renewable energy supply of the program from 50 to 80% by 2025.	Current	Yes
State	High GWP Gases	Refrigerant Management Program (RMP)	The RMP requires facilities with refrigeration systems with more than 50 pounds of high-global warming potential (GWP) refrigerant to conduct and report periodic leak inspections; promptly repair leaks; and keep service records on site. Small facilities are to begin reporting in March 2016. Applicable facilities are required to pay fees to ARB with the fee amount determined by the facility's size category (small, medium, or large) and amount of high-GWP refrigerant used.	Current	Yes
Federal	High GWP Gases	Federal Ban on Certain Hydrofluorocarbons (HFCs)	On August 19, 2015, the EPA enacted a national ban on a variety of HFC emissions with very high-GWP values (many over 2,500) under 40 CFR Part 82. ARB estimates that this ban would reduce California's HFC emissions by ten percent annually below current emission rates by 2025.	Current	Yes

Lead Agency	Sector	Measure Name	Measure Description	Current or Recommended	Included in Inventory Forecasts?
BAAQMD/Napa County	On-Road Transportation	Commuter Benefits Program	Under the purview of MTC, Bay Area employers with 50 or more employees are now required to register and offer commuter benefits to their employees in order to comply with the Bay Area Commuter Benefits Program. Through this program, employers must offer their employees one of four Commuter Benefit options in order to comply with BAAQMD Regulation 14, Rule 1. Commuter benefits encourage employees to take transit, vanpool, carpool, bicycle and walk rather than drive alone to work. Certain federal tax benefits apply. Napa County offers additional incentives for vanpool drivers, bike commuters, and emergency ride home programs.	Current	No
Napa County	On-Road Transportation	County Employee Local Housing Fund	The County's existing program encourages County employees to buy homes locally to reduce commute travel distances and VMT. The program offers down payment financial assistance up to 10% of the home's purchase price at below market interest rates as long as the home is located within Napa County.	Current	No
NCTPA	On-Road Transportation	Expand and improve bicycle and pedestrian network	The Napa County Transportation and Planning Agency (NCTPA) has adopted a long-range strategic goal of having 10% of all trips made by bicycle in Napa County by 2035. Some efforts are already being made under the NCTPA Countywide Bicycle Plan.	Current	No
State/Federal	On-Road Transportation	Advancements in Fuel Efficiency and Clean Fuels	The State and Federal governments have several policies in place that address fuel efficiency and alternative fuels. These include the Advanced Clean Car rule, CAFÉ standards, Federal Pavley regulations, and Tractor-Trail Greenhouse Gas regulations.	Current	Yes
BAAQMD	Solid Waste	Reduce methane emissions from Municipal Solid Waste Landfills	In August 2011, BAAQMD entered into a memorandum of understanding with ARB to implement and enforce this regulation, including engineering review of LFG collection system design plans. Each of the 14 active landfills in the Bay Area applied for permits for alterations for their gas collection systems. These permits include conditions to test for methane from flares and energy recovery devices per the ARB landfill regulation.	Current	Yes
State	Solid Waste	Landfill Methane Control Measure	ARB approved a new regulation that reduces emissions of methane, a greenhouse gas, from municipal solid waste (MSW) landfills. The regulation, which became effective June 17, 2010, is a discrete early action greenhouse gas emission reduction measure, as described in the California Global Warming Solutions Act ("AB 32"). The regulation primarily requires owners and operators of certain uncontrolled MSW landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner. The regulation allows local air districts to voluntarily enter into a memorandum of understanding (MOU) with ARB to implement and enforce the regulation and to assess fees to cover costs.	Current	Yes
State	Solid Waste	Statewide 75% Waste Diversion Goal	The California Department of Resources Recycling and Recovery (CalRecycle) established a target pursuant to AB 341 (Chapter 476, Statutes of 2011) to achieve a statewide waste diversion rate of 75 percent by 2020, or 2.7 pounds of waste per resident per day (lb/resident/day).	Current	Yes

Lead Agency	Sector	Measure Name	Measure Description	Current or Recommended	Included in Inventory Forecasts?
DWR	Water	Water Conservation Rebates	The California Department of Water Resources has a rebate program that provides rebates for removing turf and replacing toilets at California single-family residences to support the State's drought response. This program is financed by the Proposition 1 water bond approved by voters in 2014.	Current	No
Napa County	Water	Washer rebate	Residents in unincorporated Napa County are eligible for clothes washer rebates for up to \$150 from PG&E and the County.	Current	No