

Memo



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Date: June 23, 2016

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

From: Honey Walters, Erik de Kok, Brenda Hom

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

INTRODUCTION

This technical memorandum summarizes the preliminary draft results of the quantitative “gap analysis” process for the Napa County Climate Action Plan (CAP). 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_{2e}) 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 Final Technical Memorandum #1 to the County, dated April 13, 2016.

| Table 1 2014 Unincorporated Napa County Greenhouse Gas Emissions Inventory | |
|---|--|
| Sectors | 2014¹ (MTCO₂e/yr) |
| 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 | 8,002 |
| Imported Water Conveyance | 88 |
| Total | 484,602 |

Notes: Columns may not add to totals due to rounding.
 MTCO₂e = metric tons of carbon dioxide equivalent
 GWP = Global Warming Potential
 IPCC = Intergovernmental Panel on Climate Change
¹ Uses GWP factors from IPCC's Fourth Assessment Report.
 Source: Data compiled by Ascent Environmental in 2016. See Final Tech. Memo #1, April 13, 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 5 percent by 2020, 31 percent by 2030, and 28 percent by 2050 for the unincorporated Napa County compared to 2014 emissions.

Further details with respect to the GHG emissions projections are discussed in Final Technical Memorandum #1, dated April 13, 2016.

Table 2 Unincorporated Napa County Emissions Inventory and Legislative-Adjusted BAU Forecasts (MTCO_{2e}/yr)

| Sector and Subsector | 2014 | 2020 | 2030 | 2050 |
|-------------------------------------|----------------|---------------------|----------------|----------------|
| Energy | 148,337 | 131,635 | 59,127 | 66,184 |
| Transportation | 125,711 | 112,854 | 84,846 | 85,735 |
| Waste | 83,086 | 62,345 | 56,711 | 48,854 |
| Agriculture | 52,198 | 52,521 | 53,588 | 57,445 |
| Off-Road Vehicles and Equipment | 42,508 | 36,406 | 38,230 | 41,828 |
| High-GWP Gases | 13,481 | 11,828 | 13,169 | 15,867 |
| Water | 11,277 | 12,128 | 13,233 | 14,578 |
| Land Use Change | 8,002 | 39,912 ¹ | 17,012 | 17,012 |
| Total | 484,602 | 459,637 | 335,940 | 348,503 |
| Percent change from 2014 (%) | NA | -5 | -31 | -28 |

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

BAU = Business as usual

NA = Not Applicable

GWP = Global Warming Potential

MTCO_{2e} = metric tons of carbon dioxide equivalent

¹ 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 and Executive Order B-30-15, 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.

Similarly, the County aims to reduce community-wide emissions from the unincorporated County in proportion to the State's goals. Because the County's 1990 emissions levels were not estimated, proportional targets for the County's CAP were developed to compare with the estimated 2014 emissions inventory.

To determine the reduction needed from 2014 emissions levels that would be equivalent to the State's targeted reduction from 1990 levels, the State's GHG inventories for 1990 and 2014 were compared. According to the inventories available from the California Air Resources Board (ARB), the State emitted approximately 431 million MTCO_{2e} (MMTCO_{2e}) in 1990 and 459 MMTCO_{2e} in 2013. Scaling for the population growth between 2013 and 2014, the State emitted approximately 463 MMTCO_{2e} in 2014, or 7 percent over 1990 levels. Consequently, to reach 40 and 80 percent below 1990 levels, 2014 levels would have to be reduced by 44 and 81 percent, respectively. Consistent with State targets, the following recommended targets would reduce annual community-wide GHG emissions to:

- ▲ 7 percent below 2014 levels by 2020;
- ▲ 44 percent below 2014 levels by 2030; and
- ▲ 81 percent below 2014 levels by 2050. (ARB 2015, DOF 2015).

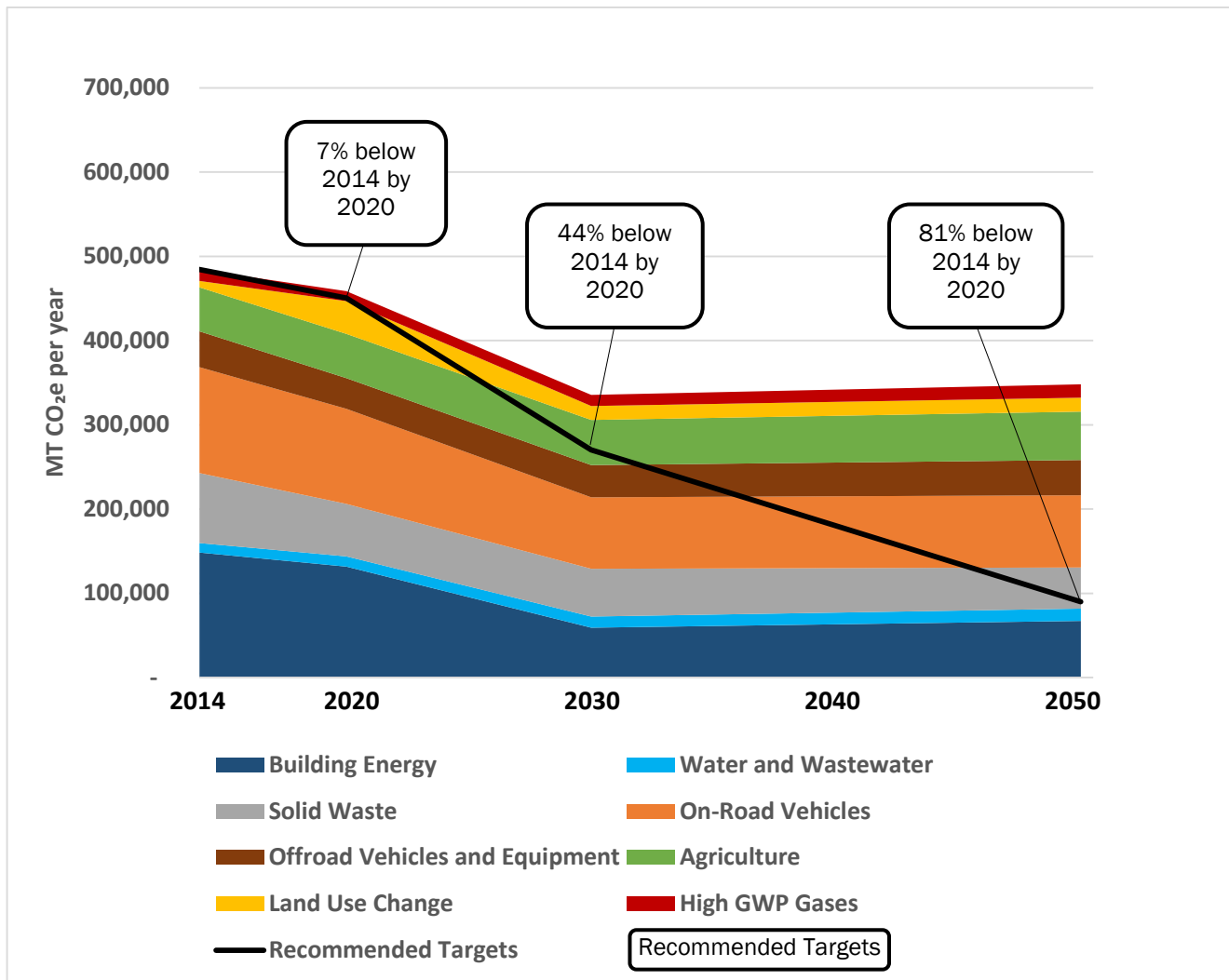
Specific assumptions and calculations for these adjusted targets are available in Attachment 1.

Based on the County’s 2014 inventory shown in Table 1, the targets above aim to reduce annual County emissions to 450,872, 270,523, and 90,174 MTCO_{2e} by 2020, 2030, and 2050, respectively. As shown in the legislative-adjusted BAU forecast in Table 2, the County is relatively close to meeting both 2020 and 2030 targets, but would require significant additional GHG reductions to meet the 2050 target. The County would need to reduce annual BAU 2020 emissions by another 8,765 MTCO_{2e} (2 percent) and annual BAU 2030 emissions by another 65,416 MTCO_{2e} (13 percent). However, meeting the 2050 target would require an additional annual emissions reduction of 258,328 MTCO_{2e}, or 53 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.

| Table 3 Recommended Greenhouse Gas Emissions Reduction Targets: 2020, 2030, and 2050 | | | | |
|---|---------|---------|---------|---------|
| Scenario or Target | 2014 | 2020 | 2030 | 2050 |
| Baseline and Projections | | | | |
| 2014 Baseline GHG Inventory (MTCO _{2e}) | 484,602 | NA | NA | NA |
| Legislative-Adjusted BAU Forecast (MTCO _{2e}) | NA | 459,637 | 335,940 | 348,503 |
| Legislative-Adjusted BAU Forecast: Percent below Baseline (%) | NA | 5 | 31 | 28 |
| Targets | | | | |
| Target Percent Reduction below Baseline (%) | NA | 7 | 44 | 81 |
| Target Annual Emissions (MTCO _{2e}) | NA | 450,872 | 270,523 | 90,174 |
| Gap Analysis | | | | |
| Reduction from Baseline needed to meet Target (MTCO _{2e}) | NA | 33,730 | 214,079 | 394,428 |
| Reduction from Legislative-Adjusted BAU needed to meet Target (MTCO _{2e}) | NA | 8,765 | 65,416 | 258,328 |
| Additional Percent Reduction below Legislative-Adjusted BAU needed to meet Target (%) | NA | 2 | 13 | 53 |
| Notes: BAU = Business as usual, MTCO _{2e} = 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 CO₂e = 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 MTCO₂e/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.

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Table 4 Summary of Greenhouse Gas Emissions Reduction Measures Performance

| Measure Number | Measure Name | GHG Reductions (MTCO _{2e} /year) | | |
|---------------------------------|--|---|--------|--------|
| | | 2020 | 2030 | 2050 |
| Agriculture | | | | |
| 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 | 1,708 | 1,915 |
| <i>Agriculture Subtotal</i> | | 3,549 | 3,736 | 4,160 |
| Building Energy | | | | |
| BE-1 | Work with PG&E 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 | 479 | 725 | 1,613 |
| BE-5 | Increase participation in MCE's Deep Green option (100% Renewable Energy) | 4,048 | 1,501 | 1,586 |
| BE-6 | Require new or replacement water heating systems to be electrically powered or alternatively fueled (e.g., solar water heating) for all residential land uses, as feasible | 6,096 | 11,575 | 12,550 |
| BE-7 | Expand current renewable energy and green energy incentives and update local ordinances | - | - | - |
| BE-8 | Develop a program to allow new development to offset project GHG emissions by retrofitting existing income-qualified homes and buildings | - | - | - |
| BE-9 | Participate in and promote PACE financing options for existing residents and businesses | - | - | - |
| <i>Building Energy Subtotal</i> | | 10,651 | 13,824 | 15,773 |
| Land Use Change | | | | |
| LU-1 | Establish targets and enhanced programs for oak woodland preservation, mitigation, and voluntary replanting | 475 | 2,268 | 10,254 |
| LU-2 | Refine protection guidelines for existing riparian lands | 660 | 660 | 660 |
| <i>Land Use Subtotal</i> | | 1,135 | 2,928 | 10,914 |
| On-Road Transportation | | | | |
| 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 |
| 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 | - | - | - |

| Table 4 Summary of Greenhouse Gas Emissions Reduction Measures Performance | | | | |
|--|---|---|--------|---------|
| Measure Number | Measure Name | GHG Reductions (MTCO _{2e} /year) | | |
| | | 2020 | 2030 | 2050 |
| TR-11 | Increase the supply of electric vehicle charging stations | | - | |
| TR-12 | Promote telecommuting at office-based businesses | | - | |
| <i>On-Road Transportation Subtotal</i> | | 5,315 | 3,951 | 3,913 |
| Solid Waste | | | | |
| SW-1 | Reinstate or expand landfill gas capture or flaring at American Canyon and Clover Flat Landfills by 2020 | 33,092 | 27,094 | 18,161 |
| SW-2 | Meet an 80% Waste Diversion Goal by 2020 | 1,179 | 1,313 | 1,581 |
| <i>Solid Waste Subtotal</i> | | 34,271 | 28,406 | 19,743 |
| Water | | | | |
| 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 | | - | |
| Multiple | | | | |
| GHG-1 | Work with other local jurisdictions within the County to develop a unified Climate Action Plan | | - | |
| GHG-2 | Support efforts to increase Napa Green Certified wineries and vineyards in the unincorporated County, with a goal of 100% certified by 2030 | 1,774 | 5,718 | 5,718 |
| Municipal | | | | |
| MU-1 | Select MCE's Deep Green Option for all County Facilities | 382 | 170 | 205 |
| Total GHG Emissions Reductions | | 57,077 | 58,734 | 60,426 |
| Recommended GHG Emissions Reduction Target | | 8,765 | 65,416 | 258,328 |
| Remaining GHG Emissions Reduction Gap (Surplus) | | (48,312) | 6,683 | 197,902 |
| 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 Pollution Control District, CO _{2e} = 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 Source: data provided by Ascent Environmental 2016 | | | | |

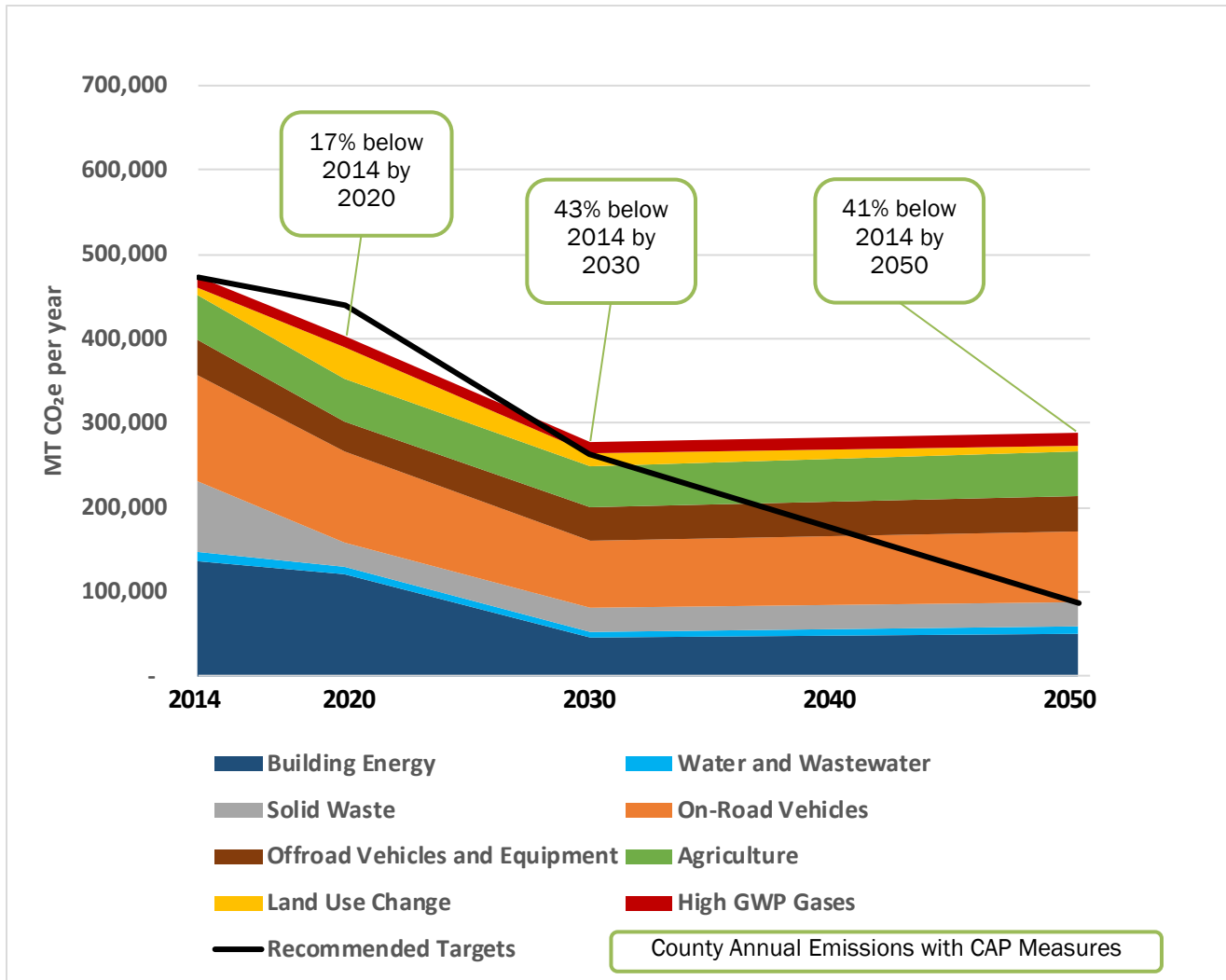


Figure 2: Projections of Greenhouse Gases by Sector with Implementation of CAP Measures and Recommended Targets: 2020 through 2050

The total estimated GHG emissions reductions from all measures quantified is approximately 57,077 MTCO₂e in 2020, 58,734 MTCO₂e in 2030, and 60,626 MTCO₂e in 2050. The total estimated reductions in 2020 would be more than sufficient to meet the recommended 2020 target, with a 48,312 MTCO₂e annual surplus of GHG reductions. However, implementation of the draft GHG reduction measures identified in Attachment 1 would not be sufficient to meet the 2030 target, with an additional 6,683 MTCO₂e in reductions needed to close the gap. Also, the projected GHG reductions from all measures in 2050 would fall considerably short of the long-term target for 2050, requiring an additional 197,902 MTCO₂e to be reduced annually 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 implementation of SW-1 would require full participation from the American Canyon landfill which is not operated by the County. 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.

REFERENCES

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Available: <http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2011-20/view.php>.
Accessed May 17, 2016.

DOF. See California Department of Finance.

ATTACHMENT 1

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| GHG Measure Reduction Summary | | | | |
|--|----------------|--|---------------|---------------|
| GHG Emission Reductions by Sector | | | | |
| Sector | Notes | Annual GHG Reduction (MTCO ₂ e) | | |
| | | 2020 | 2030 | 2050 |
| Agriculture | | 3,549 | 3,736 | 4,160 |
| Building Energy | Includes MU-1 | 11,033 | 13,994 | 15,978 |
| Land Use Change | | 1,135 | 2,928 | 10,914 |
| Wastewater | Includes GHG-2 | 1,774 | 5,718 | 5,718 |
| On-Road Transportation | | 5,315 | 3,951 | 3,913 |
| Solid Waste | | 34,271 | 28,406 | 19,743 |
| TOTAL Reductions from Proposed Measures | | 57,077 | 58,734 | 60,426 |

| Forecasts with Legislative Reductions | Annual GHG Emissions (MTCO ₂ e) | | | |
|--|--|----------------|----------------|----------------|
| | 2014 | 2020 | 2030 | 2050 |
| Building Energy | 148,338 | 131,643 | 59,150 | 67,184 |
| Water and Wastewater | 11,277 | 12,128 | 13,233 | 14,578 |
| Solid Waste | 83,086 | 62,345 | 56,711 | 48,854 |
| On-Road Vehicles | 125,711 | 112,854 | 84,846 | 85,735 |
| Offroad Vehicles and Equipment | 42,508 | 36,406 | 38,230 | 41,828 |
| Agriculture | 52,198 | 52,521 | 53,588 | 57,445 |
| Land Use Change | 8,002 | 39,912 | 17,012 | 17,012 |
| High GWP Gases | 13,481 | 11,828 | 13,169 | 15,867 |
| TOTAL | 484,602 | 459,637 | 335,940 | 348,503 |
| Forecasted Percent Reduction from 2014 | | -5% | -31% | -28% |
| State Targets (adjusted for percent reduction from 2014) | | -7% | -44% | -81% |
| State Targets (MTCO ₂ e) | | 450,872 | 270,523 | 90,174 |
| Needed reductions to meet State Targets from 2014 levels (MTCO ₂ e) | | 33,730 | 214,079 | 394,428 |
| Needed reductions to meet State Targets from forecasts (MTCO ₂ e) | | 8,765 | 65,416 | 258,328 |

| Forecasts with Legislative Reductions and County CAP Measures | Annual GHG Emissions (MTCO ₂ e) | | | |
|--|--|----------------|----------------|----------------|
| | 2014 | 2020 | 2030 | 2050 |
| Building Energy | 137,305 | 120,610 | 45,157 | 51,206 |
| Water and Wastewater | 11,277 | 10,354 | 7,515 | 8,860 |
| Solid Waste | 83,086 | 28,074 | 28,304 | 29,111 |
| On-Road Vehicles | 125,711 | 107,539 | 80,894 | 81,822 |
| Offroad Vehicles and Equipment | 42,508 | 36,406 | 38,230 | 41,828 |
| Agriculture | 52,198 | 48,972 | 49,852 | 53,285 |
| Land Use Change | 7,626 | 38,777 | 14,084 | 6,098 |
| High GWP Gases | 13,481 | 11,828 | 13,169 | 15,867 |
| TOTAL | 484,226 | 402,560 | 277,206 | 288,076 |
| Percent below 2014 | | -17% | -43% | -41% |
| Additional Reductions Needed to meet State Targets (Surplus) (MTCO ₂ e) | | (48,312) | 6,683 | 197,902 |

Attachment 1

| # | Lead Agency | Sector | Community or Municipal | Measure Name | Measure Description | Annual GHG Reduction (MT CO ₂ 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 or ARB 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. Some vineyards may already be implementing this as part of their participation in Napa Green. This measure would apply to all crop types. | 1,617 | 1,708 | 1,915 |
| BE-1 | Napa County | Building Energy | Community | Work with PG&E 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). 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 |
| 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 1000 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 |

Attachment 1

| # | Lead Agency | Sector | Community or Municipal | Measure Name | Measure Description | Annual GHG Reduction (MT CO ₂ e) | | |
|------|-------------|---|------------------------|--|--|---|--------|--------|
| | | | | | | 2020 | 2030 | 2050 |
| BE-4 | Napa County | Building Energy | Community | Require compliance with CalGreen Tier 1 standards for all new construction | Require compliance with CalGreen Tier 1 Green Building standards (incl. Tier 1 building energy efficiency standards in Title 24, Part 6) as part of the County's building code. 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 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. With respect to water conservation standards under CalGreen, amend code to: -Incentivize installation of commercial and residential rainwater capture systems -Incentivize installation of commercial and residential gray water for discharge to irrigation applications -Require ultra-low flow fixtures and toilets in new construction | 479 | 725 | 1,613 |
| 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. | 4,048 | 1,501 | 1,586 |
| BE-6 | Napa County | Building Energy | Community | Require new or replacement water heating systems to be electrically powered or alternatively fueled (e.g., solar water heating) for all residential land uses, as feasible | 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, 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/ On-Road Transportation | 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 subject to residential acreage limits on agricultural land uses. | NA | NA | NA |
| 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 and buildings | 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 |

Attachment 1

| # | Lead Agency | Sector | Community or Municipal | Measure Name | Measure Description | Annual GHG Reduction (MT CO ₂ e) | | |
|-------|---------------------------------------|-----------------|------------------------|---|--|---|-------|-------|
| | | | | | | 2020 | 2030 | 2050 |
| BE-9 | Napa County | Building Energy | Community | Participate in and promote PACE financing options for existing residents and businesses | In 2015, Napa County Board of Supervisors motioned to adopt a resolution to allow for the inclusion of unincorporated properties in the Property Assessed Clean Energy (PACE) Financing program administered by Ygrene. PACE financing programs offer 100% financing and 0% down for energy efficiency upgrades in homes and businesses. Loans are paid back through property taxes over 20 years and may be tax deductible. Under this measure, the County allows for participation in the Ygrene programs and administer payback through property taxes, but would not be required to pay into the program. The County is also responsible for outreach to residents and businesses regarding the availability and benefits of PACE financing. Due to the variety of ways participants of this program may use funds from PACE financing, this measure is not quantifiable; however, Ygrene may monitor and report energy savings to the County based on actual participation in the program over time. (Ascent is currently working with Ygrene to explore the potential quantitative benefits of this program.) | NA | NA | NA |
| GHG-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 |
| GHG-2 | Napa County | Wastewater | Community | Support efforts to increase Napa Green Certified wineries and vineyards in the unincorporated County, with a goal of 100% certified by 2030 | 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 85% by 2030 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. | 1,774 | 5,718 | 5,718 |
| GHG-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 |

Attachment 1

| # | Lead Agency | Sector | Community or Municipal | Measure Name | Measure Description | Annual GHG Reduction (MT CO ₂ e) | | |
|------|--|-----------------|------------------------|---|---|---|--------|--------|
| | | | | | | 2020 | 2030 | 2050 |
| LU-1 | Napa County | Land Use Change | Community | Establish targets and enhanced programs for oak woodland preservation, mitigation, and voluntary replanting | Target planting 2,500 trees per year in the County to mitigate forecasted losses in oak woodlands due to land conversions. This target could be achieved by a combination of existing or enhanced volunteer replanting efforts (e.g., 5,000 Oaks Initiative), and ongoing enforcement and potential updates to the County's General Plan Policy CON-24 also calls for preservation of existing oak woodlands which and requires any loss in oak woodland to be replaced at a ratio of 2:1. The County could explore increasing the mitigation ratio beyond 2:1. General Plan Policy CON-24 and Action CON NR-7 also call for preservation of existing oak woodlands. 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. | 475 | 2,268 | 10,254 |
| LU-2 | Napa County | Land Use Change | Community | Refine protection guidelines for existing riparian lands | 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. <i>[Note: the coarse resolution of GIS mapping may have resulted in erroneously forecasting a slight loss in future riparian land.]</i> | 660 | 660 | 660 |
| MU-1 | 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 |
| SW-1 | Napa County/ Landfill Owners Operators | Solid Waste | Municipal | Reinstate or expand landfill gas capture or flaring at American Canyon and Clover Flat Landfills by 2020 | Incentivize and work with Recology American Canyon and Clover Flat Landfill, both of which are privately owned, to reinstate landfill gas (LFG) capture at American Canyon Landfill and improve or expand the landfill gas capture rates at Clover Flat Landfill, as feasible. This measure would reduce methane emissions from fugitive LFG from landfills located in the unincorporated county. LFG emissions from American Canyon and Clover Flat Landfills accounted for 73% of solid waste emissions in 2014 and would increase to 90% in 2050. According to the EPA, the American Canyon landfill gas capture project ended in 2013. Clover Flat currently operates a LFG capture system. The American Canyon Landfill currently accounts for 80% of emissions from landfills within the unincorporated county. However, by 2050, the closed American Canyon landfill would account for 54% of landfill emissions accounting for the reduction in organic matter. Methane emissions from Clover Flat Landfill would increase over the same period from 19% to 44% of total landfill methane emissions. | 33,092 | 27,094 | 18,161 |

Attachment 1

| # | Lead Agency | Sector | Community or Municipal | Measure Name | Measure Description | Annual GHG Reduction (MT CO ₂ e) | | |
|------|--|------------------------|------------------------|---|--|---|-------|-------|
| | | | | | | 2020 | 2030 | 2050 |
| SW-2 | Napa County/ Waste Management Companies | Solid Waste | Community | Meet an 80% Waste Diversion Goal by 2020 | <p>The goal of this measure is to meet an 80% waste diversion goal by 2020, exceeding the State's 75% waste diversion target by 5%. 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.</p> <p>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.</p> | 1,179 | 1,313 | 1,581 |
| TR-1 | NCTPA/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 | <p>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.</p> | 78 | 58 | 57 |
| TR-3 | NCTPA/Napa County | On-Road Transportation | Community | Increase affordable housing, especially workforce housing, in Napa County | <p>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. Vision 2040 predicts growth in low wage employment. Without affordable housing in the County, VMT from commuting would increase. This measure was identified in Vision 2040.</p> | 31 | 23 | 23 |

Attachment 1

| # | Lead Agency | Sector | Community or Municipal | Measure Name | Measure Description | Annual GHG Reduction (MT CO ₂ e) | | |
|------|-------------------|------------------------|------------------------|--|--|---|------|------|
| | | | | | | 2020 | 2030 | 2050 |
| TR-4 | NCTPA/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 incorporated 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 | NCTPA/Napa County | On-Road Transportation | Community | Support efforts of transit agencies to increase availability and accessibility of transit information | In coordination with NCTPA, work with Google and other online mapping services to provide up-to-date transit information. Currently, Google Maps does not provide transit information related to Vine or ferries. Improve overall availability and accessibility of transit information. Some efforts are already being made under NCTPA's Short-Range Transit Plan and Vision 2040. The following is the link to share transit data with Google: https://support.google.com/transitpartners/?hl=en#topic=3521043 | NA | NA | NA |
| TR-6 | Napa County | On-Road Transportation | Community | Support alternatives to private vehicle travel for visitors | Reduce visitor vehicle trips through improving access to available travel alternatives. These alternatives can include: -Offering winery travel trip route plans that reduce trips and VMT; -Providing information of public and private multi-modal options (bike tour, van tour, motorcycle tour, etc.); -Participating in an industry-wide transportation demand management program (such as a "hop-on hop-off" shuttle programs); and -Exploring driverless technology solutions, as they become available. 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. | NA | NA | NA |
| TR-7 | NCTPA/Napa County | On-Road Transportation | Community | Support NCTPA and Cities in developing transit oriented development unique to the needs of the Napa Region | Support the City of Napa 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). | NA | NA | NA |
| TR-8 | NCTPA/Napa County | On-Road Transportation | Community | Support interregional transit solutions | Support and work with NCTPA, 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 transit/rail connections to Sonoma and Solano Counties. 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 efforts are already being made under NCTPA's Short Range Transit Plan and Vision 2040. | NA | NA | NA |

Attachment 1

| # | Lead Agency | Sector | Community or Municipal | Measure Name | Measure Description | Annual GHG Reduction (MT CO ₂ e) | | |
|-------|-------------------|------------------------|------------------------|--|---|---|------|------|
| | | | | | | 2020 | 2030 | 2050 |
| TR-9 | NCTPA/Napa County | On-Road Transportation | Community | Support implementation of harvest season ride matching or ridesharing service pilot | According to the Napa County Travel behavior survey and other sources, vehicle travel is greatest in the County during the harvest season that peaks in September and October. Support NCTPA and work with local vineyards to provide information to employers and their employees on ridesharing or shuttle options to transport seasonal workers to and from their home. Consider implementing a pilot program, partnering with a local transportation provider, to provide these services. Success of this pilot could lead to better understanding of the effectiveness of ridesharing services during at other times of the year. | NA | NA | NA |
| TR-10 | NCTPA/Napa County | On-Road Transportation | Community | Work with Cities and neighboring regions to increase presence of park and ride facilities near residential centers | Work with Napa Cities, neighboring jurisdictions, and NCTPA to Install additional park and ride facilities near major residential centers. Currently, there are only two park and ride facilities in the County, one in Yountville and the other in the City of Napa. Another is planned for 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 NCTPA can promote installation of park and ride facilities in areas where most of those working in the County live. | NA | NA | NA |
| TR-11 | NCTPA/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 efforts are already being made under Vision 2040. | NA | NA | NA |
| TR-12 | NCTPA/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 |
| 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"> - 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). -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. -Banning outdoor car washing on certain days of the week -Providing educational material for residents and businesses on water conservation tips | NA | NA | NA |

Attachment 1

| # | Lead Agency | Sector | Community or Municipal | Measure Name | Measure Description | Annual GHG Reduction (MT CO ₂ 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 |

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| 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 |
| BE-1 | Work with PG&E 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 and Tier 1 building energy efficiency standards for eligible alterations or additions to existing buildings | Yes | Yes | Yes | Yes | Yes |
| BE-4 | Require compliance with CalGreen Tier 1 standards and Tier 1 building energy efficiency standards for all new construction | 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 water heating systems to be electrically powered or alternatively fueled (e.g., solar water heating) for all residential land uses, as feasible | Yes | No | No | No | Yes |
| BE-7 | Expand current renewable energy and green energy incentives | 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 and buildings | Yes | Yes | No | Yes | Yes |
| BE-9 | Participate in and promote PACE financing options for existing residents and businesses | Yes | Yes | Yes | Yes | Yes |
| GHG-1 | Work with other local jurisdictions within the County to develop a unified Climate Action Plan | Yes | Yes | Yes | Yes | Yes |
| GHG-2 | Support efforts to increase Napa Green Certified wineries and vineyards in the unincorporated County, with a goal of 100% certified by 2030 | Yes | Yes | Yes | Yes | 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> |
| GHG-3 | Promote the sale of locally grown foods and/or products | Yes | Yes | No | Yes | No |
| LU-1 | Establish targets and enhanced programs for oak woodland preservation, mitigation, and voluntary replanting | Yes | Yes | Yes | Yes | No |
| LU-2 | Refine protection guidelines for existing riparian lands | No | Yes | Yes | Yes | No |
| MU-1 | Select MCE's Deep Green Option for all County Facilities | Yes | No | No | No | Yes |
| SW-1 | Reinstate or expand landfill gas capture or flaring at American Canyon and Clover Flat Landfills by 2020 | No | No | No | No | Yes, if waste-to-energy technology is implemented. |
| SW-2 | Meet a 80% Waste Diversion Goal by 2020 | 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 | Improve visitor information availability on alternatives to private vehicle travel | Yes | No | No | Yes | Yes |
| TR-7 | Support NCTPA 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 | Support implementation of harvest season ride matching or ridesharing service pilot | Yes | No | No | Yes | 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> |
| TR-10 | Work with Cities and neighboring regions to increase presence of park and ride facilities near residential centers | 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 |
| WA-1 | Amend or revise water conservation regulations for landscape design | Yes | Yes | Yes | No | Yes |
| 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. |
| BE-1 | Work with PG&E 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. |
| BE-4 | Require compliance with CalGreen Tier 1 standards for all new construction | 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-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 water heating systems to be electrically powered or alternatively fueled (e.g., solar water heating) for all residential land uses, as feasible | 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. |
| BE-8 | Develop a program to allow new development to offset project GHG emissions by retrofitting existing income-qualified homes and buildings | Medium | Some costs to the County associated with program-level management | County Only | Requires County to establish a new program. |
| BE-9 | Participate in and promote PACE financing options for existing residents and businesses | Low | Minor costs associated with coordination with PACE financier and property tax administration. Some costs associated with promotion of program. | County and PACE financier | Requires County to allow residents and businesses to pay back PACE loans through property taxes. Requires some coordination with PACE financier (Ygrene Works). |
| GHG-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. |

| 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 |
| GHG-2 | Support efforts to increase Napa Green Certified wineries and vineyards in the unincorporated County, with a goal of 100% certified by 2030 | 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. |
| GHG-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 of promotion program or dedicated staff time to achieve measure goals. |
| LU-1 | Establish targets and enhanced programs for oak woodland preservation, mitigation, and voluntary replanting | Low | Costs associated with code enforcement and replanting efforts | County Only and volunteers | Requires updating code and enforcement of code and coordination with volunteer planting efforts to count toward replanting goal. |
| LU-2 | Refine protection guidelines for existing riparian lands | Low | Costs associated with code enforcement and protection efforts | County Only | Requires updating code and enforcement of code |
| MU-1 | 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. |
| SW-1 | Reinstate or expand landfill gas capture or flaring at American Canyon and Clover Flat Landfills by 2020 | Low | Some costs associated with coordination and monitoring. | County and Recology | Requires coordination with Recology American Canyon |
| SW-2 | Meet an 80% Waste Diversion Goal by 2020 | Medium | Some increased costs associated with promotion of waste reduction options (e.g. recycling, composting, reuse). | County Only | Requires increased County efforts to promote recycling, composting, and reuse of waste materials generated in the 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 |
| 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. |
| 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 NCTPA 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. |

| 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-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. |
| TR-9 | Support implementation of harvest season ride matching or ridesharing service pilot | 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 | Work with Cities and neighboring regions to increase presence of park and ride facilities near residential centers | 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. |

| 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-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. |
| 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. |

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| 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. |
| 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 for all new construction | 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 water heating systems to be electrically powered or alternatively fueled (e.g., solar water heating) for all residential land uses, as feasible | See separate calculation spreadsheet |
| GHG-2 | Support efforts to increase Napa Green Certified wineries and vineyards in the unincorporated County, with a goal of 100% certified by 2030 | 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. |
| LU-1 | Establish targets and enhanced programs for oak woodland preservation, mitigation, and voluntary replanting | Assumes 2,500 oak trees would be planted per year between 2015 and 2030, with 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. |
| MU-1 | Select MCE's Deep Green Option for all County Facilities | See separate calculation spreadsheet |

| Quantification Assumptions | | |
|----------------------------|--|--|
| # | Measure Name | Calculation Assumptions |
| SW-1 | Reinstate or expand landfill gas capture or flaring at American Canyon and Clover Flat Landfills by 2020 | Assumes a minimum 73% reduction in emissions from American Canyon Landfill in future years, based on minimum reductions assumed in CAPCOA measure AE-5 (flaring only). According to the EPA, the waste-to-energy project ended in 2013. See separate calculation spreadsheet. |
| SW-2 | Meet an 80% Waste Diversion Goal by 2020 | See separate calculation spreadsheet. |
| TR-1 | Update Transportation System Management Ordinance (for Employers) | Applies CAPCOA measures TRT-1/TRT-3/TRT-11 (Commute Trip Reduction measures) and TRT-2 (Commute 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. |

Reduction Measure Quantification

Building Energy Assumptions

| | 2020 | 2030 | 2050 |
|---|----------|----------|----------|
| Napa County Average Electricity Emissions Factor (MTCO _{2e} /MWh) | 1.29E-01 | 5.91E-02 | 5.58E-02 |
| Natural Gas Emissions Factor (MTCO _{2e} /therm) | | 0.00685 | |
| <i>Source: Final Technical Memorandum #1: 2014 Greenhouse Gas Emissions Inventory and Forecasts</i> | | | |

AG-2

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

Assume all diesel pumps are converted to electric

| | | | | |
|---|---------|--------------|--------------|--------------|
| Diesel Emission Factor (kg CO ₂ /gal) | 10.21 | | | |
| Calculated fuel use (gal) | 162,302 | 166,231 | 175,614 | 196,880 |
| Energy content of diesel (kBTU/gal) - lower heating value | 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 _{2e}) | | 0.38 | 0.18 | 0.19 |
| Net GHG Reduction from AG-2 (MTCO_{2e}) | | 1,696 | 1,792 | 2,009 |

AG-3

| Support use of electric or alternatively fueled agricultural equipment | 2014 | 2020 | 2030 | 2050 |
|---|--------|--------------|--------------|--------------|
| Emissions from Agricultural Equipment Except for Irrigation Pumps (MTCO _{2e}) | 31,571 | 32,336 | 34,161 | 38,297 |
| Percent of Equipment Converted to Electric or Alternative Fuel | | 5% | 5% | 5% |
| Net GHG Reduction from AG-3 (MTCO_{2e}) | | 1,617 | 1,708 | 1,915 |

| BE-3 | | | | |
|--|-------------|-------------|-------------|-------------|
| Require compliance with CalGreen Tier 1 Green Building standards for eligible alterations or additions to existing buildings | | 2020 | 2030 | 2050 |
| From Inventory Demographics Assumptions (Unincorporated County) | | | | |
| | 2014 | 2020 | 2030 | 2050 |
| 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 |
| <i>Source: Fehr and Peers 2015 (Technical Memorandum to Ascent dated November 5, 2015)</i> | | | | |
| 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 |
| Emissions savings per year (MTCO _{2e}) | | 13.05 | 11.24 | 12.67 |
| 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 |
| Emissions savings per year (MTCO _{2e}) | | 15.07 | 11.27 | 11.09 |
| GHG Reductions from BE-3 (MTCO_{2e}) | | 28 | 23 | 24 |

| BE-4 | | | | |
|---|-------------|-------------|-------------|-------------|
| Require compliance with CalGreen Tier 1 standards for all new construction | 2014 | 2020 | 2030 | 2050 |
| Forecast energy usage (w/o SB350) | | | | |
| <i>Electricity (kWh)</i> | 335,783,143 | 347,514,925 | 367,177,683 | 406,493,386 |
| <i>Natural Gas (therms)</i> | 12,436,372 | 12,862,448 | 13,576,170 | 15,001,030 |
| New Energy Use Only (w/o SB350) | | | | |
| <i>Electricity (kWh)</i> | | 11,731,782 | 31,394,540 | 70,710,243 |
| <i>Natural Gas (therms)</i> | | 426,076 | 1,139,798 | 2,564,658 |
| New Energy Use Only (w/ SB350) | | | | |
| <i>Electricity (kWh)</i> | | 8,446,883 | 15,697,270 | 35,355,121 |
| <i>Natural Gas (therms)</i> | | 306,775 | 569,899 | 1,282,329 |
| CalGreen Tier 1 Percent Reduction from standards from prior set of standards | | 15% | | |
| New Energy Use Only (w/ SB350 + CalGreen Tier 1) | | | | |
| <i>Electricity (kWh)</i> | | 7,179,851 | 13,342,680 | 30,051,853 |
| <i>Natural Gas (therms)</i> | | 260,758 | 484,414 | 1,089,980 |
| Energy Reductions | | | | |
| <i>Electricity (kWh)</i> | | 1,267,032 | 2,354,591 | 5,303,268 |
| <i>Natural Gas (therms)</i> | | 46,016 | 85,485 | 192,349 |
| Emissions Reductions (MTCO ₂ e) | | | | |
| <i>Electricity</i> | | 164 | 139 | 296 |
| <i>Natural Gas</i> | | 315 | 586 | 1,318 |
| GHG Reductions from BE-4 (MTCO ₂ e) | | 479 | 725 | 1,613 |
| BE-5 | | | | |
| 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) | | | | |
| BE-3 | | 54,307 | 54,307 | 54,307 |
| BE-4 | | 1,267,032 | 2,354,591 | 5,303,268 |
| BE-6 | | (3,630) | (2,386) | (2,411) |
| Adjusted County Electricity Use (kWh) | | 343,068,260 | 188,425,929 | 214,140,695 |
| Emissions from Electricity use under MCE/PGE (MTCO ₂ e) | | 44,298 | 11,142 | 11,941 |
| Emissions removed under Deep Green (MTCO ₂ e) | | 4,430 | 1,671 | 1,791 |
| 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 (MTCO ₂ e) | | 4,048 | 1,501 | 1,586 |

| BE-6 | | | | |
|--|--------------|-------------|-------------|-------------|
| Require new or replacement water heating systems to be electrically powered or alternatively fueled (e.g., solar water heating) for all residential land uses, as feasible | | 2020 | 2030 | 2050 |
| Percent of natural gas use in homes by end use in California | 2009 | | | |
| Space Heating | 25% | | | |
| Water Heating | 34% | | | |
| Cooking | 25% | | | |
| Other | 16% | | | |
| Water heating usage by fuel type | 2009 | | | |
| Natural Gas | 85% | | | |
| Electric | 11% | | | |
| Propane | 4% | | | |
| <i>Source: EIA 2009. http://www.eia.gov/consumption/residential/data/2009/</i> | | | | |
| Average age of natural gas water heater at replacement (years) | 13 | | | |
| Percent of current main water heaters by age | 2009 | 2020 | 2030 | 2050 |
| Less Than 2 Years | 16% | 0 | 100% | 100% |
| 2 to 4 Years | 16% | 0 | 100% | 100% |
| 5 to 9 Years | 30% | 50% | 100% | 100% |
| 10 to 14 Years | 18% | 100% | 100% | 100% |
| 15 to 19 Years | 7% | 100% | 100% | 100% |
| 20 Years or More | 14% | 100% | 100% | 100% |
| Annual Residential Natural Gas Use in Napa with Legislative Reductions (therms) | 2014 | 2020 | 2030 | 2050 |
| Savings from BE-3 (therms) | 3,809,649 | 3,937,389 | 2,245,464 | 2,679,159 |
| Adjusted Residential Natural Gas Use (therms) | | 3,936,212 | 2,244,231 | 2,677,815 |
| Natural Gas Savings from replacement of Existing Water Heaters | | | | |
| 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 |
| Natural Gas Savings from elimination of new Natural Gas water heaters | | | | |
| 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 |
| Assuming all natural gas replaced by electric water heaters (conservative) | | | | |
| 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 (MTCO2e) | | 3,630 | 2,386 | 2,411 |
| Net GHG Reductions from BE-6 (MTCO2e) | | 6,096 | 11,575 | 12,550 |

| GHG-2 | | | | |
|--|-----------|--------------|--------------|---------------|
| Support efforts to increase Napa Green Certified wineries and vineyards in the unincorporated County, with a goal of 100% certified by 2030 | 2014 | 2020 | 2030 | 2050 |
| Winery wastewater emissions (Napa Green Certified Wineries are assumed to have no waste water emissions) | 5,053 | 5,323 | 5,718 | 5,718 |
| Percent of Napa Green Certified Wineries under current projections | 40% | 40% | 40% | 40% |
| Percent of Napa Green Certified Wineries under GHG-2 | | 60% | 100% | 100% |
| GHG Reductions from GHG-2 (MTCO2e) | | 1,774 | 5,718 | 5,718 |
| LU-1 | | | | |
| Establish targets and enhanced programs for oak woodland preservation, mitigation, and voluntary replanting | 2014 | 2020 | 2030 | 2050 |
| SEE SEPARATE CALCULATION | | | | |
| GHG Reductions from LU-1 (MTCO2e) | | 475 | 2,268 | 10,254 |
| 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 |
| MU-1 | | | | |
| 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 (MTCO2e/MWh) | | 1.29E-01 | 5.15E-02 | 5.15E-02 |
| MCE Deep Green Emission Factors (MTCO2e/MWh) | | 0 | 0 | 0 |
| BAU Emissions Associated with Electricity Consumption at County Facilities (MTCO2e) | | 382.08 | 170.17 | 205.03 |
| Reduced Emissions Associated with Electricity Consumption at County Facilities (MTCO2e) | | - | - | - |
| GHG Reductions from MU-1 (MTCO2e) | | 382 | 170 | 205 |
| Additional GHG Reduction if County uses Deep Green at County facilities located within cities. | | 638 | 350 | 386 |

| SW-1 | | | | |
|--|--------|--------|--------|--------|
| Reinstate or expand landfill gas capture or flaring at American Canyon and Clover Flat Landfills by 2020 | 2014 | 2020 | 2030 | 2050 |
| Estimated methane emissions from American Canyon based on methane decomposition from closed landfill tonnage and age (MTCH4) | 2,044 | 1,813 | 1,485 | 995 |
| Forecasted emissions in MTCO2e | | 45,332 | 37,115 | 24,879 |
| Minimum percent reduction in landfill emissions due to flaring (using methodology from AE-5 in CAPCOA's GHG quantification guidance) | 73% | | | |
| GHG Reductions from SW-1 (MTCO2e) | | 33,092 | 27,094 | 18,161 |
| SW-2 | | | | |
| Meet an 80% Waste Diversion Goal by 2020 | 2014 | 2020 | 2030 | 2050 |
| Current Diversion Rate | 70% | | | |
| Target Diversion Rate | | 80% | 80% | 80% |
| Legislative-Adjusted Forecasted Solid Waste Emissions from American Canyon landfill | 19,961 | 3,537 | 3,938 | 4,744 |
| Reduced Solid Waste Emissions with New Diversion Rate | | 2,358 | 2,625 | 3,163 |
| GHG reductions from SW-2 (MTCO2e) | | 1,179 | 1,313 | 1,581 |

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| 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% |
| GHG reductions from TR-1 (MTCO2e) | 4,818 | 3,582 | 3,547 | |
| 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% |
| GHG reductions from TR-2 (MTCO2e) | 77.70 | 57.77 | 57.21 | |
| 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% |
| GHG reductions from TR-3 (MTCO2e) | 31.08 | 23.11 | 22.89 | |

| 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 (MTCO _{2e}) (Commuter Passenger Only) | 77,703 | 57,768 | 57,213 | |
| CAPCOA LUT-5 Minimum percent reduction in VMT from Increasing Transit Accessibility | 0.50% | | | |
| GHG reductions from TR-4 (MTCO _{2e}) | 388.52 | 288.84 | 286.06 | |

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

Forecasted Loss in Vegetation and Carbon Storage between 2015 and 2030*

| | Total change in acres between 2015 and 2030 | Total lost carbon storage between 2015 and 2030m (MT C) | Total lost carbon storage between 2015 and 2030 (MT CO ₂ e) |
|---------------------------|---|---|--|
| Coniferous Forest | -288 | -22,712 | -83,277 |
| Croplands (Not Vineyards) | -2,896 | -6,582 | -24,136 |
| Grasslands | -3,571 | -9,146 | -33,537 |
| Oak Woodlands | -908 | -27,142 | -99,522 |
| Riparian Woodlands | -37 | -2,872 | -10,532 |
| Shrublands | -2,661 | -34,076 | -124,946 |
| Vineyards | 6,848 | 8,314 | 30,483 |
| Wetlands | -232 | -780 | -2,859 |
| Grand Total | -3,746 | -94,998 | -348,325 |

* 2030 is the build-out date of the Napa County general plan. Losses beyond 2030 are unknown at this time.

| Tree Density Calculation | Value | Source |
|---|-------|--|
| Oak Woodlands Carbon Storage per Acre (MT C/acre) | 29.5 | EPA 2015: U.S. EPA. 2010. 2010 U.S. Greenhouse Gas Inventory Report - Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (Annex 3) |
| Assumed average diameter at breast height (dbh) of existing oak woodland (in) | 28.9 | Steinberg, Peter D. 2002. Quercus agrifolia. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/plants/tree/queagr/all.html |
| USFS Tree Carbon Calculator: MT C stored per tree for average oak tree (requires dbh) | 8.2 | USFS 2016: http://www.fs.usda.gov/ccrc/tools/tree-carbon-calculator-ctcc |
| Calculated Tree Density per acre (Trees per acre) | 4 | Calculated |

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

| Calculation of Equivalent New Tree Planting to Offset Lost Carbon Storage/Sequestration | |
|--|--------|
| Total loss in oak woodland acres between 2015 and 2030 (acres) | 908 |
| Number of trees lost between 2015 and 2030 (trees) | 3,268 |
| Number of trees planted between 2015 and 2030 to meet 2:1 replacement policy. (trees) | 6,536 |
| Number of trees planted per year between 2015 and 2030 to meet 2:1 replacement policy. (trees) | 436 |
| Total loss in oak woodland carbon storage between 2015 and 2030 (MT C) | 26,756 |
| Total loss in oak woodland carbon storage between 2015 and 2030 (MT CO ₂) | 99,522 |
| Number of trees required to be planted per year to offset lost carbon storage. (trees) | 2,500 |
| Mortality Rate (%) | 20% |
| Actual number of surviving trees per year (trees) | 2,000 |
| Year by which lost carbon storage would be offset | 2046 |

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

Tree Carbon Calculator Results

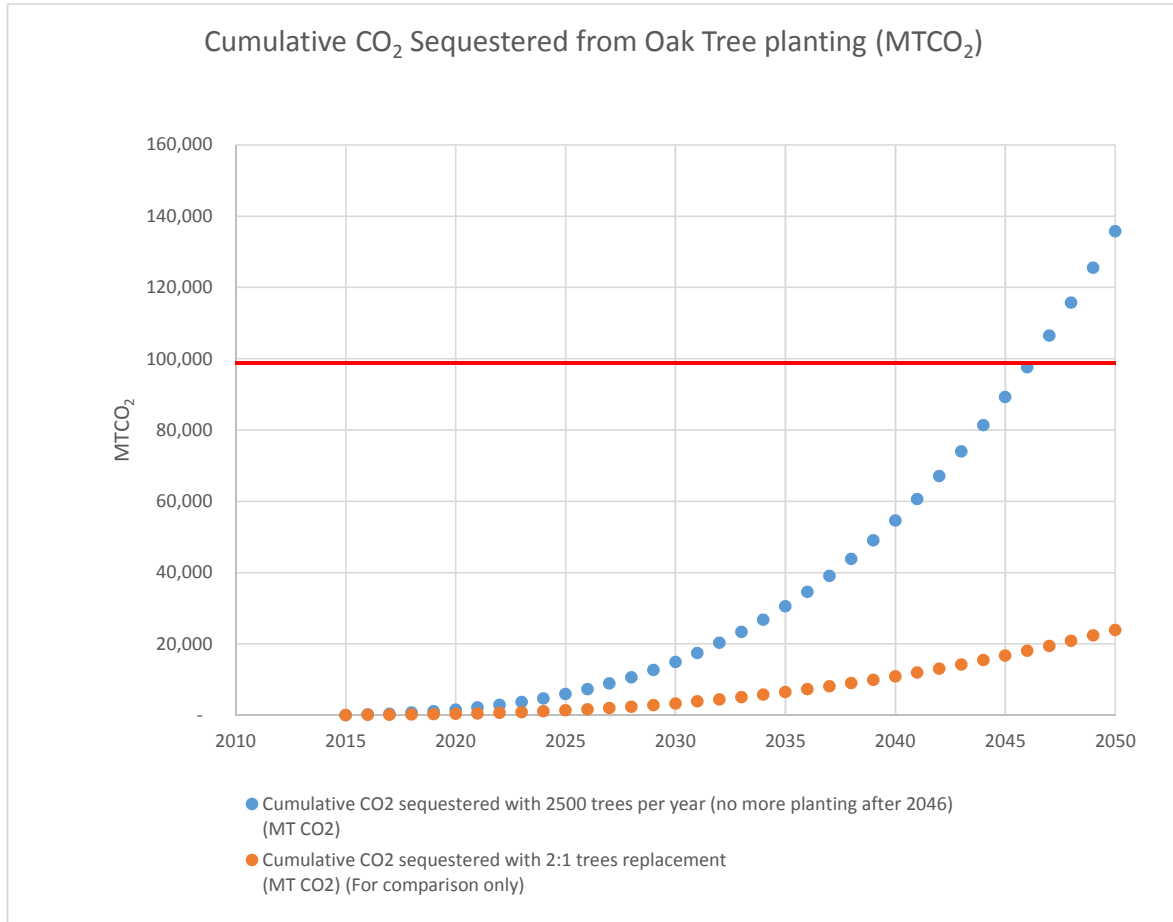
| Tree Age for Quercus Agrifolia (years) | CO ₂ Sequestration (kg/tree) | Total CO ₂ Stored (kg/tree) |
|---|--|---|
| 1 | 2 | 2 |
| 2 | 25 | 75 |
| 3 | 31 | 106 |
| 4 | 37 | 143 |
| 5 | 44 | 187 |
| 6 | 50 | 237 |
| 7 | 57 | 295 |
| 8 | 64 | 359 |
| 9 | 71 | 430 |
| 10 | 78 | 508 |
| 11 | 86 | 594 |
| 12 | 93 | 687 |
| 13 | 100 | 787 |
| 14 | 108 | 895 |
| 15 | 116 | 1011 |
| 16 | 123 | 1134 |
| 17 | 131 | 1265 |
| 18 | 139 | 1404 |
| 19 | 147 | 1550 |
| 20 | 154 | 1705 |
| 21 | 162 | 1867 |
| 22 | 170 | 2038 |
| 23 | 178 | 2216 |
| 24 | 186 | 2402 |
| 25 | 194 | 2597 |
| 26 | 202 | 2799 |
| 27 | 210 | 3009 |
| 28 | 219 | 3228 |
| 29 | 227 | 3455 |
| 30 | 235 | 3690 |
| 31 | 243 | 3933 |
| 32 | 251 | 4184 |
| 33 | 259 | 4443 |
| 34 | 268 | 4711 |
| 35 | 276 | 4986 |
| 36 | 284 | 5270 |

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

Cumulative Carbon Storage

| Year | Cumulative CO2 sequestered with 2500 trees per year (no more planting after 2046) (MT CO2) | Cumulative CO2 sequestered with 2:1 trees replacement (MT CO2) (For comparison only) | Annual Sequestration (MTCO2/year) |
|------|--|--|-----------------------------------|
| 2015 | 4 | 1 | |
| 2016 | 154 | 33 | 150 |
| 2017 | 366 | 80 | 212 |
| 2018 | 652 | 142 | 287 |
| 2019 | 1,026 | 224 | 374 |
| 2020 | 1,501 | 327 | 475 |
| 2021 | 2,090 | 455 | 589 |
| 2022 | 2,808 | 612 | 717 |
| 2023 | 3,667 | 799 | 860 |
| 2024 | 4,684 | 1,020 | 1,016 |
| 2025 | 5,871 | 1,279 | 1,188 |
| 2026 | 7,245 | 1,578 | 1,374 |
| 2027 | 8,819 | 1,921 | 1,574 |
| 2028 | 10,610 | 2,311 | 1,790 |
| 2029 | 12,631 | 2,752 | 2,022 |
| 2030 | 14,899 | 3,246 | 2,268 |
| 2031 | 17,429 | 3,796 | 2,530 |
| 2032 | 20,237 | 4,375 | 2,808 |
| 2033 | 23,338 | 5,005 | 3,101 |
| 2034 | 26,747 | 5,685 | 3,410 |
| 2035 | 30,482 | 6,417 | 3,734 |
| 2036 | 34,557 | 7,201 | 4,075 |
| 2037 | 38,989 | 8,039 | 4,432 |
| 2038 | 43,793 | 8,929 | 4,804 |
| 2039 | 48,986 | 9,873 | 5,193 |
| 2040 | 54,584 | 10,871 | 5,598 |
| 2041 | 60,603 | 11,924 | 6,019 |
| 2042 | 67,059 | 13,031 | 6,456 |
| 2043 | 73,968 | 14,193 | 6,909 |
| 2044 | 81,347 | 15,411 | 7,379 |
| 2045 | 89,213 | 16,684 | 7,865 |
| 2046 | 97,580 | 18,013 | 8,368 |
| 2047 | 106,463 | 19,397 | 8,882 |
| 2048 | 115,734 | 20,838 | 9,271 |
| 2049 | 125,495 | 22,335 | 9,761 |
| 2050 | 135,748 | 23,889 | 10,254 |

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



Red line indicates anticipated cumulative loss in carbon storage from forecasted loss in oak woodlands between 2015 and 2030

| GHG Reduction Target Calculations | | |
|--|--|-----------------------------|
| Year | State Emissions (million metric tons of CO₂ 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 |
| State Targets | | Applicable Rule |
| 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 |
| Equivalent State Targets for Reduction below 2014 | | Applicable Rule |
| 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 (http://www.arb.ca.gov/cc/inventory/data/data.htm), (2) DOF 2015 (http://www.dof.ca.gov/research/demographic/reports/estimates/e-7/view.php) | | |

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| 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 |

Attachment 1

| 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 |

| Legislative Reductions and Existing Programs | | | | | |
|--|-------------|------------------------------------|--|------------------------|----------------------------------|
| Lead Agency | Sector | Measure Name | Measure Description | Current or Recommended | Included in Inventory Forecasts? |
| 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 |
| 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 |